



# **Petroleum Replacement Promotion**

*2013 Legislative Report*

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## Executive Summary

Minnesota legislation includes a goal to replace 20 percent of state fuel consumption with renewable fuels by 2015, increasing to 25 percent replacement in 2025. The Minnesota Department of Agriculture (MDA) is charged with coordinating other agencies and stakeholders to report to the legislature on activities and recommendations for pursuing the state's petroleum replacement goal.

Minnesota is engaged in numerous efforts for increasing the state's renewable fuel use. The American Lung Association in Minnesota (ALAMN) administers ethanol blender pump infrastructure grants funded by project partners; ALAMN has also pursued federal funding for E85 pump installations. In addition, the state has in the past worked to develop additional capacity for biodiesel blending infrastructure. Further actions could be pursued to increase the number of flex-fuel vehicles in Minnesota and to continue incentivizing retailers to increase infrastructure for dispensing renewable fuels.

The state is also working to expand renewable fuel options for Minnesotans. MDA supported federal efforts to increase the allowable content of ethanol in gasoline from 10 to 15 percent, and continues to pursue the state mandate for 20 percent ethanol by 2015. The state also continues to expand its E85 and blender pump outlets; it could potentially increase E85 and blender support and marketing through various outreach and incentive efforts.

Minnesota legislation continues to allow for the use of gasoline without ethanol in certain applications; however, the majority of consumers utilize E10. The state could consider a similar policy for maintained use of E10 in certain applications if higher ethanol blends are implemented in Minnesota.

Minnesota's SmartFleet Committee reports that the state's fleet of approximately 3,000 flex-fuel vehicles has increased its use of E85 more than tenfold between 2005 and 2012. Other large fleets in Minnesota are also engaged in efforts to utilize renewable fuels—in some cases providing on-site dispensers—including the University of Minnesota, various counties and cities, and the Minneapolis-St. Paul Airport. The state can work to continue increasing renewable fuel use in large fleets, for instance by engaging with fleet manager associations at the state and national level.

The average net cost of a gallon of pure ethanol to the blender remains lower than that of a gallon of regular unleaded gasoline by a daily average of 52 cents in 2012. The price for intermediate ethanol blends is also generally lower than that of gasoline—for instance, in 2012 the average monthly price of E20 to the consumer has been approximately 9 cents lower than that of unleaded-octane 87 gasoline. The price of biodiesel has been impacted by policy changes at the federal level for 2012, now relying entirely on the Renewable Fuel Standard (RFS2) compliance and the associated Renewable Identification Number (RIN) values for adjustment. The state should continue to work towards maintaining affordable prices for liquid fuels by monitoring market conditions and responding with appropriate policy actions.

# Introduction

This report is submitted pursuant to Minnesota Statutes §239.7911, subd. 2:

*Promotion of renewable liquid fuels.*

*(a) The commissioner of agriculture, in consultation with the commissioners of commerce and the Pollution Control Agency, shall identify and implement activities necessary for the widespread use of renewable liquid fuels in the state. Beginning November 1, 2005, and continuing through 2015, the commissioners, or their designees, shall work with representatives from the renewable fuels industry, petroleum retailers, refiners, automakers, small engine manufacturers, and other interested groups, to develop annual recommendations for administrative and legislative action.*

## Background

Minnesota currently blends 10 percent ethanol (E10) and 5 percent biodiesel (B5) into nearly all of its fuel supply, as required by statute.<sup>1, 2</sup> Minnesota is also home to more E85 stations than any other state (about 17 percent of stations nationwide) and in 2011 sold nearly 20 million gallons of E85.<sup>3</sup>

Minnesota law also requires continued growth in renewable fuels production and consumption, including a mandate for 20 percent ethanol and biodiesel blends in 2015 and a goal of producing 25 percent of the state's ethanol from cellulosic materials by 2015.<sup>4</sup> In addition to these goals, Minnesota Statutes §239.7911 outlines the state's petroleum replacement goal that:

- (1) at least 20 percent of the liquid fuel sold in the state is derived from renewable sources by December 31, 2015; and
- (2) at least 25 percent of the liquid fuel sold in the state is derived from renewable sources by December 31, 2025.<sup>5</sup>

In October of 2012, the Minnesota Department of Agriculture (MDA) convened a meeting with representatives from the Minnesota Department of Commerce and the Minnesota Pollution Control Agency to discuss ideas for meeting Minnesota's statutory petroleum replacement goal. Other informal meetings have occurred throughout the year with industry and stakeholder groups. Based on these meetings and discussions, MDA developed the comments and recommendations contained in this report.

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<sup>1</sup> See MS §239.791, subd. 1(a) (Oxygenated Gasoline) and MS §239.77, subd. 2(a) (Biodiesel Content Mandate).

<sup>2</sup> In January 2010, the Minnesota Department of Commerce (MDOC) temporarily waived the requirement that #1 diesel fuel be blended with biodiesel (B100) from through March 2010. The 2010 Minnesota Legislature implemented legislation allowing MDOC to extend this waiver for the winter months through March of 2012. In spring of 2012 the waiver was extended another 3 years to 2015 in statute (MS §239.77, subd. 3(c)). The B5 mandate still applies to #2 diesel fuel year-round.

<sup>3</sup> E85 is a blend of 51 to 85 percent ethanol (per ASTM D5798 and the U.S. Department of Energy) with gasoline and can be used in flex fuel vehicles only.

<sup>4</sup> MS §239.791, subd. 1(a)(1); MS §239.77, subd. 2; MS §41A.10, subd. 2.

<sup>5</sup> MS §239.7911, subd. 1.

# Legislative Requirements, Actions and Recommendations

Minnesota Statutes §239.7911, subd. 2(b) requires MDA to work with the commissioners of commerce and the Pollution Control Agency as well as industry stakeholders to develop legislative recommendations and actions that address Minnesota's petroleum replacement goal, as follows:

*The activities of the commissioners under this subdivision shall include, but not be limited to:*

- (1) developing recommendations for incentives for retailers to install equipment necessary for dispensing renewable liquid fuels to the public;*
- (2) expanding the renewable-fuel options available to Minnesota consumers by obtaining federal approval for the use of E20 and additional blends that contain a greater percentage of ethanol, including but not limited to E30 and E50, as gasoline;*
- (3) developing recommendations for ensuring that motor vehicles and small engine equipment have access to an adequate supply of fuel;*
- (4) working with the owners and operators of large corporate automotive fleets in the state to increase their use of renewable fuels; and*
- (5) working to maintain an affordable retail price for liquid fuels.*

This report comments on each of the requirements outlined in statute in the sections that follow.

## Incentives for Retailers

### Update: Renewable Fueling Infrastructure Grants

In 2007, the Minnesota Legislature established an E85 and biodiesel cost share grant program to assist retailers with the installation and conversion of ethanol and biodiesel dispensing equipment.<sup>6</sup> Over four years the program, administered by the American Lung Association in Minnesota (ALAMN), had \$1.4 million available for E85 and biodiesel (B10-20) infrastructure and an additional \$150,000 specifically for ethanol blender pumps that dispense ethanol blends between E10 and E85.

This program ended on June 30, 2011, resulting in 78 E85 sites and one biodiesel site, along with 11 blender pump installations for a total of 90 projects. A total of \$1,351,886.75 was spent. Fifteen additional sites applied for funding beyond the end date.

