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## **Funding Request for AB118 Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP)**

### **INTRODUCTION**

The California Biodiesel Alliance (CBA) is a not-for-profit trade association promoting the increased use and production of high quality, renewable biodiesel fuel in California. CBA membership includes California producers, feedstock providers, marketers and other stakeholders.

This document will serve as an update for the original white paper introduced to the California Energy Commission (CEC) and the ARFVTP Advisory Committee on behalf of the biodiesel industry at the Advisory Committee meeting on September 19, 2012. The purpose of that original document was to demonstrate biodiesel's potential to expand volumes of low carbon fuel used in California and to help the state meet its 2020 goals and 2050 vision<sup>1</sup>.

Based on CEC's own calculations from the [2011 IEPR Benefits Section](#), biodiesel use in California provides 34.7% of results (Table 1) – more than all other modalities – and yet has only received 4.8% of the funding. In comparison, a Cost Benefit Analysis of the numbers from that same section of the 2011 IEPR shows that other programs were 9 to 20 times more expensive in achieving the same goals (Table 2).

We will explain biodiesel benefits with respect to achieving ARFVTP goals; provide an update on current production in California, and propose increasing the share of program funds going toward biodiesel (and other diesel substitutes) projects to match funding levels with achievement metrics based on CEC's own calculations.

Biodiesel is the lowest cost, commercially available low carbon fuel on the market today. It can be produced from diverse low impact feedstocks grown in California, creating in-state jobs. All OEM's support the use of B5, over 75% support B20 (nearly 90% of medium-and heavy-duty truck markets), and there is no increase in NOx in all diesel vehicles sold after model year 2009.

CBA has conducted in-depth industry-wide surveys as well as discussions with CEC staff for more than a year. We have also reviewed CEC's data on biodiesel vs. other technologies that have received funding through the ARFVTP as described in the [2011 IEPR Program Benefits Section](#) (Chapter 11). We have found that the California biodiesel (and diesel substitutes,

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<sup>1</sup> State Alternative Fuels Plan, 2007



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including renewable diesel) industry has been grossly under-funded to date by the ARFVTP, especially relative to biodiesel's further potential to meet stated program goals of displacing petroleum, reducing GHGs, reducing exhaust emissions and creating/maintaining jobs in California. California biodiesel plants historically produce at 30-50% of rated capacity and need help achieving their full potential. Based on the IEPR benefits metric, biodiesel provides the greatest return on taxpayer dollars invested – yet receives the least funding support. As required under AB 109, we urge CEC to re-examine, and update, its analyses for inclusion in the 2013 IEPR.

Based on our ongoing analysis, we continue to develop a better understanding of some inconsistencies in funding. We believe that the current ARFVTP allocation process has misallocated scarce resources, and continue to recommend that an objective, metric based approach be developed that is transparent to all, especially the AB 118 Advisory Committee. By now the Commission must have enough information on each technology's projected performance to present objective and analytical measures to enlighten the decision-making used in the funding allocation process.

## **THE CALIFORNIA BIODIESEL INDUSTRY**

There are currently 9 functioning biodiesel production facilities in California with a combined capacity of 43 million gallons per year (Mgpy). Two more plants are scheduled to begin production this year, bringing the total in-state capacity to 60 Mgpy. These green businesses directly provide approximately 200 family supporting jobs. Based on recent surveys, these plants are expected to produce 26 million gallons during calendar year 2013. This amount represents a theoretical two-thirds of 1% statewide biodiesel blend level within 5 years<sup>2</sup>.

In 2012 California biodiesel plants only achieved a 50% utilization rate. CBA conducted a survey of its producer members that same year to find out what the industry would need in order to expand biodiesel production and utilization. The survey found support for the following items in this order of importance, which our industry believes will increase production to higher capacity levels and ensure greater success of new biodiesel plants:

- 1) Grants and loan guarantees are needed to incrementally expand Ultra Low Carbon Intensity (ULCI)<sup>3</sup> biodiesel production at existing in-state facilities and to create additional capacity (on the order of 15-25%);

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<sup>2</sup> As a percentage of total annual California diesel fuel supply (4 Billion gallons by 2017 projected in the 2011 IEPR)

<sup>3</sup> Ultra Low Carbon Intensity (ULCI) is used in this paper to signify a Carbon Intensity (CI) value of 20 or less. ULCI includes a basket of existing, approved biofuel pathways under the Low Carbon Fuel Standard (LCFS) ranging from 5.9 to 18.44, and provides room for the inclusion of new technology and feedstock pathways. It is not a defined legislative or regulatory standard; it is an objective used for comparison of approaches that will facilitate compliance with the LCFS.



