MINNESOTA DEPARTMENT OF AGRICULTURE

Report to the Legislature

Annual Report on Biodiesel

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Executive Summary

In 2005, Minnesota became the first state to implement legislation mandating the use of biodiesel by blending biodiesel into its fuel supply at a level of 2 percent—commonly referred to as B2. According to subsequent legislation (Minn. Stat. 239.77, subd. 2), all diesel sold or offered for sale in Minnesota must contain 5 percent biodiesel (B5) as of May 2009, increasing to 10 percent (B10) in 2012 and 20 percent (B20) in 2018.[1,2] The move to B10 was delayed by a letter from the commissioners of agriculture, commerce and the pollution control agency dated November 3, 2011. Over the past three years, the conditions that were sighted for the delay of B10 had been addressed. Notice was published on September 30, 2013, giving the 270 day notice that the state would move to B10 on July 1, 2014. For 2014 the mandate was in effect through September 30, reverting to B5 on October 1. In 2015 the higher volume mandate will begin on April 1 and will again be in effect through the end of September.

The Biodiesel Task Force was formed in 2003—comprised of appointees from industry, academia, and various associations—to advise the Commissioner of Agriculture on implementing the state's biodiesel blend requirement and building the state's biodiesel production capacity. Since then, the Task Force has helped promote the industry and educate biodiesel developers, marketers, consumers and manufacturers about biodiesel and related issues in Minnesota.

Experience and testing demonstrate that biodiesel blends can perform well in cold weather. During the first winter following implementation of B5 in May 2009, some diesel fuel users in Minnesota reported problems potentially associated with the use of higher blends of biodiesel. In January 2010 the Minnesota Department of Commerce issued a temporary waiver for the B5 requirement in #1 diesel in response to concerns about the potential for clogged filters in extreme cold weather. Currently the waiver on blending biodiesel with #1 diesel has been extended in statute through May 1, 2020, and is in effect year-round.[3] In spite of sub-zero temperatures over the past two winters, no issues with the state's B5 mandate over winter months have been reported.

Significant progress has been and continues to be made since the original biodiesel mandate took effect in 2005 that provides industry specifications that establish and improve quality guidelines for biodiesel, biodiesel blends, and diesel fuel oil.

The price of biodiesel fuel remains higher than diesel fuel. The price difference to consumers for biodiesel blends over the past year has been slightly higher at the fuel terminal or "rack," and lower to the independent blender (one that is not obligated to show compliance with the federal Renewable Fuel Standard). For example, wholesale prices at MSP terminals showed a gallon of B5/B10 averaging 1.2 cents more than a gallon of #2 diesel in 2014, while last year B5 averaged 4.1 cents more a gallon. The

[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."

[3] MS 239.77, subd 3a.

federal biodiesel blender's tax credit of $1.00 per gallon was not reinstated until legislation was passed December 19, retroactively covering 2014, but not extending the credit through 2015.

The value of a RIN for a gallon of biodiesel, a feature of the EPA's Renewable Fuels Standard program (RFS2), was equal to or greater than the difference between the producer price for biodiesel (B100) and the rack price of #2 diesel for the all but one week for the year of 2014. As this mechanism settles into the marketplace, it has supported the third party blending market where RINs can be separated from fuel when blended, but does not assist the obligated party blender, who did have the benefit of the federal tax credit after its recent adoption. RINs can reduce the cost of biodiesel blends to the consumer, and does in many places.

The supply of biodiesel fuel to Minnesota terminals has been constant. No B5/B10 outages occurred at terminals because biodiesel fuel was not available, but rather because of maintenance to equipment. A year-round blending facility was constructed and opened by Harms Oil in Sioux Falls, SD, across the street from the Magellan terminal in late 2012. This site continues to supply winter and summer biodiesel blended for southwestern Minnesota.

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 93% for a typical year of B5/B10, and 56 percent of biodiesel needed for future statewide B20 requirements[4].

Feedstocks for biodiesel production at Minnesota plants are generally determined by the price and availability of the oil or fat 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. However, soybean oil prices reached new high levels in late 2010, with the price continuing to decline from that high mark four years ago to the point where it has almost reached the point where it began to increase. Given volatility in soybean oil price, companies like Renewable Energy Group (REG), owner of the Glenville plant, invested $20 million in a retrofit in 2013, designed to allow the plant to use lower cost feedstock such as corn oil from the corn ethanol process, waste vegetable oil, and animal and poultry fats.

[4] These estimates assume 905 million gallons of diesel usage in the state, which is based on usage totals for sectors without exception to biodiesel use 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
- Kelly Marczak, American Lung Association of Minnesota
- Steve Rupp, Ever Cat Fuels
- Ralph Groschen, At large member
- Darrick Zarling, University of Minnesota Center for Diesel Research
- 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

B10 Implementation

The commissioners of agriculture, pollution control and commerce met November 26, 2012, to discuss the delay in implementing the move to B10. Their primary task for this meeting was to re-evaluate Minnesota's readiness to move to B10, and specifically look at the obstacles that required the delay from the May 1, 2012, implementation date set in Minn. Stat. 239.77, Subd. 2(a)(3). The reasons that had been cited in announcing the delay from the commissioners' letter of November 3, 2011, were:

- Regulatory protocol: The Minnesota Department of Commerce, Weights and Measures Division is the enforcement agent for the state's biodiesel content mandate. Weights and Measures audits and samples biodiesel stored at bulk delivery facilities or sold at retail outlets in the state to ensure adequate biodiesel blends are offered. The division's investigators inspect retail outlets on a regular schedule. The length of the interval between inspections might allow for an opportunity for undetected violations of the content mandate. Also, Weights and Measures do not have the authority to audit or inspect at farms or fleet facilities to determine if Minnesota bulk facilities are delivering mandate-compliant fuel.

- Amount of blending infrastructure: The majority of the state is equipped with adequate biodiesel blending infrastructure. The southwestern portion of the state historically has experienced some problems with access to mandate-compliant fuel, leading to supply issues.

The Minnesota Biodiesel Task Force met July 17, 2013, to discuss the four statutory conditions in Minn. Stat. § 239.77. The Task Force affirmed the progress that had occurred since the commissioner's letter of November, 2011. Harms Oil Company of Sioux Falls, South Dakota's biodiesel blending facility was deemed to be sufficient for addressing the southwest Minnesota blending supply issue. HF634, which was passed by the legislature and became 2013 Laws of Minnesota, Chapter 68, addressed the Minnesota Department of Commerce's regulatory concerns by requiring a delivery ticket for a biodiesel blend to state the volume percent of biodiesel content throughout the ticketing process.[5]

The commissioners of agriculture, commerce and the pollution control agency met the following day and determined that the conditions had been met. Notice was posted in the Minnesota State Register on September 30, 2013, stating that the B10 mandate would take effect on July 1, 2014. The mandate was implemented on July 1, and ran through September 30 this past year.

Changes to Minn. Stat. 239.77 for 2014

During the regular session for 2014 a number of changes were made to Minn. Stat. § 239.77.[6] 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.

[5] 2013 Laws of Minnesota, Chapter 68
[6] 2014 Laws of Minnesota, Chapter 181, Section 9.

Department of Commerce Pricing Report

A report regarding wholesale pricing of diesel fuel and blends from the commissioner of commerce, in collaboration with the commissioner of agriculture, was issued in February, 2012.[7] The report looked at prices at various terminals both in and out of the state to see what affect the biodiesel blends have on the overall price of diesel fuel. The report was directed to be made in statute at that time and also "periodically thereafter."

Information from this report is sent to the Governor who may, after consultation with the commissioners of commerce and agriculture, adjust the mandate, should a price disparity appear to be causing economic hardship to retailers of diesel in Minnesota. The report in 2012 found it could not be determined whether economic hardship existed for diesel retailers in the state based upon the data available. Since the mandate in place at the time was B5, such a determination would have had no consequence, as the statute specifies that the blending requirement will not fall below 5% in any event. If the mandate would be greater than 5%, any adjustment made would be no lower than 5% biodiesel content and for a specified period of time.

