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March 7, 2017

Jason R. Hade, Planner III
Planning, Building & Environmental Services Department
1195 Third Street, Suite 210
Napa, CA 94559

Re: Draft Climate Action Plan

Planner Hade:

The Quercus Group appreciates the opportunity to submit draft Climate Action Plan (CAP) comments on behalf of Napa Vision 2050. Napa Vision 2050 looks forward to actively participating in the evolving development of Napa County's CAP.

Review of the CAP finds that the project fails to comprehensively analyze or feasibly mitigate anthropogenic and biogenic direct/indirect greenhouse gas (GHG) emissions pursuant to CEQA requirements. Specifically, the failure to fully account for the foreseeable carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), black carbon and hydrofluorocarbon emission effects associated with land use change/wine industry operations.

Governor Brown

"We must also reduce the relentless release of methane, black carbon and other potent pollutants across industries. And we must manage farm and rangelands, forests and wetlands so they can store carbon." January 2015 inaugural address regarding the state's greenhouse gas reduction goals for the next 15 years.

Natural Lands[1] Conversion Emissions

The 2008 California Air Resources Board (ARB) AB 32 Scoping Plan recognized the significant contribution that natural lands carbon sequestration will make in meeting the state's GHG emission reduction goals: "This plan also acknowledges the important role of terrestrial sequestration in our forests, rangelands, wetlands, and other land resources." When these natural lands are impacted due to land use change potentially five GHGs are directly or indirectly released into the atmosphere.

The limitations of the Intergovernmental Panel on Climate Change (IPCC) land use change general default standards are clearly displayed (IPCC 2006a, etc.) in the CAP. These generic IPCC default standards are applied indiscriminately worldwide. This one size fits all approach doesn't reflect California's diverse natural lands and fails to account for CEQA site-specific requirements or other pertinent state GHG policies/laws. In fact the only IPCC general default standards applicable to California natural lands are the international GHG global warming potential (GWP) values established by the 2013 IPCC Fifth Assessment Report. Napa County is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD) which has adopted the 2013 IPCC GWP factors.[2] See Attachment A for detailed regulatory and GWP values comment.

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[1] "Natural lands" as defined by Public Resources Code Section 9001.5 (2016).

[2] BAAQMD May 26, 2016 letter from Jack P. Broadbent, Executive Officer/APCO to Richard Corey, Executive Officer, California Air Resources Board regarding ARB Short-Lived Climate Pollutants Strategy, p. 2.

- Please provide the following project information:

1. Justify CAP use of the 2007 IPCC Fourth Assessment Report GWP values in lieu of the current BAAQMD GWP standards for calculating CH_4, N_2O, black carbon and hydrofluorocarbon emissions.

CEQA § 15364.5 states that "Greenhouse gas" or "greenhouse gases" includes but is not limited to: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. In 2016 Senate Bill 1383 designated methane, black carbon and hydrofluorocarbon short-lived climate pollutants. Neither the 2009 CEQA GHG amendments nor the enabling legislation Senate Bill 97 mention the term "carbon sequestration." CEQA's focus is "*the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions*." Further, the CAP must explain how the GHG mitigation proposals result in less than significant GHG emissions consistent with state 2020, 2030 and 2050 GHG reduction targets.

Upon the disposal of impacted vegetation, the decomposition of biomass does in all cases result in CO_2 and CH_4 biogenic emissions and the combustion of biomass does in all cases result in CO_2, CH_4, N_2O and black carbon biogenic emissions (Attachment B). CEQA doesn't differentiate between anthropogenic and biogenic GHG emissions. The following 2009 Natural Resources Agency response to the California Wastewater Climate Change Group proves the point:

Response 95-1: "Regarding the comment that the Guidelines should distinguish between anthropogenic and biogenic carbon dioxide emissions, the Natural Resources Agency notes that SB 97 did not distinguish between the sources of greenhouse gas emissions. Thus, it would not be appropriate for the Natural Resources Agency to treat the different categories of emissions differently absent a legislative intent that the Guidelines do so. Neither AB 32 nor the Air Resources Board's Scoping Plan distinguishes between biogenic and anthropogenic sources of greenhouse gas emissions. On the contrary, the Scoping Plan identifies methane from, among other sources, organic wastes decomposing in landfills as a source of emissions that should be controlled. (Scoping Plan, at pp. 62-63)."

CAP Carbon Stocks and Sequestration Rates

Table 16 - Presents the per-acre carbon sequestration and storage factors that were derived for region-specific tree densities and species and collected from various sources .... Changes in land use patterns do not immediately change soil carbon levels. Instead, changes to soil carbon may be gradual, while change in land use patterns would have immediate impacts on aboveground and some belowground biomass. As such, soil carbon is not included in this analysis (CAP Tech Memo #1, pp. 21, 22).

Comment 1: The memo Table 16 terrestrial carbon figures are incorrect. See Attachment C for the true Table 16 per-acre carbon stocking and annual net sequestration rates for unincorporated Napa County. Soil organic carbon (SOC) is a measure of the carbon contained within soil organic matter. Typically, the SOC stocking profile extends to a depth of one and a half meters.[3] According to the latest literature, ground disturbing activities generally release 25-30 percent of the SOC stocks into the atmosphere.

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[3] USDA Natural Resources Conservation Service. 2016. *Gridded Soil Survey Geographic (gSSURGO) Database*. Version 2.2. USDA-NRCS Soil Science Division. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=NRCS142P2_053628.

Forest Land Emissions

LU-1 - Establish targets and enhanced programs for oak woodland and coniferous forest preservation and mandatory replanting .... The measure was revised to prioritize tree preservation along with mandatory tree replanting. The revised measure targets a 30 percent preservation rate for all development projects. Replanting would then be required based on the County's current 2:1 replacement ratio stated in General Plan policy CON-24, with the assumed rate of replacement being up to 2,500 trees per year due limited County resources, staffing, and available land for replanting.

