

CONFIDENTIAL**B20 State Mandate White Paper**

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Executive Summary:

The California Low Carbon Fuel Standard (LCFS) is spreading up the coast to Oregon, Washington, and British Columbia. This policy has had tremendous impacts on the biomass-based diesel industry on a national scale, driving increased demand on the West Coast. However, as this paper lays out, LCFS policies have and will continue to create some negative consequences for certain segments of the biomass-based diesel industry and related ag markets. There is a movement that is being led by The Great Plains Institute, Low Carbon Fuels Coalition, and others to export low carbon fuels policies from California to the East coast and to mid-continent states.¹

There has been a receptiveness to this effort by biofuel producers due to a sustained breakdown of cornerstone federal policies. California's LCFS policy is well-received in California and the coastal states. But biodiesel producers who have investments in biodiesel production facilities in the interior of the continent should understand the predictable impacts of bringing California's policy to the Midwest and other parts of the country. First, the program is incredibly complex and over-engineered. It relies on constantly evolving regulations based on decisions made by state government employees, which creates uncertainty in markets. The policy heavily favors renewable hydrocarbon diesel (RHD) over biodiesel simply because of the way the implementation of the policy effects how blend margins are captured. As a result of this arbitrary advantage to RHD, approximately 1.5 billion gallons of new RHD production capacity projects have been announced. The policy also incentivizes the development of new co-processed renewable diesel (CPRD). It further incentivizes imports of RHD, BD, and Brazilian sugarcane ethanol, all at the expense of domestic biomass-based diesel. The policy also heavily disadvantages first use vegetable oils which make up approximately 70% of the domestic feedstock supply. This disadvantage has already begun to skew markets and further weaken demand for soy that has already been hurt by the trade war with China and the COVID-19 outbreak. California's LCFS is trending toward approaching half of the nation's biomass-based diesel and undifferentiated advanced consumption (D4 and D5 RIN category volumes in the RFS) in the next couple of years. This factor is already creating market threats to biodiesel companies and the soybean industry in the middle of the country. However, if the Midwest imports LCFS policy from California, it can be expected that the negative aspects of that policy will be exacerbated greatly. For example, new RHD and CPRD projects would be expected to arise to respond to the new policy, crowding out existing investments in biodiesel plants. Soy

¹ Great Plains Institute [proposal](#) for Midwest-wide state LCFS programs. See also Low Carbon Fuel Coalition meeting in Des Moines June 8, 2019. These efforts are supported by REG and NBB.

would likely go from the market leader to the discount feedstock given its disadvantage to other feedstocks under LCFS policies.

Adding to these market-skewing dynamics is the fact that the three largest national truck stop chains have aggregated a majority of the biodiesel buying power on a national scale.² With such a large percentage of the nation's biodiesel buying power in the hands of a few buyers from three companies, they are able to push prices down setting them at deep discounts to ULSD. Often these discounted prices are below the cost of production for biodiesel producers. This dynamic significantly hinders biodiesel producer's ability to capture credit values and blend margins. RHD diesel prices on the other hand are not under the grip of this repressive buying power because RHD is sold as simply ULSD, which allows the RHD to capture most of the credit values and blend margins. This advantage to RHD is not because RHD is a cheaper, superior molecule. Indeed, as described below, RHD is a more expensive and in some ways has less benefits than biodiesel compared to ULSD for performance, health, safety, durability, maintenance and emissions.

However, there is a model for a straight-forward, Midwestern, Low Carbon Fuel Policy that provides all of the carbon benefits to the heavy-duty sector at a low cost, and without the negative consequences to existing stakeholders or markets. That policy is the Minnesota B20 requirement (20% renewable component requirement in the state's diesel fuel). Since the state's statewide mandate increased from B10 to B20 it has been a success story. It offers all of the carbon benefits with none of the over-regulation, market distortions, or uncertainties. It does not incentivize CPRD or imports, it doesn't disadvantage biodiesel or vegetable oils, and favors local production from regionally-produced feedstocks. The Minnesota B20 mandate does not disadvantage RHD, but allows RHD and biodiesel to compete head-to-head on price and performance. A Minnesota-style mandate is a far less expensive way to achieve immediate carbon benefits in the heavy-duty sector. Indeed, the program achieved 7.4 billion pounds of CO2 reduction this year by seamlessly switching to B20, while adding an estimated \$1.7 billion to the Minnesota economy.³ In addition to carbon reduction, B20 from biodiesel has performance, operational safety, and environmental and health benefits compared to diesel fuel and has improved the state's diesel fuel supply. The Minnesota B20 policy should be the model for other states in the Midwest to achieve the same immediate benefits in the heavy-duty sector.