In 2010, ALAMN was also awarded funding from the U.S. Department of Energy Clean Cities program for public E85 dispensing equipment installations which will fund 15 installations through May, 2013.

Currently ALAMN is also administering funding assistance for blender pump installations, provided by Minnesota Corn Growers Association.

### Update: Biodiesel Blending Infrastructure

The 2008 Minnesota Legislature allocated \$300,000 from the NextGen Energy Grant Program for biodiesel blending infrastructure grants.<sup>7</sup> The funding was to be used for the installation of additional

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<sup>6</sup> Laws for Minnesota 2007, Ch. 57, Art. 2, Sec. 3, Subd. 6.

<sup>7</sup> Minnesota Session Laws 2007, Chapter 45, established the NextGen Energy Grant Program (Article 1, Section 3, Subdivision 4), which appropriated \$3,000,000 for grants to bioenergy projects. In 2008, the Minnesota State Legislature

infrastructure for cold-weather blending of biodiesel in areas of the state with the greatest need for such capabilities.

Inquiries received by MDA during the application period suggested that several entities were interested in applying but ultimately deterred by cost and market issues. Discussions the past year, 2012, suggest renewed interest among industry for such projects, particularly smaller companies that would like to take advantage of trading of biodiesel Renewable Identification Numbers, or RINs.

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. 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.

As of December 31, 2011, the federal biodiesel blending credit was discontinued. This leaves the Renewable Fuel Standard (RFS2) and the 5% state biodiesel blending mandate as the current mandates for biodiesel blending. The trading of renewable identification numbers has added value to B100 for most of the past year, allowing biodiesel to be profitable for blenders outside the terminal and the rack. More about biodiesel RIN values will be covered in the “Maintaining Affordable Retail Prices for Liquid Fuels” section of this document.

#### Update: E15 EPA Approval and Distribution Potential

E15, gasoline blended with 15% ethanol, has been approved for sale by the EPA for light duty vehicles model year 2001 and newer during 2012. The first retail stations to offer E15 have been opened this past summer in Kansas, Iowa and Nebraska. The current total is nine stations.

E15 will offer a slight discount and higher octane than regular unleaded-87, also known as E10. If a station already sells E85 and higher ethanol blends from a blender pump, then it should also be able to offer E15 from a dedicated hose or the E10 hose.

Since the fuel has been approved by the EPA this past summer, there have been a number of obstacles to its implementation:

- E15 was not granted the one pound waiver by the EPA that is granted to E10. This means that it cannot be blended with the gasoline blendstock, and would need to be switched to another fuel over the summer months.
- A third party study done by the Coordinated Research Council (CRC) released this past summer expressed concerns over the effects of E15 on various engines. Issues with liability and the fuel are also a concern to station owners, distributors, and other along the supply chain.
- Federal Law requires all underground and above-ground storage systems to be compatible with the products they store. In implementing this requirement and following federal guidelines, the Minnesota Pollution Control Agency has distributed a questionnaire to inventory the current systems in use and to conduct a risk based approach to any compatibility corrections needed. This work will be done in coordination with MDA and various interest groups.

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modified the NextGen Energy grant program by diverting a portion of the appropriation to biodiesel blending infrastructure (Laws of Minnesota 2008, Chapter 297, Article 1, Section 72).

Ethanol trade associations such as Growth Energy and the Renewable Fuels Association have considerable data and research that supports the use of E15 as a mainstream fuel, even should it be stored and dispensed with the majority of today's E10 infrastructure. E15 implementation provides a way to move ethanol beyond the 10% "blend wall" – the point that exists today where 10% of almost all the gasoline in the country is blended with 10% ethanol, thus saturating the domestic market in terms of ethanol use.

Higher blends of ethanol are also being considered as one method of reaching the Corporate Average Fuel Economy (CAFÉ) standard set for 2025 of 54.5 miles per gallon. Higher blends of ethanol allow for higher octane fuel. Higher octane fuel allows for greater engine efficiency and smaller engine size, which, despite the lower energy value of ethanol contributing to a lower energy value of the resultant fuel, allows for more available energy in the final system.<sup>8</sup> E15, and the introduction of ethanol blender pumps and their associated infrastructure pave the way for such a fuel of the future. The Alliance of Automobile manufacturers, with this in mind, wrote to EPA Secretary Lisa Jackson asking for consideration of high octane fuels using added ethanol when considering CAFÉ standards under review.<sup>9</sup>

## Recommendations

The state's petroleum replacement goal to expand renewable fuel options to E15 and higher blends lends itself to support for blender pump funding. It also provides rationale for ramping up flex-fuel vehicle (FFV) production and consumption, which would bolster the market for mid- and high-level biofuels blends. Implementation of the following recommendations would ensure that Minnesota remains at the forefront of state-level policy on renewable fuels infrastructure and FFVs:

- Reestablish the renewable infrastructure grant program to direct some funds toward installation of B5-B10 equipment and intermediate ethanol blends such as E15, E25 or higher up to E85.
- Establish incentives for increasing the production and use of FFVs, and other vehicles which in the future will be able to take advantage of higher octane biofuel blends in Minnesota.
- Reestablish a grant program for installing biodiesel blending infrastructure throughout the state.
- Establish a fuel tax incentive or rebate program, to ensure the cost of mid- and high-level ethanol blends is competitive with gasoline and increase their demand.
- Establish a fuel tax incentive or rebate program, to ensure the cost of biodiesel blends above the current mandate is competitive with diesel and increase their demand.

## Expanding Renewable Fuel Options for Minnesotans

### Update: E15/E20

In March 2009, an ethanol industry group called Growth Energy applied to the U.S. Environmental Protection Agency (EPA) for a national waiver from Section 211(f)(4) of the Clean Air Act to allow for up to 15 percent ethanol blends in gasoline (E15) and deem them safe for general use. Notably, Minnesota's Ethanol Combustion Efficiency Grants authorized during the 2005 legislative session resulted in drivability, materials compatibility and fuel pump durability reports that helped trigger over \$40 million in research funded by the U.S. DOE, the EPA and others to determine the impact of E20 on domestic gasoline engines. These studies were referenced in Growth Energy's E15 waiver application.

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<sup>8</sup> Anderson, J.E., DiCicco, D.M., Ginder, J.M., Kramer, U., Leone, T.G., Raney-Pablo, H.E. and T.J. Wallington. High octane number ethanol-gasoline blends: Quantifying the potential benefits in the United States. *Fuel*, Vol. 97, July, 2012, pgs. 585-594.

<sup>9</sup> Letter from Mitch Bainwol, President and CEO, Alliance of Automobile Manufacturers, Washington, D.C., to Secretary Lisa Jackson, U.S. EPA, October 11, 2011.



In December 2009, the EPA announced that they would not approve or deny the waiver request until more testing data was available from DOE and others; EPA again delayed its decision in June 2010. In October 2010, EPA approved the use of blends containing up to 15 percent ethanol in 2007 model year and newer vehicles. The decision to approve E15 in 2001 to 2006 cars and light duty trucks was made January 21, 2011. This “bifurcated” approval requires retailers opting to sell E15 to continue providing E10, with specially labeled pumps indicating that E15 is only allowed in vehicles of certain model years.<sup>10</sup> EPA’s decision document on E15 cited a lack of data on vehicles manufactured before 2001 as well as other applications (e.g., nonroad products, heavy-duty engines and vehicles, and motorcycles), and thus denied the waiver request for these market segments.