Comment 2: These proposed measures are incoherent. Napa County has no authority over coniferous timberland. The number of oak woodland mitigation trees planted is dependent on the total GHG biogenic emissions associated with the impacted woodland. Thus mitigation replacements ratios can't be predetermined. County staffing and resources aren't relevant to the applicant's responsibility to feasibly and proportionally mitigate project GHG biogenic emissions. Also, there is plenty of land in Napa County available to plant trees off-site if necessary.

The appropriate means to feasibly and proportionally mitigate forest land conversion GHG biogenic emissions is by planting/maintaining the requisite number of native woodland trees in Napa County to reduce forest conversion emissions 80 percent by 2050. Further, planted native trees would improve soil carbon stocking over time and provide wildlife habitat.

To accurately and fully account for forest land conversion GHG biogenic emissions the total biomass weight[4] of the impacted overstory/understory vegetation must be known, the means of biomass disposal identified and the soil organic carbon emissions calculated. The Forest Service, Forest Inventory Data Online (FIDO)[5] 2011-2015 dataset estimates Napa County oak woodlands stocking to be ±70 trees per acre ≥3 inches diameter at breast height. Three inches dbh is the tree size standard established by the state's Climate Action Reserve Forest Project Protocol to measure countable tree carbon stocks.

- Please provide the following forest land conversion information:

1. What is the estimated total biomass weight of the impacted overstory and understory vegetation by 2020, 2030 and 2050?

2. What are the estimated biomass decomposition CO_2 and CH_4 emissions by 2020, 2030 and 2050?

3. What are the estimated biomass combustion CO_2, CH_4, N_2O and black carbon emissions by 2020, 2030 and 2050?

4. Due to the transport of disposed biomass off-site, what are the estimated CO_2, CH_4, N_2O, black carbon and hydrofluorocarbon emissions by 2020, 2030 and 2050?[6]

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[4] EPA/USDA FS, 2015. Forest Biomass Components: https://cfpub.epa.gov/roe/indicator_pdf.cfm?i=86.

[5] FIDO 2011-2015 dataset: https://apps.fs.fed.us/fia/fido/index.html.

[6] SB 1383 requires: (1) a 50 percent statewide reduction in black carbon emissions and a 40 percent reduction in methane/hydrofluorocarbon emissions from 2013 levels by 2030; (2) a 50 percent reduction in the level of the statewide disposal of organic waste in landfills from the 2014 level by 2020 and a 75 percent reduction from the 2014 level by 2025. The 2016 ARB Short-Lived Climate Pollutants Strategy lists on-road brake/tire (2%), on-road gasoline (2%) and on-road diesel (18%) as transportation sources of black carbon emissions. http://www.arb.ca.gov/cc/shortlived/meetings/04112016/appendixa.pdf.

5. Explain how the proposed mitigation is consistent with SB 1383 2030 reduction requirements regarding methane, black carbon, hydrofluorocarbon emissions and landfill organic waste disposal.

6. By soil series, what are the estimated SOC CO_2 biogenic emissions associated with ground disturbing activities by 2020, 2030 and 2050?

Other Natural Lands Emissions

Comment 3: Other natural lands vegetation types within the CAP geographical area, include California annual grassland, scrub chaparral, chamise chaparral, riparian woodland, etc.

- Please provide the following non-forest land vegetation type and soil series conversion information:

1. By vegetation type, what is the total biomass weight of the impacted vegetation by 2020, 2030 and 2050?

2. By vegetation type, what are the estimated biomass decomposition CO_2 and CH_4 biogenic emissions by 2020, 2030 and 2050?

3. By vegetation type, what are the estimated biomass combustion CO_2, CH_4, N_2O and black carbon biogenic emissions by 2020, 2030 and 2050?

4. Due to the transport of disposed biomass off-site, what are the estimated CO_2, CH_4, N_2O, black carbon and hydrofluorocarbon emissions by 2020, 2030 and 2050?

5. Explain how the proposed mitigation is consistent with SB 1383 2030 reduction requirements regarding methane, black carbon, hydrofluorocarbon emissions and landfill organic waste disposal.

6. By soil series, what are the estimated SOC CO_2 biogenic emissions associated with ground disturbing activities by 2020, 2030 and 2050?

Wetland Emissions

Table 17 - "Other" refers to wetlands and non-vegetative land uses such as developed areas and rock outcrops ... Carbon sequestrations and storage potential of wetlands vary greatly depending on location, ecosystem, and other factors. Factors for wetlands unique to Napa County are not available and were assumed to be zero (CAP Tech Memo #1, p. 23).

Comment 4: Napa County wetlands are major carbon sinks (Attachment C). Impacted wetlands carbon sequestration rates can take decades or longer to replicate through replacement mitigation. In general, Ambrose et al. (2007) found that the primary state and federal wetland protection programs have been generating more wetlands of lower quality than the wetlands they allowed to be destroyed. CEQA GHG biogenic emissions analysis applies to *all* California wetlands, not just those wetlands designated waters of the United States and including wetlands on <5 percent grade.

- Please provide the following wetlands conversion information:

1. By wetland type, what are the estimated vegetation CO_2, CH_4 and N_2O and black carbon biogenic emissions associated with impacts to all project area wetlands by 2020, 2030 and 2050?

2. By wetland type, what are the estimated soil CO_2 biogenic emissions associated with impacts to all project area wetlands by 2020, 2030 and 2050?

3. By wetland type, what are the estimated carbon sequestration rates (i.e. metric tonnes carbon per acre per year) for the replacement mitigation by 2020, 2030 and 2050? Please provide regional data to support the findings.

4. Due to the transport of disposed biomass off-site, what are the estimated CO_2, CH_4, N_2O, black carbon and hydrofluorocarbon emissions by 2020, 2030 and 2050?

5. Explain how the proposed mitigation is consistent with SB 1383 2030 reduction requirements regarding methane, black carbon, hydrofluorocarbon emissions and landfill organic waste disposal.