Introduction:

The future of the biomass-based diesel industry (biodiesel (BD) and stand-alone renewable hydrocarbon diesel (RHD)) is currently being shaped by a number of federal and state policies. The three most influential include the two cornerstone federal policies - the renewable fuel

² This trend was predicted in 2016 and 2017 during the point of obligation discussion. See December 2016 article in [Biofuels International](#), and has since materialized.

³ Source, [Minnesota](#) Soybean Association and Minnesota Department of Agriculture.

standard (RFS) and the blenders tax credit (BTC) - and the state policy in California known as the Low Carbon Fuel Standard (LCFS). All three of these policies have significant deficiencies that create volatilities in the marketplace. The biodiesel tax credit has been lapsed since January 1, 2016. It was reinstated in March of 2018 retroactively for the calendar year 2017. However, the market has continued to price in the belief that the tax credit will be reinstated as it has in the past since its enactment in 2004, and implementation in 2005. This pricing forces biodiesel companies to take huge risks which are existential threats to their businesses in order to operate. And it forces out of business the small and independent biodiesel companies who cannot carry these risks. We are in the longest period of BTC lapse well into our second year. With each lapse, the sense of political urgency to reinstate it in a timely manner is diminished, and the risk of it never coming back is increased.

Maintaining a functional RFS has continued to be a constant struggle because of interference by the obligated party opponent's (independent petroleum refiners). These opponents continue to exert influence on EPA to conduct a wide range of measures aimed at lowering renewable volume obligations (RVOs) and to weaken renewable identification number (RIN) prices.

The California LCFS is a powerful driver of biomass-based diesel demand currently. Based on current trends, the LCFS is likely to generate half of the continent's demand by 2023. But the California policy landscape has significant weaknesses. It disadvantages soy and other first use vegetable oils (approximately 70% of the industry's available feedstock) because of flawed attribution of theoretical indirect land use changes. It advantages RHD because of biodiesel NOx emissions and the way RHD blend margins are more easily captured by the mechanics of the policy. And the policy favors co-processed renewable diesel (CPRD) and imports of Brazilian sugarcane ethanol and imports of biomass-based diesel, all at the expense of domestic biodiesel. Most importantly, California policymakers and stakeholders do not want to incentivize biofuels, but rather they see biofuels as only a transition fuel to electric vehicles including heavy-duty applications. The program has been highly over-engineered, making compliance incredibly complicated and expensive. Like the RFS and the BTC, the LCFS presents a constant series of challenges including lawsuits by the ethanol and petroleum industries, and other threats and challenges presented by the California Air Resources Board (CARB), non-governmental organizations (NGOs), the California Water Board, and the Certified Unified Program Agencies (CUPAs) .

B20 State Policies:

The state of Minnesota just completed its first year of the state-wide B20 mandate. It did so with no reported performance problems with the fuel, and an overall smooth implementation of the program. According to the Minnesota Department of Agriculture, the mandate creates a demand for 130 million gallons of biodiesel per year.⁴ Minnesota passed the first state

⁴ [MN Department of Agriculture Website](#). The mandate is 20% biodiesel content requirement from April – September and 5% from October – March. The Department sites economic and environmental benefits to the

biodiesel mandate (B2) in 2004 with the intention of leading the way for other Ag states in the Midwest to follow suit creating a large regional biodiesel market. 9 other states have since passed low blend mandates and four other states have actually implemented those mandates including Oregon, Washington, New York, and Pennsylvania.

