Comment 1 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 1st Workshop.

First Name: Stephen
Last Name: Kaffka
Email Address: srkaffka@ucdavis.edu
Affiliation: Department of Plant Sciences, UC Davis

Subject: Proposed Corn Oil Biodiesel Ppathway
Comment:

23 February 2011

Mr. John Courtis
Manager, Alternative Fuels Section
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

Re: "Detailed California-Modified GREET pathway for Corn Oil Biodiesel (COB)"_December 14, 2010.

Dear John,

In the proposed Low Carbon Fuel Standard (LCFS) pathway)for Corn Oil Biodiesel (COB), CARB treats COB as a residue of the starch ethanol process. No green house gas costs are attributed to production of the oil fraction of the corn grain extracted after starch conversion to ethanol. Secondly, there does not appear to be any adjustment of the altered DDGS meal. DDGS is an important livestock feed for cattle, hogs and poultry, and an internationally traded commodity.

I have two concerns about this approach:

1. Feeds are used based primarily on their energy, protein, fiber and some secondary properties. They are combined with other feeds using these qualities to calculate a total mixed diet or ration. These rations are dynamic, sensitive to price, livestock species, stage of growth and many other considerations. When corn oil is removed from DDGS, its energy value will be affected and perhaps other quality characteristics that could affect livestock performance like palatability or intake. At a minimum, a livestock feeder will have to find some other source of plant oil or energy to compensate. Currently, CARB provides a by-product feeding credit to adjust for the use of DDGS in livestock feeds and its displacement of crops for which it compensates. This comes from GREET. While the GREET values are just approximations for a far more complicated pattern of use in livestock feeding, they recognize of that use and estimate associated crop displacement. It is not clear to me if livestock performance trials with modified DDGS have been carried out or even if calculations based on existing nutritional formulations have been made. Perhaps they have and I missed that explanation. But if not, some accounting for altered nutritional value must be included. It is not clear if de-oiled DDGS will be significantly different from standard DDGS or

if it will effect use by all livestock species equally. If differences are significant and result in reduced use of DDGS or other feed substitutions, then the GHG benefits of using corn oil may not be real, or as large as estimated by CARB. In any case, consistency in methods as far as possible seems to me be an essential characteristic for the success of the LCFS.

2. Land Use Change is a result of decisions about which crop to grow. COB production likely will increase the value of corn to ethanol refiners, and it may also influence the price of corn relative to other crop alternatives as well. While there are different ways to proportion production costs to various products, it seems that all products have such costs, especially in so far as they influence land use decisions including acres, inputs, and cultivars, through modifying demand for the feedstock. Many ethanol businesses are coops, and the owners include farmers who produce the grain feedstocks. But even for growers who are not coop owners, but sell into the corn grain market, the acreage decision is affected by price considerations. This suggests to me that corn oil should also have a portion of the grain production costs associated with it. This is not done in the proposed COB pathway. If I understand correctly, the oil simply appears at some point in the production process, is considered a waste without alternative uses, and then a Carbon Intensity is calculated based only on manufacturing costs. This seems inconsistent to me with other pathways estiamted by CARB, risks over- or undervaluing COB, and compromises the ethanol calculations used in the LCFS.

Critical to this entire consideration is the magnitude in the changes to DDGS and the effect on demand for corn grain that COB might induce. If they are small, then, these are not important concerns. But the issue of consistency remains.

Thank you for considering these comments.

Best wishes,

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Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2011-02-23 14:45:07

No Duplicates.

Comment 2 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 1st Workshop.

First Name: Joh A.
Last Name: Paoluccio PE
Email Address: info@CNFbiofuel.com
Affiliation: President

Subject: Enhanced Torrefied Wood Pellets - Gasification
Comment:

Re: Renewable Energy – Inclusion of Torrefied Wood

There are many renewable energy technologies that are included in the Topic 5 , Ultralow Carbon Fuels draft outline. One new emerging energy source that is not included is Torrefied Wood.

When the overall energy balance of producing a fuel is considered torrefied wood may be one of the most efficient emerging renewable energy fuels and should be included in the outline.

Torrefied wood is not new and has been used in Europe and other countries with success in co-firing with coal and as the feedstock in gasification.

General information follows:
CNFbiofuel, Inc. has developed the following method of liquid immersion torrefaction:
Biomass, in the form of wood pellets, is treated in the system and undergoes immersion conduction heating with heat transfer fluid at several different temperature stages. During this process moisture and VOC's are driven out of the biomass. Further processing results in a change in the biomass structure and chemical composition in an endothermic process. This is torrefaction.
All the moisture and volatile organic compound emissions from the heat treatment process are routed through a water cooled condenser and the condensable VOC's are captured and stored in a vessel for future use. After separation of water from the concentrated VOC liquid it may have commercial value instead of being a pollutant. For example Cedar oil.
The torrefied biomass, in the form of enhanced torrefied wood pellets, is a long lasting carbon concentrated pellet that is friable, hydrophobic and resists decay. It should prove to be the ideal feedstock for combination heat and power, clean electric power generation and gasification projects. It can also be the feedstock for conversion to bio-diesel. The finished product at 10,000 Btu/pound or 20 million Btu per ton might also be used as a carbon credit.
The CNF process is not-yet-fully-commercialized technology and would benefit from a demonstration at utility scale. Coal fired power plants that are considering co-firing are considered the most likely group to consider a demonstration project to build up sufficient product for test runs. Should the economic, operation and maintenance, and air pollution results prove to be greatly

improved, the facility could then consider a commercial size unit.

Once fully tested, commercial size processing equipment of 3 to 60 tons per hour may be used for the production of clean electric power, gasification, combination heat and power systems and feedstock for conversion to liquid biofuels.
What sets CNFbiofuel™ apart from other prior art Torrefication process systems? CNFbiofuel™ uses a liquid immersion “conduction” process where the biomass is immersed in heat transfer fluid with multiple stages at different temperatures. This puts over 1,000 times as many heat transfer molecules in direct contact with the wood surface as compared to prior art “convection” hot gas methods. These result in smaller equipment, faster processing, greater control, and uniform product, less pollution, less energy use, lower operating costs and recoverable condensed liquids that may have commercial value.
Associate Company: Inventive Resources, Inc. was founded by John A. Paoluccio PE in 1984 to bring his patented environmental products and technology to the marketplace. Paoluccio has since acquired 18 US Patents on various products and technologies to help solve global environmental pollution and energy related problems.
CNFbiofuel, Inc. was founded in 2010. The USPTO has provided a notice of allowance and a US Patent will be issued.
California Registrations: Mechanical Engineer ME15046
Agricultural Engineer AG309 Fire Protection Engineer FP248

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2011-04-22 13:08:40

No Duplicates.

Comment 3 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 2nd Workshop.

First Name: Robert
Last Name: Freerks
Email Address: rfreerks@Rentk.com
Affiliation: Rentech, Inc

Subject: Establishment of CI Categories for Fuels
Comment:

Under Topic 5, Ultralow Carbon Fuels, it is being proposed that a category of fuels with CI less than 40% of conventional fuels (a 60% reduction in CI) be established. This would match a similar category of fuels as defined by the RFS2 regulations. However, a 60% reduction in CI for biofuels is not the ultimate goal for biofuels and setting this threshold as the ultimate goal may actually be counterproductive. Rentech and other biomass to liquid fuels producers can obtain much lower carbon intensity in the production of drop-in hydrocarbon fuels than others by using gasification/F-T/hydroprocessing technology. In addition, Cellulosic Ethanol producers can also achieve very low CI values if they capture and store CO2 from their process as well.

