



Report to the Legislature

Annual Report on Biodiesel

Kevin Hennessy, 651-201-6223
625 North Robert Street, St. Paul, MN 55155
www.mda.state.mn.us

Date: January 17, 2017

Pursuant to Minn. Stat. § 3.197, the cost of preparing this report was approximately \$1,800.
In accordance with the Americans with Disabilities Act, this information is available in alternative forms of communication upon request by calling 651/201-6000. TTY users can call the Minnesota Relay Service at 711.

The MDA is an equal opportunity employer and provider.

Table of Contents

Table of Contents	2
Executive Summary	3
Introduction.....	5
Background	6
Implementation of Minnesota’s Biodiesel Requirements.....	7
<i>B10 Implementation</i>	<i>7</i>
<i>Changes to Minn. Stat. § 239.77 in 2014.....</i>	<i>7</i>
ASTM Specifications	8
<i>Cold Weather Issues</i>	<i>8</i>
Biodiesel Quality and Renewable Identification Number (RIN) Reliability	10
Diesel and Biodiesel Prices	11
<i>The Renewable Fuel Standard</i>	<i>11</i>
<i>The Federal Tax Credit.....</i>	<i>11</i>
<i>Rack Pricing.....</i>	<i>11</i>
<i>Impact of Federal Tax Credit</i>	<i>13</i>
<i>Third Party Blending and Impact of RIN’s.....</i>	<i>13</i>
<i>Summary</i>	<i>15</i>
Biodiesel Supply	17
Impact of Minnesota’s Biodiesel Requirements.....	18
<i>Production Capacity</i>	<i>18</i>
<i>Feedstocks.....</i>	<i>18</i>
Appendix: Minnesota Biodiesel Task Force Member Comments.....	19

Executive Summary

In 2005, Minnesota became the first state to implement legislation mandating the use of biodiesel by blending biodiesel into its diesel fuel supply at a level of 2 percent—commonly referred to as B2. Since then the mandate has moved to 5% (May 1, 2009) and most recently to B10 beginning July 1, 2014. The currently higher level mandate is in effect for the “summer” months, April through September, and reverts to B5 for the winter months. The mandate is now scheduled to move to B20 for the summer months in 2018 (Minn. Stat. § 239.77, subd. 2).^{1,2}

Significant progress has been and continues to be made, since the original biodiesel mandate took effect in 2005, on establishing and improving industry specifications and quality guidelines for biodiesel, biodiesel blends, and diesel fuel oil. Diesel fuel can experience increases of viscosity (known as “gelling” or “waxing”) in the cold-weather months, which can cause performance problems in engines. These cold-weather-related issues are managed through changing diesel blends, additives, and through quality control. Standards for diesel fuels of ASTM International (an international standards organization) aim to ensure proper performance and address cold weather issues. Biodiesel has some different characteristics than other types of diesel fuels, and so standards and quality control programs are meant to address those differences.

The Petroleum Product Specifications in statute (Minn. Stat. § 239.761) contain ASTM standards. ASTM D975-12a is the current specification for diesel fuel, and includes up to 5% biodiesel. The standard for the blend stock (100% biodiesel, or B100) is ASTM D6751. This standard now contains provisions for a # 1 and # 2 biodiesel fuel. The use of the # 1 specification is voluntary. ASTM D7467 is the standard used for the B10 and B20 fuels in the state mandate.

The BQ-9000 program is an example of a program that certifies producers and marketers for biodiesel fuel quality and reliability.

Performance problems due to cold weather use of biodiesel in #2 diesel fuel have been minimal, and are comparable to other types of diesel fuel.

The federal Renewable Fuel Standard (RFS, now RFS2) requires refiners and/or importers of petroleum (also known as obligated parties) to blend increasing volumes of biofuels on an annual basis. Every gallon of biofuel produced that qualifies for RFS2 carries with it a Renewable Identification Number, or

¹ By law, the 10 and 20 percent minimum content levels would be effective from April 1st through September 30th only. According to MS § 239.77, subd. 2a, “The minimum content for the remainder of the year is five percent. However, if the commissioners of agriculture, commerce, and pollution control determine, after consultation with the biodiesel task force and other technical experts, that an American Society for Testing and Materials (ASTM) specification or equivalent federal standard exists for the specified biodiesel blend level in those clauses that adequately addresses technical issues associated with Minnesota's cold weather and publish a notice in the State Register to that effect, the commissioners may allow the specified biodiesel blend level in those clauses to be effective year-round.”

