April 8, 2022

Rachel Assink
Rulemaking Lead
Washington State Department of Ecology
P.O. Box 47600, Olympia, WA 98504-7600

Re: Clean Fuels Comments on Clean Fuels Standard Rulemaking

Dear Ms. Assink:

Thank you for the opportunity to provide comments on the draft Clean Fuels Standard (CFS) rulemaking, which was discussed at a workshop held by Department of Ecology (Ecology) staff on March 15, 2022. As the U.S. trade association representing the entire biodiesel and renewable diesel value chain, including producers, feedstock suppliers, and fuel distributors, the Clean Fuels Alliance America (Clean Fuels) and Renewable Energy Group (REG) are pleased to offer the following comments for your consideration.

Clean Fuels, REG, and other Clean Fuels members have been fully supportive of efforts to address climate change and has been a strong partner in Washington state, California, Oregon, and many other jurisdictions that have developed or are developing programs to reduce climate impacts from the use of petroleum fuels. We applaud Ecology's efforts to develop the CFS program pursuant to HB 1091 (Fitzgibbon, 2021). Implementation of the CFS program will complete the world's largest carbon market on the West Coast and will position Washington state on a path to meeting its near and long term climate change, air quality, and environmental justice (EJ) objectives.

Biodiesel and Renewable Diesel Provide Important Low-Carbon Fuel Benefits in the Most Difficult to Decarbonize Transportation Sectors

Currently, 3 billion gallons of biodiesel and renewable diesel are used in the U.S., which is expected to grow to 6 billion gallons by 2030 (likely several years before then) and, with additional innovations in feedstock supplies, to 15 billion gallons by 2030.[1] The domestic biodiesel industry supports $20 billion in economic activity, which translates to nearly 82,000 well-paying jobs and $3 billion in annual wages. In Washington state alone, our industry

[1] Clean Fuels 2020 Vision, https://www.nbb.org/about-nbb/mission-vision, accessed April 8, 2022.

supports 3,200 jobs and $780 million in economic activity, including $116 million in annual wages.[2]

Not only do biodiesel and renewable diesel provide substantial economic benefits, they also provide the single largest source of GHG reductions in the clean fuels programs in California and Oregon. Our industry's fuels combine to provide about 45% of the carbon reductions in California's Low Carbon Fuel Standard (LCFS)[3] and are forecasted to provide over 54% of the reductions in Oregon's Clean Fuels Program (CFP) [4] in 2021 and 2022, more than any other fuel including electricity, hydrogen, and renewable natural gas. Importantly, those carbon reductions are happening now in the most difficult to decarbonize sectors (heavy duty on- and off-road vehicles, marine, rail, and aviation), not many years from now as would be expected with longer-term decarbonization strategies like deep electrification. Studies have shown that getting deep carbon reductions in the immediate and near future provide much more climate and societal benefits than getting the same amount of reductions 20 or more years from now (sometimes referred to as the "time value of carbon").[5]

In addition to GHG benefits, biodiesel and renewable diesel provide substantial reductions in co-pollutants, especially diesel particulate matter (diesel PM). As noted in the recent Trinity Study,[6] the replacement of petroleum diesel with biodiesel in 27 high-diesel use sites evaluated across the country can reduce cancer incidences by nearly 9500, premature deaths by more than 910 per year, asthma cases by over 456,000 per year, and other health benefits, all totaling $7.7 billion annually from avoided health costs. In Seattle and Everett alone, the Trinity Study shows a switch to biodiesel would decrease diesel PM exposure significantly, reducing premature deaths 37 each year, asthma attacks by 29,000 each year, and lost workdays by over 6000 annually, all totaling over $300 million in avoided health costs each year (Figs. 1 and 2).[7]

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[2] The Economic Impact of the Biodiesel Industry on the U.S. Economy, LMC International, https://www.eenews.net/assets/2016/06/30/document_gw_01.pdf, accessed April 8, 2022.
[3] LCFS Quarterly Data Summary, https://ww2.arb.ca.gov/sites/default/files/2022-01/quarterlysummary_013122_0.xlsx, accessed April 8, 2022.
[4] Oregon 2022 Clean Fuels Forecast, https://www.oregon.gov/das/OEA/Documents/Clean%20Fuels%20Forecast%202022.pdf, accessed April 8, 2022.
[5] See, e.g., Frank, J. et al., "Quantifying the Comparative Value of Carbon Abatement Scenarios Over Different Investment Timing Scenarios," State University of New York College of Environmental Science and Forestry, https://www.sciencedirect.com/science/article/pii/S2666052021000108, May 30, 2021, accessed April 8, 2022.
[6] See https://www.biodiesel.org/news-resources/health-benefits-study, accessed April 8, 2022. [Note, the 27 sites includes 15 sites under Phase 2, which is expected to be finalized in mid-April 2022.]
[7] See Phase 1 of the Trinity Study, https://www.biodiesel.org/docs/default-source/trinity-study/trinity-nbb-tranportation-health-risks-review-v1-03.pdf?sfvrsn=ec0f774a_2, accessed April 8, 2022.

