

Armanino, Dana

From: Richard Hall
Sent: Tuesday, August 26, 2014 5:50 PM
To: Richard Hall; Pena, Omar
Cc: Armanino, Dana
Subject: Re: Comments on Marin County Draft Climate Action Plan

Clarification / correction on point (3)

(3) There is emphasis on increasing more transit usage within the county. If this is buses then it should be noted that emissions (due to low ridership) are especially high for buses running within the county.

Increasing emphasis on this transit mode is likely to increase emissions.

e.g. A 5 mpg bus with 6 passengers average will emit far more than 4 x displaced cars carrying 2 occupants where each car gets 24 mpg. (Converting to emissions per passenger mile is vital).

Thanks,

Richard

On Aug 26, 2014, at 5:36 PM, Richard Hall <

Omar (& Dana),

I wish to submit the following comments regarding the Draft Climate Action Plan. A written response to each point (email is fine) is greatly appreciated.

(1) There should be a chart identifying the CO2 emissions per passenger mile of different transport modes over the coming years. This should be based on EMFAC data and transit ridership data. This chart is important to illustrate the emissions per passenger mile of different transportation modes, and precisely how CARB anticipates these changing:

- ferries (which we know are large emitters)
- train (there are no ridership figures, the Dowling figures are disputed, so this should be based on similar trains or the US national average ridership for commuter trains). This should use SMART's published CO2 emissions.
- buses.

(2) There should be a clear acknowledgement that driving more people to use buses will result in an increase in bus emissions per passenger mile. This is because the most used arterial routes are already served, and increased ridership will be spread over less used routes (diminishing returns).

(3) There is emphasis on increasing more transit usage within the county. If this is buses then it should be noted that emissions (due to low ridership) are especially low.

(4) It should be noted that SMART's emissions per passenger mile will shortly be eclipsed by passenger cars. Therefore policy should not seek to switch passengers to the train, bus or transit which generate higher emissions

(5) There should be a clear acknowledgement that transit should first and foremost solve for mobility (e.g. reducing congestion, getting people - especially those on lower incomes - to where they need to go quickly and with the minimum of mode changes).

(6) There should be a chart showing transit usage per capita for the region and comparing this to transit investment per capita. Such a chart will show that despite increased investment, per capita transit usage has dropped. Any suggestion that this trend will reverse (which is currently implied by the CAP) should be thoroughly explained and all assumptions provided.

(7) There should be clear identification of the impact of increased investment in bike paths has had in bike ridership. A significant recommendation appears to be that a shift from cars to bikes can be accomplished. According to data from the recent Congressional Report despite investment of \$28m in bike paths in Marin ridership has declined (analysis should NOT use moving averages, or apply upward trends in bike path usage that occurred prior to bike path implementation).

Reference including links and detailed citations:

<http://www.planningforreality.org/walkbikemarin-20m-failure/>

(8) Marin's current CO2 emissions as a % global CO2 emissions and as a %US emissions should be clarified for perspective.

(9) Marin's contribution to reducing CO2 emissions versus other counties in California should be published.

(10) The CAP should reference and clearly state the impact of planned growth in adjacent counties and it's impact on traffic congestion on highway 101. It should reference that Sonoma County has 24,010 additional housing units planned for Priority Development Areas. Each unit representing ~3 additional people and 6.72 daily car trips - some of which will be on highway 101. Any assumptions around these new residents using the SMART train should be clearly identified and reconciled with SMART's limited connectivity to major employment centers.

References:

<http://www.planningforreality.org/smart-pda-growth/>

http://www.sctainfo.org/reports/Sonoma_County_Priority_Development_Area_Investment_and_Growth_Strategy_Short_Term_Report/Sonoma_County_Priority_Development_Area_Investment_and_Growth_Strategy_Short_Term_Report.pdf

(11) The CAP advocates transit oriented development that is dependent on the ability to add substantial housing development to the county. The CAP should reasonably identify the capacity of Marin County to support such additional housing based on:

- realistic understanding of the capacity of water supply, and that exceeding capacity is likely to require desalinization plants that would be major emitters of CO2
- realistic understanding of the capacity of highway 101 given expansion already planned by Sonoma County

(12) There should be clear acknowledgement that the presence of the train is likely to diminish and otherwise encroach on funding for other more cost-effective modes of transportation. It should be clarified that the trains presence is highly likely based on case studies in Southern California and New York City to increase transit fares for the region, decreasing transit ridership. Detailed references with figures and citations here:

<http://www.planningforreality.org/rail-the-transportation-cannibal/>

(13) the notion of "establishing city centered corridors" should be clarified. It should be noted that many residents do not support expanding the urbanization of the county, except for in already urbanized downtown San Rafael.

(14) The notion of reducing vehicle miles travelled by locating housing near jobs should be either struck, and/or references made to the following peer reviewed paper that identifies multiple reasons why VMT does not drop when building new housing near transit:

<http://www.uctc.net/papers/133.pdf>

- work location is one of many factors in deciding on housing location
- often people prefer to live near friends, relatives
- people will commute further to live in a larger house / more desirable location

- often households contain workers with multiple jobs
- frequency of job change is increasing. One may move close to ones current job only to change jobs
- people will commute further to get to higher paying jobs

(15) The photo on page 59 of a packed bike path implies that this is a significant way in which emissions can be reduced. It is not. Please remove this misleading picture.

(16) page 69 talks about transportation demand management programs, it should be clarified in laymans English precisely what this means. If this imposes parking fees, and these fees may increase costs for those on lower incomes, then this should be clarified.

(17) All references to "multi-modal transit" should be removed. This is a vague statement. It spans a variety of transit modes - especially transit modes that may include ferries, buses and trains, but not cars - where emissions exceed transit modes not considered "multi-modal".

Also use of the term "multi-modal" is misleading as it can imply that bike commuting is a potential solution when investments of \$28m+ by the county have proven over an extended period that this has either no effect, or may actually result in a reduction in bike commuting. Again it is strongly suggested that this misleading term is removed.

Many thanks. Your written (email or letter) acknowledgement of each item in the above list of 17 items identifying changes to the CAP is appreciated. If no change is made pointers to evidence to the contrary is welcomed.

Many thanks,

Richard Hall
San Rafael

From: "Armanino, Dana" <DArmanino@marincounty.org>
To: "Armanino, Dana" <DArmanino@marincounty.org>
Sent: Tuesday, August 26, 2014 9:54 AM
Subject: Draft Climate Action Plan Open for Public Comment & Public Workshop Announced

The Draft Climate Action Plan Update for Marin County has been posted to the County's Climate website (www.marincounty.org/climate). The full press release describing the Update and posting is included below.

COMMENTS: The County is seeking public input on the Draft CAP Update. Written comments may be submitted to Omar Pena via email (opena@marincounty.org) or by mail to Attn: Climate Action Plan Updated, 3501 Civic Center Drive, Suite 308, San Rafael, CA 94903.

PUBLIC WORKSHOP: In addition to written comments, the County will go over details at a public workshop at 6:30 p.m. Monday, October 6, at the Marin Center Exhibit Hall (10 Avenue of the Flags, San Rafael). It will be a time to learn more about the Draft CAP Update 2014, ask questions and provide input. The doors will open at 6 p.m. and presentations will begin at 6:30 p.m.

Please RSVP by contacting the Omar Pena (opena@marincounty.org) or by visiting our event page at: <https://www.eventbrite.com/e/marin-climate-action-plan-community-meeting-draft-plan-tickets-12780572035>



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September 29, 2014

Omar Pena
3501 Civic Center Drive, Suite 308
San Rafael, CA 94903
opena@marincounty.org

Subject: 2014 Draft Marin County Climate Action

Dear Mr. Pena:

Thank you for the opportunity to provide comment on the *2014 Draft Marin County Climate Action* (Marin CAP). This update and the efforts of the Marin County Community Development Agency offers the unique opportunity to galvanize and coordinate all of Marin to do its part to reduce impacts to climate through greenhouse gas emission reductions. The following comments and suggestions are offered so that this opportunity is realized. Additionally, please accept these comments as a formal offer of collaboration and assistance from the University of California Cooperative Extension and Farm Advisor Department throughout the revision and implementation of the Marin County Climate Action Plan.

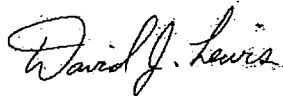
Marin Agricultural Energy and Climate Working Group: In the 1970s, Marin County made a commitment to protecting its agricultural lands so the economic and environmental benefits of open, connected, working farms and ranches could continue. At that time, it may not have been envisioned that one of the benefits derived from this policy change was the beneficial role that Marin’s farmers and ranchers have in mitigating greenhouse gas emissions. In other climate action plans, like that of Yolo County, agriculture is a formal and active partner in emission calculations, goal setting, and developing and implementing practices to obtain goals. Please accept my offer to collaborate with you and the Marin agricultural community to convene and facilitate an agricultural energy and climate working group. This group will be mutually beneficial for the Marin Climate Action Plan and the agricultural community. It will make immediate contributions to Marin CAP by accounting for the climate benefits already realized in dairy (Capper et al. 2009) and beef cattle (Capper 2011) production over the last five decades, including the realization that Marin’s livestock farms and ranches are pasture based and grass-fed operations with documented reductions in emissions relative to other systems (O'Brien et al. 2014). Additionally, this working group will be instrumental in realizing additional reductions in GHG emissions from livestock species selection (Capper and Cady, 2012), nutrition and feed modifications (USDA, 2004), manure storage and handling (Mittleohner et al, 2009; Owen and Silver, 2014), and land management strategies (Lal 2007) among other options. Lastly, it will provide Marin’s farmers and ranchers with the tools to increase their resiliency to climate change.

Incorporate Sequestration: As an update to the 2006 Marin Greenhouse Gas Reduction Plan, Marin CAP provides progress made to reduce emissions since 1990 and sets new goals for emission reductions going forward. It does not, however, include mitigation through carbon sequestration. For example, the voluntary goal for emission reduction through methane capture technologies on dairies is estimated at 4,638 (MTCO₂e). Currently, Marin farmers and ranchers are voluntarily implementing carbon farming programs and practices in collaboration with industry member associations and Marin Carbon Project partners. Conservative estimates of the amount of potential carbon sequestration from compost application, just one of 32 identified climate beneficial practices being implemented, are 10 to 100 times greater than the Marin CAP methane capture and emission reduction goal (Ryals and Silver, 2013). Furthermore, the estimated amount of CO₂e sequestered from this one practice is at a minimum half of the combined community and municipal emission reduction goal set in the Marin CAP. Expanding the Marin CAP to include sequestration is critical for a comprehensive plan that will make beneficial and lasting contributions to Marin CAP goals.

Emissions Estimates: As explained, the Marin CAP community emission inventory includes "...GHG emissions generated by activities within the unincorporated areas" and "emissions that occur outside the unincorporated areas." Similarly, the municipal inventory includes "...GHG emissions generated by the County's local government operations as it provides services to the public." This serves the primary objective of the Marin CAP, specifically project proponent use "... to comply with project-level review requirements pursuant to the California Environmental Quality Act." However, the emissions inventories and forecasts appear to be missing the larger context of GHG emissions for all activities from the incorporated and unincorporated portions of Marin. This context and the methods used are important for apportioning individual sector contributions. For instance, well-defined and accepted methods for estimating emissions from livestock production and agriculture are currently under development by the United Nations Food and Agriculture Organization (Mittleohner, 2014). Additionally, estimates of livestock agriculture contribution to GHG emissions is 18% globally (FAO, 2006), and less than 3% for the United States (EPA, 2009) and California (CEC, 2005) (Pitesky et al., 2009). I look forward to working with you and the Marin CAP project team to review the estimates, including assumptions, and collaborate on opportunities to increase the use of local sector values in inventories going forward. Presenting a comprehensive context for all Marin GHG emissions and reconciling the Marin CAP estimate with these other inventories will strengthen Marin CAP's credibility and facilitate realistic goal setting for reductions and mitigation by respective sectors.

Please accept these comments for their intended use – to advance the overall goals of the Marin CAP through the incorporation and realization of opportunities that Marin's past land use policies and partnership with the agricultural community have created to support GHG emission reduction and mitigation.

Respectfully,



David J. Lewis
Director

References

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Armanino, Dana

From:
Sent: Sunday, October 05, 2014 10:09 PM
To: Armanino, Dana
Subject: Comment on Climate Plan

Alan Scotch would like information about:

Washington Post: "it now costs NO more, in the long term, to install residential-scale solar panels than to buy electricity from utility companies." -- "battery-storage technologies will improve so much over the next two decades that homes won't be dependent on the utility companies".

Futurist Ray Kurzweil estimates, inexpensive renewable sources will provide more energy than the world needs in less than 20 years.

So perhaps our Climate Plan should:

1. Concentrate on the fastest route to reaching this inevitable future.
2. Find the most cost effective ways.

The Climate Plan simply lists just about everything anyone can think of that might effect the environment. But it makes no attempt at identifying which of the multitude of tasks are the most cost effective.

In particular its overemphasis on transit and development might not only make no advance towards this predicted future but in fact be wasted money and a step backwards, and would be Cost DEFECTIVE!

So lets rewrite this report, -- sequencing the most cost effective methods to most speedily reach this expected future.

First, there will be disruption of the entire fossil-fuel industry, starting with utility companies — which will face declining demand and then face bankruptcy.

Perhaps investing in incentives for installing clean energy, whilst subsidizing Utility Companies to keep their operations going - might be relatively more cost effective than most, and aim us towards the inevitable and necessary outcome --- of Utility Companies becoming SERVICE companies, divesting their Distribution Infrastructure which will become as good as "owned" by the people.

For all the data, facts and sources on this: http://populationalert.org/GlobalWarming/free_energy.htm
Facebook search "Energy-Solutions".(don't forget the hyphen).

Start with this FUTURE. Start with this prediction of the experts and wag the dog back to where we are and determine what's the smartest steps to take from here on.

Maybe a catalyst might be the prediction in the Washington Post article that:- "We will be able to create unlimited clean water from ocean water when we have unlimited free energy to do it"

NOTE that for the \$57 billion to be spent on Plan Bay Area - you can cover half of the 2.5 million homes in the Bay with solar panels and give free electric cars to half as well !
<http://marininfo.org/Bay/MapofPlanBayArea.htm>

Armanino, Dana

From: Stephen Nestel
Sent: Monday, October 06, 2014 10:09 PM
To: Armanino, Dana
Subject: Six Comments on the Marin Climate Action Plan

Thank you for the opportunity to comment on the Climate Action Plan. While a cleaner planet is a great goal that everyone can support, the climate action plan is lacking in real world assumptions.

- 1.) The underlying assumption of population growth is based on the Department of Finance Statistics of approximately 2 % growth while Plan Bay Area population growth statistics from 2012 -2040 is much higher at 16%. Plan Bay Area anticipates major urban growth along the 101 corridor in high density housing like the Tamal Vista project in Corte Madera.
New legislation from Sacramento encourages this growth. Your model does not take these factors into account.
- 2.) A overheated housing market in San Francisco is forcing people to find housing in Marin. This will increase the housing demand and commuting to the city. Your model does not take variables of local market conditions into account
- 3.) The affordable housing growth appears to be concentrated in Marinwood/Lucas Valley for the next housing element. The Marinwood Village project will eliminate the areas only commercial lot capable of supporting essential local businesses. This means that the entire 7000 residents will require a car to buy food and essential services or go to work . The LACK of job and shopping opportunities locally make us more car dependent.
- 4.) The scope of the plan is too long and too variable to be more than a wish list of projects. Even the Soviet Union only dared to make five year plans and often were wrong. The plan is an interesting exercise but far from a reliable planning document.
- 5.) The investments in new technologies assume the citizens and businesses will be willing to comply. It was suggested that incentives will be available from government sources. Given the current state of the federal, state and local finances, it seems unlikely that there will be an endless spigot of funds. High taxes and mandates on new construction may force citizens and businesses to relocate elsewhere.
- 6.) There is some good news. Solar, wind and other green technologies are dropping in price at a steady rate. When the consumers find an economic incentive to invest, we can assume that major energy savings will result. The rapid acceptance of the Toyota Prius proves this point.
- 7.) Our best course of action for Marin is to encourage a local business climate that will reduce the need for commuting and the construction of commercial centers near housing.

Sincerely,

Stephen Nestel
San Rafael, CA 94903



October 6, 2014

Omar Pena
3501 Civic Center Drive, Suite 308
San Rafael, CA 94903
opena@marincounty.org

Subject: DRAFT Marin County Climate Action Plan

Dear Mr. Pena:

Thank you for the opportunity to provide comment on the *2014 Draft Marin County Climate Action* (Marin CAP). The Marin Resource Conservation District (Marin RCD) commends the Marin County Community Development Agency's effort to address the issue of climate change and would appreciate the opportunity to develop the Marin CAP further.

The Marin RCD has a long history in resource conservation. In response to the national "Dust Bowl" crisis of the 1930s, when millions of acres of cropland were destroyed and air quality was compromised by drought and attendant soil loss, the federal government passed legislation in 1937 establishing the USDA Natural Resources Conservation Service (*formerly Soil Conservation Service*). Soon thereafter, local counterparts were set up under state law to be controlled by agricultural boards of directors. Thus were born Resource Conservation Districts, which began forming in the late 1930s and spread throughout the 48 states. Under Division 9 of the State Public Resources Code, Resource Conservation Districts are empowered to manage soil, water and other related resources such as air quality for conservation.

Through the years the Marin RCD has worked in partnership with local, state and federal agencies to implement thousands of conservation plans and practices resulting in improvements made to Marin County's watersheds. It is belief that the health of the county's natural landscape is dependent upon a robust agricultural economy and subsequently, the agricultural productivity of the county is dependent upon by the diligent application of practices which conserve and enhance our natural resources.

Our mission mirrors how we envision agriculture interacting with issues related to climate change. Prior to the adoption of the Marin CAP, we would appreciate the opportunity to participate in an agricultural-climate forum where representatives from our partner agencies and organizations are present, in addition to key members of the agricultural community, in order to exchange information and enhance the recommendations of the Marin CAP. In the last several years, Marin County agricultural producers have made considerable progress addressing climate change by implementing carbon sequestration and carbon beneficial practices. This work is innovative and, in part, funded by a USDA NRCS Conservation Innovation Grant which

provides the rare opportunity to work directly with the USDA NRCS Air Quality and Atmospheric Change Team in developing GHG reduction and carbon sequestration modeling software.

The Marin RCD would appreciate the opportunity to discuss these efforts and more in greater detail as it will greatly benefit Marin County's climate action endeavors. Thank you for the opportunity to participate and please feel free to contact us.

Sincerely,

A handwritten signature in black ink, appearing to read 'Nancy Scolari', with a stylized flourish at the end.

