

# STAFF REPORT

## LOCALIZED HEALTH IMPACTS REPORT

For Selected Projects Awarded Funding Through the  
Alternative and Renewable Fuel and Vehicle  
Technology Program Under Solicitation PON-11-601



CALIFORNIA  
ENERGY COMMISSION  
Edmund G. Brown Jr., Governor

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## PREFACE

The increased use of alternative and renewable fuels supports California's commitment to curb greenhouse gas emissions (GHG), reduce petroleum use, improve air quality, and stimulate the sustainable production and use of biofuels within California. Alternative and renewable transportation fuels include electricity, natural gas, biomethane, propane, hydrogen, ethanol, renewable diesel, and biodiesel. State investment is needed to fill the gap and fund the differential cost of these emerging fuels and vehicle technologies.

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007) created the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP). This statute, amended by Assembly Bill 109 (Núñez, Chapter 313, Statutes of 2008), authorizes the California Energy Commission to "develop and deploy innovative technologies that transform California's fuel and vehicle types to help attain the state's climate change policies."

The statute also directs the California Air Resources Board (ARB) to develop guidelines to ensure air quality improvements. The ARB Air Quality Improvement Program (AQIP) Guidelines, approved in 2008, are published in the *California Code of Regulations, Title 13, Motor Vehicles, Chapter 8.1, AB 118 Air Quality Guidelines for the Alternative and Renewable Fuel and Vehicle Technology Program and the AQIP*. The AQIP Guidelines require the Energy Commission, as the funding agency, to analyze the localized health impacts of ARFVTP-funded projects that require a permit (13 CCR § 2343).

The Energy Commission received proposals in response to Program Opportunity Notice (PON) -11-602 for biofuels production and is considering approving and funding the seven projects described in this *LHI Report*. This report contains the project and site descriptions (including geographic locations), potential impacts and benefits, and outreach efforts as declared by the proposers in their documentation.

## ABSTRACT

*California Code of Regulations, Title 13, Motor Vehicles, Chapter 8.1, § 2343(c)(6)*, requires the California Energy Commission to consider the localized health impacts (LHI) when selecting projects for funding. For each funding cycle, the Energy Commission is required to analyze LHI for projects proposed for program funding that require a permit.

This *LHI Report* reviews the project proposals under consideration for funding that were submitted in response to the Biofuel Production Grant Solicitation (PON-11-601) by the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) for fiscal year (FY) 2011 – FY 2012. This LHI Report contains project and site descriptions (including geographic locations), potential impacts, and outreach efforts as contained in the proposals.

This *LHI Report* analyzes the aggregated locations of projects, the impacts in communities with the most significant exposure to air contaminants or localized air contaminants, or both, including but not limited to, communities of minority populations or low-income populations, as declared by the project proposers or also as determined by Energy Commission staff. This Report identifies outreach to community groups and other affected stakeholders, also as declared by the project proposers.

A feasibility study proposed by Kent Bioenergy, Corporation, titled *Assess Fuel Production by Fermentation of Carbohydrates in Algal Biomass to Ethanol* is analyzed herein. The following projects are also analyzed:

- Springboard Biodiesel, LLC's, *Deploying Small Scale Biodiesel Facilities in California*
- New Leaf Biofuels, LLC's, *Scale up of a Biodiesel Production Facility with Reduced Carbon Intensity*
- Yokayo Biofuels, Inc., *A Catalyst for Success (Biofuels)*
- SacPort Biofuels, *Renewable Diesel Pilot Project*
- EdeniQ, Inc., *California Cellulosic Ethanol Refinery (CCEB)*
- Clean World Partners LLC's, *Sacramento Biorefinery #1, Phase II Scale-up to 100 Tons per Day.*"

**Keywords:** Assembly Bill (AB) 118, air quality, air quality improvement program (AQIP), alternative fuel, biodiesel, biofuel, biomethane, California Energy Commission, criteria emissions, ethanol, environmental justice, greenhouse gas emissions, hydrogen, localized health impacts (LHI), propane, and renewable diesel

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## EXECUTIVE SUMMARY

Under to the *California Code of Regulations Title 13, (CCR § 2343)*, this *Localized Health Impacts (LHI) Report* describes the biofuels projects proposed for Alternative and Renewable Fuels and Vehicle Technology Program (ARVTP) funding that may or may not require a conditioned or discretionary permit or environmental review, such as conditional use permits, air quality permits, wastewater permits, hazardous waste disposal permits, and other land use entitlements. This report does not include projects requiring only residential building permits, mechanical/electrical permits, or fire/workplace safety permits, as these are determined to have no likely impact on the environment.

The California Energy Commission is required to assess the LHI of the projects proposed for ARVTP funding under Biofuels PON-11-601. This LHI Report focuses on the potential impacts the projects may or may not have on a particular community, particularly those communities that are considered especially vulnerable to emissions increases within their community. For projects located in high-risk communities, this report assesses the impacts from criteria emissions/air toxics, the air quality attainment status, wastewater and hazardous waste disposal impacts (high level), and mitigation plans, if available. This *LHI Report* includes information about the proposer's outreach efforts including public notices and community outreach.

Environmental justice communities, low-income communities and minority communities are considered to be the most impacted by any project that could result in increased criteria and toxic air pollutants within an area because these communities typically have the most significant exposure to the emissions. Assessing these projects and the communities surrounding them is important because of the health risks associated with these pollutants. Preventing health issues from air pollution in any community is important, but it is especially important to minimize any negative impacts in communities that are already considered to be at risk due to their continued exposure to these contaminants.

The projects assessed for health impacts for the communities in which they could be potentially located vary in terms of socioeconomic and environmental health. In general, no additional criteria pollutants are associated with the projects. Based on this analysis, it is not anticipated that the implementation of projects will have negative impacts on surrounding communities because there will not be a net increase in criteria and toxic emissions, specifically those communities that are considered most vulnerable. Potentially, the projects stand to provide improved quality of life through cleaner air.

Although feasibility studies are exempt from an LHI assessment, since they typically do not involve fuel supply or sale, nor do they involve construction that triggers permitting or licensing requirements, one such study is included in this *LHI Report* to give a comprehensive overview of the responses to PON-11-601 and those projects that may be funded.



# CHAPTER 1: Assessment Approach and Definitions

The California Energy Commission Alternative and Renewable Fuels and Vehicle Technology Program (ARFVTP) released a competitive Grant Solicitation and Application Package on February 8, 2012. The application due date was March 14, 2012. The purpose of the Grant Solicitation Program Opportunity Notice 11-601 was to seek to fund projects that establish biofuels production. California Energy Commission ARFVTP is preparing to fund a series of projects.

The Energy Commission is required to analyze and publish this *LHI Report* for public review and comment for a period of 30 days. Based on the Energy Commission's interpretation of the Air Quality Improvement Program (AQIP) Guidelines, this *LHI Report* provides information about the communities surrounding the potential project sites and assesses the potential impacts to public health in those communities as a result of the project. This report is prepared under the *California ARB AQIP Guidelines, California Code of Regulations, Title 13, Motor Vehicles, Chapter 8.1 (CCR § 2343)*:

“(6) Localized health impacts must be considered when selecting projects for funding. The funding agency must consider environmental justice consistent with state law and complete the following:

(A) For each fiscal year, the funding agency must publish a staff report for review and comment by the public at least 30 calendar days prior to approval of projects. The report must analyze the aggregate locations of the funded projects, analyze the impacts in communities with the most significant exposure to air contaminants or localized air contaminants, or both, including, but not limited to, communities of minority populations or low-income populations, and identify agency outreach to community groups and other affected stakeholders.

(B) Projects must be selected and approved for funding in a publicly noticed meeting.”

This *LHI Report* is not intended to be a detailed environmental health or impact analysis of projects potentially to be funded by the program nor is this assessment intended to be a substitute for the comprehensive environmental review conducted by regulatory agencies during the California Environmental Quality Act (CEQA) process. The application of CEQA would provide a more detailed analysis of the potential for adverse environmental effects of the proposed projects.

This report collects available information about the potential air quality impacts of the proposed projects and provides a collective, narrative analysis of the potential for localized health effects from those projects. The AQIP Guidelines mandate that the Energy Commission to track the

projects' progress through the CEQA process and ensure a commitment exists from the proposers to complete all mitigation measures required by the permitting agency before they receive the first funding allocation.

For the current ARFVTP funding cycle, fiscal year (FY) 2011/12, the biofuels projects proposed for Energy Commission funding approval are discussed in this report. The Energy Commission staff plans to present the proposed projects for approval at business meetings (subject to the Warren-Alquist Open Meeting Act), upon receipt of the appropriate CEQA documentation in early 2012. Table 1 summarizes.

**Table 1: Projects Proposed for Funding Under PON-11-602 for FY 2011/2012**

Fuel Type	Project Type	Project Name
Diesel Substitute	Demonstration	Deploying Small-Scale Biodiesel Facilities in California (Springboard)
Diesel Substitute	Commercial	Scale-up of a Biodiesel Facility (New Leaf)
Diesel Substitute	Commercial	A Catalyst for Success (Yokayo)
Diesel Substitute	Demonstration	Renewable Diesel Pilot Project (SacPort)
Gasoline Substitute	Demonstration	Demonstrate Technology for the Conversion of Cellulosic Biomass to Ethanol (EdeniQ)
Gasoline Substitute	Feasibility Study	Assess Fuel Production by Fermentation of Carbohydrates in Algal Biomass (Kent BioEnergy)
Biomethane	Commercial	Sacramento Biorefinery #1 Phase II: Scale up to 100 Tons Per Day (Clean World)

Source: Energy Commission staff analysis

Staff reviewed results from the Environmental Justice Screening Method (EJSM) to identify projects located in areas with social vulnerability indicators and the greatest exposure to air pollution and associated health risks.<sup>1</sup> The EJSM was developed to identify low-income communities highly affected by air pollution for assessing the impacts of climate change regulations, specifically Assembly Bill 32 (Núñez/Pavley, Chapter 488, Statutes of 2006): the California Global Warming Solutions Act of 2006.

The EJSM identifies the various levels of risk in regions throughout California, and high-risk communities are considered especially vulnerable to even the smallest impacts. The EJSM integrates data on exposure to air pollution, cancer risk, ozone concentration and frequency of high ozone days, race/ethnicity, poverty level, home ownership, median household value, educational attainment, and sensitive populations (populations under 5 years of age, or over 65 years of age).

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<sup>1</sup> California Air Resources Board (ARB), *Air Pollution and Environmental Justice, Integrating Indicators of Cumulative Impact and Socio-Economic Vulnerability Into Regulatory Decision-Making, 2010*. (Sacramento, California) Contract authors: Manuel Pastor Jr., Ph.D., Rachel Morello-Frosch, Ph.D., and James Sadd, Ph.D.

The ARB applied the method to the San Francisco Bay Area, San Joaquin Valley, and California's desert region. However, the results consider only income among the list of social vulnerability indicators. For communities not yet assessed in the EJSM, the Energy Commission identifies high-risk areas as those in nonattainment basins for ozone, particle pollution, or particulate matter (PM) 2.5 and PM 10, along with populations that have high poverty and minority rates as well as a high percentage of sensitive populations.