BTL fuels such as those proposed by Rentech are 100% drop in fuels with extremely low CI. This CI is obtained by very efficient utilization of biomass resources and by co-production of electricity. Rentech has conducted several life cycle assessments in conjunction with Life Cycle Associates and determined that fuels can be produced with negative CI in most cases, and with CI of less than 10 gCO2e/MJ from all resources we have looked at. Rentech has made it a corporate policy to use only resources that are not competing with food and do not have indirect land use change issues such as seen with other energy crops such as corn and soybeans. Using forest waste and mill waste feedstocks, Rentech has achieved CI's of -6 to -18 gCO2e/MJ for forest waste to liquids projects. This range is dependent on the mix of mill waste (-18) or forest products (-6), but in all cases the CI is negative.

For a project that using urban green waste, the CI is approximately -50 gCO2e/MJ with credit for co-production of a significant amount of green power onsite.

We are concerned that if the ARB is going to set categories for the CI of fuels and not credit for the specific CI of that fuel. We suggest that they consider including more categories than just the 60% reduction from conventional fuels as RFS2 does. Additional categories such as 80%, 100%, 120% and beyond should be considered if this approach is used.

If California is going to reach a true CI reduction for fuels beyond the 10% currently proposed, it is going to need fuels with CI values as low as possible. Rentech has already established that very low CI fuels are capable of being produced, and we have not yet incorporated all potential engineering processes for further reducing the CI of fuels. A simple example is to utilize carbon

capture in the process which is already being done during synthesis gas cleanup. If the CO2 captured during production of syngas and during F-T synthesis is captured, a further 30-50% reduction in CI is achievable using currently available technology. We should not be discourages from pursuing this technology due to the simple issue of setting a target CI based on the RFS2 legislation.

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2011-04-28 14:37:14

No Duplicates.

Comment 4 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 3rd Workshop.

First Name: Robert
Last Name: Freerks
Email Address: rfreerks@rentk.com
Affiliation: Rentech, Inc

Subject: Comments on NRDC Presentation to Advisory Panel 1 July 2011
Comment:

Rentech Comments on Presentations to CARB LCFS Advisory Board Presentations

At the California Air Resources Board LCFS Advisory Panel Meeting held on 1 July 2011 in Sacramento, NRDC and Wood-McKenzie presented views on the impacts of CARB rulings on the use of High Carbon Intensity Crude Oil in California fuel meeting the LCFS.

Rentech, Inc. is developing technology and products to help Federal and State governments meet Renewable Fuels Standards and Low Carbon Fuel Standards utilizing a combination of biomass and where appropriate, fossil resources. Rentech is committed to producing fuels with carbon intensity values below that of conventional fossil based fuels by using advanced engineering technology and appropriate resources in the most efficient manner.

An example of this effort is the Rentech Rialto Renewable Energy Center. This project is being designed to produce 1200-1500 bbl/day of liquid hydrocarbon fuels that are direct replacements for conventional fuels and refinery products. Based on independent life cycle assessment data provided by Lifecycle Associates, fuels produced from the Rialto facility will have baseline carbon intensity of approximately 5% of conventional fuels; and using reasonable estimates of the alternative fates of the feedstocks used in this project, the CI of these fuels will be much less than that.

Rentech is also developing a project in Ontario, Canada where unmerchantable wood and wood waste would be converted into fuels and power with a CI for the fuel being below zero, or greater than 100% reduction in CI compared to baseline fossil fuels.

Rentech is also developing technology to produce fuels from fossil resources utilizing combined fossil and biomass gasification. The project located in Natchez, MS is designed from the start to be a low carbon emissions plant using Carbon Capture and Storage to reduce the GHG emissions from the production of fuels at that plant. CCS technology is 100% integrated into this plant design, and is in fact a requirement of the design. Therefore permanent storage of the captured CO2 is actually a profitable part of the plant economics and not just a means of disposal of a waste stream. Rentech is partnering with Denbury Resources to utilize CO2 from CTL for EOR which will produced an additional 2 bbl of crude per bbl of F-T products produced. This has benefits both for storage of CO2 and reduction of dependence on imported crude which often has higher environmental impact than domestic production.

I mention this aspect of the Rentech CBTL plant design in response to a slide presented by NRDC at the 1 July CARB LCFS Advisory Panel meeting. Slide 2 of the NRDC presentation is shown below, Figure 1. In this slide, NRDC shows that Coal to Liquids projects have GHG

emissions of 120% greater than those of conventional fossil based fuels. Although this is theoretically approximately correct (numbers vary from 80% to 130% greater than fossil fuels), it is a very different picture of the CTL industry as it would exist in the US. Based on current regulations and political realities, no CTL facility in the US would produce fuels with a CI greater than that of fossil fuels produced in 2005 based on Section 526 of the EISA of 2007. There simply would not be a market for fuels produced from CTL technology without CCS and without meeting the Section 526 requirement.

Rentech's advanced design for a CBTL plant produces fuels with a CI of 70 gCO2e/MJ, substantially below the CARB LCFS baseline for fossil derived diesel fuel of 94.71 gCO2e/MJ. The reduction in CI for CBTL fuels produced by a project such as Rentech's Natchez facility can be put into context using CARB LCFS fuel production pathway data.

Figure 1 Slide 2 from NRDC Preseentation to CARB LCFS Advisory Panel 1 July 2011

Figure 2 shows the CI of several conventional and alternative fuels as reported in CARB documents. Note that the CI for fuels from the Natchez CBTL plant is below that for Hydrogen, Ethanol, Biodiesel, and Electricity when used in EV's.

Based on our analysis and the view that no CBTL plant is being planned or permitted that would vent CO2 at the rate shown in the NRDC presentation, we submit that the NRDC value for GHG emissions from a CTL plant are extremely out of line with reality, or reality as it exists in North America for CTL plants. And we further submit that CBTL plants are much more realistic to build in the current regulatory environment and that the GHG emissions from these plants is much more representative of what CI value should be considered for coal derived fuels.

As CTL as depicted by NRDC has the highest GHG emissions of any alternative fuel, and the volume production is 1/3 of the total shown in NRDC slide 3, we believe that the "Change in Carbon Intensity v. 2005 Baseline" shown in Slide 4 of the NRDC presentation is very inaccurate.

Figure 2 Comparison of CI for fossil and alternative fuels per CARB LCFS vs Rentech Rialto Renewable Energy Center baseline CI.

The ability of a CBTL facility to produce larger volume of fuels with reduced CI compared to biofuels can be illustrated as follows:

- CBTL facility produces 10,000 bbl/day (153,000,000 gal/yr) of alternative fuel (partially biomass derived)
- CI of CBTL fuel is 70 gCO2e/MJ
- Comparison between CBTL and Biodiesel with CI of 88.9 gCO2e/MJ
- Rentech CBTL plant produces equivalent GHG emissions as production of 42,530 bbl/day of biodiesel (651,900,000 gal/yr or over 50% of all biodiesel production)

Thus economies of scale for using biomass with fossil resources results in net reduction of GHG emissions without competition for food and land resources, and also water resources needed to make such fuels as 1st generation biodiesel fuel.