Nancy Scolari
Executive Director



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James Sievert

Safe Routes Instructor

October 7, 2014

Dana Armanino

County of Marin

San Rafael, CA

Darmanino@marincounty.org

RE: Climate Action Plan Comments

Dear Dana Armanino,

The Marin County Bicycle Coalition (MCBC) appreciates the opportunity to provide comments for the Marin County Climate Action Plan (CAP) August 2014 Draft.

According to the CAP, on-road transportation represents 35% of Marin's GHG emissions, yet the community target shown in the October 6, 2014 slide show indicates only 9% for *land use, transportation and off road equipment*. Considering the significantly high percentage of GHG from these sources, MCBC believes that this target should be set higher than 9% as further reduction in GHG's can be realized through increased use of nonmotorized transportation, transit and land use changes.

While non-motorized transportation is mentioned in several sections of the Climate Action Plan (CAP), the plan lacks analysis of the substantial benefits that could come from increased nonmotorized/active transportation here in Marin. My comments below focus on this area.

The County of Marin and several of Marin's cities have a goal of 20% walking and biking trips by 2020. This coupled with the fact that 40% of trips in the US are 2 miles or less, suggests a very significant potential reduction in VMT and therefore GHG's here in Marin from increased walking and biking.

For example, accelerating construction of the bike/ped facilities identified in the Marin County Unincorporated

Bicycle and Pedestrian Master Plan, the Sonoma Marin Area Rail Transit (SMART) project (approximately 15 miles of pathways remain to be built in Marin), and expanding the greatly successful Safe Routes to Schools program, all could have substantial benefits for increasing walking and biking and therefore reducing VMT/GHG's here in Marin.

Currently there is only brief mention of the Marin County Unincorporated Bicycle and Pedestrian Master Plan in the *Supporting Strategies* section of the CAP; items in this section were not quantified for GHG emission reductions- but they should be.

The Marin County Bicycle Coalition urges the County of Marin to quantify the potential benefits from substantially increased active transportation that would result from a built-out bicycle/pedestrian network (including the SMART pathway), and an expanded Safe Routes to Schools program. We further would like to see a higher target set in the CAP that could be achieved through increased use of transit and land use changes that reduce VMT.

Sincerely,

A handwritten signature in black ink, appearing to read "Andy Peri". The signature is fluid and cursive, with a prominent initial "A" and "P".

Andy Peri, Advocacy Director
Marin County Bicycle Coalition

Armanino, Dana

From:
Sent: Tuesday, October 07, 2014 6:10 PM
To: Armanino, Dana
Subject: CAP comment - Vulnerability Assessment

Hannah Doress would like information about:

Dear Dana,

Great job on the CAP and presentation last night. As you know I am urging you to continue as you are doing to outdo the goals and move the process along as quickly as you can to reduce our carbon impact in light of the significant and growing impacts of sea level rise on Marin County's shoreline communities and infrastructure among other climate impact. Specifically since these communities are on the front lines of climate impact, we (Shore Up Marin, Earth Day Marin) strongly support including a county wide vulnerability assessment in the CAP and even beyond that recommending a county-wide adaptation plan and budget. From your position leading the charge on mitigation you know that we will not be able to mitigate enough from the local level to avert the climate change impacts that will change the face of Marin, therefore it would be logical and urgent to call for Marin to have a fully-developed serious, funded, inclusive, equitable and aggressive adaptation plan to complement the CAP efforts within the final CAP. Fundamental to that critical goal is a county-wide vulnerability assessment which the CAP is in the position to assure will happen expeditiously. As you know, time is of the essence and current efforts are great but piecemeal. Your leadership in including the vulnerability assessment in the CAP would pay dividends both in terms of actually protecting lives & property in the future as impacts worsen, as well as in terms of public engagement and participation in the core programs that will make the CAP a success. In short, if the public better understands what is at stake, I believe they will participate in greater numbers and make the CAP even more successful. Thank you for your consideration and I would appreciate knowing how you plan to address this in the plan. If I can provide any clarification or answer any questions please feel free to contact me. Again, my deep appreciation for your leadership and the great progress the county continues to make on climate change mitigation.

All the best,
Hannah Doress

Armanino, Dana

From:
Sent: Tuesday, October 07, 2014 8:44 PM
To: Armanino, Dana
Subject: CAP comment

Colin would like information about:
Hello Dana,

I was an intern with the County sustainability department while I was getting my MS in Sustainable Development years back and am excited with the ongoing effort of the County to address climate change. I'd like to make a comment on the Climate Action Plan. One huge piece that is missing from the Climate Action Plan is the divestment from the fossil fuel industry. It makes no sense to support renewable energy and energy conservation efforts while at the same time funding the fossil fuel industry. Please adjust the plan to include divestment from fossil fuels. If you want to be on the cutting edge of climate change action you will include divestment from fossil fuels in the plan (this included pension funds that are invested in fossil fuels). Many universities, organizations, businesses, are divesting, even the Rockefellers are divesting from fossil fuels. I figure if the founders of Standard Oil can divest, Marin County can do the same.

Best regards,

Colin

Armanino, Dana

From:
Sent: Tuesday, October 07, 2014 10:50 PM
To: Armanino, Dana
Subject: Intensively reared, corn fed cattle may be the most environmentally friendly

Alan Scotch would like information about:

The same amount of Greenhouse Gas from all the world's cars, planes, boats & trains is emitted by cows (+ sheep, pigs, chicken etc...)

- Every year we raise and eat 65 billion animals, that's nine animals for every person on the globe.
- Nearly a third of the Earth's ice-free land surface is already devoted to raising the animals we either eat or milk.
- A single cow can belch up to 500 litres of methane every day. Multiply that by the 1.5 billion cattle we have on our planet
- Methane is 25 times more potent a greenhouse gas than carbon dioxide.
- 30% of the crops we grow are fed to animals. 14.5% of man-made greenhouse gas emissions - the same amount produced by all the world's cars, planes, boats and trains.
- Meat consumption is predicted to double in the next 40 years as people globally get wealthier.

Intensively Reared vs Grass-Fed

A very different type of farming, thousands of cattle confined in grass-free, mud enclosures and fed a diet based on a carefully formulated mix of corn, fat, growth hormones and antibiotics. It looks the opposite of eco-friendly farming. Yet it is "greener" than raising cows on the prairies - greater efficiency leads to less environmental impact. The scientifically formulated diet means cows put on weight faster and produces 40% less methane than grass-fed cattle.

Intensively reared, corn fed cattle may be the most environmentally friendly.
Source:<http://www.bbc.com/news/science-environment-28858289>

Armanino, Dana

From:
Sent: Tuesday, October 07, 2014 10:54 PM
To: Armanino, Dana
Subject: Plastic made from Methane

Alan Scotch would like information about:
Plastic made from Methane - - perhaps Marin can get involved?

At the company's research lab, methane gas—is mixed with air in a steel tank. Newlight's patented biocatalyst then strips out the carbon from the methane and chains the molecules together to form different grades of plastic resin. At the end of the production line, the resin is chopped into pellets. Newlight sells the pellets to manufacturers to be molded into products. The company operates a plant in California and is building another one in the Midwest that will produce 50 million pounds of plastic annually. The company will obtain greenhouse gases from landfills or farms.

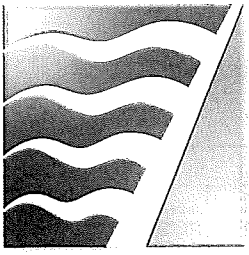
Scientists are experimenting with creating an AirCarbon replacement for plastic water bottles and foam packaging, those other ubiquitous scourges of modern life.

Dell says the computer maker next wants to use AirCarbon to replace foam packaging and, eventually, plastic parts in its computers and servers. The biggest challenge Newlight faces, he says, is scaling up production to meet the demand of global corporations like Dell.

"Why would you ever use a plastic bag that emits carbon again?" "We want to see this replace plastics everywhere." AirCarbon plastic is biodegradable and recyclable.

AirCarbon is an independently-verified, cradle-to-grave (including all energy inputs, transportation, and end-of-life) carbon-negative material, quantifiably reducing the amount of carbon in the air in every ounce of AirCarbon we make.

<http://www.takepart.com/article/2014/08/19/plastic-bag-sucks-carbon-out-air-and-may-save-planet-not-destroy-it>



**BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT**

ALAMEDA COUNTY
Tom Bates
Margaret Fujioka
Scott Haggerty
Nate Miley
(Chair)

CONTRA COSTA COUNTY
John Gioia
David Hudson
Mary Piepho
Mark Ross

MARIN COUNTY
Susan Adams

NAPA COUNTY
Brad Wagenknecht

SAN FRANCISCO COUNTY
John Avalos
Edwin M. Lee
Eric Mar
(Secretary)

SAN MATEO COUNTY
Carole Groom
(Vice-Chair)
Carol Klatt

SANTA CLARA COUNTY
Cindy Chavez
Ash Kalra
Liz Kniss
Jan Pepper

SOLANO COUNTY
James Spering

SONOMA COUNTY
Teresa Barrett
Shirlee Zane

Jack P. Broadbent
EXECUTIVE OFFICER/APCO

RECEIVED

OCT 9 2014

COUNTY OF MARIN
COMMUNITY DEVELOPMENT AGENCY
PLANNING DIVISION

October 7, 2014

Dana Armanino, Planner
Marin County Community Development Agency
3501 Civic Center Drive, Rm 308
San Rafael, CA, 94903

Subject: Draft Climate Action Plan

Dear Ms. Armanino,

Bay Area Air Quality Management District (Air District) staff has reviewed the County of Marin's (County) Draft Climate Action Plan (Plan). The Plan updates the County's 2006 *Greenhouse Gas Reduction Plan*, and outlines the County's long-term strategy for reducing communitywide greenhouse gas (GHG) emissions in the unincorporated portion of the County.

The County has already met the goal of the original 2006 plan by reducing GHG emissions 15% below 1990 levels. This is a notable achievement and puts the County at the forefront of community-based climate protection efforts in California. The current Plan expands this goal by setting a target of reducing GHG emissions 30% below 1990 levels by 2020. Air District staff understands that in setting this target, the County's intent is to be on a trajectory toward meeting the climate stabilization goal of an 80% reduction below 1990 levels by 2050 (Executive Order S-3-05 and Air District resolution 2013-11).

The Air District commends the County for addressing GHG emissions and supports the County's efforts in developing the Plan. The Air District has the following comments and suggestions to strengthen the Plan to increase the likelihood that the County's aggressive GHG reduction target will be met.

GHG Reduction Measures

The Plan includes a mix of voluntary and mandatory measures to reduce GHG emissions. The Air District has found that mandatory measures are often more effective at achieving their intended emissions reduction goals than voluntary measures. With this in mind, Air District staff suggests that the County change some of the measures in the Plan from voluntary to mandatory. In addition, we recommend that more specific actions be included in some of the measure descriptions so that it is clear exactly how each measure will achieve its stated GHG reduction goal. Here are some specific suggestions on how to address these comments:

- Measure *Trans-3.1 Off-Road Equipment* states that the County will adopt an ordinance or develop outreach programs that could require exterior

electrical outlets in all new construction. Air District staff recommends that this measure more explicitly state that the County will adopt an ordinance requiring new construction to include outdoor electrical outlets.

- Measure *Water/Wastewater-1.3 Additional Water Conservation for Existing Buildings* states that a new County program would use education and outreach and rebates to encourage existing buildings to exceed statewide requirements for water conservation. Air District staff recommends that this measure require such upgrades for all existing buildings when undergoing remodeling.
- Measures *Energy-3.3 Solar Installations for Existing Residential Development* and *Energy 3.4 Solar Installations for Existing Nonresidential Development* cite very large GHG emission reductions for voluntary solar programs. Air District staff suggests that the County either make these mandatory programs, such as requirements during remodels, or provide the basis for the assumptions that 20% of existing residential and 15% of existing commercial buildings will install solar photovoltaic systems.
- Measure *Trans-1.5 Transportation Marketing* also cites very large GHG emissions reductions for a program solely based on marketing and outreach. Air District staff suggests that the County better substantiate how providing marketing materials will result in actual behavior changes that reduce vehicle miles traveled (VMT) to the extent estimated.
- Measure *Waste-1 Zero Waste by 2025* states that the County will work with existing waste-related joint power authorities to “expand existing services” to meet an 83% diversion rate by 2020. Air District staff suggests that the County provide more specifics on the types of programs and services it plans to expand and use to achieve this goal.

Air District staff has also identified several measures that could be expanded upon to strengthen the Plan’s GHG reduction strategy. For example:

- Measure *Trans-1.3 VMT Reduction Monitoring and Implementation and Transportation Demand Management Program* requires transportation demand strategies that achieve a 10% reduction in VMT to be implemented in new residential developments of 25 or more units and new or expanded businesses of 50 or more employees. The types of transportation demand strategies listed in this measure can exceed a 10% reduction in VMT. Air District staff suggests that the County strengthen this measure to require a 20% reduction in VMT, which will better support the County’s efforts to achieve long-term GHG reductions.
- The Plan cites the agriculture sector as the third largest contributor to GHG emissions in the County, yet only has one measure to address emissions from agricultural sources is included in the Plan. Additional strategies the County could utilize to reduce emissions from this sector are listed in the Supporting Strategies section of the Plan. Air District staff recommends moving some of these measures

into the formal GHG reduction strategy, including *SP Agriculture-1 Marin Carbon Project* and *SP Agriculture-2 Best Management Practices for Agriculture*.

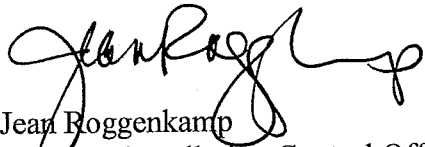
Monitoring and Implementation

The Plan contains a strong implementation program that includes conducting new emissions inventories in 2017 and 2019, and the development of new GHG reduction targets beyond 2020. The implementation program calls for “swift implementation upon adoption” and designates the County’s existing Sustainability Team to lead the implementation and adaptive management of the Plan. In addition to these efforts, Air District staff recommends the County develop a compliance checklist for new development projects to demonstrate consistency with the Plan. Recognizing that ongoing monitoring and updating of the Plan is necessary to determine whether the Plan is on track to achieving its GHG emission reduction targets, Air District staff strongly recommends that annual tracking and reporting on the implementation of Plan measures be included in the Plan’s implementation strategy.

The Air District commends the County for addressing the critical issue of climate change through local action, and for the achievements the County has already made in reducing local GHG emissions below 1990 levels. By addressing the issues in this letter, Air District staff believes that the Plan would be more likely to achieve its GHG reduction target.

Air District staff is available to assist the County in addressing these comments. If you have any questions, please do not hesitate to contact Abby Young, Principal Environmental Planner, at (415) 749-4754 or at ayoung@baaqmd.gov.

Sincerely,



Jean Roggenkamp
Deputy Air Pollution Control Officer

cc: BAAQMD Director Susan Adams

Armanino, Dana

From:
Sent: Wednesday, October 08, 2014 12:18 PM
To: Armanino, Dana
Subject: Comment on CAP -- What it takes for Marin to be 100% powered RENEWABLE

Alan Scotch would like information about:
What it takes for CA and NY State to be 100% powered RENEWABLE:
http://populationalert.org/GlobalWarming/CA_NY_Renewable_Energy.htm

Let's determine -- What it takes for Marin to generate as much RENEWABLE power as it uses.
And lay down the steps to get their.

Armanino, Dana

From:
Sent: Wednesday, October 08, 2014 12:47 PM
To: Armanino, Dana
Subject: Divest in Fossil Fuels -Are children deserve it!

Aaron Schiller would like information about:

I'd like to make a comment on the Climate Action Plan. One huge piece that is missing from the Climate Action Plan is the divestment from the fossil fuel industry. It makes no sense to support renewable energy and energy conservation efforts while at the same time funding the fossil fuel industry. Please adjust the plan to include divestment from fossil fuels. If you want to be on the cutting edge of climate change action you will include divestment from fossil fuels in the plan (this included pension funds that are invested in fossil fuels). Many universities, organizations, businesses, are divesting, even the Rockefellers are divesting from fossil fuels. I figure if the founders of Standard Oil can divest, Marin County can do the same.

Best regards,

Aaron

Armanino, Dana

From: Pena, Omar
Sent: Thursday, October 09, 2014 6:10 AM
To: Armanino, Dana
Subject: FW: Comment/Climate Action Plan

From: Peter Hensel
Sent: Wednesday, October 08, 2014 9:07 PM
To: Pena, Omar
Subject: Comment/Climate Action Plan

I attended the presentation at the Civic Center Exhibit Hall, and I will repeat what I said there.
I think it is great to have goals regarding reducing greenhouse gas emissions.
But I wonder what happens if Marin County does meet its stated goals, especially in the event that transit oriented development does not become the social panacea that it is promoted to be.
What happens then? What regulatory measures kick in? Which segments of the population would bear the burden of making personal reductions in every person's carbon footprint?
This needs to be clearly explained in the Climate Action Plan document so that Planning Commission and Board of Supervisors knows what they're voting on. And the citizenry can know too.
Also: who does oversight?
Exactly what is Marin Energy Watch---the entity which contributed funding for the Draft Climate Action Plan? Is it board of overseers? If so, who appointed them? And from what source or sources does Marin Energy Watch derive its money.
These considerations should be spelled out in the document before approval.
Thank you,

Peter Hensel

Transportation Solutions Defense and Education Fund

P.O. Box 151439 San Rafael, CA 94915 415-331-1982

October 10, 2014
By E-Mail

Dana Armanino, Planner
Sustainability Team
Marin County Community Development Agency
3501 Civic Center Drive, Rm. 308
San Rafael, CA 94903

Re: Marin County Climate Action Plan, Public Draft

Dear Ms. Armanino:

The Transportation Solutions Defense and Education Fund, TRANSDEF, is an environmental non-profit advocating for the regional planning of transportation, land use and air quality. Our focus in recent years has been reducing the climate change impacts of transportation.

TRANSDEF applauds your Sustainability Team for its inspiring Public Draft version of the Marin County Climate Action Plan (the "Plan" or "CAP"). The Plan is visually very attractive. We are especially heartened by the leadership the Team demonstrated by proposing the stepping up of the GHG emissions reduction goal for the unincorporated community. This kind of leadership is all too rare in government these days.

Due to a pressing schedule of comments needed on statewide issues, we are not able to devote the time to the kind of detailed comments that the Plan deserves. Recognizing that these are by no means meant to be comprehensive, here are a few comments:

As the largest emissions sector for the unincorporated area (see Figure ES-1, the Plan), transportation needs to be a more prominent part of the solution. We suggest that the emissions reduction goals for transportation are much too low.

