



NextGen Energy Board

2013 Report to the Legislature

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Executive Summary

The NextGen Energy Board was created by the Governor and the Minnesota Legislature in 2007. By law, the Board's purpose is to explore policies and opportunities for the state "to most efficiently achieve energy independence, agricultural and natural resources sustainability, and rural economic vitality." The Board is comprised of 20 members—including 8 who are appointed by the governor—from state government, the legislature and stakeholder groups.

In 2010 and 2011, changes to policies and the economic climate for biofuels at both the state and federal level led the Board to modify its scope to focus on three high-level goals: 1) increase the use of our state's bioenergy resources; 2) encourage energy self-reliance and security in the state; and, 3) promote environmental and economic sustainability in the production and use of homegrown renewable fuels. The Board's strategies and objectives are based on these goals.

In 2008, the Board provided approximately \$3 million in grants to eight bioenergy projects across the state. These projects ended by June 2011—five projects were completed in full while three projects were terminated early. In 2012, the Board awarded approximately \$2.4 million to nine bioenergy projects, which are scheduled for completion by June 2013.

Introduction

This report is submitted pursuant to Minnesota Statutes §41A.105, subd.3:

NextGen Energy Board; Duties.

The board shall research and report to the commissioner of agriculture and to the legislature recommendations as to how the state can invest its resources to most efficiently achieve energy independence, agricultural and natural resources sustainability, and rural economic vitality. The board shall:

- (1) examine the future of fuels, such as synthetic gases, biobutanol, hydrogen, methanol, biodiesel, and ethanol within Minnesota;*
- (2) develop equity grant programs to assist locally owned facilities;*
- (3) study the proper role of the state in creating financing and investing and providing incentives;*
- (4) evaluate how state and federal programs, including the Farm Bill, can best work together and leverage resources;*
- (5) work with other entities and committees to develop a clean energy program; and*
- (6) report to the legislature before February 1 each year with recommendations as to appropriations and results of past actions and projects.*

Background

Minnesota is a recognized national leader in policies and programs that promote bioenergy while ensuring local production benefits. The state was first in the nation to implement statewide 10 percent ethanol and 2 percent biodiesel blending requirements, as well as a producer payment program to incentivize homegrown ethanol production. Minnesota continues to lead with increasing mandates for ethanol and biodiesel in future years. Minnesota is also a national leader in E85 infrastructure with more than 360 fueling stations and 73 blender pumps for flex-fuel vehicles in use across the state.¹

In recent years, the biofuels industry as a whole has enjoyed enormous support—coupled with significant challenges. The federal Energy Independence and Security Act of 2007 established the Renewable Fuel Standard (RFS2), which guarantees a market for current and future biofuels by mandating 36 billion gallons of renewable fuels by 2022.² Additional federal support for biofuels—such as grants, loans and tax breaks—demonstrate further optimism at the national level. The biofuels industry has experienced rapid growth among existing plants seeking to innovate into cellulosic³ and other advanced biofuel developments.

At the same time, however, public perception of biofuels has waned with the emergence of debates about crops used for food versus fuel, land use, and other potential social and environmental impacts. In addition, cellulosic technology—while continuing to advance—is still not commercially viable or economically feasible at scale. Market and technological feasibility has also been called into question in terms of the availability of blender pumps for mid-level biofuel blends, the reliability of those fuels in

¹ E85 is a blend of 85 percent ethanol and 15 percent gasoline; flex-fuel vehicles are specially designed to run on gasoline or any blend of up to 85 percent ethanol.

² P.L. 110-140.

³ Cellulose is the main component of the cell walls of plants. Cellulosic materials that can be made into energy products include wood waste, corn stover (leaves, stalks, and cobs), native prairie grasses (switchgrass, miscanthus, etc.) and non-edible parts of plants, among others.

conventional vehicles, and the logistics of transporting and storing large amounts of bulky biomass to cellulosic biofuel production sites. Declining perceptions coupled with the U.S. economy's slow recovery has led to a reduction in both state and federal support for biofuels, straining the current industry and hampering the development of advanced biofuels, especially here in Minnesota.

NextGen Energy Board Role and Composition

The Next Generation Energy Board was established in 2007 as part of the [Next Generation Energy Act](https://www.revisor.mn.gov) (<https://www.revisor.mn.gov>). The Board's role is to research and recommend how the state can invest its resources to most efficiently achieve energy independence, agricultural and natural resources sustainability and rural economic vitality.⁴ The Board is specifically tasked with developing recommendations and building consensus for the development of “next generation” biofuels in the state, as defined in statute (see Appendix A).⁵

The NextGen Energy Board was formed during a period of relative optimism and with a focus on the Minnesota market. However, the increased attention on biofuels and other biomass-based energy at the national level—both in terms of optimistic support and negative perception—presents a unique opportunity for the Board to hone its strategy and continue working to steer Minnesota in a positive direction.

