DEPARTMENT OF AGRICULTURE

Report to the Legislature

Annual Report on Biodiesel

Kevin Hennessy
Bioenergy Manager
625 Robert Street North
Saint Paul, Minnesota 55155
Phone: 651-201-6223

www.mda.state.mn.us

January 15, 2019

Table of Contents

Pursuant to Minnesota Statutes, section 3.197, the cost of preparing this report was approximately $1,200.

Executive Summary[1]

As required by the Biodiesel Content Mandate statute, Minnesota Statutes, section 239.77, subd. 5(a), this report contains information on:

- Implementation of the minimum content requirements of the statute;
- The price and supply of biodiesel fuel; and
- The impacts of the biodiesel mandate on:
    - The development of biodiesel production capacity in the state; and
    - The use of feedstock grown or raised in the state for biodiesel production.

Biodiesel is defined in Minnesota Statutes, section 239.77, subd. 1(b) as:

> "…a renewable, biodegradable, mono alkyl ester combustible fuel that is derived from agricultural and other plant oils or animal fats that meets American Society of Testing and Materials (ASTM) specification D6751-11b for Biodiesel Fuel (B100) Blend Stock for Distillate Fuels..."

Biodiesel in Minnesota is produced from soybeans, corn, and recycled fats, oils, and greases. In practice, biodiesel is generally blended with diesel fuel.

Through its Biodiesel Content Mandate statute, Minnesota has a requirement for all No. 2[2] diesel fuel sold or offered for sale to have a certain minimum biodiesel content. The initial mandate, passed in 2002 and implemented in 2005, was two-percent biodiesel (B2). The statute was amended in 2008 to add provisions for moving the blending requirement to 5, 10, and 20 percent (B5, B10, and B20).

The B10 and B20 mandated content levels are effective only during the warm-weather months of April through September. The content level reverts to B5 during cold-weather months of October through March, when changes in viscosity of diesel fuels (known as "gelling" or "waxing") can cause performance problems in engines.

The statute provides that, before the B10 or B20 content levels can be implemented, the Commissioners of the Minnesota Department of Agriculture, Minnesota Department of Commerce, and the Minnesota Pollution Control Agency must determine whether four statutory conditions have been met. These conditions involve federal standards for blend specifications, the production capacity of biodiesel in Minnesota, the amount of infrastructure and regulatory protocol for biodiesel blending, and the source of feedstocks.

B5 was implemented in 2009, B10 was implemented in 2014, and B20 was implemented in 2018.

[1] The executive summary addresses comments on an earlier draft from Biodiesel Task Force members.

[2] There are three different classes of diesel fuel based on the ability of the fuel to flow ("viscosity" and "pour point"). No. 2 diesel (often shown as "#2") is standard diesel fuel used in warm-weather months. No. 1 (#1, a.k.a. kerosene) diesel is a lighter fuel which is often mixed with No. 2 diesel in winter months. No 1 diesel is exempt from the biodiesel content mandate. No. 4 (#4) diesel is a heavy fuel not typically used in vehicles.

In July 2017, after an interagency review and in consultation with the Minnesota Biodiesel Task Force, stakeholders, and technical experts, the three agency commissioners determined that the four conditions had been met, and that Minnesota was prepared to move to the next scheduled minimum content level of 20 percent (B20) on May 1, 2018. The state moved to B20 on May 1, but supply issues soon after that date resulted in Minnesota Department of Commerce action under Minnesota Statutes, section 239.77, subd. 2(a), to reduce the minimum blending requirement to 10% for the remainder of May and June. B20 was reinstated on July 1, 2018, and was in effect through the end of the warm weather period.

The price of diesel fuel offered for sale in Minnesota is affected by multiple factors, including the price of components (petroleum diesel and biodiesel), and state and federal policies. Most important among federal policies are the Renewable Fuel Standard and the Biodiesel Blenders Tax Credit. This report describes the pricing of petroleum diesel and biodiesel components of diesel fuel, and the net wholesale price of diesel as affected by federal policies.

The supply of biodiesel is affected by blending requirements, federal policy, and the demand for biodiesel from retailers, driven in part by the state mandate. This report describes the policy effects and the resulting estimated supply.

The Biodiesel Content Mandate statute requires this report to: "…include information about the impacts of the biodiesel mandate on the development of biodiesel production capacity in the state, and on the use of feedstock grown or raised in the state for biodiesel production" (Minnesota Statutes, section 239.77, subd. 5(a)). It is not possible to demonstrate a cause-and-effect relationship between the mandate and production capacity or feedstock use. It is, however, reasonable to assume that the mandate has had a significant effect on both production and feedstock use.

Production capacity and feedstock use in 2016 were summarized in the Minnesota Department of Agriculture's May 2017 report, *Economic Impact of the Minnesota Biodiesel Industry*.[3] According to the report:

- Production had increased from the amount represented by the initial B2 mandate—16 million gallons per year (mgy)—to 74 mgy in 2016.
- Production was from diverse feedstocks: soybeans were the feedstock of 45 percent of biodiesel in the state, while other oils, fats and greases comprised the remaining 55 percent of the feedstock.
- Biodiesel consumption in Minnesota in 2016 was 77 mg, representing nearly 8 percent of the 1 billion gallons per year of diesel consumption in Minnesota. The amount of biodiesel produced in Minnesota was 74 mg, representing 96 percent of consumption.

[3] *Economic Impact of the Minnesota Biodiesel Industry*, Minnesota Department of Agriculture, May 2017 (find on the MDA Biodiesel webpage at: www.mda.state.mn.us/renewable/biodiesel).

Introduction

This report is submitted pursuant to Minnesota Statutes, section 239.77, subd. 5(a):

> "Beginning in 2009, the commissioner of agriculture must report by January 15 of each year to the chairs and ranking minority members of the legislative committees and divisions with jurisdiction over agriculture policy and finance regarding the implementation of the minimum content requirements in subdivision 2, including information about the price and supply of biodiesel fuel. The report shall include information about the impacts of the biodiesel mandate on the development of biodiesel production capacity in the state, and on the use of feedstock grown or raised in the state for biodiesel production. The report must include any written comments received from members of the biodiesel fuel task force by January 1 of that year designated by them for inclusion in the report."

Background

Minnesota has a requirement for all diesel fuel sold or offered for sale to have a certain minimum biodiesel content. The minimum content percentages are specified in law (Minnesota Statutes, section 239.77, subd. 2):

(1)	September 29, 2005	2 percent
(2)	May 1, 2009	5 percent
(3)	May 1, 2012	10 percent
(4)	May 1, 2018	20 percent

The 10 percent and 20 percent (B10 and B20) minimum content levels go into effect only after the Commissioners of the Minnesota Department of Agriculture (MDA), Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Commerce (Commerce) have consulted with the Biodiesel Task Force and determined that four conditions specified in the law are met, notice is published in the State Register, and notice is provided to certain specified legislative chairs. These conditions in statute are:

> (1) an American Society for Testing and Materials specification or equivalent federal standard exists for the next minimum diesel-biodiesel blend;
>
> (2) a sufficient supply of biodiesel is available and the amount of biodiesel produced in this state from feedstock with at least 75 percent that is produced in the United States and Canada is equal to at least 50 percent of anticipated demand at the next minimum content level;
>
> (3) adequate blending infrastructure and regulatory protocol are in place in order to promote biodiesel quality and avoid any potential economic disruption; and
>
> (4) at least 5 percent of the amount of biodiesel necessary for that minimum content level will be produced from a biological resource other than an agricultural resource

> traditionally grown or raised in the state, including, but not limited to, algae cultivated for biofuels production, waste oils, and tallow.
>
> Minnesota Statutes, section 239.77, subd. 2(b)(1) to (4).

The Biodiesel Task Force was established by the MDA in 2003 to help the state carry out its biodiesel mandate. Since then, the Task Force has met on an ad-hoc basis to discuss issues related to biodiesel production and its use. Sub-teams have been formed to address more specific issues such as cold weather operability.