Rentech's RenDiesel is a drop-in replacement for conventional diesel fuel, unlike many 1st and 2nd generation biofuels such as ethanol, biodiesel, and pyrolysis oil derived fuels. We find it interesting that NRDC would choose to use KiOR technology as representative of fuel input switching. To our knowledge, KiOR has not presented a LCA study on their process, nor has KiOR presented

data on their fuel product. Pyrolysis oil is a highly toxic and corrosive product that will represent risks during transportation to refineries where it is proposed to be upgraded into finished fuel. This upgrading process will consume large quantities of hydrogen which most likely is produced from fossil fuels (mostly natural gas). PNNL estimated that partial upgrading of pyrolysis oil into liquid fuels consumes 5,000 SCF/bbl of pyrolysis oil (Ellott & Neuenschwander, PNNL, 1996). The level of hydroprocessing only reduced oxygen in the feedstock by 95-98%. Complete removal of oxygen is required to meet diesel fuel specifications.

PNNL presented data at the Smallwood conference (May 13-15, 2008 in Madison, WI) showing that H2 consumption for complete upgrading of pyrolysis oil can consume up to 47,000 SCF/bbl of pyrolysis oil processed.

Rentech presents data on its process and products openly. We welcome open presentation of data from other producers so that all aspects of fuels production from biomass, fossil, or a combination of these resources can be discussed, compared and evaluated for efficiency of biomass utilization and production of useful commercial fuels for the transportation sector. Only when all the data is made available can useful discussions about options for meeting the LCFS provisions be realized.

Attachment: www.arb.ca.gov/lists/lcfsadvisorypanel-ws/13-rentech_comments_on_presentations_to_carb_lcfs_advisory_board_presentations_jd.doc

Original File Name: Rentech comments on Presentations to CARB LCFS Advisory Board Presentations JD.doc

Date and Time Comment Was Submitted: 2011-07-22 14:42:42

No Duplicates.

Comment 5 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 3rd Workshop.

First Name: Michael
Last Name: Theroux
Email Address: mtheroux@jdmt.net
Affiliation:

Subject: Comments to LCFS Advisory Panel Workplan Version 2
Comment:

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Please find comments to the LCFS Advisory Panel Workplan Version 2
in the attached PDF.
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Attachment: www.arb.ca.gov/lists/lcfsadvisorypanel-ws/16-20110812_jdmt_comments_lcfs_advpanel_wkplnv2.pdf

Original File Name: 20110812_JDMT_Comments_LCFS_AdvPanel_WkPlnV2.pdf

Date and Time Comment Was Submitted: 2011-08-12 17:51:53

No Duplicates.

Comment 6 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 4th Workshop.

First Name: Leticia
Last Name: Phillips
Email Address: leticia@unica.com.br
Affiliation: Brazilian Sugarcane Industry Association

Subject: Comments on August meeting's documents
Comment:

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Dear Ms. Buffington,
Please see attached pdf with comments from the Brazilian Sugarcane
Industry Association - UNICA.
Sincerely,
Leticia Phillips
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Attachment: www.arb.ca.gov/lists/lcfsadvisorypanel-ws/17-lcfs_-_unica_comments_to_august_2011_documents.pdf

Original File Name: LCFS - UNICA Comments to August 2011 documents.pdf

Date and Time Comment Was Submitted: 2011-09-12 12:24:44

No Duplicates.

Comment 7 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 4th Workshop.

First Name: Harvey
Last Name: Eder
Email Address: harveyederpspc@yahoo.com
Affiliation: PSPC Public Solar Power Coalition

Subject: 10/21/11 Last Day Comments to be in 45 Day Doc10/31/11 LCFS NAT GAS lcfs HE/PSPC
Comment:

This is the last day for comments to be contained in the Oct 31,2011 45 day public review document that will go to CARB BOARD in min Dec,2011 and implimented into law Jan. 1,2011 for LCFS.
The notice dist. last Friday gave to Oct 24 and this is not enough time. Important information was send out Wed. Occt 19 on sect V Harmonizing with other State National and Regional programs. This is part 1 of 3 or more submittals that may be the foundation of future litagation in Court in this regard.

Attached is a paper By Dr. Jim Steward from July 30.2011 that is related to natural gas emissions the true competittor of solar/renewables (electric, hydrogen etc . Dr Steward teaches Physics at University of the West in Rosemead Ca. having earned his phd in Physics from Yale. In paragraph 2 of page 1 it states that"The latest research from NASA shows the impact of methane to be over 34 times that of CO2 in 2009 over 100 years and 105 over 20 years." see page one footnote 4 Drew T. Shindell,et al., Improved Attribution of Climate Forcing and venting,", Science 326 716 (2009) This is all incorporated into the ffffffrecord for comments in the 45 day document and should be included in the LCFS CI GREET/GTAP for natural gas /methane for CNG and LNG as well as for biogas natural gas from landfills. This will affect the credits counted and the cost of trading them in the market CARB is establiching for LCSF GHG More comments will follow before 5pm today, This and other informations on methane and nitrogem oxidesa N2O was submitted to John Curtis and his Kevin Cleary over the past several years before the scoping plant and ignored etc. including communications will Anel Prubu etc. all of the communications on the phoine and here and via email are now part of the officail record and must be consider and included in the natural gas pathways all types as well as the Washington DC Bus Study done in 2006 which shows what happens over the life of a vehicle published by NREL/DOE/ Uof WV
etc and was submitted to staff several years ago as well as the Natural Gas refuse truck study done and provided by SCD staff via Henry Hogo and Pandal Passic over 6 months ago which was done by Dr. Gautum of the University of West Virginal these fhow rLandfill Gas-to-Energy Projects May Release More Greenhouse Gases Than Flaring
Prepared by Jim R. Stewart, PhD,1 July 30, 2011
Executive Summary
This paper compares the net greenhouse gas (GHG) effects of most landfill-gas-to-energy projects with
the traditional practice of burning the captured methane in a

flare. Based on studies by government agencies, consultants to the waste industry, and academic institutions, a potential result is 3.8 - 7.8 times more net GHG emissions for energy recovery projects compared to flaring. This outcome is based on the larger fugitive emissions from “wet” landfills used for energy recovery compared to those from “dry” landfills used for flaring. Since the GHG savings from replacing fossil fuel with the landfill methane could be negated by GHG impacts of the fugitive emissions, “renewable energy” credits should not be given to landfill gas, except when operators can demonstrate no more emissions than flaring.

Introduction

All decomposing organic materials in landfills release methane,2 a greenhouse gas (GHG) much more potent than carbon dioxide. The Intergovernmental Panel on Climate Change (IPCC) estimated in 19953 that the global warming effect of methane was 21 times that of CO_2, averaged over a 100-year period, or 75 times CO_2, averaged over a 20-year period. The latest research from NASA in 2009 shows the impact of methane to be 34 times that of carbon dioxide over 100 years and 105 times over 20 years.4

The next 20 years are critical because of the imminent danger of releasing billions of tons of Arctic methane clathrates,5 which could lead to irreversible runaway global heating.

Figure 1. Global Warming Impact of Carbon Dioxide (set arbitrarily at 1) compared with Methane over a hundred year period and over a twenty year period

Many organizations urge the diversion of all organics from landfills. This practice would end new methane emissions from landfills. An key concern is the fact that a large fraction of the emissions from wet organics occur in the first three years, usually before the gas cap and capture systems are put in place, as shown in Figure 2.6 The reason for the delay putting on the cover is the operator is still adding waste to that section of the landfill.

1 Dr. Stewart earned a PhD in Physics from Yale University and teaches at the University of the West in Rosemead, CA, Jim@EarthDayLA.org, 213-487-9340.

2 Methane is emitted from the bacterial process known as anaerobic digestion, which requires liquids, organic materials, and absence of oxygen.