An excerpt from an analysis of a week of retail pricing with margin data for selected locations on either side of major Minnesota borders is included toward the end of this document in the "Biodiesel Pricing" section.

ASTM Specifications

ASTM is the premier international industry association that designates quality specifications for a wide variety of industrial products including fuels and lubricants. Updates in 2008 to the existing ASTM "Standard Specification for Diesel Fuel Oils D975" incorporated biodiesel blends up to 5 percent. The specification D975-09 was not adopted at the time into Minnesota Statutes because of objections from some members of the petroleum industry who believed that adding 5 percent biodiesel into #1 diesel fuel would not allow that fuel to meet required distillation properties.

In 2013, the Minnesota Legislature adopted the use of D975-12a. 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 through May 1, 2020.[8] Subsequent changes and additions have been made to D975 since last spring. The current version is D975-14a.

In 2012, latest new version of the biodiesel specification, D6751 – "Standard Specification for Biodiesel Fuel Blend Stocks for Middle Distillate Fuels," was accepted. This standard now specifies four grades of biodiesel, which includes the #1 specification 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.

[7] According to MS 239.77, subd. 2(e) "By February 1, 2012, and periodically thereafter, the commissioner of commerce shall determine the wholesale diesel price at various pipeline and refinery terminals in the region, and the biodiesel price determined after credits and incentives are subtracted at biodiesel plants in the region. The commissioner shall report wholesale price differences to the governor who, after consultation with the commissioners of commerce and agriculture, may by executive order adjust the biodiesel mandate if a price disparity reported by the commissioner will cause economic hardship to retailers of diesel fuel in this state. Any adjustment must be for a specified period of time, after which the percentage of biodiesel fuel to be blended into diesel fuel returns to the amount required in subdivision 2. The biodiesel mandate must not be adjusted to less than five percent."

[8] MS 239.77, subd. 3a(b).

- 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. Various refiners and terminals have their own standards for delivery of biodiesel and other products into their systems and these may actually be more stringent than the voluntary number 1 grade biodiesel ASTM specifications. In fact, biodiesel requirements among some Minnesota terminals and refiners have been more stringent than ASTM D6751 dating back to before 2012, but not all have adopted these strict requirements.

ASTM D6751 was first amended in 2008 to include the cold flow filtration test into the recommended test parameters to address cold flow issues. In addition, the federal government established a penalty for trading biodiesel that fails the cold flow filtration test from being sold, transported or used as of September 1, 2009.

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 (actual implementation July 1, 2014) and 2018, respectively. The standard was updated last year. The current version is D7467-13.

Biodiesel Prices

Rack Pricing

The following section addresses only diesel and biodiesel pricing based on fuel terminal, also known as rack pricing reports. This section does not take into consideration the extra value available to the non-obligated party blender (also referred to a 3rd party blender) who is able to separate and sell Renewable Identification Numbers, or RINs, into the RIN market. This market exists due to demand from the Renewable Fuel Standard (also known as RFS2) obligated parties that do not blend their own biodiesel and/or advanced biofuel, and instead uses the RIN that was separated from blended fuel, for biodiesel and advanced biofuel blending obligations.

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 over the past six year period. Ranges include $1.7268 – $1.7660 (low at Omaha, NE – high at Fargo, ND), a difference of $0.0391 for 2009; $2.2513 – $2.3087 (low at Omaha, NE – high at Superior, WI, difference of $0.0574 for 2010; $3.0991 - $3.1755 (low at Omaha, NE – high at Superior, WI), difference of $0.0764 for 2011; $3.1711-$3.2117 (low at Omaha, NE – high at Fargo, ND), difference of $0.0405 for 2012; $3.1069-$3.1617 (low at Omaha, NE – high at Duluth, MN), difference of $0.0548 for 2013; and $2.8957-$2.9719 (low at Omaha, NE – high at Duluth, MN), difference of $0.076 for 2014.

Prices for B100 at the rack historically have varied more than diesel prices, with average monthly prices for regularly reporting regions varying as much as 21 cents in 2009 (Rochester's low to Mankato's high), 50 cents in 2010 (Marshall's low to Denver's high), 25 cents in 2011 (Marshall's low to Grand Fork's high), 35 cents in 2012 (Marshall's low to Denver's high), 55 cents in 2013 (Rochester's low to Denver's high), and 69 cents in 2014 (Marshall's low to Denver's high). The cities of Omaha,

Nebraska, Sioux Falls, South Dakota, and Superior, Wisconsin, do not provide pricing for B100. Table 2 shows average yearly prices for B100 in the reporting regions.

Table 1. Diesel Pricing by City (Average of Terminals Reporting), 2009-2014.

City/Region, State	2009	2010	2011	2012	2013	2014
Alexandria, MN	1.7600	2.2860	3.1357	3.1954	3.1503	2.9433
Denver, CO	1.7377	2.2975	3.1170	3.1985	3.1201	2.9420
Duluth, MN	1.7532	2.3006	3.1639	3.2095	3.1617	2.9719
Fargo, ND	1.7660	2.2941	3.1459	3.2117	3.1614	2.9619
Grand Forks, ND	1.7628	2.2899	3.1424	3.2086	3.1591	2.9593
Mankato, MN	1.7515	2.2740	3.1190	3.1843	3.1437	2.9271
Marshall, MN	1.7538	2.2811	3.1223	3.1874	3.1407	2.9334
Omaha, NE	1.7268	2.2513	3.0991	3.1711	3.1069	2.8957
Rochester, MN	1.7437	2.2714	3.1198	3.1795	3.1388	2.9259
Sioux Falls, SD	1.7375	2.2617	3.1084	3.1776	3.1204	2.9100
Superior, WI	1.7616	2.3087	3.1755	3.2040	3.1565	2.9707
Minneapolis-St. Paul, MN	1.7456	2.2741	3.1236	3.1832	3.1298	2.9357

Table 2. B100 Pricing by City (Average of Terminals Reporting), 2009-2014.