This *LHI Report* contains detailed assessments for projects that are located in a low-income community that is highly impacted by air pollution. The reasons this *LHI Report* contains detailed assessment for these communities is that the populations within these communities are presumed to be most susceptible to health risks because of their exposure to criteria and toxic air pollutants on a more continual basis as compared with other geographic regions.

## **Permits**

For this assessment, the Energy Commission interprets "permits" to connote discretionary and conditional use permits because they require a review of potential impacts to a community and the environment before issuance. For air permits, local air districts conduct a New Source Review (NSR) to determine the emission impacts of a production facility. Since ministerial-level permits, such as building permits, do not assess public health-related pollutants, the Energy Commission staff does not assess projects requiring only ministerial level permits in this report.

Incremental increases in criteria emissions must be reduced or mitigated through a pollution control standard known as Best Available Control Technologies (BACT), and possibly, Emission Reduction Credits (ERC) which is generally a credit granted upon request by an emission source. An NSR determines if a modification to an existing facility or construction of a new facility will result in significant increased air emissions within a given region, and this report contains the related information as given by project proposers. Immediate action must be taken by the appropriate party for any toxics released that exceed predetermined thresholds before a facility is reconsidered for a permit. An overview of the permit requirements for identified projects potentially to be located in at risk communities is included in the project overviews in this *LHI Report*.

## **Demographic Data**

Demographic data for the planned project locations are provided in Table 10. Staff collected information on ethnicity, age, and income for the city where the potential project, if funded, would be located. The reason this information is collected is to identify those communities with higher minority populations, lower incomes, and highly sensitive groups (based on age). For this discussion, staff identifies sensitive populations as individuals less than 5 years of age and older than 65 years of age.

## Emissions

The Energy Commission staff directs stakeholders to the ARB *Air Quality Guidance Document for Siting Biorefineries in California*.<sup>2</sup> The ARB document evaluates the following criteria pollutants associated with various biorefinery processes: nitrogen oxide (NO<sub>x</sub>), carbon monoxide (CO), volatile organic compound (VOC), sulfur oxide (SO<sub>x</sub>), and PM 10.

This *LHI Report* includes emissions information (from stationary and mobile sources) from the proposals. Staff notes emissions associated with processes resulting from feasibility studies for pilot and commercial production projects, such as bench-scale production, are not considered a significant source of criteria emissions that could potentially affect local communities.

## Community Status and Project Overviews

The following community status and overview of the proposed projects is based on the ARB *Proposed Screening Method*, which integrates data to identify low-income communities that are highly impacted by air pollution.<sup>3</sup> The California State Implementation Plans (<http://www.arb.ca.gov/planning/sip/sip.htm>) are used as a source for public notices for attainment plans. In some cases the air district websites or the districts, themselves, were consulted.

All projects completed CEQA. The following table summarizes the findings of the project assessment. For high-risk communities, more detail is provided in the following chapters.

Staff identifies high-risk cities using the following factors: (1) in nonattainment air basins for ozone, PM 2.5, and/or PM 10, (2) high poverty, minority, and/or unemployment rates, and (3) high percentage of sensitive populations (under 5 years of age or over 65 years of age). While Visalia is not considered to be at risk, it is near Goshen (at risk); the following table classifies Visalia as high-risk.

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<sup>2</sup> California Air Resources Board (ARB), *Air Quality Guidance for Siting Biorefineries in California, California, 2011* (Sacramento, California).

<http://www.arb.ca.gov/fuels/lcfs/bioguidance/biodocs/finalbiorefineryguidenov2011.pdf>

<sup>3</sup> California Air Resources Board (ARB), *Proposed Screening Method for Low-Income Communities Highly Impacted by Air Pollution, 2010* (Sacramento, California).

**Table 2: Community Status and Project Overviews**

<b>Project/City</b>	<b>High Risk</b>	<b>CEQA</b>	<b>Air District Permit Status</b>	<b>Attainment Status for Ozone, Particulate Matter (PM) 2.5, PM 10</b>
Springboard: "Deploying Small-Scale Biodiesel Facilities in California" (Chico)	NO	YES	Butte AQMD issued a new permit for administrative purposes	Nonattainment (ALL) <a href="http://www.arb.ca.gov/planning/sip/sip.htm">http://www.arb.ca.gov/planning/sip/sip.htm</a>
New Leaf: "Scale-up of Biodiesel Production Facility With Reduced Carbon Intensity" (San Diego)	NO	YES	San Diego Air Pollution Control District issued an air quality permit	Nonattainment (ALL) <a href="http://www.arb.ca.gov/planning/sip/sip.htm">http://www.arb.ca.gov/planning/sip/sip.htm</a>
Yokayo: "A Catalyst for Success" (Ukiah)	NO	YES	Mendocino County AQMD issued a modified air quality permit	Nonattainment for PM 10. Attainment for ozone and PM 2.5. <a href="http://www.co.mendocino.ca.us">http://www.co.mendocino.ca.us</a>
SacPort: "Renewable Diesel Pilot Project" (West Sacramento)	YES	YES	Yolo-Solano AQMD issued stationary source permit; local air quality permit is pending	Nonattainment (ALL) <a href="http://www.arb.ca.gov/planning/sip/sip.htm">http://www.arb.ca.gov/planning/sip/sip.htm</a>
EdeniQ: "Demonstration Technology for the Conversion of Cellulosic Biomass to Ethanol" (Visalia)	YES	YES	San Joaquin Valley Air Pollution Control District issued an air quality permit	Nonattainment (ALL) <a href="http://www.valleyair.org">http://www.valleyair.org</a>
Clean World: "Sacramento Biorefinery #1 Phase II: Scale up to 100 Tons per Day" (Sacramento)	YES	YES	Yolo-Solano air permit (Authority to Construct) undergoing modification	Nonattainment (ALL) <a href="http://www.arb.ca.gov/planning/sip/sip.htm">http://www.arb.ca.gov/planning/sip/sip.htm</a>

Source: Energy Commission staff analysis

## **CHAPTER 2: Feasibility Study Proposed for Funding**

### **(2-A.) Project Name: Kent Bioenergy Corporation’s “Fermentable Sugars for Ethanol Production From Microalgal Biomass”**

Kent BioEnergy, Protabit LLC, and the Mayo Laboratory at the California Institute of Technology plan to collaborate on this feasibility study to determine how to reduce the cost associated with biomass-to-sugar conversion. The study would address:

- Developing efficient fractionation technologies for separating oligosaccharide components from algal biomass.
- Engineering more efficient enzymes using a proven approach in protein engineering that enables virtual screening of the possible protein sequences using protein structural information and physics- and knowledge-based energy models.

The study will evaluate the production of fermentable sugars from algal biomass. Further, it stands to demonstrate that such sugars can be fermented to ethanol using industrial yeasts. The work will study the production of fungible fuels by fermentation using sugars produced from the carbohydrates in algal biomass that has been grown on nonarable land, in brackish water, and fed nutrients contained in waste. The feedstock to be studied is outside of the typical food crop and does not require the use of conventional fertilizers, and the ethanol to be studied will be identical to that currently used as transportation fuel; however, the ethanol will have a lower carbon intensity (CI), that is, grams of carbon dioxide per mega joule (gCO<sub>2</sub>-eq/MJ), than Midwest corn feedstock.

#### **Project Sites**

This project is proposed for several sites. Namely, Kent BioEnergy Corporation (11125 Flintkote Avenue, San Diego, CA 92121), Protabit LLC (1200 East California Blvd., Pasadena, CA 91125), and the Mayo Laboratory at the California Institute of Technology (1200 East California Blvd., Pasadena, CA 91125).

The laboratory-based research to be conducted at the Kent BioEnergy Corporation requires no additional permits; the facility is operating in compliance with state and federal regulations. The office-based work to be conducted at Protabit requires no additional permits; the Protabit facility is operating in compliance with state and federal regulations. The work at the California Institute of Technology, Mayo Laboratory, is proposed for an existing facility that operates according to the institute’s regulations and complies with the state and federal regulations. No additional permits are required.

## Rationale for Exclusion From the Aggregated Analysis in This LHI Report

This proposed project, a feasibility study with no potential for adverse health effects, is not included in this report's aggregated analysis (Chapter 4), for feasibility studies are excluded.

## CHAPTER 3: Projects Proposed for Funding

### (3-A.) Project Name: Springboard Biodiesel, LLC, “Pilot Facility–Deploying Small Scale Biodiesel Facilities in California”

**Fuel and Capacity/production:** Biodiesel; 1,000 gallons daily

**Feedstock:** Used Cooking Oil (UCO)

**Proposed Technology:** Esterification/Transesterification

**Permits/correspondence:** A City of Chico letter confirms existing building use and the Butte County Air Quality Management District (AQMD) approved a new air permit. The proposer is seeking “Authority to Construct” from Butte County AQMD.

**Community:** This project would not be in a low-income community that is highly impacted by air pollution.<sup>4</sup> The city has two environmental justice (EJ) indicators, which are described later in this report.

**Other:** There are two schools and one health care facility located within a 1-mile radius of the project site.

Springboard Biodiesel, LLC, proposes to develop and build a new, pilot biodiesel fuel production facility that uses its closed local loop (CLL) system. Springboard plans to prove the commercial viability of a low-cost, small-scale, deployable biodiesel production system/facility that produces 1,000 gallons (daily) of ASTM grade D6751 biodiesel fuel from multiple feedstocks, including UCO. The CCL system can potentially be deployed in rural Northern California, for example, where feedstock is available and biodiesel fueling stations are lacking. It can be deployed elsewhere in the state. The CLL would use local UCO. Not only would fuel be produced, UCO would be kept out of landfills and wastewater systems.

#### Site Description

The proposed site, an existing facility (5,000 square feet) located at 2323 Park Avenue, Chico, CA 95928, is in an industrially zoned area, and the project would be small compared with the nearby steel suppliers, truck terminals, and manufacturers. The site is not considered to be environmentally sensitive. A residential area exists about 100 feet to the east, across Fair Street, which is a city arterial street. Park Avenue is a fully improved 4-lane city arterial street with municipal utilities available. The property is located in an infill and is an “Opportunity Site” as identified in the City of Chico's recently adopted general plan.

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<sup>4</sup> California Air Resources Board (ARB), *Proposed Screening Method for Low-Income Communities Highly Impacted by Air Pollution*, 2010 (Sacramento, California).

## Potential Impacts

In its proposal, Springboard comments that emissions directly associated with this project's operations would be nominal. The emissions from operations and trucking are listed in Table 3. Springboard notes that, as shown in the following table, it plans to manufacture 30,000 gallons of biodiesel from January 1, 2013, to June 30, 2013. It plans to have 8,000 gallons of storage of both UCO and finished biodiesel and therefore will need as much as one UCO delivery IN per week and one biodiesel OUT per week, when at capacity.

