BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Implementation and Administration of California Renewables Portfolio Standard Program.	))))	Rulemaking 11-05-005 (Filed May 5, 2011)

NOTICE OF EX PARTE COMMUNICATION

Pursuant to Rule 8.4 of the Commission's Rules of Practice and Procedure, the Bioenergy Association of California hereby gives notice of an ex parte communication with Julie Fitch and Jennifer Kalafut, advisers to Commissioner Peterman. The communication occurred on March 14, 2014, in a meeting at the Public Utilities Commission in San Francisco. Julia Levin, Executive Director of the Bioenergy Association of California (BAC), requested the meeting with Ms. Fitch and Ms. Kalafut, and Ms. Levin attended the meeting on BAC's behalf. Written handouts provided at the meeting are attached to this Notice as Attachment 1.

In the meeting, Ms. Levin raised the following issues:

1) **The Benefits of Bioenergy**
   - General – greenhouse gas reduction, base-load and load-following renewable energy, potential for energy storage, air and water quality protection, reduced landfilling of organic waste;
   - Sector specific benefits – wildfire reduction from forest biomass, methane reduction and storage potential from dairy sector, methane reduction from other sectors;

- The need for every sector to succeed under SB 1122, including the dairy and forestry sectors.

2) Why Bioenergy is Different from Other Renewables

- Ongoing feedstock needs (collection, transport, processing/handling);
- Variable feedstock sources – some can be seasonal or depend on availability of water, fire impacts, other factors;
- Ongoing operation and maintenance costs higher than other renewables;
- Operational variables due to varied feedstocks and biological processes;
- Ongoing labor and fuel costs due to ongoing fuel collection and treatment, generators and other mechanical equipment;
- Owner/operators that may serve multiple purposes (ie, wastewater agencies, local governments, agricultural operations) and mandates (ie, public health and safety protection, water disposal, etc.);
- Less or no locational flexibility – bioenergy facilities must be placed where the waste is (ie, dairies, wastewater treatment facilities, municipal waste recovery facilities) or near where it is collected (ie, forestry, agricultural waste);
- Less mature industry (particularly at SB 1122 scale).

3) Why those Differences Necessitate Changes to the ReMAT and SB 1122 Staff Proposal

- Higher starting price and faster price increases to ensure all sectors can participate in program;
- Price screen between dairy and other agricultural waste to ensure that dairy projects can compete under SB 1122;
- Inflation adjustment adder to reflect increasing fuel, labor, operations and maintenance costs;
- Lower minimum number of bidders, at least until there is sufficient program participation, in the forestry and dairy/agricultural categories;
- Revised definition of “strategically located” to include projects with fixed locations or specific geographic requirements set by statute;

- Damages based on actual, rather than liquidated, damages provisions to increase market participation and commercialize the small-scale bioenergy industry;
- More than one change to contracted energy amounts allowed over the life of 10- to 20-year contracts.

Finally, Ms. Levin urged the Commission to move forward with the SB 1122 program as quickly as possible to help commercialize the small-scale bioenergy industry.

Ms. Levin provided the following hand-outs in the meeting. All are included in Attachment 1 to this Notice except BAC's Comments on the SB 1122 Staff Proposal, which were previously filed and served in this Proceeding.

1. *Sacramento Bee* article, "Dairy digester to turn cow waste into valuable electricity," Nov. 5, 2013.
2. *San Jose Mercury* article, "San Jose biogas facility will turn food waste into energy," Nov. 12, 2013.
3. *San Francisco Chronicle* op-ed, "Yosemite fire lesson: Cut risk with biomass energy," Sept. 5, 2013.
4. Bioenergy Association of California Membership List as of 2/26/2014.
5. The Bioenergy Association of California's "Investment Plan for Bioenergy"
6. The Bioenergy Association of California's Comments on the SB 1122 Staff Proposal, filed and served December 20, 2013.

DATED: March 19, 2014

Respectfully submitted,

/s/ Julia A. Levin

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VERIFICATION

I am a representative of the non-profit organization herein, and am authorized to make this verification on its behalf. The statements in the foregoing document are true of my own knowledge, except as to matters which are therein stated on information or belief, and, as to those matters, I believe them to be true.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed this 19th day of March, 2014, at Kensington, California.

/s/ Julia A. Levin

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ATTACHMENT 1 – HANDOUTS PROVIDED AT THE MARCH 14, 2014 MEETING

THE SACRAMENTO BEE sacbee.com

Dairy digester to turn cow waste into valuable electricity

By Darrell Smith
dvsmith@sacbee.com
Published: Tuesday, Nov. 5, 2013 - 8:22 pm

The small city of Galt on Sacramento County's southern edge was founded by farmers, ranchers and dairymen like Arlin Van Groningen, a third-generation dairy farmer who continues the family tradition on a 90-acre plot off Harvey Road just north of town.

"We concentrate on cows," he said. "Our goal is to produce a clean milk product."

And his 1,200 head of dairy cattle do that every day at New Hope Dairy, the operation he owns with fellow dairyman Arlan Van Leeuwen.

But it's what else New Hope's herd produces that caught the attention of the Sacramento Municipal Utility District and will soon mean enough electric power for 250 Sacramento-area single-family homes.

Biomass. Wet resources. Manure. Each of Van Groningen's milking cows produces 120 pounds of combined manure and urine each day. That's plenty of wet resources and more than enough to stock an advanced new dairy digester that produces and collects biogases to generate renewable electricity for SMUD.

The dairy digester – a storage tank 26 feet deep – collects and breaks down the massive amounts of manure New Hope's cows produce, then sends the cleaned methane gases to an adjacent generator. The end product: 450 kilowatts of electricity.

Officials at the utility, state and federal energy and agriculture officials, and bioenergy advocates gathered Tuesday at New Hope Dairy to dedicate and tour the project.

"You couldn't have a better fuel supplier," said N. Ross Buckenham, chairman and chief executive officer of California Bioenergy, a partner in the three-year, $3.5 million project. "Dairy gas is a phenomenally valuable renewable resource and its time has come."