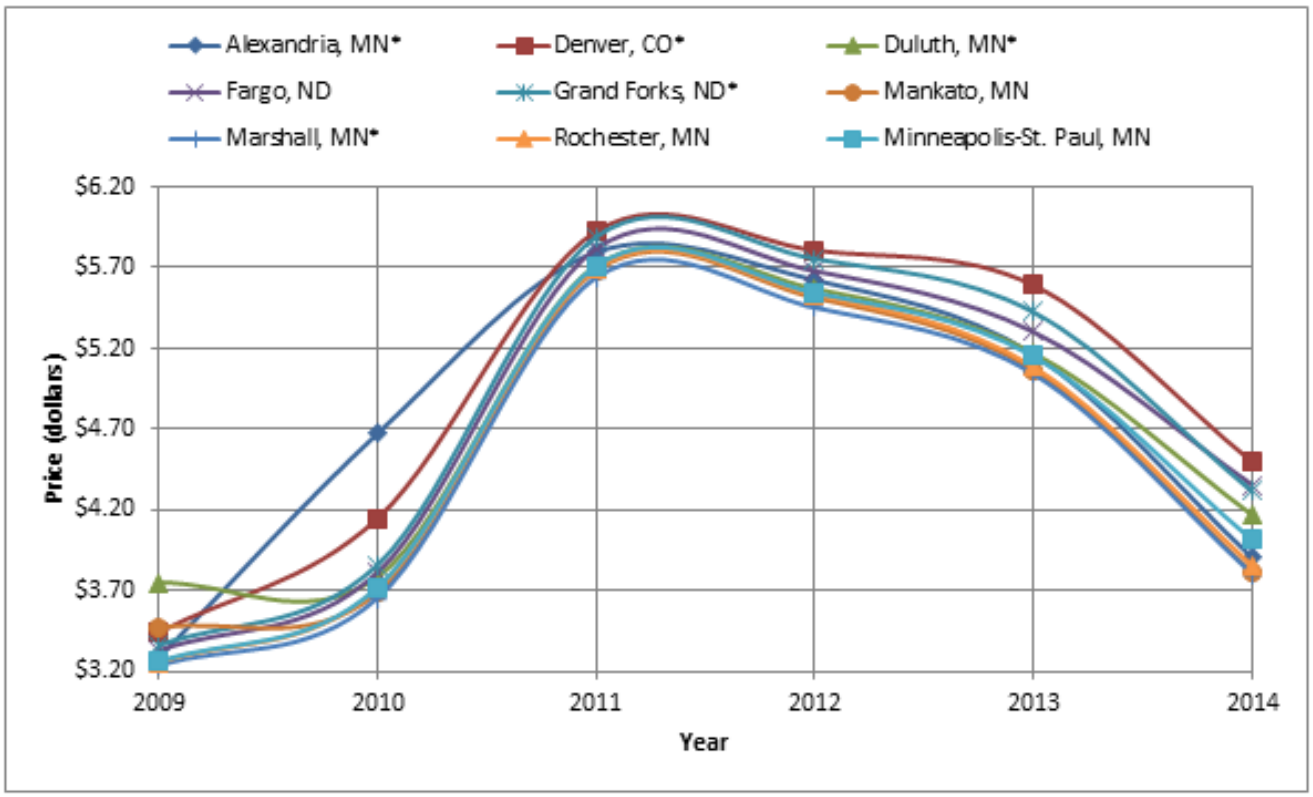
City/Region, State	2009	2010	2011	2012	2013	2014
Alexandria, MN*	3.2834*	4.6725*	5.7960	5.6217	5.1621	3.9047
Denver, CO*	3.4409*	4.1464	5.9249*	5.8060	5.5912	4.4960
Duluth, MN*	3.7471*	3.7842	5.7123	5.5683	5.1705	4.1675
Fargo, ND	3.3285	3.8114	5.8174	5.6789	5.3018	4.3537
Grand Forks, ND*	3.3600*	3.8587	5.8907	5.7536	5.4248	4.3136
Mankato, MN	3.4683	3.6852	5.6818	5.5131	5.0634	3.8133
Marshall, MN*	3.2352*	3.6536	5.6378	5.4524	5.0411	3.8035
Omaha, NE	No B100 data available					
Rochester, MN	3.2544	3.7133	5.6940	5.5321	5.0858	3.8536
Sioux Falls, SD	No B100 data available					
Superior, WI	No B100 data available					
Minneapolis-St. Paul, MN	3.2592	3.7193	5.7100	5.5442	5.1501	4.0125

*-missing prices (shaded cells) for:
Alexandria: December 11, 2009 – December 8, 2010
Denver: June 26, 2009 – July 22, 2009; March 3, 2011 – September 29, 2011
Duluth: April 28, 2009 – July 22, 2009
Grand Forks and Marshall: June 5, 2009 – June 19, 2009; July 14, 2009 – July 22, 2009

Figure 1 displays graphically the average yearly prices of B100 at the various reporting cities. Notice a similarity in the profile (shape) of most all the curves, especially since 2011. Also notice the higher

B100 price for Denver, CO, Grand Forks, North Dakota, and Fargo, North Dakota, starting in 2011 and becoming larger in recent years.

Figure 1. B100 Pricing by City (Average of Terminals Reporting), 2009-2014 (Graph).

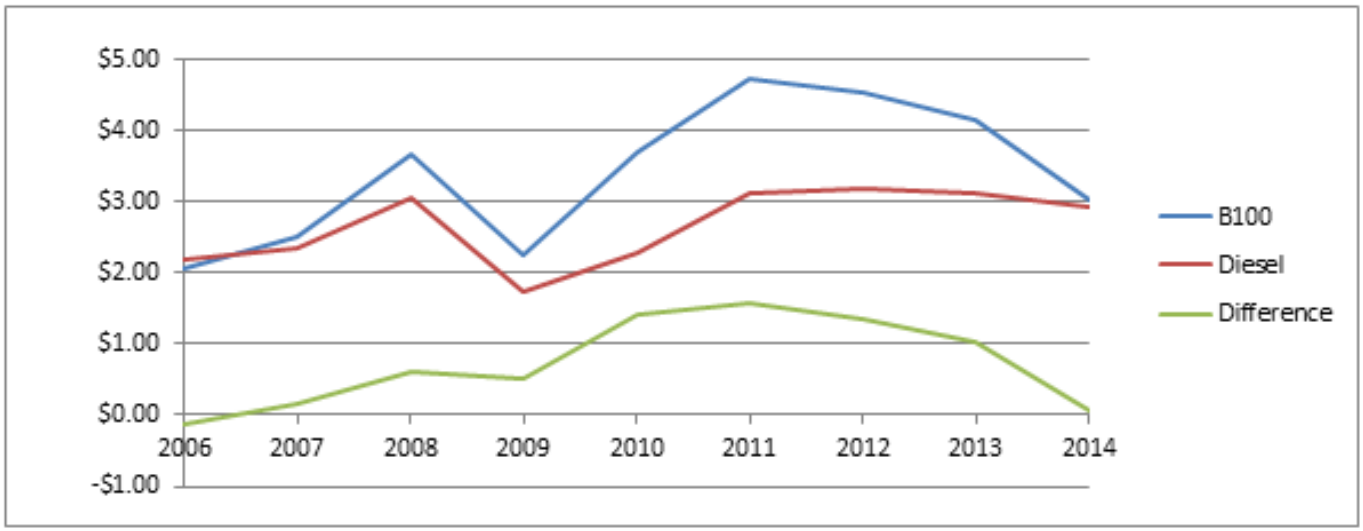


*-incomplete pricing data, see Table 2.

A graph of the net average wholesale prices (at the rack)—adjusted to illustrate after-tax costs of B100 compared to the wholesale cost of diesel at major Minneapolis/St. Paul terminal locations—can be seen in Figure 2. Each year's retroactive $1 tax credits have been subtracted from the B100 price, which is the price effective for the blender, including for this past year, where the tax credit was not reinstated until December 19.[9]

[9] The biodiesel tax credit was approved in passed December 19, 2014, and is in effect for the year of 2014 only.

Figure 2. Minneapolis-St. Paul Diesel[10] and Biodiesel[11] Price Trends at the Rack, 2006-2014.[12]



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

Table 3 displays computed prices for biodiesel blends based on B100 and diesel prices reported at the rack, using the following formula:

Where:
Pb = Net price of one gallon of biodiesel to blender (after tax credit)
Pd = Price of one gallon of diesel at the rack
%b = Percent of biodiesel in blended fuel
%d = Percent of diesel in blended fuel

*(Pb * %b) + (Pd * %d) = Computed price of biodiesel blend*

[10] Price of diesel at the rack (wholesale-Minneapolis/St. Paul average).
[11] For 2006 to 2014, the price of biodiesel is the rack (wholesale) price after the $1.00 federal tax credit including those reinstated retroactively.
[12] Generally, prices were recorded by Axxis daily (on business days). However, in 2006 prices were only recorded weekly and did not start until February for biodiesel and May for diesel. In 2007, diesel prices were consistently recorded on a daily basis throughout the year, while biodiesel prices were only recorded weekly from January through June and then daily for the remainder of the year. As such, averages prices for 2006 and 2007 represented in the chart may be less consistent than those in subsequent years. In addition, from March 24, 2008 to May 2, 2008, data on the price of biodiesel was not available through the Axxis pricing service. After a review of data in May, Axxis determined that the increase in price was not an error, but actually reflected market conditions. Axxis reestablished B100 prices effective May 2, 2008. To avoid the appearance of understating the price of biodiesel during that period, the average price of the last day of available data (March 28) and the first day of data (May 2) was inserted for the month of April. Prices since then have continued uninterrupted for both diesel and B100.

Table 3. MSP Rack Diesel and Biodiesel Blend Prices (per gallon), 2006-2014.