Fig. 1. B100 Benefits in Everett, WA

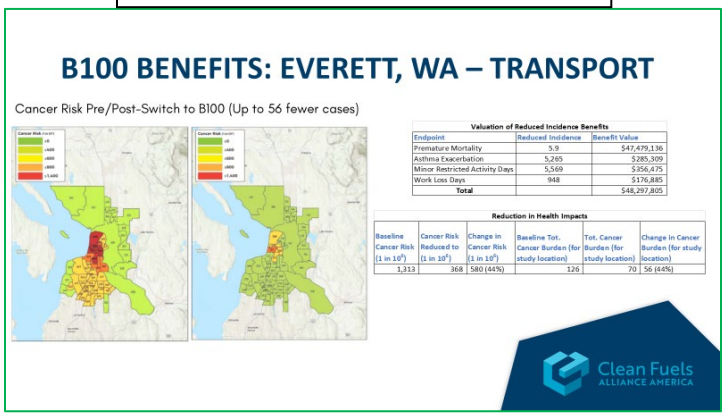
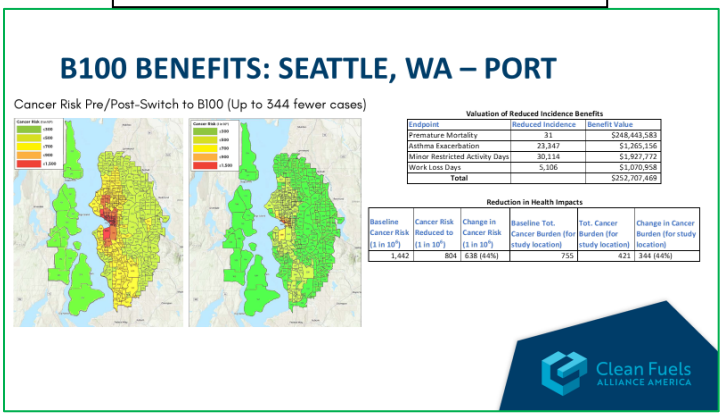


Fig. 2. B100 Benefits in Seattle, WA



<u>Support for 10% Compliance Curve Reduction in 2034</u>

Clean Fuels supports a robust and rapidly declining compliance curve. Our members and other providers of liquid, gaseous and non-carbon alternative transportation are rapidly increasing production while simultaneously decarbonizing their supply chains. Our industry has seen how well-considered policy that creates long-term certainty can be incredibly effective in driving innovation and emission reductions. Unfortunately, in recent months we have also seen in the California marketplace private sector innovation's outstripping the regulatory ambitions, leading to a precipitous decline in credit value. To ensure the development of lower-carbon energy sources continues to advance and accelerate, we strongly encourage Ecology to implement the aggressive 'green dashed line' scenario contained on slide 15 of the staff presentation.[8] In addition to creating certainty for the marketplace, this more aggressive compliance schedule appears to hue more closely to the required rate of decarbonization expressed by the IPCC. Further, the more aggressive compliance curve would make Washington's carbon intensity decreases begin to approach recent proposals from both California[9] and Oregon.[10] Oregon is even exploring a carbon intensity reduction of <u>37%</u> by 2035. Given the robust natural resources of Washington State including biomass, hydro, and others, the state is in a better position than most to implement an aggressive rate of decarbonization.

[8] See slide 15, https://ecology.wa.gov/Asset-Collections/Doc-Assets/Rulemaking/AQ/WAC173-424_455_-21-04/Presentation-WAC-173-424-03-15-22, accessed April 8, 2022.
[9] See 2022 Scoping Plan Update - Initial Modeling Runs, https://ww2.arb.ca.gov/sites/default/files/2022-03/SP22-Model-Results-E3-ppt.pdf (indicating CI reduction of 25% by 2035 was modeled for at least one of the four modeling scenarios), accessed April 8, 2022.
[10] See Proposed Targets for 2022 Clean Fuels Program Expansion Rulemaking, https://www.oregon.gov/deq/rulemaking/Documents/cfp2022m3Targets.pdf (proposing a 20% CI reduction by 2030 and a <u>37%</u> reduction target by 2035), accessed April 8, 2022.

Ecology Should Grandfather Tier 2 Pathways Already Certified in California or Oregon, Not Delay Their Certification Until 2025

We understand and appreciate Ecology's desire to move rapidly to implement the Clean Fuels Standard Program. However, we are concerned that Ecology may inadvertently slow innovation and the adoption of lower carbon fuels in the state of Washington by delaying the certification of Tier 2 pathways until 2025. We encourage the department to reconsider this and begin using at the start of the CFP program those Tier 2 pathways that have already been certified in California or Oregon.

Under the current proposal, several pathways that are currently in commerce today would be delayed unnecessarily for use in Washington State if staff delays the ability for facilities to register. For example, key credit generating pathways such as propane, which is co-produced alongside conventional renewable diesel feedstocks (Tier 1), is listed as a Tier 2. In reality, both of these fuels rely on the same information and calculations to determine the carbon intensity. Similarly, renewable naphtha, a gasoline blendstock that can be blended above E10 & E15, is co-produced alongside renewable diesel and propane; the current proposal does not specify if this will be treated as a Tier 1 or 2. Finally, producers such as World Energy produce sustainable aviation fuel from what can reasonably be described as the renewable diesel process using conventional feedstocks. The only difference is their process units are optimized for jet fuel, not diesel fuel. Again, like the propane and naphtha, there is no practical difference to the data required to generate a carbon intensity, nor is there a difference in the carbon intensity calculation. Nonetheless, these three drop-in fuels would be restricted from generating credits in Washington State for several years.

