November 10, 2009

Arthur Marin
Executive Director
NESCAUM
89 South Street, Suite 602
Boston, MA 02111

Dear Mr. Marin:

I am writing to share a number of suggestions that members of the National Biodiesel Board (NBB) believe would enhance the Northeast States Center for a Clean Air Future (NESCAF) report, "Introducing a Low Carbon Fuel Standard in the Northeast."

While we have a number of concerns with the report, which are noted in detail in the following pages, we appreciate the hard work of both you and your staff in preparing it and are grateful for the opportunities that have been afforded us to provide input. We hope to be able to continue this positive working relationship well into the future.

If you should have any questions about our comments, please feel free to contact me by phone at 573.635.3893 or by email at sneal@biodiesel.org. Thank you, in advance, for your consideration of our industry's recommendations.

Sincerely,

Shelby Neal
Director of State Governmental Affairs

Indirect Emissions

The NESCCAF report includes several references to indirect emissions resulting from use of biofuels while neglecting to mention possible or potential indirect impacts from any other fuels, including obvious candidates such as petroleum, electricity, and wood pellets. Without offering quantification, these references suggest that certain biofuels may have undesirable indirect emissions as a result of global commodity price changes. In our view, regulatory authorities should not include indirect effects in public policy until the quantification of such impacts are thoroughly understood and accepted by the scientific and regulatory communities. Clearly this is not yet the case; the lifecycle modeler employed by NESCCAF, for example, even states in his report to the agency that land use change "effects are extremely difficult to predict or measure with any accuracy, and are highly uncertain[1]."

The theory of indirect land use change (ILUC) discussed in this report is supported by references from Timothy Searchinger. Mr. Searchinger's theory begins with an assumption followed by speculative quantification that fails to meet the rigors of science to demonstrate the theory's accuracy[2]. In fact, he has been rebuked by the chief life cycle modeler at the U.S. Department of Energy (DOE) who responded to Mr. Searchinger's work by writing, in part, "The Searchinger study is plagued with incorrect or unrealistic assumptions, and obsolete data." Finally, what little real-world data that does exist with regard to this subject would appear to disprove Mr. Searchinger's highly speculative theory. For example, soybean acres planted in Brazil <u>declined</u> by 1.52 million hectares between 2004 and 2008 precisely when the U.S. biodiesel industry <u>expanded</u> from 25 million to 690 million gallons per year.

With regard to electric vehicles, the report speaks repeatedly to their potential benefits and states that available sources of electricity in the Northeast and Mid-Atlantic regions have a relatively low carbon intensity. Since electricity is a widely traded commodity, like soybeans, the theory of indirect effects – if applied consistently – would reveal that additional use of electricity for these vehicles would increase pressure on all sources of electricity nationwide, and possibly even internationally. These indirect effects would increase the price of all electricity, including high-carbon forms in other regions, potentially leading to additional output from these facilities as well as development of new facilities from high carbon sources such as coal.

Finally, the report references European and Canadian low carbon fuel standard (LCFS) programs in section 2.2.6. It should be noted that these governments have chosen not to include indirect land use emissions in their current renewable fuel policies due to a lack of scientific consensus on the subject as well as the absence of real-world data to validate the ILUC theory.

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[1] Requirements for Developing a Low Carbon Fuel Standard for Northeast States, Life Cycle Associates, Page 30.

[2] Please see NBB comments to EPA, September 25, 2009, pages 67-79.

3.1.2. Biofuels (Page 3-4)
The report states, "No advanced, low-carbon ethanol or biodiesel is currently being produced in large quantities." While it is unclear what NESCCAF means by the term "advanced biodiesel," the definition of advanced biofuel in the Energy Independence and Security Act of 2007 (EISA) includes biodiesel with a GHG reduction exceeding 50 percent relative to petroleum. NBB has established in its official comments to the U.S. Environmental Protection Agency (EPA) on the proposed rule implementing the Energy Independence and Security Act (EISA) that all current biodiesel feedstocks meet this definition. This document is attached for your reference.