Year (Blend Mandate)	Net Cost of B100 to Blender [6]	Average Rack Diesel Price	Computed Price of B2	Computed Price of B5/B10 [10]	Net Impact Price of Biodiesel Blend
2006(B2) [1,2]	$2.0584	$2.1944	$2.1917		-$0.0027
2007(B2) [3]	$2.4983	$2.3388	$2.3420		$0.0032
2008(B2) [4,5]	$3.6607	$3.0538	$3.0659		$0.0121
2009(B2/B5)	$2.2592	$1.7456			
2009 (1-4 to 4-30) B2)	$2.2064	$1.4120	$1.4278		$0.0159
2009 (5-1 to 12-31)(B5)	$2.2864	$1.9176		$1.9361	$0.0184
2010 (B5) [7,8,9]	$2.7193	$2.2741		$2.2964	$0.0223
2011(B5) [9]	$4.7100	$3.1236		$3.2029	$0.0793
2012(B5) [9]	$4.5442	$3.1832		$3.2513	$0.0680
2013(B5) [9]	$4.1501	$3.1298		$3.1808	$0.0510
2014(B5/B10) [11,13]	$4.0125	$2.9357		$3.0028	$0.0671
2014(B5/B10) [12,13]	$3.0125	$2.9357		$2.9391	$0.0034

1	2006 includes B100 and B2 prices for Feb 23 through June 20 and July 24 through Dec 29, and diesel prices for May 4 through Dec 29.
2	Beginning in October 2006, the federal government limited sulfur in diesel to 15 ppm.
3	2007 includes B100 and B2 prices for Jan 5 through Dec 31, and diesel prices from Jan 2 through Dec 31; however, biodiesel prices were very spotty (about weekly) from Jan-June whereas diesel prices were recorded daily.
4	2008 includes B100 prices for Jan 2 through March 24 and May 2 through Dec 31 (B2 prices consistent), and diesel prices from Jan 2 through Dec 31.
5	From March 24, 2008 to May 2, 2008, data on the price of biodiesel was not available through the Axxis pricing service. The rapid increase in the price of biodiesel apparently caused a loss of data. After a review of data in May, Axxis determined that the increase in price was not an error, but actually reflected market conditions. Axxiss reestablished B100 prices effective May 2, 2008. To avoid the appearance of understating the price of biodiesel during that period, the average price of the last day of available data (March 28) and the first day of data (May 2) was inserted for the month of April.
6	Net cost of biodiesel is the net cost to the blender after federal tax credit is applied.
7	B5 blend all year in #2 diesel; no B100 in #1 diesel 1-15 to 3-31 and 10-1 to 12-31
8	The tax credit was reinstated (retroactive for 2010 and thru 2011) on December 20, 2010.
9	No B100 blended with #1 diesel January-March and October-December.
10	B10 was the mandated fuel for July 1 - September 30, 2014.
11	The retroactive tax credit for 2014 has not been been applied. It was reinstated December 19, 2014, for 2014 only.
12	The retroactive tax credit for 2014 has been applied.
13	No B100 blended with #1 diesel year-round.

The computed price of biodiesel blends was generally around 1 to 2 cents higher per gallon than diesel fuel from 2008 to 2009, at which point the blender's tax credit appeared to expire. The tax credit was reinstated retroactively in December, 2010, but it is unclear whether blenders were able to take full advantage of the retroactive credit. Since that time, the impact difference has been higher, and the tax credit, despite being in effect retroactively throughout the time period, was not in effect at the actual time (was reinstated retroactively two more times) periods. The average differences were about 7 cents over for 2010 without the tax credit; 7.9 cents in 2011 (with the tax credit all year); 11.8 cents in 2012 before the tax credit was reinstated in early January, 2013; 5 cents in 2013 with the tax credit in effect the entire year; and 1.7 cents for 2014, where the tax credit was passed retroactively on December 19. When factoring in the retroactive $1 blender's tax credit for 2010, 2012, and 2014 those impacts are lowered to 2, 6.8, and 0.3 cents, respectively. In 2014 the price takes into account the B5/B10 mandated blend with the July 1 through September 30 implementation period for B10. The $1 federal tax credit is shown both absent and reinstated for 2014 in the table.

Computed prices for B2 and B5/B10 have tracked closely with actual prices for these fuels at the rack, which generally ranged from about 2 cents more to 15 cents less per gallon than the blend at the rack is priced (see Table 4). The average difference in the calculated blend price and the actual blend price over the eight year period is a little over 2 cents less for the calculated price. These differences in price have been attributed to a variety of factors including the additional impact of the timing and length of marketing contracts; the marketing strategies of biodiesel producers, petroleum refiners, pipeline operators and position holders, the temporary losses of the federal tax credit, and the amortization of the cost of blending equipment installed at refiners and terminals.

Table 4. Comparison of Projected B2/B5 Pricing and Actual Rack Pricing, 2006-2014.

Year (Blend Mandate)	Computed Price		Rack Price		Computed/Rack Difference (Computed minus Rack)	
	B2	B5/B10	B2	B5/B10	B2	B5/B10
2006 (B2)	$2.1917		$2.1678		$0.0239	
2007 (B2)	$2.3420		$2.4901		-$0.1481	
2008 (B2)	$3.0659		$3.0903		-$0.0243	
2009 (1-4 to 4-30) (B2)	$1.4278		$1.4421		-$0.0143	
2009 (5-1 to 12-31) (B5)		$1.9361		$1.9679		-$0.0319
2010 (B5)		$2.2964		$2.3372		-$0.0409
2011 (B5)		$3.2029		$3.2266		-$0.0237
2012 (B5)		$3.3013		$3.2488		$0.0524
2012 (B5)		$3.2513		$3.2488		$0.0024
2013 (B5)		$3.1808		$3.1703		$0.0105
2014 (B5/B10) (without $1 tax credit)		$2.9646		$2.9408		$0.0238
2014 (B5/B10) (with $1 tax credit)		$2.9021		$2.9408		-$0.0387

Table 5 projects B10 pricing based on data from the past six years. These projections use average prices of diesel fuel and B100 for each year and apply the same formula listed above that is used for all projections. All years are based on Minneapolis-St. Paul average prices at the rack, disregarding any effect for the trading of RINs (see *Third Party Blenders and Impact of RIN's* in the following pages). The increase in price reflects the divergent relationship of costs in B100 and diesel fuel over the past six years, with less of an effect this past year once the tax credit is applied.

Table 5. Projected cost of B10 (using tax credit with rack B100 price for all years except 2014 where both with and without are included) over 2009-2014 with its associated cost difference with straight race priced #2diesel fuel[13].

Year (Blend Mandate)	Average Price for B100	Average price of Diesel at rack	Computed Average Price for blended fuel (B5 winter/B10 summer)	Price Impact of B5/B10 Blend
2009	2.2592	1.7456	1.7823	0.0367
2010 [1]	2.7193	2.2741	2.3057	0.0316
2011	4.7100	3.1236	3.2468	0.1232
2012 [2]	4.5442	3.1832	3.2873	0.1041
2013	4.1501	3.1298	3.2109	0.0811
2014 [3]	4.0126	2.9357	3.0144	0.0786
2014 [4]	3.0126	2.9357	2.9393	0.0035

[1] – Total for 2010 with retroactive tax credit for entire year.
[2] – Total for 2012 with retroactive tax credit for entire year.
[3] – Total for 2014 without retroactive tax credit.
[4] – Total for 2014 with retroactive tax credit.

Impact of Federal Tax Credit

Production of biodiesel for 2011 set a new record at approximately 967 million gallons. This broke the 2008 mark of 690 million gallons set in 2008, and more than tripled the 315 million gallon output of 2010. That increase in production has been directly tied to the reinstatement of the Federal Tax Credit in December, 2010.

The 2010 tax credit continued through 2011 and expired on December 31, 2011. During 2012, with the lack of the tax credit the RIN through RFS2 renewable fuel use requirements was the only government intervention helping bring down the value of biodiesel fuel from its straight market value. The tax credit was reinstated, retroactive for 2012, through December 31, 2013, in the Federal Fiscal Cliff Legislation passed January 2, 2013.

The federal tax credit for 2014 was passed December 19, 2014, and is effective only for 2014. It remains to be seen who will benefit from the tax credit's reinstatement, since fuels have been sold and blended throughout the year. The tax credit will be given to the blender and that value will not necessarily be passed on to the customer, outside of contractual agreements for fuel sales.