The Biodiesel Task Force members are appointed by the Commissioner of Agriculture. Current membership was appointed September 2017, and expires June 30, 2019. Task Force members apply through the Minnesota Secretary of State's Open Appointments process which is now conducted entirely online.

The current members include:

- Ralph Groschen (At Large Member)
- Dustin Haaland, CHS Inc. (Petroleum Industry Representative)
- John Hausladen, Minnesota Trucking Association (Fuel User Group Representative)
- Scott Hedderich, REG Company, Chairperson (Processing Industry Representative)
- Bruce Heine, Magellan Midstream Partners, LP (Petroleum Industry Representative)
- Chris Hill, Minnesota Soybean Growers Association (Grower's Organization Representative)
- Jon Hunter, American Lung Association in Minnesota (Environmental Organization Representative)
- Ronald Marr, Minnesota Soybean Processors (Processing Industry Representative)
- Kevin Paap, Minnesota Farm Bureau (Farm Organization Representative)
- Steve Rupp, Ever Cat Fuels (Processing Industry Representative)
- Michael W. Stutelberg, AURI (Research Institution Representative)
- Kevin Thoma, Minnesota Petroleum Marketers Association (Petroleum Industry Representative)
- Brett Webb, Flint Hills Resources, LP (Petroleum Industry Representative)
- Gary Wertish, Minnesota Farmers Union (Farm Organization Representative)
- Darrick Zarling, University of Minnesota (Research Institution Representative)

Comments of the Biodiesel Task Force on this report are included in Appendix A.

Background on Biodiesel

Biodiesel is defined in Minnesota Statutes, section 239.77, subd. 1(b) as:

> "…a renewable, biodegradable, mono alkyl ester combustible fuel that is derived from agricultural and other plant oils or animal fats that meets American Society of Testing and Materials (ASTM) specification D6751-11b for Biodiesel Fuel (B100) Blend Stock for Distillate Fuels..."

In practice, biodiesel is generally blended with diesel fuel. The ASTM[4] specification of diesel fuel (ASTM D975) can contain up to five percent biodiesel. A separate standard exists for blends of B6 to B20 (ASTM D7467).

Biodiesel in Minnesota is produced from soybeans, corn, and recycled fats, oils and greases. Biodiesel production adds value to all these commodities.

Biodiesel is considered an advanced biofuel as well as "biomass-based diesel" in the Renewable Fuel Standard's classification of renewable fuels. Advanced biofuels under that classification must demonstrate at least a 50 percent greenhouse gas benefit over the fossil fuel that it replaces. Biodiesel has a positive energy balance, producing 5.54 units of energy for every unit of fossil energy consumed over its lifecycle.[5] Biodiesel produced from waste and recycled oils has some of the lowest carbon intensity ratings in the California Air Resources Board (CARB) system because of its ability to reduce greenhouse gas emissions.

The MDA's 2017 study, *Economic Impact of the Minnesota Biodiesel Industry,* determined that the economic impact of Minnesota's 2016 biodiesel production, including direct, indirect, and induced impacts, was $1.7 billion. The total employment impact was estimated as 5,397 jobs. Every one million gallons of biodiesel production was found to contribute $2.8 million in statewide economic output, supporting 73 jobs.[6]

According to the study, Minnesota currently ranks tenth among U.S. states in biodiesel production. Due to improved efficiencies at the plants, total Minnesota biodiesel plant capacity has increased from an original nameplate capacity of 63 million gallons per year (mgy) to 74 mgy.[7]

According to the National Soybean Board, biodiesel increased the value of a bushel of soybeans by 63 cents between 2006 and 2015. This increased the value of soybean oil to U.S. farmers by $18.8 billion and decreased the price of soybean meal by up to $48 per ton.[8]

The use of biodiesel and biodiesel/diesel blends reduces almost all forms of air pollution compared to petroleum diesel, with the most important reductions being air toxics and cancer-causing compounds. Biodiesel also reduces greenhouse gas emissions due to its production from recently-grown plant materials, in contrast to fossil fuels that have been sequestered in the earth for millions to billions of years.[9]

---

[4] ASTM International, formerly known as the American Society of Testing and Materials, is an international standards organization.

[5] A. Pradhan et al. *Energy Life-Cycle Assessment of Soybean Biodiesel Revisited*. Transactions of the ASABE, Vol. 54(3), pages 1031-1039.

[6] *Economic Impact of the Minnesota Biodiesel Industry*, Minnesota Department of Agriculture, May 2017 (find on the MDA Biodiesel webpage at: www.mda.state.mn.us/renewable/biodiesel).

[7] Ibid.

[8] United Soybean Board website (https://unitedsoybean.org/media-center/issue-briefs/biodiesel/).

[9] Biodiesel-Clean, Green Diesel Fuel. U.S. DOE by the National Renewable Energy Laboratory. July, 2015 (https://www.afdc.energy.gov/fuels/biodiesel.html).

Performance of Biodiesel in Vehicles

B5 has been used in winter months since it was first implemented in Minnesota in 2009. The current standard for diesel fuel, ASTM D975, specifies up to 5 percent biodiesel content.

The current blending requirement for B20 was implemented on May 1, 2018. It is in effect for the warm-weather months of April[10] through September, and then reverts to B5 for the cold-weather months of October through March, when changes in viscosity of diesel fuels (known as "gelling" or "waxing") can cause performance problems in engines.

The Diesel Help Line is a service available to Minnesotans who experience problems with diesel fuel of any type. Anyone experiencing a problem with diesel fuel is encouraged to call and, if needed, arrange to submit samples to the Help Line. Diesel fuel problems are analyzed to determine the root cause, and, when possible, are traced to a specific fueling source.

The MDA publishes a brochure entitled "Understanding Minnesota's Biodiesel Requirement: A user's guide for biodiesel blends from B5-B20." Available in paper copy and on the MDA's website (www.mda.state.mn.us/renewable/biodiesel), the brochure provides information to consumers on use of higher biodiesel blends.

Implementation of the Biodiesel Mandate

The original Biodiesel Content Mandate, adopted in 2002,[11] specified blending of at least 2 percent biodiesel fuel oil with all diesel transportation fuel sold or offered for sale in Minnesota. The implementation date was September 29, 2005.

In 2008, the Minnesota Legislature amended Minnesota Statutes, section 239.77 to add provisions for moving the blending requirement to 5, 10, and 20 percent[12]. All three dates were set to May 1: 2009 for B5, 2012 for B10, and 2015 for B20. B5 was implemented on May 1, 2009.

B10 and B20 Mandates

As stated previously, before a new mandate could be implemented, the Biodiesel Content Mandate statute (Minnesota Statutes, section 239.77, subd. 2 (b)), requires the commissioners of MDA, Commerce, and the MPCA to determine whether four statutory conditions have been met. These conditions involve federal standards for blend specifications, the production capacity of biodiesel in Minnesota, the adequacy of infrastructure and regulatory protocol for biodiesel blending, and the source of feedstocks.

The B10 blending date was postponed in 2011 due to inadequate blending infrastructure, specifically in the southwest region of the state, and also due to inadequate regulatory protocol. The opening of a biodiesel blending site in Sioux Falls, SD, in late 2012, and the institution of new regulatory protocol

[10] In 2018 B20 took effect on May 1; in succeeding years B20 will take effect on April 15 after a short period of April 1 through April 14 at B10.
[11] Laws of Minnesota 2002, chapter 244
[12] Laws of Minnesota 2008, chapter 297, article 1, section 51

that tracked the biodiesel content in all shipments of fuel, cleared the way for the B10 blending level to be approved. B10 was implemented on July 1, 2014.

In July 2017, after an interagency review, and in consultation with the Minnesota Biodiesel Task Force, stakeholders, and technical experts, the three agency commissioners (MDA, Commerce, and MPCA) determined that the four conditions had been met, and that Minnesota was prepared to move to the next scheduled minimum content level of 20 percent (B20) on May 1, 2018.

