National Biodiesel Board
1331 Pennsylvania Avenue
Washington, DC 20004
(202) 737-8801 *phone*

National Biodiesel Board
605 Clark Avenue
Jefferson City, MO 65110
(800) 841-5849 *phone*

December 22, 2015

Anil Prabhu
Manager, Fuels Evaluation Section
Industrial Strategy Division
P.O. Box 2815
California Air Resources Board
Sacramento, CA 95812

Dear Mr. Prabhu:

We are writing to comment on two recently released fuel pathways that are being considered for approval under the Low Carbon Fuel Standard (LCFS). Thank you, in advance, for your consideration of our views.

As you know, the National Biodiesel Board (NBB) is the trade association that represents the nation's biodiesel and renewable diesel industries. The NBB represents more than 90 percent of the U.S. industry and all major California producers.

We are writing to express concerns about the following pathways:

- Universal Biofuels Private, Ltd., which seeks to produce biodiesel at its facility in Andhra, India from animal fats and used cooking oil (UCO).
- Eco Solutions Co. Ltd, which seeks to produce biodiesel at its facility in Jeongeup, Korea from UCO.

As you know, the GREET model was developed by the U.S. Department of Energy's Argonne National Laboratory to reflect energy use and other variables within the United States. As such, the model cannot be properly utilized for other nations—especially developing nations—without significant modifications. After reviewing the three applications referenced above, we do not believe this fundamental precept has been recognized, the result being inaccurate carbon intensity (CI) values for the respective applicants.

In the case of Universal Biofuels Private's application, India has one of the world's highest rates of energy loss during electric transmission—24.5% versus the GREET default of 8.1% for the United States. This 16.4% difference is not factored into the application. Nor is India's reliance on imported, carbon intensive liquefied natural gas. While we have attached a more detailed analysis, these two issues alone suggest a new, more comprehensive review by Air Resources Board (ARB) staff is merited.

With respect to the Eco Solutions Co. Ltd. application, the fact that Korea is the world's second largest importer of high-CI liquefied natural gas is not accounted for. Nor is the fact that most, if not all, of the used cooking oil will need to be imported into the country before processing and later export to California. The correct carbon intensity of the fuels used for biodiesel processing and the true extent of the feedstock and fuel shuffling underpinning this business model are not reflected in the pathway application.

In our view, the ARB should not process foreign applications without fully understanding the key variables within each respective country. It seems improper to apply the highest possible level of scrutiny to domestic carbon intensity values—entire scientific workgroups have been devoted to this objective—only to then accept favorable gross generalizations for foreign producers. An equal degree of scientific rigor should be applied to all applications to ensure that the program is actually meeting its goals and to minimize fuel and feedstock shuffling.

More generally, we do not believe additional foreign pathways for waste feedstocks should be approved until a comprehensive Monitoring and Verification regulation has been developed and implemented to help ensure the integrity of these fuels.

High credit prices of up to $1 per gallon combined with little applicable enforcement, creates a fertile environment for fraud, especially from foreign companies. While current enforcement mechanisms seem adequate for domestic producers (who are also subject to criminal prosecution by U.S. EPA and the Internal Revenue Service), foreign entities face no real threats since they operate outside the jurisdiction of U.S. and state governments. Furthermore, unlike EPA, the ARB does not require a detailed collection plan to demonstrate the integrity of used cooking oil pathways. Nor does ARB have in place a bonding requirement to ensure that funds are available to help pay government fines and restitution in the event of fraudulent activity.

Beyond enforcement, there are lingering questions about social license that should be resolved. Biofuel facilities in India and Asia, for example, operate under a far different social contract than U.S. and Canadian producers. A July, 2015 Wall Street Journal article entitled "Palm Oil Migrant Workers Tell of Abuses on Malaysian Plantations"[1] sheds light on practices in developing nations that, according to the U.S. Department of Labor, include "forced labor." In addition, the Roundtable for Sustainable Palm Oil was recently criticized for "widespread fraud, collusion," and "conflicts of interest"[2].

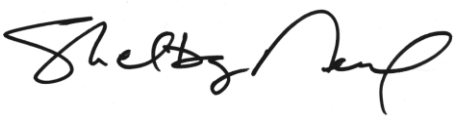
[1] http://www.wsj.com/articles/palm-oil-migrant-workers-tell-of-abuses-on-malaysian-plantations-1437933321
[2]http://www.theecologist.org/campaigning/2986342/sustainable_palm_oil_rspos_greenwashing_and_fraudulent_audits_exposed.html

All of this underscores concerns about how used cooking oil is defined and exactly what is being shipped from distant lands to California's shores as a low carbon fuel. One would not have to think long nor hard to develop a scheme whereby virgin palm oil or palm fatty acid distillate (PFAD)[3] quickly and inexpensively became UCO fit for LCFS credit generation. This concern is highlighted when sizeable production facilities apply for UCO pathways from regions that produce (1) small volumes of used cooking oil and (2) large volumes of palm oil.