Wine Industry GHG Emissions

Significant winemaking GHG biogenic emissions during the fermentation process[7] and from the disposal of grape pomace (skins, pulp, seeds, stems and other winemaking residue). In general, grapes consist of clear juice (80%), skins (8%), seeds (4.5%), pulp (4.5%) and stems (3%).[8] The annual vineyard vine clippings that are open burned generate substantial GHG emissions. Vineyard deep ripping releases soil CO_2 emissions and replanting results in significant biomass decomposition and combustion GHG biogenic emissions.

Winery Emissions

In 2014 Napa County vineyards produced 174,000 tons of grapes. Additionally, Napa County wineries import large quantities of wine grapes. The subsequent winemaking processes result in significant GHG biogenic emissions that have not been fully accounted for by the CAP. Beyond the CAP 2014 inventory data in 2015, 2016 and thus far in 2017 Napa County has approved many winery applications for new or increased wine production. Many more such applications are listed on the Planning Department current projects page.

Fermentation Emissions

Comment 5: When the sugar in grapes is fermented, it converts into almost equal quantities of ethanol and carbon dioxide.

- Please provide the following winery fermentation biogenic emissions information:

1. Including 2015, 2016 and 2017 approved winery production increases, what are the estimated winery fermentation CO_2 biogenic emissions by 2020, 2030 and 2050?

Grape Pomace

Comment 6: Processing 174,000 tons of local grapes, plus imported grapes, results in a large quantity of grape pomace, with disposal an important environmental consideration due to high-methane emissions.

- Please provide the following grape pomace disposal biogenic emissions information:

1. What are the estimated winery grape pomace disposal CO_2 and CH_4 biogenic emissions by 2020, 2030 and 2050?

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[7] Winegrape fermentation siphons off approximately 20% of grape biomass carbon.

[8] New Zealand Institute of Chemistry. 2015. *The Chemistry in Winemaking.* nzic.org.nz/ChemProcesses/food/6B.pdf.

2. Due to the transport of disposed grape pomace off-site, what are the estimated CO_2, CH_4, N_2O, black carbon and hydrofluorocarbon emissions by 2020, 2030 and 2050?

3. Explain how the proposed mitigation is consistent with SB 1383 2030 reduction requirements regarding methane, black carbon, hydrofluorocarbon emissions and landfill organic waste disposal.

Visitation Emissions

Already high-visitor numbers are expected to steadily increase in the future.

- Please provide the following visitation transportation emissions information:

1. Including 2015, 2016, 2017 event center approvals and potential helicopter air taxi services, what are the estimated visitation CO_2, CH_4, N_2O, black carbon and hydrofluorocarbon emissions by 2020, 2030 and 2050?

2. Explain how the proposed mitigation is consistent with SB 1383 2030 reduction requirements regarding methane, black carbon and hydrofluorocarbon emissions.

Wastewater

Table 6 - Estimates only account for winery wastewater sent to off-site treatment facilities and assumes those facilities use aerobic systems. On-site treatment of wastewater is not accounted for here because it is generally aerobically treated on-site and would not generate significant CH_4 emissions (Tech Memo #1, p. 10).

Comment 7: Napa Valley Register - "With hundreds of wineries in Napa County producing millions of gallons of dense water that is too thin to be processed with fat and grease waste and too thick to be sent down the drain without incurring high fees, the problem has led to more than 12,000 truckloads of wastewater being driven to Oakland's sewage treatment plant each year ... Each year, more than 74 million gallons of winery wastewater leaves the city in trucks and is driven some 40 miles south to East Bay MUD, a facility that is glad to accept the untreated waste because it can turn it into energy, statistics show" (Attachment D).

Napa County has approved significant winery production capacity since 2014 and these increases are likely to continue into the future. Under current circumstances so will the annual number of truckloads of winery wastewater being driven to Oakland. Napa County does not own or operate any wastewater treatment plants. This fact demonstrates that the county has no authority to directly reduce winery wastewater GHG biogenic emissions now or in the future. If winery wastewater GHG reductions are not possible then Napa County must gain greater reductions from other GHG emission sources located within the unincorporated county such as winemaking, visitation and natural lands conversion.

The assumption equating the state of the art capabilities of the EBMUD wastewater treatment facility to Napa Sanitation or on-site wastewater treatment hasn't been proven by the CAP. Although EBMUD wastewater generated electricity is classified as renewable energy that does not mean it is GHG emissions free. Moreover, roughly half of atmospheric black carbon comes from fossil fuel combustion and the other half from biomass/biofuel burning.[9]

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[9] Biofuels are fuels produced directly or indirectly from organic material.

- Please provide the following winery wastewater biogenic/transportation emissions information:

1. Due to the 84-mile round trip transporting Napa County winery wastewater to Oakland, how many metric tonnes of CO_2, CH_4, N_2O, black carbon and hydrofluorocarbon emissions are projected by 2020, 2030 and 2050?

2. Explain how the proposed mitigation is consistent with SB 1383 2030 reduction requirements regarding methane, black carbon and hydrofluorocarbon emissions.

3. Provide measured data documentation that EBMUD treatment of Napa County winery wastewater results in no significant direct or indirect GHG emissions, including from electricity generation.

4. Provide measured data documentation that Napa Sanitation treatment of winery wastewater, including effluent fields, results in no significant direct or indirect GHG emissions.

5. Provide measured data documentation that on-site treatment of winery wastewater, including effluent fields, results in no significant direct or indirect GHG emissions.

Vineyard Emissions

Science Magazine - "They interviewed [wine grape] growers and modeled 240 different production scenarios based on the variations. On average, they found that—per unit weight—wine grapes cultivated in Napa Valley require roughly twice as much energy and water as those in Lodi, while producing twice the carbon emissions. They attribute Napa's higher environmental burden in part to its ... common practice of reducing the number of grapes on each vine to control sugar content and boost flavor."[10]

Comment 8: Napa County vineyards commonly implement heavy fruit thinning to remove 30 to 50 percent of the grape clusters annually for quality purposes. Based on a 174,000 ton harvest this annual biomass thinning rate would yield significant CO_2 and CH_4 biogenic emissions.