Minnesota’s ethanol mandate states that gasoline must contain the maximum percentage of ethanol allowed at the federal level; however, the 2010 Minnesota Legislature added language specifying that the state will only match the federal ethanol blend rate if the EPA has approved it for all vehicles—in other words, Minnesota is not required to implement E15 or other higher blends approved at the federal level unless the approval covers “all gasoline-powered motor vehicles, irrespective of model year.” The legislation also provides the Minnesota Department of Commerce with authority to delay implementation until the state is adequately prepared for the change.

Regardless of potential changes at the federal level, Minnesota continues to pursue its goals for higher ethanol blends including E15 today and E20 by 2015. It is the responsibility of the ethanol industry to apply for a waiver to the Clean Air Act; anecdotal evidence suggests a hesitancy to pursue additional action until EPA issues a final decision on E15.

During the legislative session of 2012, language was added that required the commissioner of Minnesota Department of Agriculture to convene an advisory group to provide an analysis of next generation biofuels that can be blended with gasoline or other energy sources. The results of this analysis are to appear in the February, 2013, Report to the Legislature on the NextGen Energy Board. In it will be policy recommendations to move Minnesota’s ethanol mandate to a biofuels mandate with an implementation plan that projects out to 2025.

### [Update: E85 and Blender Pumps](#)

In 2011, estimated sales at Minnesota’s approximately 356 retail E85 outlets (12 percent of Minnesota service stations) totaled nearly 20 million gallons plus an additional 2 million gallons of E20 to E50 blends.<sup>11</sup> At the end of October, 2012, an estimated 13 million gallons of E85 had been sold with approximately 1.6 million additional gallons sold in E20 to E50 blends.<sup>12</sup> These figures, combined with the ethanol contained in state E10 sales, are equivalent to approximately 10 percent of the state’s gasoline. To reach a level of 20 percent ethanol blended into gasoline by December 31, 2012, Minnesota would need to sell at least 327 million gallons of E85 annually.<sup>13,14</sup> Figure 1 below depicts E85 stations and sales in Minnesota from 1997 to August 2012.

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<sup>10</sup> MS §239.791. subd. 10-15.

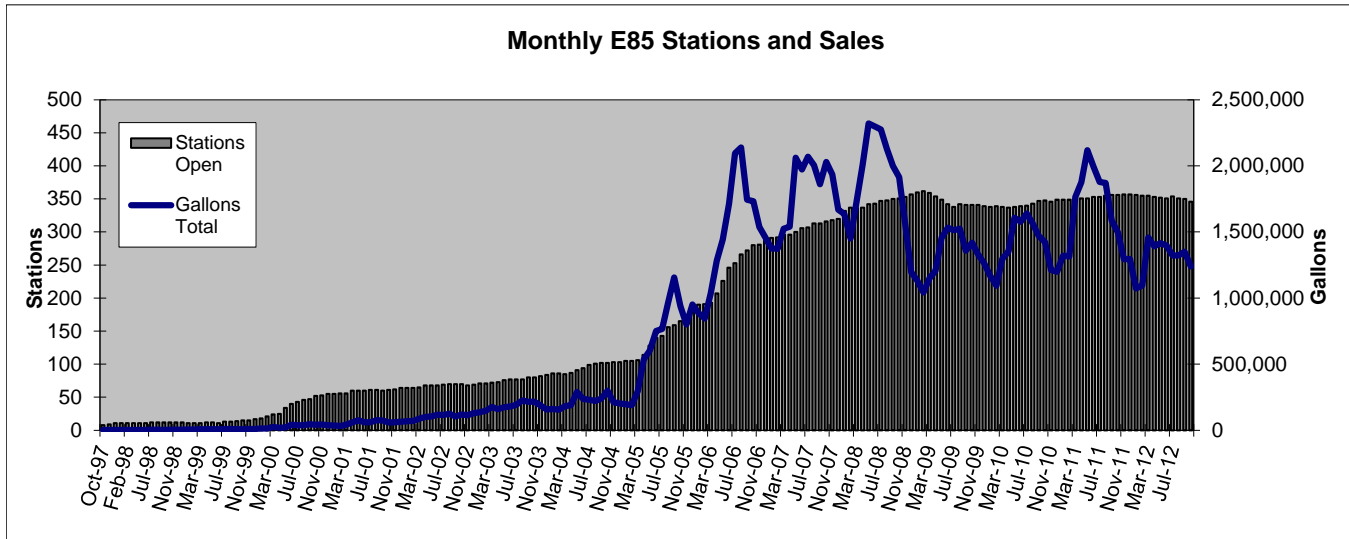
<sup>11</sup> American Lung Association in Minnesota; Minnesota Department of Commerce.

<sup>12</sup> Minnesota Department of Commerce, November 2012. Not all stations report; thus, estimated gallons are determined using the number of operating stations times the reported average monthly volume.

<sup>13</sup> MS §239.791 states that Minnesota’s mandate for E20 expires by December 31, 2014 if (1) the commissioner of agriculture certifies and publishes the certification in the State Register that at least 20 percent of the volume of gasoline sold in the state is denatured ethanol; or (2) federal approval has not been granted under paragraph (a), clause (1).

<sup>14</sup> Depending on the exact make-up of E85 (which by law can vary from a blend of 50-85 percent ethanol, and sales of intermediate ethanol blends such as E20-50, this number could vary slightly.

Figure 1. Minnesota Monthly E85 Stations and Sales, 1997-2012



Source: Minnesota Department of Commerce

Approximately 20 percent of Minnesota’s E85 stations are equipped with blender pumps. In addition, Minnesotans own and operate about 250,000 flex-fuel vehicles (out of 10 million nationwide) capable of running on intermediate and higher ethanol blends including E20, E30 and E85. ALAMN currently provides flyers to flex-fuel vehicle owners on events, station locations and other important information.

In addition to state-level efforts, several federal efforts have been made or are underway that could impact intermediate blend issues in Minnesota:

- 1) The American Society for Testing and Materials (ASTM) expanded specifications for intermediate ethanol blends in anticipation of increased blender pump use.
- 2) A federal bill called the Open Fuel Standard Act of 2011 would require a certain percentage of vehicles to be produced as flex fuel or alternative fuel vehicles. It states that 50% of new automobiles, starting in 2014, 80% in 2016 and 95% in 2017 would be warranted to operate on non-petroleum fuels in addition to or instead of petroleum based fuels.
- 3) E15, approval by EPA, may expand the market for higher ethanol blends in 2001 and newer cars and light duty trucks, thereby increasing the need for blender pumps that dispense intermediate blends that are currently intended for use in flex fuel vehicles only.

In October 2010, USDA Secretary Tom Vilsack announced plans to provide funding for the nationwide installation of 10,000 blender pumps over the next five years. This resulted in REAP funding in 2011 that resulted in one E85 and four blender pump installations for a total of five projects over the two year period. A second RFP in 2012 did not result in any additional awards in Minnesota. Senator Al Franken has worked to streamline the application process for blender pump installation applications, in order to encourage more retailers to apply, should the funding be offered again in the future.