² According to MS § 239.77, subd. 2b, the 10 and 20 percent minimum content levels “become effective on the date specified only if the commissioners of agriculture, commerce, and pollution control publish notice in the State Register and provide written notice to the chairs of the House of Representatives and Senate committees with jurisdiction over agriculture, commerce, and transportation policy and finance, at least 270 days prior to the date of each scheduled increase, that certain conditions have been met (e.g., ASTM specifications exists, adequate supply is available, etc.) and the state is prepared to move to the next scheduled minimum content level.”

RIN. The RIN is used by the obligated party to show compliance with RFS2. RINs can be used as compliance, termed “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 case #2, the value obtained by selling the RIN represents another income stream for the obligated party or the third party blender. The price difference for biodiesel blends over the past year has been beneficial to these blenders. For example, wholesale prices at MSP terminals showed a gallon of B5/B10 averaging 1.8 cents more than a gallon of #2 diesel in 2015, where a blender with no RFS2 obligation could blend with a profit margin for the entire year when taking advantage of RIN trading and the federal biodiesel blender’s tax credit. The credit of \$1.00 per gallon was not in effect for most of 2015, but was reinstated retroactively on December 18, 2015.

With the reinstatement of the blender’s tax credit, the RIN covered the difference for every week of 2015. As this mechanism settles into the marketplace, it has supported the blending market where RINs can be separated from fuel when blended and sold into the RIN market to further discount the price of biodiesel fuel.

The supply of biodiesel fuel to Minnesota terminals has been constant. When B5/B10 outages occurred at terminals, none were due to unavailability of biodiesel fuel; most occurred because of maintenance to equipment or very short delivery delays.

Minnesota’s B2, B5, and B10 mandates have provided an important incentive, leading to the establishment of the state’s biodiesel production capacity of 63 million gallons. The state’s existing capacity can provide 91.4% for a year of B5/B10, and 54.5 % of biodiesel needed for statewide B20 requirements using the current diesel usage numbers.³

Feedstocks for biodiesel production at two of Minnesota three plants are determined by the price and availability of the vegetable oil or fat that can be used in the process. Given the large soybean oil crushing capacity in Minnesota, much of the soy oil used in Minnesota biodiesel plants is likely to be sourced from Minnesota oil producers. Companies like Renewable Energy Group (REG), owner of the Glenville plant, are able to use lower cost feedstock such as corn oil from the corn ethanol process. This adds to their flexibility regarding feedstock use at that plant. The Ever Cat Fuels plant can also utilize a wide variety of fatty acid feedstocks.

³ These estimates assume 904 million gallons of diesel usage in the state, based on projected usage totals for sectors blending biodiesel as provided by the U.S. Energy Information Agency. By statute, at least 50% of the anticipated demand at the next level must come from in-state production using at least 75% of its feedstock produced in the United States and Canada.

Introduction

This report is submitted pursuant to Minn. Stat. § 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

The Biodiesel Task Force was created by the Legislature in March 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 includes:

- Ronald Marr, Minnesota Soybean Processors (Chairperson)
- Gary Wertish, Minnesota Farmers Union
- Kevin Paap, Minnesota Farm Bureau
- Dustin Haaland, CHS Inc.
- Scott Hedderich, REG Company
- Kevin Thoma, Minnesota Petroleum Marketers Association
- Steve Rupp, Ever Cat Fuels
- Ralph Groschen, At large member
- Gary Mead, Minnesota State University Mankato
- Doug Root, AURI
- Brett Webb, Flint Hills Resources, LP
- John Hausladen, Minnesota Trucking Association
- Chris Hill, Minnesota Soybean Growers Association
- Bruce Heine, Magellan Midstream Partners, LP

Implementation of Minnesota's Biodiesel Requirements

In 2005, Minnesota became the first state to implement legislation mandating the use of biodiesel by blending biodiesel into its diesel fuel supply at a level of 2 percent—commonly referred to as B2. Since then the mandate has moved to 5% (May 1, 2009) and most recently to B10 beginning July 1, 2014. The currently higher level mandate is in effect for the “summer” months, April through September, and reverts to B5 for the winter months. The mandate is now scheduled to move to B20 for the summer months in 2018 (Minn. Stat. § 239.77, subd. 2).

B10 Implementation

The mandate was implemented on July 1, and ran through September 30 for 2014, and from April 1 through September 30 the past two years.