The minimum blending requirement rose to 10% biodiesel in No. 2 diesel[13] on April 1, 2018, and then to B20 on May 1. Soon after May 1, supply was disrupted due to maintenance at one of the state's biodiesel plants. Due to this disruption of supply, and as a precautionary measure, the Minnesota Department of Commerce, pursuant to Minnesota Statutes, section 239.77, subd. 2(a), ordered the minimum blending requirement to be lowered to 10% from May 21 through June. On July 1, the level was returned to 20% through the month of September.

Legislation adopted in 2018 designated April 1 through 14 as a B10 ramp-up time, with the 20% minimum blending requirement in No. 2 diesel beginning on April 15. The sunset date was also removed from the exception for No. 1 diesel from the biodiesel content mandate.

Price and Supply of Biodiesel

The price of diesel fuel offered for sale in Minnesota is affected by multiple factors, including the price of components (petroleum diesel and biodiesel), and state and federal policies. Most important among federal policies are the Renewable Fuel Standard and the Biodiesel Blenders Tax Credit. This section describes the pricing of petroleum diesel and biodiesel components of diesel fuel, and the net wholesale price of diesel as affected by federal policies.

The supply of biodiesel is affected by blending requirements, federal policy, and the demand for biodiesel from retailers, driven in part by the state mandate. This section describes the policy effects and the resulting estimated supply.

Federal Policy and Its Influence on Biodiesel Price and Supply

As stated above, the most important federal policies affecting price are the Renewable Fuel Standard and the Biodiesel Blenders Tax Credit.

The Renewable Fuel Standard (RFS), Renewable Identification Numbers (RINS), and Renewable Volume Obligations (RVOs)

In 2007 the federal Energy Independence and Security Act (EISA) was passed by Congress and signed by President George W. Bush, revising the Renewable Fuel Standard (RFS, now RFS2) that was already in

[13] There are three different classes of diesel fuel based on the ability of the fuel to flow ("viscosity" and "pour point"). No. 2 diesel (often shown as "#2") is standard diesel fuel used in warm-weather months. No. 1 (#1, a.k.a. kerosene) diesel is a lighter fuel which is often mixed with No. 2 diesel in winter months. No 1 diesel is exempt from the biodiesel content mandate. No. 4 (#4) diesel is a heavy fuel not typically used in vehicles.

place. This law requires refiners and/or importers of petroleum (also known as obligated parties) to blend increasing volumes of biofuels on an annual basis. Volumes (Renewable Volume Obligations or RVOs), set by Congress and modified by the USEPA, are divided proportionally among all obligated parties, giving each obligated party a total amount of biofuel that they will need to show compliance for blending.

Every gallon of biofuel produced that qualifies for RFS2 carries with it a Renewable Identification Number, or RIN. The RIN is used by the obligated party to show compliance with RFS2. RINs can be used (or "retired") by an obligated party in two ways:

1. Gallons of biofuel are blended with petroleum fuels. Once biofuel is blended, the RIN can be "separated" from the fuel with which it is associated, and retired.
2. RINs can be purchased in the RIN market. Obligated parties that blend more fuel than their obligation requires, or fuel distributors that are not refiners and/or importers of petroleum (also referred to as "third party blenders"), can sell RINs into the market after fuel is blended.

In the second case above, the value obtained by selling the RIN represents another income stream for the obligated party who has met their obligation, or a third party blender who has no obligation under RFS2.

RVOs have been increased fairly consistently over the years, from 1.00 billion gallons in 2012 to 2.43 billion gallons in 2020. The 2018 and 2019 RVO for biodiesel is 2.10 billion gallons.

Biodiesel can also be used to satisfy an obligated party's requirement in the advanced biofuel category. The advanced biofuel blending volume under RFS2 was decreased slightly in 2018, with a total of 1.969 billion gallons set for non-cellulosic advanced biofuel. It is scheduled to increase to 2.402 million gallons for 2019.

Federal Biodiesel Blenders Tax Credit

The federal Biodiesel Blenders Tax Credit was first implemented in 2005. This allowed blenders of biodiesel and renewable diesel (renewable diesel being ASTM D975 specification renewable fuel) to claim $1 per gallon against their federal tax liability. The tax credit expired at the ends of 2009, 2011, 2013, and 2016. In each of 2009, 2011, 2013, and 2018 the tax credit was reinstated late in the next year (or very early in the following year) and made retroactive, such that all years from 2005 through 2017 have all been covered by the credit. At the time of this writing, the fate of the tax credit for 2018 (it would be a retroactive approval) and beyond is unknown.

Rack Pricing

Fuel terminals often exist at refineries or at points along oil pipelines. Information in this section on diesel and biodiesel blend pricing is based on fuel terminal prices, also known as "rack pricing," or prices "at the rack."

Since initial implementation of the Biodiesel Content Mandate in 2005, the price difference of the blended product from No. 2 diesel fuel has been as high as a 10-cent difference (in 2011) and as low as

0.006 cents in 2017 (where the blend was cheaper than diesel fuel without biodiesel). Detailed information on rack pricing is contained in Appendix B.

Third Party Blending and Impact of RINs

The Biodiesel Blenders Tax Credit and RIN effectively lower the net price of unblended biodiesel fuel (B100), and consequently have the potential to lower costs for the third-party blender (the net cost of biodiesel to the blender is dependent on a number of factors in addition to Biodiesel Blenders Tax Credit and RIN). Other factors can include negotiated fuel contracts.

Figure 1 shows the pricing trends for No. 2 diesel and B100. The B100 prices are the net Iowa and Illinois/Indiana/Ohio averages price from the biodiesel plants surveyed by AMS.