SMUD is banking on it. The Sacramento utility received $5.5 million in grants from the federal Department of Energy and the California Energy Commission to help bankroll the building of New Hope's digester and another at the nearby Van Warmerdam dairy in Galt.

German firm MT-Energie built the New Hope facility mimicking technology long used in Europe. The dairy's biogas facility began operations in June and soon will be connected to SMUD's grid.

Two other digesters operate in SMUD's service territory west of Galt and south of Elk Grove. SMUD board President Bill Slaton said the biogas has become a vital part of the utility's energy portfolio. About 27 percent of SMUD's energy supply comes from renewable sources, he said.

It's also a hedge against costly peak-hour power, Slaton said. The New Hope generator produces energy that SMUD would use during the peak hours of 4 to 7 p.m.

"It's 400 megawatts that we need for about 40 hours a year," Slaton said. "When you buy it at the peak of the season – that's a higher cost."

But financing, regulatory hurdles and other factors have frustrated other California farmers hoping to diversify their dairies by developing biofuels, said Julia Levin, executive director of the Bioenergy Association of California.

"This should be the first of 100 projects. We're the No. 1 dairy state in the country. We should be the No. 1 dairy digesting state," Levin said. "It's unique, but let's make it one of many, not the only one."

Van Groningen admits that persuading him to convert his dairy waste into biofuel took some doing.

He wasn't skeptical of the technology. But, "being in the dairy industry, we've seen projects like this come and go," Van Groningen said. "The technology's been there for many years, but financing was the biggest hurdle. SMUD tore down walls and made it happen."

And as the renewables industry continues to grow, New Hope Dairy and other dairy operations are poised to turn waste into a much more valuable resource.

"When he first told me, I said it was a great opportunity to use the byproduct to generate power," said Arlin's father, Art Van Groningen, a dairy farmer near Visalia in Tulare County. "It's a whole new way of doing it."

Call The Bee's Darrell Smith, (916) 321-1040.

• Read more articles by Darrell Smith

San Jose Mercury News

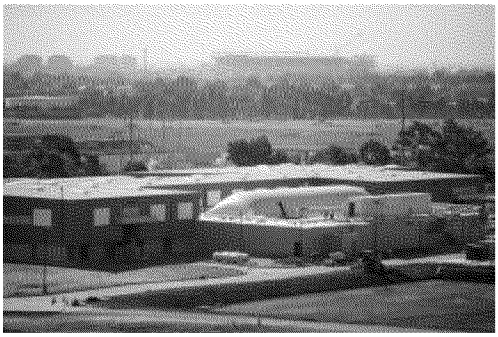
San Jose biogas facility will turn food waste into energy

By Dana Hull, Posted: 11/12/2013 08:15:29 AM PST

SAN JOSE -- The nation's largest facility for turning food scraps into biogas is about to go online in north San Jose.

The project is a unique partnership between GreenWaste, which collects garbage, recycled materials and compostibles, and Zanker Road Resource Management, which operates recycling facilities. The two firms formed the Zero Waste Energy Development Company in 2011 to take organic recycling to the next level: extracting energy.

Food waste, largely from restaurants and commercial businesses across San Jose, will be processed at the Los Esteros Road location by 16 massive digestion chambers that each can hold 350 tons of waste.



Pictured is an exterior view of the Zero Waste Energy Development Company's new Anaerobic Digestion Facility in San Jose on Oct. 31, 2013. The facility turns organic waste like food scraps into compost and methane biogas. The gas can then be converted into electricity to power the facility itself or it can be sold to PG&E. (Dai Sugano/Bay Area News Group) (Dai Sugano)

The process takes roughly 21 days, during which the food breaks down into compost and methane biogas. The gas can then be converted into electricity to power the facility or for use as fuel elsewhere. The technology, known as "dry fermentation anaerobic digestion," uses bacteria to break down organic matter in an oxygen-free environment and without using large quantities of water.

Scheduled to open later this month, the new facility arrives as California works to divert more materials -- from garbage to food scraps to consumer electronics -- away from landfills.

"This project is a big milestone for us," said Jo Zientek, the City of San Jose's Deputy Director of Environmental Services. "It's built on a piece of property that's an old landfill site that's owned by the city already. And the project is a direct outgrowth of San Jose's Green Vision."

San Jose adopted its Green Vision agenda in 2007 with the goal of making the city a world center of clean technology innovation. Included in the plan is an effort to divert 100 percent of waste from landfills and convert waste to energy.

Organic waste such as yard trimmings and leftover food are typically buried in land fills. As the waste breaks down, the landfills often emit methane gas -- a potent greenhouse gas that contributes to smog and climate change. Municipal solid waste landfills are one of the largest sources of human-related methane emissions in the United States, according to the EPA, and represent a lost opportunity to capture a significant source of energy.

"The capture rate at most landfills is not efficient," said Eric Herbert, CEO of Zero Waste Energy, which is based in Lafayette. "Methane is 23 times more potent than carbon dioxide."

Zero Waste's anaerobic digestion facility, located near the southern tip of the San Francisco Bay, will be the first large-scale commercial operation of its kind in the United States. It's being developed in three phases over the next several years, with each phase capable of processing 90,000 tons of organic waste each year. When fully operational, it will be one of the largest such plants in the world.

California utilities, including PG&E, are required to buy 33 percent of their electricity from renewable sources by 2020 via the state's "Renewable Portfolio Standard." Though much attention has focused on solar and wind power, electricity generated from biogas also qualifies for meeting the standard. So San Jose's new facility could be replicated throughout the state by cities struggling to figure out how to handle their waste.

Other biogas projects are already operating in the Bay Area. Waste Management Inc., which recycles waste for several cities in Alameda County, is turning its decomposing garbage at the Altamont Landfill near Livermore into electricity and liquefied natural gas. The fuel is then used in the company's garbage trucks.

"The interest in biogas is growing very quickly," said Julia Levin, executive director of the recently formed Bioenergy Association of California. "In the long run, there's a lot of potential for biogas to be used as transportation fuel. San Jose is on the cutting edge, but cities across California are trying to figure out how to better handle their waste. Biogas closes the sustainability loop on so many levels."

