National Biodiesel Board
1331 Pennsylvania Ave, NW
Suite 505
Washington, DC 20004
(202) 737-8801 *phone*

National Biodiesel Board
605 Clark Avenue
PO Box 104898
Jefferson City, MO 65110
(800) 841-5849 *phone*

November 4, 2019

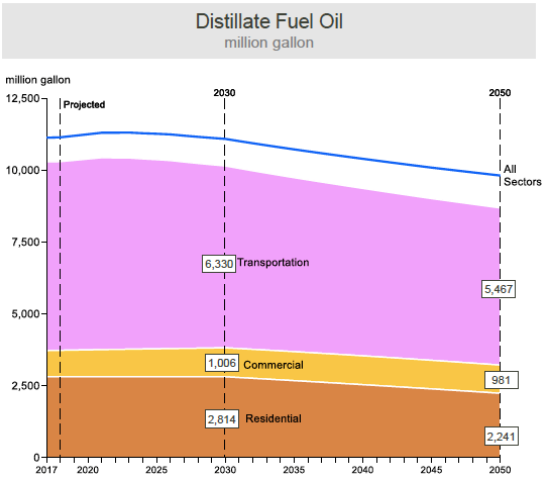
Viki Arroyo
Executive Director
Georgetown Climate Center
600 New Jersey Ave, NW
Washington, DC 20001

Re: Transportation Climate Initiative

Dear Ms. Arroyo:

Thank you for the opportunity to comment on the draft framework published October 1, 2019. The National Biodiesel Board (NBB) serves as the trade association for the U.S. biodiesel and renewable hydrocarbon diesel industries. In addition to governmental affairs activities, the NBB coordinates the industry's research and development efforts. Founded in 1992, NBB interacts with industry, government and academia. NBB members include biodiesel producers, feedstock and feedstock-processor organizations, fuel marketers and distributors, and technology providers. Biodiesel is a proven advanced fuel technology with over a billion miles driven across dozens of duty cycles.

NBB appreciates the efforts of the Georgetown Climate Center, along with the 11 states and the District of Columbia participating in the Transportation Climate Initiative (TCI), for implementing a comprehensive stakeholder process while considering options to de-carbonize the transportation sector. The goals of the participating TCI states and entities are generally consistent with achieving an 80 percent reduction from 1990 levels by 2050. These goals reflect scientific consensus on the scale of action needed internationally to avoid the worst effects of climate change. Data sets from NOAA and NASA show that the 20 warmest years on record have all occurred since 1995.[1] To achieve significant levels of reductions, TCI will need to prioritize decarbonizing the fossil fuels that contribute the bulk of the carbon within this sector.



We are both encouraged and concerned by word choices within the Draft Framework: "*The proposed program would cap emissions of carbon dioxide from the combustion of the fossil component of finished motor gasoline and on-road diesel fuel in the region. The TCI jurisdictions are evaluating whether and how to include and treat biofuels in the program.*"

[1] http://www.climatecentral.org/gallery/graphics/the-10-hottest-global-years-on-record

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NBB hired MJ Bradley to conduct a modeling effort that dissects the medium and heavy-duty fleets as well as the residential and commercial heating sectors across TCI states. The conclusions are not finalized, but the data suggests that renewable fuels such as biodiesel, renewable diesel, and renewable natural gas are the best near-term opportunities to displace fossil fuels in this sector. These existing technologies can save carbon emissions even when every other alternative such as EVs and hydrogen for medium and heavy-duty or electric heat pumps are accelerated well beyond the expected adopted rates of the most progressive projections.

As NBB understands the current vision of the program, it is modeled after the Regional Greenhouse Gas Initiative (RGGI). Whether to include biofuels in the program and how they will be treated has yet to be determined.

As an initial step, the policy must ***exclude*** all biomass-based diesels from any pricing mechanism. NBB believes that this simple but necessary first step is crucial to not do harm to current markets, fleets, and municipalities that have opted to embrace low-carbon fuels such as biodiesel. And yet, just an exclusion is not enough of an incentive to motivate fuel suppliers to switch to lower carbon fuels. Even the notion that a pricing mechanism under a "cap" could apply to only liquid fuels will have unequal impacts on gaseous and electric fuels in the market. If biomass-based diesel is nor excluded, dozens of fleets in the region for the Port Authority of New York and New Jersey, municipalities such as New York City, Washington D.C., and Cambridge, MA as well as Universities such a Harvard, Yale, and Brown would be negatively impacted for their efforts to reduce carbon with biodiesel today.

NBB believes there are additional compliance options that will help produce a successful path forward to a cleaner transportation sector. Potential reductions in carbon emissions could be achieved in the Northeast and Mid-Atlantic regions through transportation policies incentivizing low carbon solutions such as biodiesel and renewable hydrocarbon-based diesel fuels for the diesel sectors. These solutions could be easy and harmonize with choices of other federal or international standards. For example, during the first 10 years of the program, biomass-based diesel could earn 2x the price incentive instead of the 1-for-1 price exclusion that the current framework suggests.

The key to carbon reductions is to consider reductions from all sources as soon as possible. This means simultaneously reducing as much carbon now from proven near-zero technologies, like biodiesel and renewable diesel, while planning for and investing in zero-emission technologies.

According to the U.S. Energy Information Administration (EIA), transportation is responsible for 39 to 44 percent of greenhouse gases (GHG) for the TCI Region. This sector continues to grow in relevance as other sectors such as residential buildings and power reduce GHG impacts with efficiency and grid-ready renewables. By contrast, transportation is still 92 percent dependent on fossil fuels.

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According to Georgetown Climate Center's (GCC) technical appendix of Reducing Greenhouse Gas Emissions from Transportation Opportunities in the Northeast and Mid-Atlantic, vehicle types that are predominantly powered by diesel engines are expected to account for approximately 30 percent of the CO2 emissions in 2030 in both the Business as Usual (BAU) and Federal Policy models.[2] According to the Natural Resources Defense Council, petroleum consumption by personal vehicles accounts for 60 percent of transportation related GHG emissions in the United States, with an additional 20 percent coming from freight trucks.[3] According to the GCC, these emissions will result in between 60-70 Annual mmt CO2e across the TCI region.