- Please provide the following annual vineyard grape cluster thinning biogenic emissions information:

1. Due to annual vineyard grape cluster thinning, how many metric tonnes of CO_2 and CH_4 biogenic emissions are estimated by 2020, 2030 and 2050?

Replanting Emissions

Comment 9: Napa County vineyards are replanted every 25 to 30 years resulting in substantial biomass removal and soil disturbance. Until recently vineyard replanting has been in the range of 900 to 1,600 vines per acre. New vineyards with sufficient financial and water resources are currently planting up to 2,900 vines per acre, indicating future replanting GHG biogenic emissions would be much higher than those of the past.

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[10] *Life cycle greenhouse gas, energy, and water assessment of wine grape production in California*. The International Journal of Life Cycle Assessment, September 2015, Volume 20, Issue 9, pp. 1243-1253.

- Please provide the following vineyard replanting biogenic emissions information:

1. Factoring high-density vineyard replanting practices, how many metric tonnes of CO_2, CH_4 and black carbon biogenic emissions are estimated by 2020, 2030 and 2050?

2. Due to the transport of disposed biomass off-site, what are the estimated CO_2, CH_4, N_2O, black carbon and hydrofluorocarbon emissions by 2020, 2030 and 2050?

3. Explain how the proposed mitigation is consistent with SB 1383 2030 reduction requirements regarding methane, black carbon, hydrofluorocarbon emissions and landfill organic waste disposal.

Open Burning Emissions

LU-3 - Repurpose or otherwise prevent burning of removed trees and other woody material from land use conversions of oak woodlands and coniferous forests .... Under this measure, the County would require a minimum of 80 percent of total removed weight of trees to be repurposed, buried, chipped, or otherwise prevented from burning.

In Napa County, over 102,000 cubic yards, or 82 percent, of material openly burned in Napa County consisted of discarded grapevines (Reed pers. comm., 2016)" (Memo #1, p. 19) .... AG 1 - 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.

Comment 10: While acknowledging that over 102,000 cubic yards of vineyard residue are burned annually, Table 13 (p. 18) erroneously claims that only 533 $MTCO_2$/yr, 10 $MTCH_4$/yr, 1 MTN_2O/yr and no black carbon biogenic emissions will result. Quercus Group estimates 102,000 cubic yards of vineyard residue produces 19,500 MT of carbon stocks burned per year (102,000 yd3 = 78,000 m3 = 38,992 tons = 19,496 t/C).

Whether Napa County or the BAAQMD have direct jurisdiction over agriculture open burning isn't relevant concerning the requirement for the CAP to fully estimate and feasibly mitigate foreseeable vineyard CO_2, CH_4, N_2O and black carbon biogenic emissions. According to the ARB agricultural burning releases more black carbon into the atmosphere than on-road gasoline black carbon emissions.[11] Open burning produces five to ten percent CH_4.[12] The high nitrogen and water contents of many crop residues mean that the burning of such material can produce a relatively high percentage (around 1 percent) emitted as nitrous oxide.[13] Open burning black carbon emissions are substantial.

A comprehensive GHG biogenic emissions analysis regarding agricultural open burning must be accompanied by specific, timely and feasible mitigation actions on the part of Napa County, in collaboration with the wine industry, to lessen vineyard combustion GHG biogenic emissions consistent with the state 2020, 2030 and 2050 GHG reduction targets. If agriculture open burning GHG reductions are not possible then Napa County must gain greater reductions from other GHG emission sources located within the unincorporated county such as winemaking, visitation and natural lands conversion.

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[11] ARB Short-Lived Climate Pollutants Strategy. 2016.

[12] Macpherson Energy Corporation. 2014. http://macphersonenergy.com/mt-poso-conversion.html.

[13] GreenHouse Gas Online. 2016. http://www.ghgonline.org/nitrousbioburn.htm.

- Please provide the following open burning biogenic emissions information:

1. By open burning source, how many metric tonnes of CO_2, CH_4, N_2O and black carbon biogenic emissions are estimated by 2020, 2030 and 2050?

2. Explain how the mitigation is consistent with SB 1383 2030 reduction requirements regarding methane and black carbon emissions.

Municipal Solid Waste Emissions
SW-1 - This measure was reworked to focus on the GHG reduction potential of expanding composting programs in the County. Composted organics typically involve aerobic decomposition which emits less methane emissions than the same amount of organics anaerobically decomposing in an enclosed landfill.

Comment 11: The CAP assertion that composting methane emissions are less than those from Napa County controlled landfills is specious (Attachment B). In fact composting methane emissions are very high. Nevertheless California landfills are the second largest source of methane emissions, accounting for 20 percent of statewide emissions (ARB 2016). Notably, the 2010 California Air Pollution Control Officers Association (CAPCOA) 73 percent minimum default reduction in emissions standard greatly overstates actual landfill methane (LFG) capture rates in California. The best available science has set a far lower LFG capture rate than CAPCOA: "A study of landfills in California compared predicted and actual gas generation across 35 landfills (Themelis and Ulloa, (2007)). Efficiency (actual gas collected/predicted gas produced) ranged from 6 to 100 percent with an average efficiency of 35 percent."[14] The IPCC generic default landfill gas collection baseline efficiency range is only 40-50 percent.

Themelis and Ulloa noted that, "it can be assumed that, under the right conditions, at least 50% of the 'latent' methane in MSW can be generated within one year of residence time in a landfill, while the landfilled area is not capped and rainfall can penetrate into the landfilled mass." A straightforward way to avoid this CAP LFG uncertainty is to focus the GHG biogenic analysis on the period of the landfill cell where no gas collection systems are in operation. This restricts the GHG analysis to highly putrescible materials and reduces uncertainty on gas collection efficiency.

Confirming the 2007 Themelis and Ulloa findings, a 2017 Berkeley Labs study found that methane emissions are about 1.8 times what the Bay Area Air Quality Management District has estimated.[15] The study results had a 95 percent confidence level that methane emissions are 1.3 to 2.3 times the inventory. Approximately 82 percent of the increase is from biological sources, most likely from landfills and 17 percent from fossil fuel sources. The results were obtained by combining measurements of air samples from six towers in and around the Bay Area with calculations based on atmospheric transport models.