What is Anerobic Digestion?

Anaerobic digestion is the process of breaking down organic material without oxygen. One of the end products is "biogas," which can be burned to generate electricity or turned into a liquid transportation fuel.

San Francisco Chronicle | SFGate.com

Yosemite fire lesson: Cut risk with biomass energy

Julia Levin

Published 5:04 pm, Thursday, September 5, 2013

The Rim Fire is a sad reminder that wildfires are a growing threat to public health, safety and the water and power supplies for large parts of California. California can significantly reduce those risks by investing in small, sustainable forest biomass facilities that would use green waste to create renewable energy.

California has passed legislation (Senate Bill 1122, authored by former state Sen. Michael Rubio from Kern County) to accelerate bioenergy development from forestry and other organic waste sources, and it is now up to the Public Utilities Commission to adopt rules that will get facilities built in time to prevent more Rim Fires. These facilities use the forest biomass (brush, branches, small trees, bark collected to reduce fire risks) as the fuel to generate electricity in small power plants.

Wildfire is a natural part of California's ecosystem, but wildfires are increasing dramatically in frequency and severity as the result of climate change and overgrown forests. Seven of the 10 worst fires on record in California have occurred since 2000, and the Rim Fire is one of the worst yet. In recent years, wildfires in California have affected an average of more than 900,000 acres per year and cost taxpayers $1.2 billion annually in fire suppression and forest restoration efforts.

The effects of these wildfires are devastating. They threaten lives, homes and businesses. They also have enormous impacts on public health from the smoke, soot and other emissions. The Rim Fire has emitted approximately 30 million tons of carbon dioxide, equivalent to the annual emissions from 5 million cars. A severe fire season can emit as much carbon as the annual emissions from the state's entire transportation or energy sector.

Rather than letting California's forests go up in smoke, we can dramatically reduce the risk of wildfire and produce clean, renewable energy in its place. The 50 megawatts of forest biomass required by Rubio's bill would reduce wildfire risks on more than 300,000 acres over a 10-year period while providing renewable energy for 37,000 homes. Sized and located appropriately, these small-scale facilities would help increase forest ecosystem health and provide local jobs, energy and other benefits.

The Public Utilities Commission is now on the front lines of California's efforts to reduce catastrophic wildfires and maintain the many benefits that California's forests provide, including much of the state's water and electricity. Charged with implementing SB1122, the state public

utilities commission needs to adopt rules that will get new bioenergy facilities built quickly and in the most fire-prone areas, such as Placer County near Lake Tahoe and other communities in the Sierra. The CPUC must work with the California Department of Forests and Fire to ensure that the program is environmentally sustainable.

The Rim Fire makes very clear that doing nothing will cost ratepayers and the public far more than taking steps now to reduce the costs and impacts of catastrophic wildfires. Accelerating the development of small-scale forest biomass facilities is one of the most important steps California can take.

Julia Levin is the executive director of the Bioenergy Association of California and former deputy secretary for climate change and energy at the California Natural Resources Agency. She has also served as a commissioner on the California Energy Commission.

Bioenergy Association of California

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Zero Waste Energy

Bioenergy Association of California

INVESTMENT PLAN FOR BIOENERGY

EXECUTIVE SUMMARY

California generates huge amounts of organic waste – 36 million bone dry tons annually of urban, agricultural and forest waste. This material could play a dramatic role in meeting California's demand for renewable energy and low carbon fuels, while helping meet a myriad of other environmental and economic objectives:

- Provide immediate and significant greenhouse gas reductions
- Produce low carbon fuels, renewable electricity and energy storage
- Produce jobs and economic development in every region of the state
- Leverage private sector investment of three to four times as many dollars
- Reduce air and water pollution, environmental justice impacts and landfill waste
- Reduce wildfire risks and impacts

The California Energy Commission estimates that bioenergy in California – from both biomass and biogas - could provide 1.67 billion gallons of renewable, low carbon transportation fuels, or 6,000 megawatts of renewable electricity and energy storage.[1] This is approximately 10 percent of California's transportation fuels or electricity demand. Currently, however, bioenergy generates only a fraction of this potential and utilizes only 15 percent of California's organic waste.

Bioenergy in California currently stands at a crossroads. Numerous legislative and regulatory efforts have laid the foundation for bioenergy technologies. Ambitious policies, including the Low Carbon Fuel Standard (LCFS) and 75 percent waste diversion goals, have prompted unprecedented private investment that often-times leverages public grants, loans and incentives. New, environmentally sustainable bioenergy technologies are being deployed in commercial scale projects throughout the state and are beginning to demonstrate the commercial viability of community-scale bioenergy production.

[1] *2012 Bioenergy Action Plan*.

Now is the time to accelerate bioenergy development and its many benefits in California. To do so, the Bioenergy Association of California recommends the following:

1. Cap and Trade Revenues: Invest $100 million in cap and trade auction proceeds in proven bioenergy infrastructure programs and investments across all sectors including organic waste diversion and landfill gas capture, dairy and livestock waste, wastewater treatment, forest and agricultural waste.
2. Long-term Value of Low Carbon Fuel Credits (AB 2390): Enact a Green Credit Reserve (AB 2390) to guarantee the value of LCFS and RIN credits to help secure infrastructure financing needed to convert organic waste to ultra-low carbon fuels.
3. Organic Waste Diversion (AB 1826): Require diversion of organic waste from landfills and incentivize conversion to renewable electricity and low carbon fuels.
4. Clean Fuels Funding: Increase and prioritize use of AB 118 funds for transportation fuels produced from organic waste, the lowest carbon fuels available;
5. Utility Purchase Requirements: Implement utility purchase programs (SB 1122 and SB 32) to accelerate development of small-scale bioenergy projects across all sectors;
6. Renewable Electricity Funding: Expand EPIC (Electricity Program Investment Charge) funding for bioenergy in the Research & Development and Technology Development & Deployment Funds;
7. Carbon Offset Protocols: Adopt protocols for bioenergy from forest and agricultural waste, organic waste diversion and conversion, use of wastewater treatment biogas for energy, avoidance of fossil fuel based inorganic fertilizer through the land application of biosolids and other organic residuals, and use of landfill gas for electricity generation;
8. CalRecycle's RMDZ Program: Expand the Recycling Market Development Zone Program (RMDZ) to include grants as well as loans that support the financing of projects that meet CalRecycle" objectives to increase diversion of solid waste from landfills to 75 percent with projects that also produce bioenergy;
9. Tax Incentives: Expand the eligibility guidelines of the State Sales Tax Exclusion program managed by the State Treasurer's Office to include all equipment purchases for bioenergy projects and bioenergy technologies, including fueling facilities, pilot, demonstration and commercial-scale bioenergy facilities, pre- and post-processing equipment, and any and all manufacturing of equipment used in these facilities;
10. State Purchasing: Convert the state's 2,500 to 4,000 heavy duty vehicles, including trucks, buses, construction vehicles and other vehicles, to natural gas and concurrent purchase agreements for renewable natural gas.