According to EIA, TCI states collectively consume approximately 10 billion gallons of distillate annually. This equates to approximately 5 to 6 billion gallons of on-highway and about 4 billion gallons of heating oil.[4] The remaining 2 to 2.5 billion gallons are consumed in a wide-range of other diesel applications.

Diesel moves over 90 percent of freight. More than 66 percent of all farm and construction equipment, over 90 percent of commercial trucks, approximately 70 percent of all transit buses, and 100 percent of container ships, marine workboats, and freight railroad locomotives rely on diesel due to the energy density of diesel fuel and the ability of the diesel engine to translate this fuel into power. Widespread availability of ultra-low sulfur diesel (ULSD) fuel has enabled the use of new emissions control and engine technologies that reduce diesel emissions to near zero levels. In addition, biodiesel contains no sulfur and biodiesel blends have demonstrated working equal to or better than diesel fuel alone in New Diesel Technology Engines (NTDEs).

Based on Georgetown Climate Center data, biodiesel alone could reduce the transportation sector carbon by approximately 4-5 percent. This equates to 11 million metric tons of annual reduction that can be accomplished in the near-term, within current infrastructure and with minimal costs.[5]

For example, since the implementation of the Low Carbon Fuel Standard in California, biomass-based diesel (biodiesel and renewable diesel) have contributed to over 19 million metric tons of carbon reductions, or more than 45 percent of all credits generated in the program in the seven years since 2011. In addition, biodiesel has resulted in significant reductions in particulate matter (PM), sulfur dioxide (SO2), and hydrocarbons relative to the baseline petroleum diesel fuel.[6] While some of these achievements can be produced without implementing a Low Carbon Fuel Standard, regulators need to carefully construct long-term policy mechanisms that build market stability for the 8 percent of alternative fuels that help to displace fossil fuels today.

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[2] Reducing Greenhouse Gas Emissions from Transportation Opportunities in the Northeast and Mid-Atlantic, Technical Appendix, November 2015
[3] Getting Back on Track: Aligning State Transportation Policy with Climate Change Goals, 2018: https://www.nrdc.org/sites/default/files/GettingBackonTrack_report.pdf
[4] Combines Federal Highway Administration and U.S. Energy Information Administration from 2016. https://www.fhwa.dot.gov/policyinformation/statistics/2016/ and https://www.eia.gov/dnav/pet/pet_cons_821dst_dcu_nus_a.htm
[5] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator
[6] https://www.arb.ca.gov/fuels/lcfs/lrtqsummaries.htm

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Current Northeast regional biodiesel production is estimated to range from 80 to 100 million gallons per year.[7] Biodiesel offers fuel diversity that supports structural resiliency efforts. The Northeast imports all its petroleum fuels from refiners in the Gulf Coast and New Jersey. Most distillate fuel is imported to the region via pipeline and then distributed via barge. Biodiesel uses the same infrastructure, so consumption can scale up quickly.

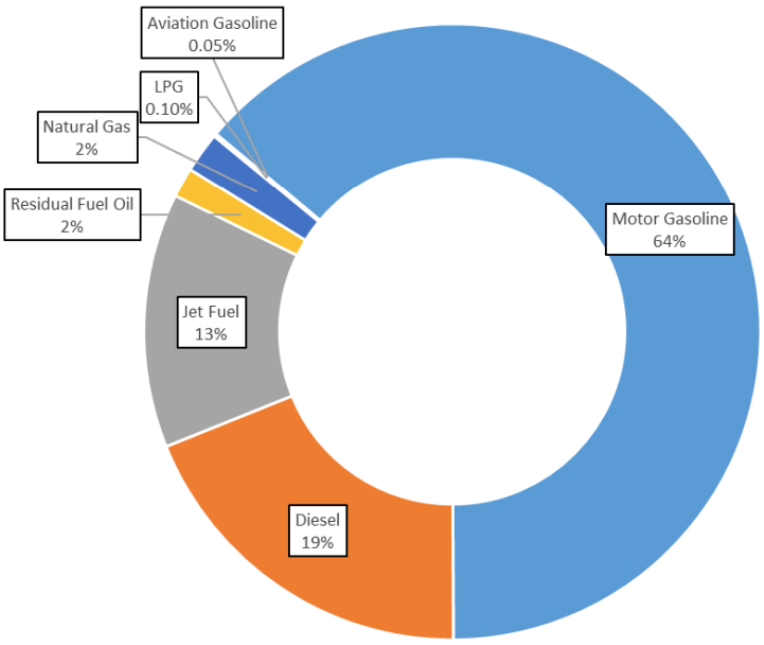
In times of massive storms, over reliance on any one fuel or distribution network (as in the case of Sandy or Harvey) may result in regional shortages. For example, during Hurricane Harvey, 25 percent of US refining capacity was temporarily shut down.[8] A program that supports biodiesel consumption also supports regional resiliency and climate adaptation. Clear market signals with long-term policy stability have correlated strongly with increases in regional biodiesel production. Current cost from producers in other regions to ship product to the Northeast is estimated to be approximately $.30 per gallon—additional costs that can be easily overcome by carbon pricing policies. Over time, such policies incentivize increased regional production.

The time to include biodiesel in the TCI program is now. The industry has grown from almost nothing to nearly 2 billion gallons of annualized production in the past 20 years. And feedstock availability is such that the industry has much more room to grow.

By 2030, biodiesel and renewable diesel in the Northeast and Mid-Atlantic states could:

- Reduce over 100 million metric tons of carbon in the hardest to reach transportation sector.
- Displace over 1 billion gallons of petroleum annually with a domestically made high quality advanced biofuel.
- Improve air and water quality. Biodiesel reduces particulate matter by 47 percent and hydrocarbon emissions by 67 percent in legacy vehicles.
- Increase economic growth. Every 100 million gallons of increased biodiesel production supports some 3,200 additional jobs. Today, the U.S. biodiesel market supports nearly 64,000 jobs nationwide and has an $11 billion economic impact.

Northeast and Mid-Atlantic
Transportation Emissions by Fuel Type, 2016



[7] National Biodiesel Board Plant list http://biodiesel.org/production/plants/plants-listing
[8] Colonial Pipeline to shut U.S. Northeast fuel lines due to Harvey: https://www.reuters.com/article/us-storm-harvey-colonial-co-northeast-idUSKCN1BA2Z6

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In the following pages, we provide reasons why domestic biodiesel and renewable diesel should be used to displace petroleum diesel fuel under the TCI initiative. In our view, each is compelling enough in its own right to justify inclusion of biodiesel in the program. Collectively, however, these reasons create a forceful case for *immediate* action.

