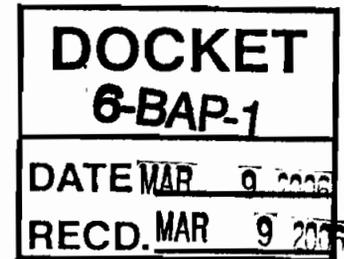




BOSCH

Robert Bosch Corporation
38000 Hills Tech Dr.
Farmington Hills, MI 48331
Telephone 248-876-2930
Telefax 248-876-1439

**California Energy Commission
Bioenergy Interagency Working Group
Thursday, March 9, 2006
Draft Bioenergy Action Plan**



From: William J. Rutecki, Director Diesel Products
Norman Johnson, Director External Affairs
Robert Bosch Corporation

Via: Mightycomm

Reference: Docket 06-BAP-1

Subject: Draft comments for March 9, 2006, California Energy Commission public workshop for Bioenergy Action Plan (formerly called Petroleum Reduction Action Plan and Biofuels Action Plan)

Background

The Bosch Group is a leading global manufacturer of automotive and industrial technology, consumer goods and building technology. Bosch develops, manufactures and supplies precision components and systems – including body electronics, chassis and powertrain – for every major vehicle manufacturer worldwide. Bosch also is one of the automobile industry's leading developers of advanced environmental technology, including work on ultra-clean diesel systems, hybrid powertrain and fuel cell components.

Bosch supports the release of specified and standardized biodiesel fuels in California and the rest of the United States. The caveat is that quality standards for biodiesel and the bio feedstocks remain to be adequately established. Feedstock producers and suppliers, distillate fuel refiners, fuel retailers as well as the automotive industry, government and other stakeholders need to work cooperatively to develop appropriate standards to ensure the long-term success of biodiesel.



As the one of the world's main suppliers of diesel fuel injection systems, Bosch has extensive expertise in the area of fuel quality. The company also has a significant stake in the outcome of the biofuels discussion in California, the United States, and the rest of the world.

We are here today because we believe the California Energy Commission has a significant opportunity to put the state and the nation on a path leading toward the development of a quality biodiesel fuel specification that can lead to a meaningful market share for biodiesel within the next years.

Support for CEC Plan

We have read the draft consultant report, "Recommendations for a Bioenergy Action Plan for California," posted to the CEC web site on March 3, and offer the following comments and recommendations specific to biodiesel as a transportation fuel.

The development, testing and deployment of biodiesel fuel that meets the technical demands of modern ultra-clean diesel engines and the regulatory demands of the California Air Resources Board and the U.S. Environmental Protection Agency is directionally supported by Bosch.

Any biodiesel fuel quality standard that emerges from the effort the CEC is engaging in today must be compatible with the emissions technology that is being developed to meet the strict 2007 (light-duty diesel, Tier 2 Bin 5 [CA LEV II]) and the medium/heavy-duty diesel emissions standards established by the U.S. EPA for 2007 and 2010.

Need for Benchmark "California Biodiesel Quality Spec"

Bosch's central concern is the lack of a national quality standard or specification for biodiesel, which threatens its successful market implementation. This pending threat goes beyond the biodiesel industry. Significant investments have been made by the automotive industry toward emissions-compliant diesels.

Due to the significant contribution diesel is positioned to make towards transportation energy consumption reductions in the future, measures need to be taken to avoid market emergence failures similar to the U.S. light-duty diesel attempt of the late 1970s and early 80s. This light duty emergence was plagued, and cut short, by serious reliability issues that continue to have residual negative image issues for diesels. The spectre of unregulated biodiesel presents the potential result of



negative performance and customer dissatisfaction on a scale of that earlier misstep.

At present we have significant concerns about the effects of non-uniform biodiesel fuel on engines tested in Bosch laboratories. These include:

- Polymers – filter clogging, deposits inside fuel injectors, nozzle coking
- Acids – corrosion, soap formation
- Peroxides – damaged seals

ASTM International, originally known as the American Society for Testing and Materials, has been working on a biodiesel quality standard for many years, trying to address some of the issues outlined in the following graphic:



ASTM D6751 / EN14214 – Relevant Parameters

Property		ASTM D 6751	ASTM D 6751 May 2005 voting	ASTM D 6751 further changes required	EN 14214
	Unit	Limits	Limits	Limits	Limits
Density at 15 °C	kg/m ³	missing		not required for B100 blending	860 – 900
Viscosity at 40 °C	mm ² /s	1.9– 6.0	1.9 – 5.0	5.0 max limit re-ballot for June06	3.5 – 5.0
Water content	mg/kg	max. -500		separate test methods for evaluation of the water content and level of total contamination required	max. 500
Total contamination	mg/kg				max. 24
Copper strip corrosion (3 h at 50 °C)	rating	class 3		class 1	class 1
Oxidation stability, 110 °C, Rancimat test	hours	missing	changes declined	≥ 6.0 h for B20	6.0
Acid value	mg KOH/g	max. 0.80	max. 0.50	0.5 max passed Dec05 ASTM D02, now part of D6751	max. 0.50
Group I (alkali) metals (Na+K) Group II metals (Ca+Mg)	mg/kg mg/kg	missing missing	max. 5.0 changes declined	max. 5.0 Na+K passed Dec05 ASTM D02, now part of D6751 max. 5.0 Ca+Mg passed E0, to be balloted in D02	max. 5.0 max. 5.0