The UCO partner would fill the truck with biodiesel, currently collecting about 27 gallons of UCO per gallon of fuel consumed on the collection route. The proposer plans to contract with "the lowest cost provider" for finished biodiesel production pick up and assume the provider will use 20 percent biodiesel. Further, the proposer plans to sell the majority of their production in Chico but will be able to sell all of it within an average 35-mile radius. It assumes fuel efficiency of delivery trucks is 6 miles per gallon.

The Springboard process uses 838 kilowatt-hour (kWh) of electrical energy/1,000 gallons of production, and per the Federal Energy Information Administration (EIA), it assumes each kWh of electricity produced generates 0.435 pounds of CO<sub>2</sub>. Therefore, the emissions from the pickup, delivery, and production of finished biodiesel are shown on the table versus the benefits derived from customers replacing diesel with biodiesel.

The proposer plans for 8,000 gallons of storage for both UCO and finished biodiesel; therefore, it will need as much as one UCO "delivery IN" per week and one biodiesel "shipment OUT" per week, when operating at capacity. The proposer's UCO partner will run trucks on biodiesel and currently collects about 27 gallons of UCO per gallon of fuel consumed on the collection route. The proposer will contract with the "lowest cost provider" for finished biodiesel pickup, and are assuming their trucks will use a 20 percent biodiesel blend.

The proposer plans to sell the majority of the biodiesel produced in Chico but will be able to sell all of it within an average 35-mile radius. It assumes the fuel consumption of delivery trucks to be 6 miles per gallon. The proposer's process uses 838 kWh of electrical energy per 1,000 gallons of biodiesel produced, and – per the EIA – the assumption is made that for each kWh of electricity produced 0.435 pounds of CO<sub>2</sub> is produced.

As shown in the following table, for 30,000 gallons of biodiesel produced, the total electrical energy required generates 10,936 lbs of CO<sub>2</sub>. The trucking associated with this biodiesel (pickup of UCO as well as biodiesel delivery) emits a combined total of 3,634 lbs. of CO<sub>2</sub>.

The total emissions reduction achieved by replacing 30,000 gallons of diesel with biodiesel is 588,720 lbs. of CO<sub>2</sub>. Factoring in the total CO<sub>2</sub> emitted by producing 30,000 gallons of biodiesel (production facility as well as trucking), the net reduction in CO<sub>2</sub> emissions realized by producing 30,000 gallons of biodiesel totals 574,149 lbs. This example is explained in the following table.

**Table 3: Springboard Biodiesel's Emissions for UCO Pick Up, Biodiesel Delivery, and Production Facility**

The proposer assumes for the following calculations:

Springboard Biodiesel UCO and Biodiesel Storage	gallons	8000
<i>(8,000 storage of UCO and 8K of Biodiesel)</i>		
Gallons in a Delivery "Load" - UCO and biodiesel	gallons	7000
Gallons of UCO collected per gallon of biodiesel consumed	gallons	26.667
MPG of finished biodiesel collection trucks	mpg	6
Average distance per "Load" of finished biodiesel	miles	35
<i>(Assumes majority of fuel is consumed in Chico, then Butte County, and lastly Sacramento)</i>		
CO2 emissions in pounds per kWh (per EIA)	lbs/KwH	0.435
<a href="ftp://ftp.eia.doe.gov/environment/co2emiss00.pdf">ftp://ftp.eia.doe.gov/environment/co2emiss00.pdf</a>		

Emissions for UCO Pickup, Biodiesel Delivery, and Production Facility **				
Fiscal Year	Fuel Produced (gallons)	UCO Pickup (lbs of CO2)	Biodiesel Delivery (lbs of CO2)	Production Facility (lbs of CO2)
Prior to 6/1/12 *	0	0	0	0
6/1/12 – 12/31/12	30,000	3,010	624	10,936
2013	307,000	30,807	6,390	111,911
2014	350,000	35,122	7,285	127,586
2015	350,000	35,122	7,285	127,586
2016	350,000	35,122	7,285	127,586
2017	350,000	35,122	7,285	127,586

\*Prior to Energy Commission grant, Springboard Biodiesel will not produce fuel; therefore, associated emissions are zero.

\*\* Assumes one 7,000 gallon UCO delivery per week when fully operational. Assumes one finished biodiesel pick up per week when fully operational. UCO collection service uses 100 percent biodiesel. Biodiesel delivery uses on average 20 percent biodiesel, and finished fuel is consumed within 35 miles of production (Chico, Butte County, and a small portion in Sacramento).

Source: Springboard submission in response to PON-11-601

**Table 4: Springboard Emissions Comparisons**

Final Emissions Comparison **				
Fiscal Year	Fuel Produced (gallons)	Gross Emissions Reduction (amount of CO2 emissions: diesel minus biodiesel) (lbs of CO2)	Total Emissions From Production (lbs of CO2) (includes all transport)	Net Emissions Benefit (lbs of CO2)
Prior to 6/1/12 *	0	0	0	<b>0</b>
6/1/12 – 12/31/12	30,000	588,720	14,570	<b>574,149</b>
2013	307,000	6,024,568	149,108	<b>5,875,460</b>
2014	350,000	6,868,400	169,993	<b>6,698,407</b>
2015	350,000	6,868,400	169,993	<b>6,698,407</b>
2016	350,000	6,868,400	169,993	<b>6,698,407</b>
2017	350,000	6,868,400	169,993	<b>6,698,407</b>

\*Prior to Energy Commission grant, Springboard Biodiesel will not produce fuel; therefore, associated emissions are zero.

\*\* Reflects the net emissions benefit of producing biodiesel and using that fuel as a replacement fuel for diesel. This number reflects the emissions “cost” of producing biodiesel, collecting used cooking oil, and delivering finished American Society for Testing and Materials (ASTM)-grade biodiesel.

Source: Springboard submission in response to PON-11-601

The proposer notes that this project would have a positive localized health impact, as it would reduce GHG in the local project area through the production of biodiesel (stationary source and mobile sources). Further, it notes that an emphasis on producing and consuming biodiesel locally would ensure that local standard diesel consumers are targeted for consumption of the biodiesel potentially produced with this project.

The proposed project would be in Butte County. The Butte County AQMD adheres to federal and state regulations to notice residents within 1,000 feet of the site if, during the permit evaluation stage, the air district determines the project will result in an increase in emissions above the threshold. They would also likely post notices to the Air Resources Board and Environmental Protection Agency websites and in local newspapers if the project is using emission offsets or emission reduction credits.

## Outreach Efforts

The proposer plans outreach efforts, including:

- City council meeting presentations about the benefits of locally producing biodiesel.
- Tours of the facilities for neighboring businesses, schools, and residents on how UCO from restaurants is turned into biodiesel for transportation.
- Through the local Alternative Fuel and Vehicle Sector Group, meetings will be held throughout the North State with public entities, such as Air Quality Management Districts, on methods to accelerate the use of alternative fuels; that is, access to fuel.
- Meetings will be held with public entities, nonprofits and businesses, particularly with fleets, on the advantages of using biodiesel.
- Meetings will be held with farm bureaus on methods to promote to farmer/ranchers the use of biodiesel in farm equipment.
- This group will also meet with smaller communities and “captured kitchens” on designing local programs to collect their used cooking oil and locally producing biodiesel for community-owned fleets using the Springboard CLL model.
- Work with both print and electronic media; place stories on the benefits of biodiesel production; send articles through partner media channels (chambers of commerce, iLab).
- Place flyers in chamber of commerce offices and on chamber/city websites.
- Post location of biodiesel production and fueling on other websites promoting locations.
- The outreach efforts will be coordinated between Springboard and the Alternative Fuel and Vehicle Sector Group sponsored by workforce development and managed by Chabin Concepts.

### **(3-B.) Project Name: New Leaf Biofuel, LLC’s, “Scale-up of a Biodiesel Production Facility With Reduced Carbon Intensity”**

**Fuel and Capacity/production:** Biodiesel; production increase from 1.5 million gallons per year to 5 million gallons per year

**Feedstock:** Used cooking oil (UCO)/ restaurant grease

**Technology:** Esterification and transesterification

**Permits/correspondence:** The San Diego Air Pollution Control District issued an air quality permit.

**Community:** This project would not be in a low-income community that is highly impacted by air pollution.<sup>5</sup> The city has one environmental justice (EJ) indicator, which is described later in this report.

**Other:** Within a one-mile radius of the site, four schools and one health care facility exist.

NewLeaf Biofuel proposes to scale up an existing biodiesel facility from 1.5 million gallons (annually) to 5.0 million gallons (annually). The scale-up would include its existing biodiesel plant with the installation of three new 5600-gallon processing vessels, two natural gas microturbines for cogeneration, molecular sieve (to reduce chemical use) equipment, and plant support equipment (including a programmable infrastructure) to increase the production capacity of biodiesel and glycerin. The cogeneration system would capture the exhaust heat from the engines to provide 50 percent of the facility’s heat load. The balance of the heat would come from boilers powered by a waste stream from the biodiesel process.

#### **Site Description**

This project would be located at an existing facility at 2285 Newton Ave., San Diego, CA 92113. The potential site is zoned “Heavy Industrial.” The site is not in an environmentally sensitive area. The site has not been identified as being affected by hazardous waste or clean-up problems by the Department of Toxic Substances and the Secretary of Environmental Protection.

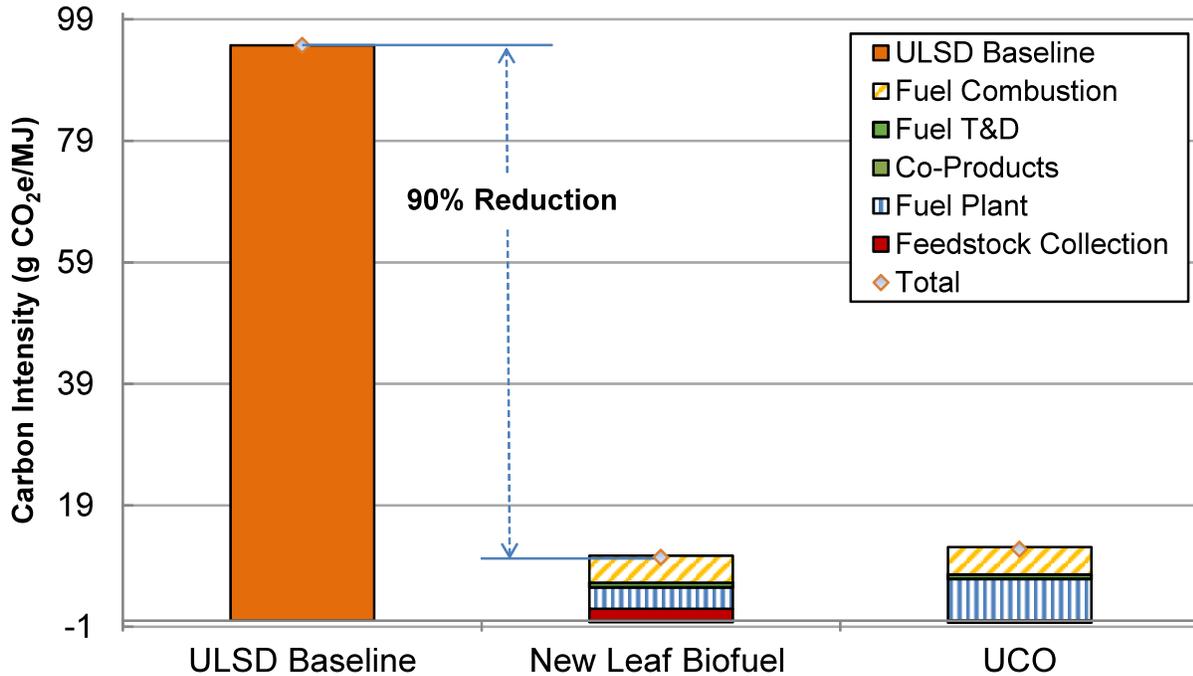
#### **Potential Impacts**

The proposer estimates a 90 percent reduction in carbon intensity (g CO<sub>2</sub>e/MJ) relative to the petroleum diesel baseline under the California Low Carbon Fuel Standard (LCFS). It is moving from an 88 percent reduction to a 90 percent with the proposed project. The proposer estimates the fuel pathway (with the scale-up), including the system of UCO collection and transport (most in a 100-mile radius), biodiesel and glycerin production, fuel transport, and distribution and fuel combustion would result in GHG emission savings (associated with displaced petroleum) that the proposer estimates at 37.2 billion g CO<sub>2</sub>e/year.

