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April 15, 2009

California Air Resources Board  
1001 I Street  
Sacramento, CA 95812-2815

**Re: Low Carbon Fuel Standard**

Dear CARB:

On behalf of CHOREN USA, we are pleased to provide the following comments on California's proposed Low Carbon Fuel Standard ("LCFS"). CHOREN is a provider of gasification technology that can be used to produce advanced renewable synthetic fuels (including renewable synthetic diesel) that is low in emissions of both GHGs and conventional pollutants. In partnership with Daimler, Volkswagen, and Shell, CHOREN has constructed a commercial scale synthetic fuel plant in Freiberg, Germany, and is currently evaluating broad opportunities in the U.S. market. In these comments, CHOREN urges California to make certain suggested improvements to the proposed LCFS in order to achieve the maximum environmental and air quality benefits and avoid unintended adverse impacts on the operation, performance and fuel-efficiency of vehicles and engines.

**I. NEW PATHWAY FOR "SYNTHETIC DIESEL"**

In the proposed regulations, CARB has only created pathways for the following types of diesel: "biodiesel" and "renewable diesel". (See Table ES-6). In response to a manufacturer's request, the Executive Officer can appropriately modify the CA-GREET model inputs to reflect specific additional fuel-production processes (Method 2A) or to generate an additional fuel pathway using CA-GREET (Method 2B). CHOREN strongly supports ARB's ongoing efforts to establish these needed additional pathways.

CHOREN is working closely with ARB staff to create a new fuel pathway for "synthetic diesel generated from the gasification of woody biomass." Such "synthetic diesel" has a much lower and cleaner "carbon intensity" value than "biodiesel" or other types of "renewable" diesel – both in terms of its production and its ultimate use. CHOREN is continuing to provide ARB staff all the needed technical information to create a well-supported new pathway.

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## II. LCFS TECHNOLOGY ANALYSIS

CHOREN requests that CARB amend the Technology Assessment sections of the Initial Statement of Reasons ("ISOR") to include CHOREN's Fischer-Tropsch biomass-to-liquids ("BTL") technology. We suggest that item 2 on Page III-16 be supplemented to include the commercialization status for CHOREN's BTL synthetic fuel. The expanded discussion of renewable diesel commercialization Volume II of the ISOR also fails to mention CHOREN. CHOREN is in the process of commissioning a 45MWth commercial demonstrator plant for the BTL pathway, and is in the conceptual engineering phase for the next scale-up to a 640MWth facility producing up to 130 million gallons per year of renewable synthetic diesel. Accordingly, we request that Table B-12 on B-37 be supplemented to include the following information:

NAME	LOCATION	CAPACITY	START-UP	STATUS
CHOREN Industries GmbH	Freiberg, Germany	3.9 million gallons/year	Q4/2009	Commercial Demonstrator is in commissioning stage

## III. INNOVATION CREDITS

CARB predicts that large volumes of renewable diesel will be needed to reduce the carbon intensity of the diesel fuel pool 10% by 2020. CARB estimates that five Fischer-Tropsch plants and one hydrotreatment renewable diesel plant each producing 50 million gallons per year will be present in California by 2020.<sup>1</sup> CARB presumably assumes that another roughly 250 million gallons will be sourced from out of state, as its compliance scenarios estimate total advanced renewable diesel volumes of between 524 and 557 million gallons in 2020.

CHOREN looks forward to producing Fischer-Tropsch renewable diesel to meet these anticipated projections. However, CHOREN is concerned that the proposed credit allocation scheme will not properly incentivize the ultra-low carbon (and ultra-clean) fuels needed to meet California's long-term goals under the LCFS. CHOREN is concerned that a linear credit allocation scheme applied to fuels with non-linear cost structures may perversely incentivize higher carbon intensity fuels that provide only incremental improvement. Breakthrough technologies will initially be produced in only very low volumes, and the amount of credits generated by these low volumes may not justify the substantial investment needed to bring

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<sup>1</sup> See Staff Report, Initial Statement of Reasons, Vol. I, p. VII-10 (hereinafter ISOR, Vol. I); Staff Report, Initial Statement of Reasons Vol. II, Appendix F-28 (hereinafter, ISOR, Vol. II).