The figure for 2007 biodiesel production in the U.S. (360 million gallons) should be updated to include the 2008 production level, which was 690 million gallons.

Table 3-9. Key Assumptions for Scenario D2 (Page 3-16)
The following assumption is included in the table: "Estimated total neat biodiesel production from regional waste feedstocks = 6.7 Mgal." This estimate is extraordinarily low, particularly when taking into account that recovery rates for used cooking oil from restaurants are very high in urban areas where demand for biodiesel is present. With more robust demand for biodiesel created by a regional LCFS, it is reasonable to assume a much higher rate of recovery than that which is included in the report – only 10 percent. In our view, 50 percent would be a very conservative estimate. In addition, waste feedstocks such as animal fats, brown grease, and inedible corn oil are not included in the analysis, causing the estimate to be extremely low.

The National Renewable Energy Laboratory (NREL) conducted an extensive report on the availability of yellow and brown grease (attached) [3]. That report concludes that 9.4 pounds of yellow grease and 13 pounds of brown grease are available on an annual, per capita basis. These figures should be used to more accurately forecast the amount of feedstock available in the Northeast and Mid-Atlantic states. NBB estimates that, nationally, these feedstocks can produce more than 900 million gallons of biodiesel. In addition, a report commissioned by the NBB addresses biodiesel from animal fats, which could also be a major contributor of waste feedstock[4].

Finally, while soybean oil is not considered a waste feedstock, some discussion of this raw material is merited in the report since farmers in several Northeast and Mid-Atlantic states produce soybeans. In 2007, approximately 39 million bushels of soybeans were grown in the states of Delaware, Maryland, New Jersey, New York, and Pennsylvania. The oil derived from this crop should certainly be considered a sustainable, regional feedstock.

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[3] Urban Waste Grease Resource Assessment, National Renewable Energy Lab, November, 1998.
[4] Biodiesel: Feedstock Supply, September, 2009.

3.3. Sensitivity of Results to the Carbon Intensity of Biofuels (Page 3-18)

The implication that forthcoming research on indirect emissions could prove that biofuels may be substantially worse than previously thought in terms of carbon emissions is highly speculative. Assuming the outcome before science conclusively proves a hypothesis misleads policy makers who are better served by acting on settled facts. The comprehensive lifecycle inventory of soy biodiesel published by the U.S. Department of Energy in 1998 has stood the scrutiny of more than a decade of peer review. The DOE study showed that biodiesel reduces carbon emissions by 78 percent compared to petroleum diesel. Numerous subsequent studies have confirmed a similar GHG reduction benefit for biodiesel.

While this reduction figure is likely very attractive to policy makers, it should be noted that there have been many advances in efficiency since the report's original publication, thus improving the number even further. The U.S. Department of Agriculture (USDA), for example, recently released an update of the energy balance portion of that study (attached) that shows the energy balance for biodiesel improved from 3.2 units to 4.56 units for every unit of energy invested in the production process – an improvement of approximately 40 percent[5]. The study also predicts that this trend will continue, reaching 5.44 by 2015. This improvement in energy efficiency translates to a reduction in GHG emissions, which is likely to exceed 78 percent compared to petroleum. And even this latest study does not make use of very recent survey data from industry demonstrating still greater efficiency improvements. Please see attached energy consumption surveys from the NBB and the National Oilseed Processing Association showing significant advancements in energy efficiency[6].

Finally, NBB's technical analysis of EPA's approach to modeling indirect emissions for EISA identified several data corrections that are necessary to improve the accuracy of models. By using the EPA methodology with correct numerical data, biodiesel reduces GHG emissions by 99 percent compared to petroleum diesel. This includes EPA's methodology for assessing indirect land use change emissions. Please see the attached comments submitted to EPA as an example of a comprehensive lifecycle assessment that concludes biodiesel's GHG benefit is even better than the DOE study suggests.

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[5] Energy Life-Cycle Assessment of Soy Biodiesel, USDA, September, 2009.