## Update: Advanced Biofuel Research and Implementation

Legislation in the spring of 2012 made provision a task force assigned to study the next generation of biofuels, and to make policy recommendations regarding Minnesota's biofuel mandates.<sup>15</sup> In that report, provisions are made to allow sales of other biofuels other than corn starch-based ethanol up to certain target volumes, beginning in 2013. The progressive implementation sets these levels through 2025. This implementation schedule also increases the amount of biofuel blended with gasoline gradually through 2025.

Currently there are Minnesota companies working on isobutanol, a 4-carbon alcohol, and drop-in hydrocarbon-identical fuels. GEVO became the first commercial renewable isobutanol company in the United States in June when they started producing isobutanol in their converted ethanol plant in Luverne, Minnesota. Two other Minnesota ethanol plants have signed letters of intent with Butamax Advanced Biofuels, LLC. Butamax is licensing technology that also would make for an add-on to an ethanol plant that will convert it to an isobutanol plant, and is targeting its first commercial scale project for Lamberton at the Highwater Ethanol facility for 2014. Other Minnesota companies are working on "drop-in" replacement fuels made from biomass, and include:

- [SynGas Technology, LLC](http://www.syngastechnology.com/) (<http://www.syngastechnology.com/>) (SGT) has developed a laboratory-scale, integrated torrefaction and high pressure gasification system, the data from which shows it addressing economic barriers to using diverse biomass feedstocks to produce cost-competitive full specification ASTM standards for gasoline, diesel, and jet fuels. These performance benefits will be tested in a semi-commercial scale demonstration project. If results to date are confirmed as data suggests, an integrated SGT commercial system would reduce the cost to produce full specification ASTM standard biomass-based fuels to less than \$2.00/gallon.
- [JetE](http://www.jete.com/) (<http://www.jete.com/>) has designed a 30 MGY plant that can produce full ASTM specification D7566 aviation turbine fuel. The plant, which utilized fats and oils as feedstock, can be integrated into existing Ag processing plants or be located near points of fuel demand. JetE is currently partnering with Al-Corn Clean Fuel ethanol plant in Claremont, Minnesota, on a NextGen Energy grant project that would use corn oil extracted from distiller grains as feedstock for JetE's renewable drop-in fuel.

## Update: Renewable Natural Gas

Kwik Trip, Inc., of LaCrosse, Wisconsin, has installed nine compressed natural gas fueling stations, with three of those in Minnesota. They have plans to add 12-14 more in 2013 with four of those new sites in Minnesota. These are primarily for Kwik Trip's fleet of semis – Kwik Trip currently has 34 vehicles ranging from light duty (vans) up to semi-trucks used for delivery. They have plans to add 20 more compressed natural gas powered semi-trucks in 2013. The fueling stations have been built to accommodate their fleet, and are also available to the general public. Due to low natural gas prices in recent years, compressed natural gas presents an opportunity as a transportation fuel, and is currently

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<sup>15</sup> Minnesota Session Laws 2012, Chapter 244, Section 81: Next Generation Biofuel blends.

selling for less than \$2/diesel gallon equivalent. Besides fleet trucks, a few passenger cars, such as the Honda Civic, have a natural gas model.

Compressed natural gas is not a renewable fuel, but the increase in infrastructure to dispense it presents an opportunity for renewable natural gas that can be sold to the pipeline as transportation fuel. Such fuel does have a production pathway with the EPA under the Renewable Fuel Standard, and as such can generate RINs that can be sold to obligated parties to satisfy renewable fuel blending requirements.

## Recommendations

Minnesota could increase E85 and blender pump support and marketing, and encourage the use of in-state advanced biofuel production through the following actions:

- Expand ALAMN's marketing and outreach efforts by developing and/or participating in a state-wide education campaign to promote better understanding of E85 and other mid-level ethanol blend use. Such a campaign could be combined with environmental, national security and energy balance messages. Incorporations of efforts by all major auto manufacturers to build engines capable of utilizing higher biofuel blends with high octane ratings to take advantage of engine efficiencies could be a part of this effort.
- Provide stable incentives for high blend ethanol fuels. On December 31, 2011, the Volumetric Ethanol Excise Tax Credit ((VEETC) expired. This has made it more difficult for retailers to sell E85 and mid-level blends at a price competitive with gasoline.
- The drought of 2012 took its toll on corn production in many of the Midwestern states in the summer of 2012 as well, making continuation of RFS2 essential to continuing a strong biofuels industry in Minnesota and nationwide.
- Update current biofuels mandates to better reflect the direction of the Federal Renewable Fuel Standard.

## Ensuring an Adequate Fuel Supply for Certain Applications

### Update: State E10 Exemptions

Minnesota's legislation allows for the use of non-oxygenated gasoline (E0) as premium-grade gasoline for certain applications such as vintage automobiles and small engines.<sup>16</sup> However, just over 250 of the state's 3,200 retail gas stations actually employ this option, along with specialized fuel outlets, indicating that demand for E0 is minimal. The majority of consumers utilize E10, maintaining our commitment to the use of domestic renewable fuels, reducing the carbon footprint of our fuels and helping to reduce emissions of carbon monoxide, volatile organic hydrocarbons and other toxic chemicals into the atmosphere.

Questions come up regarding both higher blends of ethanol (E15) and biodiesel (B10, B20) for specific applications, especially regarding vehicle and equipment warranties. These issues are considered as implementation of these products is moved forward. Maintaining a fuel supply for all vehicles is a consideration as new fuels and blends move forward.

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<sup>16</sup> MS §239.791, subd. 10-16.

## Recommendations

To ensure continued access to various fuels across Minnesota, the State should continue to offer alternative fueling options such as E0 for specific applications. Other fuel options for aging vehicles are considered as well as new fuels are brought to market.

### **Increasing Renewable Fuel Use in Large Fleets**

#### Update: SmartFleet Reporting and Other Fleet Use

Minnesota's SmartFleet Committee, established by Executive Order 04-10, sets ambitious goals for reducing state government consumption of petroleum fuels for transportation fuels through the use of E85 in the state's fleet of approximately 3,000 flex-fuel vehicles. The SmartFleet Committee began tracking fuel use in January of 2005; fuel reports are distributed to agencies on a quarterly basis.

State agencies continued to increase their use of E85 through 2011. Figure 2 details fuel use across state agencies for 2011, showing a 18.6% total usage for that year – a year that also included a 3 week work stoppage for the government shutdown in July. Figure 3 shows fuel use for the agencies in the first three quarters of 2012. 2012 shows slightly less use of E85 at 17.2%, with projected total gallons of just over 700,000 gallons total.