3 IPCC Second Assessment Report: Climate Change 1995 (not available on line – replaced by the 2007 report).

4 Drew T. Shindell, et al., “Improved Attribution of Climate Forcing to Emissions,” Science 326, 716 (2009).

5 Climate Progress, Vast East Siberian Arctic Shelf methane stores destabilizing and venting, March 4, 2010 (http://climateprogress.org/2010/03/04/science-nsf-tundra-permafrost-methane-east-siberian-arctic-shelf-venting)

6 Chicago Climate Exchange, Avoided Emissions from Organic Waste Disposal, Offset Project Protocol, 2009 (www.chicagoclimatex.com/docs/offsets/CCX_Avoided_Emissions_Organic_Waste_Disposal_Final.pdf)

Note this report does not show the later wave of gas generation

expected decades hence, after the landfill closes, maintenance ends, the protective cover begins to leak, and rain water stimulates more anaerobic digestion.

Figure 2. Much Methane Escapes in the First 3 Years, Usually Before Capping

To get the above data, the Chicago Climate Exchange uses a decay model to calculate GHG emissions from a landfill, which is described in detail in their paper. 7 The bottom line is, if there are any organics in the landfill, we need to deal with the ongoing methane emissions from the remaining waste. For many years people installed impermeable caps and gas collection systems to capture the methane and put it into a flare to burn it. Every ton of methane captured and burned avoids the effect of adding 104 tons of CO_2 to the atmosphere (calculated over a 20-year period).8

Wet vs. Dry Landfills

But then people thought, why waste that biomethane burning it in a flare? Why not use it to replace fossil fuels? It sounded like a good idea, except, if you take the methane from a dry landfill and try to burn it in an engine or turbine, it is inefficient. The normal methane flow from a “dry tomb” landfill is so slow and impure, that the operator doesn't make enough money to pay for the additional capital and operating expenses of an engine or turbine. So they need more moisture in the landfill. As the chart below from research done for the U.S. EPA shows, wet landfills generate 2.3 times more methane than dry ones (based only on measuring the collected gas, not the total emitted, which was not looked at in these studies).9 If the collection efficiency were the same in both cases, the result is up to 2.3 times more GHG emissions for energy recovery sites.10

Figure 3. Moisture Greatly Increases Methane Emissions

7 Chicago Climate Exchange, Avoided Emissions from Organic Waste Disposal, Offset Project Protocol, 2009 (www.chicagoclimatex.com/docs/offsets/CCX_Avoided_Emissions_Organic_Waste_Disposal_Final.pdf)

8 Calculated from methane global warming factor 105 minus the 1 part CO_2 from the flare burning the methane.

9 Reinhart, D.R. et al. First-Order Kinetic Gas Generation Model Parameters for Wet Landfills, report prepared for US EPA, 2005, p. 4-5. (http://www.epa.gov/nrmrl/pubs/600r05072/600r05072.pdf). See also Sally Brown, “Putting the Landfill Energy Myth to Rest,” BioCycle, May 2010, p. 5.

10 We note that these data are from experimental sites; some energy recovery sites may not be this wet.

Since it is supposed to be illegal to deliberately add water to a landfill, waste engineers came up with a variety of ideas to increase the gas production in the short term and decrease costs so they could make more money, including such methods as11:

• Leaving the cap off as long as possible so more water from rain and snow can enter.
• Regrading the slopes to drain rain into the landfill.
• Recirculating the liquid leachate flowing from the bottom of the landfill back into the top.12
• Turning off gas collection wells on a rotating basis in order to give each field time to recharge moisture removed by the gas extraction process itself.
• Reducing the vacuum pump pull on gas collection wells when imperfections in the landfill cover allow air to be drawn into the waste mass. Pulling lower amounts into the collection system allows more methane to escape. (Note: While landfills that just flare gas can accept 3%-5% oxygen infiltration before risking igniting fires, those recovering energy are restricted to as low as 0.1% because a high rate of methane production depends upon having an oxygen-starved environment.)
• Installing more gas collection wells at the center of the landfill, where methane ratios are greatest, and less at the periphery, which could allow more gas to escape with no wells to capture it.

Result of Increasing Moisture is More Uncollected, Fugitive Emissions

The problem is that these aids to more profitable “energy recovery” result in much more uncaptured methane. A report for the US EPA analyzed fugitive emissions for three types of approaches: (1) normal dry tomb landfill, (2) closed landfill, but circulating leachate to provide moisture for energy recovery, and (3) active landfill circulating leachate to provide moisture for energy recovery. The results are shown in Figure 4. The closed, but wet landfill had 1.9 times more escaping emissions, while the active wet landfill designed for maximum energy production had 4.7 times more emissions.13

Figure 4. Moisture Increases Fugitive Methane Emissions from a Landfill, by up to 4.7 times

11 List compiled in March 2010 by Peter Anderson, RecycleWorlds Consulting, based on these publications:
- Augenstein, Don, Landfill Operation for Carbon Sequestration and Maximum Methane, (http://www.osti.gov/bridge/purl.cover.jsp?purl=/795745-EMfXDz/native).
- Institute for Environmental Management (IEM), Emission Control: Controlled Landfilling Demonstration Cell Performance for Carbon Sequestration, Greenhouse Gas Emission Abatement and Landfill Methane Energy, Final Report, February 26, 2000.
- Augenstein, Don, et. al., Improving Landfill Methane Recovery - Recent Evaluations and Large Scale Tests (2007) (http://4.36.57.37/expo_china07/docs/postexpo/landfill_augustein_paper.pdf)
- Oonk, Hans, Expert Review of First Order Draft of Waste Chapter to IPCC’s 4th Assessment Rpt, 2008 (http://scp.eionet.europa.eu/publications/wp2008_1/wp/wp1_2008)
- SCS Engineers, Technologies and Management Options for Reducing Greenhouse Gas Emissions From Landfills, 2008 (http://www.calrecycle.ca.gov/publications/Facilities/20008001.pdf).
- U.S. Environmental Protection Agency, 40 CFR Part 60 WWW

(proposed and final rule).
- Sierra Club LFGTE Task Force, Sierra Club Report on Landfill-Gas-to-Energy, January 2010 (http://sierraclub.org/policy/conservation/landfill-gas-report.pdf)
12 "[Director of Butte County's solid waste program] Mannel explained that in this process, liquid is introduced into the sealed "waste cells" in the landfill. The addition of the liquid improves the production of methane up to five times more than the unaugmented process." Chico Enterprise-Record, 6/14/2010 (chicoer.com/news/ci_15292646)
13 Mark Modrak, et al., Measurement of Fugitive Emissions at a Bioreactor Landfill (2005) (available at http://clubhouse.sierraclub.org/people/committees/lfgte/docs/measurements_fugitivieemissions.pdf)

The IPCC estimated that, over the long term, including the extensive times (before and after installation of the gas capture systems) when there is little or no gas collection, the average total fraction captured may be as low as 20%.14 U.S. EPA's Compilation of Air Pollutant Emission Factors (AP-42) assumes a range from 60 to 85 percent, with 75 percent as "typical" for sites having a well-designed active collection control system in place.15 However, EPA gives no estimates of the amounts lost before the installation of the gas capture system and after landfill maintenance ends, which often are very large.16

A report by consultants for the solid waste industry17 provides their view of the ranges of gas collection values: 50-70% for an active landfill, 54-95% for a inactive landfill or portions of a landfill that contain an intermediate soil cover, or 90-99% for closed landfills that contain a final soil and/or geomembrane cover systems. Their view is stated as, "The high ends of the range of these values are proposed for sites with NSPS or similar quality LFG collection systems which are designed for and achieve compliance with air quality regulations and surface emissions standards." "The low end of the range would be for full LFG systems that are installed and operated for other purposes, such as energy recovery, migration control, or odor management; . . ." (emphasis added). Our interpretation of these statements is the high ends of the ranges apply to sites using flaring, while the low ends apply to those doing energy recovery.