In sum, we believe there are significant questions related to foreign producers and their waste feedstocks even beyond proper GREET modeling that should be considered within the context of a Monitoring and Verification regulatory process before these applications are provided further consideration. We agree with the ARB that the next logical step for LCFS implementation should be a strong enforcement regulation and look forward to participating in that process.

Once again, we wish to thank you for the opportunity to comment. If we can answer any questions or provide additional information, please feel free to contact us at any time.

Sincerely,



Shelby Neal
Director of State Governmental Affairs

Cc: Richard Corey, Executive Officer
Sam Wade, Chief, Transportation Fuels Branch

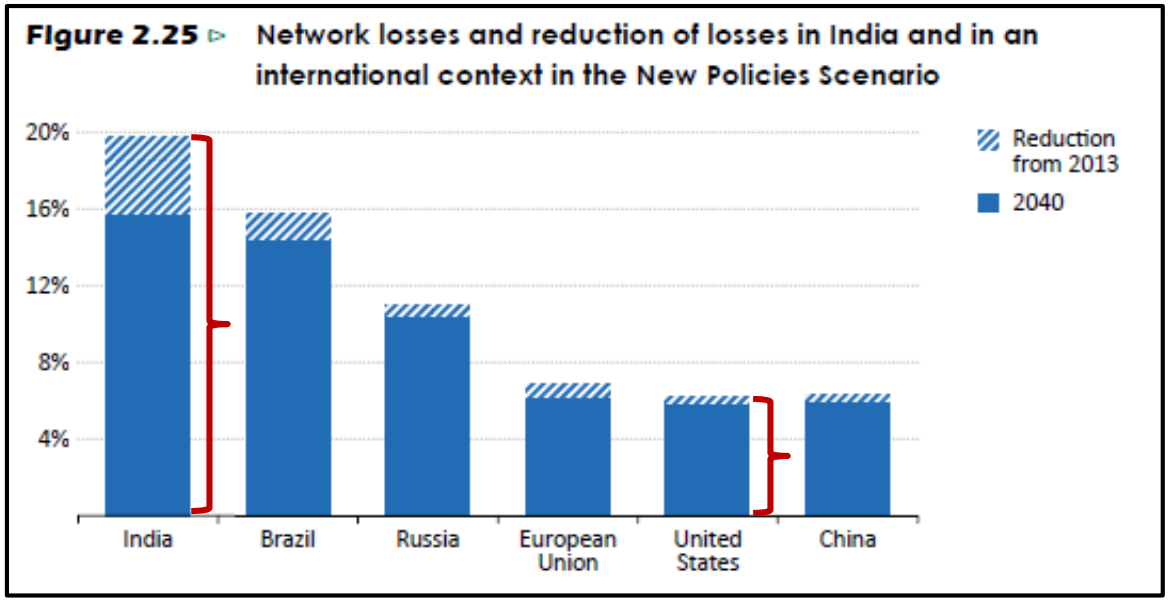
[3] Palm Fatty Acid Distillate (PFAD) is a co-product of palm production that is generally recognized as the same as virgin palm oil for purposes of carbon accounting.

Further Comments on Universal Biofuels Private, Ltd. Application

Lifecycle analysis has a spatial dimension to it. It is more than just what is done; where it is done is also important. This is recognized in the CA GREET model where options exist for different electric power grids to be used. However, more than just electric power generation mix varies from one region to another.

According the U.S. Energy Information Administration (EIA),[4] India had 249 gigawatts of installed electricity generation capacity connected to the national network, but because of insufficient fuel supply, power generation and transmission capacity, the country suffers from a severe electricity shortage, which causes rolling blackouts. Transmission and distribution losses and technical problems in moving electricity between various states also impairs system reliability. In other words, India has a much different and much less modern system than the United States.

The IEA released a report entitled "India Energy Outlook" in November of 2015[5]. The report includes data for the energy sector in 2013. It states that "India's network suffers from one of the highest shares of loss (of electricity generation) in the world". This is illustrated in the following figure.