1) Biodiesel is high quality, road-tested and commercially available.

Biodiesel is a renewable, low-carbon, diesel replacement fuel that is widely accepted in the marketplace. It is the only commercial-scale Advanced Biofuel under the U.S. EPA Renewable Fuels Standard (RFS2) program. Biodiesel is one of the best-tested alternative fuels in the country and the only alternative fuel to meet all of the testing requirements of the 1990 amendments to the Clean Air Act. There are currently about 100 biodiesel plants in the U.S. with a combined production capacity of over 2.5 billion gallons.

The National Biodiesel Accreditation Program is a cooperative and voluntary program for the accreditation of producers and marketers of biodiesel fuel called BQ-9000®. The program is a unique combination of the ASTM standard for biodiesel, ASTM D6751, and a quality systems program that includes storage, sampling, testing, blending, shipping, distribution, and fuel management practices. Sourcing biodiesel from a BQ9000 producer or marketer provides additional assurance that the product meets and often exceeds ASTM specifications. Biodiesel and renewable diesel are high quality fuels that meet or surpass ASTM standards.

Biodiesel blends increase lubricity and cetane of diesel fuel—two necessary properties that diesel fuel lacks.[9] Biodiesel blends provide performance characteristics such as fuel economy, horsepower, and torque similar to petroleum diesel while improving other characteristics, extending the life of diesel engines.[10]

2) Biodiesel is one a very few alternatives to petroleum use in the heavy-duty sector.

Biodiesel offers the only significant opportunity to reduce the region's carbon footprint for medium and heavy-duty transportation within current infrastructure and available vehicle stocks. According to the Department of Transportation, in 2015, among the 263,610,219 total registered vehicles in the United States, 8,456,302 were single-unit trucks (straight trucks), 2,746,882 were combination trucks (tractor-trailers), and 888,907 were buses.[11] Focusing on the large trucks alone, at 8 miles per gallon (the average is between 6-7 miles per gallon in legacy vehicles), this equates to more than 37 billion gallons of diesel fuel consumed per year in the U.S. The trend of large trucks, average weight, and distance

[9] Ibid.
[10] National Renewable Energy Laboratory; Biodiesel Handling and Use Guide: Fifth Edition; https://www.afdc.energy.gov/uploads/publication/biodiesel_handling_use_guide.pdf
[11] Pocket Guide to Large Truck and Bus Statistics, 2017: https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/safety/data-and-statistics/81121/2017-pocket-guide-large-truck-and-bus-statistics-final-508c-0001.pdf

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travelled is increasing over time. These estimates align with U.S. Environmental Protection Agency (EPA), Federal Highway Administration and EIA data.[12,13]

According to International Council on Clean Transportation (ICCT), many things can be done to improve the mileage of 18-wheelers.[14] If the trucking industry can put these recommendations into practice, diesel use could be reduced in the heavy-duty sector to 28 billion gallons per year in the next few years. Considering that there are no electric options for class-8 trucks today, biomass-based diesel can replace about 15 percent of this national figure with current feedstocks.

In other diesel sectors, potential for zero tailpipe emission technologies exists. For example, according to Bloomberg New Energy Finance, electric buses could reach upfront cost parity with diesel buses by 2030. By then, the battery pack in the average e-bus should only account for around 8% of the total e-bus price—down from 26% in 2016.[15] While Total Cost of Ownership (TCO) of an electric bus may be competitive today in certain market segments, the relative small size (1.7 Billion) of the bus market as compared to larger trucks (37 Billion) is quite small.[16] As the MJ Bradley report suggests, even if widespread adoption of electric busses occurs, real carbon and tailpipe reductions can still be accomplished as this transition happens.

In fact, biomass-based diesel should be considered synergistic with electric vehicles for all applications. Diesel-electric hybrids have shown significant improvements in maintenance and mileage. Our view is that light-duty electric vehicles and medium and heavy-duty diesel vehicles can work in harmony to reduce fossil consumption in the transportation sector. Energy density of fuels determines the highest utilization for most applications. While battery technology is advancing, the energy density of liquid biodiesel is many times greater than batteries and hence is well suited for medium- and heavy-duty transportation.[17]

Finally, unlike many transportation technologies that are 100 percent reliant on securing particular fuels (NG/BEV/Hydrogen) at particular intervals, diesel vehicles can access diesel and biodiesel blends at various levels from B0 to at least B20 without a pause in their routes. With biodiesel, the concerns of uptime or downtime of a station are eliminated.

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[12] Facts U.S. Transportation Sector Greenhouse Gas Emissions Office of Transportation and Air Quality EPA-420-F-17-013 July 2017 Fast Facts 1990 –2015: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100S7NK.pdf

[13] https://www.fhwa.dot.gov/policyinformation/statistics/2016/ and https://www.eia.gov/dnav/pet/pet_cons_821dst_dcu_nus_a.htm

[14] https://www.theicct.org/blogs/staff/eighteen-wheels-and-ten-miles-gallon

[15] Electric Buses in Cities: Driving Towards Cleaner Air and Lower CO2, https://about.bnef.com/blog/electric-buses-cities-driving-towards-cleaner-air-lower-co2/

[16] Fast Facts U.S. Transportation Sector Greenhouse Gas Emissions Office of Transportation and Air Quality EPA-420-F-17-013 July 2017 Fast Facts 1990 –2015

[17] Department of Energy, Energy Density of Fuels: http://coldfusion3.com/wp-content/uploads/2014/07/1109dp_01+renewable_diesel_vs_electric_cars+energy_density_chart.jpg

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3) Biodiesel is a critical tool in combating climate change.

Government agencies and national laboratories consistently determine through their research that biodiesel has significant lifecycle greenhouse gas emissions reductions compared to petroleum diesel. Earlier studies that argued the opposite have been discredited; https://blog.ucsusa.org/jeremy-martin/the-latest-on-biofuels-and-land-use-797.