However, we note that the Palos Verdes landfill study in the 1990's, which was cited by SCS Engineers for its "capture efficiencies above 95%,"18 was for a landfill that had been closed for nearly 20 years and had a 5-foot thick clay cap installed. That study was recently reevaluated by the California Air Resources Board, which found a collection rate of only 85%.19 Thus for closed landfills with a final cover, 85% capture is a more substantiated upper limit, meaning that more than 15% is escaping.

In any event, the SCS report indicates the waste industry recognizes the potential losses in the collection efficiency of energy recovery compared to state of the art flaring. This means that an active landfill (shown in the left two columns in Figure 5 on the next page) using an energy recovery system could

have a collection efficiency as low as 50%, compared to about 70% for one using flaring, which implies 1.6 times more methane is likely escaping when a landfill is used for energy recovery. A study of Dutch landfills20 shown in the two right columns found that, averaged over the life of the landfill, flaring gas extraction systems designed for minimizing emissions could realize collection efficiencies only up to 50%, while energy recovery systems averaged only 20% efficiency. However, the numerical factor is the same, 1.6 times more methane is likely escaping when a landfill is used for energy recovery.

Figure 5. Methane Capture Efficiency in Energy Recovery Systems is much less than in Flaring sites, which increases Escaping Methane by 1.6 Times

14 Intergovernmental Panel on Climate Change, Fourth Assessment Report, Waste Chapter 10, p. 600 (2008).

15 Office of Air Quality Planning and Standards and Office of Air and Radiation, Emission Factor Documentation for AP-42, Section 2.4, Municipal Solid Waste Landfills (Revised 1997) (http://www.epa.gov/ttnchie1/ap42/ch02)

16 “Critique of SCS Engineers’ Report Prepared for California’s Landfill Companies on Gas Collection Performance,” by Peter Anderson, Center for a Competitive Waste Industry, Sept. 5, 2008.

17 SCS Engineers, Current MSW Industry Position and State-of-the-Practice on LFG Collection Efficiency, Methane Oxidation, and Carbon Sequestration in Landfills, for the Solid Waste Industry for Climate Solutions (June 2008), p. 16-17 (http://www.scsengineers.com/Papers/FINAL_SWICS_GHG_White_Paper_07-11-08.pdf).

18 California Integrated Waste Management Board, Overview of Climate Change and Analysis of Potential Measures to Implement Greenhouse Gas Emission Reduction Strategies, May 8, 2007.

19 “Initial Statement of Reasons for the Proposed Regulation to Reduce Methane Emissions from Municipal Solid Waste Landfills,” (May 2009) p. IV-5 and Appendix D (http://www.arb.ca.gov/regact/2009/landfills09/isor.pdf).

20 Oonk and Boom, 1995, Landfill gas formation, recovery and emissions, Chapter 7, TNO-report 95-130.

We note that a recent report21 by Patrick Sullivan, senior vice president of SCS Engineers, consultants for the solid waste industry, states, “Opponents of landfills claim development of LFGTE projects will increase methane emissions at landfills [in comparison with flaring]. . . This is simply not true.” Some of the points he makes are quoted in italics below:

1. “The landfill is required by federal regulations to achieve the same surface emission limits and LFG system operational requirements in either case.” Our response is the landfill operator must demonstrate there is no increase in fugitive emissions from practices that aid LFGTE, such as reducing the vacuum pump pull, as mentioned above.

2. “Landfill opponents suggest that LFG engines, which represent the largest majority of LFGTE devices,

do not destroy methane as well as flares. Indeed, the capacity of flares to destroy methane is greater than most LFGTE equipment, but the true difference between the two devices is very small with flares and other control devices achieving more than 99% control and lean-burn LFG engines achieving more than 98% control of methane (Solid Waste Industry for Climate Solutions [SWICS], 2007).” He is referencing his own company report, but the report actually states that methane destruction efficiency of flares is 99.96% compared to internal combustion engines 98.34%. As we will show later, this 1.6% difference is very significant, even using the outdated GHG multiplier of 21 (and much worse using the 20-year multiplier 105).22 This means that it is impossible to use engines and have less net impact than flaring, but turbines with high destruction efficiency are acceptable, as are systems that inject the methane directly into natural gas pipelines for normal uses.

3. “There are some landfills, which are not required by regulation to collect and control LFG, that are developed for LFGTE.” Our response is this is a valid point. Voluntary LFGTE projects undertaken before the NSPS standards require temporary capping and collection could significantly reduce GHG emissions compared to cases where operators wait as long as possible (up to 5 years is allowed for active cells) to cap and install collection systems. A consultant report found a very large collection of methane before the five year limit produced substantial carbon reduction credits.23 However we feel the EPA needs to drastically tighten the NSPS standards, especially in light of the studies reported above that the largest emissions from wet organics occur within the first three years.

Combining the Two Effects Produces Much More Net GHG Emissions for Energy Recovery

In addition to the increase in fugitive emissions, there is the effect reported above that wet landfills produce 2.3 – 4.7 times more methane than dry ones. If we combine these two observed effects, the net result would be 3.8 - 7.8 times more net GHG emissions for energy recovery compared to flaring (a result that applies irrespective of the value of the GHG multiplier for methane).

The charts in Figure 6 indicate the actual global warming savings using the captured methane from energy recovery to replace the burning of fossil methane are very small (0.0007 tons of carbon dioxide equivalent per typical ton of municipal solid waste (MSW)), much less than the overall impacts of the escaping methane. The left chart shows a net increase of GHG emissions of 0.034 CO_2 equivalent tons/ MSW ton using the old (1995) multiplier of 21 (which is still used by the US EPA for “consistency”).

The right chart shows a net increase of GHG emissions of 0.172 CO_2 equivalent tons/MSW ton using the latest (2009) multiplier of 105 over the next critical 20 years. Below the large right red bars for energy recovery in both figures, there is a very tiny blue line (that looks almost like a shadow) that

represents the amount of benefit from offsetting the use of fossil fuels, which in each case is only 0.0007
tons of carbon dioxide equivalent per typical ton of MSW.
21 Patrick Sullivan, SCS Engineers, The Importance of Landfill Gas Capture and Utilization in the U.S., April 2010, p. 28-30. (http://www.scsengineers.com/Papers/Sullivan_Importance_of_LFG_Capture_and_Utilization_in_the_US.pdf)
22 It is very unfortunate that EPA 40 CFR Part 98 allows the use of a default 99% destruction efficiency for
methane for all types of LFG combustion devices, including engines, ignoring this large GHG impact.
23 McCommas Bluff LFGTE Project, Voluntary Carbon Standard Assessment, Jan. 2010, by Blue Source LLC,
available from the author, Annika Colson, (212) 253-5348, acolston@bluesource.com
Jim Stewart, PhD Landfill gas to energy GHG impacts July 23, 2011ates of metnene released of 50-100 grams of methane per mile by natural gas trach trucks vs. 11 to 17 g per mine methane released in the Wash D.C Study cited herein More comments will follow today before 5 pm

Harvey Eder for self and for PSPC Public Solar Power Coalition

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2011-10-21 12:30:04

No Duplicates.

Comment 8 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 4th Workshop.