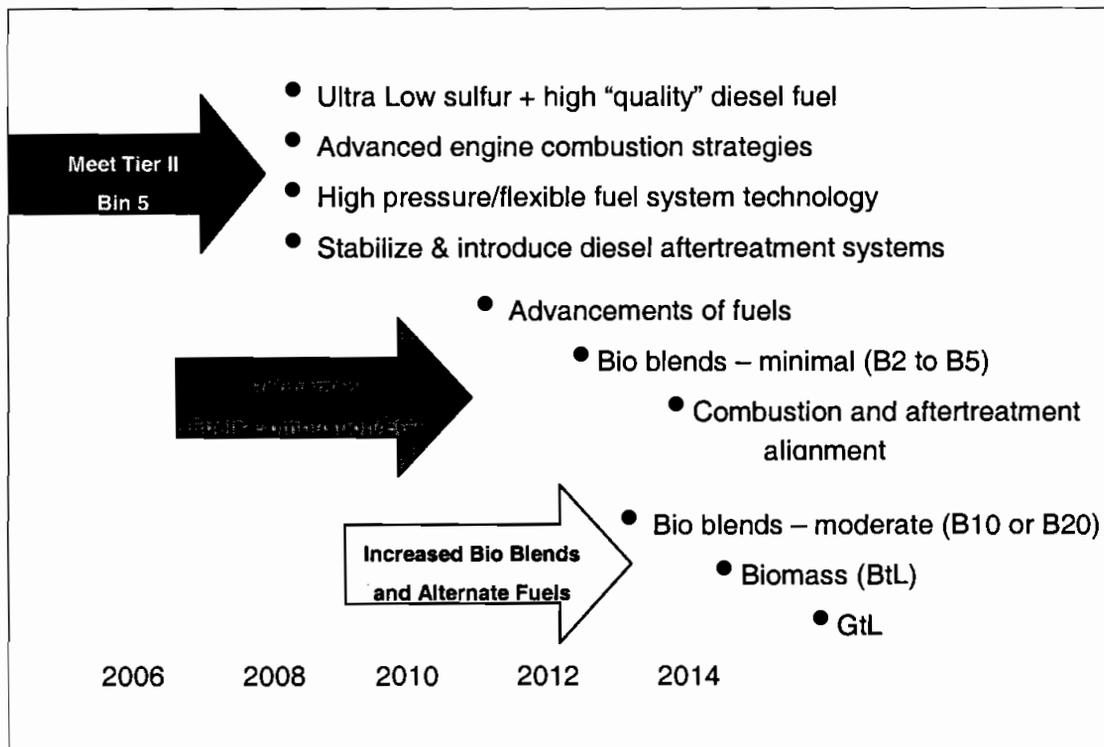
(EN14214 is the European Union biodiesel spec. The feedstock for EU diesel comes primarily from rapeseed [canola]. ASTM 6751 is the ASTM spec for B100, but no spec has been approved for blended stocks.)

A Multi-Step Approach

Bosch believes that there may be a pragmatic and perhaps more manageable approach leading to biodiesel use and its ultimate success in the market. We see a possible path forward that would include: 1) a minimization of the many bio feedstock variables that are currently in discussion and 2) a more focused approach towards defining specifications for a single feedstock on which everyone – including fuel producers, auto and engine manufacturers and suppliers – can agree.

Bosch would like to see a single, benchmark, prime-path biodiesel blend spec developed and tested as quickly as possible, starting with

B2 (<B5). And then work towards higher blends up to B20 at a later stage. We believe this focused, linear approach – as outlined in the graphic below – will actually move the bio fuel stakeholders towards having a defined specification sooner.



Mainstream Soy-Based Biodiesel Spec should be the FIRST STEP

We understand and appreciate the desire of CEC and stakeholders to develop a biodiesel industry that uses feedstocks produced in California. We believe this can be accomplished by taking the process a step at a time, with the first step the development of a biodiesel quality “spec.”

Soy feedstock, the most common and widely available feedstock nationally, seems the logical FIRST STEP, or benchmark, in a quality spec development path. The NEXT STEPS could then be based off the work done with the benchmark spec and address other feedstocks that may be more prevalent in California such as rapeseed (canola), yellow grease or bio-wastes.

In fact, the intent of this recommendation isn't to find only a soy based solution, but to fast-track the overall biodiesel spec development



process. According to survey data released at the recent National Biodiesel Board's annual conference in San Diego, mainstream biodiesel production plants across the nation generally use the following feed stocks:

- 30 soy
- 13 multi-feed stocks
- 5 recycled cooking oil
- 1 palm oil
- 1 cotton seed
- 1 tallow

A benchmark biodiesel spec with soy feedstock has the potential to involve the highest number of mainstream fuel providers and users working in synch toward the common goal of increasing the use of biofuels as quickly as possible. Placing other feedstocks before soy for quality spec development would slow the progression and potentially delay large-scale introduction of all biodiesel blends. Using this approach actually may initially seem counter to the stated goals in the 2005 Integrated Energy Policy Report to reducing petroleum use at accelerated rates by 2020.