BIOENERGY POTENTIAL AND BENEFITS

SECTOR	FUEL POTENTIAL	ELECTRICITY POTENTIAL	GHG REDUCTION (million metric tons)	OTHER BENEFITS
Diverted Organic Waste	168 million gallons	450 MW	5-10 MMT CO_2 e / year (not including fossil fuel displacement)	- Reduced landfill waste - Revenue and/or energy for local governments - Production of organic fertilizers
Landfill Gas	121 million gallons	330 MW	6.77 MMT CO_2 e / year (not including fossil fuel displacement)	- Reduced pollution and environmental justice impacts from diesel and fossil fuels
Dairy Waste	184 million gallons	250-500 MW	6 MMT CO_2 e / year (not including fossil fuel displacement)	- Reduced odor, air and water pollution - Revenue for dairies - Production of organic fertilizer
Agricultural Waste	-	274 MW	Not available	- Reduced air pollution from open field burns - Production of organic fertilizer and soil amendments
Wastewater Treatment Biogas	53 million gallons	100 - 450 MW	3 MMT CO_2 e / year (not including fossil fuel displacement)	- Produce revenue and/or energy for local governments - Reduced pollution from fossil fuels - Production of organic fertilizer and soil amendments
Forest Waste	-	371 MW	Not available	- Reduced wildfire impacts - Reduced air pollution from “pile and burn” - Protect infrastructure and forest ecosystem - Provide energy and/or revenues to rural communities

I. THE CASE FOR BIOENERGY: GREENHOUSE GAS REDUCTION, RENEWABLE ENERGY, PUBLIC HEALTH AND SAFETY, JOBS AND ECONOMIC DEVELOPMENT

As the table above demonstrates, bioenergy produces significant greenhouse gas reductions, renewable energy production and low carbon fuels. It produces many other environmental, public health and safety, and economic benefits as well.

A. SOLID WASTE SECTOR

The solid waste sector – both landfill emissions and diverted organic waste (that would otherwise be landfilled) – could generate almost 300 million gasoline gallon equivalents of clean, low carbon transportation fuels per year. This level of low carbon fuel, if made available by 2020 would exceed the requirements of California's low carbon fuel standard. Alternatively, the solid waste sector could provide nearly 800 megawatts of baseload renewable electricity.

1. Methane Emissions from Landfills

- California landfills generate 322,381 tons of methane (6.77 MMTCO$_2$ e) per year.[2]
- Almost half of California's landfill methane is flared (wasted) rather than beneficially used.[3]
- That methane could instead be converted to 121 million gallons of low carbon transportation fuels or 330 megawatts of renewable electricity.
- Converting the methane to transportation fuels and electricity reduces air pollution and environmental justice impacts by replacing diesel and other fossil fuels with renewable natural gas.

2. Diverted Organic Waste

- California continues to landfill 37 million tons of waste per year, almost half of which (16 million tons) is organic material that could instead be used to produce carbon negative fuels and renewable electricity.
- Diverted organic waste could produce 168 million diesel gallon equivalents of transportation fuels or 450 megawatts of renewable electricity.[4]
- Diverting 10 million tons of organic waste would reduce greenhouse gas emissions by 5 to 10 MMTCO$_2$ e, not including the greenhouse gas reductions from fossil fuel displacement[5]

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[2] California Greenhouse Gas Emissions Inventory, 2011, California Air Resources Board.

[3] CalReycle, Landfill Gas Master, 2010.

[4] Clean World Partners' calculation based on CalRecycle's estimate of organic municipal waste: 5.4 million tons of paper, 4.8 million tons of food, 4 million tons of greenwaste and 3.5 million tons of other organics. The calculation assumes 35% efficiency for electricity generation and 75% efficiency for transportation fuels conversion. The megawatts calculation assumes that 1 MW requires 33,000 tons of organic waste per year.

[5] Based on 50-100% diversion. CalRecycle Paper on *Composting and Anaerobic Digestion*, released September 17, 2013, Table 2, page 5.

- The electricity and transportation fuels produced from diverted organic waste would reduce air and water pollution, as well as environmental justice impacts, by displacing diesel and other fossil fuel use.

B. WASTEWATER SECTOR

- Wastewater treatment generates methane and produces renewable energy on-site thus reducing reliance on the grid, but can also inject it directly into the pipeline, produce transportation fuel, and partner with the Investor Owned Utilities to implement demand response strategies.[6]
- California's larger wastewater treatment facilities generate an estimated 141,000 tons of methane per year that could be converted to 53 million gallons of low carbon or carbon negative transportation fuel or more than 100 megawatts of renewable electricity.[7]
- Based on a conservative estimate developed by EPA in 2011, wastewater treatment facilities could generate an additional 450 megawatts of renewable electricity if they co-digest food, as well as fats, oils, and grease.[8]
- In addition, increased bioenergy production at wastewater treatment facilities provides energy and revenues for public agencies and local governments, and produces digestate for compost and/or land application, which reduces the need for synthetic fertilizers and improves carbon sequestration of the soil on which it is applied.
- Biosolids contain embedded energy and should be included in the investment plan when used to produce energy or fuel.