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<sup>5</sup> California Air Resources Board (ARB), *Proposed Screening Method for Low-Income Communities Highly Impacted by Air Pollution*, 2010 (Sacramento, California).

**Table 5: Emissions From UCO-to-Biodiesel at New Leaf Biofuels  
(first table including plant emissions and transport emissions)**



Source: New Leaf Biofuel submission in response to PON-11-601

New Leaf Biofuel intends to install two natural gas microturbines to generate process steam and electricity and expand fuel production to 5 million gallons per year (MGY). In addition to achieving a low carbon intensity score, the proposed project would displace a significant quantity of petroleum energy and associated greenhouse gas emissions.

The biodiesel transport and distribution of the fuel to blending facility will be mostly by heavy duty truck. These activities would generate 19 percent of the emissions, or 1.9 g CO<sub>2</sub>e/MJ. The truck traffic would increase, on average, from two trucks per day to five trucks per day, traveling on the “5” or “15” freeways and exiting at 28<sup>th</sup> Street. The trucks would travel down Main Street to Sampson or Sicard. The community is reportedly at risk of breathing toxic air emissions from 4-5 tanker trucks per day for the transport of materials in and out of New Leaf’s plant. The five trucks (combined) would travel an estimated 150 miles per day (source: [www.roadnet.com](http://www.roadnet.com)). The total annual miles traveled by the trucks would be 195,700 miles. The proposer anticipates the diesel trucks would consume 6.5 miles per gallon (30,115 miles per year), resulting in emissions of 673,982 lbs. of CO<sub>2</sub> annually, or 302 metric tons per year. It notes that potentially the New Leaf Biodiesel would be used.

Fuel transport and distribution and fuel combustion results are the same as for the LCFS UCO-to-biodiesel fuel pathway. Fuel transport results are based on 80 percent of the biodiesel transported from the fuel plant to the blending facility by heavy-duty truck (HDT) followed by 90 miles of distribution by HDT to a refueling station; the remaining 20 percent of the biodiesel would be transported directly to the refueling station by HDT. Fuel transport and distribution

emissions (0.8 g CO<sub>2e</sub>/MJ fuel) account for 7 percent of the total fuel carbon intensity. Fuel combustion is calculated based on the methane and nitrous oxide emissions from an HDT, plus carbon dioxide from oxidation of the methyl carbon in the biodiesel derived from methanol. Carbon dioxide resulting from combustion of carbon in the hydrocarbon part of the ester fuel is considered climate neutral. The resulting fuel combustion emissions are 4.5 g CO<sub>2e</sub>/MJ fuel, equivalent to 43 percent of the carbon intensity (CI).

New Leaf Biofuel’s 3.5 MGY biodiesel contains an equivalent amount of energy to 3.3 MGY ULSD. For the UCO-to-biodiesel fuel pathway, 42,773 Btu of petroleum are consumed for every mmBtu of biodiesel produced; petroleum consumption (including energy in the fuel) for ULSD is 1,096,069 Btu per mmBtu of ULSD produced. The lower heating value of biodiesel relative to ULSD and the higher petroleum use for producing ULSD relative to biodiesel cancel each other out approximately, indicating that 3.5 MGY biodiesel displaces 3.5 MGY ULSD, or 440,725 mmBtu/year petroleum.

**Table 6: Comparison of New Leaf Biofuel to Equivalent CA ULSD**

	New Leaf Biofuel	Equivalent CA ULSD
Annual Fuel Production (MGY)	3.5	3.3
Fuel Heating Value (Btu/gal, LHV)	119,500	127,464
Annual Energy Production (mmBtu/yr)	418,425	418,425
Life-Cycle Petroleum Energy (Btu/mmBtu)	42,773	1,096,069
Total Annual Petroleum Energy (mmBtu/yr)	17,897	458,662
Annual Petroleum Energy Savings (mmBtu/yr)	440,725	
ULSD Gallon-Equivalent Saved	3,457,658	

Source: New Leaf Biofuel submission in response to PON-11-601

The 3.5 MGY biodiesel and the equivalent ULSD displaces GHG emissions, as shown in the following table. The table summarizes the GHG savings based on the carbon intensity for NLB biodiesel and ULSD. It shows annual fuel energy produced in mmBtu and MJ. As the table indicates, production of 3.5 MGY biodiesel results in GHG savings of 37.2 billion g CO<sub>2e</sub>/year by displacing 3.5 MGY ULSD and its associated emissions.

**Table 7: Greenhouse Gas Emission Savings Associated With Displaced**

	New Leaf Biofuel	Equivalent CA ULSD
Annual Energy Production (mmBtu/yr)	418,425	
Annual Energy Production (MJ/yr)	441,461,744	
Carbon Intensity (g CO <sub>2</sub> e/MJ)	10.44	94.71
Total Annual Emissions (Billion g CO <sub>2</sub> e/year)	4.6	41.8
Annual Emission Savings (Billion g CO <sub>2</sub> e/year)	37.2	

Source: New Leaf Biofuel submission in response to PON-11-601

The San Diego Air Pollution Control District issued an air quality permit to accommodate increased methanol use associated with this project. The air district adheres to federal and state regulations to notice residents within 1,000 feet of the site if, during the permit evaluation stage, the air district determines the project will result in an increase in emissions above the threshold. They will also likely post notices to the Air Resources Board and Environmental Protection Agency websites and in local newspapers if the project is using emission offsets or emission reduction credits.

#### Outreach Efforts

The proposal acknowledges that local outreach and education are a priority, and it notes the need to hold local workshops. The proposal mentions opening the plant for public tours. It also gives presentations to schools and other community-based organizations.

New Leaf participates in community outreach in the following ways: CEO Jennifer Case is on the Board of Directors for the San Diego Regional Clean Cities Coalition, which holds 10 to 15 clean fuel events in the county every year. In August 2011, New Leaf sponsored and organized a Biofuels Workshop at Pearson fuels that introduced local fleets to biodiesel and ethanol in San Diego. New Leaf has a booth every year at the ACT Expo in Long Beach, which caters to government and commercial fleets interested in alternative fuels.

Executive Vice President Portia Smith works closely with the California Restaurant Association to educate culinary students and restaurateurs about the importance of recycling cooking oil into biodiesel. Each year, New Leaf helps organize and has a booth at the Western Food and Beverage Expo to educate restaurants and food manufacturers on cooking oil recycling. New Leaf holds regular tours of its biodiesel production plant for students and members of the public to learn about the biodiesel production process.

### **(3-C.) Project Name: Yokayo Biofuels, Inc., “A Catalyst for Success”**

**Fuel and Capacity/Scale up:** Biodiesel, scale up from 417,000 gallons to between 702,900 and 722,700 gallons (annual)

**Feedstock:** Brown grease

**Proposed Technology:** Enzymatic Catalysis-esterification

**Permits:** Mendocino Air Quality Management District issued a modified air quality permit.

**Community:** This project would not be in a low-income community that is highly impacted by air pollution.<sup>6</sup> The city has an environmental justice (EJ) indicator, which is described later in this report.

**Other:** There are five schools and one health care facility within a one-mile radius of the project site.

Yokayo Biofuels, Inc., currently a biodiesel producer and distributor, proposes to expand/scale up production from 1,400 to 2,000 gallons per day by switching to a higher-yield technology using lower cost feedstock. Instead of the current biodiesel production (yellow grease through caustic catalysis), the proposed project would produce biodiesel from brown grease through enzymatic process. Through partnership with Piedmont Biofuels, Yokayo Biofuels would model economic sustainability with this proposed project.

#### **Site Description**

The project site, located at 350 Orr Springs Road, Ukiah, CA 95482, is on an industrial lot with a concrete building and a wooden-and-metal pole barn. Industrial buildings are located to the east and west of the site. The Pinoleville Reservation is located within a ¼ mile of the site, to the north. The proposed project would involve the construction of two new buildings. The first would house an area for washing and processing of by-products and a laboratory. The second would house the mixing and enzymatic reaction process. A methanol storage tank would be installed as would a liquid nitrogen blanketing system will be installed to increase fire safety.

#### **Potential Impacts**

##### ***Plant-side:***

The proposer’s capacity increase from 417,000 gallons to 722,700 gallons will result in plant-side incremental increases in emissions. Any increases in emissions due to production increases will be due to additional heating of the larger volume of oil or the additional energy used to mix the reactor. Due to the substantially lowered reaction temperature and decreased settling time, the amount of heating needed will be reduced by 62.5 percent on a per gallon basis. Accounting for the 55 percent increase in production, the total emissions due to heating remain unchanged.

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<sup>6</sup> California Air Resources Board (ARB). 2010. California Air Resources Board (ARB), *Proposed Screening Method for Low-Income Communities Highly Impacted by Air Pollution, 2010* (Sacramento, California).

Mixing energy is directly proportional to the volumes being mixed; so, the power consumed by the proposer's reactor mixer will increase 55 percent. However, part of the project is to switch from a compressed air powered mixer to an electric one (mixer). The main driver of this change is to eliminate the inefficiency associated with compressed air. The proposer does not assert measured data on the efficiency of the compressor (accounting for the compressor and impeller); an ideal system would be around 25 percent efficient. Combined with the 55 percent increase in production the decrease in carbon emissions (plant-side) should be from 1976 to 765.7 kg CO<sub>2</sub> per year.