Tiering off a Climate Action Plan

TRANSDEF supports the project streamlining role of the Plan: to provide a simple and clear-cut method of demonstrating that a project undergoing environmental review has a less-than-significant cumulative impact on GHGs. Two steps are needed before tiering can be made available: The Plan itself must undergo CEQA review, and the measures must be compiled into a separate list. We find that Appendix C is not adequate for that latter purpose, as it would be unnecessarily confusing to applicants.

To be useful in the real world, the strategies provided to project applicants need to be simple, clear, directive, and uncluttered by theory, explanation or analysis. In other words, the strategies need to be distilled from the text of the Appendix before they can be useful. Because the strategies become part of the development entitlement process, there must be no wiggle-room or ambiguity in how they are drafted. The Plan should explicitly state that these strategies are to be included as conditions of project approval, with appropriate enforcement mechanisms.

We suggest that the Plan call for a checklist of measures that would become part of project environmental review. That list could be subject to its own comment period and come before the Board of Supervisors for approval at the same time as the Plan.

Transportation Measures

Trans-1 calls for mixed-use development near high-quality transit (p. C-34). Marin currently has no high-quality intracounty transit. A substantial increase in operations funding is needed to provide the 15-minute service on major thoroughfares that is the definition of high-quality transit. With transit service only every 30 or 60 minutes, Trans-1 cannot be implemented, because it will be impossible to build the significant choice ridership needed to make TOD work.

Providing transit for TOD is a chicken-and-egg problem. It is difficult to make one of them happen in the absence of the other. TRANSDEF believes the transit needs to be in place first to catalyze the development choices that result in TOD. That's why we stress the importance of securing the resources for Trans-2.1 (p. C-40). (see below for a discussion of funding.) We don't see TOD happening without the "T."

Given the prominence of motor vehicles in the community inventory, we suggest that measure Trans-1.3's achievement of 0.2% of local reductions (p. C-38) is wholly inadequate. A higher VMT reduction goal would be appropriate. We see no substantive reason for the choice of a 10% VMT reduction goal. While it is the goal selected by MTC for its 2013 Sustainable Communities Strategy, that choice is certainly not binding on Marin. Recent countywide transportation plans by Alameda and Contra Costa Counties have shown marked increases in VMT, on the order of 46% and 35% respectively. It would be highly desirable for Marin to set a different kind of example, where VMT is stable or falls over time.

Just as the expected results are overly low for Trans-1.3, it is clear to us that they are overly high for Trans-1.5, Transportation Marketing (p. C-39). TRANSDEF has seen these programs before, and we are not overly enthusiastic about them. Achieving 87.6% of the CAP's transportation results from this measure seems wildly inflated.

The discussion of per-passenger GHG emissions (p. C-42) should be expanded to include these points: 1) The successful implementation of the CAP should result in higher transit vehicle occupancies than the present. 2) Massive congestion in Marin increases the co-benefit value of transit service, especially where buses operate in HOV lanes. TRANSDEF has proposed the creation of peak-hour HOV lanes on arterials.

Transportation Funding

The Plan's methodology of dividing the County into jurisdictions and focusing only on the unincorporated areas misses the forest for the trees: It ignores the County's special dual role. The County of Marin is both one of the 12 Marin jurisdictions creating CAPs, and is also the entity that creates transportation plans for the entire county. Unsurprisingly, the County's Countywide Plan Transportation element has countywide impacts, especially its Implementing Programs TR-1.g, Determine Appropriate Mitigation, and TR-1.j, Install Highway Improvements.

The time has come for a thorough review of the 2007 Countywide Plan Transportation element. The element is internally self-contradictory: The highway improvements facilitate more solo driving, while other policies are designed to reduce driving. The time has come to fully align the Transportation element with the County's climate goals. Policy coherence will require shifting funding priorities away from facilitating solo driving.

In hindsight, it is clear that Policy TR-1.1 was never implemented:

TR-1.1 Manage Travel Demand. Improve the operating efficiency of the transportation system by reducing vehicle travel demand and provide opportunities for other modes of travel. Before funding transportation improvements consider alternatives — such as Transportation Demand Management (TDM) — and prioritize projects that will reduce fossil fuel use and reduce single-occupancy vehicle trips.

TDM has been ignored while transportation improvements continue to get funded. As a result, travel demand has continued to grow. Massive congestion indicates that Policy TR-1.8, Reduce Vehicle Miles Traveled, has entirely failed.

The update of the Climate Action Plan is the appropriate moment to reevaluate the climate-related internal contradictions in the Transportation Element of the Countywide Plan. The CAP should include an action item:

- Review Countywide Plan Transportation Element for opportunities to reduce transportation-related GHG emissions. Give funding priority to CAP measures.

While the County does not control the Transportation Authority of Marin, it does have five votes on TAM's Board. The Countywide Plan and the Supervisors have a lot of influence over TAM project funding decisions. It would be a serious oversight to not harness the County's role in transportation planning and funding as a major component of a coherent Climate Action Plan.

TAM's highest priority is supporting solo driving. It has spent over \$200 million widening highways. Continuing to prioritize funding this way will impede the attainment of the 80% reduction in transportation emissions called for in Governor Brown's Executive Order. With recent science suggesting that climate models have been too conservative, achieving that 80% reduction will probably need to come before 2050.

Appendices

We found the collection of data in the Appendices to be very helpful. Appendix D, the Funding and Financing Options paper, should be especially helpful. Thank you for thinking of including it. We likewise appreciate the Literature Cited Appendix and the Inventory and Forecast Details Appendix.

To make it easier to find the individual component parts of Appendix C, we recommend using very visual section headings to separate 'State Emissions Reduction Strategies' from 'Local Emissions Reduction Strategies--Community' from 'Local Emissions Reduction Strategies--Municipal' from 'Supporting Strategies-Municipal' and 'Supporting Strategies--Community.' Each of these headings should be placed at the top of a new page, to make them easier to find.

We found it odd that the Supporting Strategies-Municipal section of Appendix C reused the very same measure names as Supporting Strategies--Community. It would be far better practice to use unique names for each measure in Appendix C.

Inventories

Our experience with statewide inventories calls into question the exceedingly gentle slope of your projection on page 4-2. Please see our chart on the last page of this letter: http://transdef.org/index_assets/ARB%20Scoping%20Plan%20Update%20Comments.pdf

Forestry Quandry

We wanted to call your attention to a counterintuitive opinion piece published in the New York Times on September 17, 2014. Nadine Unger, an atmospheric chemist, contends in "To Save the Planet, Don't Plant Trees" that there is a paradoxical effect from planting trees. The implication is that natural lands sequestration is not in any way straight forward. We have no way to evaluate her opinions, but thought you should be aware of them, as they relate to strategies such as SP Land Conservation-2, Create New Vegetated Open Space.

We appreciate this opportunity to provide our comments on the Climate Action Plan. We would be pleased to assist in the further development of TDM measures.

Sincerely,

/s/ DAVID SCHONBRUNN

David Schonbrunn,
President

CC:

Supervisor Kinsey
Nancy Whelan, MT
Dianne Steinhauser, TAM

Armanino, Dana

From:
Sent: Thursday, October 09, 2014 5:11 PM
To: Armanino, Dana
Subject: Marin Co. climate action plan and investments

Brian Lamoreaux would like information about:

Hi, I am concerned while Marin Co. may be doing things right be developing good measured steps toward sustainability on one hand with your & others' work by promoting renewable energy and conservation, we are negating this good work and perhaps yielding a net-negative result by keeping and maintaining investments in fossil fuel-based economies. Many County employees have pension plans that are invested in fossil fuels - the problem we find ourselves in is complex and intertwined - it makes sense to fully approach the whole problem, not just some of the problem, or the easy parts, by acknowledging and addressing the entire issue - divesting from fossil fuels toward renewable and socially responsible investments will also have an impact. I am concerned that in Marin we have a culture that is feel-good by doing something green here, or buying organic there, while one the same day we are less consciously doing harmful things like financially supporting enterprises that do not foster the values we tout. Patting ourselves on the back by "greenwashing" in my opinion does worse than saying truthfully with integrity the full nature of the problems we are in, even if we haven't figured out all the solutions yet. Thankfully there are many who have figured out how to divest from fossil fuels and investing in better, more sustainable alternatives. Please make this part of your/our plan. Thank you.

Sincerely,
Brian Lamoreaux
resident of Tomales

October 10, 2014

Mr. Brian Crawford, Director
Community Development Agency
County of Marin
3501 Civic Center Drive, Room 309
San Rafael, CA 94903



Protecting Marin Since 1934

SUBJECT: DRAFT CLIMATE ACTION PLAN UPDATE 2014

Dear Mr. Crawford,

Thank you for the opportunity to comment on this Draft Plan. The Marin Conservation League has been protecting and promoting the welfare of Marin County for over eighty years, and more recently its Climate Action Working Group has been monitoring Marin's responses to climate change. We are encouraged that the County has prepared the present Climate Action Plan, though we have several comments about it.

First, although it is doubtless true that Marin has been near the forefront among jurisdictions in California in responding to the threats of climate change and to the more specific directives of AB32 and other legislation, the tone of the present document seems a bit self-congratulatory. The challenges we face are enormous.

Second, while we feel that the Plan presents a good high level overview of our present climate situation with pie charts and tables, a greater focus on engagement, education and implementation is needed if goals are to be reached. Although an admirable list of strategies is listed for the various arenas such as energy, land use, agriculture, etc., greater detail and focus on those strategies seems warranted. This is where potential conflicts over money and interests will arise. This is where leadership structures and budgets are not yet in place.

Third, the CAP will remain on a shelf unless practical engagement with the public and all levels of government occurs. Countywide leadership, or perhaps new leadership structures, will be needed to lead and coordinate planning. Greater budgeting and dedicated staff should be called for in the Plan. We've seen that with dedicated staff to help motivate action, inertia can be overcome.

Fourth, if the public is to be engaged, the language of the public should be used. Better than using the word "mitigation" to refer to efforts to reduce or avoid the worst damage to the environment, might be the word "prevention". It's not as precise, but it is understandable by everyone. We must strive to prevent further damage. The word "adaptation" changed to "preparedness" is better. We must prepare for what's coming. We simply note that all sectors of society must be reached.

Thank you for the opportunity to comment.

Yours truly,

A handwritten signature in cursive script that reads "Jon Elam".

Jon Elam
President

PHONE: 415.485.6257
FAX: 415.485.6259

EMAIL: mcl@marinconservationleague.org
WEB: marinconservationleague.org

ADDRESS: 175 N. Redwood Dr., Ste. 135
San Rafael, CA 94903-1977





County of Marin:

October 6, 2014

Following are Sustainable Marin’s comments on the County’s Draft Climate Plan Update 2014. Thank you for the opportunity to suggest improvements in the Plan from the sustainability perspective: We must do more, faster, all hands on deck as a community, commensurate with the scale of the challenges the Plan is designed to address.

/s/

Edward A. Mainland, Secretary, Sustainable Marin

1. Introduction, page 1, para. 1: The Plan says climate change poses a “considerable threat” to the environment and human health and society. Scientists say the threat is in fact worse than “considerable”, so the Plan should reflect current scientific views of the threat. Also, the Plan’s first paragraph should note “urgency of action” and “scale of the crisis”, emphasizing the threat’s existential seriousness.

2. Introduction, page 1, para. 4: California’s Executive Order S-3-05 (2006) gives legal force to 80% GHG reductions below 1990 by 2050. Recent scientific findings make clear S-3-05’s reduction trajectory falls well short of what climate stabilization requires, and faster progress is imperative in California, e.g. 80% GHG reduction by 2030 in the electrical sector, 50% GHG reduction by 2030 in the transportation sector. (An internal analysis by Sierra Club California concludes this is realistic and possible using today’s technologies.) The County’s Plan should get on this faster trajectory.

There is widespread lack of attention even to Executive Order S-3-05 in the ranks of municipal officialdom. Officials are generally doing better with near-term targets but are making decisions that compromise the longer goals. For example, Sierra Club has already been obliged to litigate San Diego’s deficient long-range climate and transportation plans. California’s Attorney General joined the suit against San Diego’s long-range transportation plan, in part because it failed to comply with S-3-05.

3. Introduction, page 1, para. 5: Reducing County emissions by 2050 only “significantly” won’t be enough. Stabilization of the climate requires virtually

zeroing out GHG emissions as quickly as possible. The County should state this overall aim clearly, justify it with the latest climate science, and frame it as “climate stabilization”.

4. Introduction, page 1, para. 5: The Governor recently stated to a UN climate summit in NYC that California will be issuing new post-2020 (post-AB32) GHG reduction and renewable power goals “within six months”. S-3-05 has been overtaken by events and new targets will be generated, so Marin’s Plan should contain capacity and flexibility for timely review and updates to stay ahead of these presumably more aggressive new goals, and make this explicit.

5. The Climate Action Plan should show that the County has notified the state that it wants “climate-stabilization-supporting targets” in transportation and other areas, beyond the currently deficient targets. The Climate Action Plan should present and get political consensus for a suite of enforceable local measures that will, along with state mandates and reasonable state policies beyond those mandates, achieve a truly climate-stabilization-supporting target by 2030.

6. The Plan doesn’t get to real reduction programs and how they are calculated until page 188. For editorial clarity and emphasis, put a concise summary of key, highest-leverage action programs in the draft ahead of the verbiage that now precedes them.

7. Avoid wishy-washy verbs that look like an excuse for delay or inaction rather than a clarion call commensurate with the climate-planning challenge. For example, Municipal Transportation 2.2. and 3.2 only call for “*study and where feasible implement* a parking management plan”. Municipal Waste/Wastewater 1.2 calls only for “*considering*” a water monitoring and management system.

8. Some assumptions appear over-aggressive: e.g. Measures Energy 2.2, Energy 3.3 (assuming 20% of existing homes will have installed solar by 2020), Energy 3.4, Transportation 1.5, Municipal Transportation 2.2 and 3.2. We support doing more faster to meet the climate protection challenge but caution against over-promising results on problematic assumptions.

9. The following are high-leverage GHG reduction measures that County and municipalities should support or enable. These might include:

— Phase out natural gas (fossil fuel) water and space heating, and replacement by solar heating, geothermal, highly efficient electric systems or thermal heat pumps. Push for state standards and incentives.

— Support MCE’s long-term aim for all-renewable electricity. Advocate that California, long term, be carbon-free and nuclear-free. Publicize this goal.

-- Give highest priority in the electrical sector to MCE's "Deep Green" program. It promises high-leverage GHG reduction for modest cost as well as potential for community volunteer promotion help. Spur MCE away from over-dependence on Renewable Energy Certificates into real added local distributed renewable systems. As "Deep Green" gathers momentum and capacity, urge MCE to fund local energy efficiency as well as local renewables from the "Deep Green" revenue.

— Support electrification of all transportation. Design, zone and build infrastructure accordingly. Promote charging stations for multiunit dwellings. Prepare for vehicle-to-grid technologies.

— Reduce single-passenger auto commuting by making mass transit more effective, providing bikeways and walkways, move toward transit-oriented development and walkable, liveable communities. Measure proposed programs by how much they reduce GHGs and Vehicle Miles Traveled (VMT).

-- Smart parking is potentially a high-leverage element of any GHG-reducing transportation strategy. The following is a plan to efficiently and conveniently unbundle parking costs. <http://sierraclub.typepad.com/files/mike-bullock-parking-paper.pdf>, Global warming, air pollution, trade deficits, and fairness are some of the significant reasons that governments have a responsibility to implement smart parking. Do a pilot test of unbundling and smart parking with TAM to prove feasibility and scalability.

— Efficiency increases in building energy use (including envelopes and appliances) should be at least 2 percent per year. Conduct an all-Marine "Energy Efficiency Homes and Businesses" Campaign to rally community buy-in for large-scale energy efficiency gains; help businesses and consumers anticipate implementation and compliance with coming higher state standards.

— Aggressively support, enable and implement zero-net-energy and zero-net-carbon building standards. Restore independent expert verification of the actual "greenness" of remodels and new construction. Without verification, compliance tends to be shaky and inconsistent.

— Join with MCE to promote, advocate, incentivize and enable the "new energy paradigm" — the suite of emerging new technologies that will be making distributed renewable power feasible and affordable: e.g., robust energy efficiency, conservation and behavior changes, battery energy storage, "prosumerism" (consumers become producers), "wise grid" management and advanced community-level controls, wireless technology, demand response, microgrids, nanogrids, combined heat and power (co-generation), the "rooftop

revolution” — a combination of concepts now challenging the historically conventional, one-way industrial-scale fossil-fueled utility model.

-- Don't dismiss energy storage as “not ready for five years” (as averred at the Plan's October 6 workshop). Energy storage is ready now to become an essential component of the “new energy paradigm”. Energy storage is at an inflection point; it can now compete with gas-fired peakers for ramping, grid reliability, systems balance and integration of renewables. Encourage MCE's pilot projects with Tesla; streamline permitting of local solar/storage installations.

— Clarify and streamline County permitting of small units of wholesale solar PV in appropriately sited and environmentally appropriate agriculture-zoned locations as a normal element of coming distributed renewable energy systems

— Give priority to scaling up Marin Carbon Project's pilot test composting/mulching of local rangelands to increase carbon storage — it apparently produces significant GHG capture. Resolve any confusion about “counting credits” between County and state so this won't delay scalability.

— Accelerate the County's push toward zero waste by reducing the energy embedded in the products we consume. Promote a shift from “end of the pipe” waste management techniques to looking “upstream” and focus on more sustainably managing materials throughout our economy that otherwise become “waste”.

— Intensify County-MCE-MMWD partnering for water-energy efficiency. Apply for State Water Board's grant money for water-energy “standard offer” pilot project. Encourage “pay as you save” programs for energy and water efficiency.. Stipulate in the Plan that major energy efficiency savings can help avoid major capital expenses for water agencies and drive large GHG emissions reductions.

— Step up coordination, consistency and strengthening of Climate Action Plans among municipalities and County. Retitle them “Climate Stabilization Support Plans” to make clear the character of the crisis these plans are designed to address.

###

Armanino, Dana

From: dalewmiller
Sent: Friday, October 10, 2014 1:42 PM
To: Armanino, Dana
Subject: Climate Action Plan Update

Dale Miller would like information about:
Dana,

I have reviewed the Marin County Climate Action Plan, Public Draft, August 2014.

I would like to commend you for your work on the update to the Marin County Greenhouse Gas Reduction Plan, 2006. It is important that the County of Marin continue to promote measures to reduce greenhouse gases and other damaging pollutants from using fossil fuels.

However, after reviewing the document, I believe this plan basically proposes measures which continue to perpetuate the use of the fossil fuels which produce GHGs rather than specify measures to completely eliminate the use of fossil fuels. The plan relies on small changes to the status quo. The plan does not include any even slightly bold or visionary steps to use the existing, easily available measures to significantly reduce GHGs and provide economic benefits to the County and its residents.