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- 2) As the biodiesel industry expands in California there will be a pressing need for sustainable low ILUC feedstocks. Preliminary work is being done by California academic and commercial institutions, but this is a long lead time item that urgently needs support now; and
- 3) Grants and loan guarantees are needed for new blending and storage infrastructure at petroleum distributors' and terminal racks.

### ULTRA-LOW CARBON INTENSITY BIODIESEL

For 2012/2013, Energy Commission staff indicates that between 73 – 82% of biodiesel produced in California was made from the following feedstock types and associated carbon intensity (CI) values, with a strong predominance toward UCO/YG:

- Used Cooking Oil (UCO) from in-state sources – CI value = 11.76
- Yellow Grease (YG), from in-state sources – CI value = 15.84
- Inedible animal fats (AF) from in-state sources – CI value = 34.11
- Distillers Grain Corn Oil – CI value = 5.9

Both on a volume-weighted, average basis and individually for UCO, YG and Corn, these types of biodiesel are often referred to as Ultra-Low Carbon Intensity (ULCI) fuel. Compared to the CI value of petroleum diesel at 98.03 gCO<sub>2</sub>e/MJ, ULCI biodiesel represents an 88% reduction using UCO, an 84% reduction using YG, and a 96% reduction using DDG corn oil<sup>4</sup>. Approximately 200 Mgpy of biodiesel (5% blend by 2017) can be absorbed at fuel blends compatible with existing vehicles and retail infrastructure.

As the federal Renewable Fuel Standard (RFS2) has moved forward, relative to its pro-rata share of total US diesel consumption, California has lagged behind national biodiesel production and consumption volumes. In 2011 and in 2012, more than 1 billion gallons of biodiesel were produced in the US to meet the RFS2 volume obligations. ARB's Low Carbon Fuel Standard 2011 Program Review Report states:

▀ *"The federal RFS2 requires fuel importers and refiners to blend substantial amounts of biomass-based diesel fuel in the coming years. . . Many of the same companies are obligated parties under both the federal RFS2 and the California LCFS. These entities would appear to have an incentive to blend biodiesel in California because the same activity would help meet RFS2 obligations while also earning credits toward LCFS compliance obligations. **For this reason, it is possible that biodiesel volumes in California could be significantly higher in the future than those reported in previous years or the projection above.**"*

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<sup>4</sup>  $1 - (11.76/94.71) = 87.58\%$



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California contributed less than 3% of national production and consumption to meet this goal compared to a proportional share of 7%.<sup>5</sup> A recent review of low ILUC feedstock availability concludes that there is the potential to substantially increase these feedstocks, but that current supplies in California are insufficient<sup>6</sup>. Considering (i) the availability of current ULCI feedstock types, (ii) ongoing development of new ULCI feedstock types such as algae and (iii) the tremendous GHG/CI value reduction and petroleum displacement benefits (see Table 1) reductions, **California production of ULCI biodiesel should be increased to meet both the mid-term and longer-term goals of LCFS and AB118.**

## COMPARISON TO OTHER FUELS AND TECHNOLOGIES

In an effort to explain our rationale for increased funding for biodiesel (and other diesel substitutes) in the next budget cycle, we have reviewed metrics published in the 2011 Integrated Energy Policy Report Benefits Section (Chapter 11). In Table 1 ***Projected 2020 Alternative Fuels Benefits*** results shown are derived by averaging the **High** and **Low Case** scenarios separately for petroleum displacement, GHG reduction, and air quality benefits. For example Biodiesel is reported with 9.4 and 378.1 million gallons in 2020. These are averaged to 193.75 million gallons. This is done for each funded option. Then all options averages are totaled for 779.55 million gallons in 2020. Then biodiesel's 193.75 million gallons is divided by the total 779.75 yielding 24.85%. In this example biodiesel provides 25% of the ARFTVP's, first funding round, projected 2020 petroleum reductions. Likewise, biodiesel provides 35% of all funded projects 2020 GHG reductions, and so on. As an oversimplification, to illustrate the holistic benefit of biodiesel using the CEC values, if one values petroleum, GHG and Air Quality equally, then biodiesel provides the most benefits, 34.7% of all benefits, from the funding projects in the first round of funding.