Outside of the various products generated from the renewable diesel process, Clean Fuels' members are also pursuing incredibly innovative ways to reduce their carbon intensity. For example, in part because of the signals and certainty created by these policies, biofuel companies are installing wind and other forms of renewable energy onsite to lower their carbon intensity.[11] It is unclear if these plants which rely on alternative, lower-carbon energy will be allowed to register prior to 2025.

We strongly recommend that the Washington take a different approach and, at a minimum, allow Tier 2 pathways that have been approved in California or Oregon to be recognized in the Washington State program until a formal process to approve Washington state-specific Tier 2 pathways can be created. Considering the highly conservative nature of the data contained in California's current version of GREET compared to the best available data contained in GREET 2021, we believe this should provide confidence to the department that it is not allowing excessive credit generation.

[11] Wind turbine in Albert Lea Powers REG Biorefinery | Renewable Energy Group (regi.com)

Strong Concerns Regarding Specified-Source Feedstock Provisions

In a related matter, Clean Fuels strongly discourages Ecology from delaying the use of so-called specified source feedstock until 2025. As discussed above and as outlined more below in our comments on life cycle accounting, Washington state should allow for currently certified California carbon intensities of Tier 2 and/or specified source feedstocks to be registered in the state immediately. We are unsure why the state would delay certification of some of the lowest carbon pathways for two and a half years after the program begins, especially when these pathways have been thoroughly vetted and approved by other West Coast jurisdictions.

Enforceability of Co-Processing Provision Is Critical

Clean Fuels understands that Ecology is looking for all opportunities to decarbonize the Washington's energy sector, including the co-processing of small amounts of biomass in the large petroleum refineries within the state. In fact, this may be an important pathway for future feedstocks like high-oxygen biocrudes derived from cellulosic biomass (e.g. dead wood). However, we encourage staff to be hyper vigilant when creating monitoring, reporting, and verification requirements for these co-processing pathways. Due to the nature of co-processing, it is critical that Ecology require the renewable content claimed by an oil refinery to be verified on a frequent and regular basis using measured results, such as C-14 radiocarbon assay, applying consensus methodologies developed by ASTM International for this purpose. This is critical to determining the true amount of renewable content in a predominantly petroleum fuel. Without direct, measured results, it is highly likely that that these facilities will inadvertently (or purposefully) over generate CFS credits. Requiring refineries to test their fuel for renewable content is not only consistent with current practices in California and Oregon, it will also ensure that carbon that is lost through CO_2, CO, or is converted to light-ends which do not end up as a transportation fuel are not assigned CFP credits.

In addition to ensuring that the renewable content actually ends up in a transportation fuel and not as non-energy waste like CO_2, testing will ensure that the renewable content is assigned to the correct fuel type, not the one that is deemed most financially attractive by the refinery. Assigning the renewable content to the correct fuel (gasoline, diesel, kerosene, LPG, etc.) is critical for two reasons:

1) Each fuel has its own unique energy density. Making sure this is correct helps ensure that the right amount of *energy* is actually being claimed. This is important as the energy density of these fuels can be significantly different.
2) Ensuring the biomass-based content is assigned to the right fuel pool not only ensures the energy density is correct, but it also ensures that the correct amount of credit is being generated. For example, if a co-processor claimed all the biomass preferentially went to diesel, when in reality it all went to jet fuel, this would result in over generation of credit because the fossil fuel baselines for these two fuels are significantly different (Table 1).

Table 1.

Illustrative Credit Generation Scenarios				
	Diesel	**Jet Fuel**	**LPG**	
Biofuel CI	30	30	30	G CO2e/MJ
Fossil Fuel baseline	101.09	89.98	83.19	G CO2e/MJ
Energy Density	129.65	126.37	89.63	MJ/gal
Gallons Claimed	1,000	1,000	1,000	Gal
Credits Generated	9.22	7.58	4.77	MT CO2e Reduced

Lastly, we strongly encourage Ecology to restrict the 'mass-balancing' of renewable attributes from partially renewable fuel produced in co-processing situations. For example, if an out of state facility imports a co-processed fuel that is 95% petroleum and 5% renewable content, they should generate credits and debits as such. Simply put, they should not be able to assign all the attributes to a small amount of production and call it 100% renewable. Ensuring that co-processed fuels -- which are imported into, exported out of, or consumed within the state -- are credited based on their actual renewable content is critical to ensuring the program works effectively, efficiently, and does not lead to fuel shuffling in the name of compliance.

Support Expanded Use of Book and Claim

Central to any low carbon fuels program is the intent to incentivize carbon reductions throughout a fuel's lifecycle. Accordingly, Clean Fuels strongly encourages Ecology to consider expanding the opportunities to book-and-claim renewable energy to allow renewable energy to be claimed at the fuel or feedstock production facility in cases where the generation asset is located offsite. Currently, the proposal allows a supply chain participant to use and claim a lower CI energy when the applicant generates the energy behind the meter for renewable electricity and renewable thermal energy. At the same time, certain provisions have been created to allow for the environmental attributes of off-site renewable energy resources to be booked-and-claimed when they are used in a limited number of applications, such as the production of hydrogen for charging a vehicle.