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[14] Climate Action Reserve. 2009. *Issue Paper: Methane Avoidance from Composing*, p. 40. http://www.climateactionreserve.org/how/future-protocol-development/issue-papers/.

[15] Seongeun Jeong et al. 2017. *Estimating methane emissions from biological and fossil-fuel sources in the San Francisco Bay Area*. Lawrence Berkeley National Laboratory, for the California Energy Commission. http://newscenter.lbl.gov/2017/01/17/bay-area-methane-emissions-may-double-thought/.

- Please provide the following American Canyon/Clover Flat landfill biogenic emissions information:

1. Based on the best available science, what are the estimated CO_2 and CH_4 biogenic emissions associated with expanding composting operations by 2020, 2030 and 2050?

2. Based on the best available science, how many metric tonnes of CO_2 and CH_4 biogenic emissions associated with the American Canyon and Clover Flat landfill operations are estimated by 2020, 2030 and 2050?

3. Explain how the proposed mitigation is consistent with SB 1383 2030 reduction requirements regarding methane emissions and landfill organic waste disposal.

Sincerely,

Ron Cowan

Ron Cowan, Principal
Quercus Group

attachments (4)

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Vegetation

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Attachment A

Regulatory Framework

Executive Order S-3-05
Signed by Governor Schwarzenegger on June 1, 2005. Executive Order S-3-05 established a California GHG reduction target of 80 percent below the 1990 level by 2050.

Assembly Bill 32
AB 32 defines carbon dioxide equivalent (CO_2e) to mean, "... the amount of carbon dioxide by weight that would produce the same global warming impact as a given weight of another greenhouse gas, based on the best available science, including from the Intergovernmental Panel on Climate Change [IPCC]."

Bay Area Air Quality Management District
"The IPCC released its Fifth Assessment Report (AR5) in 2013, including scientific research and conclusions regarding current GHG global warming potential (GWP) values for determining CO_2e. The IPCC recommends using the AR5 GWP values, as they reflect the best information on global warming potentials. The Air District is using the GWP values from AR5, which include a GWP for methane (including all feedback effects) of 34. We recommend that ARB also use GWPs from AR5 in the Strategy." Consistent with the AB 32 carbon dioxide equivalent definition, the Bay Area Air Quality Management District applies the GWP values from AR5.

Senate Bill 97
Signed by Governor Schwarzenegger on August 24, 2007. This statute required that the Office of Planning and Research prepare CEQA guidelines for evaluating the effects of GHG emissions and for mitigating such effects. The Natural Resources Agency adopted these guidelines on December 31, 2009.

Senate Bill 32
Signed by Governor Brown on September 8, 2016. This statute requires that statewide greenhouse gas emissions be reduced to 40% below the 1990 level by 2030.

Senate Bill 1383
Signed by Governor Brown on September 19, 2016. This statute requires: (1) a 50 percent statewide reduction in black carbon emissions and a 40 percent reduction in methane and hydrofluorocarbon emissions from 2013 levels by 2030; (2) a 50 percent reduction in the level of the statewide disposal of organic waste in landfills from the 2014 level by 2020 and a 75 percent reduction from the 2014 level by 2025.[1]

Senate Bill 1386
Signed by Governor Brown on September 23, 2016. This statute states that the protection and management of natural lands, as defined, is an important strategy in meeting the state's GHG reduction goals, and would require all state agencies, departments, boards, and commissions to consider this policy when revising, adopting, or establishing policies, regulations, expenditures, or grant criteria relating to the protection and management of natural lands.

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[1] See Gov. Brown's SB 1383 signing comments at https://www.gov.ca.gov/news.php?id=19549.

California Air Resources Board

"California is committed to reducing emissions of CO_2, which is the most abundant greenhouse gas and drives long-term climate change. However, short-lived climate pollutants [methane, black carbon, etc.] have been shown to account for 30-40 percent of global warming experienced to date. Immediate and significant reduction of both CO_2 and short-lived climate pollutants is needed to stabilize global warming and avoid catastrophic climate change" (Reducing Short-Lived Climate Pollutants in California, 2014).

Methane

"Methane is emitted from a wide range of fugitive sources and biological processes, and is the second largest source of GHG emissions globally. Methane emissions are growing globally as a result of human activities related to agriculture, waste handling and treatment, and oil and gas production. Agriculture represents the largest methane source in California, accounting for nearly 60 percent of methane emissions (Figure 6). Landfills are the next largest source of methane, accounting for a fifth of statewide methane emissions. Pipeline leaks, oil and gas extraction, wastewater, and other industrial and miscellaneous sources make up the remainder of emissions" (Short-Lived Climate Pollutants Strategy, p. 58).

Black Carbon

"Black carbon (BC, also referred to as black soot, black carbon aerosols, black carbon particles) refers to a solid particle emitted during incomplete combustion. All particle emissions from a combustion source are broadly referred to as particulate matter (PM) and usually delineated by sizes less than 10 micrometers (PM10) or less than 2.5 micrometers (PM2.5). Black carbon is the solid fraction of PM2.5 that strongly absorbs light and converts that energy to heat. When emitted into the atmosphere and deposited on ice or snow, black carbon causes global temperature change, melting of snow and ice, and changes in precipitation patterns. Roughly half of atmospheric BC comes from fossil fuel combustion, and the other half from biomass and biofuel burning. While BC is short-lived in the atmosphere (1-4 weeks), it is linked to strong regional climate effects and a large share (~30%) of recently observed warming in the Arctic." http://www.unep.org/transport/gfei/autotool/understandingtheproblem/Black%20Carbon.pdf.

Stanford Engineering

"Biomass burning also includes the combustion of agricultural and lumber waste for energy production. Such power generation often is promoted as a 'sustainable' alternative to burning fossil fuels. And that's partly true as far as it goes. It is sustainable, in the sense that the fuel can be grown, processed and converted to energy on a cyclic basis. But the thermal and pollution effects of its combustion - in any form - can't be discounted, [Mark] Jacobson said.