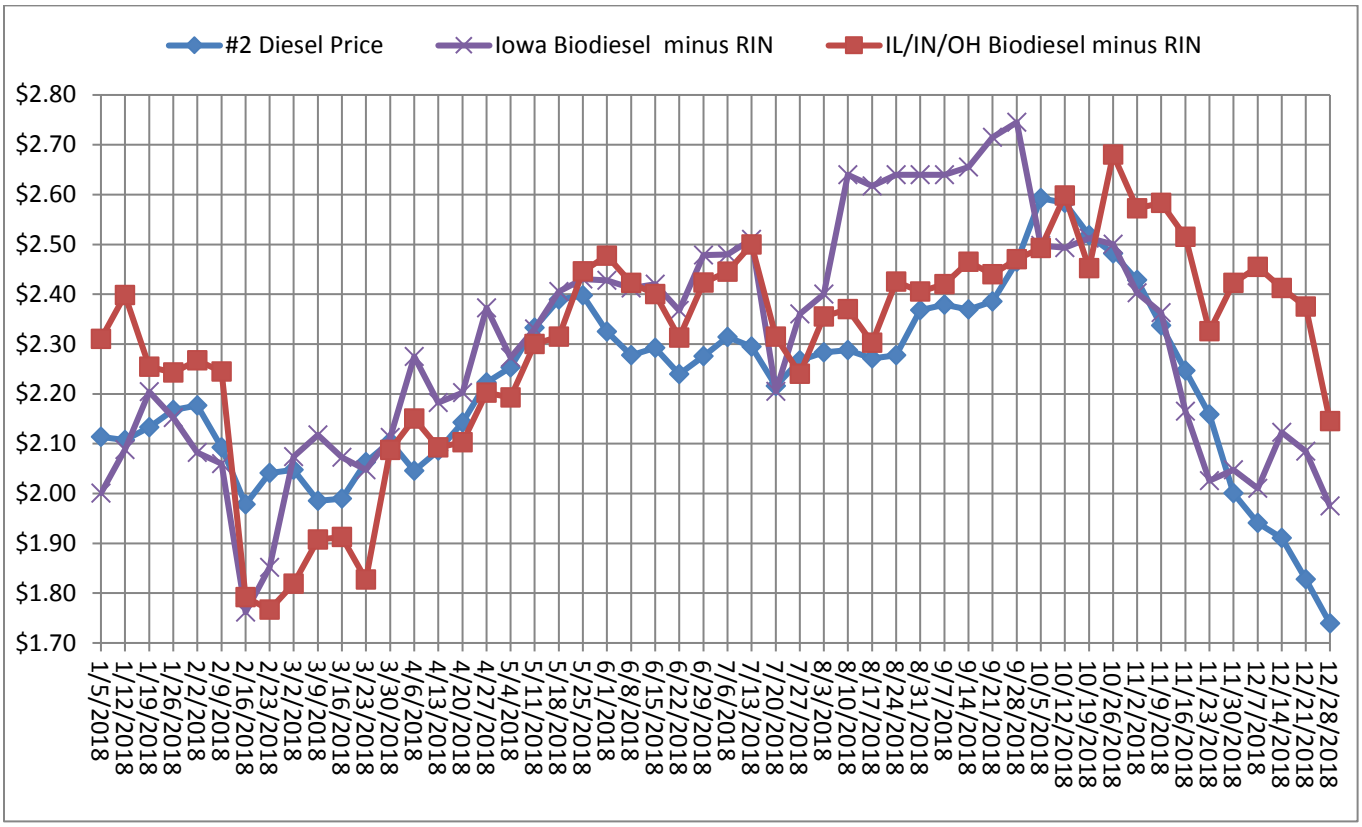


Figure 1 #2 Blended diesel price factors for 2018 including RIN only: Diesel price (MSP Rack), the Iowa B100 price, and the IL/IN/OH B100 price (B100 prices as reported by the biodiesel plants to AMS) with the RIN subtracted.

As stated above, the $1 federal biodiesel blending tax credit has not been reinstated by Congress for 2018. Figure 2 shows the trends of pricing factors for blended diesel fuels should the tax credit be reinstated retroactively for 2018. The graph shows B100 minus the tax credit only, and B100 minus the tax credit and RIN because the obligated and the third party blender can use the tax credit, while the obligated party cannot use the RIN unless its obligation under the RFS has been met (the third party blender has no obligation to retire RINs and so can sell their RINs into the market).

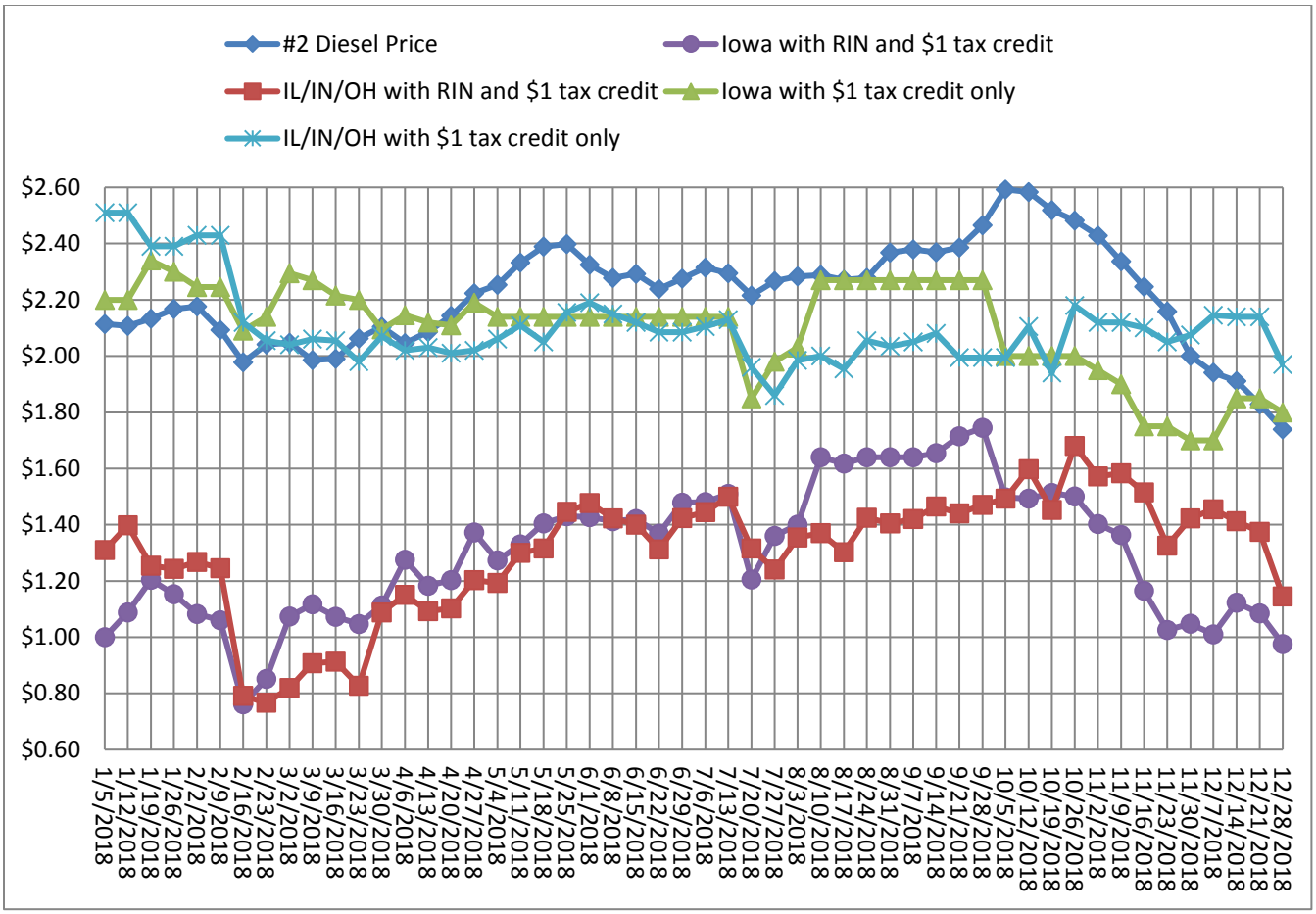


Figure 2 No. 2 Diesel price factors for 2018 including RIN and the federal biodiesel blending tax credit. Diesel price (MSP Rack), the Iowa B100 price with the $1 tax credit only and with RIN subtracted, and the IL/IN/OH B100 price with the $1 tax credit only and with the RIN subtracted (B100 prices as reported by the biodiesel plants to AMS).

Biodiesel Supply

The nameplate capacity (the capacity that the three Minnesota biodiesel plants were constructed to originally produce) is 63 mgy. Recent expansion and efficiency improvements have allowed the plants to increase production levels. The plants are permitted by the Minnesota Pollution Control Agency to produce a total of 87.5 mgy in 2018.

Table 1 shows a breakdown of these capacities by plant. The overall trend is increased production capacities for Minnesota facilities.

Table 1 Minnesota biodiesel plant permitted production capacities.

Plant – Location	2018 Permitted Production Capacity (mgy)
Ever Cat Fuels – Isanti	3.0
Minnesota Soybean Processors – Brewster	40.5
Renewable Energy Group (REG) – Glenville	44.0
Total	87.5

Minnesota Statutes, section 239.77, subd. 2 (b)(4) specifies :

> "At least five percent of the amount of biodiesel necessary for that minimum content level will be produced from a biological resource other than an agricultural resource traditionally grown or raised in the state, including, but not limited to, algae cultivated for biofuels production, waste oils, and tallow."

Where the majority of biodiesel was produced from soybeans in the early days of Minnesota's minimum biodiesel blending requirement, production now uses a variety of feedstocks. Minnesota Soybean Producers is a full-crush soybean processing facility and uses soybean oil exclusively for its biodiesel production. Ever Cat Fuels' three mgy plant uses a high temperature, high pressure catalytic transesterification process, and uses alternative feedstocks such as recycled oils. REG upgraded its plant to process a wide variety of oil feedstocks. For 2017 REG used a majority of distiller's corn oil with a minority amount of used cooking oil (UCO). The overall trend for Minnesota facilities has been increased diversification of feedstocks that is currently higher than five percent of the total biodiesel produced.