In some sections, such as on page C27, the plan actually recommends increasing the use of natural gas by recommending that residents replace electric clothes dryers with natural gas clothes dryers. Not only does burning natural gas produce GHGs, but much of the natural gas is obtained from fracking. The County Board of Supervisors has passed a resolution opposing fracking, so it is hypocritical for the County to promote expanded use of natural gas.

The plan is based on only 20% of new buildings installing solar. With solar prices now on a par with utility prices, the plan should recommend that all new buildings include solar if the building's exposure permits.

The plan should recommend that the County of Marin prohibit the use of natural gas, propane, or any other fossil fuels in all new residences built or undergoing major remodeling in the County just as double pane windows and low flow toilets are now required. With the availability of 100% GHG-free electricity and solar options, all-electric buildings will contribute to reduced GHG production. The all-electric buildings on the conventional electric grid will automatically become cleaner as grid moves to renewable electricity as is already mandated. Highly efficient electric heat pump systems are available for heating and cooling, electric heat pump water heaters are available (and currently eligible for a \$500 rebate from PG&E), and very efficient induction cook tops can be used for cooking. There is no need for modern residences to burn natural gas.

The proposed plan virtually ignores the benefits that can be achieved by promoting the replacement of gasoline and diesel vehicles with electric vehicles. Transportation is one of the largest sources of GHGs, yet the measures to reduce GHGs from transportation do not take advantage of the many electric vehicles and plug in hybrids that are now available at lease and purchase prices nearly equivalent to gas vehicles.

For just one example, providing low cost 120 Volt outlets for workplace charging for the County employees to encourage the use of electric vehicles by employees commuting to County facilities would yield significant reductions in GHGs and provide an economic benefit to the County. Electricity for vehicles costs approximately one fifth as much as gasoline, therefore the EV drivers realize a significant savings that is primarily spent in the

local community boosting the local economy. The cost of providing outlets for employees and providing about 60 cents worth of electricity per day for the average employee will yield a significant benefit in GHG reduction.

There are also opportunities for reduction of GHGs via support of electric buses. Electric buses are being used successfully in other locations, but Marin is lagging in moving toward electric buses.

I would urge you to revise the plan to include more emphasis on moving to all-electric buildings and electric transportation.

Dale

Marin County Community Development Agency
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Climate Action Plan Updated
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The Carbon Cycle Institute (CCI) appreciates the opportunity to provide comments on the Marin County Draft Climate Action Plan (CAP) Update 2014. CCI is a California non-profit organization working to support the Marin Carbon Project (MCP) and extend its scientifically verified climate beneficial land use management strategies beyond Marin through advocacy and technical assistance.

It is our understanding that the CAP Update builds on the 2006 GHG Reduction Plan and provides an update of GHG emissions in 2012, forecasts of emissions for 2020, and an assessment of actions that the County will take to further reduce emissions by 2020. We understand that the County has set two distinct targets: a community and a municipal emissions reduction target for 2020. While our comments below attempt to address the CAP in its entirety, we focus on the County's Community Emissions Reductions target for the Agriculture sector, which, according to the CAP Update, accounts for 23% of the County's GHG Emissions Inventory.

Our review has resulted in a number of questions, comments and concerns that emanate from our deep sense of urgency and the immediate need to respond to the increasing impacts of global warming. These comments are meant to assist the County to effectively respond to global climate change.

The CAP Update is limited in its scope of work and does not include the necessary analyses required by an effective Climate Action Plan. These analyses include, but are not limited to the following: Carbon sequestration potential of Marin's terrestrial ecosystems; Countywide climate vulnerability assessment; vulnerability of Marin's agriculture sector; and community engagement. This lack of analysis undermines existing climate action efforts in Marin's agriculture sector. By not including a more robust carbon sequestration action plan for Marin's terrestrial ecosystems, Marin County is not recognizing the significant role for Marin's agriculture in the County's climate strategy.

The use of State and National data in the agriculture section of the CAP is unjustified and leads to erroneous conclusions. The County must use and/or develop Marin-County specific data to provide an accurate account of GHG emissions as well as opportunities that the County can leverage from Marin's agriculture sector. It is incumbent upon the County to actively engage the MCP and the County's agriculture community (i.e. farmers, ranchers, the Marin Resource Conservation District (RCD), Marin Agricultural Land Trust (MALT), Marin Organic, UC Cooperative Extension (UCCE) to identify and incorporate potential terrestrial ecosystem reduction and sequestration strategies into the CAP to help the County meet its GHG reduction goals.

During the County's review of our comments and prior to the adoption of the 2014 CAP Update, we recommend that the County:

- Engage Marin County's agricultural organizations including, UC Cooperative Extension (UCCE), the Marin Resource Conservation District (RCD), the Agricultural Commissioner's office, Marin Carbon Project (MCP), Marin Agricultural Land Trust (MALT) and others, to learn what climate-related work has been done on the ground, to strategically organize outreach with local ranchers and farmers to gather their advice and support, and to develop a specific agricultural strategy to address climate change as part of Marin's CAP. By doing so, the County is also acknowledging the interest of Marin's residents, who have requested more sequestration actions and coordination with the agricultural industry (Public meetings held on Apr 14th and 29th, 2014).
- Gather and use local data to review the County's GHG reduction strategies around the CAP's Agriculture emissions inventory. Local data, where available, is referenced in our detailed comments below.
- Review the following publications to increase understanding of the costs of agriculture mitigation practices from a producer's perspective, the quantification of GHG sources and sinks in agriculture and forestry systems, methods for estimating soil carbon stock changes due to agricultural practices, and to revise the agriculture sections of the CAP Update. See links below:
[http://www.usda.gov/oce/climate_change/mitigation technologies/GHG Mitigation Options%20-%20Final%20Report%20\(February%202013\).pdf](http://www.usda.gov/oce/climate_change/mitigation_technologies/GHG_Mitigation_Options%20-%20Final%20Report%20(February%202013).pdf)
[http://www.usda.gov/oce/climate_change/Quantifying GHG/USDATB1939_070_72014.pdf](http://www.usda.gov/oce/climate_change/Quantifying_GHG/USDATB1939_070_72014.pdf)
<http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Annex-3-Additional-Source-or-Sink-Categories.pdf>
- Review other Climate Action Plans (CAP's), to identify how agricultural carbon sequestration practices were incorporated and adopted by other Counties. We would specifically reference the Agriculture Section of Yolo County's CAP, San Luis Obispo County CAP and Butte County CAP. We suggest that you build on these examples to create a more robust agriculture strategy for Marin County. See links below:
<http://www.yolocounty.org/home/showdocument?id=17989>
[http://www.slocounty.ca.gov/Assets/PL/CAP-LUCE/final/SLOCoCAP Board Approved-Complete+Doc.pdf](http://www.slocounty.ca.gov/Assets/PL/CAP-LUCE/final/SLOCoCAP_Board_Approved-Complete+Doc.pdf)
[http://www.buttecap.net/.](http://www.buttecap.net/)

We suggest that the following supporting strategies for the agriculture sector be included in the Final CAP update:

1. Work with local agricultural entities to develop and implement education and outreach programs about carbon farming practices that will enhance carbon sequestration, increase soil health, climate resilience and crop productivity.
2. Work with local agricultural entities to develop an engagement strategy for Marin's agriculture community regarding the vulnerability of the sector to existing and projected climate risks. This should produce a working framework that can be built upon during the development of the agriculture section of the Community GHG Reduction Plan.
3. Assist Marin County's agriculture community, with the support of agricultural entities, to implement and expand carbon-farming practices that have been adopted by local ranchers and farmers, as well as practices that have been supported by local, regional and national conservation efforts and peer reviewed research.
4. Develop, in consultation with local agriculture entities, a Marin County-based NRCS greenhouse gas (GHG) reduction/sequestration best practice list and integrate it into the CAP for implementation, utilizing practices listed under the NRCS Practice Standards for GHG Emission Reduction and Carbon Sequestration.
5. Postpone adoption of the Marin Climate Action Plan Update until the agricultural community, including the MCP, has been consulted and engaged to develop a robust agriculture component to the CAP and strengthen the role of Marin agriculture in reaching the County's climate change and greenhouse gas reductions goals.

Further detailed comments are presented below for your consideration. We look forward to a revised CAP incorporating our recommendations. Please do not hesitate to contact us with questions or for further information.

Sincerely,

Dr. Jeffrey Creque, Director, Rangeland and Agroecosystem Management
Torri Estrada, Director of Policy
Salote Soqo, Program Coordinator, Ag Carbon

*On behalf of the
Carbon Cycle Institute
PO Box 107
Nicasio, CA 94946*

Comments on Updated [draft] Marin Climate Action Plan

For ease of reference, our specific comments are listed below under each heading as listed in the Draft CAP Update. Please note that members of the Marin Carbon Project will be submitting separate, coordinated comments on the Marin Climate Action Plan, specifically focused on agriculture and working lands in Marin County.

Executive Summary

- Introduction (Pg 1-2)
 - The Plan consistently downplays the immediacy and severity of climate change and the urgency of the required response. To address this we suggest reworking appropriate language in the plan as reflected in our rewording of the first paragraph of the Introduction of the Plan's Executive Summary, presented here:
'The County of Marin (County) acknowledges the consensus among leading scientists that without immediate and substantive action to reduce greenhouse gas (GHG) emissions and sequester atmospheric carbon in terrestrial biomass and soils, climate change due to global warming, already underway, will pose a catastrophic threat to the environment and to human health and society'.

- Implementation Program (Pg 12)
 - We agree that "The County faces many challenges—and correspondingly many opportunities—as it moves to reduce GHG emissions," and strongly agree that "Establishing a realistic and effective management program is necessary." We believe, however, that reducing GHG emissions alone is an inadequate strategy "to ensure the CAP Update meets its GHG reduction objectives and is implemented in a timely and efficient manner." Both near and long term sequestration of significant additional quantities of atmospheric carbon –in soil and biomass- is essential in order for Marin County to both meet its GHG reduction and offset goals and enhance the resilience of its natural systems, including agriculture, in the face of advancing climate change.
 - The failure of the draft Plan to engage agriculture as a significant component of the County's climate change response strategy is a serious gap in the overall analysis that must be corrected in the final Plan. We recognize the potential for dairy manure methane capture to result in significant GHG reductions for the agriculture sector and believe these reductions should be supported on a voluntary basis through streamlined permitting and county, state and federal funding mechanisms. Additionally, the county's rangeland soils alone have been shown to have the potential to offset the entire Ag

sector's GHG emissions (Ryals and Silver 2013, DeLonge et al, 2013; Ryals et al 2014), with additional carbon-beneficial agricultural practices broadly recognized as offering significant GHG offset potential and associated mitigation and adaptation benefits (Lal 2004a,b). "For example, increasing the carbon content in agricultural soils...result(s) in an increased ability of soils to retain moisture and allow growers to better cope with droughts that may become more frequent with climate change.... By diverting organics from landfills to produce compost, GHG emissions are reduced at the landfill and the finished compost is useful for soil restoration" (CCRP 2014).

- **Adaptation Plan (Pg 13)**
 - **Sea Level Rise, Extreme Weather Events and Soil Carbon:** With reference to the statement "Given the potential for sea level rise of "1.4 to 5.5 foot increase by the end of the century" and "more frequent flood inundation of low-lying areas of the North San Francisco Bay Estuary (San Pablo Bay) shoreline," (table 7-1), it is ludicrous to state, as on page 13, "there could be a rise in local sea levels." The CAP must include a sober recognition of the inevitability of significant increases in mean sea level and include a discussion of the potential for active land management practices -specifically, carbon farming and paludiculture along Marin's bayshore, to restore wetlands, sequester atmospheric carbon and accrue significant quantities of carbon-rich soil to increase shoreline elevation and buffer storm surges (CCRP 2014). (http://www.paludiculture.uni-greifswald.de/doc/paludiculture_broschuere_eng.pdf)
 - The USGS Twitchell Island pilot project has shown that it is highly feasible to use managed wetlands to sequester carbon and reverse subsidence in the Bay/Delta (http://ca.water.usgs.gov/Carbon_Farm/RandD.html). This is critical information for all Bayshore communities to incorporate into Climate Action Planning efforts.
 - Similarly, given projected changes in precipitation amount, frequency and intensity, the need to enhance the carbon content of Marin's soils to build resilience against an increasingly unstable hydrologic regime is obvious (Sposito 2013, McBratney et al 2014) and should be explicitly addressed in the CAP, including discussions addressing land management strategies to mitigate increased erosion and flooding risks (e.g., p 7-2).

Chapter 1 Introduction and Purpose

1.1 Purpose of the CAP Update (Pg 1-1)

- The plan states that "New development proposed within the county can use the CAP Update to address GHG impacts and streamline project-level environmental review

of climate change impacts under the California Environmental Quality Act (CEQA). The CAP Update therefore serves as a mechanism to facilitate sustainable development as well as a tool to support community-wide reductions in GHG emissions.” Failure to effectively recognize agricultural carbon sequestration potential in the CAP will limit opportunities for agriculture to participate in climate offset projects under CEQA in Marin. As county staff turn to the CAP for guidance on implementing such projects, the “third largest source” (CAP p. 3-5) of GHG in Marin must have a means of addressing both its own GHG footprint and that of other sectors to the full extent possible. Engagement with the CEQA offset process, whether at the County, regional or state level, is essential to realize the full potential of agricultural GHG offsets.

Chapter 2 Climate Change and Regulatory Overview

2.2 Background on Climate Change and GHG Emissions (Pg 2-1 – 2-3)

- **Please correct this misstatement:** *“For example, vegetation is a sink because it removes atmospheric CO₂ during respiration.”* Vegetation removes atmospheric CO₂ during **photosynthesis**.

2.4 Climate Change Regulations (Pg 2-5 – 2-8)

2.4.2 Local Actions (Pg 2-6 – 2-8)

- Section 2.4.2 states *that the CAP Update will build on existing programs and will propose additional strategies that the County and the community can implement to help reduce GHG emissions within Marin County.* Please clarify what it means for the Marin Carbon Project to be a ‘County program’ in terms of how the County will work/support the MCP?
- Please rewrite thus: **Marin Carbon Project.** *This program seeks to identify and implement strategies for enhancing carbon sequestration on agricultural lands and rangelands in Marin and beyond. The project focuses on carbon farming, which implements practices to increase the rate at which carbon dioxide is removed from the atmosphere and converted to plant material and soil organic matter on farms and rangelands. The goal of a carbon farming project is to sequester more carbon from enhanced land management and conservation practices than is emitted through farming operations, making the agricultural ecosystem a net carbon sink capable of offsetting emissions from both ag and other sectors.*

Chapter 3 Updates Emissions Inventory and Forecast

3.2 Overview of Analysis Methods (Pg 3-1 – 3-5)

3.2.1 Community Emissions Overview (Pg 3-1 – 3-3)

- Agriculture emissions under the CAP Update include nitrogen oxide emissions from fertilizer application, methane emissions from manure management and enteric fermentation from livestock in the unincorporated areas. From our review, we understand that NO₂ from fertilizer application is accounted for under ICLEI’s independent consumption-based GHG approach while manure

management and enteric fermentation were accounted for under ICLEI's Community Protocol, and which are also the only emission sources that the ICLEI protocol provides GHG accounting methodologies for. Can the County clarify what other agriculture practices were evaluated for emissions in Marin County and which of these practices were excluded because they were not within ICLEI's protocol?

- We understand that emissions resulting from fertilizer use were calculated based on the total number of acres in California treated with fertilizers, and the standard fertilizer use emission factors from CARB. This method does not take into consideration the type and amount of fertilizer used in Marin County. This approach to calculating emissions from fertilizer use could over-estimate the actual emissions from this source. We suggest that the County provide data on the type and amount of fertilizer used in Marin County to more accurately assess this potential source.
- Also under this section are additional emissions that were estimated for informational purposes, but were not included in the inventory. We recognize that the community inventory was analyzed primarily by ICLEI's Community Protocol for Accounting and Reporting of GHG Emissions (ICLEI, 2012) and that the protocol does not recommend that emissions from these sources be combined with other anthropogenic emissions. (Pgs 10-11 of the ICLEI Protocol states that the protocol does not provide guidance on project level carbon stock/sinks/carbon sequestration/carbon-offset projects.) However, this does not preclude the County from including generally accepted quantitative methods for carbon sequestration practices or from identifying the carbon sequestration potential of existing practices on Marin's forested lands and rangelands and held in above-ground biomass and soils. In order to provide a more accurate picture of the role of Marin agriculture in the County's 'climate action', carbon sequestration potential in these systems need to be effectively incorporated into the Plan.
- Moreover, ignoring carbon sequestration in the Plan ignores the potential for the management of these systems to increase or decrease their carbon stocks. We have suggested a number of ICF/USDA/EPA references. Please review those references, and in consultation with the County's agriculture community, incorporate appropriate information into the Final Marin CAP in a way that these practices can be accounted for and monitored over time.
- We understand that the estimated sequestration rates were calculated at the landscape level using aerial imagery, as the acreage of each land cover type was unknown. The Marin RCD, MALT, and other agriculture-based entities have accurate data regarding land cover types in Marin County. We suggest that the County exhaust all means of gathering data from local organizations/agencies before resorting to generically available data for this analysis, as this could also provide an inaccurate picture of GHG emissions in the County.
- Carbon sequestration from forested lands was not included because ICLEI recommends that this emissions sink be disclosed but not combined with other emissions created by human activity in an emissions inventory. This raises the

need for the CAP to identify the potential avoided GHG emissions that would be realized through the protection and conservation of forested lands in Marin County.

- Total carbon storage in rangeland soils and above-ground carbon stock were not included in the inventory because ICLEI does not recommend combining global atmospheric carbon cycling with other anthropogenic emissions. This is intuitive as total carbon and carbon stock refer to the amount of carbon embodied in these systems, and may over time change depending on the management of these systems. Thus, we feel that it is crucial to identify practices that would affect these carbon stocks in this CAP and how they should be quantified within existing frameworks.
- We highlight that MCP research shows that significant quantities of atmospheric carbon can be sequestered in soils through compost application on rangelands, with several co-benefits (Ryals and Silver 2013, DeLonge et al 2013). The MCP has also registered its rangeland carbon protocol under the American Carbon Registry (ACR) and we suggest that this protocol, along with other existing and registered protocols, be integrated into the Final CAP Update to support carbon sequestration practices to the full extent possible. Ongoing MCP work on Carbon Farm Planning on Marin farms and ranches supports the potential for carbon sequestration through farming practices, including enhancement of above ground and soil carbon stocks.