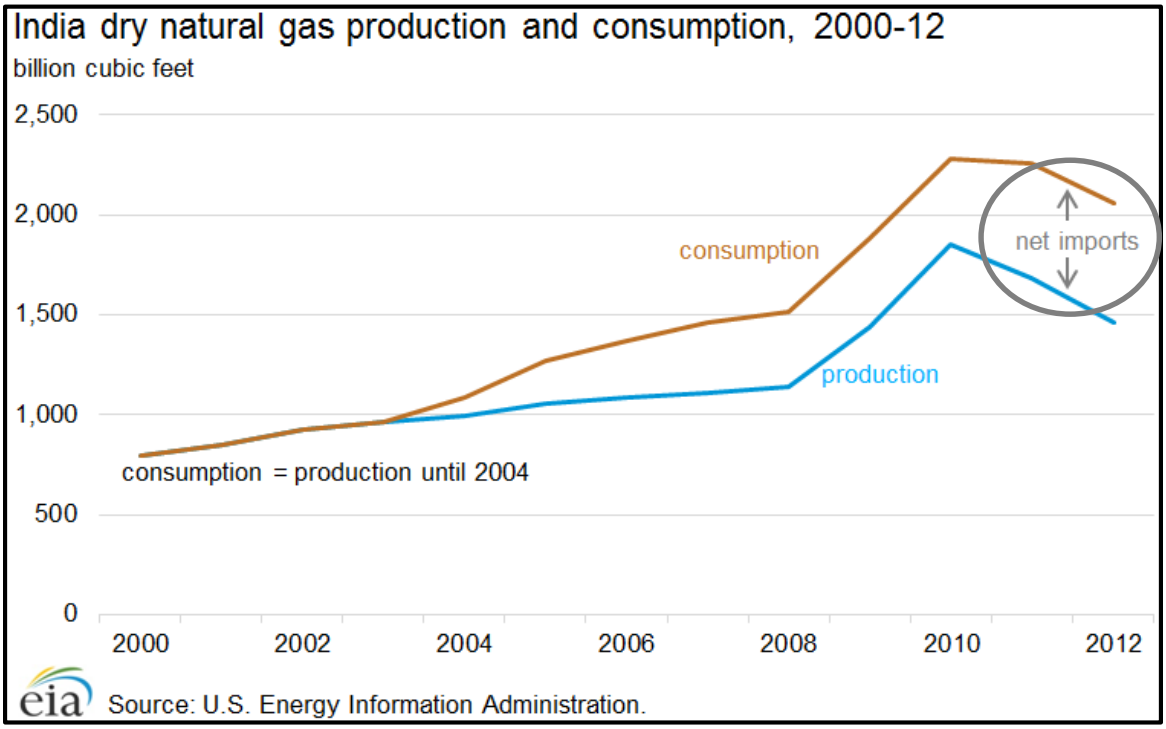


The losses in the GREET model are 8.1%, and so even if the India fuel mix is used the emissions are 12% less than they actually are because the loss factor is significantly underestimated in the model. The India Statistics Office[6] reports even higher transmission losses for 2012-2013 of 24.5%.

[4] US EIA. India. http://www.eia.gov/beta/international/analysis.cfm?iso=IND
[5] IEA. India Energy Outlook. November 2015.
http://www.worldenergyoutlook.org/media/weowebsite/2015/IndiaEnergyOutlook_WEO2015.pdf
[6] India Central Statistics Office. Energy Statistics 2015.
http://mospi.nic.in/Mospi_New/upload/Energy_stats_2015_26mar15.pdf?status=1&menu_id=243

The EIA summarized the natural gas supply situation in India as follows:

> *Natural gas mainly serves as a substitute for coal for electricity generation and as an alternative for LPG and other petroleum products in the fertilizer and other sectors. The country was self-sufficient in natural gas until 2004, when it began to import liquefied natural gas (LNG) from Qatar. Because it has not been able to create sufficient natural gas infrastructure on a national level or produce adequate domestic natural gas to meet domestic demand, India increasingly relies on imported LNG. India was the world's fourth-largest LNG importer in 2013, following Japan, South Korea, and China, and consumed almost 6% of the global market, according to data from IHS Energy.*



The Universal CI application does not account for the increased emissions associated with LNG and thus underestimates the CI of the biodiesel produced. The IEA report forecasts significantly increased LNG imports in the future as the fuel becomes a more important component of India's natural gas supply.