"The bottom line is that biomass burning is neither clean nor climate-neutral," he said. "If you're serious about addressing global warming, you have to deal with biomass burning as well."

https://engineering.stanford.edu/news/stanford-engineers-study-shows-effects-biomass-burning-climate-health. Jacobson, M. Z. 2014. *Effects of biomass burning on climate, accounting for heat and moisture fluxes, black and brown carbon, and cloud absorption effects.*

UC Irvine Engineering

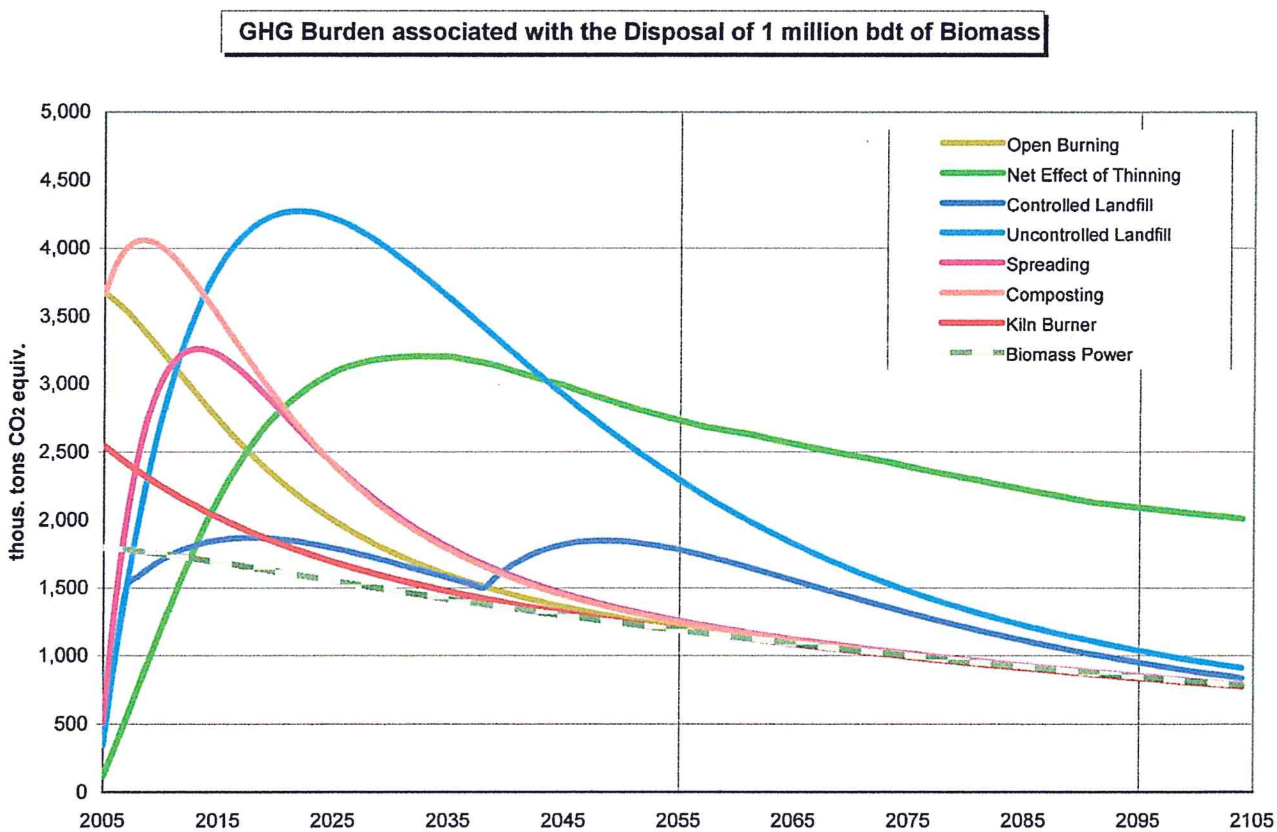
"Generation of electricity from biomass is unique among the potential technologies for meeting RPS [renewable portfolio standards] goals in that it is associated with the generation of substantial amounts of GHGs and pollutants at generation sites during operation. This feature elucidates the importance in assessing GHG and air quality impacts from biopower." Sospedra, M. and Dabdub, D. 2015. *Assessment of the Emissions and Energy Impacts of Biomass and Biogas Use in California.*

Attachment B

Biomass Disposal Greenhouse Gas Emissions
The following chart illustrates the relative GHG indirect biogenic emission effects from common methods of vegetation (biomass) disposal.[1] **The biomass combustion GHG emission values do not include black carbon emissions.**

Uncontrolled landfill disposal produces the greatest biomass GHG biogenic emissions followed by composting, open burning, mulching, forest thinning, kiln burner, controlled landfill and biomass power. The chart demonstrates that peak GHG emissions vary substantially depending on the means of biomass disposal, with the higher peaks reflecting increased amounts of methane and/or nitrous oxide emissions.

Terminology: Net effect of thinning emissions apply to forest thinning emissions and spreading emissions are equivalent to mulching emissions.



Graphic: Gregory Morris, PhD. *Bioenergy and Greenhouse Gases.* Published by Pacific Institute (2008).

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[1] One bone dry ton (bdt) is a volume of wood chips (or other bulk material) that would weigh one ton (2000 pounds, or 0.9072 metric tons) if all the moisture content was removed.

Attachment C

Biogenic carbon cycling across lowland and upland terrains in Northern California north coast and interior ranges vegetation and wildlife habitat regions in the northern San Francisco Bay Area: 2017 overview of published research and professional (technical) literature on above- and below-ground carbon stocks and sequestration in woody plant biomass[1] and soil organic matter[2] within natural and agricultural-development vegetation communities in mesic and dry-mesic (maritime and interior) climatic zones of Central California Foothills and Coastal Mountains ecoregions.