Studies performed by the U.S. Environmental Protection Agency (EPA), the California Air Resources Board, the U.S. Department of Agriculture (USDA) and Purdue University all found significant reductions in greenhouse gas emissions, and all included international indirect land use change. This means that, in addition to the actual emissions of farming and biodiesel production, econometric modeling was used to quantify the theoretical increase in agricultural production worldwide resulting from economic stimulus of the Renewable Fuel Standard (RFS). This modeling also included substitution in vegetable oil markets between U.S. soybean oil and tropical palm oil, for instance. Even after factoring in all these indirect drivers of potential land use change and emissions, US biodiesel consistently reduces greenhouse gas (GHG) emissions by more than 50 percent compared to petroleum.

EPA's inclusion of international indirect land use change—in addition to requiring that eligible renewable biomass only comes from existing farmland—makes the RFS a protective policy. This requirement includes the quantification of lifecycle GHG emissions including indirect emission from domestic and international land use changes.[18] Only those feedstocks and production facilities that have been certified by EPA are eligible to generate Renewable Inventory Numbers (RINs). In addition to minimum GHG performance, all fuel generating credits under the federal program must certify compliance with the definition of renewable biomass. A key provision to this definition is that crops and residue can only come from agricultural land cultivated or managed prior to December 2007.[19]

4) Biodiesel provides healthier air.

Biodiesel's overall emissions from internal combustion engines are significantly lower than those of petroleum diesel. Biodiesel emissions have decreased levels of all target polycyclic aromatic hydrocarbons (PAH) and nitrited PAH compounds. These compounds have been identified as potential cancer causing agents.

Biodiesel is the only alternative fuel to perform Environmental Protection Agency (EPA) Tier I and Tier II testing to quantify emission characteristics and health effects. That study

[18] Section 211 (o) (1) (B) of the Clean Air Act (42 U.S.C. 745(o)) as amended by the Energy Independence and Security Act of 2007 and implemented under 40 CFR 80.1401
[19] Section 211 (o) (1) (B) of the Clean Air Act (42 U.S.C. 745(o)) as amended by the Energy Independence and Security Act of 2007 and implemented under 40 CFR 80.1401

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found that B20 biodiesel blends provide significant reductions in total hydrocarbons, carbon monoxide, and total particulate matter.[20,21]

Research also shows that the ozone forming potential of the hydrocarbon emissions of pure biodiesel is nearly 50 percent less than for petroleum fuel. Biodiesel reduces sulfur dioxide emissions to virtually zero and complements Ultra Low Sulfur Diesel (ULSD) fuel as an alternative to sulfur-containing fuels.[22] The American Lung Association is a proponent of biodiesel.[23]

New Diesel Technology Engines with their ERG and SCR post-after treatment devices are certified to further reduce NOx and PM to near-zero emission levels. According to the Diesel Technology forum, about 30 percent of diesel engines in the TCI region meet the 2010 and later standards. These latest models drive a much higher percentage of Vehicle Miles Traveled (VMT).

5) Biodiesel is nontoxic, biodegradable, and benefits water quality.

A latte to-go uses 26 times more water to make than a gallon of biodiesel does.[24] The lifecycle for petroleum diesel generates roughly five times as much wastewater flow as the lifecycle for biodiesel.[25] Notably, hazardous wastes from the biodiesel cycle are indirect waste flows associated with the production of diesel fuel and gasoline used in production. Biodiesel reduces wastewater by 79 percent and hazardous waste by 96 percent, when compared to petroleum diesel.[26]

Soybean production also benefits water quality with production practices that require less tilling of the soil and less application of synthetic fertilizer.[27] This means less nitrogen and phosphate runoff, resulting in fewer nutrients in the water that cause algal blooms, eutrophication, hypoxia, and dead zones.

Today, there is considerable concern about stormwater runoff from farmlands containing high levels of nutrients.[28] The same nutrients that make plants grow healthy and tall—like

[20] TIER 2 TESTING OF BIODIESEL EXHAUST EMISSIONS Study Report Number FY98-056, Lovelace Respiratory Research Institute (LRRI) P.O. Box 5890 Albuquerque, NM 87185-5890, May, 2000
[21] EPA; A Comprehensive Analysis of Biodiesel Impacts on Exhaust Emissions; EPA420-P-02-001; October 2002; https://19january2017snapshot.epa.gov/www3/otaq/models/analysis/biodsl/p02001.pdf
[22] EPA; Report to Congress on Black Carbon; March 2012; https://19january2017snapshot.epa.gov/www3/airquality/blackcarbon/2012report/fullreport.pdf
[23] http://www.cleanairchoice.org/fuels/bio.cfm
[24] Renewable Energy Group, Inc.; Environmental Benefits of Biodiesel; 2016; http://regi.com/docs/default-source/marketing-collateral/reg-environmental-improvement-fact-sheet.pdf?sfvrsn=6
[25] National Renewable Energy Laboratory; NREL/SR-580-24089 UC Category 1503; Life Cycle Inventory of Biodiesel and Petroleum Diesel for Use in an Urban Bus; U.S. Department of Agriculture and U.S. Department of Energy; 1998; http://www.nrel.gov/docs/legosti/fy98/24089.pdf
[26] National Renewable Energy Laboratory; NREL/SR-580-24089 UC Category 1503; Life Cycle Inventory of Biodiesel and Petroleum Diesel for Use in an Urban Bus; U.S. Department of Agriculture and U.S. Department of Energy; 1998; http://www.nrel.gov/docs/legosti/fy98/24089.pdf
[27] National Academies of Sciences; Water Implications of Biofuels Production in the United States; 2008; https://www.nap.edu/catalog/12039/water-implications-of-biofuels-production-in-the-united-states
[28] American Rivers; How Stormwater Affects Your Rivers; https://www.americanrivers.org/threats-solutions/clean-water/stormwater-runoff/

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nitrogen—also promote biological growth downstream in waterways, such as algal blooms.[29] Although plants require nitrogen to produce protein for the food supply, no nitrogen is required for biofuel production.

Excessive biological growth feeding on these nutrients can destabilize the ecosystem and is considered one of the most common forms of water pollution.[30] Soy is a legume; legumes can "fix" (create) their own nitrogen.[31] Farmers do not need to apply synthetic nitrogen to soybeans. The more soy planted (versus other sources of protein), the less nitrogen is added, resulting in reductions of nitrogen runoff. Soy is a solution to the nitrogen problem.