First Name: Harvey
Last Name: EDER
Email Address: harveyederpspc@yahoo.com
Affiliation: self & PSPC PUBLIC SOLAR POWER COALITION

Subject: Oct 21 timely comments on LCA /LCFS CARB Pt.2 if 3 plus by Harvey Eder &PSPC to 45 Day Do.
Comment:

This is a part 2 of 3 or more submittals on LCFS CARB testimeny onthe record ion OCt 21,2011 to be included rather that ignored as in the past in the record for staff Expert Work Group and Sustainiability Work Group to be cirulated for comments in the 45 day public somment document due Oct 31 to go to CARB BD in mid Dec 2011 to make law by Jan 1.2011. This all is submitted under protest with possible litigation considered as part of the record. Most comments will flow but this was ignored by CARB staff like Richard, who cut me off during public comments in the Aug or Sept meeting of the Expert Wk Group violating the brown act etc. This was rudely done as if I/WE worked for him rather than him being a public servant and work ing for us !!! Maybe most people in the room worked for his but this violated due process and didn't let this infor. before the Panel /Group this is also being submitted to the Extert wk Grroup and to the Sustainablity Work Group for LCFS for their record they were cited in Ch 2 and 5 in Oct 19,2001 Weed circulation on Harmony with other programs and Life Cycle Analysis. This is not enough time to respond ! Also we had been notified we had untilMonday Oct 24 in writting to respond to this.

Attached is a copy of emails (everything said orally via email and over the telephone in this matter are on the record) It is address to Henry Hogo Asst. Ex Officer for SCD and contains a copy of an email to John Courtis regarding looking at Natural Gas emissions over time the life of a vehicle and corredtions to the CARB Staff document GREET ?GTAP LCFS LCA of CI done by Staff andHowdy Henry Hogo,

It's been a while since we last talked. I hope you are well. Sorry it has taken me so long to get back to you. Here is an email send to CARB LCFS group manager John Courtis last month in reference to what we talked about methane emissions in the real world over time/the life of the vehicle. I've talked with John Courtis and his staff (Kevin Cleary) a few times and am shaking out their numbers which are dubious. I will send you another email with further communications. Please send me any informations that you have that we talked about. I will call you.

Thanks, take care

Harvey Eder (310)3932589

RUDE ! NG VEH. HE/PSPC 3/9/11
From: Harvey Eder <harveyederpspc@yahoo.com> View Contact
To: jcourtis@arb.ca.gov
Cc: harveyederpspc@yahoo.com

--

Howdy John Courtis,

It's been a month or more since I emailed you and your staff and called you on the phone, to no avail. Sir this is more than rude. It follows the pattern that you and your staff have exibited going back 3 years ago when I/We contacted you with testimony / information for the record in LCFS for the Scoping Plan !

Once again in reference to the paper circulated for LCFS for LNG ("The Staff of the Air Resources Board developed this preliminary draft version as part of the Low Carbon Fuel Standard regululatory prosess The ARB acknowledges contributions from Life Cycle Associates (under contract with the California Energy Commision) during development of this docyument") (CNG etc.) please send me at once the correct link for the CH4 and N2O 2.5 gCO2e/MJ that connects with the Austrailian study from apx. 10 years ago that forms the basis of CARB numbers for these GHG emissions. Page 17 of the LCFS Tank To Wheel or what you used LNG Tailpipe emissions. Again the information you are using is dated and the study done by NREL showing CH4 emissions over the life of an engine (3 years) shows 70% increase in CH4 emissions from comparing 2001 NG buses in DC with 2004 NG buses. This omitts N2O which has the number of 300 times co2 e and increases the Washing DC study numbers 10%.. Your document refers to a web site that doesn't work now http://www.arb.ca.gov/fuels/lcfs/lcfs.htm "for complete details" " Preliminary Draft Distrubuted For Public Comment.

The study that disproves CARBs LCFS numbers is http://www.nrel.gov/docs/fy06osti/36355.pdf this document paper is Emission Testing of Washington Metropolitan Area Transit Authority (WMATA) Natural Gas and Diesel Transit Buses Nrel, W.V. University , U.S. DOE. Page 22 shows graphs Fig.14 of Methane Emissions (CNG vehicles only) which is multiplied by 21 times for CH4 at least NASAs James Hansen uses 33 times as well as fig. 15 co2 emissions., Page 16 and 17 show NG CH4 and CO2 emissions for 2001 (3 yrs old buses) and 2004 new NG buses. There is an average of 17.3 g/mi CH4 at 42,886 BTU/mile and 10.6 CH4 g/mi and 2,173 CO2 g/mi at 40,899 BTU/mi. This shown 2004 buses CH4 emissions only yield 5.128 g co2e and 2001 (3 year old buses yeild 8.03 g co2 e per mj)or more than 2 to 3 times your numbers without counting N2O(degradation of the engine ocver the life of the vehicle) and with a linariar increaes of this rate of emissions of an average of 16.73 g CO2e per MJ to with an exponential increase at the Nrel WV University , DOE of 43.54 g CO2 e of CH4 over an 18 year life of the vehicle, or from apx. 6+ times the amount linarly aging engines to over 17.4 times or a magnatude and more of increases the dated numbers CARB and your staff used with counting N2O.

Please Respond at once this time...

Thanks, take care
Harvey Eder Ex. Director PSPC Public Solar Power Coalition
1218 12 th St. #25
Santa Monica, Ca. 90401
(310)3932589

PS the emphasis that CARB and SCD is putting on converting to Natural Gas Vehicles rather that Solar Electric etc. is beyond illadvised almost criminal.
0UR SERVICES ARE AVAILABLE FOR CONSULTING IN THIS REGARD.
CC will be sent to Dr. Michael Benjamin and Dr. Cody Livingston CARB Staff that introduced us to this study on DC NG Buses.

Howdy Aaron,

Here is info about the NREL study on natural gas GHG emissions over the life of a vehicle that I told you about. Hope this get to you.

Thanks, take care

Harvey (310)3932589

brought to staffs attention over the past several years.

Please excuse the mistakes in this document in spelling, grammer etc. There is only limited (not legal time to respond.S Cal busses are taken after 12 years and sold to Mexico etc. and these emissions are all part of the life cycle emissions etc.

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2011-10-21 13:14:58

No Duplicates.

Comment 9 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 4th Workshop.

First Name: Harvey
Last Name: Eder
Email Address: harveyederpspc@yahoo.com
Affiliation: self & PSPC Public Solar Power Coalition

Subject: RE part 3 of 4 or more testimony CARB LCFS LCA Nat GasEnd of Dr.St. Doc/
Comment:

Attached is the balance of Dr. Jim Stew
art paper about Natural Gas last page will follow if possible in
submittal 4 of 4 or more

Following comments are also submitted for /on the record . As cited
in part 2 of 3 or more when branch Chief Richard ???
would not let me/us finish talking at the public meeting in Aug.
or July 2011 this is also submitted to the ombudsman as an official
complaint. signed Harvey Eder public solar power coalition for self
and PSPC. Page 6 0f 6 will follow Dr. Stewart
paper under part 4 or 4 or more

In his paper he states that in the best of all perfect world a new
engine full tuned will burn 98% of the methane /nat, gas with 2 %
emitted into the atomosphere etc. In a conversation earlier today
Dr. S said in a not new engine 95% world burn with 5% ch4
emittedinto the atmosphere. This is a very conservative number. 3
years ago at a SQAUMD meeting on clean technology held in Long
Beach in 2008 (where TBoon Pickens was the lunch specker who
talked abput fracking natural gas and converting vehicles to
natural gas throughout the US and puching his proposed Proposition
on the Nov Ballot in Calif to do this which was soundly rejected by
California voters as was PG&E anti Public Solar Power Prop. in
spring 2009 Prop 16 and last years 2010 Prop 23 against our Golbal
warming law which this proceeding was initated by in 2006 AB32-the
people of Ca. know better and deserve a resources agency/epa etc
CARB that legally does it's job and uses the best data available to
impliment the LCFS (and it's trading law and CI studies etc. not
bought out oil and gas industry people doing there bidding. Gas is
better left in the ground. and immediatesolar conversion is needed
now!