### *Trucking*

The trucking miles will change if the proposer expands from the current capacity. Pertaining to trucking the feedstock oil, the proposer projects purchasing 225,000 gallons of feedstock during the course of the proposed project. There are two scenarios for trucking the feedstock to the proposer's facility: using its trucks (preferred) or hiring a hauler. The average round trip per load would be 275 miles. A typical hired truckload would be 8000 gallons, while an in-house load would be 4600 gallons. Using hired trucking would necessitate 29 truck loads totaling 7975 miles, assuming 10 miles per gallon: about 800 gallons of diesel fuel would be burned, resulting in 8583 kg of CO<sub>2</sub>, 393 g of PM, 7.4 kg of NO<sub>x</sub>, and 5.2 kg of nonmethane hydrocarbons (NMHC). Using in-house trucking would require 49 truck loads totaling 13475 miles, assuming 12 mpg: 1122 gallons of biodiesel would be burned, resulting in 2622 kg of CO<sub>2</sub>, 23 g of PM, 1101 g of NO<sub>x</sub>, and 494 g NMHC.

Pertaining to methanol, the proposer currently receives methanol deliveries every two to three weeks. They use 96,000 gallons of methanol (annually), which is delivered in 4000 gallon loads -- on a tank tractor trailer. The methanol more than likely comes to the San Francisco Bay Area, East Bay on rail. The trucking requirements for the methanol are roughly 4,800 miles (annually) which produces 5136 kg of CO<sub>2</sub>, 235 g of PM, 4.438 kg of NO<sub>x</sub>, and 3.10 kg of NMHC. Because of the decreased methanol usage due to the proposed new process and the installation of a larger methanol storage tank, the proposer will receive 93,600 gallons of methanol per year in 6000 gallon loads, 16 truck loads per year, or 3200 miles per year. This travel produces 3638 kg CO<sub>2</sub>, 156.5 g PM, 2.96 kg NO<sub>x</sub>, and 2.06 kg NMHC.

Pertaining to the catalyst, the proposer currently receives KOH deliveries via box truck approximately once per month. They use 43,200 lb. of KOH per year which is received in 3000 lb. loads; this is shipped by tractor trailer. They received a total of 15 shipments annually. KOH also arrives in the San Francisco Bay Area, East Bay by rail. The trucking from the East Bay is 3,000 miles per year and the emissions are 3,210 kg of CO<sub>2</sub>, 147 g PM, 2.77 kg of NO<sub>x</sub> and 1.932 kg of NMHC. This project will eliminate all of these emissions, as the proposer will no longer require KOH.

Of the two new catalysts used, one is reusable and therefore is part of the initial system; for the other, the proposer will use 2,400 gallons per year. The proposer plans to take delivery of the

second catalyst quarterly via tractor trailer from the closest location of the manufacture, a 280-mile roundtrip, or 1,120 miles per year. The emissions associated with the transport of this catalyst are 1,198 kg of CO<sub>2</sub>, 54.88 g PM, 1.036 kg of NO<sub>x</sub>, and 0.721 kg of NMHC.

Pertaining to finished biodiesel, the current travel is 46,800 miles per year (fuel delivery), which accounts for 9,107 kg CO<sub>2</sub>, 79.56 g PM, 3,823.56 g NO<sub>x</sub>, and 1,715 g NMHC. This will increase to 72,500 miles per year, creating 14,116 kg of CO<sub>2</sub>, 119 g of PM, 5924 g of NO<sub>x</sub>, and 1715 g of NMHC. The trucks used are a 3,000-gallon bobtail tanker and a 1,550-gallon bobtail tanker.

Pertaining to by-products and coproducts, the by-products of the current system are crude glycerin and wash water. These are blended and trucked to the East Bay Municipal Utility Board where they are used as substrate for an anaerobic digester to produce methane. The proposer sends two truckloads per week, approximately 250 miles per trip or 26,000 miles per year. This is sent in oil collection trucks which run on biodiesel (ranging from 2,300 to 4,500 gal capacity). The resulting emissions are 5,070 kg of CO<sub>2</sub>, 44.2 g PM, 2.12 kg NO<sub>x</sub>, and .95 kg NMHC. With the new system no wash water will be created, and the glycerin will be sold. The proposer will make 120,000 gallons of glycerin annually, which will be trucked out, probably to the East Bay by a hauler in 5,000 gallon loads, or 24 loads per year, totaling about 48,00 miles. This will create 5,136 kg of CO<sub>2</sub>, 235 g of PM, 4.44 kg of NO<sub>x</sub>, and 3.09 kg of NMHC.

The Mendocino AQMD issued a modified air quality permit (Vapor Recovery 207.10) for this proposed project. The modification is required for the discharges realized from the reaction vessels in this project; the modified permit from the AQMD is needed due to the process change, a change in the equipment, and an increase in the number of gallons processed. The AQMD notes that, potentially, the only other air quality permits required will be for “expansion and modification” of the facility. The AQMD adheres to federal and state regulations to notice residents within 1,000 feet of the site if, during the permit evaluation stage, the air district determines the project will result in an increase in emissions above the threshold. They will also likely post notices to the Air Resources Board and Environmental Protection Agency websites and in local newspapers if the project uses emission offsets or emission reduction credits.

Additional future environmental permitting includes updates to the Stormwater General Permit for Industrial Facilities from the State Water Board due to the changes in locations of stormwater facilities, and the Hazardous Material Management Plan from Mendocino County due to the changes in locations of the hazardous material.

### Outreach Efforts

A town hall meeting would be scheduled for June 2012 to inform local citizenry of this project. The project managers plan to publish information in the local newspaper and broadcast project information on the community radio.

### **(3-D.) Project Name: SacPort Biofuels, “Renewable Diesel Pilot Project”**

**Fuel and Capacity:** Renewable diesel; 360,000 gallons (annual)

**Feedstock:** Green waste and municipal solid waste

**Proposed Technology:** Advanced Fischer Tropsch (FT)

**Permits/Environmental Impact Report (EIR):** A local air quality permit is pending. The EIR (certified) and addendum conclude this project would not result in any new significant environmental effects and would not substantially increase the severity of the previously identified effects.

**Community:** This project is proposed to be in a low-income community that is highly impacted by air pollution.<sup>7</sup> The city has four environmental justice (EJ) indicators, which are described later in this report.

**Other:** No schools or health care facilities are within 1 mile of the proposed project site.

The SacPort Biofuels Renewable Diesel Pilot Project proposes to develop, build, and test a pilot facility to demonstrate an innovative and cost-effective process to produce renewable Fischer-Tropsch (FT) diesel from locally sourced waste. With this project, SacPort Biofuels would demonstrate sourcing raw material and producing and using a renewable diesel fuel within a 20-mile radius.

#### **Site Description**

The project would be located on a vacant 18.8 acre infill industrial site located at 3225 Industrial Blvd, West Sacramento, California 95691. The site is at the Port of Sacramento just south of U.S. Highway 50 and west of the intersection of Harbor Boulevard and Industrial Boulevard. The site is bounded on the west and south side by Lake Washington and the Sacramento Deep Water Channel. It is bounded on the north by business park development and a Union Pacific rail line and on the east by a concrete recycling facility and undeveloped industrial land within the port. The surrounding area generally includes shipping terminals, business park development, warehouses, and other industrial uses. The project site would be an infill reuse.

The site is in West Sacramento’s Enterprise Zone, the area surrounding is a U.S. Department of Transportation designated Economically Distressed Area (EDA), and the county is characterized by significant poverty, unemployment, home foreclosure, or general distress. A residential development near the site is about 1,000 feet to the north, on the other side of the U.S. Highway 50 freeway.

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<sup>7</sup> *Proposed Screening Method for Low-Income Communities Highly Impacted by Air Pollution, 2010* (Sacramento, California).

## Potential Impacts

An estimate of the project-generated emissions, along with the associated vehicular emissions excerpted from the project proposal follow.

**Table 8: Estimate of Project-Generated Emissions for SacPort**

Estimate of Project-Generated Emissions	The plant (stationary source): Conversion of waste materials to FT diesel in kg/hour  (This is based on plant operating at 95% productivity -- annual 365,0000 gallons per year)	Vehicular transportation (mobile source), estimated, to/from project site (kg/day)  The emission from vehicular transportation (incoming feedstock and outgoing FT diesel/co-products) assumes that 6 trucks operate on conventional petroleum diesel and travel 50 miles/day roundtrip. The calculation of emissions reductions assumes 5 mpg (a total of 60 gallons) of non-FT diesel used per day to support plant operations.
O <sub>3</sub>	Not detectable	Not detectable
CO	0.01333	0.07
SO <sub>x</sub>	0.0193	0.05
NO <sub>x</sub>	0.1046	0.309
PM 10, PM25	0.0121	0.0085
ROCs	0.00004	0.0185

Source: SacPort Biofuels proposal received in response to PON-11-601

The above table assumes 365,000 gal/year production. The emissions are expressed in kg/hour. The calculations are as follows: that is, CO: 0.01333 kg(CO)/hr. @ 365,000 gal/yr, including an “onstream factor” of 95 percent, gives a 43.75 gal(diesel)/hr average production rate for the plant. Given 43.75 gallons of diesel are produced per hour, the “specific criteria pollutant emission factor for CO” is: 0.01333 kg(CO)/hr divided by 43.75 gal(diesel)/hr = 0.00030 kg(CO)/gal(diesel produced).

For Year-1, diesel produced is 79,000 gal/annum, which means 79,000 gal (diesel) \* 0.00030 kg(CO)/gal(diesel produced) = +24.07 kg(CO) emitted in Year-1. This plant CO emission is then combined with the net reduction in CO emissions (by using 79,000 gals of FT Diesel instead of ULSD) to generate the combined net criteria pollutants.

The FastOx gasification process planned for this project is a “closed system,” with nondetectable emissions released in the production of renewable synthetic gas (syngas). The conversion of the syngas into renewable diesel using the FT process is also a very clean process

with low emissions. The previous table includes conservative estimates of criteria pollutants assuming a worst-case scenario – that all the hydrocarbon-rich “tailgas” from the FT process are sent to the steam isle and used to generate steam; hence combustion exhaust is shown above. In reality, it is likely that any “tailgas” will be sent back to the FastOx gasifier to be thermally reformed into additional syngas for conversion to FT diesel.

The emission from vehicular transportation (incoming feedstock and outgoing FT diesel/co-products) assumes that 6 trucks operate on conventional petroleum diesel and travel 50 miles/day roundtrip. The calculation of emissions reductions assumes 5 mpg (a total of 60 gallons) of non-FT diesel used per day to support plant operations.

This project is proposed to be located in an industrial area and is not expected to negatively impact public health of surrounding communities and that the ultra-clean FT diesel produced by the project will help clean the air for communities throughout the region. Table 5 shows production and consumption of the FT diesel. The proposal for this product included a letter of intent from a distributor.<sup>8</sup> The letter provides that the distributor would provide the required infrastructure and it is currently providing a clean fuel point (CFP) network for low-carbon fuels. Table 5 starts with Year-1 with production and distribution of 79,000 gallons of FT diesel.

Specifically in the first year of operation, the proposer notes that annual environmental reductions (both GHG and criteria pollutants emissions) from producing (stationary sources) and consuming (mobile sources) 79,000 gallons of FT diesel would result in an annual CO<sub>2</sub> reduction (displacing other, non-FT diesel fuels) as follows: ultra-low-sulfur diesel (U.S. average): -1,380 metric tons; FT diesel derived from purpose-grown biomass; -474 metric tons, and biodiesel derived from soybean: -594 metric tons. These reductions are based on “Well-to-Wheels” Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) modeling.