Changes to Minn. Stat. § 239.77 in 2014

During the regular legislative session for 2014 a number of changes were made to Minn. Stat. § 239.77.⁴ These changes included:

- The date of implementation for the B20 mandate was changed to May 1, 2018.
- The months for the B10 mandate (and eventual B20 mandate) were changed from April through October to April through September.
- Subdivision 3 was retitled Exempt Equipment and a sixth sector was added to the list. All exempt equipment carries no sunset date except nuclear, which will expire 30 days after the Nuclear Regulatory Commission would approve the use of biodiesel in motors at electric generating plants under its regulation.
- #1 diesel fuel is exempt from blending with biodiesel year-round until May 1, 2020.

No changes were made to the Minn. Stat. § 239.77 in 2015 or 2016. In 2015 a paragraph was added to Minn. Stat. § 239.751 allowing the term diesel fuel to advertise any fuel approved for use in compression ignition (diesel) engines. This paragraph ensures that retailers do not have to incur costs to update boulevard signs, canopies, and pump labels seasonally as the mandated levels of biodiesel change.⁵

⁴ 2014 Laws of Minnesota, Chapter 181, Section 9.

⁵ See revised Minn. Stat. § [239.751, subd. 4a](#).

ASTM Specifications

ASTM is the premier international industry association that designates quality specifications for a wide variety of industrial products including fuels and lubricants. In 2013, the Minnesota Legislature adopted the use of the D975-12a diesel standard. This specification of the standard does include up to 5% biodiesel with D975 being the general diesel specification for ASTM. The state waiver for biodiesel blending in #1 fuel still addresses the concern for blending biodiesel into #1 diesel in Minnesota, and is now in effect until May 1, 2020.⁶ Subsequent changes and additions have been made to D975 since 2012. The current version is D975-16a.

The most current version of the biodiesel specification – “Standard Specification for Biodiesel Fuel Blend Stocks for Middle Distillate Fuels”, is D6751-15ce1. In 2012 this standard began specifying four grades of biodiesel, which includes the #1 specifications for cold temperature blending:

- Grade 1-B S15-A: special purpose biodiesel blendstock intended for middle distillate fuel applications requiring good low temperature operability and requiring a fuel blend component with 15 parts per million (ppm) sulfur maximum.
- Grade 1-B S500-A: special purpose biodiesel blendstock intended for middle distillate fuel applications requiring good low temperature operability and requiring a fuel blend component with 500 ppm sulfur maximum.
- Grade 2-B S15-A: general purpose biodiesel blendstock for middle distillate fuel applications that require a fuel blend component of 15 ppm maximum.
- Grade 2-B S500-A: general purpose biodiesel blendstock for middle distillate fuel applications that require a fuel blend component of 500 ppm maximum.

Currently, the use of the new #1 grade biodiesel is entirely voluntary. The version of the standard used in Minnesota Statute is D6751-11b.

The ASTM “Standard Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20)” was approved in 2008 as D7467. The standard establishes specifications for biodiesel blends including B10 and B20, which are proposed for general usage in Minnesota in the years 2012 for B10 (actual implementation July 1, 2014) and 2018 for B20. The current version is D7467-15ce1.

Cold Weather Issues

Diesel fuel can experience increases of viscosity (known as “gelling” or “waxing”) in the cold-weather months, which can cause performance problems in engines. These cold-weather-related issues are managed through changing diesel blends, additives, and through quality control. Standards of ASTM International (an international standards organization) exist to ensure proper performance of diesel fuels, and address cold weather issues. Biodiesel has some different characteristics than other types of diesel fuels, and so standards and quality control programs are meant to address those differences.

No additional issues due to the use of biodiesel in #2 diesel fuel have been reported due to cold weather. Minnesota biodiesel blenders have been using more restrictive specifications that reduce the amount of monoglyceride (a fuel component that can cause gelling or waxing) and the cold soak filtration time (a diesel fuel test) even before the #1 biodiesel specification in ASTM D6751 was adopted. These industry practices, along with the yearlong waiver for blending biodiesel into #1 diesel fuel (that continues into

⁶ Minn. Stat. § 239.77, subd. 3a(b).

2020) have made for minimal fuel gelling issues for B5 winter blend with #2 diesel during the cold weather season.

Diesel fuel users are encouraged to contact the Diesel Help Line regarding any cold weather diesel fuel issues.⁷ The Diesel Help Line reports fewer total cold weather related issues reported in recent years, with no major issues reported in some time. They believe that fuel distributors have become proactive in addressing water in storage tanks and vehicles before cold weather arrives, and that many are winterizing fuel they know will be used into the cold season, such as those in the harvest and construction sectors.

⁷ The Diesel Helpline can be reached at 1-800-929-3437.