C. AGRICULTURE SECTOR

California agriculture emits 32 MMTCO$_2$ equivalent per year, about ⅓ from manure (10.28 MMT CO$_2$ e) and about ¼ from fertilizers (7.54 MMTCO$_2$ e).[9]

1. Dairies

[6] Wastewater treatments is the 4th or 5th largest source of methane and 3rd largest source of N$_2$O in CA. CH2M Hill report for BACWA and CCWG, page 19, based on 2007 CEC estimates, and AB 32 Scoping Plan Update Draft, released October 1, 2013, page 16.

[7] California Association of Sanitation Agencies, November 2013. <Need more info for reference –is this Greg's spreadsheet? If so, we need to make it clear that this is a conservative estimate based on default values from 2011 EPA CHP doc>

[8] Kukarni, Pramod, *Combined Heat and Power Potential at California's Wastewater Treatment Plants*. California Energy Commission, available at http://www.energy.ca.gov/2009publications/CEC-200-2009-014/CEC-200-2009-014-SD.PDF.

[9] California Greenhouse Gas Emissions Inventory, 2000-2011, California Air Resources Board.

California is the biggest dairy state in the United States, with approximately 1.8 million cows housed in about 1,600 dairies.

- Manure emits an estimated 489,524 tons of methane per year,[10] which could produce 184 million gallons of ultra-low carbon fuels or 500 megawatts of renewable electricity and energy storage.[11]
- Converting dairy waste to electricity could reduce emissions by 6 MMT CO_2 per year.[12]
- Dairy digesters also reduce or eliminate odors from dairies, protect water quality and provide organic fertilizers and soil amendments as a byproduct.

2. Agricultural waste

- California agriculture produces approximately 1.7 million tons of organic waste annually, including orchard and vineyard prunings, rice straw, field residue after harvest, nut shells, etc.[13]
- This agricultural waste can be used to generate 274 megawatts of renewable electricity in California.[14]
- Using agricultural waste to produce energy also reduces air pollution from open field burning and provides organic fertilizer and other soil amendments, reducing the need for synthetic fertilizer use.

D. FOREST SECTOR

The Rim Fire has demonstrated the enormous impacts and costs of wildfire, as well as the benefits of forest fuel removal to mitigate wildfire impacts. Large wildfires damage or destroy buildings, power and water infrastructure, and other resources, and cause enormous amounts of soot and other air pollutants. The recent Rim Fire has emitted as much CO2 as nearly 3 million cars driven for a year. It has also cost the SFPUC and PG&E tens of millions of dollars to repair power lines and substations and to clean up Hetch Hetchy reservoir.

California forests sequester 30 MMT CO_2 e annually.[15] A severe wildfire season, which is increasingly frequent in California, can emit as much CO_2 as the state's transportation or energy sector emits in a year.[16]

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[10] AB 32 Scoping Plan Draft, released October 1, 2013, p. 16.
[11] The Draft Consultant Report by Black & Veatch estimates only 227 potential megawatts from dairy waste, but it only includes dairies with 5,000 cows or more. The Agricultural Energy Consumers Association estimates potential at 250-500 megawatts.
[12] NRDC/ E2 study.
[13] "*Small Scale Bioenergy,"* Draft Consultant Report prepared for the CPUC, April 2013, at B-2. Heat content of agricultural waste is assumed to be 7,387 to 8,598 BTU/dry pound. Id. At page A-4.
[14] "*Small Scale Bioenergy,"* above, at page B-4.
[15] CalFire, 2012 FRAP.
[16] National Academy of Sciences report.

Investing in community-scale forest biomass reduces wildfire impacts and pollution from controlled burns by sustainably removing forest fuels and using the biomass to generate energy in a controlled power plant. Specifically, forest biomass can:

1. Generate 371 megawatts of renewable electricity[17]
2. Reduce GHG emissions by 65 percent or more, reduce wildfire by more than 22 percent, and save hundreds of millions of dollars in avoided wildfire damages annually. [18]
3. Protect public health and safety, local communities and infrastructure, water supplies and quality, electricity supply and infrastructure, wildlife habitat and other ecosystem benefits.
4. Provide jobs, local energy supplies and economic development in economically disadvantaged, rural communities. Investing in just 50 MW of forest biomass, as is required by SB 1122, would create more than 1,000 new jobs and generate millions of dollars in local tax revenues and economic development.
5. In addition, biosolids from wastewater treatment plants can be used to restore and reclaim fire ravaged land and reduce the potential severity of future fires.[19]

II. BIOENERGY INVESTMENT NEEDS

A. SOLID WASTE SECTOR

1. Landfill Methane

California has 278 landfills that, together, produce more than 40 billion standard cubic feet (scf) of methane per year. Almost half of that methane, approximately 19 billion scf per year, is flared rather than used to produce energy. That is equivalent to 19 million MMBTU's of energy.

The approximate cost to convert landfill methane to transportation fuel is $8 to $15 per MMBTU, depending on the size of the landfill, percentage of methane in the landfill gas, cleaning requirements, and the equipment to liquefy or compress the landfill methane for use as a transportation fuel. The fuel value is currently about $4 per MMBTU, resulting in about a $4 - $11 revenue deficit.

This translates to a need of approximately $76 to $209 million (19 million MMBTU's x $4 - $11 per MMBTU) to convert landfill methane that is currently flared in California to

[17] "*Small Scale Bioenergy,"* Draft Consultant Report prepared for the CPUC, April 2013, at B-2. The report estimates that California forests can sustainably yield 2.4 million bone dry tons of forest biomass, which in turn can be used to produce 371 megawatts of electricity.

[18] *Biomass to Energy: Forest Management for Wildfire Reduction, Energy Production, and Other Benefits,"* Prepared by the USDA Forest Service for the California Energy Commission, January 2010, CEC-500-2009-080, page 3.

transportation fuel, not including the costs of the fueling infrastructure or conversion of vehicles to natural gas.