Figure 2. Fuel Use by Minnesota State Agencies, 2011.

| <i>Governmental Unit</i> | <i>E85 Percentage</i> | <i>E85 Gallons</i> | <i>Gasoline Gallons</i> | <i>Diesel Gallons</i> |
|--------------------------|-----------------------|--------------------|-------------------------|-----------------------|
| Higher Education         | 82.4%                 | 654                | 139                     | 0                     |
| Revenue                  | 57.7%                 | 10,843             | 7,951                   | 11                    |
| Mediation Services       | 50.7%                 | 2,898              | 2,823                   | 0                     |
| Agriculture              | 44.3%                 | 55,960             | 70,330                  | 542                   |
| Transportation           | 33.3%                 | 403,382            | 808,305                 | 1,436,984             |
| Enterprise Technology    | 32.6%                 | 1,957              | 4,048                   | 0                     |
| DEED                     | 30.6%                 | 9,335              | 21,122                  | 67                    |
| Health                   | 30.4%                 | 28,573             | 65,303                  | 51                    |
| Housing Finance          | 28.8%                 | 1,524              | 3,761                   | 0                     |
| Governor's Office        | 28.2%                 | 753                | 1,917                   | 0                     |
| Pollution Control        | 25.4%                 | 20,281             | 59,547                  | 431                   |
| Military Affairs         | 25.2%                 | 2,274              | 6,745                   | 0                     |
| Corrections              | 24.7%                 | 75,097             | 229,405                 | 32,674                |
| Commerce                 | 22.5%                 | 8,097              | 27,909                  | 15,569                |
| Labor and Industry       | 21.8%                 | 14,036             | 50,209                  | 0                     |
| Human Services           | 16.0%                 | 78,334             | 409,949                 | 6,927                 |
| Other Governmental Units | 15.7%                 | 66,288             | 355,621                 | 28,424                |
| Education                | 11.7%                 | 914                | 6,888                   | 0                     |
| Administration           | 11.5%                 | 2,814              | 21,734                  | 3,558                 |
| Public Safety            | 11.0%                 | 153,158            | 1,234,611               | 5,605                 |
| Natural Resources        | 3.3%                  | 27,939             | 814,571                 | 280,455               |
| Iron Range Resources     | 0.8%                  | 30                 | 3,646                   | 0                     |
| Veterans Affairs         | 0.8%                  | 159                | 20,616                  | 7,331                 |
| <b>Totals:</b>           | <b>17.2%</b>          | <b>965,303</b>     | <b>4,227,149</b>        | <b>1,818,629</b>      |

Source: Minnesota Department of Administration, January 2012.

Figure 3. Fuel Use by Minnesota State Agencies, First 3 Quarters, 2012.

| <i>Governmental Unit</i> | <i>E85 Percentage</i> | <i>E85 Gallons</i> | <i>Gasoline Gallons</i> | <i>Diesel Gallons</i> |
|--------------------------|-----------------------|--------------------|-------------------------|-----------------------|
| Higher Education         | 94.7%                 | 588                | 33                      | 0                     |
| Revenue                  | 48.3%                 | 5,355              | 5,728                   | 0                     |
| Mediation Services       | 45.5%                 | 1,849              | 2,219                   | 0                     |
| Agriculture              | 37.0%                 | 27,804             | 47,379                  | 64                    |
| Enterprise Technology    | 32.4%                 | 1,224              | 2,553                   | 0                     |
| Transportation           | 30.8%                 | 227,952            | 511,425                 | 761,804               |
| Housing Finance          | 28.8%                 | 833                | 2,059                   | 10                    |
| Commerce                 | 27.6%                 | 5,465              | 14,310                  | 9,174                 |
| Governor's Office        | 27.4%                 | 345                | 912                     | 0                     |
| Health                   | 26.7%                 | 14,678             | 40,359                  | 48                    |

| <i>Governmental Unit</i>        | <i>E85 Percentage</i> | <i>E85 Gallons</i> | <i>Gasoline Gallons</i> | <i>Diesel Gallons</i> |
|---------------------------------|-----------------------|--------------------|-------------------------|-----------------------|
| <b>DEED</b>                     | 26.5%                 | 5,076              | 14,052                  | 0                     |
| <b>Labor and Industry</b>       | 24.8%                 | 9,382              | 28,451                  | 0                     |
| <b>Military Affairs</b>         | 22.4%                 | 1,172              | 4,057                   | 0                     |
| <b>Pollution Control</b>        | 22.1%                 | 10,592             | 37,287                  | 248                   |
| <b>Corrections</b>              | 21.3%                 | 36,283             | 133,694                 | 25,591                |
| <b>Administration</b>           | 17.1%                 | 2,329              | 11,299                  | 1,165                 |
| <b>Human Services</b>           | 15.5%                 | 45,973             | 250,832                 | 3,234                 |
| <b>Other Governmental Units</b> | 15.3%                 | 38,571             | 214,302                 | 33,270                |
| <b>Education</b>                | 12.7%                 | 703                | 4,826                   | 0                     |
| <b>Public Safety</b>            | 10.1%                 | 81,301             | 719,929                 | 2,958                 |
| <b>Natural Resources</b>        | 2.6%                  | 13,476             | 499,798                 | 192,382               |
| <b>Iron Range Resources</b>     | 2.5%                  | 49                 | 1,877                   | 0                     |
| <b>Veterans Affairs</b>         | 0.1%                  | 10                 | 11,692                  | 4,362                 |
| <b>Totals:</b>                  | 17.2%                 | 531,010            | 2,559,073               | 1,034,308             |

Source: Minnesota Department of Administration, September 2012.

In addition to state government, other fleets in Minnesota have efforts underway to reduce petroleum consumption. The University of Minnesota is a significant consumer of E85, having pumped more than 58,000 gallons from its two on-campus E85 pumps in 2012. The University currently owns almost 200 flex fuel and over 110 B20-capable vehicles and counts these among their green fleet of electric, hybrid, and alternative fuel vehicles. Hennepin County reported their biofuel consumption, shown below in Figure 4. Seventeen diesel ambulances were replaced with gasoline vehicles in May, 2012, and one of the two E85 stations for the county was unavailable for most of 2012. In addition to the University of Minnesota and Hennepin County, the cities of Minneapolis, St. Paul, Burnsville and St. Louis Park have their own on-site E85 fuel sites, as well as the Met Council, and Minneapolis-St. Paul International Airport. Certain city fleets such as Brooklyn Park require renewable fuel use.

Figure 4, Fuel Use by Hennepin County, 2011-12.

| <b>Year</b>     | <b>Gallons</b> |
|-----------------|----------------|
| <b>2011 B10</b> | 161,865.92     |
| <b>2011 B20</b> | 198,839.70     |
| <b>2011 E85</b> | 18,503.20      |
| Total           | 379,208.82     |
| <b>2012 B10</b> | 88,387.10      |
| <b>2012 B20</b> | 145,709.19     |
| <b>2012 E85</b> | 8,619.90       |
| Total           | 242,716.19     |

## Recommendations

Minnesota could potentially increase its renewable fuel use in large fleets through the following actions:

- Consider introducing legislation to require certain cities to mandate or incentivize renewable fuel use in city fleets.
- Continue to explore options for initiating biodiesel fuel use among sectors currently excepted from using the fuel. Document emissions data for these industries to demonstrate potential positive impacts of biodiesel use. Help implement infrastructure and long-term blending strategy of fuel supply to take advantage of RIN values in the Renewable Fuel Standard, so as to improve costs for those sectors and other industries with fleets able to take advantage of lower diesel cost.
- Work with the Minnesota Departments of Administration, Transportation, and Agriculture; the American Lung Association in Minnesota; and other stakeholders to raise awareness among the fleet community (i.e., National Association of Fleet Administrators and National Council of State Fleet Administrators) about the success of selected fleet managers in incorporating biofuels into daily operations and the positive impact and cost savings of renewable fuel use in fleets at the state and national level.