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advanced renewable diesel to market. As such, CHOREN supports the system of innovation credits recommended for consideration in the UC Berkeley study.

The supporting documentation for the previous draft LCFS (October 2008) stated without explanation that CARB staff recommends that innovation credits not be included in the LCFS. We encourage CARB to revisit this decision and consider the role that innovation credits can play in helping California reach the long term goals of AB 32. In the alternative, CARB should consider a parallel ultra low carbon volume standard as discussed in the March 2008 concept outline.

#### **IV. EMISSION - RELATED PERFORMANCE OF ENGINES**

CARB should develop holistic and integrated regulatory programs that will promote the introduction of fuels that will not contain impurities or damage engines or air quality. We obviously want to avoid a consumer backlash against new low-carbon fuels because vehicles are damaged or fail to perform properly on a new unproven fuel.

Unfortunately, the proposed LCFS does not adequately consider the impact of the mandated new fuels on an engine's performance, its efficiency and its total emissions. For example, the proposed LCFS treats two fuels with identical carbon intensities the same – regardless of whether one fuel has vastly different impacts on an engine's performance and emissions.

CARB recognizes its need to keep with the “spirit” of California law by conducting the functional equivalent of a multimedia pollutant analysis on the environmental impacts of the LCFS. However, CARB does not consider potential air quality benefits, or provide any mechanism for incentivizing or crediting optimum fuels that improve the emission-related performance of conventional fuels.

CARB should establish provisions to incentivize “optimum” low-carbon fuels that are also low in conventional pollutants – sulfur, tar, methane, aromatic hydrocarbons, and other impurities. For example, California should incentivize and promote fuels like “second generation” synthetic diesel derived from a BTL process (such as CHOREN's SunDiesel). Because of these emission benefits, CARB has “verified” Shell's very similar gas-to-liquids (GTL) blends to promote these blends – under CARB's “Emission Reductions for Alternative Diesel Fuels” used in its diesel-retrofit programs. These synthetic BTL and GTL fuels can improve engine efficiency and performance, while dramatically reducing emissions of carbon, particulate matter, hydrocarbons, NOx, and soot and smoke emissions. The attached Daimler GTL study documents the benefits of “synthetic diesel fuels”, even when compared to European sulfur-free diesel. These emissions benefits would be magnified when compared to American ultra low sulfur diesel. In addition, CHOREN's fuel, even if blended in small quantities, offers

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synergistic benefits to the air quality impacts of the blended fuel. For example, a 3% blend would yield far more than 3% better emissions performance as compared to conventional diesel.

California must ensure that the LCFS does not unintentionally promote problematic, dirtier or less-efficient fuels. In the LCFS program, CARB generally recognizes that “as fuels are developed and produced to comply with the LCFS, CARB **can** adopt new specifications or amend existing specifications for such fuels as needed.”<sup>2</sup> In 2009, CARB plans to propose new motor vehicle specifications for biodiesel and renewable diesel – and possibly for E-85 and CNG as well.<sup>3</sup> Before California starts implementing the LCFS program, it must make sure all the different new low-carbon fuels are subject to stringent specifications. Such specifications should respond to the widespread problems with “first-stage” biodiesel that has caused sticking and clogging of critical fuel systems – particularly at cold temperatures. We look forward to working with CARB on the expeditious finalization of these needed fuel specifications.

## V. CREDIT FOR DIESEL EFFICIENCY

The LCFS is intended to be a fuel neutral performance standard. Accordingly, CARB should establish a unitary LCFS that sets an average carbon intensity for the entire fuel pool. The UC Berkeley study, which is heavily relied upon by CARB in this rulemaking, notes that diesel enjoys a 22% efficiency advantage over gasoline and recommends that diesel passenger vehicle drive-train efficiencies be accounted for in the standard. Increased use of diesel fuel in passenger vehicles offers immediate carbon benefits that should not be ignored by artificially bifurcating the LCFS. Below, CHOREN responds to each of CARB’s concerns about a unitary LCFS, or, under a bifurcated scheme, crediting diesel efficiency in light duty vehicles against the gasoline standard.