2. **Anaerobic Digestion of Diverted Organic Waste**

California landfills 16 million tons of organic waste per year, of which approximately 7,197,000 million tons is recoverable green and food waste. The following cost estimates is based on using 75% (5.4 million tons) of that waste for anaerobic digestion.

a) Facility Costs - $1.3 to $2 Billion

- If the average facility handles 80,000 tons per year, then California would need 67 facilities need to process 5.4 million tons. Price per facility, including biogas cleanup, is $20 million, so 67 facilities would cost $1.34 billion
- If the average facility handles 40,000 tons per year, then California would need 134 facilities at $9.3 million each, or a total facilities investment of $1.25 billion.
- If the average facility handles 20,000 tons per year, then California would need 268 facilities at $7.4 million each, or a total facilities investment of $1.98 billion.

b) Heavy Duty Vehicle Subsidy - $166 million

- Each 80,000 ton facility would produce about 1 million diesel gallon equivalents (DGE) per year, which is enough to fuel about 70 heavy duty vehicles
- 67 facilities would produce 67 million DGE per year, enough to fuel 4,690 trucks
- Recommended subsidy per truck is $35,000
- The total subsidy for 4,690 trucks is estimated to be $166 million

c) Fueling Infrastructure - $73.7 million

- Assuming 80,000-ton facilities are used, 67 anaerobic digestion facilities will be needed, as well as 67 fueling stations.
- Each fueling station costs approximately $1.1 million, resulting in a total of $73.7 million for 67 fueling stations.

d) Total Incentive Needed - $750 million to $1 billion over 10 years

- Incentive based on 33% of the costs of new facilities and refueling infrastructure, plus $35K subsidy per vehicle
- Resulting GHG reductions of 75% diversion would be approximately 2.06 MMTCO2e, not including fossil fuel displacement.[19]

3. **Biomass Conversion of Urban Waste**

[19] CalRecycle Paper on *Composting and Anaerobic Digestion*, released September 17, 2013, Table 2, page 5.

California landfills more than 8 million tons per year of lumber and green waste.[20] Diverting just one-third of that waste, 2.85 million tons, could generate 250 MW of electricity and create 1,750 direct jobs, at an estimated cost of $1.4 billion.

B. WASTEWATER SECTOR

Of California's 557 existing wastewater treatment facilities (WWTF's), approximately 400 WWTF's already have anaerobic digestion facilities. At this time, 42 of the large WWTF's that have anaerobic digestion facilities are not beneficially using the biogas and 97 WWTF's have no anaerobic digestion facilities onsite. Many of the existing anaerobic digestion facilities can be repowered to expand electricity generation and/or produce transportation fuel. The costs to repower are estimated below.

1. Adding Capacity at Existing Facilities

For WWTF's that already have anaerobic digestion capacity, the capital cost to add 1 MW of power generating capacity is approximately $7 to $10 million, not including interconnection costs.[21]

2. New Capacity, Including Anaerobic Digestion and Power Generation

For WWTF's that do not have anaerobic digesters or that would need to add digestion capacity, the capital cost to add 1 MW of power generation would be $17 to $20 million, not including interconnection to the grid.[22]

C. AGRICULTURE SECTOR

1. Dairy Waste to Energy

Methane emissions from California dairies could be converted to 250 to 500 MW of renewable energy and energy storage. The cost to build 250 MW of distributed generation from dairy digesters is approximately $1 to $1.5 billion over a decade or longer. An investment of 33 percent of that cost - $333 to $500 million over ten years - would stimulate private investment and ensure that California reduces its methane emissions and increases low carbon fuel and renewable energy production.

2. Agricultural Waste to Energy

The capital costs of agricultural waste to energy may be somewhat lower than other types of bioenergy, particularly if the facility uses gasification or other conversion technologies, but the feedstock, fuel and operating costs are likely to be significant for agricultural waste, much like forestry waste.

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[20] CalRecycle Paper on *Composting and Anaerobic Digestion*, released September 17, 2013, Table 1, page 3.
[21] Black & Veatch report, at page 4-1, Table 4-2.
[22] Black & Veatch report, at page 4-1, Table 4-1, with adjustments by CASA.

The cost to develop 100 MW of electricity from agricultural waste would be approximately the following:

Capital costs	($6.5 million per MW)	$650 million
Feedstock Costs	($30 per bone dry ton)	$18 million
TOTAL FOR 100 MW		$678 million

D. FOREST SECTOR

BAC supports the forest sector investment plan proposed by CalFire and the Sierra Nevada Conservancy, summarized below (in millions of dollars).

Phase	Bioenergy Facilities	Transportation Incentive	Forest Treatment	Total State Funding
Year 1 (2014 - 15)	$2.5	$5.345	$5.5	$13.3*
Year 2 (2015 - 16)	$4.0	$4.5	$11.5	$20.0
2024 (cumulative)	$75.0	$25.0	$275.0	$375.0

* Year 1: $795,000 of the $13,345,000 is requested for CAL FIRE and SNC to administer the programs (consistent with the Budget Change Proposals (BCP) submitted October 2013).

This proposal is a 10-year program to be funded through 2024. The bioenergy component includes a $75 million investment over 10 years at which time the 50 MW of forest bioenergy generation is estimated to be online. The transportation incentive is assumed to be funded for the first 7 of 10 years of the program, providing about $10 per bone dry ton of biomass to help offset the cost of delivering biomass to bioenergy facilities. The transportation incentive totals $25 million, starting with about $5 million each of the first two years and decreasing to zero in 2021. The forest treatment component is funded at $275 million over 10 years, and will result in reducing fuel loads on 550,000 acres with State funds and an additional 550,000 acres with the required match to receive grant funding. The total of 1.1 million acres is only 25 percent of the amount CAL FIRE identified as immediately in need of fuels treatment.

Over ten years, these investments will:

- Reduce forest fire risks on 1.1 million acres, creating over 10,000 direct and indirect jobs in biomass energy and forest treatment work, and leveraging an additional $500 million in public and private funds.