3.3 Marin County Inventories and Forecast (Pg 3-5 – 3-9)

3.3.1 1990 and 2012 Emissions Inventory (Pg 3-5 – 3-7)

- Page 3-6 shows that agriculture emissions dropped from 122,366 MTCO_{2e} in 1990 to 110,850 MTCO_{2e} in 2012. Page 3-7 describes that this decrease was due to the following:
 1. Herd size decrease and change in composition
 2. Cattle emission factors slightly increased (due to a change in diet)
 3. The number of “non-livestock animals” (sic) (chickens, goats, swine) increased, raising emissions slightly. *Please explain how these factors were determined?*
- Please correct the misstatement: “The number of non-livestock animals (chickens, goats, swine) increased, raising emissions slightly.” Perhaps this was meant to read, “...number of non-cattle/non-bovine livestock ...?”
- Page 3-7 describes that total tons of waste going to landfills decreased, due to expanded recycling and composting programs. Please provide data to support this.
- Table 3-1 shows the 2012 rangeland soil carbon stock as 10,783,021 MT C, emissions for aboveground carbon stock as 7,248,888 MT C and emissions for forestry as -207,141 MTCO_{2e}. The MCP has shown the potential carbon sequestration rate that can be achieved through a one-time application of one-half inch of compost application on Marin’s rangeland in MTCO_{2e} units (i.e. 1 MTCO_{2e}/ha/yr). We suggest that the CAP use this data to scale out the potential rangeland carbon sequestration on Marin’s rangeland system and incorporate this figure in the Final CAP Update.

3.3.2 2020 Business-as-Usual Forecast (Pg 3-8 – 3-9)

- The CAP update expects that agriculture emissions will slightly decrease relative to 2012 as a result of expected reductions in overall agriculture activity. Can you please provide data that supports this statement? Our research shows that Marin agriculture production recorded its highest value ever at \$80,365,289 in 2012, a growth of \$2,520,009 from 2011. Agriculture production gross value has been steadily increasing for the last 10 years and crop agriculture has been expanding in Marin County.
http://www.marincounty.org/depts/ag/~/_media/Files/Departments/AG/Crop%20Reports/2012.ashx.

Chapter 4 Community GHG Reduction Goals and Measures

4.2 Marin County GHG Reduction Goals (Pg 4-1 – 4-2)

- Page 4-1 highlights in two instances the need for the combination of State and local policies, as well as the participation of local residents and businesses in achieving the County's 2020 goal (i.e. 30% below 1990 levels), and that reaching this goal would avoid the generation of 97,000 MTCO₂e and reduce emissions to 393,000 MTCO₂e from 490,848 MTCO₂e under the BAU scenario.
 - The development of the agriculture section of this Draft CAP Update did not actively solicit the participation of the agriculture community in the County. We request that the County conduct outreach to the agriculture community on this Draft CAP Update and the recommendations that have been made, solicit their input and integrate their feedback and suggestions.
 - With relation to meeting the County's 2020 goal, and as mentioned above, the MCP research has found that a one-half inch application of compost on grazed rangelands can sequester up to 1 MTC/ha/yr for over 10 years. Up-scaling this to a County-wide level presents a significant opportunity for Marin County to meet and exceed this goal.
 - MCP has also conducted Life Cycle Analysis research to quantify the amount of avoided emissions that can be achieved through the application of composted organic materials as compared with manure and inorganic fertilizers. We suggest that you incorporate this information into the Final CAP.
- Page 4-2 states that the County has identified 13 local actions (voluntary and/or incentive based programs) that will reduce emissions from both existing and new development in the County and that all these actions will be coordinated under a GHG Reduction program. Please provide a framework for how the GHG reduction program will identify strategies for the agriculture sector.
- Table 4-2, Agriculture, should read: "Methane Capture and *energy generation* at Dairy Operations." Only dairies accumulate manure in anaerobic ponds with methane capture potential in Marin. "Other livestock operations" probably do

not represent methane capture potential in Marin County. However, local food waste diversion to dairy digester facilities may offer significant GHG offset potential and should be explored in more detail in the Plan.

- The Plan sets a methane capture and combustion goal for dairies and livestock operations of 4,638 MT CO₂e, or 14% of overall 2020 reductions, but actual potential may be an order of magnitude higher than this, as shown below.

Comment Table 1. Opportunities to Capture Methane and Generate Electricity with Anaerobic Digestion Of Dairy Manure, Marin County (based on US EPA (2011) equations).

Factors (assumes anaerobic lagoon storage)

Estimated number of Marin dairy cows, captured manure	8,000
Manure capture efficiency (CE, balance assumed deposited directly on pasture)	0.65
Typical animal mass (TAM), ^a lb/cow	1,332
Total VS excretion rate (VS _E), lb VS/1,000 lb animal mass day	10.1
B ₀ , ft ³ CH ₄ /lb VS	3.84
MCF in California, decimal	0.741
CH ₄ density, lb CH ₄ /ft ³	0.041
CH ₄ emissions, ^b tons CH ₄ /yr	1,489
CH ₄ emission reduction from biogas capture, ^c tons CH ₄ /yr	1,489
Equivalent reduction in CO ₂ emissions, ^d tons CO ₂ /yr (CH ₄ x 34)	50,641

^aThe TAM, B₀, and MCF values were obtained from EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008*.

^b CH₄ emissions are calculated using the equation: Milking cow population x VS_E x TAM/1000 x MCF x B₀ x 0.041 lbs/ft³ x 365 days/year x 1 ton/2000 lbs x CE = 8000 x 10.1 x 1332/1000 x 0.741 x 3.84 x 0.041 lbs x 365 days/year x 1 ton/2000 lbs x 0.65 = 1,489 tons CH₄/yr = 50,641 tons CO₂e/year. This is nearly half of the 2020 projected emissions for agriculture under a BAU scenario (110,798 MT CO₂e), and nearly half of the overall community emission reduction goal for 2020. The use of biogas to generate electricity further reduces CO₂ emissions from conventional power generation sources because fewer fossil fuels are combusted by electric power plants, suggesting methane capture with energy conversion alone could potentially offset all or nearly all of 2020 ag emissions under a BAU scenario.

^c Note: it is assumed that biogas combustion destroys essentially 100 percent of baseline methane emissions. This analysis assumes CH₄ has approximately 34 times the heat trapping capacity of CO₂. CO₂ Equivalents = CH₄ Emissions x 34 (Myhre et al 2013).

4.3 CAP Framework (Pg 4-2)

4.3.2 Emissions Reductions (Pg 4-4)

- Section 4.3.2 states that strategies that do not currently support a quantitative reduction analysis are provided as supporting measures that strengthen the quantified measure, and although emissions reduction have not been quantified for these strategies, they are still an important part of the CAP Update. The MCP is listed as a supporting measure in the CAP Update. To avoid any confusion with the capability of the implementation of supporting strategies for the development of carbon offset or carbon sequestration projects, we suggest that this section be extended to read.....*and its exclusion in the GHG inventory does not prevent these strategies from being implemented for the purposes of participating in the carbon market.*
- *Further development and implementation of these strategies may result in sufficient data to quantify GHG reductions in the future.* Please incorporate information provided with these comments as you review this section of the CAP.

4.4 Meeting Marin County's GHG Reduction Goals (Pg 4-6 – 4-7)

- Table 4-1 on page 4-6 lists GHG reduction targets by sector. Agriculture is required to achieve a GHG reduction of 579 MTCO_{2e}. We note that MCP research suggests that this reduction can be achieved with a one half inch compost application on 579 acres of grazed rangelands.
- Under Agriculture, the County has identified the MCP as an action that will reduce emissions in the agriculture sector. For clarification, the MCP is not an action to be implemented – the action in this case is the application of one half inch of compost on grazed rangelands and the implementation of carbon farming practices.

4.5 Measures to Reduce GHG Emissions (Pg 4-8)

4.5.2 Local Measures (Pg 4-8 – 4-13)

- Waste Reduction, Reuse and Recycling (Pg 4-10)
 - ICLEI's Recycling and Composting (RC) Emissions Protocol (2013) outlines the additional benefits of composting that can be acknowledged in the CAP Update. This RC protocol also includes an estimated emissions reduction factor for one benefit of composting not currently included in EPA's Waste Reduction Model (WARM); the reduction in emissions associated with producing commercial fertilizers which may be displaced due to the use of compost. *As identified above, the MCP has conducted a comparative Life Cycle Assessment (LCA) of compost, manure and inorganic fertilizer application on rangelands, which shows that compost application achieves significantly greater avoided GHG emissions than manure or inorganic fertilizer.*

- Agriculture (Pg 4-11 – 4-13)
 - **Methane Capture:** Agriculture is attributed with 23% of community emissions, or 110,000 MTCO₂e/year. Most of this presumably originates as methane from livestock manure storage, with some nitrous oxide emissions probably coming from barns and loafing yards (Owen and Silver 2014). Given the importance of the dairy industry in Marin, and the potential for methane capture and electricity production on dairies to both eliminate much of this source of GHG and foster avoidance of GHGs through renewable energy production, Marin County should pursue funding and regulatory relief to rapidly accelerate voluntary universal methane capture and energy conversion on all Marin County dairies with liquid manure handling systems (US EPA 2011).
 - “CARB has identified digesters as having the largest potential to reduce agriculturally related GHG emissions in California...Covering manure and flaring the gas requires relatively simple technology. In California, candidates for lagoon covering are only those farms with existing anaerobic lagoons, because new lagoon construction or significant modifications would likely require stringent permit requirements from local authorities which entail substantial costs.” *Pursue regulatory relief to quickly advance these projects.* “The cost calculations presented below do not include the cost of lagoon construction. Total costs for a covered lagoon system ranges from \$0.1 million for a herd of 300 cows (\$333 per cow) to \$0.9 million for a herd of 5,000 cows (\$180 per cow) Based on these costs, the break-even prices of carbon offsets per MTCO₂e are: \$5 per MTCO₂e for 5,000 cows; \$7 per MTCO₂e for 1,000 cows, \$8 per MTCO₂e for 600 cows, and \$9 per MTCO₂e for 300 cows” (Lee and Sumner 2014). *These practices should be strongly subsidized by public dollars, including County of Marin.*
 - In over 30 states, “...electricity produced from biogas may qualify operations with a digester to receive renewable energy credits or a premium price for their green power.” (US EPA 2011). While “specific sites conditions, such as energy contracts, environmental permitting requirements, and other variables will impact the economic feasibility of projects” (US EPA 2011), Marin County could offer dairy producers a premium price through Marin Clean Energy and/or aggregate dairy methane projects for submission as CEQA offsets and/or through CAPCOA’s GHG offset registry. Centralized digester systems are designed to gain economies in digester operation by using the manure from a cluster of dairy farms (Lee and Sumner 2014), but new and emerging biogas recovery technologies suggest this approach may be applicable even to Marin’s smaller dairy operations (Greer 2010), particularly as the value of carbon offsets increases. Recent increases in the

estimated global warming potential of methane (Myhre et al 2013), from 21 to 34 times that of CO₂, also potentially improve the economics of methane recovery as a GHG offset strategy for smaller dairies.

- To be economically feasible, digesters in California must be designed per regulatory constraints, maximize operational efficiency through the use of recovered heat and co-digestion where possible, capture all potential revenue streams, and secure power purchase agreements or offset their own energy use at favorable prices (Lee and Sumner 2014). Achieving these conditions is extremely challenging, but could be made less so by the active engagement of County regulatory agencies in support of such projects and by the use of Marin dairy digester projects for CEQA mitigation at a CO₂e value high enough to render projects economically viable.
- Note Owen et al (2014) report an order of magnitude higher CO₂e emissions from dairies with liquid vs. solid manure handling systems, suggesting the importance of specifying precisely what types of systems are represented in the County and in what numbers in order to accurately assess GHG emissions and offset potential. Compost barns, as solid manure handling facilities, may offer a viable alternative to liquid systems with methane capture. A full lifecycle assessment of manure management options should be conducted for Sonoma/Marin regional dairies.
- P 4-11; Marin Carbon Project, suggested rewrite:
The Marin Carbon Project (MCP) is a consortium of the leading agricultural institutions and producers in Marin County, university researchers, and federal agencies, and nonprofit organizations seeking to understand and demonstrate the potential of enhanced carbon sequestration in Marin's agricultural and rangeland ecosystems (Marin Carbon Project 2013). MCP works to enhance carbon sequestration in rangeland, agricultural, and forest soils through applied research, demonstration and implementation, and facilitates development of a carbon market that supports soil carbon sequestration efforts in Marin County and globally.
MCP demonstrates and promotes the concept of *carbon farming* through an integrated planning and implementation process that includes agricultural practices known to improve the rate at which CO₂ is removed from the atmosphere and converted to plant material and/or soil organic matter. Carbon farming is successful when carbon gains resulting from enhanced land management and/or conservation practices exceed carbon losses. MCP has launched a demonstration carbon farm program in the County, starting on three farms, and is securing the policy and economic supports necessary to support adoption of carbon-beneficial practices at scale in Marin County.

The farms, Stemple Creek Ranch (700 acres), Straus Dairy (500 acres), and Corda Ranch (850 acres), have already applied nearly 4,000 cubic yards of compost to their rangelands and are working to complete the Carbon Farm Planning process. The farms will continue to work with MCP and the Natural Resources Conservation Service (NRCS) to identify farm management practices to compliment compost application by building soil carbon and soil health and improving productivity and forage quality. Each Carbon Farm Plan includes known climate-resilience and carbon- beneficial practices such as windbreaks, riparian and range management improvements, and grass, shrub and tree establishment.

- P. 4-11, footnote 12 is confusing as written: suggested rewrite: “Individual project proponents could also sell GHG credits associated with these installations on the voluntary carbon market to offset GHG emissions due to other activities. To the extent that project proponents sell GHG credits offset GHG from other activities, these same credits may not be applied to local GHG emission reductions. Nevertheless, Carbon Markets offer opportunities for agriculture to provide offsets and be financially compensated for doing so, including the sale of offsets that could be credited to local GHG reduction and then be retired, rather than being sold as offsets for other projects.”
- P 4-12. Suggested rewrite of paragraph on MCP and carbon credits:
MCP is exploring the opportunity for agriculture to receive carbon offset credit through California cap and trade or other carbon markets for on-farm climate beneficial practice implementation. The MCP market protocol for compost application to grazed grasslands, for example, *has been* approved by the American Carbon registry, effective October 2014. Numerous other agricultural practices, broadly recognized as GHG beneficial, are also available and already often employed by Marin County farmers and ranchers. The GHG benefits of these practices can be quantified through the use of models such as NRCS COMET-Farm, or less complex tier-1, practice based methods. This CAP does not include any specific reduction “credit” for specific practices, but recognizes the significant potential for agriculture to contribute to climate change mitigation and resilience through the implementation of such practices, and supports recognition of such practices as offsets for CEQA compliance under County, BAAQMD and CAPCOA authorities. For example, the County **Greenhouse Gas Performance Standard for New Development** (see below) offers a mechanism whereby developers unable to reduce GHGs below the required threshold could purchase offset credits to support GHG-beneficial practice implementation

on Marin agricultural lands.

MCP research supports the potential for a *single one half inch* compost application (65 cubic yards per acre) to Marin's grazed grasslands to result in the sequestration of one and a half tons of CO₂e per acre *per year* for up to 30 years, *for a net GHG benefit of over 30 tons per acre over a 30 year period* (Ryals and Silver 2013, DeLonge et al 2013). With some 160,000 acres of rangeland in Marin, the GHG implications of widespread adoption of this practice are evident. Similar rates of GHG sequestration can be achieved through numerous standard NRCS on-farm conservation practices. Practices include use of compost from local community waste streams, no-till and reduced-till practices, reduced fossil fuel use, cover crops, windbreaks, improved grazing practices and restoration of riparian areas, among many others.

The County supports the efforts of the MCP and the efforts of Marin farmers to implement on-farm practices that help to address greenhouse gas emissions, consistent with County policies found in the Countywide Plan and other County directives. This program is supported by a number of *Marin Countywide Plan* policies. These measures are detailed in Appendix C.

- Page 4-12 states... *since MCP is exploring obtaining carbon credits related to the work being done by Marin farmers for potential sale in the CA cap and trade or other carbon markets, this CAP does not include any specific reduction 'credit' for MCP, (What would it look like if it did? Is it the CAP's role to specify a reduction credit?), as one cannot quantify as a valid offset credit if the reductions can be claimed under an existing reduction scheme. Thus, to avoid any double-counting of reductions and to avoid any impediment to MCP and local farmer's effort to potentially obtain economic incentives through sale of offset credits, the MCP reductions are not presumed in this CAP.*
 - The primary goal of the MCP is to reduce and reverse global warming. The mechanics of achieving this goal will involve the exploration of various economic models that will enable agricultural producers to implement carbon sequestration practices and sustain their operations. Participating in the carbon market is not the sole economic incentive. As written, this statement downplays the potential of the MCP to actually reduce emissions and undermines the protection and conservation of agricultural systems in Marin.
- Page 4-12 also states that the county supports voluntary BMP's for ag, which may include adding compost from local community waste streams to the soil, using no-till practices, etc. and that the county will also encourage the conversion of land grazed full-time to land with grazing managed to maximize environmental benefits.

- We note that these BMP's also have a carbon sequestration rate associated with them, and most of these BMP's will also be incorporated in the Carbon Farming Planning process.
 - Can the County define what measures the County envisions to 'support' and 'encourage' these practices?
- GHG Performance Standard for New Development (Pg 4-13)
 - P 4-13; **Greenhouse Gas Performance Standard for New Development; suggest rewrite:** New development in the county has the potential to be an important contributor to the County's GHG emissions reductions efforts. Through ensuring quantification of GHG emissions associated with new projects and the development of reduction measures to reduce *and/or offset* these emissions, the GHG Performance Standard for New Development would result in reductions of GHG emissions by 2020.
 - The County's Performance Standard for New Development (PS) would provide a streamlined and flexible program for new residential and nonresidential projects to reduce *and/or offset* their emissions. The PS would include performance standards for new private developments as part of the discretionary approval process under CEQA. Under the PS, new projects would be required to quantify project-generated GHG emissions and adopt feasible reduction *and/or offset* measures to reduce project emissions to 30% below BAU project emissions. The PS does not require that project applicants implement a predetermined set of measures. Rather, project applicants are encouraged to choose the most appropriate measures for achieving the percent reduction *and/or offset* goal, while taking into consideration cost, environmental or economic benefits, schedule, and other project requirements.
 - We suggest including a discussion of BAAQMD and/or CAPCOA as agencies engaged in offset protocol approvals or offset project coordination.

Chapter 6 GHG Reduction Measure Implementation Program

6.2 Marin County Sustainability Team (Pg 6-1 – 6-2)

- Section 6.2 states that the responsibility of implementing the strategies (Please clarify whether these are quantitative strategies only or both quantitative and supporting strategies) and ensuring that emissions reductions are achieved in a cost-effective manner lies with the Sustainability Team, which is a division of the CDA. A list of their responsibilities is shown on pages 6-1 and 6-2.
 - With relation to the MCP, we suggest that the CDA support the MCP by making CEQA offset credits available to the agriculture sector.
 - Included in this list of strategies is 'engaging the community and stakeholders. Although not explicitly stated, the language under this section (and section 6.6) suggests that community engagement regarding the

implementation of each emission reduction strategy will be done post CAP adoption. We strongly recommend that the County engage the agriculture community on GHG reduction strategies prior to the adoption of the CAP.