[6] Comprehensive Survey on Energy Use for Biodiesel Production, National Biodiesel Board, 2009; January, 2009 NOPA TESH Committee Recommendations to USB on National Renewable Energy Laboratory (NREL) Database.

3.3.2 Biodiesel (Page 3-20)

The report includes a statement regarding biodiesel which perpetuates a harmful myth relating the production of biodiesel to increased plantings of soybeans. In an effort to set the record straight, it is important to understand that demand for protein meal used as livestock feed is the primary driver for the planting of soybeans since 80 percent of a soybean is comprised of protein meal. Only 20 percent of the bean is comprised of oil. Historically, the demand for protein meal has driven soy production, resulting in a supply of soybean oil that exceeds the demand for food uses (primarily deep frying foods and baking products). The biodiesel industry utilizes this excess oil. And by increasing the value of the oil at the soybean crushing facility, the price of the protein meal is reduced on a proportional basis. In this way, the cost of animal feed is reduced.

3.4.1. Energy Economy Ratio (Page 3-22)

The report contains a highly subjective statement on page 3-22 which is repeated on page A-6, asserting that "liquid transportation fuels are of inherently lower quality" relative to electricity. In our view, this statement is incorrect because liquid fuels are the densest, safest, most economical way to store fuel. For transportation and mobile equipment, storage of fuel is critical. When measuring storage properties, liquid fuel should be compared to batteries, not electricity. When comparing the efficiency of electric motors with internal combustion engines, one must also include the electrical generation where solid or liquid fuel is converted to electricity. In the end, there is little need to disparage either liquid biofuels or renewable electricity. Both should be considered part of the solution to our problem of over reliance on fossil fuels for energy.

3.5. Conclusions from Scenario Analysis (Page 3-27)

The final paragraph of this section states that "Reducing the carbon intensity of transportation diesel by 10 percent in the 2020 timeframe could be more difficult than for gasoline, given that there are fewer apparent near-term replacement options for diesel fuel." This is clearly not the case. While it is true that the outlook for electric vehicles in the diesel sector is rather bleak, the good news is that no additional technology is needed in the diesel sector to meet the 10 percent GHG reduction goal. The requirement could be met by utilizing existing biodiesel capacity and feedstocks[7]. This is to say nothing of technologies and feedstocks, such as algae, that are in various stages of commercial development.

[7] Economic Contribution of the Biodiesel Industry, John M. Urbanchuck, December 16, 2008, Page 2.

4.3.3 Transportation Diesel Fuel and No. 2 Heating Oil (Page 4-11)

I would like to provide some additional context to the following statement, which is found on page 4-13: "Biodiesel can also be used more easily in oil burning furnaces than in highway diesel engines." The U.S. biodiesel industry has strict quality standards that require all commercial biodiesel to meet ASTM D 6751 as a blend stock, D 975 for blends of B5 and lower, and D 7467 for blends between 6 and 20 percent. Federal requirements by the EPA and the Internal Revenue Service also require adherence to D 6751, as do more than 45 state laws enforcing biodiesel fuel quality. Meeting these specifications means that biodiesel is fit for purpose in diesel engines, just as meeting D 396 means it is fit for purpose in heating oil applications. All major original engine manufacturers (OEMs) support the use of B5 and many have or are moving toward approval of blends up to B20. In addition, several OEMs support blends up to 100 percent biodiesel in engines manufactured by their companies.

No. 2 Fuel Oil Used in Space Heating Applications (Page 4-12)

This section (pg. 4-13) of the report discusses the economic advantages to the paper industry of having a ready market for its wood "waste" in the form of space heating. While the NBB does not oppose use of this fuel under a prospective LCFS, it is interesting that one of the benefits of the policy, as stated in the report, would be to enhance the profitability of the forest products industry in the region, yet there is no discussion of potential indirect land use changes. If the profitability of the timber industry is enhanced, would this cause an expansion into additional forest lands, eliminating important carbon sinks? The report assumes this to be the case for soybeans (in several sections) yet fails to mention it as even a possibility in the case of the forest products industry. The report should analyze and treat all fuels in precisely the same manner; anything less results in a demonstrated bias for some fuels and against other fuels.