In the refined petroleum products sector, India has a reputation for high energy intensity[7]. In the following figure, the CEL is calculated as follows:

$$\text{CEL Index} = \frac{\text{Actual Energy Consumed + HC loss} \quad x100}{\text{Allowance for (Energy + HC loss)}}$$

[7] Narayana. Benchmarking. http://petrofed.winwinhosting.net/upload/13nov09/SessionI/2_Narayana_CHT.pdf

The benchmark value is 100 and the results for Indian refineries are shown in the following figure. Whereas U.S. refineries would be close to the benchmark, some Indian refineries use twice the benchmark energy consumption. So this is another area in which the use of the GREET or CA GREET models for biodiesel production in India would significantly understate the true carbon intensity of the product.

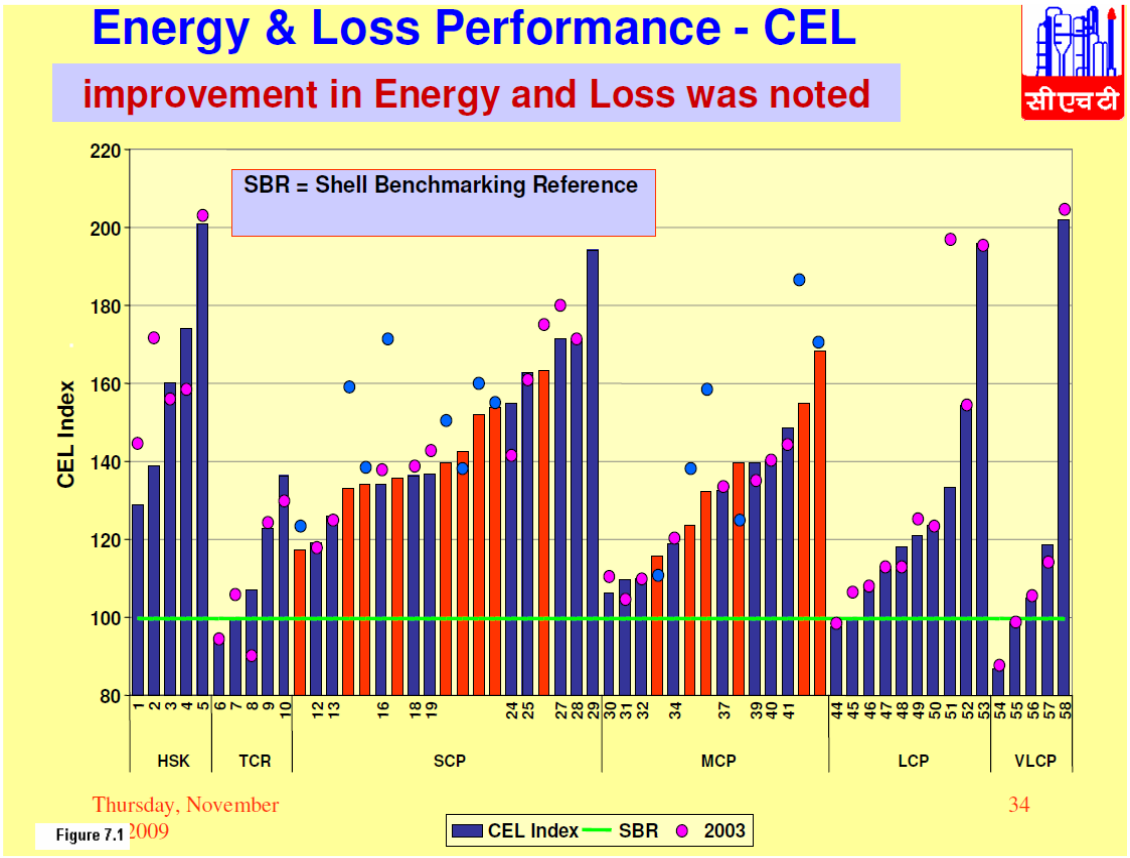


Figure 7.1

Further Comments on Eco Solutions Co. Ltd. Application

As stated previously, lifecycle analysis has a spatial dimension to it. It is more than just what is done; where it is done is also important. This is recognized in the CA GREET model where options exist for different electric power grids to be used. However, more than just electric power generation mix varies from one region to another.