### A. CARB Objections to a Unitary LCFS

CARB rejects a unitary LCFS and maintains that “a separate standard for diesel would minimize fuel shuffling to diesel as a method of compliance with the LCFS and the health effects associated with dieselization...”<sup>4</sup> CARB argues later in the ISOR that crediting diesel would not achieve the objective of encouraging low carbon fuels.<sup>5</sup> As CARB recognizes that the majority of carbon intensity reductions will come from advanced renewable diesel (which has a much lower conventional emissions profile than petroleum-based diesel), CHOREN believes that both the health effects and fuel shuffling concerns should be addressed by limiting credit eligibility

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<sup>2</sup> See page V-32 and V-33 of CARB’s Initial Statement of Reasons (ISOR) for LCFS.

<sup>3</sup> *Id.*

<sup>4</sup> See ISOR, Vol. I, p. V-5.

<sup>5</sup> See ISOR, Vol. I, p. X-5.

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within a unitary system to clean renewable diesels that exhibit positive emissions characteristics as compared to conventional diesel.

**B. CARB Explanation for Not Crediting Light Duty Diesel**

CARB's explanations for not awarding credits for diesel used in "light duty vehicles" against the gasoline standard are not convincing. CARB reasons that because diesel meeting the 2020 standard would generate only 0.8 million metric tons of additional credits under gasoline (vs. 2.1, 2.8, and 2.9 million credits generated by plug-in hybrid vehicles, battery electric vehicles, and fuel cell vehicles, respectively) that it is not significant enough to warrant awarding credits.<sup>6</sup> Diesel efficiency should not be ignored merely because it would generate less credits than other vehicle-fuel combinations under the gasoline standard. Moreover, CARB should not be making judgments on the value of these credits to renewable diesel producers. If CARB elects to bifurcate gasoline and diesel fuels, it is imperative that CARB at least allow diesel used in light duty vehicles to count against the gasoline compliance standard.

CARB maintains that awarding credits for diesel efficiency would ignore expected improvements in gasoline engine technology that may close the gap in engine efficiencies.<sup>7</sup> Even if this were true, it cannot be used as a basis to justify awarding credits only to alternative fuel vehicles (such as natural gas, electric, or fuel cell vehicles) – as increased gasoline engine efficiencies will also reduce the relative efficiency advantages of other technologies that CARB does credit.

CARB inexplicably justifies the exclusion of diesel efficiency considerations on the basis that it is already credited under the AB 1493 vehicle GHG regulations.<sup>8</sup> Again, while this may be true, this is also true of the vehicle efficiencies for electric and fuel cell vehicles that CARB has elected to credit under the LCFS. Applying efficiency factors to some vehicles and not others would undermine the basic tenets of a fuel-neutral performance standard and compromise the ability of the LCFS to deliver the most economically efficient solutions.

**C. Additional Concerns**

With regard to diesel used in heavy-duty application, CHOREN recommends that the LCFS allow for the possibility that some renewable diesel fuels are more efficient than the conventional diesel they are displacing. The LCFS currently assigns biomass based diesel blends an EER value of 1.0 as compared to conventional diesel, which may be an adequate assumption for most biomass-based diesels. However, we encourage CARB to review the attached study of

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<sup>6</sup> See ISOR Vol. I, p. VI-17.

<sup>7</sup> *Id.*

<sup>8</sup> *Id.*

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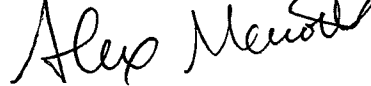
gas to liquids (GTL) synthetic fuels (chemically nearly identical to BTL synthetic fuels), which notes that synthetic fuels have an additional 2-3% efficiency advantage over conventional diesel. This is a significant efficiency difference that also should be accounted for.

## **VI. CONCLUSION**

CHOREN strongly urges CARB to incentivize low carbon fuels that also benefit air quality, improve vehicle efficiency and engine durability. CHOREN also encourages credit allocation schemes that provide a strong long term market signal for advanced ultra-low carbon fuels. Without these provisions, CHOREN is concerned that California may find that its options for carbon reductions from the fuel pool are not appreciably different in 2020 than they were in 2010.

If you have any questions, please do not hesitate to contact us.

Sincerely,

A handwritten signature in black ink, appearing to read "Alex Menotti", with a long horizontal flourish extending to the right.

William M. Guerry  
Alexander D. Menotti