- Reduce GHG emissions by nearly 8.3 million metric tons ($MMTCO_2e$). By 2050, the projection exceeds 59 $MMTCO_2e$, with an approximate long-term cost-benefit ratio of less than $7 per ton of GHG emissions reduction. GHG emission reductions would continue to accrue beyond 2050.

- Help protect forest resources, wildlife habitat, watersheds and recreational lands; improving air quality; benefits to water quality and quantity; lower firefighting costs and other costs associated with fire; developing energy security; and creating local jobs and rural community vitality.

III. CURRENT FUNDING PROGRAMS AND GAPS

A. EPIC (Electricity Program Investment Charge) - $9 million per year

The Electricity Program Investment Charge (EPIC), formerly the Public Goods Charge program, provides approximately $150 million per year for clean energy research and development (R&D), technology deployment and demonstration (TD&D), and market facilitation. Most of the program funds are administered by the California Energy Commission, which must spend a minimum of $9 million per year on bioenergy development and deployment. None of the R&D funding is set aside for bioenergy, despite the need for new pollution control technologies, better quantification of greenhouse gas and other benefits, development of higher efficiencies and other R&D needs.

We urge the CEC to allocate a much higher portion of the EPIC program, both the R&D and the TD&D funds, to bioenergy development.

B. AB 118/AB 8 (Clean Fuels and Transportation) - $20 million per year

California's Alternative and Renewable Fuel and Vehicle Technology Program, also known as the AB 118 program, provides approximately $100 million per year to clean fuels and vehicle technology projects. Funding for biofuels, including ethanol and fuels generated from organic matter other than organic waste, receive approximately 20 percent of the total funding. In 2013, the funding for biofuels was $23 million, but the proposed funding for 2014 is only $20 million.

The CEC's allocation for biofuels, and especially for fuels generated from organic waste, should be much higher given that biofuels from organic waste are the lowest carbon fuels available. The most recent investment plan for the program acknowledges that biofuels from organic waste are actually lower carbon per mile than electric vehicles.[23]

In addition to the actual allocations, the CEC has included eligibility requirements in its recent program solicitation that exclude waste to fuel projects because they require a minimum

[23] *2014-2015 Investment Plan Update for the Alternative and Renewable Fuel and Vehicle Technology Program, Staff Draft,"* California Energy Commission, October 2013. CEC-600-2013-003-SD.

project size (5 million gallons per year) that is larger than even the largest waste to fuel projects.

We urge the CEC to increase the portion of AB 118 funding for biofuels and to prioritize biofuels from organic waste in other funding categories, including funding for Natural Gas Vehicle Incentives, Medium- and Heavy-Duty Advanced Vehicle Technology Demonstration, and Emerging Opportunities. We also urge the CEC to reduce the minimum project size required by the program to ensure that waste to fuels projects are eligible.

C. Low Carbon Fuel Standard (LCFS) Credits

LCFS credits should be a major driver of organic waste to fuel projects, but the credits are only contracted once the low carbon fuel has been produced – or only for a few years at a time, so they do not provide enough certainty for investors to rely on them for financing new low carbon fuel production facilities. As currently structured, the value of LCFS credits is only generated once a facility begins producing and selling fuel. Consequently, at the project development stage, the future value of LCFS credits is unknown and the duration of the program is uncertain, so LCFS credits do little to help secure the capital investments needed to build the infrastructure for biofuels production.

For LCFS credits to help spur investments in bioenergy infrastructure, the state needs to provide longer-term price and market guarantees, as described in BAC's proposal below.

D. Carbon Offsets

Carbon offsets could provide an important source of funding for bioenergy projects, but too few have been approved for bioenergy projects and the program's uncertain end-date make the protocols less valuable for investors. Carbon offset credits – credits (and payments) available for carbon reductions that are not otherwise required by law – are not currently available to most bioenergy projects. So far, the Air Resources Board (ARB) has approved protocols for only one bioenergy sector – dairy digesters. ARB has not adopted protocols for forest or agricultural waste to energy, organic waste diversion or conversion, use of wastewater treatment gas to energy, or use of landfill gas for electricity generation. The Climate Action Reserve (CAR) has already adopted protocols for organic waste digestion and landfill gas control measures.[24] ARB should either adopt these protocols or clearly explain reasons why it has chosen not to adopt offset protocols for these emission reductions.

Adoption of additional carbon offset protocols for organic waste to energy would provide an important funding source and the certainty of long-term benefits, if available, will attract private investment for these projects with benefits lasting well beyond 2020.

E. Self-Generation Incentive Program (SGIP)

The CPUC's Self-Generation Incentive Program provides incentives for utility customers that generate renewable power for onsite use. Very few bioenergy projects take advantage of the

[24] http://www.climateactionreserve.org/how/protocols/

program, although there is an added incentive for fuel cells to use renewable natural gas (from biomethane) rather than fossil fuel gas as the fuel source.

IV. OPTIONS FOR ADDITIONAL FUNDING FOR BIOENERGY

In addition to the recommendations described above, BAC urges California to invest $50 to $100 million per year of cap and trade revenues in bioenergy infrastructure investments. Investing cap and trade revenues in bioenergy would:

- Provide immediate, significant and quantifiable greenhouse gas reductions
- Produce low carbon fuels, renewable energy and energy storage
- Stimulate private sector investment of three to four times as many dollars
- Produce jobs and economic development in every region of the state, including many rural and economically disadvantaged communities
- Reduce air and water pollution, particularly in environmental justice communities, and waste going to landfills
- Protect public health, safety and infrastructure by reducing wildfire risks and impacts

We urge California to invest cap and trade revenues in bioenergy development using one or more of the mechanisms described below.

A. INVEST IN EXISTING AND NEW GRANT PROGRAMS

The simplest way to invest cap and trade revenues in bioenergy development would be to provide grants to bioenergy projects through existing and dedicated grant programs.