The Board is comprised of 20 members, eight of whom were appointed by Governor Dayton in 2011:*

- Senator Dave Tomassoni
- Senator Dan Sparks
- Senator Torrey Westrom
- Representative Jean Wagenius
- Representative Joe Atkins
- Representative Joe Hoppe
- Commissioner Tom Landwehr, Minnesota Department of Natural Resources
- Commissioner Dave Frederickson, Minnesota Department of Agriculture
- Commissioner Katie Clark Sieben, Minnesota Dept. of Employment & Economic Development
- Commissioner John Linc Stine, Minnesota Pollution Control Agency
- Commissioner Mike Rothman, Minnesota Department of Commerce
- Teresa Spaeth, Agriculture Utilization Research Institute (AURI)
- Lissa Pawlisch*, Minnesota Institute for Sustainable Agriculture
- Amanda Bilek*, Great Plains Institute
- Thom Petersen*, Minnesota Farmers Union
- Wayne Brandt*, Minnesota Forest Industries
- Dick Hemmingsen*, University of Minnesota Initiative for Renewable Energy and the Environment (IREE)
- John Frey*, Minnesota State Colleges and Universities (MnSCU)
- Neal Feeken*, The Nature Conservancy in Minnesota
- Paul Stark*, Minnesota Farm Bureau

⁴ Although not directly germane to the NextGen Energy Board's charge, the Board acknowledges the importance of energy conservation and the use of renewable energy sources other than biomass, such as solar, wind and geothermal, to supplement biomass energy initiatives. Placing biomass energy initiatives in this context will help ensure that these initiatives remain consistent with sustainable, available biomass and environmental needs.

⁵ MS §41A.105.

* Denotes NextGen Energy Board members appointed by Governor Dayton.

NextGen Energy Board Strategic Vision

Strategic Vision

The NextGen Energy Board supports policies and programs for the production and use of bioenergy to replace fossil fuels and provide maximum benefit to the state's economy. Minnesota's bioenergy policies have created prosperity for Minnesota farming communities, improved air quality, reduced carbon emissions, displaced petroleum use and encouraged public acceptance of biofuels for widespread use. The NextGen Energy Board's vision promotes the continued improvement of existing biofuels industries and supports innovation in the next generation of bioenergy feedstocks and technologies while ensuring local benefits and sustainable solutions.

The NextGen Energy Board has identified three high-level goals that guide the objectives and strategies for meeting its strategic vision: 1) increase the use of our state's bioenergy resources; 2) encourage energy self-reliance and security in the state; and, 3) promote environmental and economic sustainability in the production and use of homegrown renewable fuels.

Objectives

Through a series of facilitated discussions, the NextGen Energy Board narrowed its focus on meeting the following objectives to promote the goals of the strategic vision.

- 1) To increase the use of our state's bioenergy resources:
 - Prioritize investments and incentives for fossil fuel replacements that capitalize on Minnesota's resources, talents and technologies while ensuring sustained benefits to the state.
- 2) To encourage energy self-reliance and security:
 - Strengthen Minnesota's current biofuel industries—including corn-based ethanol and soy-based diesel—to sustain first generation and increase next generation biofuels production;
 - Expand renewable fuel economic opportunities for Minnesota communities and individuals.
- 3) To promote sustainability:
 - Ensure the efficient, innovative and sustainable use of energy and natural resources as well as continued improvement in air quality;
 - Support the development of bioenergy feedstocks and systems;
 - Increase public awareness about the benefits of developing and maintaining biofuels in Minnesota.

Strategies

To help achieve the stated objectives, the Board adopted the following strategies.

- 1) To increase the use of our state's bioenergy resources:
 - Promote policies and programs for displacing fossil fuel use with energy conservation and the production and use of homegrown renewable resources.
- 2) To encourage energy self-reliance and security:
 - Build on existing biofuels industries to increase technological capacity for producing next generation biofuels;
 - Integrate research and development, education initiatives, technology transfer, production incentives and market creation focused on current and next generation fuels;
 - Create and retain local community and other investments in current and new biofuels enterprises;
 - Create market-based policies that allow farmers, loggers, landowners, and producers to benefit economically from the next generation of bioenergy production.

- 3) To promote sustainability:
 - Encourage the evolution of current biofuels production technology toward processes that are more energy efficient, use less water and consume less fossil energy;
 - Develop sustainable production systems for bioenergy crops, crop residues and materials that minimize fossil and other resource inputs while maximizing environmental benefits.