Occasionally, there are disruptions in biodiesel supply, typically related to equipment or tank maintenance. Low biodiesel supplies at terminals can cause outages for individual distributers, which can cause distributors to purchase biodiesel outside the terminal distribution system by going directly to the biodiesel plants. Minnesota Statutes, section 239.77, subd. 2 (d) provides for fuel suppliers to obtain a waiver from the Minnesota Department of Commerce should there be a period of biodiesel fuel shortage or a problem with biodiesel quality.[14]

Twenty-four waivers were issued by the Department of Commerce in 2018. Fifteen of the waivers were issued outside of the B20 period. All but five waivers lasted less than a day. Four of the five waivers lasting more than a day occurred during B5 or B10 mandate periods. Worth noting is that the Department of Commerce only started receiving automated notification of outages from terminals in late 2017. Previous years' notifications were at the discretion of terminal operators. A list of all biodiesel waivers in 2018 is included in Appendix C.

[14] This paragraph addresses comments on an earlier draft from Biodiesel Task Force members.

Impacts of Biodiesel Mandate on Production Capacity and Feedstocks[15]

The Biodiesel Content Mandate statute requires this report to: "…include information about the impacts of the biodiesel mandate on the development of biodiesel production capacity in the state, and on the use of feedstock grown or raised in the state for biodiesel production." (Minnesota Statutes, section 239.77, subd. 5(a)). It is not possible to demonstrate a cause-and-effect relationship between the mandate and production capacity or feedstock use. It is, however, reasonable to assume that the mandate has had a significant effect on both production and feedstock use.

Production capacity and feedstock use in 2016 were summarized in the Minnesota Department of Agriculture's May 2017 report, *Economic Impact of the Minnesota Biodiesel Industry*. According to the report:

- Production had increased from the amount represented by the initial B2 mandate (16 mgy) to 74 mgy in 2016.
- Production was from diverse feedstocks: soybeans were the feedstock of 45 percent of biodiesel in the state, while other oils, fats and greases comprised the remaining 55 percent of the feedstock.
- Biodiesel consumption in Minnesota in 2016 was 77 mg, representing nearly 8 percent of the 1 billion gallons per year of biodiesel consumption in Minnesota. The amount of biodiesel produced in Minnesota was 74 mg, representing 96 percent of consumption.[16]

Over the time period when the B20 mandate was in effect, the amount of biodiesel produced exceeded 50 percent of biodiesel consumption in the state.

[15] This section addresses comments on an earlier draft from Biodiesel Task Force members.
[16] Ibid.

Appendix A: Comments from Biodiesel Task Force Members

Comments of Brett Webb, Flint Hills Resources, LP (Petroleum Industry Representative)

Kevin Hennessy, Biofuels Manager
Minnesota Department of Agriculture
625 Robert Street North
St. Paul, MN 55155-2538

December 27, 2018

Mr. Hennessy:

This letter is in response to your request for feedback on the draft 2019 Biodiesel Report to the Minnesota Legislature.

As a producer of both diesel fuel and biodiesel, Flint Hills Resources appreciates the opportunity to provide these comments and we thank the Department of Agriculture and its staff for its ongoing efforts to manage the implementation of Minnesota's biodiesel mandate and assess the policy's impact on consumers and the state's economy.

The 2019 draft report includes several assertions about the mandate's effectiveness, including the recent increase in the minimum content requirement from B10 to B20. There are some assumptions in this report, however, that should be clarified to provide a more complete accounting of the program and properly inform policymakers about the full implications of mandating biodiesel at the current levels.

The report currently credits the mandate with increasing biodiesel production and soybean prices in Minnesota and maintains that 96 percent of the biodiesel consumed in Minnesota was also produced in the state. It further suggests the jump from B10 to B20 was largely without incident and had no deleterious effects.

These assertions are either overstated or incorrect. An analysis of biodiesel production and soybean prices in surrounding states shows there is no basis for these conclusions. In some cases, states that have no blending requirements produce much more biodiesel than Minnesota and their farmers earn more for growing soybeans (Attachments 1A and 2A).

The report's suggestion that 96 percent of the biodiesel consumed in Minnesota is produced in Minnesota is also not supported by the facts. During the summer B20 season, Minnesota's mandated biodiesel demand is nearly double the state's nameplate monthly production capacity. Additionally, a significant percentage of Minnesota's non-soybean-derived biodiesel production is estimated to be exported to markets out of the state where it commands a higher price. For these and other economic reasons, including security of supply, Flint Hills Resources alone imports more than 15 percent of the biodiesel consumed annually in Minnesota from outside the state. United States federal government trade data also indicates that volumes equivalent to approximately 10 percent of Minnesota's biodiesel demand is imported from Canada.

Flint Hills Resources previously expressed concerns about the adequacy of the biodiesel supply and blending infrastructure needed to meet and ensure compliance with the B20 requirement. We also expressed concerns about the potential consequences of mandating consumption of biodiesel regardless of cost or other economic factors. These concerns have proven valid.

The report maintains that there were only "occasional" supply issues following the transition to B20. In fact, there was an unprecedented number of waivers issued by the Minnesota Department of Commerce due to supply issues. At least 25 waiver requests were made in 2018 because terminals did not have biodiesel available. In contrast, just six waiver requests were made in 2017. (Attachment 3A)

The extensive number of waivers issued for biodiesel created uncertainty and an unlevel playing field within the market. Waivers are typically issued on a terminal by terminal basis even though customers may have other terminal options available to them that have adequate supply. Currently, waivers are issued for most any supply disruption and applied inconsistently across markets. To the extent waivers are issued at all, they should be more uniform, done more selectively for only significant long-term supply problems and for broader geographical areas (preferably statewide).

The extensive issuance of waivers further compounded the economic disadvantages associated with the Minnesota mandate. According to rack pricing data, biodiesel blends were from 1.0 to 2.5 cents per gallon higher than clear diesel across Minnesota in 2018. This would equate to $10,000,000 to $25,000,000 higher fuel costs for Minnesota consumers this year. The blend incentive for biodiesel (including RIN subsidy) has been negative since the $1/gallon federal tax credit was suspended and made retroactive. This negative incentive has been as high as 50 cents per gallon (i.e., B100 is up to 50 cents per gallon more expensive than diesel after including the RIN value). The impact of the negative blend incentive does not necessarily correlate directly to rack pricing, but directionally makes biodiesel blends more expensive. This is magnified in the summer B20 months when we saw the widest spread between clear diesel and biodiesel (B20).

In effect, Minnesotans are paying more for fuel while subsidizing the cost people outside of Minnesota pay for the same product – especially states where prices are determined by traditional marketplace fundamentals or states like California that require the type of non-soybean-derived biodiesel produced in Minnesota.

Finally, Flint Hills Resources continues to have concerns about the cold weather performance of B20, especially during the transitional months of April and September. There is no doubt the blending exemption for #1 diesel fuel has helped reduce cold whether issues, but we've heard reports and have received direct queries from consumers who have experienced problems they believe are associated with the higher biodiesel blends. Inaccurate blending percentages for biodiesel "splash blended" downstream of the terminal has also been a reported problem. The report mentions the Diesel Help Line that is available to assist consumers, but it does not include any accounting of the number of calls received or the types of issues people are reporting or how those issues were resolved.

Flint Hills Resources appreciates the opportunity to provide these comments. We look forward to continuing our work as a member of the Minnesota Biodiesel Taskforce to ensure the continued reliability and prudent integration of biodiesel into Minnesota's fuel supply.