Inclusion of Home Heating Oil (Page 4-15)

While the report recommends including heating oil in the low carbon fuel standard at some point in time, it is disappointing that it fails to recommend including heating oil from the onset of the policy. This is difficult to understand since: 1) approximately half the diesel fuel used in the Northeast and Mid-Atlantic regions is used as heating oil; 2) blending biodiesel with heating oil to form "Bioheat" would provide immediate benefits in the form of CO_2, PM, and NO_x reductions; and 3) as the report notes in several places, if heating oil is not included in the policy, that fuel sector will become a "dumping ground" for high carbon fuels, thus seriously compromising the efficacy of the LCFS. Finally, the report indicates that the primary reason not to include heating oil in the initial policy is that it "is difficult to track residential fuel." Since most of the companies that sell transportation diesel also sell diesel fuel used for heating applications, this hardly seems like a reason to forgo the substantial benefits of including heating oil in the LCFS policy.

4.4.3 Diesel (Page 4-19)
The report appears to indicate that increased light duty diesel vehicles could reduce carbon emissions while simultaneously increasing other emissions such as particulate matter (PM). It should be noted that diesel emission standards under the Clean Air Act are resulting in increasingly clean diesel engine emissions. The combination of new "clean diesel" vehicles and ultra low sulfur diesel (ULSD) fuel produces a light duty vehicle that is comparable to light duty gasoline vehicles with regard to emissions[8]. The addition of biodiesel further improves the emissions profile of these vehicles.

4.5 Timeframe for the Introduction of the Low Carbon Fuel Standard (Page 4-21)
This section of the report discusses the California Air Resources Board's (CARB) implementation plan. While the NBB views a conservative, back loaded implementation schedule as a prudent approach, CARB's implementation plan is overly conservative to the extent that more biodiesel will not be required under the plan than is currently being used in that state until at least the fourth year of the program. Therefore, the first three years of the program accomplish precisely nothing. As such, we recommend the Northeast and Mid-Atlantic states adopt a more aggressive implementation schedule than CARB has proposed.

4.6.1 Electricity (Page 4-22)
Only by excluding accounting of indirect effects can the Northeast and Mid-Atlantic states claim that they can use increased amounts of electricity for electric vehicles and use only their local, low-carbon, electricity. Increased use of electricity for electric vehicles will raise the commodity price of electricity, incentivizing high-carbon forms of electrical generation. Even if those emissions occur outside the Northeast and Mid-Atlantic states, this region will be indirectly accountable for those additional carbon emissions. As stated earlier, the report should analyze and treat all fuels in precisely the same manner; anything less results in a demonstrated bias for some fuels and against other fuels.

5.1 Overview of Analysis (Page 5-1)
It is important to include the full range of biodiesel feedstocks in order to foster innovation for more and better resource utilization. In 1996, the U.S. government terminated its algal biomass research activities. Research on algae based-fuels did not resume at a meaningful level until the U.S. biodiesel industry built 175 plants all across the country. With the existence of production capacity to refine oil into marketable fuel, privately-funded research projects began studying ways to make new sustainable oils. While most existing plants can use virtually any type of oil

[8] Clean diesel vehicles utilize particulate trap technology, which reduces particulate emissions by more than 90 percent compared to 2004 model year vehicles. These vehicles also employ selective catalytic reduction (SCR) or NOx absorber technologies, which reduce NOx emissions by more than 90 percent compared to 2004 model year vehicles. These technologies require ULSD fuel such as S15 ULSD or biodiesel.

or animal fat, many of them use soybean oil because it is inexpensive, abundant, clean, and makes an excellent fuel. If this feedstock is excluded from the LCFS, the existing industry will contract, fewer refineries will be available to process new oils, such as algae, into fuel, and there will be less motivation to identify and commercialize sustainable oils that could be purchased by these existing companies. Ultimately, a healthy biodiesel industry is needed to drive innovation that may perfect new sources for renewable fuels,

Table 5-7. Advance Biomass Conversion Technologies Under Development (Page 5-13)
The biochemical conversion efficiency of biodiesel is very high. Biodiesel essentially captures solar energy and stores it in a liquid form. For every unit of energy investing in producing biodiesel 4.56 units of energy are produced in the fuel. More details are available in the latest USDA energy balance report, which is attached[9].

