



March 7, 2013

# Public Comments for the Cap-and-Trade Workshops

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## Introduction

As a Stakeholder, we are submitting this document as a public comment to the Cap-and-Trade Workshops, specifically to address ARB use of proceeds.

We believe, and strongly suggest, that the ARB can provide its greatest public benefit through a focus on incentive programs that promote the development of renewable natural gas through the anaerobic digestion of dairy manure.

Such a program would have a profound effect on California's four most challenged counties. Tulare, Kings, Madera and Merced counties are at the bottom ranking of most social and economic profiles, yet they are also the home to the majority of dairy farms in the state, 789 to be exact. Further, these counties have 171 food processing and manufacturing facilities that could greatly contribute to the amount of feed stock used for CNG fuel production.

This concept is the logical answer to providing the maximum economic and environmental benefits to the State of California. It solves many problems for dairy farmers, from production to compliance issues. It provides substantial employment opportunities through the construction of facilities, creating permanent and ancillary jobs in areas of the state that need it most. It also provides the ARB the opportunity to accomplish its goals in such a sweeping manner, it would be quantifiably challenging to compete against with any other program.

## Program Overview Draft Outline

### Single Investment Program – Provide Incentives for the Development of Manure Digesters for Central California Dairies

- Development Manure Digesters in four Central Valley Counties
- Four of the lowest ranking counties in the State
  - Kings, Tulare, Merced and Madera
  - Home to 789 Dairies
  - Home to 171 Food Processors and Manufacturers
- Biogas – Advanced Bio Fuels – Transportation Fuel
  - Renewable Natural Gas
  - Hydrogen
  - Very Low Carbon Intensity
- Economic Development - \$100 Million per year for seven years minimum
- Construction jobs in four counties
  - Support jobs
  - Training –new skills – retraining
- Long term full-time employment at each facility developed
  - Management
  - Computer skills

- Process system skills
- Climate Action Reserve – registration
  - Organic Waste Digestion Project Protocol
  - U.S. Livestock Project Protocol
- APX Environmental Management Account
  - Western Climate Initiative
  - Compliance Instrument Tracking System Service – “CITSS”
- Recycle/Reuse Water

## Background

California enacted the Low Carbon Fuel Standard (LCFS) regulation in 2007 as part of the Global Warming Solutions Act of 2006, known as AB32. California’s transportation sector consumes nearly 18 billion gallons of fuel each year. The LCFS requires that by 2020 the “carbon intensity” of the fuels being consumed be reduced by ten percent below the 2006 gasoline and diesel baseline. These goals can be achieved by bringing advanced biofuels<sup>1</sup> to market. The most readily available source in the Central Valley is the development manure digesters on dairy farms that generate massive amounts of substrate materials<sup>2</sup>. The dairy manure could be supplemented with food waste and cheese whey that is generated in close proximity to the dairies, which have higher energy content than manure and therefore will produce a higher BTU value end product.

There is data available indicating that methane, i.e. renewable natural gas (compressed or liquefied), is the cleanest burning transportation fuel available today. The Carbon Intensity is 50% to 75% below that of gasoline. When you also compare the four carbon molecules in methane to the twenty-two carbon molecules in diesel, diesel does not have a chance. Diesel engines can be readily converted to run on renewable natural gas. Currently, even BNSF Rail is considering the conversion of its diesel engines to natural gas.

A 2011 report prepared by Environmental Entrepreneurs titled *Meeting the California LCFS* states: “It is indeed possible to deliver enough advanced biofuel to meet the California LCFS.” It finds that investment, not technology, is the biggest market barrier and that regulatory certainty is needed to ensure market stability. It also describes additional policies California could pursue to improve the likelihood of meeting its LCFS.

## Solution

What is the solution? Set the goal for the consumption of 15.6 billion gallons of traditional fuel and supplement 2.4 billion gallons of advanced biofuels assuming that the advanced biofuel has a carbon intensity that is 50%-75% lower than gasoline and diesel. This would allow California to meet its LCFS goals according to the Environmental Entrepreneur study. To meet the earlier 2015 milestone of a 2.5 percent reduction, 600 million gallons (gasoline equivalent) of advanced biofuels are needed. Dairy manure digesters could provide half of this requirement by the end of 2015 with the assistance of the California Energy Commission and those they collaborate with in government. It would, however, require “Fast Track” development assistance in five counties.