Biofuels Advisory Task Force Report

Introduction

Legislative Charge:

The NextGen Energy Board, established in Minnesota Statutes, section 41A.105, shall include in its February 2013 report to the legislature an analysis of next generation biofuels that can be blended with gasoline or other energy sources. The report shall analyze research on next generation biofuel blends and information on federal approvals needed and the status of the federal approval for next generation biofuel blends, and make policy recommendations for updating Minnesota's biofuels mandates to reflect current industry practices. The commissioner of agriculture shall convene an advisory group to advise and assist the NextGen Energy Board in the analysis and report. Members of the group may include representatives of the next generation biofuels industry, the ethanol industry, persons with biofuels engineering or other biofuels expertise, suppliers of biofuels feedstocks or inputs, and other persons with applicable knowledge or expertise as designated by the commissioner.

Historical Overview:

Minnesota was one of the first states to recognize the benefits possible from locally-based, renewable fuel production. Its early adoption of innovative legislation and its support for public/private partnerships proved effective. As a result, Minnesota has been a leader in biofuels policy and practices around the country and the world.

Minnesota's leadership in biofuels was demonstrated in 1992 when minimum content standards in oxygenated gasoline were first established. Due to a succession of supportive policies, by 2002 ethanol production exceeded in-state consumption and became an export commodity for the state. Today ethanol production capacity of more than 1 billion gallons per year exceeds state consumption and adds significant value to state GDP.

Minnesota is one of the only states that has both an ethanol and biodiesel blending mandate and at higher volumes and without the caveats of other states.

Key Dates:

1992: Minnesota first adopted the use of oxygenated fuel, requiring a minimum 2.0% oxygen by weight be included in a fuel blend in a carbon monoxide control area during a carbon monoxide control period (winter months) in MN Statute §239.791.

1993: Oxygen content was increased to 2.7%. The statute was also amended to remove the words “during a carbon monoxide control period” for 1995 implementation and to require the blend statewide for 1997 implementation.

2000: Statute limited the use of methyl tertiary butyl ether (MTBE), ethyl tertiary butyl ether (ETBE) and tertiary amyl methyl ether as oxygenates. Language also eliminated these non-ethanol oxygenates use starting in 2005.

2003: Statute was amended to read that all gasoline sold in Minnesota be blended with 10% denatured ethanol by volume rather than specify an oxygen content.

2005: Subdivision 1a was added. This part of the statute requires that all gasoline sold in the state be blended with 20% denatured ethanol once it receives EPA approvals and carried a sunset date of 2010.

2007: Defined the terms “cellulosic biofuel,” “cellulosic material,” and “cellulosic biofuel facility.” A cellulosic biofuel production goal of “one-quarter of the total amount necessary for ethanol use required under section 239.791, subdivision 1a, by 2015 or when cellulosic biofuel facilities in the state attain a total annual production level of 60,000,000 gallons, whichever is first” was added in MN §41A.10, subdivision 2. “Biobutanol” appears in statute (MN §41A.105, subdivision 3(1)).

2009: Language was added that would require all gasoline sold in Minnesota be blended with the highest volume of denatured ethanol approved by the EPA – whenever that should occur.

2010: Language extended the date for expiration of E20 language to 2012.

2011: “Biobutanol facility” and “biobutanol” are both defined in MN §41A.105, subdivision 1a. Language included in MN §116D.04 regarding permits for conversion of an ethanol facility to a biobutanol facility.

2012: Added language for permitting of new plants and expansion of existing plants, adding biobutanol and cellulosic plants to the descriptions previously existing for ethanol plants to MN §116D.04. E20 mandate language extended to 2014 and a task force charged to report findings and make policy recommendations for updating Minnesota’s biofuels mandates to reflect current industry practices added to MN Statute §239.791.

The information given above is summarized in the following table.

Major Changes to Biofuel Statutes	
Year	Events
1992	Minnesota first adopts use of oxygenated fuel. 2.0% minimum by volume is required in carbon monoxide non-attainment areas during the non-attainment period of the year (winter).
1993	Minimum oxygen level raised to 2.7%.
1995	Language written in 1993 takes effect requiring the oxygenate blend year-round.

Major Changes to Biofuel Statutes	
Year	Events
1997	Language written in 1993 takes effect that requires the oxygenate blend statewide.
2000	Reduced use of MTBE, ETBE and other non-ethanol oxygenates added to statute.
2003	Language amended to require 10% ethanol rather than an oxygenate percentage.
2005	MTBE and other non-ethanol oxygenates prohibited by law written in 2000.
	Subdivision 1a added to statute for implementation of E20 when approved for all motor vehicles by the EPA.
2009	Language added to move the state to the highest ethanol blend approved for all motor vehicles by the EPA added.
2010	Subdivision 1a extended to 2012.
2011	Language added to various statute for "cellulosic" and "biobutanol."
2012	Subdivision 1a extended to 2014 - the Biofuels Advisory Task Force is created to make policy recommendations on NextGen biofuel-gasoline blends.