Given the current strength of the demand generation being stimulated in California by the LCFS, there has been much discussion about pursuing similar state carbon policy in other parts of the country. However, for reasons stated earlier, pursuing state B20 mandates would be far superior policies for the existing biodiesel industry and their allies in the soybean industry. The state of Minnesota led by the Minnesota Soybean Association (MSA) and Minnesota Soybean Research and Promotion Council (MSRPC) have demonstrated that a B20 mandate can have significant ag, environmental, and economic benefits to a state. Minnesota has established the beachhead for this effort overcoming all of the alarmist arguments of the opponents and overcoming legal, legislative, and technical challenges. At a recent Midwest regional NBB member meeting, Tom Slunecka, Executive Director of Minnesota Soy, attended the meeting to deliver the message to the other five state stakeholders in attendance that Minnesota is willing to help them pursue a B20 mandate in their states based on Minnesota's experience.

A Midwest regional block of B20 mandate states could have tremendous benefits to the biodiesel, soy, and other ag sectors and to the states themselves. Such a block of B20 mandates would bring stability to the national market buttressing the instability created by the two federal and West coast LCFS policies. State mandates are permanent policy that don't require annual rulemakings with opposing sides fighting for higher or lower volumes. Whether the BTC is lapsed or RIN prices are low, the mandate continues to generate stable demand. Soybean farmers are not participating currently in the healthy economy because they are being disproportionately harmed by the trade war with China. The timing is actually good for soybean groups to ask for something from their state assemblies, especially their Republican controlled state houses. The only state constituent group that has a strong argument against a state B20 mandate are petroleum refiners who stand to lose distillate fuel market share. Other than Illinois and Pennsylvania, most of the states identified as possible B20 mandate states do not have strong refiner constituencies.⁵

There are other ancillary benefits to having a regional block of statewide B20 mandates. First, it would eliminate the EPA's absurd assertion that biomass-based diesel has a B5 blendwall, which it uses to justify its tepid RVO increases each year. Second, LCFS programs are fueling a disturbing trend that threatens to diminish the soybean industry reputationally and to artificially constrain the biomass-based diesel industry. The trend is one that is tilting toward distinguishing between "good biodiesel" and "bad biodiesel" based on the feedstocks and using

state but is based on the previous B10 mandate of 74 mgly and the data has not yet been updated for the 130 mgly generated by the new B20 mandate.

⁵ [US refinery data](#). This statement is not meant to convey that state B20 policies would not encounter opposition as they most certainly will.

flawed modeling assumptions. B20 mandates counter this harmful trend. B20 mandates allow biomass-based diesel that meets the respective quality specification using feedstocks that have an EPA-approved pathway that qualify it as an Advanced Biofuel (greater than 50% GHG reduction) complies to meet the minimum renewable requirement of 20%.

Table 1 below identifies 12 states that have significant potential as top targets for B20 mandate policies. These states were selected based on a number of factors including state biodiesel and ag constituents in the states that have the resources and ability to wage such an initiative in their states. There are some states that are not included in the list such as Texas which is far and away the leading diesel consumer in the nation at 6.2 B gpy (20% of which would amount to 1.24 B gallons of biodiesel). However, it was not included in the list because of the anticipated opposition by the Texas oil industry. There are also some states that could easily be added to the list such as the Dakotas, Carolinas and New York State. Of the states that were selected for the list in Table 1, the total potential demand generation is 2.7 bgy, which exceeds the current industry domestic production. By adding in Minnesota's volume, the B20 regional block would account for nearly 3 bgy. Even if just a portion of these state initiatives were to be successful, it would provide a significant wave break against the tremendous uncertainties and volatilities created by current federal and state policy challenges. Demand generated by B20 mandates are not at the mercy of whether federal tax credits are lapsed, or the impact of the latest attacks on RIN prices by RFS opponents. B20 mandates are also not at the mercy of California state policy which favors RHD and CPRD as well as a limited supply of animal fats and used vegetable oils.