The current proposal sets an arbitrary standard for when book-and-claim is allowed and when it is not. In fact, the implementation of this rule is creating haves and have nots in the industry based on nothing more than the physical location where the plant is constructed. For example, consider Washington's only biodiesel plant, the Grays Harbor plant owned and operated by the Renewable Energy Group (REG). This facility is one of the largest and most efficient in the country, in part owing to its superior logistics due to its physical location. However, its physical location in the Port of Grays Harbor makes it extremely difficult, if not impossible to construct onsite biomethane, biomethanol, or renewable electricity production. Conversely, plants located in the Midwest U.S. are generally in rural areas, providing them ample space and opportunity to build behind the meter assets. This creates opportunities for certain biofuel producers to reduce their CI by incorporating wind or solar based on nothing more than their physical footprint, a legacy decision that sometimes was made more than 20 years ago.

Similarly, the current proposal allows for biomethane to utilize book-and-claim for the production of hydrogen that is used to fuel a vehicle or is used in the production of a transportation fuel. The latter example was designed to allow for the use of renewable hydrogen at a renewable diesel facility or a refinery. However, a critical oversight of that process was how to treat the molecules of "green" hydrogen.

Much of the hydrogen distribution infrastructure, like that of natural gas, is a common system. While not as large as the U.S. natural gas grid, certain areas of the country, like the Gulf Coast have robust, interconnected hydrogen distribution systems. This means that there will inevitably be co-mingling of the hydrogen produced from book-and-claimed RNG and hydrogen produced from fossil natural gas. As more biofuel facilities are built or converted to produce hydrocarbons, rather than oxygenated fuels, it will become increasingly likely that hydrogen will be needed in the process. To ensure that these biofuels are as cost-effective as possible, many of these facilities will likely make the decision to locate in these legacy petrochemical complexes which already contain a robust utility distribution system, like a common hydrogen pipeline. Without clarification from staff regarding the ability of lower-carbon hydrogen to be co-mingled with fossil hydrogen, the adoption of lower carbon hydrogen, including hydrogen from electrolysis will likely be slow to be implemented.

Finally, we encourage the staff to consider the opportunity to expand on the current provision allowing for the book-and-claim of biomethane to hydrogen production for the use in the production of a transportation fuel to be inclusive of facilities that are capable of producing "green" methanol from biomethane. Today, green methanol has an immediate market in the production of biodiesel; by replacing fossil methanol with biomethanol, the average biodiesel plant could reduce its carbon intensity by 4-6 grams CO_2e per MJ. In the near- to medium-term, green methanol may be a critical fuel for ocean going vessels[12]. Given Washington State's key position in the maritime shipping industry and as home to one of the country's largest biodiesel plants, Clean Fuels believes this is a great opportunity for the state to jumpstart this industry.

In summary our recommendations regarding book-and-claim are:

1. Expand the book-and-claim of biomethane and electricity to allow for the displacement of grid electricity and fossil fuels which are used as process energy to produce alternative transportation fuels including on-road, maritime, and aviation fuels.
2. Explicitly allow for lower-carbon intensity hydrogen to be book-and-claimed to a qualifying end use when transported through a common-carrier hydrogen pipeline.
3. Include the production of green methanol under the book and claim provision, recognizing that green methanol can be incorporated into transportation fuel today as part of a methyl ester (biodiesel) and that in the near future it will be needed to help decarbonize vessels arriving and leaving Washington State.

[12] Maersk unveils design of next-gen methanol-powered boxships - Offshore Energy (offshore-energy.biz)

Putting the Current California Carbon Intensity Scoring information into Context

Clean Fuels is deeply concerned with the information that was presented at the March 15th workshop. We found it extremely troubling that the information was presented as 'the best available science.' In fact, the material that was presented by Life Cycle Associates was far from being the 'best available science' -- it was devoid of any academic literature which discussed the fundamental updates to GREET or GTAP since 2015 and 2016. This is extremely troubling, especially since a robust Clean Fuels Standard program requires a solid and up-to-date scientific basis.

Currently, California and Oregon rely on two models to calculate the carbon intensity score of biofuels. While both states use the models to estimate relatively accurate carbon intensity scores, the results these models' produce are only as accurate as the data and its vintage that is contained within them.

Argonne GREET

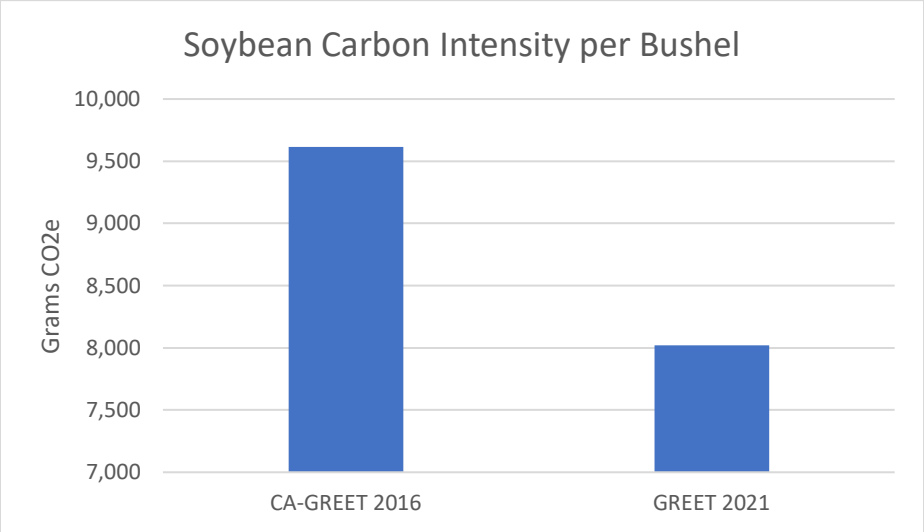
Clean Fuels believes that Argonne GREET (adjust for Washington conditions as needed) is the most appropriate model to calculate the direct life cycle carbon intensity of alternative transportation fuels. We believe this model is the best choice for several reasons:

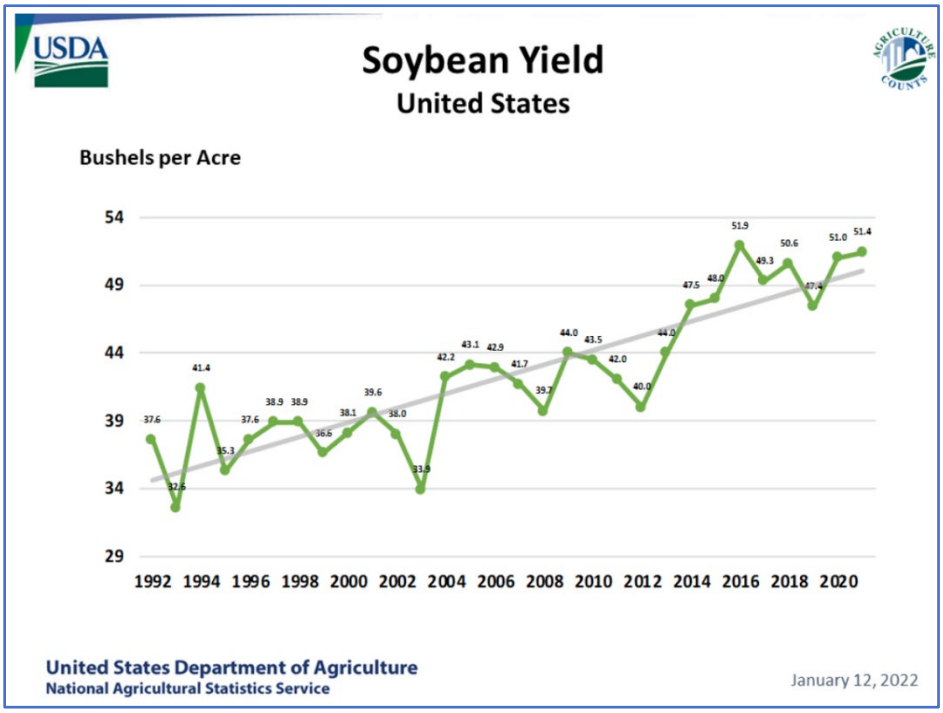
1. Is capable of modeling a wide range of traditional and alternative transportation fuels and modes.
2. Argonne's (not CARB's) GREET model is updated annually, incorporating the best available science from a combination of industry surveys, process modeling, and literature reviews.
3. The model is constructed in a fairly consistent manner, ensuring that related biofuel systems (i.e. corn ethanol and corn oil biodiesel) are estimated in a consistent fashion. By contrast, CARB's adaptation has introduced double counting (double debits) for certain pathways.

A critical issue with wholesale adoption of CA-GREET is the vintage of the data included. It is critical to note that while California adopted and modified the 2016 version of GREET, crucial data sources in that model were already several years old at the time. For example, the 2016 version of CA-GREET relies on 2012 agricultural data for soybean processing. This data, which is now a decade old, fails to account for the continued and significant improvements in efficiency on the farm related to better genetics and higher yields, precision agriculture, and general efficiency. Utilizing the older data overestimates the energy associated with producing soybeans by over 30%.

Energy Per Bushel of Soybeans		
Input	**CA-GREET 2016**	**GREET 2021**
Diesel (Btu)	13,696.64	9,352.51
Gasoline (Btu)	3,061.02	2,064.69
Natural Gas (Btu)	984.20	176.45
LPG (Btu)	765.48	662.03
Electricity (Btu)	935.21	1,468.05
Total Energy Usage (Btu)	**19,442.56**	**13,723.73**

Inputs Per Bushel of Soybeans		
Input	**CA-GREET 2016**	**GREET 2021**
Nitrogen (grams)	44.13	43.73
P_2O_5 (grams)	180.45	207.81
K_2O (grams)	289.01	329.56
$CaCO_3$ (grams)	-	-
Herbicide (grams)	17.34	19.43
Pesticide (grams)	0.34	0.28





Source: USDA - National Agricultural Statistics Service - Charts and Maps - Soybeans: Yield by

The outdated data is not only relevant to the soybean oil to biodiesel and renewable diesel pathway, but other major pathways such as animal fat rendering have been updated and corrected[13] since the 2016 CA-GREET model was adopted by CARB. To date, CARB has not adopted these new figures, even though they are well established in the literature and CARB staff has approved several domestic and foreign producer-specific Tier 2 applications which are documenting rendering energy which meets or exceeds to survey results contained within GREET 2021.

Energy Per LB of Tallow Rendered		
Input	**CA-GREET 2016**	**GREET 2021**
Residual oil (Btu)	1,055.56	-
Natural gas (Btu)	1,611.11	1,052.45
Electricity (Btu)	444.44	306.86
Total Energy Usage (Btu)	**3,111.11**	**1,359.31**

Indirect Land Use Change (ILUC) and Direct CI Updates

We strongly encourage Ecology to consider the various approaches and models that are available for estimating indirect land use change. This is a critical decision that the department will have to make and one that should not be taken lightly. Staff should consider how they can craft an approach that complies with the statute, but also encourages innovation, competition, and ultimately one that incentives more sustainable production while discouraging less sustainable actions. Clean Fuels does not believe that the current approach taken in California achieves these objectives. Below we have provided three options for the department to consider.