zIn 09 in LBeach staff from International Harvester said that they
tested a nat gas engine and that 15% of the methane was emitted
into the atmosphere un burned. CARB SCD state and Fed EPA , CEC and
DOE need to do the studies of these buses in D.C
that were tested 5/6 years ago etc and get the facts data and
figures on whats out there and not push "what I called at the CARBs
LCFS Expert Wk Group the elechant in the room" that if being
ignored. The N.ice cap if melting and all the epople of Ca. get is
Bus as Usual. Maybe more that 15% of methane is leaking and being
emitted into the Atmosphere with a GWP of 34 to 105

There was a study done in April of 2011 that said fracked natural
gas had a higher ghg emission than coalat Cornell University a copy

of this I/we submitted to CSD Randal Pasak and Henry Hogo etc. and upon request if was sent to John Courtis
requesting that this be delt with this year rather in 20123 or 2014 plus. when we're converting to natural gas. All of the Biomas fig. still have3 to be looked at not pushed through llike the nat. gas is now with 2 days before Ch 2 and % submittals poped up on the WEB by CARB staff !!!Dr. David R. Atkinson Prof of Ecology and Environmental Biology at Cornel and Dwight C. Baum Prof. of Engerneering and Renee4
Santoro a reasarch Tech on ecology and evolutionary biology published this paper I /we will try to submitt it and related info by the 5 pm deadline for LCFS etc today. including a May 4, 2010 letter from the Council of Scdientific Society Presidentd Wash D. 202 872-4452 etc.Combining the Two Effects Produces Much More Net GHG Emissions for Energy Recovery
In addition to the increase in fugitive emissions, there is the effect reported above that wet landfills
produce 2.3 – 4.7 times more methane than dry ones. If we combine these two observed effects, the net
result would be 3.8 - 7.8 times more net GHG emissions for energy recovery compared to flaring (a
result that applies irrespective of the value of the GHG multiplier for methane).
The charts in Figure 6 indicate the actual global warming savings using the captured methane from
energy recovery to replace the burning of fossil methane are very small (0.0007 tons of carbon dioxide
equivalent per typical ton of municipal solid waste (MSW)), much less than the overall impacts of the
escaping methane. The left chart shows a net increase of GHG emissions of 0.034 CO2 equivalent tons/
MSW ton using the old (1995) multiplier of 21 (which is still used by the US EPA for “consistency”).
The right chart shows a net increase of GHG emissions of 0.172 CO2 equivalent tons/MSW ton using
the latest (2009) multiplier of 105 over the next critical 20 years. Below the large right red bars for
energy recovery in both figures, there is a very tiny blue line (that looks almost like a shadow) that
represents the amount of benefit from offsetting the use of fossil fuels, which in each case is only 0.0007
tons of carbon dioxide equivalent per typical ton of MSW.
21 Patrick Sullivan, SCS Engineers, The Importance of Landfill Gas Capture and Utilization in the U.S., April 2010, p. 28-30. (http://www.scsengineers.com/Papers/Sullivan_Importance_of_LFG_Capture_and_Utilization_in_the_US.pdf)
22 It is very unfortunate that EPA 40 CFR Part 98 allows the use of a default 99% destruction efficiency for
methane for all types of LFG combustion devices, including engines, ignoring this large GHG impact.
23 McCommas Bluff LFGTE Project, Voluntary Carbon Standard Assessment, Jan. 2010, by Blue Source LLC,
available from the author, Annika Colson, (212) 253-5348, acolston@bluesource.com

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2011-10-21 14:36:16

No Duplicates.

Comment 10 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 4th Workshop.

First Name: Harvey
Last Name: Eder
Email Address: harveyederpspc@yahoo.com
Affiliation:

Subject: 10/22/11 Comments/ Testimony HE/ PSPC CARB LCFS for 45d
Comment:

Sorry couldn't get in full Dr J. Stewart paper or Assesment of the Greenhouse Gas Footprint of Natural Gas From Shale Formations Obtained by High-Volume, Slick-Water Hydralulic Fracturing By Rovert W. Howarth David R. Atkinson Prof. of Ecology & Env. Biology , Cornell University (Revised April 11,2011)

All info cited hereing is also now submitted for the hearing in Dec. 2011 of the CARB Board.See p. 16 of draft advancxes in lcassesmentref elasicities between petro products The conversion to low sulfer diesal is fortelling what may happen wiht nat gas Its dangerous.

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2011-10-21 15:31:51

No Duplicates.

Comment 11 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 4th Workshop.

First Name: Harvey
Last Name: Eder
Email Address: harveyederpspc@yahoo.com
Affiliation: self and PSPC Public Solar Power Coaliti

Subject: 10/21/11 Comments/Test. LCFS to be in 45 day com. pd 10/31/11
Comment:

```
Sorry couldn't copy p 6 of Dr. S paper. Cite on Cornell University
is "Assesment of the Greenhouse Footprint of Natural Gas from Shale
Formations Obtained by High-Volume, Slick -Water Hydraulic
Fracturing" Robert W. Howarth David R. Atkinson Professwor of
Ecology ^ Biology , Cornell University (Revised April 11, 2011)

Sldo  dee p 16 or 25 Advances in Lifesyscle Assesment about par 2
elasticily of prince of petro prices etc. Ex Low Sulfee3r Diesal
was cheap enough to compete with reg. diesel like natural; gas will
compete with diesal and gasoline 1-3 to 1-2 of natural gas is from
fracking the oil and gas cos. are doing this like crazy and buying
each other out ie ElPaso etc, No more time

HE & PSPC
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Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2011-10-21 16:44:53

No Duplicates.

Comment 12 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 4th Workshop.

First Name: Greg
Last Name: Karras
Email Address: gkatcbe@gmail.com
Affiliation:

Subject: Request for Advisory Panel recommendation on petroleum fuels carbon intensity values
Comment:

Dear Advisory Panel members,

Accurate carbon intensity estimates for transportation fuels are critical to the efficacy of the LCFS. Refined petroleum fuels now dominate the transport fuel mix. However, current LCFS carbon intensity values for these fuels omit direct and indirect emissions associated with refining denser, higher sulfur crude oils. Please consider the attached scientific evidence quantifying the impact of these emissions that are likely to increase dramatically by 2020 on the efficacy of the LCFS and supporting an Advisory Panel recommendation for revisions to account for this source of emissions in the carbon intensity values. Attachments noted in this comment will follow directly. Thank you, in advance for considering this critically important matter. Greg Karras, Senior Scientist, CBE

Attachment: www.arb.ca.gov/lists/lcfsadvisorypanel-ws/23-cbe-arb_adv_panel_102411.pdf

Original File Name: CBE-ARB Adv Panel 102411.pdf

Date and Time Comment Was Submitted: 2011-10-24 22:11:51

No Duplicates.

Comment 13 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 4th Workshop.

First Name: Greg
Last Name: Karras
Email Address: gkatcbe@gmail.com
Affiliation:

Subject: Attachments to request for Advisory Panel recommendation on petroleum fuels CI values
Comment:

```
Dear Advisory Panel members,

Please find attached the attachments noted and discussed in CBE's
comment just submitted entitled "Low Carbon Fuel Standard (LCFS):
Request for LCFS Program Review Advisory Panel consideration and
recommendation on petroleum fuels carbon intensity values"

Thanks again for your consideration of this critically important
matter for the accuracy and efficacy of the LCFS.