Land Cover Plant Vegetation Community (all geologic and topographic terrains)	Long-term Carbon Storage (Stocks)		Annual Net Carbon Sequestration	
	Unit-area Carbon Stock typical value range and [estimated average] (Mt C/acre) ▪ Woody Plant Biomass Carbon (WPB-C) ▪ Soil Organic Matter Carbon (SOM-C)	Sources	Unit-area Carbon Sequestration typical value range and [estimated average] (Mt C/acre•year^{-1}) ▪ Woody Plant Biomass Carbon (WPB-C) ▪ Soil Organic Matter Carbon (SOM-C)	Sources
Oak Savanna, Woodland & Forest (upland)	WPB-C: 15–75 [40] SOM-C: 10–60 [35] *Total: 25–135 [75]*	Footnote no. 3	WPB-C: 0.2–1.4 [0.4] SOM-C: 0.1–0.4 [0.2] *Total: 0.3–1.8 [0.6]*	Footnote no. 3
Conifer Forest & Woodland (upland)	WPB-C: 25–190 [60] SOM-C: 25–100 [50] *Total: 50–290 [110]*	Footnote no. 4	WPB-C: 0.6–1.6 [0.8] SOM-C: 0.15–0.4 [0.2] *Total: 0.8–2.0 [1.0]*	Footnote no. 4
Riparian Woodland & Forest (lowland)	WPB-C: 15–800 [90] SOM-C: 45–200 [90] *Total: 60–1,000 [180]*	Footnote no. 5	WPB-C: 1.0–3.65 [1.5] SOM-C: 0.15–1.05 [0.7] *Total: 1.15–4.7 [2.2]*	Footnote no. 5
California Perennial/Annual Grassland (upland, lowland, or meadow)	WPB-C: 0.5–20 [20] SOM-C: 20–100 [50] *Total: 20.5–120 [70]*	Footnote no. 6	WPB-C: 0–2 [<<0.1] SOM-C: -0.9–0.4 [0.15 where perennial, -0.15 where annual] *Total: -0.9–0.4 [0]*	Footnote no. 6
Shrubland (upland)	WPB-C: 3–22 [20] SOM-C: 1–72 [15] *Total: 4–94 [35]*	Footnote no. 7	WPB-C: 0.1–1.7 [0.5] SOM-C: 0.1–0.3 [0.2] *Total: 0.2–2.0 [0.7]*	Footnote no. 7
Woody Wetland-Marsh (lowland)	WPB-C: 1–2 [1.5] SOM-C: 40–175 [110] *Total: 41–177 [111.5]*	Footnote no. 8	WPB-C: 0–5.5 [0.2] SOM-C: 0.2–5.5 [0.9] *Total: 0.2–11.0 [1.1]*	Footnote no. 8
Cropland (annual vegetables, nuts & non-winegrape fruit) (upland, lowland)	WPB-C: 0.5–15 [5] SOM-C: 5–65 [40] *Total: 5.5–80 [45]*	Footnote no. 9	WPB-C: 0.5–15 [5] SOM-C: -0.5–0.1 [-0.2] *Total: 0–15.1 [4.8]*	Footnote no. 9
Vineyard (perennial vine and annual winegrape) (upland, lowland)	WPB-C: 1–7 [5] SOM-C: 25–70 [50] *Total: 26–77 [55]*	Footnote no. 10	WPB-C: 1–2.2 [1.5] SOM-C: -0.5–0.4 [0.1] *Total: 0.5–2.6 [1.6]*	Footnote no. 10

[1] Woody plant biomass carbon stock and sequestration values originate from non old-growth, non-stocked, and non-plantation forests, woodlands, shrublands, and grasslands.

[2] Soil organic matter carbon stock and sequestration values originate from non old-growth, non-stocked, and non-plantation forests, woodlands, shrublands, and grasslands. Soil organic matter carbon stock values represent the total stocks over the entire 1.5-meter-deep soil profile.

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Attachment D

Napa Valley Register

Sanitation district to study winery wastewater disposal

September 06, 2014 3:30 pm • By Janelle Wetzstein

After hearing several wineries "implore" them to action, the Napa Sanitation District (NSD) agreed last week to find a more affordable way for wineries to dispose of their wastewater.

For David Graves, a Napa resident and co-founder of Saintsbury Winery in Carneros, plans to address the matter haven't come soon enough.

"I implore you to explore and embrace the possibility of a win-win solution and convene all concerned parties, with the best contemporary thinking on technical and financial solutions." he wrote in a letter to the NSD board of directors on Sept. 3. "Too much is at stake to act in haste and regret at leisure."

With hundreds of wineries in Napa County producing millions of gallons of dense water that is too thin to be processed with fat and grease waste and too thick to be sent down the drain without incurring high fees, the problem has led to more than 12,000 truckloads of wastewater being driven to Oakland's sewage treatment plant each year.

Graves, whose winery is typically capable of pre-treating wastewater and using it for irrigation on site, has been holding and hauling his wastewater to East Bay Municipal Utility District (MUD) for several weeks, since a glitch in his system caused the pre-treatment to fail. He estimated that Saintsbury would spend $40,000 during this year's harvest on trucking water to East Bay MUD.

Napa Sanitation officials said a fix to the current situation would not happen soon. "This is not something that has to be done quickly, as much as it has to be done properly," said Peter Mott, a board member and Napa city councilman. "I want our discussions to continue, but I want us to be cognizant of the fact that we are dealing with businesses that, for some, this is a pretty big surprise, cost and issue."

Wastewater treatment plants in cities with smaller populations that serve a large number of food and beverage producers are generally not designed to take the volume or density of wastewater generated by large-scale commercial producers.

Though wastewater generated by food and beverage producers typically isn't contaminated with toxins, it's mostly created when these businesses use water to clean grapes, brew beer, wash receptacles and create dairy products. Since it's a vast amount of the thick water, it's extremely expensive for smaller treatment plants to process.

Because of the added expense, treatment plants often don't accept such waste unless it has been pre-treated by the producer. Or, like Napa Sanitation, plants can accept the wastewater for extremely high fees, which makes it cheaper for producers to collect their wastewater and send it in trucks to a different plant. In the North Bay, the Oakland East Bay MUD facility is the plant of choice.