Biodiesel Quality and Renewable Identification Number (RIN) Reliability

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. The REG plant in Glenville and the Minnesota Soybean Processors in Brewster are certified producers under this program.⁸ Most state purchasing programs currently require BQ-9000[®], including Minnesota's Metro Transit.

There are now programs within the United States Environmental Protection Agency's (USEPA's) Quality Assurance Program that ensure validity of Renewable Identification Numbers, or RINs (explained and discussed in the next section) generated by producers. These programs are again voluntary and can be used to reduce the risk of fraud in the RIN trading market.

⁸ [BQ-9000 Program website](#).

Diesel and Biodiesel Prices

The Renewable Fuel Standard

In 2007 the federal Energy Independence and Security Act (EISA) was passed by Congress and signed by President Bush, revising the Renewable Fuel Standard (RFS, now RFS2) that was already in 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 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.⁹

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 as compliance, termed “retired”, by an obligated party in two ways:

3. 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.
4. 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 case #2, the value obtained by selling the RIN represents another income stream for the obligated party or the third party blender.

The Federal Tax Credit

Since 2005 a tax credit of \$1 has been in place for blending of a gallon of biodiesel. The tax credit has expired four times over the last seven years (including at the end of 2016), but has been reinstated retroactively in all years previous to 2017. For the years of 2014 and 2015, the tax credit was not reinstated until late December. The tax credit was in place for the entire year of 2016.

Rack Pricing

The following section addresses diesel and biodiesel blend pricing based on fuel terminal prices, also known as rack pricing.¹⁰ Fuel terminals often exist at refineries or at the end of pipeline locations. This section will also report biodiesel blend prices sold from the rack. While this section only provides rack pricing, we attempt to describe the effect of the federal tax credit and the RIN market as they can be reflected at the pump.

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 1 compares average yearly prices for ultra-low sulfur diesel and displays the yearly ranges over the past eight year period.

⁹ Annual volumes for four types of biofuel are set annually and are referred to as the Renewable Volume Obligations, or RVO’s. The categories are conventional biofuel (or corn starch ethanol), biodiesel, advanced biofuel, and cellulosic biofuel. Biodiesel can also be used to satisfy the advanced biofuel obligation in addition to the biodiesel obligation.

¹⁰ Rack prices may not be a true reflection of what a buyer would actually pay for a gallon of product as agreements between the seller and buyer may employ volume discounts, early pay discounts or other “non-reported” considerations.

Table 1. Diesel Pricing by City (Average of Terminals Reporting), 2009-2016.

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

Source: Minnesota Department of Agriculture summary of Axxis pricing data through December 31, 2015.

Table 2 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.¹¹

¹¹ AXXIS Software is an OPIS company, Two Washingtonian Center, 9737 Washingtonian Blvd., Suite 200, Gaithersburg, MD 20878; www.axxispetro.com.

Table 2. 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

Impact of Federal Tax Credit

The Federal Tax Credit can be claimed only by the blender (which can be the obligated party or a third-party blender). The federal tax credit for 2014 was passed December 19, 2014, and was effective only for 2014. The credit for 2015 was passed retroactively on December 18, and extended the credit through 2016. The credit has not been extended into 2017.

Discussion occurred over the past year about the possibility of changing the blender’s tax credit to a production tax credit that would be payable to the biodiesel fuel producer. In the end that did not materialize but remains a possibility for the future.

Biodiesel production reached its highest mark to date in 2013 at 1.359 billion gallons of domestic production. Production for 2016 was already at 1.279 billion gallons at the end of October, making it likely that this past year was the highest domestic biodiesel production year on record.

Third Party Blending and Impact of RIN’s

When the net price for B100 (price minus impact of the blender’s tax credit and RIN) is less than the price paid for #2 diesel, a higher percent of biodiesel blended in the fuel makes for a lower cost of the

resulting blended fuel for a third party blender. Figure 1 shows the 2016 trend for the price of the mandated blend (B5/B10) and projected costs for blends of B5/B10/B20.¹²

Figure 1: Week-by-Week Profit Potential: MSP Rack B5 Price, and Calculated B5, B10, and B20 Price using Rack #2 Diesel and Plant Average B100 with the Retroactive \$1 Tax Credit and RIN Subtracted.