6.4 Implementation Schedule (Pg 6-2 – 6-5)

- Section 6.4 describes the implementation schedule of strategies and how it was determined that strategies fall under specific implementation timelines. We suggest that the County work with agriculture producers to come up with a GHG reduction target within the suggested timelines and assist them in determining the resources that they would need to achieve those targets. This information could then be used to develop the Agriculture framework of the GHG Reduction Plan.

6.5 Funding Strategies (Pg 6-5)

6.5.2 Community and Project Level Financing (Pg 6-6 – 6-7)

- The County has identified under section 6.5 that it will have a leadership role in identifying and pursuing relevant funding for some candidate strategies and that the private sector will also need to pursue different funding options. Appendix C shows that the upfront costs for implementing most of the strategies were not estimated. No potential funding source was identified for the agriculture sector in Table 6-3. Also, it is not clear whether potential philanthropic funds were accounted for in these sections of the Plan.
- Successful climate action on any scale largely depends on the availability of funds and the practicality of funding modalities between recipients and funders. A County can identify thousands of climate actions in its CAP, but without funds and workable funding modalities, CAP's are essentially ineffective and feckless. We urge the County to think outside the box and to find innovative funding solutions for its CAP and to leverage the County's wealth and resources to subsidize existing climate action funds.
- Since the Draft CAP Update was released, a lot of progress has been made regarding the State's Cap and Trade funds, the State water bond, USDA's wetlands and farmland conservation funds, etc. We recommend that the County identify potential opportunities from these funding streams for the implementation of agriculture supporting measures and incorporate them into the Final CAP Update.

6.8 Regional Collaboration (Pg 6-8 – 6-9)

- Section 6.8 lists partners for regional collaboration. We suggest you include Agriculture under this section and identify potential partners such as the Natural Resources Conservation Service (NRCS), US Department of Agriculture (USDA), California Resource Conservation Districts (Marin, Sonoma, Goldridge), California Climate and Agriculture Network (CalCAN), California Rangeland Coalition, Community Alliance with Family Farmers (CAFF), etc.

6.9 Beyond 2020 (Pg 6-9 – 6-10)

- **Suggested rewrite:**In order to reach 80% below 1990 emissions levels by the year 2050, the County would need to reduce community emissions to 112,370

MTCO_{2e}, as illustrated in Figure 6-2. Based on population forecasts from ABAG, this is equivalent to 1.4 MTCO_{2e} per capita or 1.1 MTCO_{2e} per service population (population + employment). Current emissions in 2012 are 7.1 MTCO_{2e} per capita and 5.7 MTCO_{2e} per service population. This demonstrates the scale of the challenge to get to 2050 recommended levels *and makes it clear this goal will not be met by emission reductions alone. Significant terrestrial carbon sequestration efforts must, therefore, be an integral component of the County CAP.* Because the County has adopted an aggressive target of 30% below 1990 levels by 2020, the County is currently ~~on the right track to meet the 2050 target, and is ahead of the AB 32 goal for 2020 (1990 levels).~~ The County's 2020 target is equivalent to 5.7 MTCO_{2e} per capita or 4.5 MTCO_{2e} per service population, *underscoring the challenge associated with meeting the 2050 goal of 1.4 MTCO_{2e} per capita or 1.1 MTCO_{2e} per service population and the need for a much more aggressive approach to GHG reduction and sequestration moving forward.*

P 6-10, Footnote¹⁴; “According to the IPCC, “an increase in the global average temperature of 2°C (3.6°F) above pre-industrial levels, which is only 1.1°C (2.0°F) above present levels, poses severe risks to natural systems and human health and well-being.” In order to avoid temperatures above those levels, we need to stabilize atmospheric GHG concentrations at 450 parts per million (California Air Resources Board 2014).” ***This information is dangerously deceptive and outdated. Natural systems and human health and well-being are already at high risk, and GHG concentrations are already at or above 479 ppm, accounting for CO₂ (400 ppm), CH₄, NO₂ and other GHGs (<http://www.esrl.noaa.gov/gmd/aggi/>).***

Chapter 7 Climate Change Adaptation

7.1 Introduction (Pg 7-1)

- ***Suggested revision:*** Climate change planning *includes at least two distinct response categories—mitigation and adaptation. Mitigation* refers to minimizing the *magnitude* of climate change, primarily through adopting GHG reduction strategies, *including drastic reduction of GHG emissions and significant increase in GHG sequestration.* However, even with the adoption of aggressive mitigation actions, climate change *is already underway and cannot be completely avoided.* *Adaptation* refers to *actions taken to minimize the disruption resulting from the impact of unavoidable climate change effects.*

7.2 How the Climate May be Changing in Marin County

- Suggested re-write: How the Climate Is Changing in Marin County

7.3 Status of Adaptation Efforts in Marin County (Pg 7-5)

7.3.2 Additional Efforts Needed (Pg 7-6)

- Although a large number of adaptation activities are underway, there has not been a

consolidated look across sectors and climate change stressors, at the vulnerabilities of Marin County. A more comprehensive, county-wide vulnerability assessment would help highlight where resources should be focused under adaptation planning efforts. ***Why is this not the focus of this Climate Action Plan? Marin appears to be kicking the can down the road on climate change action.***

7.4 Potential impacts of climate change on Marin County's sectors and potential adaptation actions (Pg 7-7 – 7-9)

- **Table 7. 2. Agriculture;** Reference is made to the following bullet points. This list is apparently derived from somewhere other than Marin. It would be vastly improved by engaging with agricultural practitioners and institutions in Marin County.
 - Adjust growing season and planting methods or select varieties of plants that are heat resistant.
 - Grow different varieties of plants and crops that are more tolerant to variability or projected climate conditions.
 - Develop plan for animal safety in the event of an extreme event such as a flood, storm surge, or extreme heat.
 - Use buffers to modify and reduce fertilizer and pesticide application to address potential increases in polluted agricultural runoff from floods, inundation, and erosion.

7.4.4 Agriculture (Pg 7-12)

- Under section 7.4.4 the CAP recommends that the County Department of Agriculture and independent farmers and ranchers take a lead on conducting a vulnerability assessment and identify the appropriate adaptation options that are appropriate for the region, while also increasing their collaborative efforts with the Marin Municipal Water District, Marin County Fire, CDA and Marin County Flood Control and Water Conservation District. Why is this not part of this CAP? In order to assess how the Agriculture sector will adapt to climate change, we need to first identify the vulnerabilities and risks of climate change to this sector, its producers and its consumers. This plan has already identified adaptation measures that are not relevant to Marin's Agriculture landscape and is now recommending in this section that its communities need to assess their own vulnerabilities. We suggest that this Plan reframe this section as an important action item for Marin's climate adaptation and mitigation moving forward. As a first step toward this, we suggest that the County increase its scope of work for the CAP to facilitate the suggested 'collaboration' between these groups and to agree on a scope of work that the County will then integrate into its CAP.

Appendices

Appendix A Summary of Adaptation Actions

- Agriculture
 - **Riverine Flooding:** *Please edit this language for clarity of meaning:*
"Develop a watershed plan to mitigate flooding that is built off existing

floodplains and takes into account potential for changes in precipitation patterns (e.g., heavier rainfall events).”

“Use buffers to modify and reduce fertilizer and pesticide application to address potential increases in polluted agricultural runoff.”

- **Sea Level Rise:** Under mitigation, include a discussion of the potential for active land management practices along Marin’s Bayshore -specifically, carbon farming and paludiculture- to restore wetlands, sequester atmospheric carbon and accrue significant quantities of carbon-rich soil to increase shoreline elevation and buffer storm surges (CCRP 2014). (http://www.paludiculture.uni-greifswald.de/doc/paludiculture_broschuere_eng.pdf)
- **Shift in Water Demand/Supply:** include enhancement of water holding capacity of Marin’s agricultural soils through use of compost and other soil organic carbon enhancement strategies per Marin Carbon Project Carbon Farm Planning protocol.
- **Warming/acidification of Bay and Coastal waters;** add language supporting maximization of shellfish production options within the County to enhance County-wide resilience against potential warming/acidification impacts in specific shellfish production waters

Appendix B Inventory and Forecast Details

- Forestry
 - “Calculation of GHG emissions sinks from carbon sequestration from outside the agricultural sector in forest, timberland, scrubland, non-rangeland grasslands and wetlands as well as urban forests.” Given the high percentage of forest cover on Marin agricultural properties, how was forest land distinguished from agriculture land? It would be helpful to present this in tabulated form in an appendix, so that, for example, forested ag land can be distinguished from forested non-ag lands. This will help in quantifying agriculture’s position as a source or sink for GHGs.
- Rangeland Soil Carbon Stock
 - The plan cites *A Low-Cost, High-Benefit Approach to Climate Change Mitigation* (Silver and Ryals 2009), but ignores subsequent significant peer-reviewed work done by Silver, Ryals and others, including a full lifecycle assessment of the rangeland compost practice (Ryals and Silver 2013, DeLonge et al, 2013). The final plan should include an in-depth discussion of the potential for rangeland/agricultural soils to play a significant role in Marin’s climate change response strategy.
 - B-18; Rangeland Soil Carbon. Given the wide range of soil carbon values presented in the single cited data source (Silver and Ryals 2009), it would be helpful to know how rangeland soil carbon stock values were determined. Given the significant carbon sequestration potential in Marin county rangeland soils (Ryals and Silver 2013, DeLonge et al 2013), it is important to forecast that potential in the overall context of agriculture’s potential role in

- GHG mitigation for Marin. While there may be some “uncertainty about future change in land cover types “in Marin, rangeland acreage is highly unlikely to change significantly in the foreseeable future.
- It is equally important, given the findings of the Marin Carbon Project (Ryals and Silver 2013, DeLonge et al 2013), that the link between the County’s organic waste streams, including livestock manure, food waste and other organics, and its agricultural carbon sequestration potential, be made explicit in the CAP.
 - P. B-16; Please clarify this statement: “Standard emissions factors from USEPA and CARB, and 2012 ICLEI Community Protocol equations specific to manure management were used to estimate emissions **resulting from manure use for the livestock population** in the county.”
 - Please tabulate this data in the appendix, with respect to enteric fermentation, lagoon storage of manure on dairies, and other manure handling and spreading practices. Recent work by Owen and Silver (2014) is highly relevant here.
 - P. B-17. “Emissions resulting from fertilizer use were calculated using the number of acres treated with fertilizers from the USDA’s agriculture census for the years 2000 through 2010 (U.S. Department of Agriculture n.d.)” This data has a high probability of being inaccurate for Marin, which is dominated by organic agriculture and uses relatively little synthetic nitrogen fertilizer. At a minimum, it would be good to see this data tabulated in the appendix.
 - Strategies to address potential catastrophic livestock mortalities due to extreme heat, via on-site composting, for example, should be addressed in the ag component of the plan.

Appendix C Reduction Strategy Details and Analysis Methods

- Agriculture
 - Suggested changes to this section: Assume 80% of dairies will install methane digesters and that no other ag facilities will do so.
 - Footnote 4 suggested rewrite: ⁴ *Individual project proponents could also sell GHG credits associated with these installations on the carbon market. To the extent that project GHG credits are used to offset GHG emissions due to other activities, they may not be taken as “credit” in reducing local GHG emissions.*
 - Changed Assumptions around methane capture:
 - Participating dairies *will capture 65% of methane emissions from manure management.*
 - *80% of milking dairy cows in the County will feed the methane digesters (see Comment Table 1)*
 - *75% of captured methane would be combusted to produce electricity.*
 - *Analysis Method: 2020 BAU Manure management emissions from dairy cows, ~~beef cows, and other cattle~~ were multiplied by 52% (80% participation rate * 65% total capture rate) to determine GHG emission reductions from this measure. Total captured methane was multiplied by 75% to calculate the amount of methane combusted for electricity generation.*

- Under Ag Supporting Practices (page C-73), the CAP describes the MCP again, but does not identify how the County would use the MCP to reduce its emissions or to support quantitative strategies.
- Land Conservation
 - Under Land Conservation (page c-74), the CAP describes very generally how the County will protect conservation areas and create new vegetated open spaces by encouraging... preservation and restoration... with no other specific actions stated thereafter. We suggest that the County increase its work with the Marin RCD and MALT to promote conservation, assist them in seeking funding opportunities and integrating climate mitigation and adaptation into their programs.
- Energy Efficiency and Renewable Energy
 - C-29, **Tree Planting**. 310 trees per year is a very low number; suggest increasing this to not less than 3,100 trees per year. Failure to include the carbon sequestration benefits of tree planting misses a significant opportunity to reduce atmospheric GHG levels. As per agricultural comments, please include sequestration potentials in this sector.
 - C-56, **Energy-1.5. Shade Tree Planting** Objective: Promote the planting of shade trees around County facilities. *Plant 100 new trees* each year as part of this goal. Promote California natives or low water trees and include irrigation upgrades to support tree health until established. *Promote use of compost and mulch in all planting projects.*

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October 10, 2014

Dana Armanino
Sustainability Team
Marin Community Development Agency
3501 Civic Center Drive
San Rafael, CA 94903

RE: Draft Revised Marin Climate Action Plan (MCAP)

Dear Ms. Armanino,
Thank you and your staff for compiling a thorough roadmap for climate action in Marin County for the remainder of this decade and beyond.

Sustainable San Rafael strongly supports these MCAP elements:

- The doubling of the County goal to achieve a 30% reduction of greenhouse gas (GHG) emissions by 2020. We urge adoption of this near-term goal.
- The trajectory established by the revised goal that would put Marin on track to achieve the 80% GHG reduction required by both the State and the science to begin to meaningfully slow climate change. We urge ongoing planning during the next five years to identify ways to achieve this goal.
- The emphasis on climate 'adaptation' to begin to prepare Marin for the impacts and costs of the climate change already baked in by the burning of fossil fuels over the last century and a half. As a first step, we urge immediate funding of a countywide Climate Vulnerability Assessment, in coordination with other Marin jurisdictions—and including cost projections and a budgetary policy that spending on preparing for and recovery from climate impacts will be at least matched by spending on reducing climate change impacts by reducing carbon emissions.

We also suggest the following revisions to further strengthen the Plan:

- Specific strategies for County leadership and coordination of climate actions throughout Marin and with regional agencies.
- Identifying and lobbying for State and Federal actions supportive of local and regional climate actions.
- Establishing a rapid timeline for 80% reduction of GHG emissions in accordance with increasingly accurate scientific projections of what is now needed to achieve actual climate stabilization.
- Increased attention to incentivizing the large-scale adoption of electric vehicles to rapidly reduce car emissions, the largest source of Marin GHGs.
- Establishing aggressive timelines to achieve a 'green grid' of 100% renewable power and 'zero-net energy' buildings, as well as 'zero waste.'
- Measures to move heating systems off gas to electric heat pump.
- Increase countywide creation and connection of walk-able, bike-able, communities with coordinated planning, infrastructure, and transit.
- In particular, complete the build-out of Marin's dedicated bicycle/pedestrian paths and assure that their location and design is attractive to use by both cyclists and pedestrians. These alternatives to car travel should be further promoted by ample and secure bike parking fully coordinated with transit, public education and traffic calming techniques such as roundabouts.
- Include means of promoting the widespread use of transit, including SMART, for example by providing special service for large community events such as the County fair and major concerts.
- Adding a 'carbon forestry and wildlands management' section to complement the 'carbon farming' section, including proactive management of fuel loads, invasive species, and forest decline brought on by the climate stresses of increased heat, drought and pathogens—as well as proactive wetland enhancement and urban forestry to store carbon and reduce heat islands.
- Further emphasize and identify financing tools incorporating life-cycle cost savings to offset upfront costs of energy efficiency improvements, solar installation and EVs.
- Continue to pursue all available means of reducing carbon emissions, since all will be necessary to reach a meaningful reduction.
- Produce a visually compelling, user-friendly summary of MCAP for wide public distribution and adoption of the measures it suggests.

Again, thank you for pursuing this important work.

Sincerely,

William Carney
President, Sustainable San Rafael

Marin Sanitary Service

CONSERVATION - OUR EARTH, OUR MISSION, OUR JOB



October 10, 2014

County of Marin
Climate Action Plan Update
3501 Civic Center Drive, Suite 308
San Rafael, CA 94903

RE: Support for Marin County Climate Action Plan Update

Dear Dana,

Marin Sanitary Service (MSS) supports the major themes in the Marin County Climate Action Plan Update and has demonstrated a strong commitment to sustainability and the addressing of climate change through greenhouse gas reductions within the County of Marin (County). In the *Marin County Greenhouse Gas Reduction Plan (2006)*, the County set a goal to reduce greenhouse gas (GHG) emissions from both community and municipal activities by at least 15% below 1990 levels by 2020. MSS joined the California Climate Action Registry (CCAR) in 2006 to determine programs to assist the County, and was named a Climate Action Hero. MSS continues to voluntarily report their annual GHG emissions with The Climate Registry, the successor to CCAR. MSS has been integral in reducing waste, improving recycling and reducing greenhouse gas emissions within the County.

GHG Reductions: How is MSS doing?

- MSS currently avoids over 20.7 times the emissions it generates through its recycling, composting and biomass to energy programs. This equates to just over 122,384 metric tons of GHGs reductions in 2012, making the MSS Facility a "Net Zero" Facility as defined by the California Air Resource Board.
- MSS is now operating the Food-to-Energy (F2E) program using commercial food waste in an anaerobic digestion system at the Central Marin Sanitation Agency to harness energy from organics. This program not only avoids landfill emissions but also helps to meet recycling goals, reduce overall GHG emissions and promote renewable energy.
- MSS has completed energy retrofits in its buildings, including the installation of solar panels, and supports businesses in obtaining LEED certification through the promotion of source separation and the achievement of high recycling rates.
- MSS is currently investigating low carbon fuel options for their fleet of trucks such as the use of hydraulic hybrid vehicles to further reduce GHG emissions thereby and supporting the communities' GHG goals.
- MSS has always offered recycling to commercial businesses and has expanded programs at the County facilities to further support zero waste and a low carbon community.