“Our State Will Never Pass a Mandate”

State low carbon policies are coming sooner or later. Ag states have an opportunity to do what Minnesota did and to put in place a powerful low carbon policy that actually benefits ag rather than punishes ag. Renewable fuel producers have an opportunity to lead and to shape these policy initiatives. We are entering an important inflection point befitting the axiom, “If you're not at the table, you're probably on the menu.” And if there ever was a time when ag is in need of a win, this is the time. State B20 mandates are the most technology-neutral, feedstock-neutral, simple, straight-forward, and cost-effective way to make immediate and significant reductions in a state's heavy-duty transportation sector. A B20 mandate could be a stand-alone initiative or it could be a part of an overall Low Carbon Fuel state program.

TABLE 1

State	Diesel gal/yr.	20% Biodiesel
Missouri	1,100,600,000	220,120,000.00
Iowa	721,000,000	144,200,000.00
Nebraska	594,000,000	118,800,000.00
Kansas	646,000,000	129,200,000.00
Illinois	1,864,000,000	372,800,000.00

Arkansas	678,000,000	135,600,000.00
Kentucky	931,500,000	186,300,000.00
Tennessee	1,096,746,000	219,349,200.00
Ohio	1,720,614,000	344,122,800.00
Indiana	1,270,878,000	254,175,600.00
Pennsylvania	1,448,538,000	289,707,600.00
Florida	1,844,178,000	368,835,600.00
Total	13,916,054,000	2,783,210,800.00

Source: [US Energy Information Agency](#) citing BBL/yr translated to gal/yr (BBL/yr x 42)
Distillate fuel oil used in transportation. The above numbers reflect BD or RHD volumes of 20% state-wide and year-round. If the legislation called for a reduction of the content requirement during winter months, the volumes would be less.

Biodiesel and Renewable Hydrocarbon Diesel:

Biodiesel and renewable hydrocarbon diesel⁶ are different fuels using different refining technologies. Chemically, they have both similarities and differences; both have advantages and disadvantages compared to the other. Both are renewable replacement fuels for petroleum diesel and have similar GHG reduction (avg 80%), as well as energy and economic security benefits. Both are made from the same fats and oils feedstocks. Both can be used in pure form as a fuel or in blends with diesel fuel in existing diesel vehicles. Both are “biomass-based diesel” designated by the EPA as Advanced Biofuels that comply with RFS, LCFS, and other state and federal renewable fuel policies.

Renewable hydrocarbon diesel:

Renewable diesel (RHD) is different from biodiesel in that it is made by a conventional refining process by hydrotreating the feedstock to create a product that is chemically indistinguishable from diesel fuel. RHD by-products are renewable propane and renewable gasoline (naptha). RHD is usually sold in pure form (R100) as ULSD and can be moved in pipelines as ULSD. RHD has a similar emissions profile as diesel fuel. It is suitable to use in aviation and marine applications; both of these sectors are moving to desulfurize as well as decarbonize. RHD is a suitable low sulfur, low carbon replacement. Indeed, RHD is currently the only low sulfur, low carbon replacement fuel for those sectors.

Biodiesel:

Biodiesel (BD) is made by reacting a lipid (natural fat or oil) with an alcohol to produce a methyl ester. Glycerin is a by-product. BD contains 11% oxygen which makes it burn cleaner, reducing virtually every regulated emission. BD in pure form is a registered fuel and is used as B100 in some applications, but is most often used in blends up to B20. In blends up to B20, it is a drop-

⁶ The BD and RHD referred to here is produced in a dedicated refinery producing 100% renewable fuel as opposed to CPRD which is process where small amounts of fats and oils (1-3%) are blended into the crude oil stream in a conventional petroleum refinery.

in replacement fuel, with support from virtually all original equipment manufacturers (OEMs). In higher blends such as B100, there are issues to manage including cold temperature operability, OEM acceptance, and a slight NOx increase, but these are not issues in blends up to B20.

RHD has the following advantages over biodiesel:

- 1) RHD is considered to be ULSD even when used in pure form.
- 2) RHD can be moved in pipelines in pure form.
- 3) RHD is a fit-for-purpose fuel in aviation and marine applications, which biodiesel is less suited.