5.5 Chapter Summary (Page 5-20)
Please see the attached fact sheet from the NBB regarding biodiesel feedstock supply. Based on this assessment, which predicts the availability of 5.4 billion gallons of domestically produced feedstocks by 2016, an order of magnitude higher than 7 million gallons of waste feedstock would be available for production of biodiesel in the Northeast and Mid-Atlantic states. In addition, it should be pointed out that used cooking oil from restaurants is not the only waste material that should be considered. Animal fats, brown grease, and inedible corn oil should also be considered.

While this section, once again, discusses indirect impacts from crops for use in biofuels, electric vehicles are, once again, championed without any discussion whatsoever of potential indirect impacts. Ultimately, if NESCCAF applies indirect emissions to biofuels, a consistent approach would also consider the indirect impacts of a larger electric vehicle fleet, since the creation of electric vehicles is more energy and resource intensive than new "clean diesel" vehicles. Such impacts could include the mining of rare earth metals from Bolivia, China, and Russia and the recycling or disposal of batteries. Through indirect accounting (which is being applied to crop-based biofuels), the Northeast and Mid-Atlantic states should also include more carbon intensive forms of electricity in other regions (such as Midwestern coal) that may be used as a result of the overall boost in electricity use and resulting commodity price increase. While the NBB does not support inclusion of indirect emissions for any fuels at this point in time, if indirect impacts are to be assessed for one fuel, they should be assessed for all fuels, including electric vehicles where the potential for indirect impacts is quite obvious.

[9] Energy Life-Cycle Assessment of Soy Biodiesel, USDA, September, 2009.

GREET Model Inputs

Transportation of Biodiesel

If NESCCAF modifies the GREET input parameters for transporting biodiesel, the agency should include the high likelihood that 5 percent biodiesel will be transported in cross-country and regional pipelines now that B5 has been included in the D 975 specification for biodiesel, making it a fungible diesel fuel. Large biodiesel production facilities from the gulf coast to New York harbor already exist, or are planned to be built, with direct access to pipelines that can be used to efficiently transport biodiesel.

N2O Emissions

The report mentions that EPA used the DAYCENT model to estimate nitrous oxide emission from agriculture. While it is yet unclear how EPA will quantify N2O emission in the final rule, the agency used several inconsistent methods to compute N2O emissions for biodiesel in the proposed rule. Unfortunately, sufficient data does not exist to accurately apply the DAYCENT model to international emissions because data regarding nitrogen application methods, rates, and timing is insufficient for much of agricultural production that occurs outside the United States.

For U.S. N2O emissions, the FASOM model used by EPA was calibrated to an obsolete U.S. greenhouse gas inventory based on an outdated Intergovernmental Panel on Climate Change (IPCC) protocol for estimating nitrogen emissions. This oversight resulted in a significant over counting of N2O emissions from soybeans. The IPCC has since modified its guidelines to account for the fact that soybeans and other legume crops remove nitrogen from the air and fix nitrogen into the soil where it can be used as a valuable nutrient. This nitrogen fixing is one benefit of growing soybean in rotation with corn. By adding this resource to the soil, soybeans reduce the nitrogen that must be applied to the following year's corn crop.

It is expected that EPA will correct this error in its final rule. NBB estimates this correction will improve soy-based biodiesel's score by 20 percent relative to petroleum-based diesel emissions[10].

[10] For additional information, please see NBB's comments to the EPA on EISA implementation from September 25, 2009.