Greg Karras, Senior Scientist, CBE
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Attachment: www.arb.ca.gov/lists/lcfsadvisorypanel-ws/24-cbe_attachments_102411.pdf

Original File Name: CBE Attachments 102411.pdf

Date and Time Comment Was Submitted: 2011-10-24 22:26:14

No Duplicates.

Comment 14 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 4th Workshop.

First Name: Greg
Last Name: Karras
Email Address: gkatcbe@gmail.com
Affiliation:

Subject: 24 November Comment to the Panel--Errata
Comment:

Dear Advisory Panel members: In the attached corrected comment, two typographic errors omit the quantitative comparison of observed and predicted 2004–2009 average statewide refinery emission intensity that is reported in the attachments cited as references 5 and 6 to the comment from the comment itself. A sentence on page one is corrected to read: Differences in refinery crude feed density and sulfur content explain 90–96% of differences in CO2 emission intensity observed across U.S. and California refineries and predict average 2004-2009 statewide refinery emissions within 1% (5, 6). A sentence on page 2 is corrected to read: Observed statewide emissions are within the 95% confidence of prediction in four of six years (Table 1) and are within 1% of the prediction as a six-year average (6). These typos are corrected in the attached resubmitted comment. Apologies for any inconvenience. Greg Karras, Senior Scientist, CBE

Attachment: www.arb.ca.gov/lists/lcfsadvisorypanel-ws/25-cbe-arb_adv_panel_102411.pdf

Original File Name: CBE-ARB Adv Panel 102411.pdf

Date and Time Comment Was Submitted: 2011-10-25 10:52:52

No Duplicates.

Comment 15 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 4th Workshop.

First Name: Charles
Last Name: Alexander
Email Address: sushibar@excite.com
Affiliation:

Subject: In re, (inter alia) Ultra-low carbon fuel (hydro-electric dam generated electricity)
Comment:

Thank you for the opportunity, herenow, to provide Comment on "Low Carbon Fuel Standard 2011 Program Review Report."
Now, at various places in the "Low Carbon Fuel Standard 2011 Program Review Report; Working Draft, Version 1" (herein after referred to as "the Report") optimism is expressed that, as standards become progressively more stringent, that the fact of it will spur investment in research into and development, production, distribution, & (ultimately) retail sales of ultra-low carbon fuels. Recent events up in Siskiyou County, among other things, should temper some of that optimism. For instance, there are those endeavoring to remove several hyrdo-electric dams in Siskiyou County, and another in eastern Shasta County. Additionally, these same entities have been endeavoring to abrogate (or at least derogate) the water rights of farmers & ranchers living in Siskiyou County. If these entities ultimately succeed, they will remove from the electricity grid in California a number of different ULTRA-LOW CARBON sources of electricity. Additionally, dam removal will remove water availability from senior water rights holders, including many lesser-capitalised farmers & ranchers. Operation, permitation, maintenance, etc. of the pumps, etc. that would replace all those dams (for the water rights holders) would be significantly more expensive than the use dam water. This is expected to cause at least some lesser-capitalised water rights holders to remove their lands from availability for to cultivate crops. This, in turn, will cause inflationary pressures brought to bear upon food prices (already) by biofuel production & mandate to be even WORSE. And this in addition to the fact that the cultivation of biofuel feedstock requires land. And when land is removed from crop-availability, this brings inflationary pressures to bear BOTH on the price of food & on the price of biofuel feedstock. Pumps require fuel. When dams are removed, the carbon index (CI) of electricity in California will inevitably increase! It's a simple matter of mathematics. Compliance with LCFS targets will be more difficult! Already, carbon net deficits are expected to be generated by approximately 2017. Removal of hydro-dams & of irrigation dams will make that problem even worse. Under Executive Order S-06-06, by 2020, 40% of all biofuels used in California will have to be produced in California (see pg. 30 of Report, inter alia). How is that to happen when hydro-dams & irrigation dams are proposed to be removed? Incidentally, when a dam is removed, all the sediment that settles at the base of it is released downstream, killing many fish (especially those endangered). And some of that sediment can be expected to deposit in downstream spawning beds, thus exacting long-term toll on fish populations. Is this at all in keeping with the ideas of Sustainability? No. It is not! On

pg.s 59 & 60 of the Report, it was noted that, during a 6 yr. survey period between 2004 & 2010, increased crop-based biofuel production has contributed significantly to increases in extreme poverty, particularly in South Asia & in Sub-Saharan Africa, not to mention increases in hunger-related diseases & tthus to decreases in life expectancies in those affected populations. And when crop-land in Northern California is taken out of circulation, the problem can get even WORSE, because yet additional inflationary pressures are thus brought to bear upon both food commodity & biofuel feedstock commodity prices. Fuels like "algae-gasoline" & "algae-diesel" are yet many years away from large-scale retail availability. Also, butanol is still not yet available for retail. So what is left is that ultra-low carbon electricity is being proposed to be taken off the market, whilst next generation low-carbon fuels like butanol, "algae-gasoline," & "algae-diesel" are still a number of years yet into the future. First generation biofuels, such as corn-ethanol, whose CI is the same as that for gasoline (BTW), production of which 1st Gen biofuels has imposed inflationary pressures on food-commodity prices, end up in the line-up by default. But is THIS the way to move forward with a LCFS? How is latter-year compliance supposed to be achieved under those conditions? The only answer is that of ultra-low carbon electricity! And that means hydro-dams! They must not be removed! Calculate separately the CI of electricity generated by hydro-dam from that of electricity State-wide & there is no contest. Hydro-dams are an extremely low-carbon way of generating electricity! Hydro-dam generated electricity is an already existing ultra low carbon fuel! Why take it off the market? And if existing crop land is allowed to remain in circulation, inflationary pressures that would have (by the crop-lands being taken out of circulation) been brought to bear upon both food-commodity & biofuel feedstock commodity prices are thus NOT added to the inflationary pressures that biofuels already bring to bear upon food-commodity prices. But one thing, inter alia, is essential. The dams must NOT be removed!! It would behoove ARB, & anyone reading this, to contact all relevant State & Federal agencies & urge them to save the hydro-dams.

Thank you.

P.S.,
On a positive note, it is good that, in several places in the Report, there is mention of inclusion of indirect land use effects in calculation of CI values. This must remain an indelibile part of the LCFS! Thank you.

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2011-11-16 20:39:56

No Duplicates.

Comment 16 for LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) - 4th Workshop.

First Name: Leticia
Last Name: Phillips
Email Address: leticia@unica.com.br
Affiliation: Brazilian Sugarcane Industry Association

Subject: Comments on LCFS 2011 Program Review Report – Working Draft Version 1.
Comment:

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Please see comments attached. Thank you, Leticia
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Attachment: www.arb.ca.gov/lists/lcfsadvisorypanel-ws/27-lcfs_-_unica_comments_to_draft_report.pdf

Original File Name: LCFS - UNICA Comments to Draft Report.pdf

Date and Time Comment Was Submitted: 2011-11-18 18:48:28

No Duplicates.

There are no comments posted to LCFS Program Review Advisory Panel (2011) (lcfsadvisorypanel-ws) that were presented during the Workshop at this time.