## Maintaining Affordable Retail Prices for Liquid Fuels

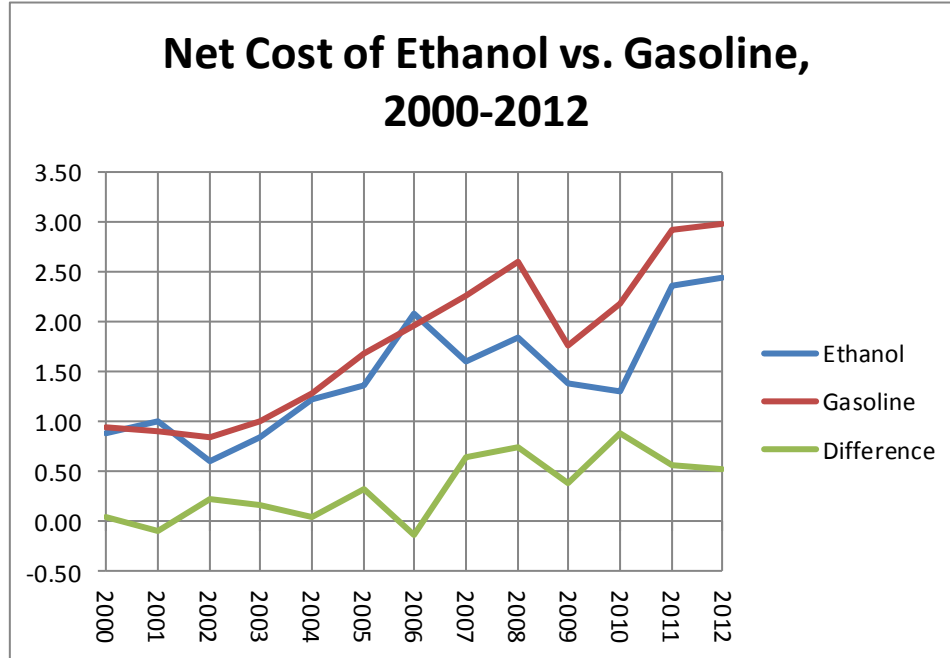
### Update: Ethanol and Biodiesel Pricing Trends

The average net cost of a gallon of pure ethanol (E100) to the blender<sup>17</sup> for 2012, this year without a federal tax credit, has averaged 53 cents per gallon less than a gallon of 87 octane (regular unleaded) gasoline. In 2011, the average price per gallon of ethanol to the blender was \$2.80 as compared to \$2.93 per gallon of wholesale regular unleaded gasoline—a 13 cent difference. During 2011 the \$0.45 blender's tax credit was in effect so the total effective difference to the blender was 58 cents, very close to the difference for 2012. Figure 5 details these trends from 2000 to 2012.

<sup>17</sup> A blender is an individual or business that blends a petroleum product (other than denaturing ethanol) with fuel grade ethanol or biodiesel. For example, a blender could be a refiner, a position holder at a pipeline terminal, a business that operates a chain of gas stations, or a jobber (wholesaler) that makes bulk deliveries and blends ethanol or biodiesel with gasoline or diesel for use at the consumer level. Most ethanol and biodiesel blends are made at the refinery or terminal level.



Figure 5. Minnesota Ethanol<sup>18</sup> and Gasoline<sup>19</sup> Pricing Trends, 2000-2012



Source: Minnesota Department of Agriculture analyses of Axxis pricing data.

The lower cost of ethanol per gallon, along with the significant boost in the octane value of an ethanol blend, is generally expected to be passed onto the consumer and reflected in lower costs at the pump. Thus, extraordinary means have not been necessary for ensuring that the price of ethanol does not negatively impact that of gasoline to the consumer.

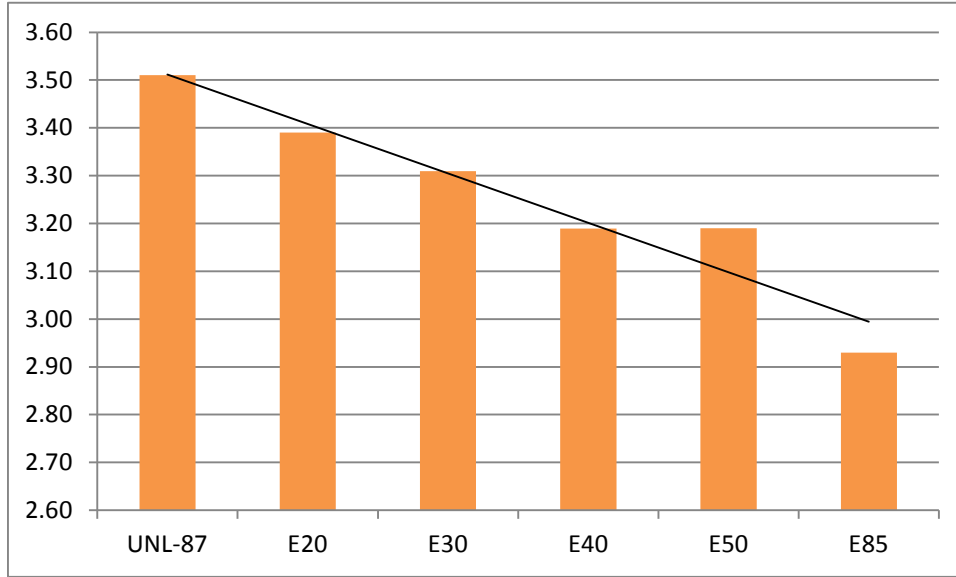
The price for intermediate ethanol blends has also been below that of gasoline. In 2011-12, the price to the consumer for a gallon of fuel was lowered with higher blends of ethanol, as shown in Figures 6 and 7.<sup>20</sup>

<sup>18</sup> Net ethanol cost to the blender, after tax credit.

<sup>19</sup> 87 octane gasoline price at the rack. A rack price reflects prices that are posted at the rack, but do not include taxes, customer discounts or transportation costs—thus, these prices can be used to indicate general price trends.

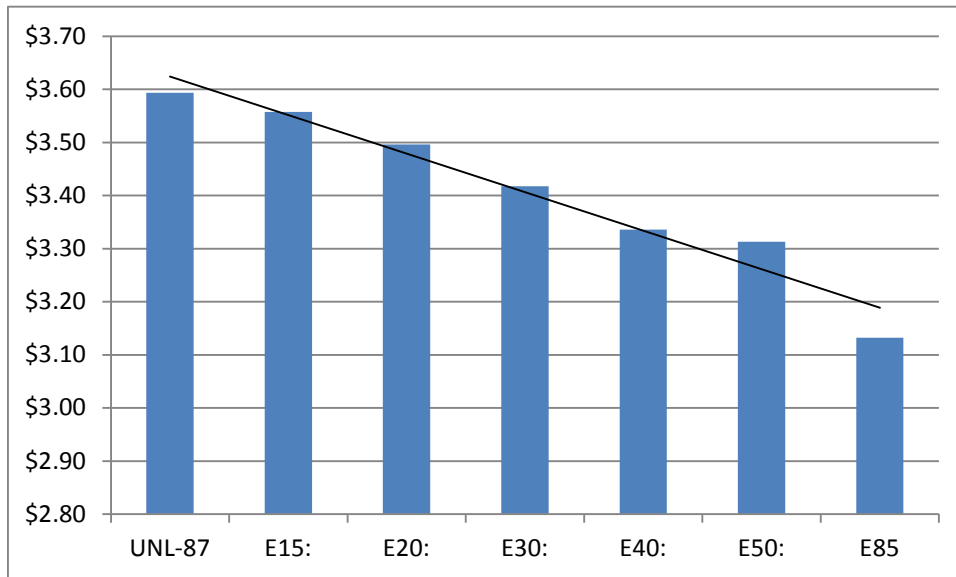
<sup>20</sup> The price for E15 may be skewed by the fact that very few stations offer this blend and for three months out of the 2009 year, reporting stations recorded no E15 usage.