On March 29, 2012, the Energy Commission adopted a Temporary Suspension Order suspending RPS eligibility of biomethane to provide the Energy Commission (and the Legislature)

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<sup>1</sup> Advanced biofuels are renewable transportation fuels that can replace traditional gasoline and diesel at a competitive price and with significantly lower greenhouse gas (GHG) emissions.

<sup>2</sup> California dairies produce 192 million pounds of manure per day. “Can California’s Cap and Trade Program Turn Manure Into Gold?”, Power, p.24, July 2012, Allison A. Davis

additional time to evaluate the RPS eligibility of biomethane under the new law Senate Bill X1-2. This regulatory action stopped all dairy digester project development in California for 2012. And to the best of our knowledge none of the tentative projects that were in the planning stage have resumed. This has caused the loss of momentum and the attention of equity investors which now need to be regained.

The *Cleantech Group* forecasts the market for low-carbon fuels at \$33.4 billion by 2020. This is nearly double the future market of energy efficiency at \$17.3 billion, and significantly higher than renewable electricity \$20 billion.<sup>3</sup>

## Recommendation

How can the Energy Commission with judicious application of Cap and Trade Dollars provide the momentum in moving toward meeting the LCFS in a timely manner?

First, recognize that the advanced biofuel industry is a new, cleantech sector and it is an emerging industry, therefore no comprehensive list of active companies in the industry exist. The absence of such a database does not represent a lack of data or activity, merely the difficulty in tracking an ever-moving target. This is a problem for the private equity investor and makes due diligence more costly and slower. Cap and Trade funds could provide financial incentives to developers that would bring private equity investors back to the Central Valley. The demand to meet the LCFS and 192 million pounds of fresh manure generated on a daily basis are an opportunity that needs to be capitalized on. The CEC has the capital and there are developers with projects that are waiting for financial assistance.

Provide performance based funding i.e. Registration and implementation of the U.S. Livestock Project Protocol and or Organic Waste Project Protocol. Registration for WCI – CITSS. Registration with APX Environmental Management Account. All of these activities require time, money, training and additional personnel. For developers that create renewable natural gas to be employed as a transportation fuel consider a program similar to the EPA – RIN – renewable identification number program to offset a portion of the gas cleaning and transportation costs. This would not need to be a long term program, as five years would be sufficient to attract equity investor.

Second, approve/assist in approving the request that has been submitted by SoCalGas<sup>4</sup> for a tariff allowing the cleaning and transport of methane from dairy digesters to third party buyers. This would eliminate a significant risk to investors and third party buyer. This would also simplify the project development, timeline and costs.

Third, consider incentives for processing digester effluent (digestate) and composting systems.

Fourth, water is a most valuable commodity to the dairy and to Central Valley agriculture. We would like to suggest consideration be given to providing incentives for cleaning both digester effluent and agriculture tile water for recycle/reuse and for possible recharge of the aquifer. We have the technology and the supporting analysis from tests run on agriculture tile water from June through November 2011. The data is shown in the table below.

<sup>3</sup> Environmental Entrepreneur, Meeting The California LCFS, p.5

<sup>4</sup> A. 12-04-024 Application of SoCalGas to establish Conditioning/Upgrading Services Tariff

**Agricultural Tile Water Run Off Tests<sup>5</sup> – Central Valley**

<b>Test</b>	<b>Tile Water Analysis</b>	<b>Processed Water</b>
Boron	29,300 ppb	4,970 ppb
Calcium	509,000 ppb	444 ppb
Hardness	2,720 mg/L	2.0 mg/L
Magnesium	353,000 ppb	215 ppb
Mercury	.97 ppb	.31 ppb
Sodium	318,000 ppb	6,110 ppb
Strontium	8,190 ppb	6.0 ppb
TDS	10,700 mg/L	21.0 mg/L

Water analysis performed by independent lab – APPL – Clovis, CA

Installation of a renewable energy facility at a dairy requires a third party developer. It requires specialized skill sets in addition to understanding dairy operations. Additionally, for very basic reasons, the banker providing the line of credit to the dairy does not want the dairyman doing anything other than operating the dairy; milking cows and delivering calves. The construction of the renewable energy facility will cost between fifteen hundred and five thousand dollars per wet cow equivalent. With a minimum two (2) thousand cow dairy, there will be an investment of three (3) to ten (10) Million Dollars and this is a whole new business. The renewable energy facilities will be built, operated and managed by third party private equity investors with long-term leases and supply agreements with the individual dairies. The dairies may have an interest in the LLC, but not the responsibility to operate and manage.