Third Party Blenders and Impact of RIN's

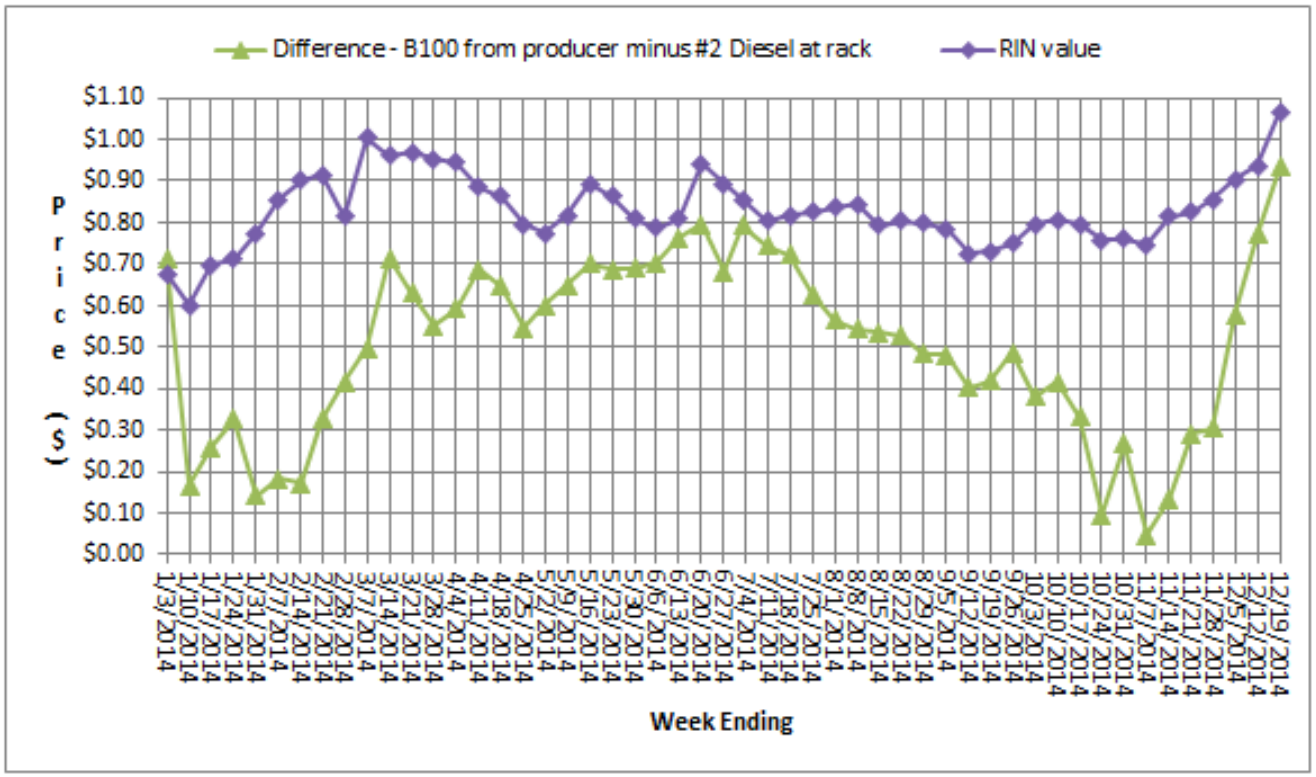
The RFS2 program allocates RINs to each gallon of biodiesel produced or imported. Each qualified gallon of biodiesel earns 1.5 the value of the RIN, which can be sold by the third party blender (but not the obligated party, unless they have met their blending obligation under RFS2 and have excess RINs) to offset the cost of biodiesel. This value is over and above the federal biodiesel blender's tax credit, which can be claimed by any blender of record for gallons of biodiesel. RIN's are bought in the market by

[13] Data from Minneapolis-St. Paul rack averages as reported by AXXIS. This data assumes that the tax credit was not deducted from the B100 price (which is not always true), and does not take other factors, such as the trading of RINs by parties under RFS2, into account.

energy companies who do not blend any or enough renewable fuel (and hence cannot "retire" the RINs for the gallons blended) to meet their obligation under the RFS2 program.

Throughout the year of 2014 the RIN value was the only factor that reduced the cost of B100. While obligated parties (petroleum refiners and importers) under RFS2 are mandated to blend certain percentages of their petroleum fuels with biofuels, other petroleum marketers and distributers are not. RINs can be separated from gallons of B100 that have been purchased once the fuel is blended. The RINs can be sold in the RIN market. A potential for profit from blending exists if the value of the RIN is greater than the difference between the biodiesel purchase price (including the federal tax credit if it is in effect) and the price paid for #2 diesel. A look at the RIN values (Biodiesel RIN price times 1.5) and the weekly difference for averages of B100 minus diesel fuel for 2014 is shown in Figure 3. The RIN value was higher than the B100/#2 diesel price difference (except for the week of January 3) for the entire year which indicates the potential of profit for the 3rd party blender.

Figure 3: Comparison of Difference in B100 from the Producer[14] Minus #2 Diesel Price[15], and the Biodiesel RIN Value[16], 2014, as it Appeared Before the Tax Credit was Reinstated.

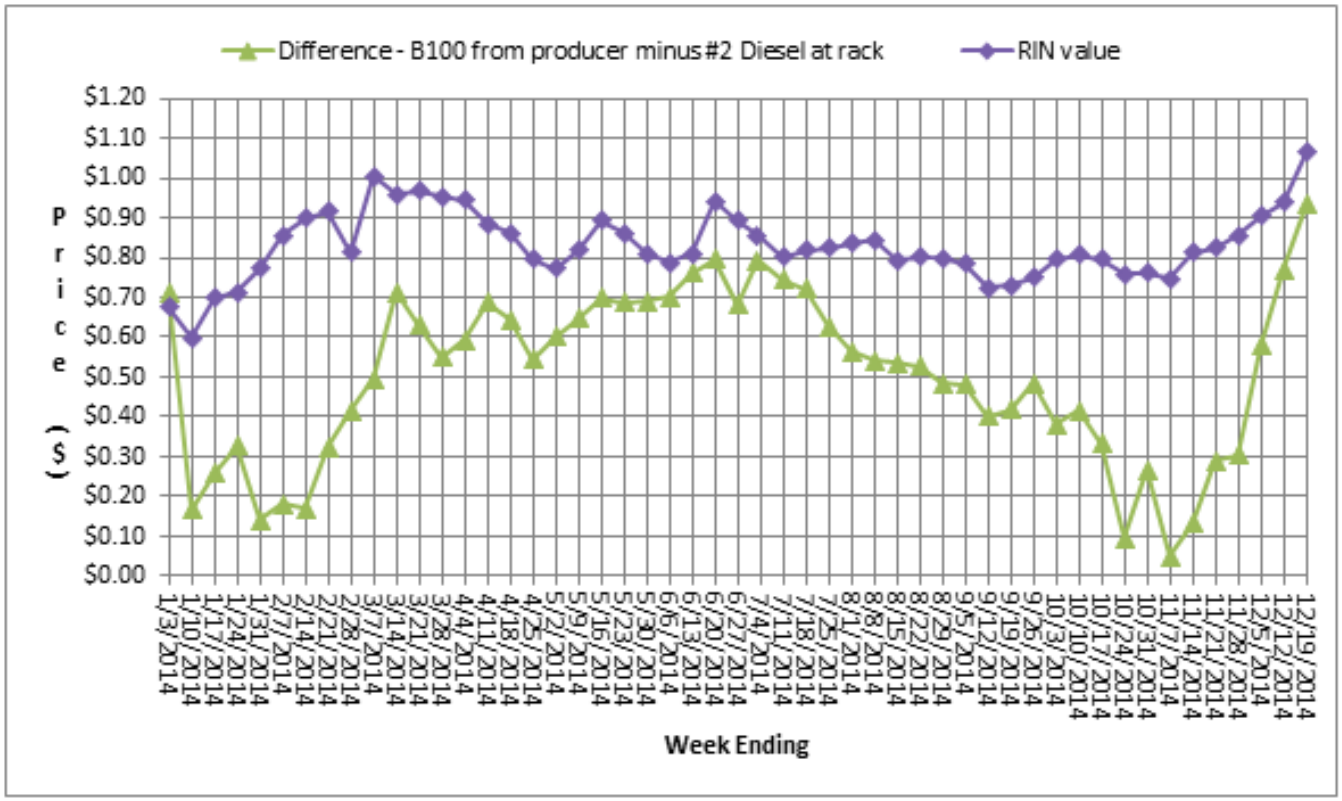


Using the biodiesel weekly RIN for the year, an average of 60.1% of the value of a biodiesel RIN gallon (and a median value of 64.2%) would make up for the difference in the two fuel's prices. The extra percentage of the RIN gallon price could be used for transport, processing, profit and price break to the customer for the blender that is able to sell RINs.