1. Develop Country- or Regional-Specific Land Use Change Factors

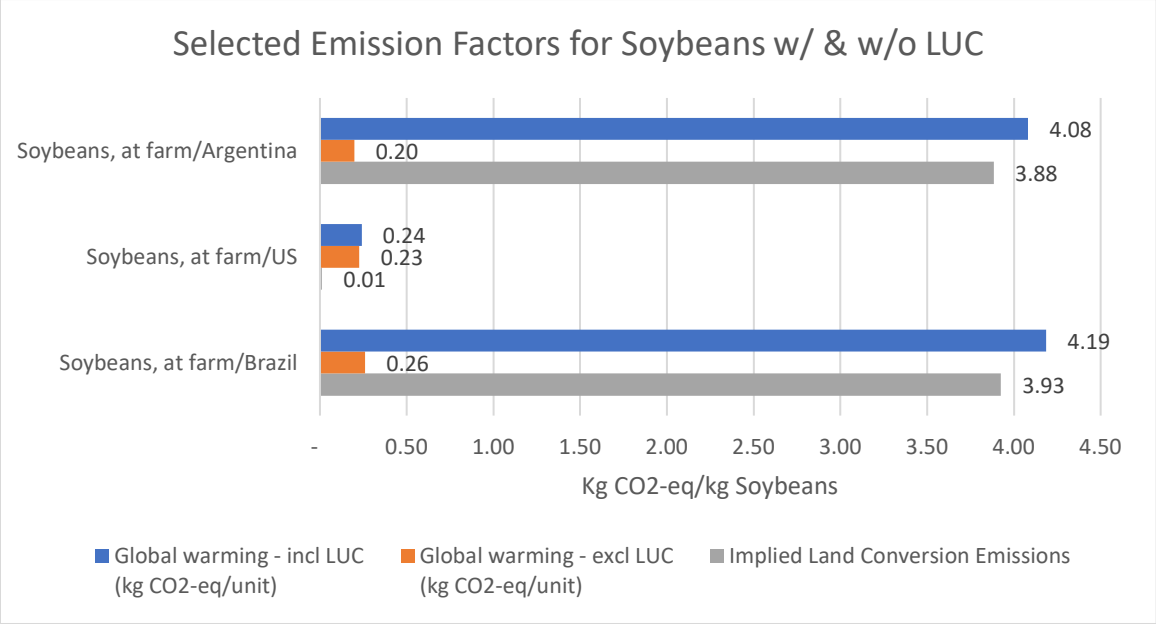
The Department could draw on the approach established by Canadian jurisdictions such as British Columbia which have prominently incorporated country specific direct land use change into their estimates for major regions or certain crops. This is based on observed changes in land cover type in major growing regions for a specific crop. For example, although British Columbia's Low Carbon Fuel Requirements has no explicit indirect land use change, the LCA for feedstock such as southeast Asian palm oil -- which have historically been grown on high carbon stock land that is converted -- is directly penalized in the model. This results in a carbon intensity for palm oil biodiesel approaching or exceeding that of diesel fuel. This is consistent with the ILUC value for palm oil.

Additionally, if the department is interested in crafting a policy which rewards the sustainability leaders and incentivizes laggards, rather than painting everyone with an unduly broad brush, Ecology may consider using the data from Blonk[14], more commonly known as Agri footprint.

[13] Argonne GREET Publication : Updates on the Energy Consumption of the Beef Tallow Rendering Process and the Ratio of Synthetic Fertilizer Nitrogen Supplementing Removed Crop Residue Nitrogen in GREET (anl.gov)
[14] Blonk Sustainability | Agri-footprint

Blonk utilizes highly respected data including UN FAO statistics and IPCC calculation rules[15] and follows PAS2050-1[16] to develop country and crop specific emission factors. Critically, for voluntary markets and corporate emission reductions pledges, PAS2050-1 is accepted by the World Resources Institute a global leader in GHG reduction efforts and the founder of GHG Protocol and the Science Based Targets Initiative. Applying a standard that is accepted by WRI will help drive consistency between major regulatory markets like the WA CFS program and global voluntary reporting of carbon emissions.

Illustrated below using the Blonk data, the sharp contrast in emission factors becomes apparent for soybeans from markets like the United States and two selected markets in South America. Utilizing more granular and transparent information such as what is outlined below would help the Clean Fuels Standard program reward leaders for highly sustainable practices and encourage laggards to improve. Without clear differentiation between growing regions which is masked by a one-size fits all ILUC penalty, the market will continue to operate in a highly inefficient manner, broadly judging all agricultural commodities of the same type by the least sustainable producer.



2. Simplify the Process by Utilizing One Model

If Ecology determines that country-specific emission factors, such as those from Blonk, do not meet the statutory requirements, we encourage staff to take the simplest approach they can moving forward with the current tools being used by California and Oregon. Clean Fuels believes that the simplest option for Washington state to maintain a modern program that uses the best available science would be to use Argonne National Lab's most recent version of

[15] Agri-footprint 5.0 (amazonaws.com)
[16] bsi.shop (bsigroup.com)

GREET, including their land use change emission estimates modeled in the CCLUB module. This would remove a significant burden from Ecology staff, eliminating the need to maintain their own unique GREET model and indirect land use change scores. Additionally, this would ensure the program stays up to date and is not beholden to another state's regulatory apparatus or political aims when devising their own decarbonization strategy. Additionally, it is critical to note that the CCLUB module contained within GREET, which is used to estimate land use change values, is based on results from the GTAP modeling. GTAP was the model used by California years ago to conduct its estimates of indirect land use change.