Biodiesel has the following advantages over RHD:

- 1) BD is less expensive than RHD. RHD has a 2x-4x capex cost to build the refinery and it has a higher opex cost because it requires the use of hydrogen and more energy in the process.
- 2) Biodiesel has a better emissions/health/safety profile than RHD. RHD has a similar health and emissions profile as diesel fuel. Biodiesel is an oxygenated fuel that makes it burn cleaner than diesel fuel for virtually every regulated emission. BD is less toxic than table salt and biodegrades as fast as sugar.
- 3) BD has been shown to reduce maintenance costs in both the diesel particulate filter and the fuel injection system. Because of the oxygenation, BD blends trigger the regeneration event of diesel particulate filters (DPF's) at cooler temps – this reduces DPF maintenance and replacement costs. Also the fuel's natural lubricity extends the life of the fuel injection system in a diesel engine.
- 4) Blends of B5-B20 have premium diesel characteristics compared to diesel fuel as well as RHD (except for cetane and sulfur which are similar for BD and RHD). BD has:
 - Higher lubricity and cetane (performance)
 - Higher conductivity and flashpoint (safety)
 - Lower sulfur and aromatics (emissions)
 - Oxygenated fuel (emissions, performance, maintenance)
 - Solvency acts similar to a detergent additive in premium diesel to help keep the fuel system clean (maintenance)

In these ways, B20 BD is a superior fuel to diesel fuel (and in some ways RHD). B20/RHD80 is the best fuel of all, providing the 100% renewability and maximum carbon benefits of RHD with the added health, environmental, safety, maintenance, performance, and cost benefits of biodiesel.

As a demonstration of B20's performance benefits, B20 set the diesel land speed record. In 2011, Brent Hyjeck set the B Production Diesel Land Speed World Record running on ULSD at

171 mph on the Bonneville Salt Flatts with a Ford F250. On his second run he drained the tank, replaced the diesel fuel with B20 and broke the record he had just set using the same truck – nothing was different except the fuel. The new record: 182 mph.



This achievement was a part of the decision by Ford to incorporate the B20 insignia into the Power Stroke emblem that goes on the side of every Ford diesel pickup truck throughout the world.

Conclusions:

- The failure of the federal government to properly manage the two cornerstone biomass-based diesel policies in a predictable way is threatening biodiesel companies in the interior of the country with extinction.
- The California LCFS policy is driving demand, but it disadvantages biodiesel and has stimulated expansion of new RHD capacity, co-processing projects, and imports, which is exacerbating the threat to biodiesel investments in the interior of the country.
- The LCFS policy is neither technology neutral or feedstock neutral and penalizes first-use vegetable oils with indirect land use change theories from ten years ago that did not occur.
- B20 is a fuel that is superior to diesel fuel in health, environmental, safety, maintenance costs, and (the one people forget) *performance*.
- State low carbon transportation policies are coming to the Midwest sooner or later and are building momentum now.
- Biodiesel companies have an opportunity to mobilize with its allies in the Ag sector to help shape these policies in Ag states which will fortify biodiesel investments from the threats mentioned above.
- A block of B20 state policies could loosen the grip that the three largest national truck stop chains have aggregated on biodiesel prices, which currently gives RHD an arbitrary advantage over biodiesel. This arbitrary advantage to RHD creates an anti-competitive disadvantage to consumers because it favors the more expensive, less beneficial molecule.
- Minnesota-style low carbon policy in the form of state B20 mandates is a better approach for the Midwest than the California LCFS model. State-wide use of B20 is the best way for a state to make immediate and significant reductions in carbon in the heavy-duty transportation sector. It does so with a policy that is the most technology-neutral, feedstock-neutral, simple, straight-forward, and cost-effective way available. It

utilizes a diverse supply of regionally abundant agricultural feedstocks produced from existing regional production capacity investments.

This white paper is the work product of [Rock House Advisors LLC](#), 7-2-19. It is a confidential concept paper but can be shared with permission by the author. Contact joe@rockhouse.us