Figure 6. Average 2011 Prices for Intermediate Ethanol Blends and Gasoline



Source: Minnesota Department of Agriculture analyses of Minnesota Department of Commerce Data

Figure 7. Average 2012 Prices for Intermediate Ethanol Blends and Gasoline

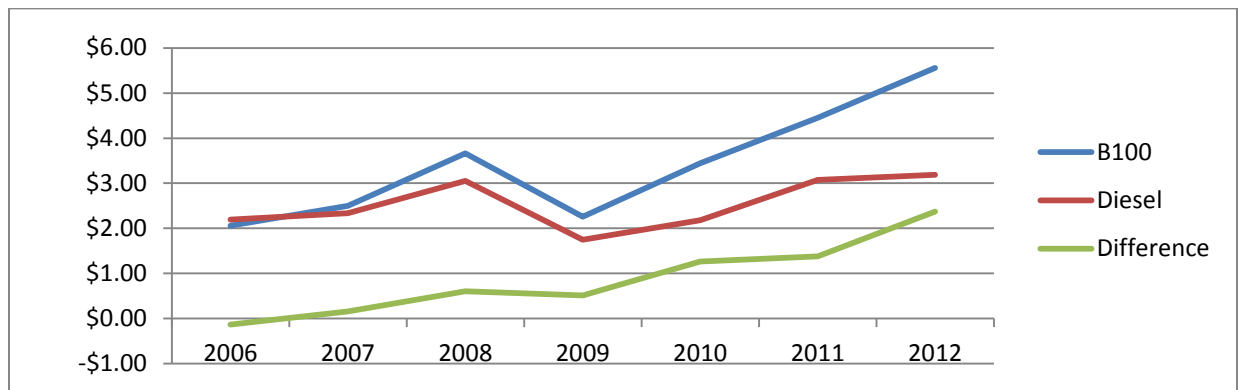


Source: Minnesota Department of Agriculture analyses of Minnesota Department of Commerce Data

The price of biodiesel fuel has experienced volatility along with diesel fuel prices. Over the past several years, the net cost of a gallon of pure biodiesel (B100) to the blender—after the federal tax credit, which was set at \$1 per gallon until December 31, 2011—has at times been lower and higher than the commensurate wholesale cost of diesel fuel.<sup>21</sup> The rack prices are graphically shown in Figure 8. Rack prices for biodiesel, however, are only part of the overall pricing story, as will be discussed later.

<sup>21</sup> The net price is the price of biodiesel at the rack (wholesale) minus the \$1.00 federal tax credit to the blender.

Figure 8. Diesel<sup>22</sup> and Biodiesel<sup>23</sup> Price Trends, 2006-2012<sup>24</sup>



Source: Minnesota Department of Agriculture analyses of Axxis pricing data.

### Tax Credits for Biofuels

The Volumetric Ethanol Excise Tax Credit expired December 31, 2011, and has not been reinstated. It is not expected to be reinstated by the ethanol industry.

Historically, biodiesel blenders have received a tax credit of \$1.00 per gallon of biodiesel blended with diesel. This credit expired at the end of 2011. Since that time industry and other stakeholder groups have been urging the U.S. Congress to retroactively reinstate the tax credit. According to the National Biodiesel Board, the U.S. biodiesel industry supports approximately 64,000 jobs throughout the economy and generates \$3.4 billion in federal, state and local government tax revenue. The same report claims that an additional 19,000 jobs would be supported and \$962 million in revenue would be generated should the tax credit be retroactively reinstated for 2012, and 30,000 jobs and \$1.6 billion more in income generated should the credit extended into 2013.<sup>25</sup> Although retroactive extension of the tax credit through 2013 was passed by the Senate Finance Committee on August 2, 2012, no legislation had been passed at the time of this report.

The Volumetric Ethanol Excise Tax Credit expired December 31, 2011. Cellulosic ethanol received a tax credit of \$1.01 through December of 2012.

### Impact of Market Value for Renewable Identification Numbers

The federal Renewable Fuel Standard (RFS2) program allocates Renewable Identification Numbers (RINs) to each gallon of ethanol, biodiesel, advanced and cellulosic biofuel produced, which have a value in the market when the fuel is blended and the RINs change hands. Each qualified gallon of

<sup>22</sup> Price of diesel at the rack (wholesale).

<sup>23</sup> Net B100 cost to the blender, after \$1.00 federal tax credit is applied. This credit was applied for 2006-2009; however, the tax credit expired as of January 1, 2010 and was thus not included in 2010 data analyses .

<sup>24</sup> 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.

<sup>25</sup> Urbanchuk, John M. Economic Impact of Reinstating the Biodiesel Tax Credit through 2013. November 27, 2012.

ethanol earns one RIN and a gallon of qualified biodiesel represents one and a half RINs. Besides being retired to show compliance with RFS blending requirements, RINs can be used by the blender to offset the cost of the biofuel when sold in the RIN market. Biodiesel RINs can also be used to satisfy advanced biofuel requirements for RFS2 obligated parties, or sold as advance biofuel RINs.

As of mid-December 2012, the value assigned to ethanol RINs had ranged from 1 to 6 cents per gallon for 2012—therefore each qualifying gallon of ethanol, given a 6 cent RIN value at the time of blending, could be traded on the RIN market for a value of 6 cents. Biodiesel RINs ranged from \$0.42 to \$1.46 during 2012, and earning 1.5 RINs per gallon, would be eligible to trade at up to \$2.18 per gallon. The average biodiesel RIN price for all weeks in 2012 has been approximately \$1.05 representing a value \$1.58 per gallon. Higher RIN values were available up to early October (values over \$1), after which it appeared obligated parties under RFS2 had collected enough biodiesel RINs to document their compliance requirements. Since then biodiesel RIN values have declined. RINs can also be carried forward into the next year. Even though RINs have been more stable in 2012 without blending credits for either ethanol or biodiesel, this is the first year of a RIN market without tax credits, and the exact behavior of the market may still prove difficult to predict.

It appears that the value of RINs is offsetting much the federal tax credits. For 39 of the 45 weeks tracked by MDA informally this past year, the RIN value for biodiesel has produced a B100 with a lower value than #2 diesel at the rack in Minneapolis St. Paul terminals. See Figure 9 for a plot of those numbers and Figure 10 for the detailed breakout of the difference and RIN price. When the RIN value (1.5 X Biodiesel RIN price) is greater than the difference in #2 diesel and biodiesel, there is potential profit for the blender that is not an obligated party under RFS2.