Today, most soy is planted without plowing the soil. In "no-till" planting, seeds are inserted into the soil without disturbing the surrounding ground, which reduces soil erosion.[32] Reducing erosion itself is good for water quality and for reducing phosphorous—another nutrient that binds with the soil and can cause algal blooms.[33]

6) Biodiesel's energy density combined with New Diesel Technology Engines (NDTE) are key differentiators.

Diesel engine technology continues to evolve, offering key industries a great combination of efficient, low-emission, cost-effective, powerful, and reliable engines. The newest diesel engines are much cleaner than the previous generation, achieving near-zero emissions levels with selective catalytic reduction (SCR) systems that continue to become more efficient and less expensive with each model year.

The U.S. Environmental Protection Agency and the California Air Resources Board scrutinize today's diesel emissions performance closely. These agencies set stringent standards for passenger cars, heavy-duty vehicles, and more. All diesel engines must now prove how they operate at certification levels in real-world settings.

Diesel engines are today, and will remain for the foreseeable future, the prime movers for this key sector of the global economy. Diesel powers well over 90 percent of all commercial trucks on the road in America today. In 2017, the North American Class 3-8 truck market came in at more than 250,000 vehicles. Of that population, approximately 75 percent of VMT of trucks in the TCI states are powered by the newest generation of clean diesel technology. In the off-road sector, diesel engines continue to power manufacturing, agriculture and construction projects around the globe.

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[29] EPA; Nutrient Pollution: The Problem; https://www.epa.gov/nutrientpollution/problem

[30] EPA; Water Topics; Monitoring and Preventing Water Pollution; https://www.epa.gov/environmental-topics/water- topics

[31] Tilth Alliance; How Legumes 'Fix' Nitrogen in Your Soil; http://www.seattletilth.org/learn/resources-1/almanac/october/octobermngg

[32] The Washington Post Wonkblog; No-till farming is on the rise. That's actually a big deal; November 9, 2013; https://www.washingtonpost.com/news/wonk/wp/2013/11/09/no-till-farming-is-on-the-rise-thats-actually-a-big-deal/?utm_term=.c900348a8d26

[33] Iowa State University; Cover Crops Reduce Loss of Nitrogen and Phosphorus to Waterways; April 17, 2017; https://www.extension.iastate.edu/article/cover-crops-reduce-loss-nitrogen-and-phosphorus-waterways

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7) U.S. biodiesel consumed is now U.S. produced.

In early 2018, the National Biodiesel Board Fair Trade Coalition won a final antidumping determination from the U.S. Department of Commerce. Import duties imposed by the U.S. Commerce Department have nearly stopped biodiesel imports from Indonesia and Argentina that were being sold below fair-market value. Since mid-2017, imports of biodiesel are down from almost 100 million to approximately 10 million gallons per month—and those gallons come largely from Canada.

U.S. Biodiesel should be understood in a global perspective. According to OECD-FAO Agricultural Outlook 2016-2025[34], the expansion of global biodiesel production will be driven by policies in place in the United States, Argentina, Brazil and Indonesia, and to a lesser extent the fulfillment of the RED target in the European Union. The biodiesel market is expected to increase from 8.1 billion gallons in 2015 to 10.9 billion gallons by 2025." This latest move by the National Biodiesel Board Fair Trade Coalition should displace petroleum while allowing domestic producers to better utilize current capacity. Despite increases in biomass-based diesel production between 2004 and 2011, the amount of forested areas grew globally by 19 million acres—partially because global agricultural land decreased by 60 million acres.[35]

EPA acknowledges that there is an existing registered capacity in the United States alone to produce 4.2 billion gallons of biomass-based diesel.[36] The U.S. Energy Information Administration reports U.S. biodiesel capacity is 2.3 billion gallons[37] and U.S. renewable diesel capacity is roughly 460 million gallons, meaning that immediately available U.S. production capacity for biomass-based diesel is at least 2.76 billion gallons.

8) Biodiesel absorbs excess oils and fats, driven by world protein demand.

NBB supports the use of all available domestic feedstock materials, including recycled cooking oil, animal fat, and those meeting the criteria of advanced biofuel as defined by the Energy Independence and Security Act of 2007 and certified through federal regulation. All fats and oils used for biomass-based diesel in the U.S. are by-products from growing food demand for protein. All fuels produced from these feedstocks share a GHG and criteria pollutant profile appreciably better than petroleum. All biodiesel approved by the EPA as qualifying feedstock for the federal Renewable Fuel Standard should be included in a regional TCI program.

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[34] OECD (2016), "Biofuels", in *OECD-FAO Agricultural Outlook 2016-2025*, OECD Publishing, Paris, https://doi.org/10.1787/agr_outlook-2016-13-en.

[35] GTAP Data Update, Forecasting and Backcasting in GTAP, and CRC Work on CARB Results; Wally Tyner, Farzad Taheripour, Purdue University; proceedings of the Coordinating Research Council Workshop on Life Cycle Analysis of Transportation Fuels; October 2015; Argonne National Laboratory https://crcao.org/workshops/LCA/LCA%20October%202015/Session%203/Tyner,%20Wally.pdf

[36] Federal Register; Environmental Protection Agency; Renewable Fuel Standard Program: Standards for 2018 and Biomass-Based Diesel Volume for 2019; 82 Fed. Reg. 34234, n. 100; https://www.gpo.gov/fdsys/pkg/FR-2017-07- 21/pdf/2017-14632.pdf#page=29

[37] U.S. Energy Information Administration; Monthly Biodiesel Production Report; https://www.eia.gov/biofuels/biodiesel/production/

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Suite 505
Washington, DC 20004
(202) 737-8801 *phone*

National Biodiesel Board
605 Clark Avenue
PO Box 104898
Jefferson City, MO 65110
(800) 841-5849 *phone*

The feedstock used to produce U.S. biodiesel has become increasingly diversified, with waste products such as animal fat and used restaurant cooking oil (yellow grease) comprising a larger portion of feedstock used to produce fuel. The National Renewable Energy Laboratory (NREL) recently published an extensive report on the availability of yellow and brown grease. That report concludes that 9.4 pounds of yellow grease and 13 pounds of brown grease are available on an annual, per capita basis throughout the U.S. 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 be used to produce more than 900 million gallons of biodiesel.