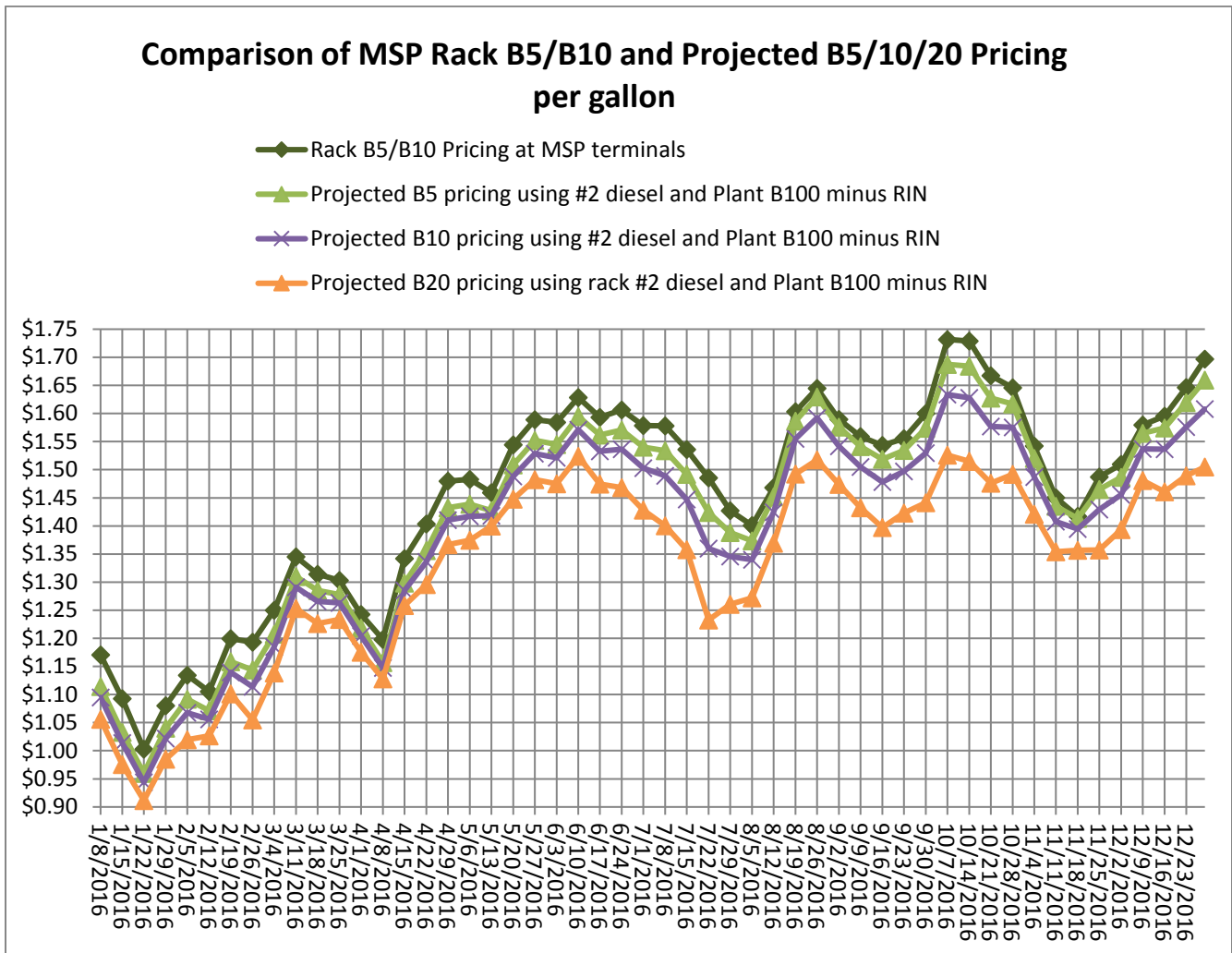
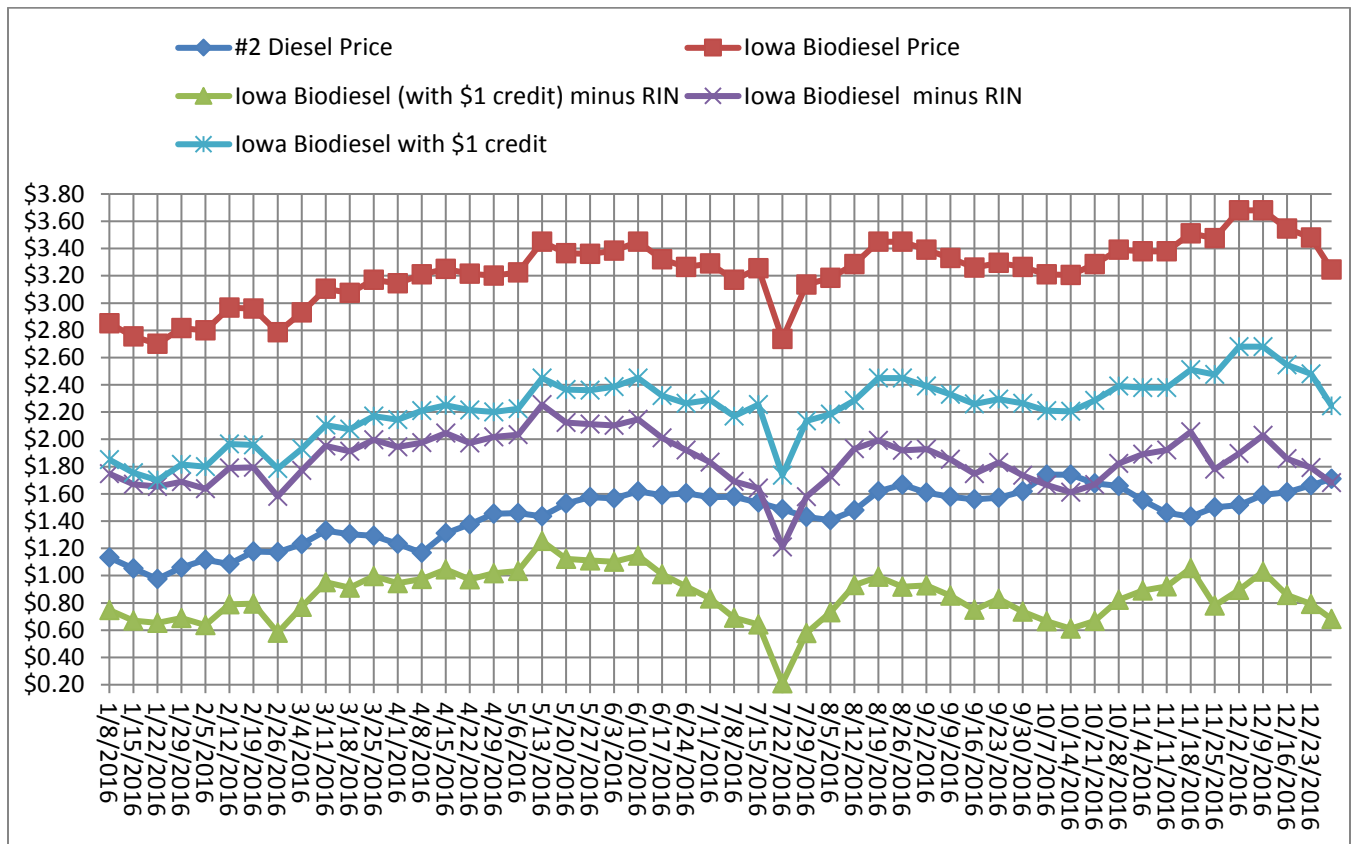