3. Rely On an Updated Version of GTAP

Finally, if Ecology determines that the use Argonne's CCLUB model is impractical, necessitating the need to use a discrete land use change model, we implore the department to use the most recent version of GTAP, not simply implement the values CARB calculated in 2015. A strict adherence to consistency is neither logical nor warranted; indeed, simply copying California's use of the older GTAP results effectively guarantees Washington's program will be based on flawed and outdated science. Currently, as was shown during the presentation, there is a lack of consistency between Oregon and California on a number of topics. Both programs continue to exceed the expected performance.

Clean Fuels believes it is inappropriate and inconsistent with state policy goals to use data, methods and results -- which in some cases are over a decade old -- in a climate-progressive policy which is claimed to be based on the 'best available science.' Before staff wholesale accepts antiquated results from the 2015 CARB ILUC modeling exercise, we strongly encourage them to look at the literature which has been published relating to GTAP since then, none of which was mentioned by Life Cycle Associates during their presentation.[17][18] Clean Fuels also found it troubling that none of this literature was covered, while the results provided by Life Cycle Associates' presentation was described as the "best science." In fact, the table on slide 75 references results that are based on decade-old data. Additionally, charges of extreme substitution between the various crop oils were made, without reference to GTAP publication which directly questions the elasticity of these substitutions.[19]

Clean Fuels in the strongest terms urges Ecology to undergo a fresh evaluation of the emissions from land use change, at a minimum utilizing the updated models which are publicly available from Argonne and Purdue and to the extent possible develop a framework which more accurately portrays the emissions associated with individual country's agricultural sectors. If GTAP-BIO and AEZ-EF were updated to reflect the current literature, soy oil- and canola oil-

[17] The increasing global environmental consequences of a weakening US–China crop trade relationship | Nature Food

[18] Land | Free Full-Text | Dynamic Amazonia: The EU-Mercosur Trade Agreement and Deforestation (mdpi.com)

[19] US biofuel production and policy: implications for land use changes in Malaysia and Indonesia | Biotechnology for Biofuels and Bioproducts | Full Text (biomedcentral.com)

based biofuel's ILUC penalty would be reduced to 17.5 g CO2e/MJ (a 40% reduction) and 11.7 g CO2e/MJ (a 19% reduction), respectively.[20]

4. **Direct CI Updates Based on Real-World Experiences in California and Correction of Existing Errors**

In addition to using an updated GTAP-BIO and AEZ-EF, Clean Fuels strongly encourages Ecology to use updated direct CI inputs that reflect both real-world experience in California as well as errors that have been identified by not yet corrected in that state. Using updated direct CI values, inputs, and assumptions will help ensure that the Clean Fuels Standard reflects the most robust and current science available. These updates are shown in Attachment 1.[21]

Miscellaneous Provisions

Understanding that the draft provisions will continue to undergo additional development, we note the need for clarity in a number of provisions:

- Opt-in provisions for offroad, rail, and marine (some apparent internal and external inconsistency between the proposed language and the statute; also, whether the opt-in applies to providers of transportation fuel for military and/or tactical support equipment);
- To encourage getting more GHG reductions through the opt-in provision, once parties voluntarily opt in, they should only be required to meet reporting requirements applicable to other regulated parties, rather than have requirements unique to opt-in parties;
- More clarity needed for reporting above and/or below the rack;
- Agency action should be required after a date certain once an application has been deemed complete (or has surpassed the completeness process) to avoid applications remaining in administrative limbo for unreasonable amounts of time;
- The carbon intensity benchmarks for alternative jet fuel should be based on what the science says for jet fuel, rather than on policy considerations;
- Need provisions for monitoring feedstocks and for triggering ongoing carbon reductions pursuant to HB 1091.

We also support the use of a Washington-specific electrical grid for determining the CI score for electricity. And for administrative simplicity, we suggest reducing the requirement for maintaining records from 10 years to 7 years; over ten years of experience in California has not shown the need for such a long recordkeeping requirement.

[20] Current ILUCs are 29.1 and 14.5 for soy oil and canola oil, respectively.

[21] NBB comments submitted to CARB in response to public workshop to consider potential changes to the LCFS regulation, https://www.arb.ca.gov/lists/com-attach/120-lcfs-wkshp-oct20-ws-WjQCZgBjUV0FYFM8.pdf, accessed April 8, 2022.

Conclusion

We thank you for your consideration of these comments, which are offered in the spirit of helping craft the most rigorous and scientifically sound Clean Fuels Standard as possible. We look forward to continuing a positive collaborative effort with Washington state as we further develop and implement the world's largest transportation carbon market.