In addition, a report commissioned by the NBB addresses the use of animal fat, which has also become a major contributor of waste feedstock. According to a July 2018 World Food Outlook study, "Of special interest are the complex trends in the oilcrops sector, where international prices of oilseeds and oilmeals are rising even as those of vegetable oils are falling. Evolving trade relations between the United States and China—the world's largest soybean producer and buyer—have introduced considerable uncertainty into the market, as evidenced by a recent plunge in world soybean and soymeal prices."[38] Industries like biodiesel help to absorb these vegetable oils and stabilize protein meal prices.

While soybean oil is considered a co-product rather than a waste feedstock, further discussion of this raw material is merited since farmers in most Northeast and Mid-Atlantic states produce soybeans. In 2017, approximately 78 million bushels of soybeans were grown in the states of Delaware, Maryland, New Jersey, New York, and Pennsylvania.[39] The potential of 120 million gallons of biodiesel derived from this crop should be considered a sustainable, regional feedstock.

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 soybean is comprised of oil. Historically, the demand for protein meal has driven soy production, resulting in a supply of soybean oil that far exceeds the demand for food uses (primarily deep-frying foods and baking products). The biodiesel industry absorbs much of this excess oil, making protein meal a viable commodity for poultry and pork production.

9) Biodiesel offers benefits to low-income and disadvantaged communities.

Limited transportation options and high levels of air pollution disproportionately impact many low-income neighborhoods across the nation. Expanding access to clean transportation through deployment of biodiesel in the diesel engines that travel adjacent to or through low-income and disadvantaged communities is essential. Unlike some technologies that require expensive vehicles and costly infrastructure, biodiesel is an *immediate* and cost-effective solution for many communities in the Northeast Corridor.

[38] Food Outlook: BIANNUAL REPORT ON GLOBAL FOOD MARKETS, ISBN 978-92-5-130768-7 FAO, 2018
[39] http://usda.mannlib.cornell.edu/usda/current/CropProdSu/CropProdSu-01-12-2018.pdf

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The U.S. biodiesel market supports nearly 64,000 jobs nationwide and more than $11 billion in economic impact. Every 100 million gallons of increased biodiesel production supports some 3,200 additional jobs. Producers nationwide are poised to expand production and hire new workers with steady growth in the industry.

Biodiesel production offers the opportunity for significant job creation in the agricultural and food industry sectors throughout the U.S. The economics of biodiesel can be favorable for small through large-scale, thus providing flexibility for local and regional feedstock and fuel production. There are countless real-life examples of the power of biodiesel supporting the American economy and jobs throughout the supply chain. From the farmers who grow the feedstocks, to the producers who make the fuel, to the marketers and distributors who ensure it gets to the end users, biodiesel is an economic and job creation success story.

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Suite 505
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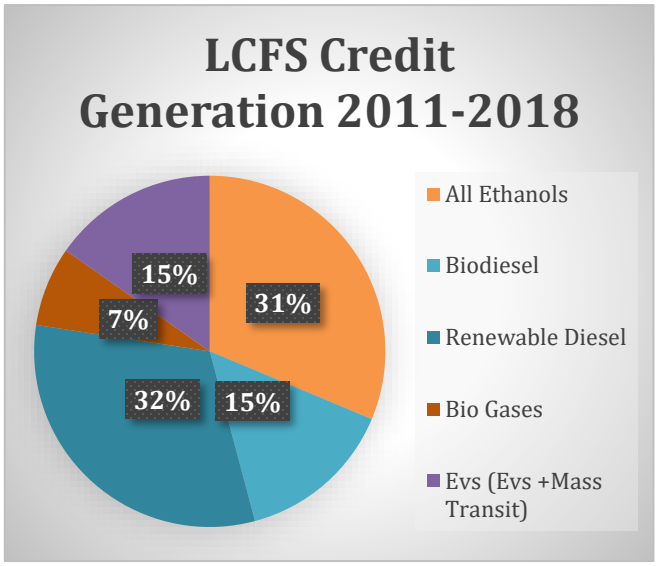
Appendix A
Discussion of Effective Biodiesel Programs

State Legislatures across the country have taken the lead in passing legislation designed to encourage the growth and development of the biodiesel industry. 32 states in the U.S. incentivize biodiesel production, distribution, and/or use with over 100 different types of credits, mandates, exemptions, and other policies. Of these many statutes, only a few have been truly effective in prompting the states to produce, distribute, and consume significant volumes of biodiesel for their relative size.



2011-2018 Credit Generation in California LCFS

The structure of the policy is essential. In the case of biodiesel credits, the consumer should not be required to do anything to realize the savings. Based on our experience, there are two types of policies we think the TCI should strongly consider:

1. Low Carbon Fuel Standards;
2. Tax Incentives.

Low Carbon Fuel Standards

The Low Carbon Fuel Standard in California (LCFS) and the Clean Fuel Program (CFP) in Oregon have been extremely successful in incentivizing the lowest carbon intensity fuels in the transportation sector. From 2011 through 2018, California has reduced CO2 by more than 42 million metric tons of carbon with a wide array of fuel types including ethanol, biodiesel, renewable diesel, renewable natural gas (RNG), and electricity. All alternative fuel types have expanded. Biomass-based diesel grew from under 15 million gallons annually in 2010 to more than 565 million gallons in 2018. Mandatory blend disclosure on bills of labeling is used to track compliance.

Biomass-based diesel represents about 19 million tons of the total and now represents about 18 percent of the on-road diesel pool. While the LCFS may not be considered an easy program to establish and track, the market-based approach continues to transform the fuels sector while appearing seamless to the consumer. Oregon's CFP has taken great advantage of California's desire to replicate their successes elsewhere. The CFP is practically a "carbon copy" of California's LCFS delayed by 5 years and yet managed by only 2-3 staff.