Higher-Quality Biodiesel Fuel Means More Biodiesel Fuel Use

Bosch's reasons for supporting a high-quality biodiesel specification are fairly simple:

- The automotive industry is working diligently toward achieving LEVII emissions compliance with light duty diesels. Once LEVII compliance has been met, California stands to benefit in the near term with respect to light duty diesel vehicle petroleum consumption reductions (of 20% to 40%) as well as corresponding reductions (of 15% to 20%) in CO₂ (carbon dioxide) emissions.
- Californian LEV II diesel emissions benefits are being achieved in part by high precision manufactured fuel injection systems, with extremely close fitting components, under some very significant loads or injection pressures. These systems require quality fuels to perform reliably over the lifetime of the vehicle. Moreover, LEVII compliance drives the need and use of diesel aftertreatment systems where little experience relative to their compatibility with biodiesel exists. Therefore, we should not forgo the substantial energy and GHG reduction benefits that clean LEVII compliant diesels can supply near term. But, rather we should be using LEVII compliant diesels as a step forward in



continued evaluation of bio, or alternative fuel assessment and usage.

- These same benefits and reliability concerns apply to medium and heavy-duty vehicles as well.
- An example of this concern was reinforced by a presentation from John Deere at the recent NBB annual conference in San Diego. In testing European Union B100, the fuel injectors on the heavy-duty test engine failed in three out of three tests.
- The introduction of poor quality biodiesel fuels may serve to cast a poor diesel image and thwart Californians' movement toward larger-scale purchases of LEVII compliant fuel efficient diesels.
- Lastly, we would like to see the establishment of a clean, fuel efficient and reliable diesel vehicle market to help create the opportunity for a new biodiesel market, and then take a responsible approach toward further reductions in petroleum dependency in conjunction with quality biodiesel fuels.

Conclusion

The quickest path to a benchmark quality standard that all feedstock blends have to meet is to use soy as a starting point. Then address what might prevent other feedstocks' success in the biodiesel arena. That said, Bosch isn't necessarily advocating the importation of soy into California, but only addressing the starting point for a rapid introduction of biodiesel. In addition, Bosch believes it is critical that fuel-efficient diesels be successfully introduced in the state, and we believe quality biodiesel stands only to further reduce the state and nation's dependence on imported oil.

Recommendations

1. Break down the discussion of biodiesel specs into stages:
 - a) Consider how widespread the biodiesel market is and where it should be by a certain date. As noted in the 2005 IEPR, there is only enough bio feedstock and production capacity in the U.S. for a B2 to B5 blend nationwide. Beyond that there may be certain limited fleet objectives that require higher concentrations or blends of biodiesel, perhaps up to B20 as specified by EPA Act.
 - b) Ask CARB to work with other appropriate state agencies, biofuel producers and automotive industry participants to develop a "California spec" for biodiesel quality in concentrations up to B2, B5 and B20.



- c) Begin this process with a mainstream, soy-based feedstock as a way to fast-track a biodiesel quality spec benchmark for all other feedstocks to follow.
 - d) Require all feedstocks to meet the same quality standards as the benchmark.
2. CARB is drafting an agreement with UC Riverside researchers to test the emissions characteristics of a potential "California biodiesel" that would be produced from state blendstocks. Add to those tests:
- a) Recommend CARB and other relevant state agencies first establish a benchmark "California biodiesel" quality spec.
 - b) Recommend that CARB assess the impact of all biodiesel blends on engine aftertreatment systems. There seems to be very little data on this, in particular the effects on reliability of aftertreatment (particulate filter and/or NOx catalysts) performance after long-term use of biofuels.
 - c) Have soy-based biodiesel emissions testing as the first of many feedstocks in order to establish a baseline understanding of emissions against which all other feedstocks would be measured.
3. Include more automotive industry representatives in the CEC's list of "stakeholders" to insure a complete circle of expert involvement: academic, government, fuel producer, fuel user.

From: "Tom Fulks" <tfulks@mightycommunications.com>
To: "Docket Optical System" <docket@energy.state.ca.us>
Date: 3/9/2006 10:46:31 AM
Subject: Docket 06-BAP-1 Bioenergy Action Plan

Dear CEC staff,

I'm submitting this document covering the comments from the Robert Bosch Corp. regarding the draft Bioenergy Action Plan for the March 9 public workshop of the Bioenergy Interagency Working Group. We'd appreciate having these comments posted to the Bioenergy Action Plan's Documents Page.

Please let me know if you have any questions. Thank you.

Kind regards,

Tom Fulks

Mightycomm Sacramento

916.984.1661

CC: "Rutecki Bill (AP/PJM5) *" <Bill.Rutecki@us.bosch.com>, "Johnson Norman (RBNA/LOE) *" <Norman.Johnson@us.bosch.com>