The federal biodiesel blender's tax credit was passed retroactive for 2014 on December 19. Figure 4 shows how the potential for 3rd party blender profit looks under that scenario.

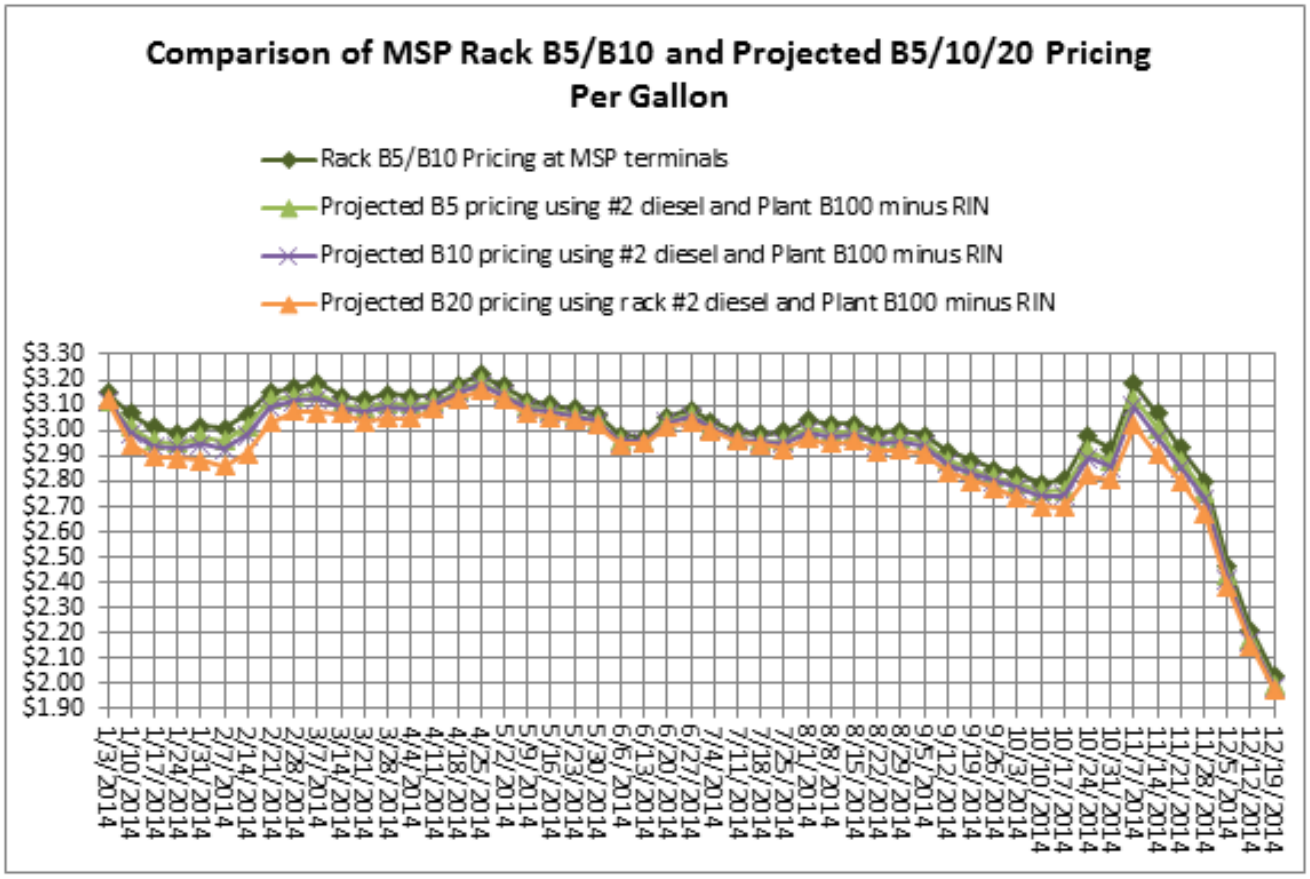
[14] National Weekly Ag Energy Round-Up. USDA Livestock and Grain Market News, Des Moines, IA.
[15] Weekly average rack price from Minneapolis-St. Paul terminals as reported by AXXIS.
[16] PFL Markets Daily. Progressive Fuels Limited, Naples, FL.

Figure 4: Comparison of Difference in B100 from the Producer Minus #2 Diesel Price, and the Biodiesel RIN Value, 2014, as Would Exist with the Tax Credit was Reinstated.



And finally, when the net price for B100 (with or without the blender tax credit and RIN) nets less than the price paid for #2 diesel, the higher the percent of biodiesel blended in the fuel makes for a lower cost of the resulting blended fuel. Figure 5 shows the 2014 trend for the mandated fuel price at the rack (B5 except for July 1 through September 30 when the mandated blend level was B10) and projected costs for blends of B5/B10/B20. The B5/B10/B20 projected price is calculated using the Iowa B100 production price average minus the RIN price (no tax credit was considered here) and the formula on page 13. The rack B5/B10 price is as listed on the daily AXXIS data for the average terminal price in Minneapolis-St.Paul. Factoring in the $1 tax credit (which could be available to the 3rd party blender retroactively) would further increase any profit margin.

Figure 5: Week-by-Week Profit Potential Using RIN Value: MSP Rack B5 Price, and Calculated B5, B10, and B20 Price using Rack #2 Diesel and Plant Average B100 (without the tax credit removed).