Respectfully,

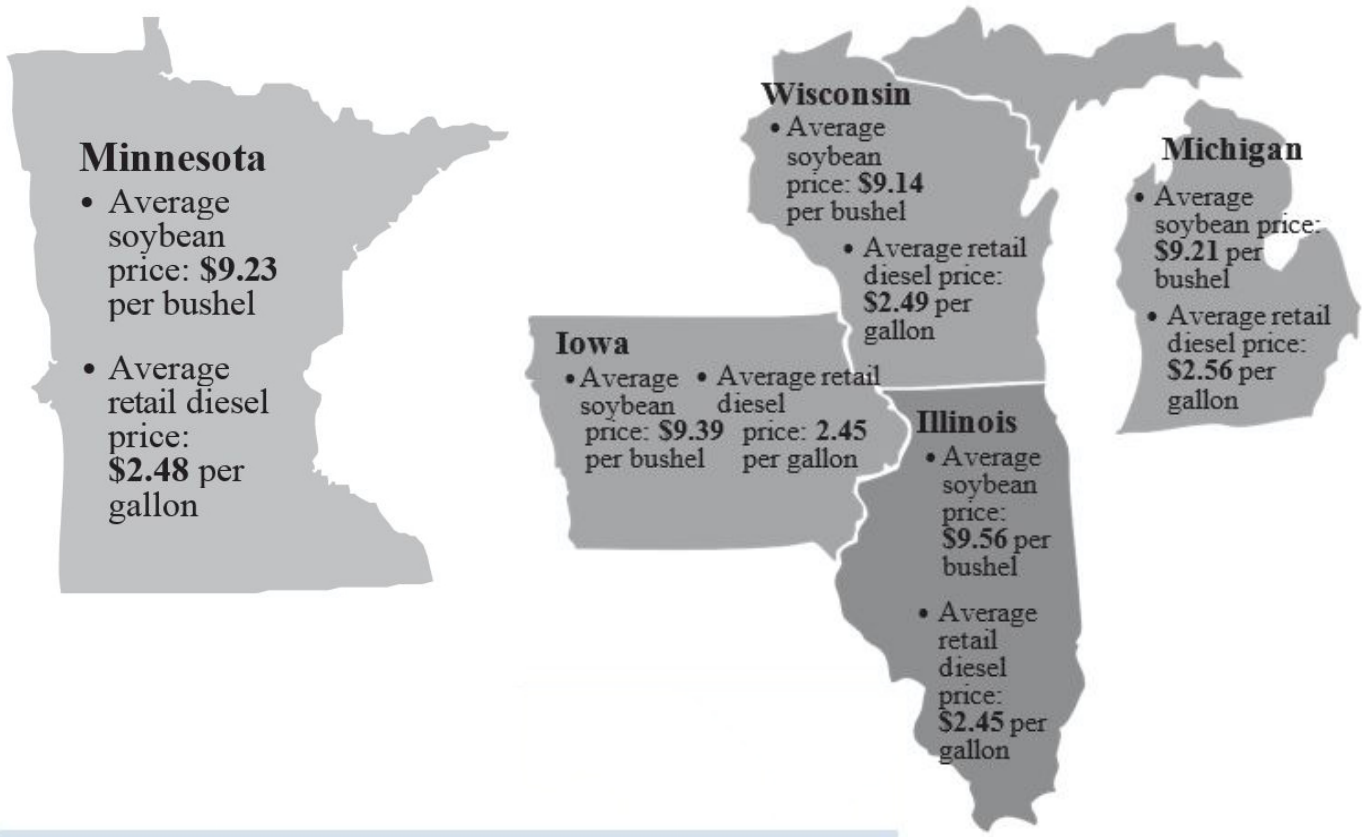
Signed copy on file

Brett Webb
Director, Commercial Development
Flint Hills Resources

CC: Minnesota Biodiesel Taskforce
Commissioner Dave Frederickson, Minnesota Department of Agriculture
Commissioner Jessica Looman, Minnesota Department of Commerce
Commissioner John Linc Stine, Minnesota Pollution Control Agency

Soybean and diesel fuel prices in a biodiesel-mandated state (Minnesota) vs. non-mandated states in the region.

Mandated State **Non-Mandated States**



The bottom line

- U.S. average soybean price: $9.34 per bushel
- U.S. average retail diesel price: $2.50 per gallon
- From 2002-2016, Minnesota soybean prices were on average 1.1% less than the U.S. average.
- Minnesota has by far the most aggressive biodiesel mandate in the U.S.
- Minnesota is ranked third in U.S. soybean production but only 10th in biodiesel production.

Biodiesel price averages are from 2002-2016. Retail diesel prices are a recent daily average from AAA on June 8, 2017.

Sources: USDA, National Agricultural Statistics Service and MN Department of Agriculture, Annual Report on Biodiesel Gasprices.aaa.com

Biodiesel incentives and mandates in the Midwest

Minnesota: Mandates

Blend mandates

- Diesel fuel sold Apr.-Sept. 2017: B10
- Diesel fuel sold during remainder of the year: B5
- Diesel fuel sold in summer after 5/1/18: B20

Illinois: No mandates or minimum content requirements

Incentives

- Biofuels tax exemption: Sales and use taxes apply to 80% of the proceeds from the sale of fuel blends containing between 1% and 10% biodiesel made between 7/1/03 and 12/31/18. If these taxes are imposed at a rate of 1.25%, the tax on biodiesel blends will apply to 100% of the proceeds of sales. These taxes do not apply to the proceeds from the sale of biodiesel blends containing more than 10% biodiesel. Taxes will apply to 100% of the proceeds from biodiesel sales made after 12/31/18.
- Biodiesel production tax: A private biodiesel producer that produces less than 5,000 gallons of biodiesel annually is subject to the annual state motor fuel tax.
- Biodiesel blend use requirement: Any diesel-powered vehicle the state, county or local government, school district, community college, public college or university, or mass transit agency owns or operates must use a biodiesel blend that contains at least 5% biodiesel (B5) when fueling at a bulk central fueling facility.
- Advanced vehicle acquisition and biodiesel fuel use requirement: Any vehicle purchased with state funds that is fueled with diesel fuel must be certified by the manufacturer to run on B5 fuel.
- Biofuels preference for state vehicle procurement: When awarding contracts that require vehicle procurement, state agencies may give preference to an otherwise qualified bidder who will fulfill the contract through the use of vehicles powered by ethanol produced from Illinois corn or biodiesel produced from Illinois soybeans.

Iowa: No mandates or minimum content requirements

Incentives

- Alternative fuel production tax credits
- Biofuel infrastructure grants for infrastructure upgrades
- Biodiesel blend retailer tax credit (expires 12/31/24): $.045/gal for B5 blends (minimum) until 12/31/17; $.055/gal for B11 blends (minimum) starting 1/1/18
- Biodiesel producer tax refund

Nebraska: No mandates or minimum content requirements

Incentives

- Ethanol and biodiesel tax exemption: Motor fuels sold to an ethanol or biodiesel production facility and motor fuels manufactured at and sold from an ethanol or biodiesel facility are exempt from certain motor fuel tax laws.

Michigan: No mandates or minimum content requirements

South Dakota: No mandates or minimum content requirements

Incentives

- Biodiesel blend tax credits
- Tax refund for methanol used in biodiesel production
- Reduced tax on biodiesel and biodiesel blends if 10 million gallons produced annually