Further, from producing (stationary sources) and consuming (mobile sources, including both external public vehicles using the SacPort diesel offsite and any trucks that are part of the SacPort process/operations onsite) 79,000 gallons of FT diesel, the reduction of criteria pollutants (annual) would be: -250 kg(CO), -251 kg(VOC), -988 kg(NO<sub>x</sub>), AND -30kg(PM 10). This would yield a total reduction of criteria pollutants of -1,519 kg if 79,000 gallons of FT diesel were consumed. These reductions are based on “Well-to-Wheels” modeling. Emissions of SO<sub>x</sub> would also decrease due to the almost-undetectable levels of sulfur (<20 ppb) present in the FT diesel, compared with ULSD (<15 ppm), but this reduction was not calculated.

The net GHG and net criteria pollutant reductions will increase after Year-1, as the SacPort facility increases production rates beyond the initial 79,000 gal (FT diesel)/annum phase. This

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<sup>8</sup> Letter dated February 22, 2012, sent to the California Energy Commission from Propel Fuels, Inc.

project is proposed to be located in an industrial area and is not expected to negatively impact public health of surrounding communities and the ultra-clean FT diesel produced by the project will help clean the air for communities throughout the region. The following table provides details.

**Table 9: Potential Annual Environmental Reductions Compared With Conventional Diesel Fuels for SacPort**

WTW GHG Reductions Using SacPort's FT Diesel, Displacing Other Diesel Fuels <sup>(1)</sup>				
		[Metric tons(CO <sub>2</sub> e) reduction/annum]		
FY	Fuel Produced (gallons/year)	ULSD	FTD	BD
2013	79,000	-1,380	-474	-594
2014	258,000	-4,506	-1,547	-1,940
2015	297,000	-5,187	-1,781	-2,233
2016	337,000	-5,886	-2,021	-2,534
2017	357,000	-6,235	-2,140	-2,685
2018	365,000	-6,375	-2,188	-2,745
2019	365,000	-6,375	-2,188	-2,745
2020	365,000	-6,375	-2,188	-2,745
2021	365,000	-6,375	-2,188	-2,745
2022	365,000	-6,375	-2,188	-2,745

Where: WTW = "Well-to-Wheels"

ULSD = Ultra-low-sulfur diesel, U.S. average

FTD = Fischer-Tropsch Diesel derived from purpose-grown biomass

BD = Biodiesel derived from soybean

Notes: <sup>(1)</sup> GHG Well-to-Wheels analysis from GREET Modeling.

Source: SacPort Biofuels proposal received in response to PON-11-601

The proposer's production capacity will increase over time. The proposal's letter of intent from a local distributor states intent to pick up and distribute the fuel as it is produced. The preceding table shows reduction in environmental pollutants (annually).

**Table 10: Potential Annual Environmental Reductions -- Net Criteria Pollutant Reductions Compared With Conventional Diesel Fuels for SacPort**

Net Criteria Pollutant Reductions by producing and consuming SacPort FTD, displacing conventional U.S. ULSD <sup>(2)</sup>						
FY	Fuel Consumed (gallons/year)	[kg(criteria pollutants) reduction/annum]				
		CO	VOC	NOx	PM 10	TOTAL <sup>(3)</sup>
2013	79,000	-250	-251	-988	-30	-1,519
2014	258,000	-816	-819	-3,227	-98	-4,960
2015	297,000	-939	-943	-3,715	-113	-5,710
2016	337,000	-1,065	-1,070	-4,216	-128	-6,479
2017	357,000	-1,129	-1,133	-4,466	-135	-6,863
2018	365,000	-1,154	-1,159	-4,566	-138	-7,017
2019	365,000	-1,154	-1,159	-4,566	-138	-7,017
2020	365,000	-1,154	-1,159	-4,566	-138	-7,017
2021	365,000	-1,154	-1,159	-4,566	-138	-7,017
2022	365,000	-1,154	-1,159	-4,566	-138	-7,017

Notes:

(2) Criteria Pollutant reductions from GREET Modeling, combined with actual emissions data from SAE - Technical Paper Series #982526 - "Emissions from Trucks using Fischer-Tropsch Diesel Fuel", 1998

(3) Not including Net SOx reductions, as this emissions data was not included in the SAE paper used to calculate criteria pollutants. However, the U.S. ultra-low-sulfur diesel (ULSD) requirement is less than 15 ppm sulfur, whereas the SacPort FTD will contain less than 20 ppb sulfur, therefore reducing tailpipe emissions of SOx considerably over conventional ULSD.

Source: SacPort Biofuels proposal received in response to PON-11-601

The proposer's production capacity will increase over time. The proposal's letter of intent from a local distributor states intent to pick up and distribute the fuel as it is produced. The preceding table shows reduction in environmental pollutants (annually).

The City of West Sacramento and the Port of West Sacramento conducted an extensive environmental review for the SacPort project, and the City Council certified an environmental impact report (EIR) under CEQA on February 11, 2009. On January 1, 2012, the Sacramento-Yolo Port Commission approved an addendum under the certified EIR for the proposed project, stating that all impacts from the renewable fuels project are within the scope of the certified EIR.

The Yolo-Solano AQMD is responsible for providing the stationary source air quality permit for the project. As a responsible agency, Yolo-Solano AMQD can use the certified EIR and the completed air quality risk health assessment for its CEQA compliance, allowing an efficient process for a project that will provide a net air quality benefit for the air district and the region. The AQMD adheres to federal and state regulations to notice residents within 1,000 feet of the

site if, during the permit evaluation stage, the air district determines the project will result in an increase in emissions above the threshold. They will also likely post notices to the Air Resources Board and Environmental Protection Agency websites and in local newspapers if the project is using emission offsets or emission reduction credits.

Localized production and transportation air emissions from the SacPort Biofuels Renewable Diesel Pilot Project will be well under the emissions in the certified health risk assessment. Fuel production via Fischer-Tropsch (FT) is a clean synthesis process, and the project will employ an advanced dust abatement device, called a cyclone, a tar removal system, advanced scrubbers, and sulfur removal and polish systems, which are part of a “closed system” process that will not include any candlestick-type flares.

Final issuance of the air quality permit will be secured before construction and operation, and it is not expected to cause delay. In addition, standard storm water and wastewater discharge permits will be secured through the Port and City of West Sacramento and solid waste permitting from CalRecycle may be pursued. The proposer is working with CalRecycle on the best path forward and it supports the project and will be secured before operations, if needed. The other permits needed to commence construction and/or operations are standard over-the-counter local approvals, such as building permits, plan checks, fire and safety checks, and so forth. The City of West Sacramento is an efficient local government with a good track record of issuing ministerial, over-the-counter permits and a great record of developing projects on time. The outstanding permits, mainly air and water, are within the scope of the EIR and should be very time-efficient to secure.

### **Outreach Efforts**

Outreach efforts to communicate the objectives and activities for this project have begun. Presentations are planned for public meetings at the West Sacramento Economic Development Advisory Commission, West Sacramento Chamber of Commerce public meeting, and at West Sacramento’s One Stop Career Center.

### **(3-E.) Project Name: EdeniQ, Inc., “California Cellulosic Ethanol Biorefinery (CCEB)”**

**Fuel and Demonstration for scale up:** Cellulosic ethanol; demonstrate a scale-up from 2 tons per day (yielding 50,000 gallons per year) to 10 million gallons per year output

**Feedstock:** Wood prunings and cellulosic energy crops – switchgrass

**Permits:** San Joaquin Valley Air Pollution Control District, air quality permit received

**Proposed Technology:** Saccharification and fermentation

**Community:** This project would not be located in a low-income community that is highly impacted by air pollution.<sup>9</sup> Additionally, the project would be near Goshen, a low-income community. The city has an environmental justice (EJ) indicator which is described later in this report.

**Other:** Within a 1-mile radius, a school and a health care facility exist.

EdeniQ proposed to first generate data in bench-scale and pilot units to determine the optimum processing conditions and equipment configurations for converting feedstocks to ethanol using EdeniQ's proprietary technology. It then proposed to demonstrate the scale-up for converting California-relevant feedstocks to ethanol at a 2-ton-per-day scale yielding 50,000 gallons per year. Subsequently, it will gather data sufficient to enable the construction of a 10 million gallon per year commercial plant for the conversion of feedstock to ethanol. The proposer plans to demonstrate its California Cellulosic Ethanol Biorefinery (CCEB). It is developing a low-cost, low-carbon-intensity technology for the conversion of cellulosic biomass to ethanol that includes cellulosic feedstock processing, saccharification (conversion of biomass to intermediate cellulosic sugars), and fermentation to produce cellulosic ethanol. It plans to evaluate two classes of feedstock, agricultural wastes (orchard wood prunings) and energy crops (switchgrass), and determine optimum processing conditions and equipment configurations.

The proposer plans to include input from California's ethanol producers to evaluate the attractiveness of integrating our cellulosic ethanol technology into its current corn-based ethanol plants. A preliminary model shows the potential to reduce greenhouse gas emissions by more than 60 percent relative to corn-based ethanol production.

#### **Site Description**

The proposed site is at 2505 North Shirk Road, Visalia, California 93291. A single building (34,250 square feet) is planned, and the site is in an industrial area. Immediate neighbors include U.S. Cotton Classing Office (a U.S. Department of Agriculture Agricultural Marketing Service) located about 500 feet to the west; Alliance Games Distribution, located about 1,500 feet to the west, Tulare County Child Care Educational Program, located about 1,700 feet to the south, and the R&R Library, located about 1,500 feet to the south.

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<sup>9</sup> California Air Resources Board (ARB), *Proposed Screening Method for Low-Income Communities Highly Impacted by Air Pollution*, 2010 (Sacramento, California).

## Potential Impacts

The proposed CCEB project quantitative goals include an overall yield greater than 70 gallons per ton of bone dry cellulosic feedstock, overall conversion >70 percent, and reduction of life-cycle GHGs greater than 60 percent for the proposer's process relative to corn based ethanol production (carbon intensity < 30 grams CO<sub>2</sub>e/MJ).

EdeniQ's pilot plant and proposed commercial scale plant processes (from growing feedstock to producing the ethanol end product) do not produce any GHG emissions and actually have a net positive impact when taking into account that growing feedstock actually absorbs carbon, which the proposer took into account in their estimates and in the GREET model. Emissions from the proposed 10 million gallon / year commercial scale plant would be 427 kg of CO<sub>2</sub> per day. However, when one takes into account the positive impact of growing the feedstock on CO<sub>2</sub> reduction, the emissions are less than zero.

The CCEB pilot plant will emit nominal levels of criteria pollutants such as VOCs, CO, NO<sub>x</sub>, and PM 10 as part of normal operations. CO, NO<sub>x</sub>, and PM 10 will be produced by two Permit Exempt Equipment Registered (PEER) package steam boilers (50 hp and 119 hp) with low-NO<sub>x</sub> burners that meet the 2010 standard of 9 ppm; emissions are quite small, at estimated volumes of far below 1 ton per year of each. VOC emissions are estimated at less than 2 tons per year, prior to abatement with a liquid-vapor scrubber. VOC emissions from the vapor scrubber are estimated at less than 50 lb. per year.