Note that biodiesel provides the most benefits, in terms of petroleum displacement, GHG reduction and air quality improvements, yet receives the least amount of funding support of all competing options.

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<sup>5</sup> Based on 2010 CA on-road diesel consumption vs. the on-road national diesel consumption, per EIA

<sup>6</sup> The supply of UCO and AF in California is estimated to be about 100 Mgy. If the in-state production of biodiesel is to expand beyond this, then new feedstocks need to be developed in California or imported from out-of-state. The EPA estimates that there are potentially 500 mgy of recycled corn oil recovered from ethanol production, a portion of which could be imported to California. In-state, research and development of low ILUC feedstocks is focused on algae, brassicas and castor, but other crops and agricultural wastes have potential as well. Additional funding for developing in-state low ILUC feedstocks is needed.



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**Table 1**  
**Projected 2020 Alternative Fuels Benefits**

Fuel Type	Petro Reduct	GHG	Air Quality	Total	% of $\Sigma$ Results	% of Funding
Biodiesel*	25%	35%	44%	104%	34.7%	4.8%
Electric Vehicles	24%	20%	40%	84%	28.0%	36.6%
Biogas	19%	28%	4%	50%	16.8%	20.7%
Natural Gas Vehicles	24%	10%	5%	38%	12.8%	18.4%
Fuel Cell Vehicles	4%	3%	8%	14%	4.8%	13.3%
Ethanol	5%	5%	-1%	9%	3.0%	6.1%
	100%	100%	100%	300%		

\*Modifications were made to biodiesel's Air Quality Results to account for the Air Resources Board's updated emissions and regulations documents: [Guidance on Mixed-Feedstock Biodiesel Production](#) and [California Air Resources Board Guidance on Biodiesel Use](#).

**Based on CEC's own calculations from the 2011 IEPR Benefits Section, biodiesel provides 34.7% of results – more than all other modalities – and yet only received 4.8% of the funding.**

As illustrated in Table 1, the Commission is investing 50% of its funding in electric and fuel cell vehicles. CBA asks the Commission to share the metrics that were used to justify this investment level, in terms of petroleum displacement, GHG reduction, and air quality benefits from the performance of actual projects funded and proposed funding to the Advisory Committee. As the state of California implements its mandates that fleets procure near-zero emission, 2010 model year and newer diesel engines by 2023, diesel engine emissions will decline to virtually zero. De minimis NOx impacts from biodiesel use in older vehicles disappear even as the use of biodiesel increases.

The following table indicates that on an objective cost/benefit basis funding of biodiesel programs is far more efficient. The IEPR Cost Benefit Analysis shown in Table 2 is based upon the data from the 2011 IEPR/ Chapter 11. It shows that the cost of obtaining each percentage of the total benefits obtained by the program expenditures through September 2011 was \$270,000 for biodiesel, compared to an average of \$1,980,000. By comparison all other Fuel Types were 8.9 to 20 times more expensive. We understand that cost-effectiveness is not the only decision factor. However, evidence to date, and a review of past meeting transcripts indicate, that cost-effectiveness has not been used or applied to this program. Should this not be used in some way to guide, not dictate, the funding allocation process?

Table 2: IEPR Cost Benefit Analysis					
Budget Expenditures ending 9/2011 =		\$198.40	(all \$ in millions)		
Fuel Type	% of Results <sup>1</sup>	% of funds <sup>1</sup>	Budget	\$/% of Results	Ratio
Biodiesel	34.7%	4.8%	\$9.52	\$0.27	1.0
Electric Vehicles	28.0%	36.6%	\$72.61	\$2.59	9.4
Biogas	16.8%	20.7%	\$41.07	\$2.44	8.9
NG Vehicles	12.8%	18.4%	\$36.51	\$2.85	10.4
Fuel Cell Vehicles	4.8%	13.3%	\$26.39	\$5.50	20.0
Ethanol	3.0%	6.1%	\$12.10	\$4.03	14.7
	100%	100%	\$198.40	\$1.98	7.2
1. Data from Table 1					