Figure 2 shows the pricing trends for #2 diesel and B100 (Iowa plants average price); also the B100 average price with the \$1 blender’s tax credit, the RIN, and then both tax credit and RIN removed. In 2016 the tax credit and RIN put together kept the price of B100 less than the price of #2 diesel at the rack for the entire year. Keep in mind that the tax credit was in place at the start of 2016 for the first time in three years, allowing for a more predictable market.

¹² Projected price = (Pb * %b) + (Pd * %d) where Pb = average price of biodiesel at Iowa biodiesel plants report Fridays by AMS, Pd = average price of #2 diesel at Minneapolis-St. Paul terminal locations as reported by AXXIS, %b = percent of biodiesel in blended fuel, and %d = percent of #2 diesel in blended fuel.

Figure 2: #2 Diesel Price (MSP Rack), Iowa B100 Price (as Reported by the Biodiesel Plants to AMS), Iowa B100 minus the \$1 tax credit (with and without the RIN subtracted) and the B100 Price with just the RIN Removed.



Summary

If the price component of biodiesel as reflected at the pump (feedstock costs + production costs + distribution costs) is less than diesel pump prices, then biodiesel blending is economically viable. The tax credit and RINs, in theory, bring that total to a level where blending makes economic sense and blenders are incentivized to put in place blending and storage infrastructure. Additionally, in theory, the consumer who is buying diesel is not penalized by any mandated biodiesel blending.

Less industry instability would exist with the tax credit in place at the beginning of the year (as it was in 2016), as production is not capped by RINs and RFS2. More aggressive biodiesel/advanced biofuel Renewable Volume Requirements (RVOs) also increase demand for biodiesel.

In December the USEPA set the RVOs for 2017 and the RVO for biomass-based diesel for 2018. Table 3 shows the upward trend.