1. Existing Grant Programs Include:
    - AB 118/AB 8 – biofuels projects
    - EPIC – bioenergy to electricity projects
    - Carl Moyer and other diesel cleanup programs – biofuels

2. New Grant Programs are needed for specific sectors:
    - Dairy digesters and other agricultural waste to energy projects
    - Forest biomass projects
    - Diverted organic waste
    - Wastewater biogas to energy projects

B. INVEST IN A GREEN CREDIT RESERVE FOR LOW CARBON FUELS

Bioenergy developers often find it very difficult to finance a project based on the projected future value of credits they will produce. A Green Credit Reserve would provide a commitment

at the beginning of a development project to buy produced credits at an agreed-upon price would provide needed certainty to lenders of the financial viability of the project and thereby remove a large barrier to the development of bioenergy infrastructure in California.

Legislation should be enacted to establish a low carbon / renewable fuel (LCRF) financing mechanism using a portion of the revenues from the sale of California GHG Cap and Trade emission allowances. The legislation would also authorize the operation of a LCRF Bank, which could be administered by a state entity such as the California Infrastructure and Economic Development Bank (iBank -- http://www.ibank.ca.gov/) or some other newly created entity. This LCRF Bank would contract with prospective LCRF project developers for the long-term value of the LCRF Credits associated with the fuels they plan to produce. The LCRF Bank would then purchase LCRF Credits at the agreed upon price when they become available (when the fuel is actually produced and used). The contract for the purchase of LCRF credits between the Bank and the producer would need to be sufficient to cover the capital payback period for a LCRF facility developed to serve California's LCRF needs – say, 5-10 years.

The LCRF Bank would then sell the LCRF Credits to obligated parties required to ultimately hold and retire LCFS credits and RINs. The LCRF Bank would only be obligated to pay the up-front contracted value of LCFS and RIN credits for fuels that are actually produced and used. The certainty of an extended contract to purchase LCFS and RFS credits over a future period, backed by the full faith and credit of the State, would enable California LCRF developers to secure financing much more readily.

Managing the Fund

The program could be established with an initial budget of $50 to $100 million/year that would be deposited into the California LCRF Bank. The LCRF Bank could not commit more funds than is projected to be contained in the Bank from both auction revenues and expected LCFS and RIN credit sales. However, the LCRF Bank would be backed by the full faith and credit of the State.

The LCRF Bank would offer to LCRF developers, say, 5 to 10 year contracts for the value of LCFS and RIN credits on future LCRF production to be used in California. The credit values could be reached by having the LCRF bank establish a proposed long-term credit value – depending on the willingness of low carbon fuel developers to enter into contracts with the LCRF bank. The bank could start with an initially low price for LCRF Bank's future acquisition LCFS and RIN credits. The value could then be raised until sufficient commitments are made for a specified quantity of future LCRF Credits and continue until the LCRF Bank has allocated the funds available at that solicitation.

A seller of future LCRF credit to the LCRF Bank would not have to sell the full amount of credits that are anticipated to be produced by the LCRF production facility. A production facility could hold onto any amount of credits they may wish to sell privately. They are only obligated to sell the amounts committed to by contract with the LCRF Bank. The LCRF Bank is only obligated to purchase future LCRFs Credits that are actually produced -- at the previously agreed upon price. If a LCRF project never produces the LCRF, the LCRF Bank would not be obligated to pay for the

LCRF Credits. However, if the LCRF does produce fuel as contracted, the LCRF Bank would be obligated to purchase the credits for the fuels produced at the agreed upon price.

While the Federal RFS2 program allows intermediary and third parties to purchase and acquire RIN Credits, the California LCFS currently does not. A change in CARB rules would be required to allow the LCRF Bank to transact and acquire LCFS Credits.

Once the LCRF Credits are produced by the backed projects and held by the LCRF Bank, the bank could offer them for sale to parties with a compliance obligation under the LCFS and RFS2. This sale could occur at any time favorable to the bank, consistent with the objectives of the program, to a willing purchaser (with a compliance obligation) under the LCFS or RFS. The sale of credits held by the LCRF Bank could be made by means of a "reverse Dutch auction" by which the LCRF Bank would set an initially high price and reduce the offered price until sufficient sales are made. Revenues from the sale of LCFS and RIN credits would be deposited into the LCRF Bank. In this fashion, the funds held by the LCRF Bank would be renewed on an ongoing basis. Funding from the GHG Cap and Trade allocation revenues could be adjusted downward as the program matures. Funding should be limited to domestic LCRF projects that produce LCRF for use in California.

It is expected that the LCRF Bank would be self-sustaining after a period and provide a stable basis for financing LCRF projects in California. In fact, if the LCFS and RIN credits are ultimately sold to the obligated parties for a higher price than the original futures price backed by the LCRF Bank, the State would actually have a positive cash flow and funding from cap and trade revenues could be substantially reduced or eliminated.

The LCRF Bank would incentivize production of low carbon and renewable fuels by providing greater certainty in the value of LCFS and RFS credits. The LCRF should eventually be self-sustaining as revenues generated by the sale of LCRF Credits to the obligated parties will eventually displace the need for cap and trade revenues as a source of LCRF Bank funding. Further, investment in this LCRF program would provide continuing financial incentive for California to support the ongoing continuation of both the LCFS and RFS.

C. GREEN FUELS / STATE PURCHASE REQUIREMENT

The State of California has significant purchasing power that could be harnessed to help provide greater long-term certainty to the clean fuels market. If the State's heavy duty vehicle fleet was converted to natural gas and the state committed to 10-year or longer purchase agreements for renewable natural gas (biomethane), it would spur significant private sector investment in the infrastructure needed to produce renewable natural gas.

The state's heavy-duty vehicle fleet is about 2,500 to 4,000 vehicles, including state-owned trucks, buses, construction vehicles and other vehicles. Converting these vehicles to natural gas while entering into long-term renewable fuels contracts would provide the certainty needed to finance biofuels infrastructure. If California could convert its heavy-duty vehicles while entering into long-term contracts for renewable fuels, the private sector could provide financing for the

infrastructure needed to provide the fuels. Project equity financing would only be available, however, if the fuel contracts are for 10- to 20- year periods.

In addition to providing market certainty for the necessary infrastructure investments, the State could save money on its own fueling costs as bulk purchase, long-term contracts would reduce fuel costs and provide cost certainty.