The proposer notes that the transport of the feedstock to the pilot plant will be by vehicle-towed trailer, once-to-twice weekly, from a nearby receiving facility. Round-trip distance from the receiving facility to the pilot plant is less than 10 miles. Transport of feedstock to the receiving facility would be by tractor-trailer, as needed, about once every two weeks. Emissions from the transport of feedstock to EdeniQ's pilot plant would be approximately 1.6 kg of CO<sub>2</sub> per day.

California feedstocks that supply the project site in the Central Valley can be assumed to be no more than a distance of 400 miles from the pilot plant. Using a GREET model to approximate emissions for such a trips, emissions can be expected to be less than 0.33 tons/yr CO, 0.96 tons/yr NO<sub>x</sub>, and 0.03 tons/yr PM 10 combined for all feedstock transportation.<sup>10</sup>

EdeniQ proposes that, for the pilot plant, it would transport the ethanol produced to another ethanol plant for disposition, and these emissions (for the related transportation) are estimated to be roughly 0.8 kg of CO<sub>2</sub> per day. When one takes into account the positive impact of growing the feedstock on CO<sub>2</sub> reduction, the emissions related to trucking the ethanol to another ethanol plant for disposition are less than zero.

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<sup>10</sup> GREET Model: Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation Model, <http://greet.as.anl.gov>.

Due to the size and limited period of operation of the proposed project, no significant environmental impacts are expected, and this has been confirmed in discussions with both the lead agency for CEQA project compliance (the City of Visalia) and the San Joaquin Valley Air Pollution Control District (SJVAPCD). The lead agency filed a notice of exemption for the facility in December 2010. The proposed facility has also undergone review by the U.S. Department of Energy as part of an ongoing project and, due to the lack of any significant environmental impact, has been granted a Categorical Exclusion (National Environmental Policy Act – NEPA) for the operations phase that would run concurrent with the proposed project.

The SJVAPCD issued an Air Quality Permit for the existing facility. The Air Pollution Control District adheres to federal and state regulations to notice residents within 1,000 feet of the site if, during the permit evaluation stage, the air district determines the project is likely to result in an increase in emissions above the threshold. They will also likely post notices to the Air Resources Board and Environmental Protection Agency websites and in local newspapers if the project is using emissions offsets or emission reduction credits.

### **Outreach Efforts**

Presentations at city meetings have already been held regarding this project and will continue at least annually. The presentations review the existing facility, changes that will be made to the facility, as well as the type of research being completed and expected benefits from the technology. Additionally, presentations to the scientific and business communities will continue in an effort to educate local and potential stakeholders of the work being undertaken. Finally, several EdeniQ employees have been approached about making presentations to students in nearby schools about both the underlying technologies/business, as well as EdeniQ's project and potential impact.

### **(3-F.) Project Name: Clean World Partners LLC, “Sacramento Biorefinery #1 Phase II: Scale-up to 100 Tons per Day (Commercial)”**

**Fuel and Capacity/Scale up:** Biomethane; scale-up existing processes from 25 tons per day to 100 tons per day to produce 566,000 diesel gallon equivalents of renewable natural gas (RNG) (annually) and other outputs

**Feedstock:** Source separated food waste

**Technology:** Anaerobic digestion (AD)

**Permits:** Air permit issued 12/31/11 for 25 tons per day is undergoing modification to accommodate 100 tons per day. The proposer will need an “Authority to Construct” permit for the flare which is pending AQMD evaluation.

**Community:** This project would be in a low-income community that would be highly impacted by air pollution.<sup>11</sup> The city has no environmental justice (EJ) indicators; EJ indicators are described later in this report.

**Other:** There is one school and one health care facility within a one-mile radius of the proposed project site.

Clean World Partners, LLC, in collaboration with Atlas Disposal Industries, LLC, Carson Development, Otto Construction Company, Sacramento Municipal Utility District (SMUD), and the County of Sacramento proposes to scale-up the existing 25 ton-per-day Phase-I Sacramento BioRefinery #1 (SBR1) to a larger system capable of diverting 100 tons per day. The scaled-up facility would be the largest commercial-scale, high-solids anaerobic digestion (AD) system in California and the first to produce renewable vehicle fuel. All energy needs would be created by a combined heat and power system. There would be reclaimed water from the municipal solid waste, and the technology chosen will require no additional water.

The proposed project would convert source-separated food waste via anaerobic digestion into 566,000 diesel gallon equivalents (DGE) of renewable natural gas (RNG) per year; 3.17 million kWh of electricity per year to power the SBR1 facility; 190,000 therms of heat per year for use at the SBR1 facility; 8,000 tons per year of nitrogen-loaded zeolite for granular fertilizer; 7,500 tons per year of compost; and 5,450,000 gallons per year of reclaimed water.

#### **Site Description**

The site for this Sacramento Biorefinery project would be at the County of Sacramento South Area Transfer Station (SATS), a 12.26-acre property located at 8550 Fruitridge Road, Sacramento, California 95826. The site is within a permitted facility on land zoned as heavy industrial. While not on the Department of Toxic Substances Control (DTSC) list for hazardous waste, a leaking underground tank was previously located on the site; that case was closed by the county on October 15, 1986. This site is not identified, by the Secretary of Environmental Protection, as being affected by hazardous waste or clean-up problems.

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<sup>11</sup> California Air Resources Board (ARB), *Proposed Screening Method for Low-Income Communities Highly Impacted by Air Pollution*, 2010 (Sacramento, California).

The facility for this planned project is eligible for a Research Composting Operations exemption from the Local Enforcement Agency (LEA) and Cal Recycle (§17862, Title 14 CCR) to a full solid waste facility permit. According to the proposal, this city approval is adequate for the LEA CEQA process; further, LEA notification does not happen until 30 days prior to operations.

### Potential Impacts/Air Emissions and the Scale up to 100 Tons per Day

The scale up of the existing 25-ton-per-day (TPD) Phase-I Sacramento BioRefinery #1 (SBR1) at the County of Sacramento SATS to a larger system capable of diverting 100 TPD (36,500 tons per year) of source-separated food waste will involve a relatively slight increase in criteria air pollutant emissions. Below are the calculated air emissions for the three principal project operations that contribute air emissions.

Truck traffic delivering the food waste feedstock will increase from an annualized average of 2.5 trucks per day to 10 trucks per day. The collection radius is predicted to average about 10 miles for each truck trip. Assuming 20 miles per round trip, this equates to 73,000 miles per year for the 100 TPD facility an increase of 54,750 miles over the 18,250 miles per year for the 25 TPD facility. In determining the increase in air emissions, the trucks that deliver the food waste feedstock to the facility will also be fueled with the renewable natural gas (RNG). Using the RNG, like any form of natural gas, lowers truck exhaust emissions compared to petroleum diesel fuel. Although the actual emissions profile will depend on the engine design, the U.S. Environmental Protection Agency (U.S. EPA) calculated a reasonable emissions reduction estimate in 2002 based on the cleaner burning characteristic of natural gas.

The potential emission benefits of fossil CNG compared to gasoline from EPA calculations are:

- Reduced carbon monoxide (CO) emissions 90-97 percent.
- Reduced nitrogen oxide (NOx) emissions 35-60 percent.
- Potentially reduced nonmethane hydrocarbon (NMHC) emissions 50-75 percent.
- Little or no particulate matter (PM).
- Fewer toxic and carcinogenic pollutants.

Air emissions calculations for the 25 TPD and 100 TPD systems for the delivery trucks using RNG indicated that NOx emissions would increase only between 0.38 and 0.62 tons per year (TPY), an increase in CO emissions of between 0.01 and 0.03 TPY, PM would increase only 0.004 TPY, and NMHC 0.018 to 0.036. Putting the NOx and PM emissions increase into a statewide perspective, the California Air Resources Board (ARB) estimated in 2005 that diesel exhaust emissions for NOx were 578,000 TPY and 25,000 TPY for PM.

Both the 25 and 100 TPD systems require flaring of the produced biogas during start-up and maintenance periods. The highest amount of flaring time is in the first year when the system starts up, as it can take 60 or more days to develop enough biogas to generate electricity. The air

emissions increase presented below is based on an estimated 730 hours of flare operation during the first year of operations. It should be noted that once the system is fully stabilized, for example in “Year 2,” the flare would be used only during “downtime,” that is, 5 percent of the total annual hours of the year (8,760 hours) or 438 hours per year.

The increase from 25 to 100 TPD is calculated to be: NO<sub>x</sub> - 0.22 (tons per year) TPY; CO - 1.182 TPY; NMHC - 0.45 TPY; PM - 0.04 TPY; and sulfur oxides (SO<sub>x</sub>) - 0.048 TPY. These calculations were made based on the air pollutant emissions factors determined by the Sacramento Metropolitan Air Quality Management District in their air quality permit for the SATS facility.

Finally, there will also be an increase in electricity generation in the scale-up from 25 to 100 TPD systems at SATS. The 25 TPD system will use an ultra-low emissions 65 kilowatt (kW) microturbine. In the scale-up to 100 TPD, a 250 kW ultra-low emissions FlexEnergyFlexPowerstation™ is proposed. Based on emission factors supplied by FlexEnergy, there is also a very low air emissions addition from the microturbines in the scale up to 100 TPD. NO<sub>x</sub> emissions increase 0.057 TPY, CO 0.035 TPY, and NMOC 0.20 TPY. Although PM emission levels were not provided, it would be expected that they could be as low as the level for the increased truck traffic.

The Sacramento Metropolitan AQMD issued an air permit for the SBR1 with the maximum allowable emissions specified for VOC: 16.8 lbs. per day, NO<sub>x</sub>: 8.2 lbs. per day, SO<sub>x</sub>: 1.8 lbs. per day, PM 10: 1.6 lbs. per day, CO: 44.4 lbs. per day, and PM 2.5: 1.6 lbs. per day. The permit would allow maximum emissions, based on the Sacramento AQMD requirements for operating 5.0 MMbtu/hr, 556 btu/sq. ft., 24 hour/day, 92 days per quarter, and 365 days per year. The air permit limits GHG emissions with combustion to 5,067.2 tons / year and without combustion to 2.43 tons per year. The air permit also limits pass through CO<sub>2</sub> to 2,037.54 tons per year. The documentation notes that the Authority to Construct is not an authority to operate.

If landfill emission offsets were used to sell carbon credits, the Low Carbon Fuel Standard (LCFS) carbon intensity established by ARB would be 13.45 gCO<sub>2</sub>e/MJ. This ranking is for biomethane generated from dairy gas; it is commonly understood that the LCFS standard for biomethane from food waste and urban organic material will be much lower than this LCFS standard.