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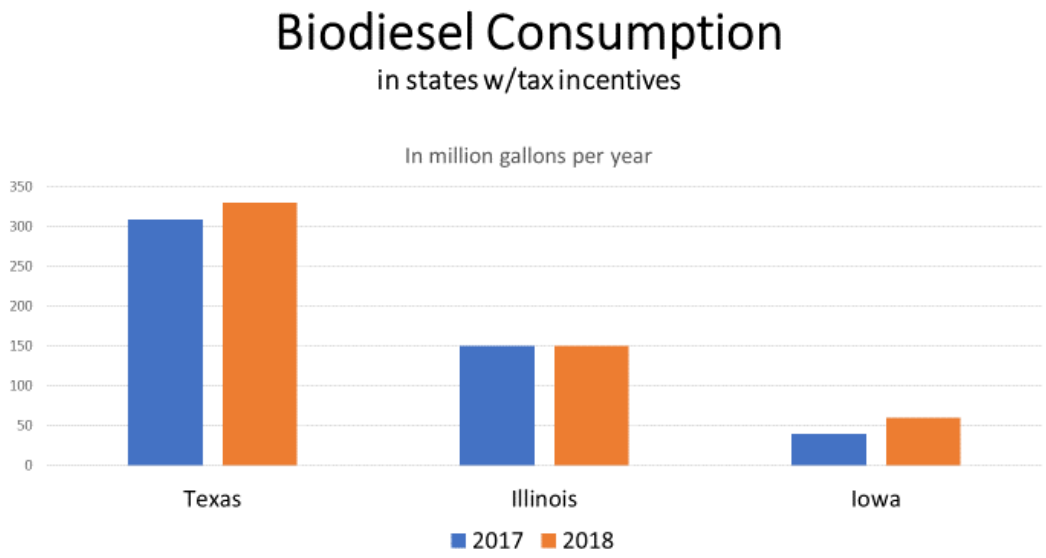
Tax Incentives

Consumption incentives have been the effective and simple to implement.

The most successful consumption policies are Illinois (150MG), Iowa (60MG), Texas (322MG), all of which feature tax credits for retailers and/or road tax exemptions.



Notable Policies

Below is a selected listing of effective state programs for your reference.

State	Level	Additional Information
Iowa	Tax Differential, Production Incentive	Biodiesel producers receive a tax credit of 2 cents per gallon for first 25 million gallons per producer through 2024. Biodiesel receives a 3 cent per gallon road tax differential; biodiesel blends are taxed at 29 cents per gallon instead of 32 cents for petroleum diesel. S 531 (2011), IA Code, Chapter 423.4
Illinois	Tax Exemption on Fuel	Biodiesel blends above 10% are completely exempt from the state's on-road excise tax until December 31, 2023. Biodiesel is defined as renewable diesel fuel made from biomass. SB 46 (2003), 35 ILCS 105/3-10 (Use Tax); 35 ILCS 105/3-41 to 44.5 (Use Tax); 35 ILCS 110/3-10 (Service Use Tax); 35 ILCS 115/3-10 (Service Occupation Tax); 35 ILCS 120/2-10 (Retailers Occupation Tax).
Minnesota	Blending requirement	20% biodiesel blends required for all on-road fuel April 1 through September 30. 5% biodiesel blends required in remaining months.

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New York State	Blending Requirement	5% biodiesel required to be blended in all home heating oil sold in Nassau, Suffolk, and Westchester counties.
City of New York	Blending Requirement	5% biodiesel required to be blended in all home heating oil sold. Requirement increases to 10% biodiesel blends in 2026 and 20% in 2034.
Oregon	Blending Requirement and Carbon Program	5% biodiesel blends required for all on-road fuel. Clean Fuels Program similar to California Low Carbon Fuel Standard.
Pennsylvania	Blending requirement	2% biodiesel blends required for all on-road fuel. Requirement increases to 5% when in-state production reaches 100 million gallons for three consecutive months on an annualized basis.
Rhode Island	Blending Requirement	5% biodiesel required to be blended in all home heating oil sold.
TX	Tax Exemption	The biodiesel portion of a blend is exempt from state diesel fuel excise tax. SB 5 (2001); TX Code 162.204(a)(9)

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Appendix B
Policy Recommendations for the TCI Region

Georgetown Climate Center's Reducing Transportation Emissions in the Northeast and Mid-Atlantic: Fuel System Considerations, July 2018, describes how any multi-state cap-and-invest program that could be used to limit greenhouse gas (GHG) emissions from transportation fuels. Based on the draft framework, the NBB suggests any such program should include the following:

1. Exclude low-carbon fuels from any pricing mechanism

Low carbon fuels such as biodiesel and renewable hydrotreated diesel should be exempted from any pricing mechanism. We strongly encourage the TCI states to consider the immediate carbon reductions that can be attained with use of biodiesel. The medium- and heavy-duty sector is almost entirely driven by diesel, something that will not change anytime soon.

Treating low-carbon alternative fuels such as biodiesel the same as high-carbon fossil fuels such as petroleum diesel is completely inappropriate. Incentives to decarbonize this fuel pool should be a central part of any TCI framework. A non-fuel neutral approach focused on electricity will have very little impact on the medium- and heavy-duty sectors.

We believe there are several effective policy options to expand the use of bio-based fuels. The LCFS policies in California and Oregon are market-oriented and have proven to be particularly effective decarbonization strategies. Blending requirements in states like Minnesota and Oregon are another option. And properly designed incentives in states such as Illinois and Iowa are a third. What is clear from our years of experience is that without specific policies in place, high-carbon products like petroleum diesel will remain the primary fuel option.

2. Consider feedstock neutral thresholds for all U.S. based biodiesel

All biodiesel approved by the EPA as qualifying feedstock should be considered under a regional TCI program. Only those feedstocks and production facilities that have been certified by U.S. Environmental Protection Agency (USEPA) are eligible to generate Renewable Inventory Numbers (RINs). In addition to minimum GHG performance, all fuel generating credits under the federal program must certify their compliance with the definition of renewable biomass. A key provision to this definition is that crops and residue can only come from agricultural land cultivated or managed prior to December 2007.[40]

The California Air Resources Board uses the CA-GREET model to determine Lifecycle Analysis and Indirect Land Use Change in its Low Carbon Fuel Standard. While CARB

[40] Section 211 (o) (1) (B) of the Clean Air Act (42 U.S.C. 745(o)) as amended by the Energy Independence and Security Act of 2007 and implemented under 40 CFR 80.1401

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1331 Pennsylvania Ave, NW
Suite 505
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605 Clark Avenue
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currently determines every fuel with individual pathways, the average Carbon Intensity of the of biomass-based diesel is well below 50 percent of diesel fuel. Most of these gallons have been at a 70 percent reduction or greater with biodiesel's average slightly below that of Renewable Hydrotreated Diesel.[41]

Applying carbon intensity thresholds to a TCI program would be relatively easy. However, to properly consider regional production and domestic feedstocks are essential. According to both EPA and CARB all domestic feedstocks qualify as approximately 50 percent or greater reduction to diesel fuel inclusive of Indirect Land Use Change concerns. Current estimates suggest the weighted average Carbon reduction scores across all US biodiesel are approximately 86% below Diesel fuel.