Figure 9. #2 Diesel<sup>26</sup> and Biodiesel<sup>27</sup> Price Trends, showing effect of Biodiesel RIN<sup>28</sup> Values - 2012<sup>29</sup>

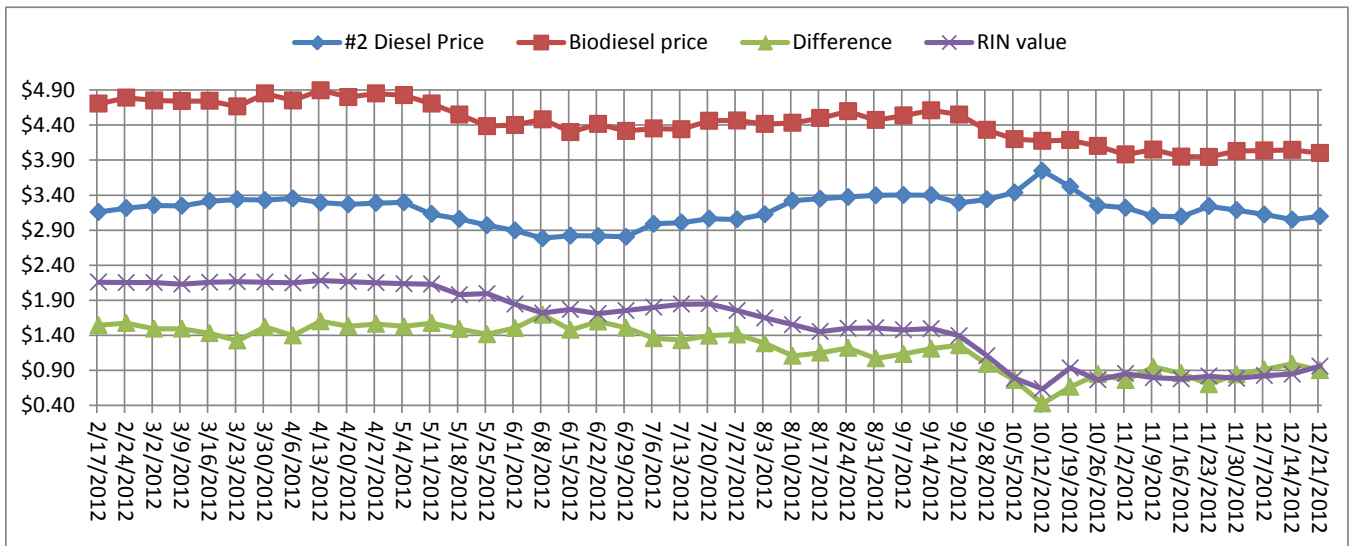
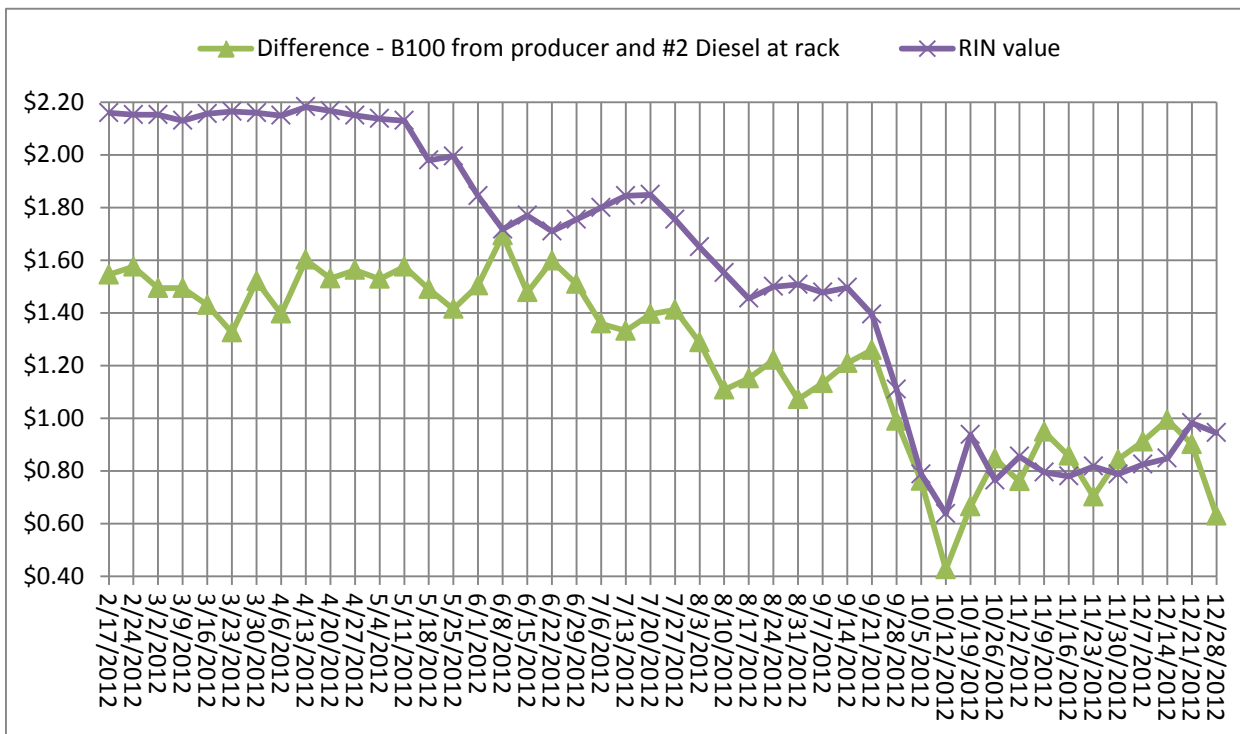


Figure 10. Zoom in of Difference and RIN value of Figure 9.



<sup>26</sup> Price of diesel at the rack (wholesale).

<sup>27</sup> Biodiesel average price of Iowa plants (Minnesota unavailable) for weekly AMS report [National Weekly Ag Energy Round-up](http://www.ams.usda.gov/mnreports/lswagenergy.pdf) (http://www.ams.usda.gov/mnreports/lswagenergy.pdf).

<sup>28</sup> RIN values obtained from

<sup>29</sup> 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.

Using RINs as a de-facto replacement for the biodiesel tax credit is still increasing the volatility of plant profitability and adversely impacting small farmer-owned biofuel plants. Total dependence on RINs may also work as a cap on renewable fuel production, possibly making smaller independent plants even more vulnerable to competition from larger entities.

This potential impact of RINs illustrates the fact that the net cost of ethanol or biodiesel to the blender (which could ultimately be passed onto the consumer) is dependent on a number of variables including unknown customer discounts, term contract prices versus spot market differentials, the value of RINs, tax credits, profit margins and marketing strategies. The ability to manage these variables can add to the profitability of blending; thus, the “cost” of ethanol and biodiesel is not reflected by rack or retail prices alone.

### Recommendations

To date, the market has developed in a way that minimized any additional fuel cost to blenders and often led to circumstances where blender costs were lower than if they had purchased conventional gasoline or diesel fuel alone. As long as blender costs are lower or not significantly higher, the cost to consumers should not be a great concern. To maintain affordable prices for renewable fuels in Minnesota, the state should:

- Encourage blending of biodiesel by the independent blender so as to allow profit to be made at all levels of the petroleum distribution chain.
- Continue to monitor market conditions and respond with appropriate policy actions.