The project team communicated with the Local Enforcement Agency (LEA) —the County of Sacramento, California, Community Development Department, Planning Division—and has received notice that the proposed scale-up does not qualify as a new project (under CEQA) and counts, instead, as a minor modification to a Previous Approval, requiring only ministerial action. The project team expects to have a letter of approval from the LEA by March 15, 2012. The Yolo-Solano Air Quality District, where this site is located, adheres to federal and state regulations to notice residents within 1,000 feet of the site if the project is likely to result in an increase in emissions above the threshold. It will also likely post notices to the Air Resources

Board and Environmental Protection Agency websites and in local newspapers if the projects is using emissions offsets or emission reduction credits.

### **Outreach Efforts**

The proposed project would be among the largest bioenergy facilities in the United States. A significant marketing and public education campaign would be conducted about the benefits of an organic waste digestion system. Efforts could include direct mail to local, regional and state residents; public outreach meetings; radio and television public service announcements; field trips for schools, churches, and civic organizations; press and media tours; and site visits by elected officials. The project term notes that participation of at least 1,000 residents, community leaders, and media representatives is anticipated.

## CHAPTER 4: Aggregate Location Analysis and Community Impacts

Based on the staff's assessment of the proposed projects, it is expected that none of the surrounding communities would be disproportionately impacted by the implementation of the projects. For this *LHI Report*, environmental justice (EJ) indicators are evaluated as follows.

-A minority EJ is indicated if a minority subset represents more than 30 percent of a given city's population.

-A poverty level EJ is indicated if a city's poverty level exceeds the state of California's poverty level (for the entire state – 13.7 percent).

-An unemployment EJ is indicated if a given city's unemployment rate exceeds the state of California's unemployment rate (for the entire state – 10.9 percent as of January 2012).

-An EJ indicator is also noted for cities where the percentage of persons under 5 years of age or over 65 years of age is 20 percent higher than the average of the percentage of persons under 5 years of age or over 65 years of age for the entire state. (For the entire state, the percentage of persons under the age of 5 years is 6.8 percent, and the percentage of persons over the age of 65 years is 11.4 percent).

The cities and EJ indicators follow. While EJ indicators exist, the proposed projects are expected to have a net benefit by reducing pollution and providing cleaner burning fuels to local fleets that support those communities.

**Table 11: Cities With Environmental Justice Indicators**

City	Minority	Poverty Level	Unemployment Rate	Age
Chico		X	X	
San Diego		X		
Ukaih		X		
West Sacramento	X	X	X	X
Visalia <sup>14</sup>	X			X

Source: Energy Commission staff analysis

The emission reductions associated with the projects are anticipated to lead to improved air quality in these communities. While overall air quality depends on a number of factors, the Energy Commission expects that air quality will improve over time with the increased use of alternative fuels, in disadvantaged communities and in those communities with the most significant exposure to air pollutants.

The following table provides city-level data to give additional insight into the community demographics where the proposed projects, if funded, would be located.

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12 <http://www.labormarketinfo.edd.ca.gov/Content.asp?pageid=133> and <http://www.bls.gov/eag/eag.ca.htm>

13 <http://quickfacts.census.gov>

14 Visalia is not considered a low-income community highly impacted by air pollution; however, it is near Goshen, which is a low-income community highly impacted by air pollution.

**Table 12: Demographic Data (Note: Data Obtained from <http://quickfacts.census.gov>)  
(Percentage of the total population in the city)**

	<b>Chico</b>	<b>San Diego</b>	<b>Ukiah</b>	<b>West Sacramento</b>	<b>Visalia</b>	<b>Sacramento</b>
Below Poverty Level (2006-2010)	21.2	15.6	15.5	16.6	13.7 <sup>15</sup>	13.9
Black persons (2010)	2.1	2.5	1.1	4.8	2.1	14.6
American Indian and Alaska Native (2010)	1.4	1.0	3.7	1.6	1.4	1.1
Persons of Hispanic or Latino Origin (2010)	15.4	48.4	27.7	31.4	46.0	26.9
White persons (2010)	80.8	60.4	72.1	60.6	64.5	45
Persons under 5 years (2010)	5.7	8.1	7.3	8.4	8.6	7.5
Persons over 65 years (2010)	10.6	10.5	14.5	9.8	10.3	10.6
Unemployment rate <sup>16</sup> (2011)	12.8	9.7	10.8	13.1	10.9	13.1

Source: California Energy Commission staff assessment

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15 Visalia is the only city in this LHI Report below the state's poverty level.

16 <http://www.labormarketinfo.edd.ca.gov/Content.asp?pageid=133> and <http://www.bls.gov/eag/eag.ca.htm>

## CHAPTER 5: Summary

For an overview, the following table combines the EJ indicators, demographics, permits, and potential impacts in terms of emissions. In summary, staff concludes that the proposed projects, if funded, would reduce emissions, exposure, and health risk at a local level, based on the assumption that the vehicles deployed and operated with said projects are cleaner than the gasoline vehicles they are likely to replace.

Additionally, the conclusion that the anticipated potential impacts are positive to the communities is explained below. This is true even for those communities that are described as low income and would be highly impacted by air pollution and also those with EJ indicators.

**Table 13: Facility, Location, and Community Impacts**

Project	Facility/location	Community	Anticipated Potential Impact (brief summaries based on details in the proposed project descriptions)
3-A	Existing facility at 2323 Park Avenue, Chico, CA 95928  2 schools and 1 health care facility are located within a 1 mile radius of the site.	This project would not be in a low-income community that is highly impacted by air pollution. <sup>17</sup> The city has 2 EJ indicators.	-Reduced GHG in local area (both stationary and mobile sources)  -Local production and local consumption  -Positive impact the local air shed
3-B	Existing facility at 2285 Newton Ave., San Diego, CA 92113  Within a 1 mile radius of the site, 4 schools and 1 health care facility exist.	This project would not be in a low-income community that is highly impacted by air pollution. <sup>18</sup> The city has 1 EJ indicator.	-Production expansion would result in 90% reduction in carbon intensity (g CO <sub>2</sub> e/MJ), relative to the petroleum diesel baseline under the California Low Carbon Fuel Standard (LCFS)  -The fuel pathway (stationary and mobile emissions) would result in GHG emission savings associated with displaced petroleum estimated at 37.2 billion g CO <sub>2</sub> e/year
3-C	New construction (2 buildings) at 350 Orr Springs Road, Ukiah, CA 95482.  There are 5 schools and 1 health care	This project would not be in a low-income community that is highly impacted by air pollution. <sup>19</sup> The city has 1 EJ indicator.	-Increased production of biodiesel with reduced carbon intensity from 11.76gCO <sub>2</sub> /MJ to 8.82gCO <sub>2</sub> /MJ, thereby lowering the GHG level by 33%  -Corresponding emissions reduction

<sup>17</sup> Proposed Screening Method for Low Income Communities Highly Impacted by Air Pollution. California Air Resources Board (ARB). 2010.

<sup>18</sup> *ibid.*

<sup>19</sup> *ibid.*

Project	Facility/location	Community	Anticipated Potential Impact (brief summaries based on details in the proposed project descriptions)
	facility within a 1 mile radius of the project site.		<p>related to the use of biodiesel as a vehicle fuel would be: carbon dioxide, carbon monoxide, sulfur dioxide, and particulate matter emissions will decrease by 4.5 million, 14,000, 140, and 633 lb/year respectively.<sup>20</sup></p> <p>-Elimination of current emissions (47lb of KOH)</p> <p>-Elimination of hazardous materials in production</p> <p>-No net additions (emissions) to the localized airshed</p>
3-D	<p>A pilot facility will be constructed at 3225 Industrial Blvd, West Sacramento, CA 95691</p> <p>No schools or health care facilities are within 1 mile of the proposed project site.</p>	<p>This project is proposed to be in a low-income community that is highly impacted by air pollution.<sup>21</sup> The city has 4 EJ indicators.</p>	<p>-Environmental Impact Report (EIR)(certified) and addendum conclude this project would not result in any new significant environmental effects and would not substantially increase the severity of the previously identified effects.</p> <p>-This project is proposed to be located in an industrial area and is not expected to negatively impact public health of surrounding communities</p> <p>-The ultra-clean FT diesel produced by the project will help clean the air for communities throughout the region</p>
3-E	<p>Existing facility at 2505 North Shirk Road, Visalia, CA 93291</p> <p>Within a 1-mile radius, 1 school and 1 health care facility exists.</p>	<p>This project would not be located in a low-income community that is highly impacted by air pollution.<sup>22</sup> Additionally, the project would be in close proximity to Goshen, a low-income community. The city has 1 EJ indicator.</p>	<p>-Due to the size and limited period of operation of the proposed project, no significant environmental impacts are expected</p>
3-F	<p>Facility expansion at 8550 Fruitridge Road,</p>	<p>This project would be in a low-income community that</p>	<p>-Reduction of air contaminant emissions</p>

20 Emissions numbers from [http://www.biodiesel.org/pdf\\_files/fuelfactsheets/emissions.pdf](http://www.biodiesel.org/pdf_files/fuelfactsheets/emissions.pdf), and <http://www.epa.gov/tier2/amendments/420f06027.htm>

21 California Air Resources Board (ARB), *Proposed Screening Method for Low-Income Communities Highly Impacted by Air Pollution, 2010* (Sacramento, California).

22 *ibid.*

<b>Project</b>	<b>Facility/location</b>	<b>Community</b>	<b>Anticipated Potential Impact (brief summaries based on details in the proposed project descriptions)</b>
	Sacramento, CA 95826  There is 1 school and 1 health care facility within a 1 mile radius of the project site.	would be highly impacted by air pollution. <sup>23</sup> The city has no EJ indicators.	-Increased net GHG offset from to 66 metric tons of CO2/day  -Production (RNG) equal to reduction in the demand for petroleum by 1,550 DGE per day

Source: California Energy Commission staff assessment

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23 *ibid.*

## CHAPTER 6: Acronyms

Air Quality Improvement Program (AQIP)  
Air Quality Management District (AQMD)  
Air Resources Board (ARB)  
Alternative and Renewable Fuels and Vehicle Technology Program (ARFVTP)  
American Society for Testing and Materials (ASTM)  
Best Available Control Technologies Act (BACT)  
Biodiesel (BD)  
California Code of Regulations (CCR)  
California Environmental Quality Act (CEQA)  
Carbon monoxide (CO)  
Compressed natural gas (CNG)  
Emission reduction credits (ERC)  
Environmental impact report (EIR)  
Environmental justice (EJ)  
Greenhouse gas (GHG)  
Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET)  
Fiscal year (FY)  
Fischer Tropsch (FT)  
kilowatt-hour (kWh)  
Localized health impacts (LHI)  
New Source Review (NSR)  
Nitrogen oxide / oxides of nitrogen (NO<sub>x</sub>)  
Non-methane hydrocarbons (NMHC)  
Particulate matter (PM)  
Renewable natural gas (RNG)  
Sulfur oxide (SO<sub>x</sub>)  
Tons per day (TPD)  
Tons per year (TPY)  
Ultra-low-sulfur diesel (ULSD)  
United States Environmental Protection Agency (U.S. EPA)  
Used cooking oil (UCO)  
Volatile organic compound (VOC)  
Well to Wheels (WTW)