"Net-Zero" and Avoided GHG Emissions

The California Air Resources Board (CARB) has adopted the AB 32 Scoping Plan first updated in May 2014 which frames post-2020 GHG reduction goals for the State of California. As the State looks beyond 2020 and towards the 2050 goal of achieving 80% GHG emission reduction compared to 1990, CARB is looking toward the waste industry to achieve Net-Zero GHG emissions as a goal during the Mid-Term (2030 to 2035). Net Zero has been defined by CARB as when direct GHG emissions minus avoided GHG emissions equal zero or less. To achieve Net-Zero, the direct emissions from the waste sector would have to be fully offset by avoided GHG emissions. Avoided GHG emissions are reductions in life-cycle GHG emissions that would occur because waste is shifted from landfilling to alternative non-disposal pathways.

$$\text{Net-Zero} = \text{Direct GHG} - \text{Avoided GHG} = 0$$

MSS has been calculating their avoided indirect emissions since 2006 using the modified Federal EPA WARM model, the best available life-cycle model. This program analyzes the avoided GHG emissions that would occur when waste is shifted from landfilling to recycling, composting, and biomass energy. It has been demonstrated on an annual basis that MSS has offset an average 20.7 times the direct GHG emissions generated by avoiding GHG emission through alternatives non-disposal pathways. MSS is well beyond Net-Zero now and has avoided 122,384 metric tons of carbon dioxide equivalent emissions through their recycling and composting activities!

As reported in the Climate Action Plan Update, the County is planning to reduce emissions from community actions in the following categories:

- **Energy Efficiency and Renewable Energy** – including reductions primarily achieved through community choice aggregate, energy efficiency and the use of solar and other renewable energy sources.
- **Land Use, Transportation, and Off-Road Equipment** – including reductions achieved by utilizing alternative land use designs, public transportation and reductions in vehicle miles travelled (VMT).
- **Water Conservation and Wastewater Treatment** – achieved through reducing water consumption, increase water pump efficiency, reducing wastewater and utilizing recycled water.
- **Waste Reduction, Reuse, and Recycling** – targeting a zero waste goal by 2025 and increasing recycling at all county facilities.
- **GHG Performance Standard** – achieved through setting GHG efficiency standards for all new development.

As a County partner, collecting and processing recyclables and compost, MSS has already and will continue to assist the County in reaching their GHG reduction goals. Here are the

accomplishments and planned activities MSS has to best address the goals set forth in the Climate Action Plan update:

Energy Efficiency and Renewable Energy

Page #	Goal	MSS accomplishment
4-8	Community choice aggregate allows residential clients to purchase energy from renewable energy sources as part of their electricity mix.	MSS supports the use of renewable energy in the County. Through the partnership with the Central Marin Sanitation Agency, materials collected by MSS are combined with biosolids to generate gases that can then be turned into fuel. In fact, 75% of the energy needs of the facility are being met by current generation.
4-9	Energy efficiency measures reduce actual building energy consumption through efficient design.	MSS has prioritized energy efficiency by completing retrofits in their buildings, purchasing energy efficient appliances, and installing energy efficient lighting.
4-9	Use of solar and other renewable energy sources to increase the renewable portion of the County's energy mix.	MSS supports the use of solar energy and completed the installation of solar panels in their facility generating 778 megawatt hours of electricity during the lifetime of the panels, reducing 438 tons of carbon dioxide.

Through lighting retrofits and promoting conservation behavior among their staff, MSS has reduced electricity consumption by 9% since 2006. MSS has installed solar panels at their facility and have partnered with the Central Marin Sanitation Agency (CMSA) to co-process food waste with biosolids to capture methane as a secondary energy source.

Land Use, Transportation, and Off-Road Equipment

Page #	Goal	MSS accomplishment
4-9	Improved land use design through focusing new development along city center corridor.	MSS prioritizes route mapping to maximize efficiencies in their hauling operations. Additionally MSS is investigating low carbon fuel options for their fleet of trucks to further reduce GHG emissions. MSS uses efficient routing to maximize right hand turns and minimize idling.
4-9	Public transportation through transportation demand management system	MSS supports employees utilizing public transportation to and from work and provides commuter benefits to employees who participate.

4-9	Reduction in vehicle miles travelled (VMT) through supporting car and van pool options	MSS has supported carpool and car share programs for their employees to help reduce GHG emissions associated with travel.
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MSS actively works to stay in front of the curve of the regulatory requirements for their fleet of heavy and light duty trucks. They are governed by regulations such as the Truck and Bus Regulation and the Solid Waste Collection Vehicle (SWCV), which are both overseen by the California Air Resources Board (CARB). MSS has replaced many of the older vehicles in their fleet with newer clean diesel vehicles and will ensure technological advances and fuel economy is maximized in new vehicle purchases. MSS is also deploying advanced hydraulic hybrid heavy duty collection vehicles that have been shown to reduce GHGs by approximately 40%.

Water Conservation and Wastewater

Page #	Goal	MSS accomplishment
4-10	Reduced water consumption by requiring all new development meets CALGreen Tier 1 standards and encouraging existing development to do the same.	MSS supports water conservation efforts through the tracking and monitoring of water usage. Additionally, water conservation practices and technologies have been implemented in their facilities and operations.
4-11	Goal to reduce wastewater generation by 10-15% by 2020	MSS controls runoff through the installation of vegetative bioswales to clean and capture groundwater before it becomes run-off. MSS also utilizes recycled water for truck washing.

MSS actively tracks water consumption in all facilities. A major source of their usage is for dust control which is necessary to ensure the surrounding community is not impacted by dust released from the processing of materials. Water consumption is continually tracked to increase awareness and promote conservation measures with a goal to reduce water consumption by 3%.

Waste Reduction, Reuse, and Recycling

Page #	Goal	MSS accomplishment
4-10	Marin Hazardous and Solid Waste JPA established goal of 83% waste diversion by 2020 and zero waste by 2025.	MSS has demonstrated a commitment to zero waste by assisting the County in reaching a 75% waste reduction goal by 2012, 8 years ahead of the statewide goal. MSS currently avoids over 20 times the emissions it generates through recycling, composting and converting biomass to energy. This equates to just over 96,000 metric tons of GHGs in 2011 alone.

4-10	Increased waste diversion through more public outreach and education to increase program participation and through financing recycling bins and organics collection receptacles at all County facilities visited by the public.	MSS has been instrumental in the expansion of compost collection programs throughout the County and also services many public recycling and composting bins. MSS staff attend monthly Zero Waste meetings with County staff to improve diversion efforts in all County buildings. Annually, diversion data is reported to the County to help measure progress with goals. In addition, MSS has three dedicated Recycling Program Coordinators who provide education and technical support to customers and community groups.
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GHG Performance Standard

Page #	Goal	MSS accomplishment
4-13	Measure GHG emissions associated with new projects and seek to reduce these emissions.	MSS supports the implementation of emissions standards on new buildings and has been responsible for implementing many of these standards already in its existing buildings. MSS has been reporting and had third-party verification of their carbon emissions inventory since 2006 through the California Climate Action Registry and The Climate Registry.

MSS has demonstrated a commitment to resource conservation, zero waste and GHG reductions and should be considered a valued partner to the County in achieving larger countywide goals. As the state of California and the County of Marin continue to set the standard nationally for GHG reduction targets, MSS looks forward to staying at the front of the curve.

MSS does have technical comments of the following information embedded in the Appendices.

Appendix B, Page B-9 - Solid Waste Generation (Community and Municipal)

The method used by ICF International may be consistent with the 2012 ICLEA Community Protocol, but it discounts the avoided indirect greenhouse gas emissions benefit of recycling. MSS has calculated their avoided indirect emissions benefits due to recycling following the best practices of a modified Federal EPA WARM model, and has published that report annually since 2006. MSS would be like to share this information with ICF International to demonstrate the value of recycling, and include that information in the Climate Action Plan. A copy of the Avoided Emissions Assessment for CY 2012 is attached.

Appendix B. Page B-10 - Solid Waste Generation (Community and Municipal)

It is claimed that the Redwood Landfill has a 90% methane collection rate, which is higher than the industry standard rate of 75%. Please provide a reference on the documentation of the 90% methane collection rate, as our consultants have been using the 75% methane collection rate in the modeling of landfill emissions of the solid waste that MSS sends to Redwood Landfill.

Appendix C. Table C-1. Page C-2

This table includes the 2020 GHG Reduction of 2,995 metric tons of CO₂ after implementing the Local Strategy (Waste-1 Zero Waste by 2025). Please provide documentation of the ICLEA model.

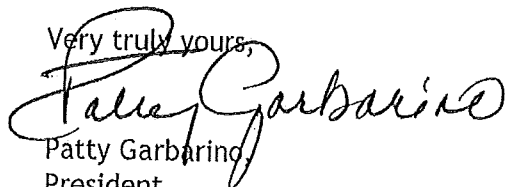
Appendix C. Page C-44 Waste Reduction, Reuse, and Recycling

The 2020 GHG Reduction of 2,995 metric tons of CO₂ by 2025 is referenced again. The flowing assumption is listed: *one ton of waste generates 0.196 metric tons of CO₂e if landfilled*. This does not address the lifecycle analysis of recycling with the upstream and downstream benefits. MSS has calculated their avoided indirect emissions benefits due to recycling following the best practices of a modified Federal EPA WARM model, and has published that report annually since 2006. MSS believes there should be more benefit to recycling versus landfilling.

Appendix C. Page C-45 Waste Reduction, Reuse, and Recycling

Giving the example of the City of Santa Monica is not appropriate and should be removed. This example discounts the cost effectiveness of clean source separated food scraps collection in favor of a dirtier wet/dry collection of commercial material. We have already successfully launched the Commercial Food to Energy program and are finding it to be extremely cost effective. This information is misleading and does not account for the existing organics collection programs and processing infrastructure.

Very truly yours,



Patty Garbarino

President,

Marin Sanitary Service

Marin Recycling & Resource Recovery



Avoided Emissions from Recycling

Report 2012

March 31, 2014

Prepared by:



**1822 21st Street
Sacramento, CA 95811**

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Optional Reporting – Avoided Indirect Emissions from Recycling

AVOIDED EMISSIONS FROM WASTE RECYCLING, COMPOSTING AND COMBUSTION

The Marin Sanitary Services (MSS) facilitates GHG emission reductions by recycling the waste it manages, and composting. Recycling reduces the demand for raw or virgin materials, while re-manufacturing with recycled materials generally reduces overall energy use. Recycling also results in increased carbon sequestration by forests since fewer trees need to be harvested for wood and paper products. Well-managed composting ultimately results in increased soil carbon storage, and end use of compost results in reduced demand for water, fertilizer, and other soil inputs.

GREENHOUSE GAS ESTIMATION METHODOLOGY

Greenhouse gas emissions, both generated and avoided emissions, are estimated using two sources: 1) the U.S. EPA WARM model, and 2) California Air Resources Board-developed emission reduction factors for recyclables and compost. Both of these sources use a life-cycle approach.

It should be noted that WARM and CARB estimates of actual or avoided emissions for a given solid waste management scenario are assigned on an annual basis. For instance, all avoided emissions from recycling are reported in the current year, even though they may not enter the manufacturing process in the same year that they enter the recyclables market. Likewise, the total amount of landfill gas emissions that would occur from a given amount of landfilled organic waste are reported in the current year, even though it may take many years for the decomposition of the organic material to reach completion.

US EPA WARM MODEL

The US EPA's Waste Reduction Model (WARM) was developed to help solid waste managers evaluate management options with respect to their GHG emissions impact. WARM calculates the emissions impacts of several waste management options (landfill, recycling, composting, and combustion with energy recovery) for 34 separate categories of waste material. The WARM emission factors are based on an EPA study entitled "Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks", originally published in 2002 and now in its 13th edition released in February 2012. The model uses a life-cycle analysis approach that considers emissions associated with acquisition of raw materials, emissions during the manufacturing process, and transportation emissions. GHG emissions reductions are calculated by comparing the emissions from an alternative Scenario with the emissions associated with the baseline Scenario. In this way, the reduction in GHG emissions from increasing the recycling rates of various commodities can be estimated.

It is noted that, like all models, WARM has inherent uncertainties, embedded simplifications, and boundary conditions that limit its accuracy and applicability to all situations. In lieu of an alternative, WARM remains the best general model available. Although an in-depth analysis of the model is beyond the scope of this report, some areas where the model might be improved include the following:

Landfilling: Since many organic materials do not completely decompose in landfills, some of the biogenic carbon is stored there; thus, WARM credits landfilling as a biogenic carbon sink for such materials. WARM provides an estimate of the amount of biogenic carbon stored through landfilling organic material. It then subtracts the amount of stored biogenic carbon in the landfill from the avoided emissions associated with recycling, composting or biomass energy generation, to arrive at a "net" GHG emission reduction relative to the landfill scenario, which favors landfill disposal. For some materials (notably, wood, yard trimmings, leaves, branches, mixed organics, and newspaper and phone books),

Optional Reporting – Avoided Indirect Emissions from Recycling

WARM gives more GHG reduction benefits to landfilling than it does to composting, or combustion of waste wood for biomass energy generation.

Composting: In WARM, the benefits from composting are associated with soil carbon restoration and the carbon storage capacity of increased humus content. The EPA life-cycle report referenced in this report states that there are additional greenhouse gas benefits related to compost use, such as decreased irrigation requirements and energy for pumping water, reduced need for fertilizer, fungicides and pesticides, and the energy to produce these products. However, quantifying these benefits was beyond the scope of the study.

Greenhouse gas emissions that may be generated during composting (methane and nitrous oxide) are not calculated by WARM as they were assumed to be small by the model developers.

CALIFORNIA AIR RESOURCES BOARD EMISSION REDUCTION FACTORS

The California Air resources Board prepared two documents presenting the development of GHG emission reduction factors, one for compost and the other for recyclables.

Compost:

CARB uses a life-cycle method to quantify the California-specific greenhouse gas emission reductions from using compost and the greenhouse gas emissions associated with compost management. Compost application to agricultural fields increases soil health while providing multiple co-benefits. Compost application reduces the amount of synthetic fertilizer needed, reduces the amount of water used, decreases soil erosion, increases soil carbon storage and reduces the use of herbicides. Composting material also causes greenhouse gas emissions during the collection of the initial feedstock and delivery of the compost, the use of energy and water to manage the compost pile, and as microorganisms convert the initial feedstock to compost. It is generally accepted that methane and nitrous oxide emissions are generated during composting; however, WARM does not include these emissions but CARB does, for the specific case of open windrow composting. The CARB method also includes GHG benefits from compost use that aren't considered in the WARM Model, which only included GHG benefits from soil carbon storage.

The following equation is used to calculate the compost emission reduction factor (CERF):

$$\text{CERF} = (\text{CSb} + ((\text{Wb} + \text{Eb} + \text{Fb} + \text{Hb}) * \text{Cuse})) - \text{Etotal}$$

Where:

CERF = Compost emission reduction factor (MTCO₂E/ton of feedstock)

CSb = Emission reductions associated with the increased carbon storage in soil (MTCO₂E/ton of feedstock)

Wb = Emission reductions due to decreased water use (MTCO₂E/ton of compost)

Eb = Emission reduction associated with decreased soil erosion (MTCO₂E/ton of compost)

Fb = Factor to account for the reduced fertilizer use (MTCO₂E/ton of compost)

Hb = Factor to account for the reduced herbicide use (MTCO₂E/ton of compost)

Cuse = Conversion factor used to convert from tons of compost to tons of feedstock

Etotal = Emissions due to the composting process (MTCO₂E/ton of feedstock)

Optional Reporting – Avoided Indirect Emissions from Recycling

Recyclables:

CARB developed emission reduction factors to quantify the benefits associated with recycling. The life-cycle approach used in this method incorporates avoided emissions from manufacturing using recyclables, the use of raw materials in the manufacturing process (i.e., harvested wood), transportation emissions, and recycling efficiency. The following equation is used to calculate each recycling emission reduction factor (except dimensional lumber; RERF):

$$\text{RERF} = ((\text{MS}_{\text{virgin}} - \text{MS}_{\text{recycled}}) + \text{FCS} - \text{Tremanufacture}) * \text{Ruse}$$

Where:

RERF = Recycling emission reduction factor (MTCO₂E/ton of material)

MS_{virgin} = Emissions associated with using 100% virgin inputs for manufacturing the material (MTCO₂E/ton of material)

MS_{recycled} = Emissions associated with using 100% recycled inputs for manufacturing the material (MTCO₂E/ton of material)

FCS = Forest carbon sequestration (MTCO₂E/ton of material)

Tremanufacture = Transportation emissions associated with remanufacture destination (MTCO₂E/ton of material)

Ruse = Recycling efficiency (fraction of material remanufactured from ton of recycled material)

The above equation uses an approach similar to one established by the United States Environmental Protection Agency (USEPA). This method modified USEPA's approach to include California-specific data and added a model to evaluate forest carbon sequestration. Emissions from the landfilled fraction of waste are estimated using the WARM Model. Emissions from recycling and composting are estimated using both methods for comparison purposes.

WARM METHODOLOGY AND SOLID WASTE MANAGEMENT REGULATIONS

WARM is generally used in a manner that allows waste diversion methodologies (recycling, composting and combustion) to be compared with the Baseline Scenario of landfilling. The policy of the State of California is to reduce and minimize the amount of waste that is landfilled (Assembly Bill 939 (1989), et al). It is a core value of CalRecycle that all materials be properly managed in order to minimize the generation of waste (source reduction), maximize the diversion of materials from landfills, and manage all materials to their highest and best use, in accordance with the waste management hierarchy and in support of the California Global Warming Solutions Act of 2007. It is also a strategic directive of CalRecycle to assist in the development of viable, sustainable markets to divert materials from landfills and encourage source reduction and recycling. Specifically, CalRecycle intends to reduce the amount of organics in the waste stream by 50% by 2020 (adopted February 13, 2007, California Integrated Waste Management Board meeting). CalRecycle staff's position is that it is technically correct to quantify and report the amount of carbon stored in a landfill; however, it should not be interpreted as offsetting landfill methane emissions.

BIOGENIC VS. ANTHROPOGENIC EMISSIONS

Biogenic emissions are plant derived emissions, such as decay or combustion of plant based materials. The perspective is that plant based energy and waste materials are part of a short-term carbon cycle of harvest and regrowth and doesn't affect the overall greenhouse gas concentration of the atmosphere.

Optional Reporting – Avoided Indirect Emissions from Recycling

On the other hand, burning fossil fuels that have been stored for millennia does increase the atmospheric greenhouse gas concentration and is an anthropogenic emission. Anthropogenic emissions occur because of human activities. Anthropogenic emissions are counted as part of an entity's greenhouse gas footprint, but biogenic emissions are not. For instance, burning fossil fuels is anthropogenic, but burning biodiesel is biogenic (i.e. B20 is 20% biogenic). Landfill methane is considered an anthropogenic emission, but if burned and converted to carbon dioxide it is considered biogenic because the natural decomposition of the organic waste would have resulted in carbon dioxide emissions anyway. Methane is 21 times more powerful as a greenhouse gas than carbon dioxide, so this distinction is important.