In the case of South Korea, the natural gas supply system is completely different than that which exists in the United States. The U.S. EIA summarizes the South Korea[8] gas situation as follows:

> *South Korea relies on imports to satisfy nearly all of its natural gas demand, which has nearly doubled over the past decade. Although the country possessed discovered proved reserves of 250 billion cubic feet (Bcf) as of the end of December 2014, according to OGJ, domestic natural gas production is negligible and accounts for less than 1% of total consumption. South Korea does not have any international natural gas pipeline connections and must therefore import all gas via LNG tankers. As a result, although South Korea is not among the group of top natural gas-consuming nations, it is the second-largest importer of LNG in the world after Japan.*

The Eco Solutions pathway application makes no adjustment for the liquefaction of natural gas or the transport of the LNG from its source to Korea. It therefore underestimates the emissions for all processes that use natural gas for the production of biodiesel.

In terms of feedstock, the Eco Solutions Co. Ltd. application is designed around the use of domestic used cooking oil (UCO). The plant has a capacity of 85 million litres per year, and while the yield has been redacted in the application, it is likely that the plant requires 80,000 tonnes/year of used cooking oil. A recent paper by Cho et al[9] included the following figure.

[8] South Korea. https://www.eia.gov/beta/international/analysis.cfm?iso=KOR

[9] Sangmin Cho, Jihyo Kim, Hi-Chun Park, Eunnyeong Heo, Incentives for waste cooking oil collection in South Korea: A contingent valuation approach, Resources, Conservation and Recycling, Volume 99, June 2015, Pages 63-71, ISSN 0921-3449, http://dx.doi.org/10.1016/j.resconrec.2015.04.003

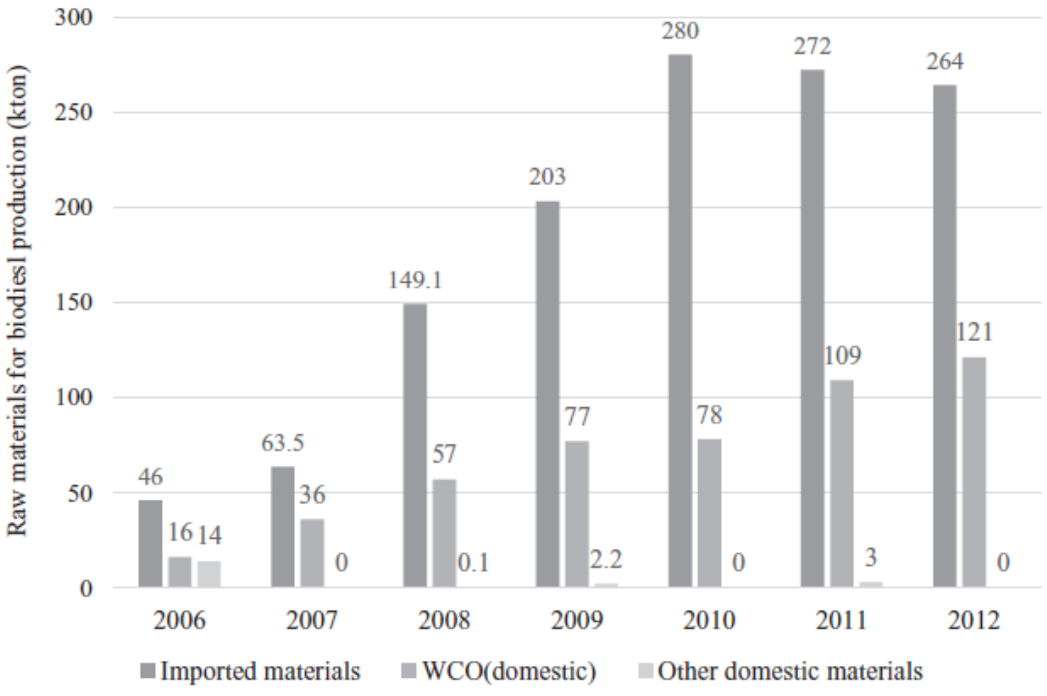


Fig. 1. Biodiesel feedstock in South Korea (2006–2012).
Source: Korea Bio-energy Association (http://www.kbea.or.kr).

This chart indicates that less than one third of the available supply of used cooking oil in Korea was domestically sourced and that the domestic availability is only slightly higher than the Eco Solutions requirements. The 2010 USDA Gain report for Korea Biofuels reported the biodiesel production capacity as 800,000 tonnes per year.

Since the Air Resources Board has already approved a UCO to biodiesel pathway for Dansuk Industrial that also requires 80,000 tonnes of domestic UCO, there does not appear to be sufficient domestic feedstock for both facilities.

The ARB should not approve the Eco Solutions Co. Ltd. pathway application because the GREET modeling does not represent the actual natural gas supply in Korea and there are major discrepancies with regard to the availability of domestic used cooking oil that need to be resolved.