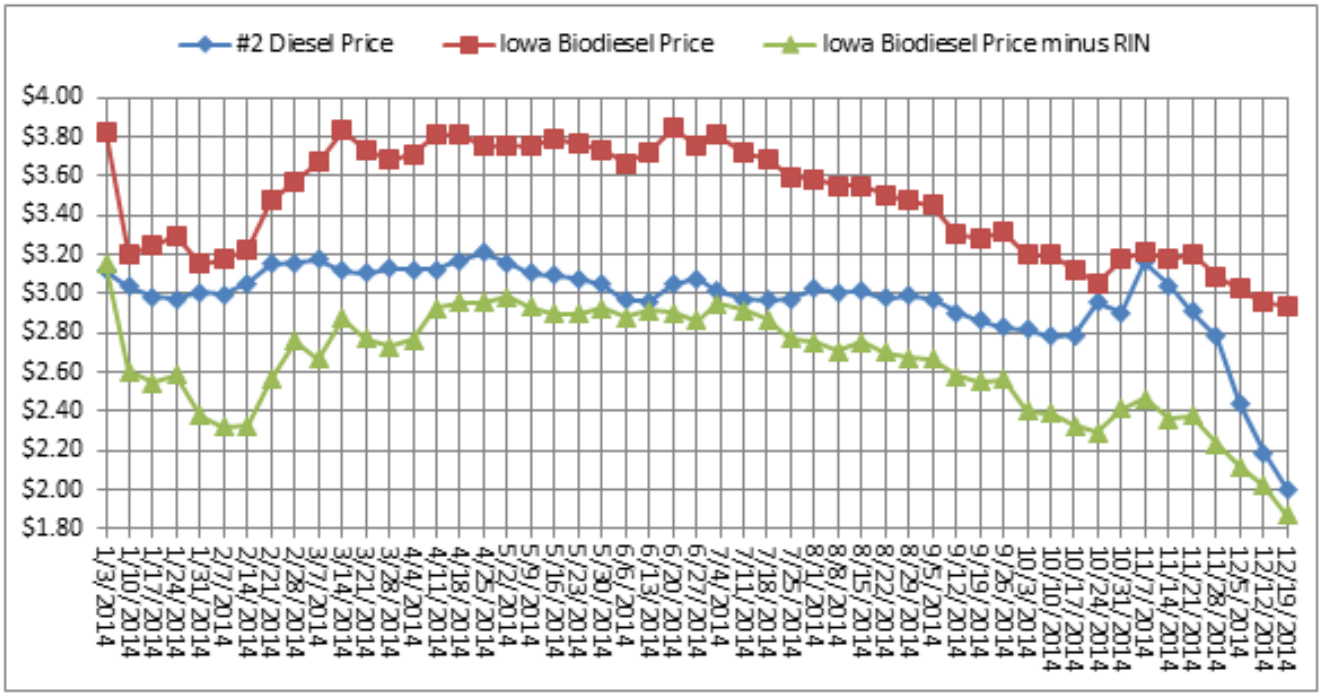


The ability to take advantage of RIN trading does require knowledge of the market, or services of an agency that specifically works with trading in that market. This data does show that there has been great potential profit for blenders who do not need to retire RINs for compliance with the RFS. Minnesota's obligated parties, due to the fact that the blending required by Minnesota's biodiesel mandate is higher than blending volumes required nationally by RFS2, will likely have excess RINs beyond what they need to satisfy their national obligation and after meeting that obligation, sell into the RIN market.

The apparent loss of the blender's tax credit this past year was immediately reflected in lower B100 prices from the producer. The price of B100 decreased 60 cents between the weeks of January 3 and 10, and then this past week increased 30 cents after reinstatement.

Figure 6 shows the pricing trends for #2 diesel, B100 (Iowa plants average price), and the B100 average price with the RIN removed. Here you can see clearly the effect the RIN on the price of B100, and B100 relative to #2 diesel.

Figure 6: #2 Diesel Price (MSP Rack), Iowa B100 Price (as Reported by the Biodiesel Plants to AMS), and the B100 Price with the RIN Removed.



Tracking Retail Pricing

An opportunity arose this past year to look at the effect of Minnesota's biodiesel mandate on retail pricing as it occurs on opposite sides of state borders along major trucking corridors. The Minnesota Department of Agriculture, using a trial subscription for a selection of retail outlet pricing for seven days, put together a sample report. Table 6 is a section of that data, containing analysis of the corridor of I-94 from Wisconsin into Minnesota for the week of May 15-21. Reported fuels included B2SMEU (B2), B5SMEU (B5), and ULS (B0). Other state corridor analysis was done for the I-90 Wisconsin border; the I-90 South Dakota border; the I-35 Iowa Border; the Duluth-Superior area; the I-94 North Dakota border; the East Grand Forks-Grand Forks border; and the Marshall-Brookings border regions. The summary of all these analyses is available upon request. Results of this analysis show varying pricing (including margins taken) for the various corridors in and out of the state, where in some corridors where Minnesota had lower pricing, and other corridors where it didn't. Only the Minnesota locations are color coded in Table 6.

Table 6: Example Retail Pricing Report at Major Interstate Border Regions, May 15-21, 2014[17].

Truckstop	City	State	Product	Retail	Cost	Spread
KWIKTRIP#662***	SaintPaul	MN	B5SMEU	3.949	3.6851	0.2639
			ULS	3.949	3.6684	0.2806
QUICKFUEL#1601***	SaintPaul	MN	B5SMEU	4.005	3.6923	0.3124
			ULS	4.005	3.6799	0.3248
KWIKTRIP#869**	SaintPaul	MN	B5SMEU	3.889	3.6892	0.1998
			ULS	3.889	3.6776	0.2114
HOLIDAY STATIONSTORE #318*	Saint Paul	MN	B5SMEU	3.939	3.6754	0.2636
			ULS	3.939	3.6611	0.2779
HOLIDAYSTATIONSTORE#335**	Minneapolis	MN	B5SMEU	3.899	3.6923	0.2067
			ULS	3.899	3.6799	0.2191
KWIKTRIP896**	Minneapolis	MN	B5SMEU	3.900	3.6826	0.2179
			ULS	3.900	3.6659	0.2346
TA TWIN CITY EAST TRAVEL CENTER	Hudson	WI	B5SMEU	4.050	3.6657	0.3848
			ULS	4.050	3.6698	0.3807
FLYING J #470 HUDSON	Roberts	WI	B5SMEU	4.019	3.6628	0.3562
			ULS	4.019	3.6672	0.3518
KWIK TRIP #696	Baldwin	WI	B2SMEU	3.925	3.6543	0.2704
			B5SMEU	3.925	3.7170	0.2077
			ULS	3.925	3.7005	0.2242
KWIK TRIP #453	River Falls	WI	B2SMEU	3.952	3.6477	0.3041
			B5SMEU	3.952	3.7104	0.2414
			ULS	3.952	3.6939	0.2579

Color Key:

	Minnesota more expensive*
	Parity on both sides of border
	Minnesota less expensive**
	Minnesota cheaper than some, more than others***
	Location in Minnesota is no higher than the highest out of state location
	At least parity or better than out of state locations

Summary

The cost of biodiesel depends on a number of factors. Even with reinstatement of the tax credit this past year, RIN prices continue be an important element in regards to profitability and price of biodiesel blends. The tax credit, RINs, and other mitigating factors can contribute to fluctuations in profitability, the loss of jobs and the price of B100 becoming uncompetitive with diesel.

There would be less industry instability with the tax credit in place, as production would not be capped by RINs and RFS2. RINs have help mitigate the cost of blending biodiesel for the third party blender, and even made it profitable. In the future, perhaps, they will help in sustaining the industry if the tax

[17] Daily Oil Price Information Service retail station tracking of select diesel prices at selected petroleum retail outlets, May 15-21, 2014.

credit is discontinued. If such is the case, more aggressive biodiesel/advanced biofuel volume requirements will be helpful and maybe even necessary for increasing demand for biodiesel, and hence the RIN price. Overall RINs buffer the cost of biodiesel to make it possible for third party blenders to offer biodiesel blends without jeopardizing their profitability or increasing the consumer's cost of blends over the cost of diesel fuel.

Currently the EPA has set the same RFS2 blending requirement that was in place in 2013 for both 2014 and 2015. A final EPA ruling on renewable volume obligations (RVOs) for obligated parties is expected in early 2015. 1.28 billion gallons of biodiesel was the quantity set for 2013 – this was up from 1 billion gallons of total blending requirement the previous year. Biodiesel can also be used to satisfy an obligated party's requirement for the advanced biofuel category. The advanced biofuel blending volume under RFS2 has also been reduced in the current ruling from 2.75 billion gallons in 2013 to 2.2 billion gallons for 2014, which is a reduction in advanced biofuel (that could or could not be biodiesel beyond the 1.28 billion gallons) of 557 million gallons.

The net cost of biodiesel to the blender (which could ultimately be passed on to the consumer) is dependent on a number of variables including unpublished wholesale customer discounts, term contract prices versus spot market differentials, the value of RINs, profit margins and marketing strategies, not to mention whether or not the $1 tax credit is renewed in the coming year, and if so, when. The ability to manage these variables can add to the profitability of blending; thus, the "actual cost" of biodiesel to blenders is not reflected by rack or retail prices alone. The section on RINs and pricing for the third party blender is included to show the different market dynamics for that demographic.

Other costs may also exist, such as the use of cold weather additives, blending of #1 diesel in cold weather months, more frequent changing of fuel filters and cold weather associated repairs. These have not been documented by the Diesel Help Line, but have been expressed as concerns by various diesel user groups. These costs would be added costs to the blender and the end-user.

Biodiesel Supply

The supply of biodiesel fuel to Minnesota terminals has been constant. No B5/B10 outages occurred because B100 was not available, according to Minnesota Department of Commerce's Division of Weights and Measures. More common reasons for blend outages were the lack of diesel fuel at terminals or equipment taken down for servicing.