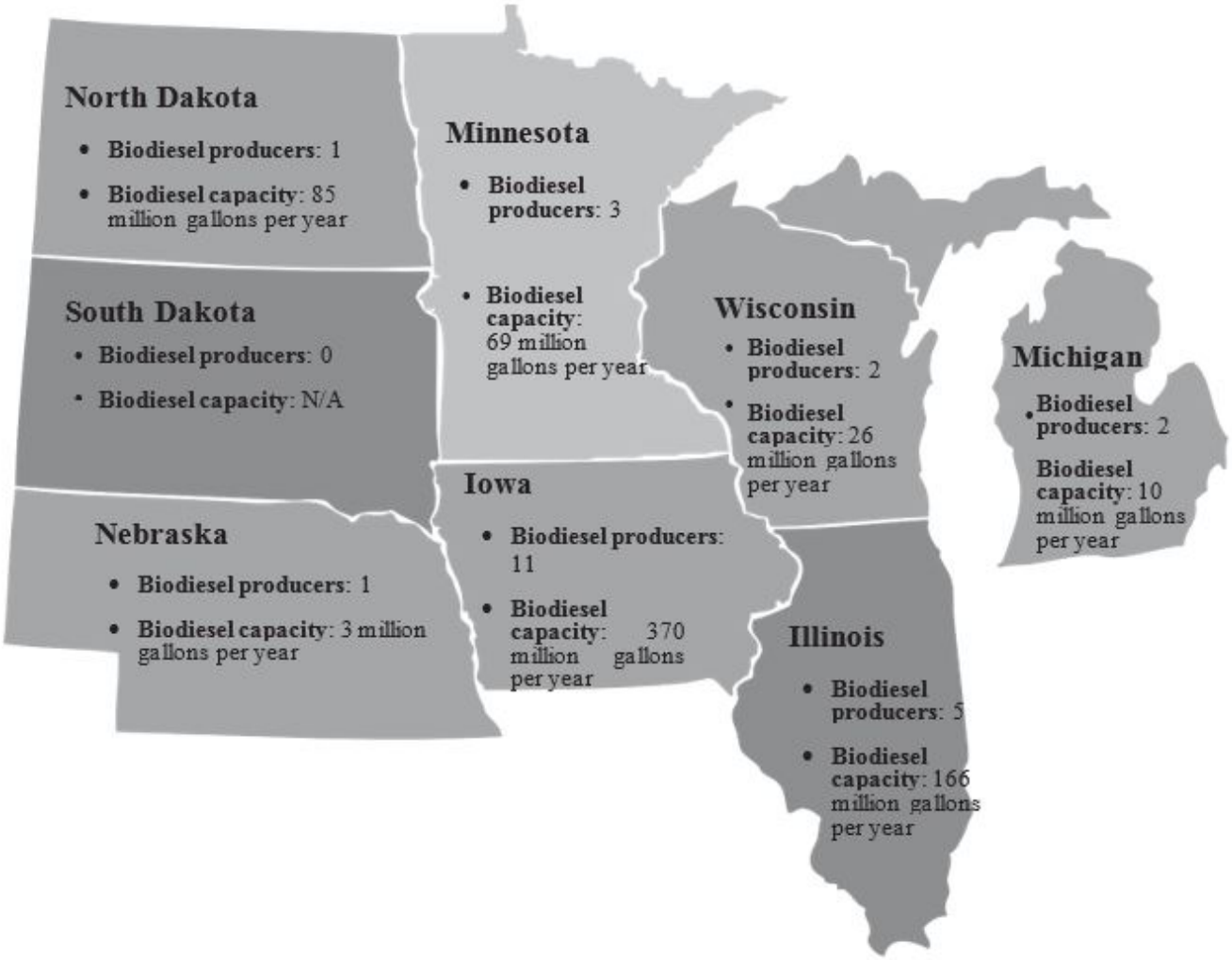
Wisconsin: No mandates or minimum content requirements

Incentives

- Biodiesel fuel incentives for school districts that use biodiesel fuel to operate buses
- Alternative fuel tax exemptions
- Renewable fuel producer excise tax and inspection exemption for first 1,000 gallons

Biodiesel capacity in the Midwest

Source: U.S. Department of Energy Biodiesel Monthly Survey and Alternative Fuels Data Center



The terminals and dates biodiesel was unavailable are listed below. Where possible, the date range reflects the actual dates that biodiesel was not available. However, when updates were not available, the duration of the waiver was used. Source: Department of Commerce (https://mn.gov/commerce/industries/fuel/biodiesel/)

2018 Biodiesel Waiver Requests

1. Magellan Terminal – Fargo: January 25, 2018 to February 4, 2018
2. Magellan Terminal –Eyota: March 12, 2018 to March 20, 2018
3. Magellan Terminal – Alexandria: April 3, 2018 to April 12, 2018
4. Superior Refining Company – Esko: April 5, 2018 to April 6, 2018
5. Magellan Terminal – Mankato: April 25, 2018
6. Magellan Terminal – Marshall: May 7, 2018 to May 14, 2018
7. Magellan Terminal – Grand Forks: May 14, 2018
8. NuStar Terminal – Sauk Center: May 17, 2018
9. Magellan Terminal – Alexandria: May 21, 2018
10. NuStar Terminal – Sauk Center: May 22, 2018
11. Magellan Terminal – Fargo: June 13, 2018
12. NuStar Terminal – Sauk Center: July 2, 2018
13. Magellan Terminal – Alexandria: July 2, 2018
14. Magellan Terminal – Mankato: July 17, 2018 to July 18, 2018
15. NuStar Terminal – Sauk Center: July 31, 2018
16. Magellan Terminal – Alexandria: September 11, 2018
17. NuStar Terminal – Sauk Center: September 16, 2018 to September 17, 2018
18. Magellan Terminal – Mason City: October 8, 2018 to October 9, 2018
19. Magellan Terminal – Alexandria: October 13, 2018 to October 14, 2018
20. Magellan Terminal – Mankato: October 26, 2018
21. Magellan Terminal – Mankato: November 21, 2018
22. Magellan Terminal – Fargo: November 20, 2018
23. Magellan Terminal – Wrenshall: November 24, 2018
24. Magellan Terminal – Roseville: December 8, 2018 to December 9, 2018
25. Flint Hills Resources Terminal – Roseville: December 8, 2018 to December 9, 2018

2017 Biodiesel Waiver Requests

1. Magellan Terminal – Alexandria: May 11, 2017 to May 12, 2017
2. Flint Hills Resources Terminal – Alexandria: May 11, 2017 to May 12, 2017
3. Magellan Terminal – Mankato: July 6, 2017 to July 16, 2017
4. Magellan Terminal – Eyota: September 21, 2017
5. Magellan Terminal – Mason City: October 26, 2017 to November 5, 2017
6. Magellan Terminal – Mason City: December 28, 2017 to January 7, 2018

Comments of Bruce Heine, Magellan Midstream Partners, LP (Petroleum Industry Representative)

BRUCE W. HEINE
Vice President Government and Media Affairs
One Williams Center MD 27
Tulsa, OKLA 74172
bruce.heine@magellanlp.com

December 28, 2018

Mr. Kevin Hennessey
Bio Energy Manager
Minnesota Department of Agriculture
625 Robert Street St. Paul, MN 55155

DELIVERED VIA EMAIL

RE: Minnesota Biodiesel Report to the Legislature

Dear Mr. Hennessey:

I am writing to provide brief comments regarding the 2019 Minnesota Biodiesel Report to the Legislature. First, it is a privilege for Magellan Midstream Partners to do business in Minnesota, where over 50% of the gasoline, diesel and jet fuel consumed in the state is transported through our pipeline system, stored and distributed from our terminals. We own and operate facilities in Minneapolis, Alexandria, Wrenshall, Mankato, Marshall and Rochester. These facilities also store and distribute renewable fuels including biodiesel. In addition, we have invested in biodiesel storage and blending infrastructure at our facilities in Mason City, Iowa, Fargo, North Dakota and Grand Forks, North Dakota.

We continue to believe the most accurate and efficient method of blending biodiesel into diesel fuel is through ratio blending systems like those Magellan offers at our terminals. We agree with comments filed on December 27, 2018 by Flint Hills Resources that downstream splash blending can lead to inaccurate biodiesel blending percentages when offering the product to the ultimate consumer. Moreover, from a regulatory enforcement standpoint, we believe the most practicable enforcement point for the Minnesota biodiesel program is at the terminal.

As the seasonal biodiesel requirement increases from winter to summer levels, we believe it is important for fuels distributed to retail outlets to meet all regulatory standards at all times.

Thank you for the opportunity to comment on this important report.

Sincerely,

Signed copy on file

Bruce W. Heine

Comments of Scott Hedderich, Renewable Energy Group (REG), (Processing Industry Representative)

Kevin Hennessy, Biofuels Manager
Minnesota Department of Agriculture
625 Robert Street North
St. Paul, MN 55155-2538

Mr. Hennessy:

On behalf of Renewable Energy Group, REG, I am writing in response to your request for feedback on the draft 2019 Biodiesel Report to the Minnesota Legislature.

Renewable Energy Group, Inc. is a leading provider of cleaner, lower carbon intensity products and services. We are an international producer of biomass-based diesel, a developer of renewable chemicals and North America's largest producer of advanced biofuel. REG utilizes an integrated procurement, distribution, and logistics network to convert natural fats, oils, greases and sugars into lower carbon intensity products.