Land Use Change (LUC)

The report notes that the GREET model does not include LUC for soybeans and states "crop yields for soybean production are one fourth those of corn." In our view, the number of bushels per acre produced by soybeans versus corn is irrelevant. This is a case of over simplifying an analysis to create a comparison and should in no way indicate the land use change potential of either crop. The commodities produced by these crops have different uses and different values. In addition to the product value, soybeans also add nitrogen to the soil. So part of that crop's value lies in soil amendments and not just the crop that is taken to market. Additionally, as stated earlier, 80 percent of a soybean is protein meal. The demand for protein meal drives the planting decisions of soybean farmers. Since oil comprises only 20 percent of the bean, prices for that commodity do not drive planting decisions and therefore are very unlikely to cause land use changes. This is why the GREET model does not include a land use change input for soy.

C.6. Yellow Grease and Inedible Tallow as a Potential Biodiesel Resource (Page C-25)

The report states that "inedible tallow and yellow grease typically have a lower economic value, compared to the other animal fats and therefore are the better candidates for use as fuel." This statement should not imply that other feedstocks are undesirable alternatives to petroleum. It is often desirable to use whatever feedstocks are available locally. NBB, therefore, advises against setting an arbitrary GHG reduction threshold that unnecessarily limits the potential for environmental and societal good from use of domestic, non-petroleum resources.

The National Renewable Energy Laboratory (NREL) conducted an extensive report on the availability of yellow and brown grease (attached and referenced in the NBB feedstock analysis) [11]. That report concludes that 9.4 pounds of yellow grease and 13 pounds of brown grease are available per capita. These figures should be used to provide a more accurate forecast in Table C-16 (page C-27) regarding the amount of potential feedstock available in each of the Northeast and Mid-Atlantic states. NBB estimates that, nationally, these feedstocks can produce more than 900 million gallons of biodiesel. Due to population density, a significant portion of these feedstocks reside in the Northeast and Mid-Atlantic regions.

Finally, it should be mentioned that brown grease is an important emerging technology being pursued by several NBB member companies. Black Gold Biofuels, located in Philadelphia, is an example of one such company. This company is completing the construction of a brown grease biodiesel production facility to be installed at the San Francisco wastewater treatment plant. The City of San Francisco estimates it will save more than $3 million dollars each year by preventing sewage backups caused by brown grease. The City welcomes the economic incentive provided by biodiesel to capture grease before it enters the sewage system. NESCCAF should recognize and encourage such innovations by including brown grease in its biodiesel forecast.

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[11] Urban Waste Grease Resource Assessment, National Renewable Energy Lab, November, 1998.

C.8. Biodiesel (Page C-30)

The National Biodiesel Board maintains a directory of retail fuel stations that offer biodiesel and biodiesel blends (http://www.biodiesel.org/buyingbiodiesel/guide/). The directory currently contains 1,320 retail fueling sites that currently offer biodiesel. Entrants to this database self-report on a voluntary basis, so it likely undercounts the number of actual retail locations.

Concerns with regard to limited rail capacity and barge availability in certain regions for biodiesel shipment can be alleviated by the availability of truck shipment as well as the eventual introduction of biodiesel into pipelines. Therefore, transportation and retail availability should not be seen as obstacles to more extensive use of biodiesel as part of a regional LCFS.

An updated directory of biodiesel production and distributors is also available online at http://www.biodiesel.org/buyingbiodiesel/guide/. Sufficient capacity exists in the U.S. to easily meet the Northeast and Mid-Atlantic states' potential demand for biodiesel. Additionally, plans exist for significant expansion in this 11-state region, should an LCFS that includes a key role for biodiesel move toward implementation.

Biodiesel Feedstocks

The report lacks a comprehensive section regarding the many, varied, and diverse feedstocks currently used for production of biodiesel as well as materials that may be used in the future for production of the fuel. Please see the attached report entitled "Feedstock Supplies for Biodiesel Production" for more information on this subject. The report provides a basis for better understanding biodiesel's potential in both the present and future.