On November 28, 2012, Harms Oil Company of Sioux Falls, South Dakota held their grand opening for a new biodiesel blending facility across the street from the Magellan terminal in Sioux Falls. Two 20,000 gallon underground storage tanks were installed; one is heated and can keep the B100 at 75°F throughout the winter months. When the warm biodiesel is injected into the tanker of #2 diesel, the warmth helps with the overall blending of the fuels. The availability of biodiesel at this site has provided petroleum marketers in the southwest portion of the state an important additional option to comply with the statutory requirements of biodiesel sales in Minnesota.

Production Capacity

Assuming approximately 905 million gallons of annual state diesel fuel use,[18] it is estimated that the B5/B10 mandate requires 68 million gallons of biodiesel and the B20 mandate would require 113 million gallons of biodiesel to meet state blending requirements.[19] The state's existing 63 million gallons of production capacity therefore provides 93% for B5/B10, and 56 percent of that required for B5/B20. Differences in the actual rate of state diesel fuel usage and gallons of state production will increase or decrease the percentage of biodiesel available from state producers. These percentages are enough to meet the statutory requirement needed for B10 and to move to B20.[20]

Minnesota's biodiesel mandate was an important incentive leading to the establishment of the state's existing biodiesel production capacity of 63 million gallons. Plans to further increase the minimum biodiesel content to B20 for warmer months could therefore be an important driver of additional state biodiesel production capacity. The extension of the federal tax credit may cause producers to establish new production facilities or increase production to higher levels, but it remains to be seen how the intermittent or potentially permanent loss of the tax credit would affect the spectrum of small to large producers.

The prospect for new and increased biodiesel production capacity will also depend on developing markets and the relative price of organic fats and oils compared to diesel fuel. The Ever Cat Fuels biodiesel plant in Isanti, currently with 3 million gallons of production capacity, has plans to expand capacity in the future. Increased diesel use by the state could make increased biodiesel production capacity necessary, with additional production capacity also working as insurance against increasing diesel fuel usage.

RFS2 is likely to have additional impact on any increased production that occurs in Minnesota and elsewhere around the country. In November 2013, the EPA (which sets the rules for implementing the RFS2) recommended to set the mark of 1.28 billion gallons for biodiesel in 2014 and 2015, the same biodiesel volume number as 2013. This volume has yet to be made final, and the industry is hoping it will be raised to better reflect biodiesel capacity that currently exists. Biodiesel sold in excess of RFS2 requirements can count towards the advanced biofuel and total renewable fuel volume requirements. Given that biodiesel earns 1.5 RINs per gallon, most of the advanced biofuels requirement in the past few years has been fulfilled by biodiesel. The RFS2 continues to prove an important driver of biodiesel production throughout the United States.

An RFS2 with the considerable value of biodiesel RINs is a potent force to expand the use of biodiesel.

Finally, while the recent cost of biomass oil has been high, the world crude oil market has also proven to be very unpredictable. Some experts predicted that gasoline prices would exceed $4.00 per gallon before the summer of 2012, which means that diesel fuel would have been in excess of $4.50. Should the yield of soybeans and the corresponding oil be high, this could in turn reduce the cost of feedstock and lower biodiesel cost. In the end, it remains to be seen if the cost of biodiesel will remain higher than that of diesel into the coming years.

[18] U.S. Energy Information Agency, 2013 Distillate Fuel Oil and Kerosene Sales by End Use.
[19] 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%.
[20] Minn. Stat. §239.77, Subd. 2(b)(2).

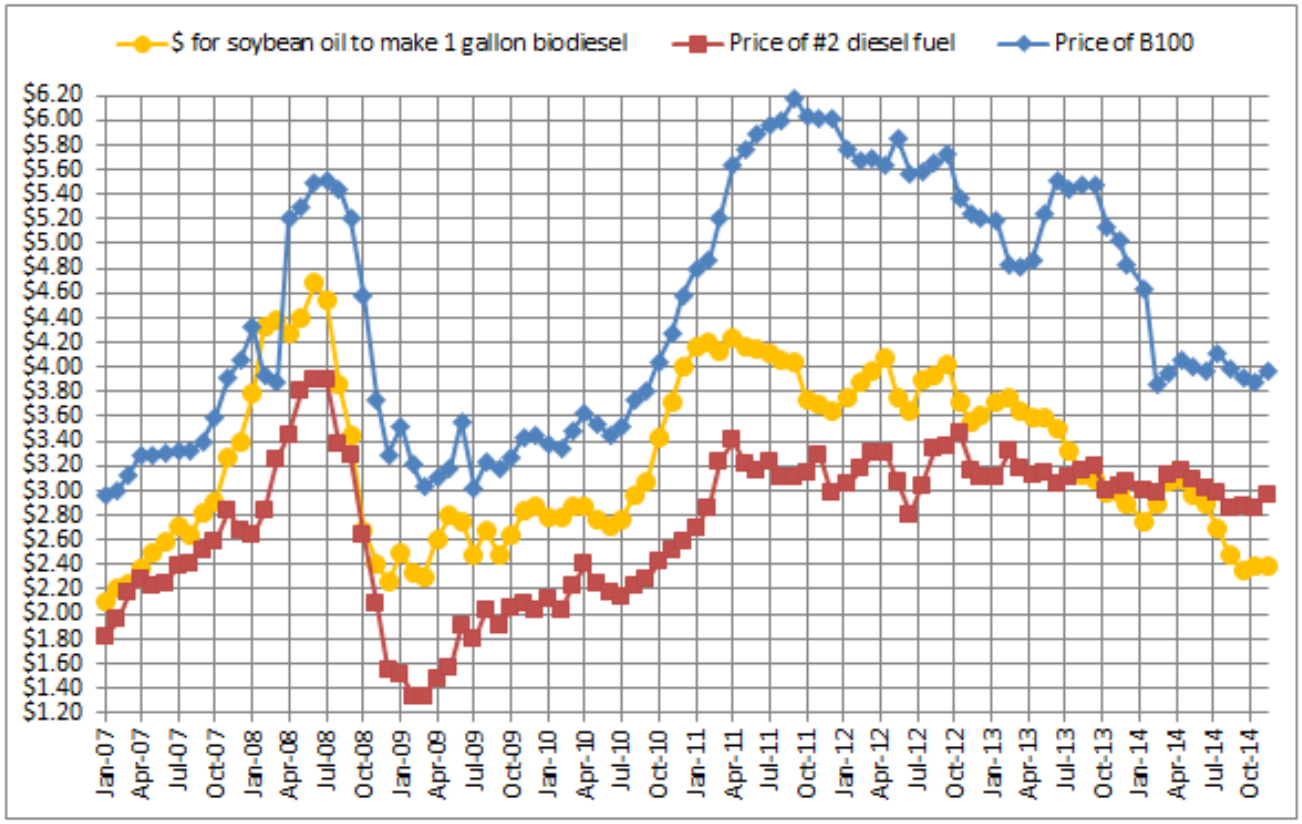
Feedstocks

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 the oil being considered. Minnesota Soybean Processors (MnSP) in Brewster will use oil from their soybean crushing plant. The REG plant in Glenville has bought oil from various soybean oil producers; in 2013 they completed a $20 million upgrade to the plant that allows them to process lower cost fats and oils such as inedible corn oil from ethanol plants, waste cooking oil, and animal and poultry fats. 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.

Although various lipid feedstocks can be used, the large soybean oil crushing capacity in Minnesota suggests that much of the feedstock used in Minnesota's biodiesel plants can be sourced from Minnesota soybean oil producers.

The price of biodiesel appears to be a hybrid following the price of soybean oil and diesel fuel (see Figure 7). Thus, the capacity to process non-soy oils and fats when the price is advantageous further benefits a biodiesel processor when margins with other feedstock are advantageous. Please note that the graph below lists the Minneapolis-St. Paul rack price for biodiesel, without subtracting either the $1 tax credit or the RIN value.

Figure 7: Price of #2 Diesel, Biodiesel[21] and Soybean Oil[22] in dollars, 2007-2014.



[21] Price of diesel and biodiesel at the rack (wholesale-Minneapolis/St. Paul average)
[22] Index Mundi website.

Appendix A: Minnesota Biodiesel Task Force Member Comments

No comments were submitted by Biodiesel Task Force members for addition to this report.