We would like to take this opportunity to thank the Department for its efforts behind this report. We support the underlying data collection and agree with its conclusions and general outlook. However, there are two areas in particular we would like to provide comment and feedback.

First is while there was a production disruption in 2018 from one of the major suppliers in the state, we strongly believe that our increased production capacity combined with a significant increase in our storage capacity can more than offset any short term production stoppage. REG has invested considerably in our Albert Lea facility. I have attached a 2017 fact sheet regarding the plant's impact on the surrounding economy. Please note that our production capacity has grown to 44 million gallons and that the amount of production we have sold in state has also increased significantly. Moreover, REG operates facilities near Madison, Wisconsin and Mason City, Iowa. Both facilities, rated at a combined 50 million gallons annually, can respond with product should there be a disruption within Minnesota.

Second, the report highlights the number of waivers that the Dept of Commerce Division of Weights and Measures have issued. Comments from certain Biodiesel Task Forces members may give the impression that those waivers are due solely to biodiesel unavailability. However, a close review of the data shows that the waivers are given for a variety of reasons and typically arise from equipment breakdown to maintenance and usually last less than 48 hours. Lack of supply is rarely the reason for the outage. We have engaged the Dept of Commerce about providing more detail within the waiver process in order to highlight the underlying reasons a waiver is issued. We continue to support greater transparency in this area.

Thank you again,

Sincerely,

Scott R. Hedderich
Executive Director, Corporate Affairs
Renewable Energy Group

Appendix B: Rack Pricing

Diesel prices at terminals statewide and across Minnesota's borders—to the south (Omaha, Nebraska) and west (Denver, Colorado)—have shown remarkably close pricing historically. Table 2 compares average yearly prices for ultra-low sulfur diesel and displays the yearly ranges over the past eight year period.

Table 2 Diesel pricing by city (average of terminals reporting), 2009-2018

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Alexandria, MN	1.7600	2.2860	3.1357	3.1954	3.1503	2.9433	1.7246	1.4461	1.7546	2.2168
Denver, CO	1.7377	2.2975	3.1170	3.1985	3.1201	2.9420	1.7002	1.4229	1.8021	2.2475
Duluth, MN	1.7532	2.3006	3.1639	3.2095	3.1617	2.9719	1.7318	1.4784	1.7752	2.2444
Fargo, ND	1.7660	2.2941	3.1459	3.2117	3.1614	2.9619	1.7372	1.4542	1.7716	2.2197
Grand Forks, ND	1.7628	2.2899	3.1424	3.2086	3.1591	2.9593	1.7364	1.4516	1.7613	2.2105
Mankato, MN	1.7515	2.2740	3.1190	3.1843	3.1437	2.9271	1.7130	1.4381	1.7451	2.2042
Marshall, MN	1.7538	2.2811	3.1223	3.1874	3.1407	2.9334	1.7134	1.4369	1.7429	2.1948
Omaha, NE	1.7268	2.2513	3.0991	3.1711	3.1069	2.8957	1.7047	1.4250	1.7439	2.1947
Rochester, MN	1.7437	2.2714	3.1198	3.1795	3.1388	2.9259	1.7097	1.4321	1.7367	2.1971
Sioux Falls, SD	1.7375	2.2617	3.1084	3.1776	3.1204	2.9100	1.7071	1.4173	1.7339	2.1867
Superior, WI	1.7616	2.3087	3.1755	3.2040	3.1565	2.9707	1.7197	1.4730	1.7780	2.2759
Minneapolis-St. Paul, MN	1.7456	2.2741	3.1236	3.1832	3.1298	2.9357	1.7116	1.4480	1.7459	2.1991
Low	1.7268	2.2513	3.0991	3.1711	3.1069	2.8957	1.7002	1.4173	1.7339	2.1867
High	1.7660	2.3087	3.1755	3.2117	3.1617	2.9719	1.7372	1.4784	1.8021	2.2759
Difference-Range	0.0391	0.0574	0.0764	0.0405	0.0548	0.0762	0.0370	0.0611	0.0683	0.0891

Source: Minnesota Department of Agriculture summary of Axxis pricing data through December 31, 2018.

Table 3 shows rack pricing of #2 diesel and biodiesel blends at the Minneapolis-St. Paul (MSP) terminals since 2009. 2009 is the year when the first step-up in the state mandate occurred with the move from B2 to B5 on May 1, 2009. These are the average of prices reported through the MDA's subscription to AXXIS.

Table 3 MSP rack diesel and biodiesel average prices with net price impact of blends.

Year (Blend Mandate)	Average Rack Diesel Price	Rack B2 Price	Rack B5 Price	Rack B10 Price	Rack Average Mandate Blend Price	Net Impact Price of Biodiesel Blend
2009(B2/B5)	$1.7456				$1.7891	$0.0435
2009 (1-4 to 4-30) B2)	$1.4120	$1.4421				$0.0302
2009 (5-1 to 12-31)(B5)	$1.9176		$1.9679			$0.0503
2010 (B5)	$2.2741		$2.3372			$0.0631
2011(B5)	$3.1236		$3.2266			$0.1030
2012(B5)	$3.1832		$3.2488			$0.0656
2013(B5)	$3.1298		$3.1703			$0.0405
2014(B5/B10)	$2.9357				$2.9539	$0.0181
2014 (1-2 to 6-30, 10-1 to 12-31) (B5)	$2.9300		$2.9476			$0.0176
2014 (7-1 to 9-30) (B10)	$2.9529			$2.9724		$0.0195
2015 B5/B10)	$1.7138				$1.7433	$0.0294
2015 (1-2 to 3-30, 10-1 to 12-31) (B5)	$1.6227		$1.6473			$0.0246
2015 (4-1 to 9-30) (B10)	$1.8042			$1.8384		$0.0342
2016 B5/B10)	$1.4480				$1.4517	$0.0037
2016 (1-2 to 3-30, 10-1 to 12-31) (B5)	$1.3833		$1.3876			$0.0043
2016 (4-1 to 9-30) (B10)	$1.5122			$1.5152		$0.0031
2017 (B5/B10)	$1.7459				$1.7463	$0.0004
2017 (1-4 to 3/31, 10-2 to 12-29) (B5)	$1.8061		$1.8054			-$0.0007
2017 (4-3 to 9/29) (B10)	$1.6852			$1.6867		$0.0015
2018 (B5/B10/B20)	$2.2137				$2.22	$0.0105
2018 (1-1 to 3-30, 10-1 to 12-31) (B5)	$2.1412		$2.1410			-$0.0002
2018 (4-2 to 6-29) (B10)	$2.2521			$2.2671		$0.0150
2018 (7-2 to 9-28) (B20)	$2.3215				$2.3491	$0.0276

Appendix C: Minnesota Department of Commerce Weights and Measures Division Waivers for 2018

Mandate Level	Start Date	Duration (hrs)	Duration (days)
B5	1/25/18	240:00:00	10.0
B5	3/12/18	195:00:00	8.1
B10	4/3/18	216:00:00	9.0
B10	4/5/18	24:00:00	1.0
B10	4/25/18	5:00:00	
B20	5/7/18	168:00:00	7.0
B20	5/14/18	4:00:00	
B20	5/17/18	6:49:00	
B20 Suspension to B10	5/21/18	2:59:00	
B20 Suspension to B10	5/22/18	2:30:00	
B20 Suspension to B10	5/22/18	3:46:00	
B20 Suspension to B10	6/13/18	3:53:00	
B20	7/2/18	7:04:00	
B20	7/2/18	1:40:00	
B20	7/17/18	23:50:00	
B20	7/31/18	3:03:00	
B20	9/11/18	2:50:00	
B20	9/16/18	16:46:00	
B5	10/8/18	19:30:00	
B5	10/26/18	3:02:00	
B5	11/20/18	7:25:00	
B5	11/21/18	1:06:00	
B5	12/8/18	11:46:00	
B5	12/8/18	11:48:00	

Note: The B20 mandate was suspended from May 21 through June 30.