To further illustrate biodiesel's merits we have compared ULCI B5 deployment in California to other technologies in CEC's 2011 IEPR Benefits Section:

- Hydrogen fuel cell (FCV) and Electric (EV) vehicles are estimated to displace 425 gallons of petroleum fuel per vehicle per year. In this direct comparison, a 200 million gallon (B5) deployment in California is equivalent to putting 470,588 FCVs or EVs on the road in the state<sup>7</sup>. Although [HybridCars.com](http://HybridCars.com) reported that only 7146 EVs were sold in the first 7 months of 2012 *nationwide*, if we optimistically assume 10,000 EVs and FCVs will enter the California market each year over the next several years, which is very optimistic, it **would take more than 47 years to accomplish the equivalent petroleum displacement and carbon reduction that ULCI biodiesel blended to B5 in California can achieve near term**<sup>8</sup>.
- According to the [California Fuel Cell Partnership](#) (CaFCP), to accommodate a hypothetical rollout of 53,000 FCEVs by 2017 it will cost \$65 million for 68 stations around the state. [Toyota does not anticipate introducing its first FCEV until 2015](#) and most other automakers regard this technology as about 10 years from being marketable. A B5 implementation of biodiesel **would be equivalent to almost 10x that displacement of petroleum and GHGs** while providing a near term solution. Biodiesel is being produced in the state now and should be expanded to create immediate benefits.
- <sup>9</sup>The average petroleum reduction per heavy-duty natural gas vehicle (NGV) is 7,000 gallons. Heavy-duty CNG vehicles are reported at 11-16% GHG reduction (per mile driven)

<sup>7</sup> 200,000,000/425 = 470,588 FCVs/EVs

<sup>8</sup> 470,588/10,000 = 47.76 years

<sup>9</sup> According to CEC (File Pass of DMV Data), in 2009 60% of natural gas vehicles (NGVs) were heavy-duty (1283 units), 40% were light fleet (consumer vehicles), and 75% of petroleum reduction from all NGVs comes from the heavy-duty fleet (CEC 2011 Total Fuel Use Analysis).



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and heavy-duty LNG vehicles are 1% increase to 4% decrease in GHG (per mile driven) ([CEC Wells to Wheels 2007 Report](#)). **A B5 implementation in California would be equivalent to putting 28,571 heavy-duty NGVs on the road<sup>10</sup>, which would take more than 22 years to accomplish otherwise<sup>11</sup>. And from a GHG-reduction perspective that is equivalent to placing at least 127,819 heavy-duty NGVs on the road<sup>12</sup>.**

- Note: To put this into real-world perspective, this year the California biodiesel industry's estimated production of 26 million gallons is equivalent to putting over 61,000 EVs/FCVs<sup>13</sup> or over 3,700 heavy-duty NGVs<sup>14</sup> on the road in California.

## FUNDING RECOMMENDATION

We recommend that each biofuel be considered and funded in its own category on its own merits and not grouped together as has previously been done in the program. We further recommend that in-state biodiesel (diesel substitutes) production and feedstock and distribution infrastructure development projects receive \$24 million in each of the next two funding cycles, to be allocated as follows:

- \$8.5M – In-state production expansion grants with preference provided to Ultra-Low Carbon Intensity Biodiesel production (defined as CI less than 20 gCO<sub>2</sub>e/MJ) / Implementation of CI-lowering technologies and feedstocks
- \$4M – Low Interest / Loan Guarantee programs for expanding in-state production with a preference provided to ULCI biodiesel
- \$4M – In-state Low Indirect Land Use Change, purpose-grown energy crop research, development and implementation grants
- \$4M – \$0.10/gallon in-state ULCI production incentive program
- \$3.5M – Distribution infrastructure development grants
  - \$1.75M – Large terminals
  - \$1.75M – Wholesale / jobber distribution sites

According to the CEC technology break out in Table 1, there are 6 core technologies; equal funding would suggest 16% per technology area. Biodiesel and Ethanol are the two options funded below the parity level to date. Increasing biodiesel's share to \$24 million in each of the next two funding cycles would start to bring this towards parity. However, we request that the Energy Commission provide an assessment of the projected benefits per the awarded projects to

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<sup>10</sup>  $200,000,000/7000 = 28,571$  heavy-duty NGVs

<sup>11</sup>  $28,571/1283 = 22$  years

<sup>12</sup>  $(87.58/16) - 1 \times 28,571 = 127,819$  heavy duty NGVs

<sup>13</sup>  $26,000,000/425 = 61,176$  EVs/FCVs

<sup>14</sup>  $26,000,000/7000 = 3714$  heavy-duty NGVs





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the Advisory Committee so we can be better informed about how and where to place program emphasis.