**Induced Blanket Reactor<sup>6</sup> – Complete Mix Digester – 2,000 WCE<sup>7</sup> Dairy**

<b>Dairy Manure<sup>8</sup></b>	
Manure production per day – Weight	284,560 pounds
Manure production per day – Volume	38,043 gallons
Effluent Wastewater per day	33,097 gallons
Effluent Wastewater per year	11,915,067 gallons or 36.57 acre feet
<b>IBR Digester Performance<sup>9</sup></b>	
Total Energy Production per day	318,041,360 BTUs
Total Biogas Production per day	454,345 cubic feet
Total Parasitic Load per day	30,890,738 BTUs
Total Energy For Sale per day	287,150,622 BTUs
<b>Transportation Fuel<sup>10</sup></b>	
Renewable Natural Gas per day	3,700 GGE <sup>11</sup>
Renewable Natural Gas year	1,332,000 GGE
Hydrogen – kg - day	kg
<b>Environmental Attributes<sup>12</sup></b>	
CO <sub>2</sub> Equivalent per year	46,662 MT
N <sub>2</sub> O Reduction per year	2,783 credits
Renewable Identification Number per day	3,700

<sup>5</sup> Employing World Wide Water Solutions Technology

<sup>6</sup> Technology developed at Utah State University with 8 patents issued and 40 digesters installed on dairies.

A Two digester system installed on a dairy in Pixley, CA., as a test and demonstration site.

<sup>7</sup> Wet Cow Equivalent

<sup>8</sup> This assumes that the manure is collect by a vacuum truck where no flush water is employed.

<sup>9</sup> In compliance with the Organic Waste Project Protocol, Climate Action Reserve

<sup>10</sup> Advanced Biofuel with very low Carbon Intensity – 75% of gasoline

<sup>11</sup> Gasoline Gallon Equivalent

<sup>12</sup> Through APX Environmental Management Account and the WCI –CITSS platform

Renewable energy projects employing the Climate Action Reserve Organic Waste Digestion Project Protocol can produce sustainable amounts of methane which can be cleaned, compressed and provided as the cleanest burning transportation fuel in California. The majority of dairies are located in the lowest ranking counties in California as shown in the table below.

County Ranking By Income	County	Number of Dairies	Food Processes & Manufacturers Substrate Feedstock
38	San Joaquin	132	138
42	Stanislaus	284	105
47	Fresno	101	174
49	Kern	50	47
54	Madera	40	28
55	Merced	299	50
56	Tulare	312	72
57	Kings	138	21
<b>Totals</b>		<b>1,356</b>	<b>635</b>

In the report titled *Spending California's Cap-and-Trade Auction Revenue* prepared by the Emmett Center on Climate Change and the Environment, it states: *Fund greenhouse gas reduction projects, out of the specialized fund, favoring projects within disadvantaged communities that also achieve ancillary benefits such as the reduction of traditional air pollution.*<sup>13</sup>

The development of manure digesters will provide in excess of \$100 Million Dollars per year through 2020. The development will provide construction jobs, support jobs and long-term jobs at each of renewable energy facilities. Manure digesters will provide renewable natural gas – advanced biofuel – that can not be produced by other renewable energy sources i.e. solar, wind, geo-thermal or hydro sources.

## Summary

The ARB should focus on the development of Manure Digesters for the production of large molecule, low carbon intensity, renewable natural gas from dairy manure. The four bottom tier challenged counties, Kings, Tulare, Merced and Madera, are home to 789 dairies and 171 food processors and manufacturers who generate mountains of organic feedstock that can be digested and processes into high quality transportation fuel.

The ARB can create a performance based incentive program modeled after the EPA Renewable Identification Number (RIN) program that is proven and tested for more than six years. An annual ten (10) million dollar investment with Cap and Trade dollars will initiate 100 million dollars in new construction, new construction jobs, supporting jobs and sales tax revenue for cities and counties. For every 150 million dollars of construction, 10 million gallons of renewable natural gas will be delivered as a transportation fuel to market and make a contribution to the Renewable Portfolio Standard goals of the CEC.

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<sup>13</sup> *Spending California's Cap-and-Trade Auction Revenue*, Emmett Center On Climate Change And The Environment, UCLA School of Law, May 2012, p.18.