3. Use credit multipliers until scalable alternative options exist

In the initial years of any program, a multiplier would be necessary to elevate the allowance accounting to incentivize the highest realistic blend levels. Remember that biomass-based diesels are the only realistic choice that requires no new infrastructure for the 20 percent of the fuels sector that is driven by on-road diesel. Less than 5 percent of diesel fuel is used in municipal buses and over 90 percent is used to move good in the heaviest class-8 trucks.

For example, every gallon of biodiesel purchased and consumed by the obligated parties for on-road use could garner a 2x the credit benefits. Over time, these allowances/credits could be readjusted to reflect technology changes in the medium and heavy-duty sector.

These credit multipliers can incentivize renewable diesel consumption and production, a growing popular choice for fleets.

4. Stimulate Demand

According to EIA, PADD 1 consumed more than 520 million gallons of biodiesel in 2016. Approximately 85 percent of these volumes were imported prior to the National Biodiesel Board Fair Trade Coalition winning a final antidumping determination from the U.S. Department of Commerce. Import duties imposed by the U.S. Commerce Department have nearly stopped biodiesel imports from Indonesia and Argentina that were being sold below fair-market value. This history offers key insights.

On one hand, the TCI region has proven ability to blend and consume at least 520 millions gallons. This level of consumption reflects about a B5 across PADD 1A and PADD 1B. This also suggests that many blending terminals across TCI states have the capacity to blend above B5.

On the other hand, the height of biodiesel consumption in PADD 1 corresponded to the height of low-cost foreign imports. Only approximately 15 to 20 percent of biodiesel can be made regionally today. This means that more biodiesel needs to reach TCI states via current infrastructure of rail, barge and pipeline. Only recently have many pipe-line

[41] https://www.arb.ca.gov/fuels/lcfs/lrtqsummaries.htm

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operators approved B5 for transport. This means that additional gallons will need to come via the Gulf Coast via barge and rail from PADD 2 (the largest biodiesel producing PADD). An additional 800 – 1,000 rail cars would be needed during the peak demand months. Based on US Department of Transportation data, there are over 12,000 rail cars in service that could be biodiesel compatible. However, timing may be critical. If a large number of railcars are needed suddenly, the industry may not have sufficient time to adjust without startup issues.

Furthermore, when considering the market signals from the West Coast and the financial incentives to ship the lowest carbon intense fuels to the other markets, the TCI would be best served by putting all domestic feedstocks on an even playing field. In this way, biodiesel and renewable hydrotreated diesel moving to the West Coast may not compete with biodiesel flowing to the TCI region.

5. Reevaluate Feedstock limitations.

Reducing Transportation Emissions in the Northeast and Mid-Atlantic: Fuel System Considerations, uses one reference by Wade Brorsen entitled "Projections of U.S. Production of Biodiesel Feedstock." July 2015 to state, "The major impediment to greater production of biodiesel in the US is the availability of affordable feedstock".[42] In fact, the EPA responded to this specific document by stating, "For the following reasons we believe it likely underestimates the total availability of advanced feedstocks for biodiesel and renewable diesel production in 2017. USDA's most recent World Agricultural Supply and Demand Estimates (WASDE) has larger increases in vegetable oils in the U.S. than the Nelson and Searle study. The Nelson and Searle study did not consider the availability of feedstocks for advanced biodiesel and renewable diesel production in countries other than the United States. It also assumed no significant increases in distillers' corn oil or the recovery of additional waste oils such as yellow grease or brown grease."

The latest 2018 research in the OECD-FAO Agricultural Outlook 2018-2027 suggests that vegetable oil feedstocks are more plentiful then before. "The growing demand for protein meals, especially in China, has been the main driver behind the expansion of global oilseed production." The report goes on to states that "vegetable oil prices will decline at a faster rate than protein meal prices in real terms over the outlook period." [43]

EPA acknowledges that there is an existing registered capacity in the United States alone to produce 4.2 billion gallons of biomass-based diesel.[44] The U.S. Energy Information Administration reports U.S. biodiesel capacity at 2.3 billion gallons[45] and U.S. renewable diesel capacity is roughly 300 million gallons, meaning that immediately available U.S. production capacity for biomass-based diesel is at least 2.6 billion gallons.

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[42] Wade Brorsen. "Projections of U.S. Production of Biodiesel Feedstock." July 2015. Union of Concerned Scientists. http://www.ucsusa.org/sites/default/files/attach/2015/07/Brorsen-RFS-Biodiesel-Feedstock-Analysis.pdf

[43] OECD (2016), "Biofuels", in *OECD-FAO Agricultural Outlook 2018-2027*, OECD Publishing, Paris, http://www.agri-outlook.org/

[44] Federal Register; Environmental Protection Agency; Renewable Fuel Standard Program: Standards for 2018 and Biomass-Based Diesel Volume for 2019; 82 Fed. Reg. 34234, n. 100; https://www.gpo.gov/fdsys/pkg/FR-2017-07- 21/pdf/2017-14632.pdf#page=29

[45] U.S. Energy Information Administration; Monthly Biodiesel Production Report; https://www.eia.gov/biofuels/biodiesel/production/

National Biodiesel Board
1331 Pennsylvania Ave, NW
Suite 505
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Besides the massive trade impacts on major commodities such as soybeans, federal policy elapsed Biodiesel Tax Credit, the insecurity about the future of the Renewable Fuel Standard have contributed to the shuttering of over a dozen biodiesel plants. With China's door to soybeans currently closed has left over 1 Billion bushels of soybean overstock. This overstock alone could displace millions of gallons of diesel fuel.