Each year, more than 74 million gallons of winery wastewater leaves the city in trucks and is driven some 40 miles south to East Bay MUD, a facility that is glad to accept the untreated waste because it can turn it into energy, statistics show. The massive plant that serves 650,000 residential customers and 88-square miles of city was built with extra capacity as well, making the winery wastewater easy and inexpensive to treat.

And so, this is the way one of the world's premiere wine locations has processed its industry waste for years - sending tens of thousands of truckloads out of the county each year or charging businesses exorbitant fees for a known cost of doing business.

Now, five years after becoming aware of the magnitude of the issue, the wineries and the Napa Sanitation board both want to find a solution. But when and what remain to be seen.

Graves asked the district not to relay on a 2009 study of this issue, saying the technology may have improved since then.

Tim Healy, Napa Sanitation's general manager, pointed out Friday that the purpose of the 2009 study wasn't necessarily to find a way to accommodate winery users, but to figure out what the county's winery wastewater situation truly was.

"Back in 2008, (the district) was experiencing operational issues at the plant that we thought could be attributed to winery wastewater," he said. "That document was really us, studying who was discharging to our system and who would potentially want to in the future."

Healy said that the district has budgeted an additional $100,000 this year to begin studying solutions to the winery wastewater issue.

According to Graves, vast technological innovations have occurred since 2011 in the wastewater industry. Rex Stults, governmental affairs director for the Napa Valley Vintners, said that innovation and collaboration are the hallmarks of the Napa Valley wine industry, and the area's community as a whole.

"Shouldn't we step back and ask `is this the best we can do'? David's (Graves') comments raised eyebrows when he questioned (the 2009) data. It seems there is a lot of opportunity for additional collaboration and innovation between the wineries and NSD."

While Stults and Graves remained optimistic about the meeting's outcome, district officials acknowledged that solutions could take time.

Healy said that the matter will come before the board again at the Oct. 15 meeting, but said that while money has been set aside to study the matter in this year's budget cycle, the district's four-year work plan has not dedicated any time for the issue. "Though this wasn't in our plan, we are trying to squeeze it in this year," he said. "We're doing some internal studies right now."

Mott said that how local wineries dispose of their wastewater is a significant matter that needs to be addressed sooner, rather than later, but agreed that it could take time. "Though we studied it in 2009, it just wasn't acted on fast enough," he said. "There are a lot of ways to handle this issue, but we haven't chosen to be a partner in the discussion and the industry hasn't done it on their own. So I see a real partnership possibility here."

Winery waste creates treatment hurdles

November 10, 2014 3:00 pm • By Howard Yune

NAPA - Every year, Napa County produces 11.3 million gallons of a liquid not nearly as cherished as its wines - and with no nearby place to dispose of it.

Local sanitation officials say nearly 43,000 gallons of wash water, wine lees, grape skins and other detritus from Napa-area wineries end up in tanker trucks, on average six or seven each working day. Bypassing the local wastewater treatment centers, the trucks make the 42-mile run to Oakland, where a single sewage plant processes the wastewater from winemakers across the Bay Area - and a broad swath of California extending to the North and Central coasts.

In a report published last month, the Napa Sanitation District has begun grappling with how it might begin handling winery byproducts at its own plant in south Napa - and deal with the higher costs officials admit nearly any alternative would pass on locally.

"If cost weren't an issue, you would want to reduce the environmental cost of trucking that waste," Jeff Tucker, the sanitation district's director of administrative services, told board members last Wednesday. "But cost is a factor, and we need the best solution that meets wineries' environmental and economic needs."

Since the early 2000s, the expedient path for wineries in Napa and much of Northern California has been to the Oakland treatment center, where the East Bay Municipal Utility District has long used excess capacity to soak up waste from wineries in the Bay Area and beyond. Much of the East Bay district's plant's capacity originally was built in the 1970s to handle wastewater from fruit and vegetable packers, only to fall into disuse with the Bay Area's increasing urbanization.

The wastewater produced by winemaking falls into an awkward middle ground of treatment. Too thin to be broken down alongside fats and oils, yet too dense to be mixed with ordinary wastewater, it does not easily fit the normal processes for removing or breaking down contaminants, officials say.

Any plan to treat winery waste within the county, Tucker said, must conquer the East Bay district's heretofore unbeatable price advantage. Customers hauling such waste to the Oakland plant -- which handles winery byproducts separately from other waste products -- pay fees totaling 12 cents per gallon, a price Napa Sanitation staff admits is nearly impossible for any local facility to match.

The Napa Sanitation report floats several options for processing local winery waste. Possibilities include setting up a pretreatment center to reduce its strength, building new digesters especially for winery byproducts, or channeling wastewater into its own plant's oxidation ponds (and adding more aerators) to speed processing.

However, district staff warned many of the alternatives would require multimillion-dollar upgrades, require land for new digesters or other additions, and require charging higher rates than the Oakland plant. Adding enough digester space for all Napa's winery wastewater, for example, could cost Napa Sanitation more than $25 million, the study suggested.

Moreover, too small an increase in local sewer capacity could leave the district struggling to process winery waste and serve other customers at the same time - especially during the fall crush season, when the volume of winery waste products can double.

"We cannot afford to take up a substantial amount of our own capacity just for our wineries, or else we'll need substantial space to build up capacity," board member Charles Gravett said at the Wednesday meeting.

In the report, district officials predicted wineries would need to make a long-term financial commitment to deliver their wastewater to Napa Sanitation for any upgrade plan to succeed - perhaps by creating a property assessment district to pay for debt service, in exchange for cheaper per-load fees.

The sanitation district may take up the issue again with local winery leaders present, but not before year's end, Tucker said after the meeting.

Regardless of the district's timetable, though, Jason Holley, the public works director of nearby American Canyon, said that city would offer it support for any proposal that can cut heavy-vehicle use on its main route.

"We have our own concerns in American Canyon: more trucks leaving the county with a product generated in the county, and all those trucks taking Highway 29," said Holley.