Sincerely,

Floyd Vergara, Esq., P.E.
Director of State Governmental Affairs
Clean Fuels Alliance America

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Attachment 1

Post-2015 Updates to Indirect and Direct Carbon Intensity Values and Parameters

DIRECT/ INDIRECT EMISSIONS	MODEL	FEED STOCK	UPDATE NEEDED	CURRENT VALUE/CI	UPDATED VALUE/CI	REFERENCE/COMMENTS
DIRECT	CA-GREET	Tallow	Rendering Energy	3944 BTU/lb. This is about **18 g/MJ**	2211 BTU/lb. This is about **10 g/MJ** (GREET 2019)	Chen, R., Qin, Z., Han, J., Wang, M., Taheripour, F., Tyner, W., O'Connor, D. and Duffield, J., 2018. Life cycle energy and greenhouse gas emission effects of biodiesel in the United States with induced land use change impacts. Bioresource Technology, 251, pp.249-258. https://www.sciencedirect.com/science/article/pii/S0960852417321648/pdfft?md5=768c9ac49614fbb7252d0ff821fa3ea9&pid=1-s2.0-S0960852417321648-main.pdf Updates on the Energy Consumption of the Beef Tallow Rendering Process and the Ratio of Synthetic Fertilizer Nitrogen Supplementing Removed Crop Residue Nitrogen in GREET. https://greet.es.anl.gov/files/beef_tallow_update_2017
DIRECT	CA-GREET	Uncooked UCO	Rendering Energy	1073 BTU/lb This is about **5.3 g/MJ**	300 BTU/lb This is about **2 g/MJ**	A new pathway with a default values is recommended for this feedstock. A number of renderers have supplied ARB with data on energy use for uncooked UCO rendering operations and these are conservative values. This would restore one of the default pathways that was present in the original regulations.
DIRECT	CA-GREET	Hydrogen	Energy Density	290 BTU/lb	274 BTU/lb	The current value is at 32F whereas the standard for measurement is 60F. CARB has accepted this change but only in approved Tier 2 applications.
DIRECT	CA-GREET	Hydrogen	Carbon Intensity	106,907 g/mm BTU	105,612 g/mm BTU	CARB has also accepted this change. Existing value includes 150 miles of hydrogen pipeline transportation, which is not applicable in most cases.
DIRECT	CA-GREET	Corn Oil	Extraction CI	**13.27 g/MJ**	**10.46 g/MJ**	2.81 g/MJ for corn oil extraction is improperly double-counted as both an ethanol debit and a biodiesel feedstock debit.

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DIRECT/ INDIRECT EMISSIONS	MODEL	FEEDSTOCK	UPDATE NEEDED	CURRENT VALUE/CI	UPDATED VALUE/CI	REFERENCE/COMMENTS
INDIRECT	GTAP-BIO	Soy	Various, as shown below	**29.1 g/MJ**	**17.5 g/MJ**	
			Using model parameters recommended by GTAP developers	**29.1** → 22.4		Follow-On Study of Transportation Fuel Life Cycle Analysis: Review of Current CARB & EPA Estimates of Land Use Change Impacts http://crcsite.wpengine.com/wp-content/uploads/2019/05/E-88-3b-Final-Report-2016-08-23_v2.pdf
			Updating to 2017 GTAP model (includes intensification changes) and 2011 data base.	22.4 → 18.3		Taheripour, F., Cui, H. and Tyner, W.E., 2017. An Exploration of agricultural land use change at the intensive and extensive margins: implications for biofuels induced land use change. Bioenergy and Land Use Change, pp.19-37. https://doi.org/10.1002/9781119297376.ch2 Taheripour, F., Zhao, X. and Tyner, W.E., 2017. The impact of considering land intensification and updated data on biofuels land use change and emissions estimates. *Biotechnology for biofuels*, *10*(1), p.191. https://biotechnologyforbiofuels.biomedcentral.com/track/pdf/10.1186/s13068-017-0877-y
			Including feed-land substitution in GTAP	18.3 → **17.5**		Taheripour, F. and Tyner, W.E., 2020. US biofuel production and policy: implications for land use changes in Malaysia and Indonesia. *Biotechnology for Biofuels*, *13*(1), p.11. https://link.springer.com/content/pdf/10.1186/s13068-020-1650-1.pdf

DIRECT/ INDIRECT EMISSIONS	MODEL	FEEDSTOCK	UPDATE NEEDED	CURRENT VALUE/CI	UPDATED VALUE/CI	REFERENCE/COMMENTS
INDIRECT	GTAP-BIO	Canola	Various, as shown below	**14.5 g/MJ**	**11.7 g/MJ**	
			Using model parameters recommended by GTAP developers	**14.5**		Follow-On Study of Transportation Fuel Life Cycle Analysis: Review of Current CARB & EPA Estimates of Land Use Change Impacts http://crcsite.wpengine.com/wp-content/uploads/2019/05/E-88-3b-Final-Report-2016-08-23_v2.pdf
			Updating to 2017 GTAP model (includes intensification changes) and 2011 data base.			Taheripour, F., Cui, H. and Tyner, W.E., 2017. An Exploration of agricultural land use change at the intensive and extensive margins: implications for biofuels induced land use change. Bioenergy and Land Use Change, pp.19-37. https://doi.org/10.1002/9781119297376.ch2 Taheripour, F., Zhao, X. and Tyner, W.E., 2017. The impact of considering land intensification and updated data on biofuels land use change and emissions estimates. *Biotechnology for biofuels*, *10*(1), p.191. https://biotechnologyforbiofuels.biomedcentral.com/track/pdf/10.1186/s13068-017-0877-y
			Including feed-land substitution in GTAP		**11.7**	Results have not been published for US canola biodiesel shock but similar percentage reductions can be expected for canola as were found for soy oil