In order to achieve this funding increase, we recommend that a 20% incremental amount of funding be re-allocated to biodiesel from the other fuels and technologies funded above the parity line. With this adjustment biodiesel is still 10% under-funded compared to its performance metrics in meeting stated ARFVTP goals, but at this funding level the CEC still retains the ability to fund so-called “transformative” programs that are not yet justified by the metrics.

We also would like to work with CEC to devise and implement a policy for all Program Opportunity Notices to require all proposals to contain a dollar per metric unit improvement analysis.

## CONCLUSION

The Energy Commission’s ARFVT Program has been underfunding biodiesel for several funding cycles while biodiesel has the very real potential to displace 200 Mgy of petroleum fuel if blended at 5% near term. B5 would more than satisfy the diesel fuel LCFS GHG reduction targets through 2016. For carbon reduction and petroleum displacement purposes this would be equivalent to removing almost half a million cars from California roads or putting that many EVs or FCVs on California roads. It is equivalent to taking over 28,000 heavy-duty vehicles off the road or putting that many heavy-duty NGVs on the road. With biodiesel we can achieve in a very short period what these other technologies will take decades to accomplish.

The biodiesel industry strongly believes we must address our energy and climate challenges with multiple solutions. Technologies such as EVs and hybrids have the potential to address California’s light fleet and should be funded in accordance with their proven successes, reasonable potential impact and implementation costs. But in addressing long haul trucking, there is no solution that approaches biodiesel’s effectiveness in the near-, mid- and long-term, and this is borne out when reviewing CEC’s own data.

Based on current data, statewide support for B5 would create another 500 production jobs, not including all of the ancillary employment this industry would generate. In addition to these production jobs, up to 10,000 new agricultural jobs will be created to support biodiesel feedstock cultivation, harvesting and processing.<sup>15</sup>

These jobs would be generated in the highest unemployment areas of the state. These are new jobs growing new crops on underutilized land. In order to produce ULCI biodiesel these feedstocks need to have very low indirect land use change impacts.

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<sup>15</sup> Based upon rotational biodiesel feedstock crop program with Biodico & Red Rock Ranch under CEC grant PIR-11-030





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In conclusion, we wish to express our conviction that improved communication between CBA and CEC is needed to improve the quality of information in policy making circles and the marketplace. In order to keep up with the rate of technology evolution and enable good decision-making, CBA is committed to keeping CEC updated and informed about the progress of our industry, including the benefits of biodiesel and renewable diesels and their potential to meet ARFVTP goals.

We urge your serious and timely consideration of the proposals in the paper, especially the request for funding for California's biodiesel industry and that an objective metric-guided approach be developed, and wish to call attention to the following important facts:

- Biodiesel is the lowest cost, commercially available low carbon replacement fuel on the market today;
- Biodiesel is the most diverse commercial biofuel on the planet. It is produced from agricultural byproducts and co-products such as used cooking oil, waste animal fats, plant oils, and other co-products, and does not compete with food or feed;
- Biodiesel creates in-state manufacturing and agricultural jobs;
- All manufacturers selling diesel vehicles and equipment in the U.S. support at least B5;
- Model year 2010 and later diesel vehicles, known as New Technology Diesel Engines, significantly reduce all emissions in the engine technology, and biodiesel does not increase NOx in these engines, regardless of blend level;
- Biodiesel can be lower cost than diesel, considering current RFS RIN and LCFS credit values; and
- Biodiesel has clear advantages when comparing ULCI B5 to other technologies and fuels in real world settings.

Now is the time to support the California biodiesel industry. We look forward to working closely with the Advisory Committee, CEC staff and commissioners toward that end going forward.