AVOIDED EMISSIONS VS. GENERATED EMISSIONS

WARM assigns a negative number to avoided emissions, such as fossil fuel emissions that are offset by biomass energy generation or soil carbon storage from compost use. Emissions that enter the atmosphere are given a positive number, such as transportation fuel combustion or fugitive landfill methane. Therefore, the net result may be either positive or negative depending on whether the total avoided emissions are greater or less than the total generated emissions. In this report, avoided emissions are presented in parentheses.

APPROACH OF THIS GHG ASSESSMENT

The intent of this portion of the GHG emissions inventory is to quantify the GHG emissions reductions that occur as a result of recycling materials from the solid waste stream, providing biomass feedstock for energy generation, and/or the provision of compost or mulch for soil application. To achieve this, the biogenic carbon storage is factored out in the interpretation of the WARM Model results. Essentially, the WARM Model approach to calculating landfill emissions is the following:

*Net WARM calculated landfill emissions = Landfill fugitive and operational emissions (positive) + **biogenic carbon storage (negative)** + avoided fossil fuel emissions from energy generation (negative)*

Since carbon storage and avoided fossil fuel emissions are negative, the net emissions from WARM are often negative for organics. The approach used by this GHG assessment tool is to remove the biogenic carbon storage from the calculation. To arrive at actual landfill GHG emissions from WARM, the energy offsets would also have to be removed. However, they are much less significant than the carbon storage amount and represent a reduction of fossil fuel emissions. The landfill in this case Tolland Road Landfill, began generating energy from landfill gas in July 2010. The biogenic carbon storage is factored out by:

1. Starting with the WARM-calculated emissions for the organic tonnages landfilled.
2. Using the WARM biogenic carbon storage factors (Exhibit 6-8, USEPA 2007) to calculate the amount of biogenic carbon storage that WARM attributes to each organic material.
3. Subtracting the biogenic carbon storage amount from the WARM output to remove it from the net emissions estimate.

WARM has a material category called Mixed Municipal Solid Waste (MSW); however, the characteristics of this category match the national landfilled solid waste profile from 2003. To improve accuracy, this analysis uses the most recent solid waste characterization information (2008) for the State of California as the basis of the WARM analysis.

Optional Reporting – Avoided Indirect Emissions from Recycling

SITE SPECIFIC INFORMATION

For MSS, WARM inputs for each category (tonnage) were based on annual 2011 tonnages from accounting spreadsheets provided by MSS. Table 1 summarizes the WARM categories that were included in the analysis for MSS, along with a listing of materials that were included in each category.

Additional information used in the model include:

- MSS sends its waste to the Redwood Landfill, which collects landfill gas and flares it. In the near future Redwood Landfill is slated to install a Landfill Gas Energy Recovery System. The material deposited in the landfill in 2011 will decompose and generate gas for approximately 40 years; as a result it is assumed that the landfill gas for this waste is used to generate electricity. The landfill gas collection efficiency chosen in the WARM model is for the typical efficiency scenario, which assumes zero percent efficiency for the first two years, 50% in the third year, 75% in the fourth, fifth, sixth and seventh years, and 95% thereafter. The Redwood Landfill is in an area with less than 25 inches of rainfall annually; therefore, the dry landfill option is chosen in WARM.
- Round-trip transport distances are:
 - Redwood Landfill = 32 miles;
 - Recycling management facility (Port of Oakland) = 44 miles;
 - Combustion Facility = 150 miles;
 - Composting facility = 174 miles.

MATERIAL CATEGORIES FOR GHG EMISSION MODELING

The material inputs to the WARM and CARB model are shown in Table 1, where the correlation between MSS's material categories and WARM material categories is presented.

Table 1: Material Inputs to the WARM and CARB Models

WARM Category	MSS's Material Categories	Management Scenario
Aluminum Cans	Aluminum	Recycled
Steel Cans	Steel	Recycled
Glass	Glass	Recycled
HDPE	HDPE	Recycled
PET	PET	Recycled
Corrugated Containers	Cardboard	Recycled
Newspaper	Newspaper	Recycled
Yard Trimmings	Green Waste	Composted
Dimensional Lumber	Biomass	Combusted
Mixed Paper (general)	Mixed Paper	Recycled
Mixed Plastics	Mixed Plastics	Recycled
Mixed Metal	Mixed Metal	Recycled
Mixed Paper (office)	Office Pack	Recycled
Tires	Tires	Recycled
Drywall	Drywall	Recycled
MSW	Trash	Landfilled
Concrete	Road Base	Recycled
Concrete	Dirt (mixed inerts)	Landfilled
Drywall	Drywall	Recycled

Note: Garbage/Refuse distribution based on a 2008 state wide characterization study.

Optional Reporting – Avoided Indirect Emissions from Recycling

COMPOST EMISSIONS

MSS sends food waste to a compost facility that uses aerated static pile composting within a synthetic compost vessel. It is generally accepted that methane and nitrous oxide emissions are generated during composting; however, WARM does not include these emissions but CARB does, for the case of open windrow composting. Therefore, to calculate the emissions associated with composting food waste, emission factors developed by CARB for open windrow composting were used, but were reduced by 2/3 for methane and 1/3 for nitrous oxide because of the enclosed, aerated static pile compost method. This is congruent with the Organic Waste Composting Protocol developed by the Climate Action Reserve. In that protocol, emissions factors for these compounds were reduced when composting occurred in aerated static piles under synthetic cover.

PRESENTATION OF RESULTS

The approach taken in this report is to categorize the waste managed by MSS as waste that is landfilled and waste that is recycled, which includes providing compost. Since CARB doesn't provide emissions factors for all of the materials processed by MSS, the results from using the CARB emission factors are included along with WARM results to give a total emissions estimate for the management scenario. Emissions associated with the landfilling of materials are calculated using WARM; CARB did not provide estimates for landfill emissions. In prior years, only the WARM model was used to calculate emissions; however, with the recent publishing of the CARB emissions factors (Nov. 2011), emissions based upon CARB data will now be used in conjunction with that from WARM. The presentation of results proceeds as follows:

- The emissions that would have occurred if the recycled material had been landfilled instead of recycled are presented (Table 2);
- The avoided emissions from the use of the recycled materials are presented (Table 3);
- The emissions from landfilling the solid waste that is currently landfilled are presented (Table 4).

From this information, the overall emissions reduction from recycling can be ascertained, as well as the benefits from increasing the recycling rate of specific materials.

The emissions that would have resulted if the currently recycled material were landfilled rather than recycled are presented in Table 2. The total emissions avoided by recycling are the avoided landfill emissions plus the emissions avoided by the use of recycled materials. The tonnages shown in the second column of Table 2 are equal to the tonnages currently recycled, but the destination is assumed to be landfilling.

The values presented in the third column are the direct WARM results, including the reduction in emissions that WARM attributes to the stored biogenic carbon in the landfill. The amount of stored biogenic carbon calculated by WARM is shown in the fourth column, and the adjusted results, shown in the fifth column, are the WARM generated emissions with the biogenic carbon storage benefit factored out. Therefore, the values in the fifth column are the landfill emissions that would have occurred if the tonnages shown in the second column had been landfilled rather than recycled.

Optional Reporting – Avoided Indirect Emissions from Recycling

Table 2: Emissions if the Recycled Material Had Been Landfilled Instead

Commodity	Tons Recycled	Emissions if Landfilled MTCO₂-e	Landfill Carbon Storage Adjustment MTCO₂-e	Landfill Emissions w/o CS MTCO₂-e
Aluminum Cans	388	16	0	16
Steel Cans	11	0	0	0
Copper Wire	8	0	0	0
Glass	5,047	204	0	204
HDPE	262	11	0	11
PET	450	18	0	18
Corrugated Containers	6,543	-4,964	-5,375	411
Newspaper	6,159	-7,809	-8,172	363
Office Paper	1,000	-46	-158	112
Dimensional Lumber	26,464	-28,890	-30,099	1,209
Mixed Paper (general)	1,124	-810	-910	100
Mixed Metals	2,807	114	0	114
Mixed Plastics	956	39	0	39
Carpet	437	18	0	18
Concrete	32,487	1,316	0	1,316
Tires	4	0	0	0
Drywall	1,114	143	0	143
Yard Trimmings	23,429	-10,164	-14,717	4,553
Total	85,259	-40,641	-44,715	4,074

Notes:

- MTCO₂-e is metric tons carbon dioxide equivalence.
- CS = Carbon Storage

The overall avoided emissions from recycling are presented in Table 3 using both WARM and CARB methods. The values in the third column are the avoided emissions from the use of recycled materials. The fourth column is carried over from Table 2 and the fifth column is the sum of the third and fourth columns.

Optional Reporting – Avoided Indirect Emissions from Recycling

Table 3: Avoided Emissions from Materials that are Currently Recycled, Composted, or Used for Biomass Electricity Generation

Commodity	Tons Recycled	Avoided Emissions from use of Recycled Materials MTCO2-e	Emissions if Material had been Landfilled MTCO2-e	Overall Avoided Emissions from Recycling MTCO2-e
Aluminum Cans	388	-5,030	16	-5,046
Steel Cans	11	-28	0	-28
Copper Wire	8	0	0	0
Glass	5,047	-799	204	-1,004
HDPE	262	-204	11	-214
PET	450	-641	18	-660
Corrugated Containers	6,543	-32,861	411	-33,273
Newspaper	6,159	-20,829	363	-21,193
Office Paper	1,000	-4,259	112	-4,370
Dimensional Lumber	26,464	-5,557	1,209	-6,766
Mixed Paper (general)	1,124	-4,610	100	-4,710
Mixed Metals	2,807	-16,764	114	-16,878
Mixed Plastics	956	-1,155	39	-1,194
Carpet	437	-1,033	18	-1,051
Concrete	32,487	-148	1,316	-1,464
Tires	4	-2	0	-2
Drywall	1,114	39	143	-104
Yard Trimmings	23,429	-9,629	4,553	-14,182
Total	108,688	-103,512	8,627	-112,139

Notes:

- MTCO2-e is metric tons carbon dioxide equivalence.

In addition to providing materials for recycling and composting, MSS disposed of 99,645 tons of solid waste in 2012 in the Redwood Road Landfill. The emissions generated by the landfilling of this material are presented in Table 4. The tonnages shown in the second column are distributed according to the California Statewide Waste Characterization (2008).

Optional Reporting – Avoided Indirect Emissions from Recycling

Table 4: Emissions from the Landfilled Waste Assuming a California Waste Profile

Commodity	Tons Landfilled	Landfill Emissions MTCO2-e	Carbon Storage Adjustment MTCO2-e	Actual Landfill Emissions MTCO2-e
Glass	1,392	56	0	56
Corrugated Containers	4,774	-3,621	-3,921	300
Newspaper	1,293	-1,639	-1,716	76
Dimensional Lumber	14,421	-15,744	-16,402	659
Food Scraps	15,416	2,648	-1,230	3,878
Yard Trimmings	2,685	-1,165	-1,687	522
Grass	1,890	14	-452	467
Leaves	1,890	-1,436	-1,694	258
Branches	597	-651	-679	27
Mixed Paper (general)	11,139	-8,026	-9,019	993
Mixed Metals	4,575	185	0	185
Mixed Plastics	10,135	410	0	410
Mixed Organics	6,564	-746	-2,396	1,649
Mixed MSW	796	-67	-173	106
Carpet	3,183	129	0	129
Personal Computers	497	20	0	20
Concrete	18,399	745	0	745
Total	99,645	-28,887	-39,369	10,482

Notes:

- MTCO2-e is metric tons carbon dioxide equivalence.

Optional Reporting – Avoided Indirect Emissions from Recycling

SUMMARY OF RESULTS

Avoided emissions from recycling consist of two components:

1. *Avoided emissions* from use of recycled products, biomass to energy and composting (MTCO₂e) = 126,845 MTCO₂e
2. *Avoided landfill emissions* from avoiding landfill disposal = 8,627 MTCO₂e
3. *Emissions from Beneficial Reuse, ADC and Landfill* = 13,087 MTCO₂e

The Total Avoided Indirect Emissions from these activities are estimated at 122,384 MTCO₂-e. As recycling rates continue to increase, and the total materials sent to landfill or used as beneficial reuse and ADC decrease, this will have a direct impact on increasing avoided GHG emissions.

The GHG emissions impacts are provided by category in Table 6.

Table 6: GHG Emissions by Category

Management Scenario	Tonnage	Avoided Emissions From End Use MTCO ₂ -e	Avoided Landfill Emissions MTCO ₂ -e	Total Avoided Emissions MTCO ₂ -e
Recycled	58,796	-88,325	2,865	-91,190
Composted	23,429	-9,629	4,553	-14,182
Biomass Energy	26,464	-28,890	1,209	-30,099
Landfill Beneficial	64,328	2,605	NA	2,605
Landfilled Residual	99,645	-28,887	-39,369	10,482
Total	272,661	-153,127	-30,742	-122,384

Notes:

- Negative landfill emissions are avoided by not landfilling materials; the positive landfill emissions are actual emissions generated by landfilling waste, alternative daily cover and the residual fraction.

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Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks, 3rd Edition, U.S. Environmental Protection Agency, September 2007.

Proposed Methods for Estimating Gas Emission reductions From Recycling, California Air Resources Board, November 14, 2011.

Proposed Methods for Estimating Greenhouse Gas Emission Reductions From Compost From Commercial Organic Waste, California Air Resources Board, November 14, 2011.

California Climate Action Reserve, Organic Waste Composting Project Protocol Version 1.0, June 2010.

Armanino, Dana

From: Pena, Omar
Sent: Friday, October 10, 2014 5:30 PM
To: David Lewis
Cc: Armanino, Dana
Subject: RE: Marin CAP

Hello David,

Thank you for submitting the CAP comments attached to your below email. We have received the comments and will review and consider them as we develop the Final Climate Action Plan to be released in November.

Best Regards,

Omar Peña
PLANNER

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From: David Lewis [djllewis@ucanr.edu]
Sent: Friday, October 10, 2014 4:09 PM
To: Pena, Omar
Subject: Marin CAP

Hello Omar,

I wanted to provide a few additional comments relative to the Marin CAP and specifically implementation opportunities and partnerships for water conservation and local food production.

- **Water Conservation:** For individual home garden water conservation, the University of California Marin Master Gardeners in partnership with the Marin Municipal Water District are in their sixth season of providing individual home consultations on gardening choices and irrigation management to reduce water use. The Marin Friendly Garden Walks program has served over 1,000 home owners resulting in a total of 23M gallons of water saved to date.
- **Local food production:** Through Tending Marin's Community Gardens, we have been actively partnering to expand the number of school and community gardens and increase the production of existing gardens with garden education. Currently the University of California Marin Master Gardeners are working directly with over 33 school and community gardens and in addition facilitating policy implementation to make community gardens a permitted in use in Marin's cities.

Please consider UC Cooperative Extension's Environmental Horticulture and Marin Master Gardener Program's as current and future partners in the implementation of programs relevant to accomplishing Marin CAP goals and objectives.

All the best,

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Armanino, Dana

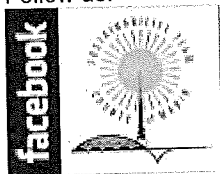
From: Pena, Omar
Sent: Friday, October 10, 2014 3:50 PM
To: Armanino, Dana
Subject: FW: Marin CAP comments

New CAP comment below...

Omar Peña PLANNER

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From: Whendee Silver [mailto:wsilver@berkeley.edu]
Sent: Friday, October 10, 2014 3:48 PM
To: Pena, Omar
Cc: Justine Owen
Subject: Marin CAP comments

Dear Mr. Pena,

We would like to comment on the Marin Climate Action Plan Draft dated August 2014. I am a professor at UC Berkeley who does research on carbon and greenhouse gas dynamics in rangeland ecosystems. Dr. Owen is a postdoctoral researcher in my lab working with me on dairy emissions and emissions reduction. Our comments will be brief, but we are happy to supply more information and supporting references later if that would be helpful.

First we would like to say that this is a great step for Marin and an example for other counties in California and beyond. That said, the county may be missing some significant opportunities. It is now well known in the scientific community that emissions reduction alone is insufficient to stop climate change. The build up of CO₂ in the atmosphere will continue even with drastic (and unrealistic) emissions reduction scenarios. To have a real impact on climate change we must BOTH reduce emissions and remove CO₂ from the atmosphere through carbon sequestration.

Marin County has a significant land base in which to sequester carbon. The CAP draft stresses the role of agriculture in generating emissions, but misses the opportunity to use these lands for carbon sequestration. It is important to realize that most management for carbon sequestration will also improve the sustainability and

productivity of ecosystems through enhanced soil organic matter. This is good management, and thus easily justifiable as a County goal. I was concerned that C sequestration activities were to be exclusively left to the market. Carbon sequestered by land owners and managers with an interest in engaging in a carbon market (should this become feasible) can be tracked separately from County generated activities. Regardless - this is carbon sequestered and should be explicitly considered in Marin's inventory. Agriculture is likely to be able to offer a large suite of practices that can both reduce emissions and sequester carbon. Several of these approaches are being actively researched; is there a mechanism in this plan for their incorporation should they prove viable?

Some of the data cited in the plan is out dated or from preliminary reports. We encourage the drafters to use the peer-reviewed literature and are happy to supply both our publications (on carbon sequestration and greenhouse gas emissions from rangelands and dairies) as well as other relevant studies. Data are available to provide much more accurate estimates with associated errors and sensitivities.

Some specific comments:

Table 2-1 should specify that the time scale global warming potential without carbon-climate feedbacks; the most recent IPCC accepted 100 year GWPs are 298 for N₂O and 34 for CH₄

On page 3-3 please refer to chapter 4 when discussing the exclusion of soil C and ANPP. The way it is currently written, it implies that these won't change, but the section about the MCP clearly states otherwise.

On page 4-11 where the main mitigation action is adoption of anaerobic digesters, please consider the economic feasibility. In the EPA's evaluation of anaerobic digestion potential nationwide, they say in Table 2 that dairies with flushed or scraped freestalls and > 500 head are the most likely to profit from digester installation.

It is unclear how the emissions inventories were calculated. For example, in Appendix B, page B-16 it sounds like only livestock-related emissions were included in those, but not fertilizers. It might be worth adding 1990 fertilizer emissions into that estimate (if 1990 data are unavailable, the 1991 data would probably be a good approximation).

The statement was made that "Standard emissions factors from USEPA and CARB, and 2012 ICLEI Community Protocol equations specific to manure management were used to estimate emissions resulting from manure use for the livestock population in the county". How were those emissions factors represented? Is there data on the proportion of manure in solid vs. liquid storage? Potentially large N₂O emissions from direct application of slurry waste should be considered. These are not accounted for at all in the current estimate. See Owen and Silver (2014) Global Change Biology for help on this.

Sincerely

Whendee Silver and Justine Owen

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