Table 3. Renewable Volume Requirements for Biodiesel.

Year	RVO (in billions of gallons)
2012	1.00
2013	1.28
2014	1.63
2015	1.73
2016	1.90
2017	2.00
2018	2.10

Biodiesel can also be used to satisfy an obligated party's requirement in the advanced biofuel category. The advanced biofuel blending volume under RFS2 also continues to rise modestly through 2017 with a total of 1.969 billion gallons set for non-cellulosic advanced biofuel.

The net cost of biodiesel to the blender is dependent on a number of variables. The section on RINs and pricing for the third party blender is included to show the different market dynamics for that demographic and is by no means the only cost consideration to those blenders.

Biodiesel Supply

The supply of biodiesel fuel to Minnesota terminals has been nearly constant. Although B5/B10 outages did occur because B100 deliveries had not arrived at terminals, the more common reason for blend outages was equipment taken down for servicing or required federal inspections.¹³

¹³ Minnesota Department of Commerce, Division of Weights and Measures.

Impact of Minnesota's Biodiesel Requirements

Production Capacity

Assuming approximately 933 million gallons of annual state diesel fuel use,¹⁴ it is estimated that the B5/B10 mandate requires 70 million gallons of biodiesel and the B5/B20 mandate would require 117 million gallons of biodiesel.¹⁵ The state's existing 63 million gallons of production capacity therefore provides 90% for B5/B10, and 54% of that required for B5/B20. These percentages are enough to meet the statutory requirement needed for B10 and a move to B20 if that were to occur today.¹⁶

Diesel usage for 2015 was down 37.5 million gallons from the approximate total usage of 919 million gallons in 2014 in the sectors where biodiesel blending is required in Minnesota.¹⁷ Diesel usage has been up overall every year since 2009 until this past year, rising at a fairly linear rate. At the current rate of diesel fuel usage, the 63 million gallons of production is projected to be adequate to meet the 50% threshold until 2023.

The statutory increase to B20 is now a little more than one year away, set to begin on May 1, 2018.

Feedstocks

The feedstocks used at biodiesel plants are generally determined by the price and availability of oil or fat products and the ability of plants to process oil being considered. Minnesota Soybean Processors will use oil from their soybean crushing plant. The REG plant located in Glenville completed a \$20 million upgrade in 2013 that allows them to process lower cost fats and oils such as inedible corn oil from ethanol plants. The Ever Cat fuels plant in Isanti has the capacity to produce biodiesel out of plant and animal fats, spent cooking oil, and even fatty acid materials from various industrial sources. With these contributions from the REG and Ever Cat plants using non-soybean feedstock, the statutory requirement for using non-traditional sources is easily met.

¹⁴ U.S. Energy Information Administration, [2015 Distillate Fuel Oil and Kerosene Sales by End Use](#).

¹⁵ B10 and B20 would only be effective during the summer months of April, May, June, July, August, and September; during the "winter" months, the amount of biodiesel blended with #2 diesel would revert back to 5%.

¹⁶ Minn. Stat. § 239.77, Subd. 2(b)(2).

¹⁷ Source: U.S. Energy Information Administration (EIA)

Appendix: Minnesota Biodiesel Task Force Member Comments

February 22, 2017

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

Mr. Hennessy:

This letter is in response to the Minnesota Department of Agriculture's recent report to the Minnesota Legislature concerning Minnesota's biodiesel mandate and the state's readiness to potentially double the amount of biodiesel that is required in diesel fuel by next year. Flint Hills Resources, as a member of the Minnesota Biodiesel Taskforce, respectfully disagrees with some of the report's conclusions, including whether the statutory conditions have been met to move forward with increasing the mandate to B20, which would be by far the highest biodiesel blend required in the United States.

As both a petroleum refiner and biofuel producer, Flint Hills Resources strives to maintain the highest degree of consumer confidence in the quality and reliability of the fuels the driving public depend on. We are concerned that the adoption of the B20 requirement next year could prove problematic, harm consumers and erode consumer confidence in the fuels we produce and market, including biodiesel. We believe some of the required statutory conditions for mandating B20, as well as several practical issues, also remain unresolved, including:

- ***Adequacy of blending infrastructure*** – It appears that the requisite blending infrastructure will not be in place by next year to accommodate the B20 mandate without disruption to the marketplace. Very few, if any, of the terminals that serve Minnesota are expected to have the tanks and dispensers that would be needed to efficiently administer B20 before the mandate goes into effect. The mandate creates a difficult business decision for these terminals that are faced with spending millions of dollars on new equipment that provides no economic return and that is only needed six months out of the year. Absent this equipment, however, Minnesota could see terminal product outages, longer wait times for loading and delivery of fuel, higher costs for trucking from distant terminals and/or higher fees to pay for new infrastructure investments, and possibly, product quality issues due to imprecise and inconsistent blending and storage practices. In addition to infrastructure, it's not clear if the necessary regulatory structure is in place to ensure B20 compliance, including adequate enforcement resources. With the higher blend, there is more potential for error and potentially more incentive to disregard the mandate when biofuel economics are unfavorable.
- ***Adequacy of supply*** – The Department of Agriculture report says the “nameplate” capacity of Minnesota's three biodiesel plants supply 54% of the biodiesel demand under B20, which it says is statutorily adequate. This demand estimate appears to be based on an average annual demand for biodiesel rather than average daily demand. Since it is not practical to store large quantities of biodiesel produced in the winter for use in the summer, using average daily demand for biodiesel more accurately reflects the state's true supply and demand fundamentals. Using this basis under ideal circumstances, there would be only enough biodiesel capacity in Minnesota to

meet roughly 33 percent of the average daily demand required at the next minimum content level of B20, as required in the statute. Because production facilities rarely operate at 100 percent utilization, the actual daily biodiesel supply is likely even less. It's also important to note that the production from Minnesota's three biodiesel facilities are not entirely committed to Minnesota. Significant volumes go to other states.

- ***Cold weather performance*** – Although the cold weather performance of biodiesel has improved, the vast majority of biodiesel available in the marketplace today is still susceptible to cold weather issues and it's likely the months of April and September in Minnesota are simply too cold for higher blends such as B20. Even with its sophisticated quality control program and heated storage, Metro Transit continues to experience cold weather challenges with biodiesel. It has reported issues with bus filters clogging when temperatures drop below 35 degrees while using a blend of 50 percent #1 diesel fuel (no biodiesel) with 50 percent #2 diesel fuel (B5), which has an effective biodiesel blend of just 2.5 percent. This suggests that despite the biodiesel blending waiver for #1 diesel fuel, which has been a critical tool for managing cold weather problems, there is still the potential for filters clogging, especially at higher blends during the transitional months of April and September when tanks are switched back and forth between B5 and B20. This could be particularly problematic for general consumers who don't have the resources Metro Transit has to manage these challenges.

In addition, Metro Transit has reported issues with bacteria fouling higher biodiesel blends, which it solved with its new, above ground heated tanks. It also took other significant actions to ensure product quality, including fitting all vents and tanks with desiccant filters, fitting all pumps with non-water blocking filters and performing regular maintenance checks. It is unlikely general consumers have the same capability to manage challenges like these that may be exacerbated by higher biodiesel blends.

- ***Vehicle warranties*** - While B20 is an acceptable consumer choice under the right conditions, not all diesel engine manufacturers cover higher blends in their engine warranties. Forcing consumers to purchase B20 could void warranties for some Minnesota consumers who own light duty diesel vehicles, including brands such as Mercedes, BMW, VW, Nissan, Jaguar, Mazda, Porsche, and Toyota. Older vehicles and some farm equipment that are more than a few years old also are not warranted to run on diesel blends above B5.
- ***Uncertain economics*** – The Department of Agriculture report asserts that B20 is supported by sound and stable economics. However, the report stipulates that to be competitive biodiesel requires subsidization from the federal blender tax credit and the value of RINs under the federal Renewable Fuels Standard. The future of these federal programs is presently unclear. The \$1 per gallon blender tax credit has already expired (effective Jan 1, 2017), and may not be restored. The federal Renewable Fuels Standard also may undergo changes under the new administration, which could affect the value of RINs that further subsidize the cost of biodiesel. Today, biodiesel (B100) typically costs between \$1.75 to \$2.00 per gallon more than diesel fuel (per figure 2, pg. 13 of report) and, at times, the difference has exceeded \$3.00 per gallon. At B20, Minnesota would be more exposed than the rest of the country to possible changes in federal law that could result in dramatically higher biodiesel prices.

In closing, Flint Hills Resources believes biofuels, including biodiesel, can compete in the marketplace without subsidies, incentives or government mandates. Higher biodiesel blends, including B20, are already available in the marketplace and being chosen freely by consumers when cost and seasonal

factors make it a competitive and practical option. Mandating the use of B20 in Minnesota, however, as outlined above, is another matter.

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,

Brett Webb
Director, Commercial Development
Flint Hills Resources

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