Members of the Task Force:

The group appointed by Minnesota Department of Agriculture Commissioner Dave Frederickson is listed by name, affiliation and position in the appendix to this report.

Agriculture Commissioner Frederickson opened the first meeting, and introduced Assistant Commissioner Charlie Poster, who would chair the task force meetings from that point forward.

Renewable Fuel Standard (RFS2) Overview and Analysis of Next Generation Biofuels

RFS2 Overview

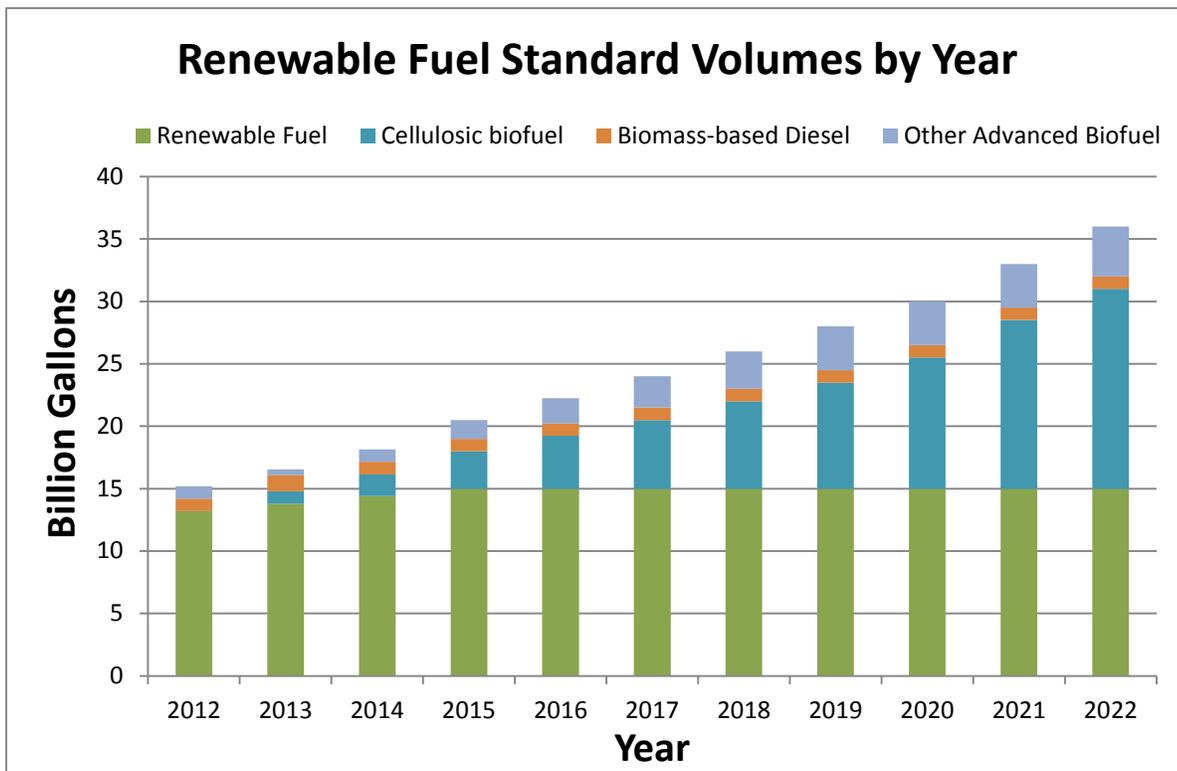
The volume requirements for the current Federal Renewable Fuels Standard (RFS2), the national requirement for blending of biofuels by obligated parties (refiners, importers, etc.), are published by the EPA and extend to the year 2022. Gallons of “renewable fuel” (primarily corn ethanol) that count toward RFS2 compliance is capped at 15 billion gallons starting in 2015. The total number of gallons of biofuel is set to peak at 36 billion in 2022. The gallons beyond corn-based ethanol (21 billion gallons) are to be distributed amongst biomass-based diesel, cellulosic biofuel and other advanced biofuels. Other advanced biofuels can include ethanol made from starch other than corn, biofuels other than ethanol made from corn starch, and imported or domestic biofuels made from sugarcane, which are limited in the amount eligible for use towards compliance.

Currently, corn-based ethanol accounts for almost 87% of the biofuel used by obligated parties to conform to RFS2 requirements. In 2015, when corn-based ethanol will be capped at 15 billion gallons per year under RFS2 requirements, those gallons will represent about 73.2% of the total biofuel required. In 2022, which is the year RFS2 extends to currently, the 15 billion gallons will represent about 42%. The remaining biofuels used to satisfy RFS2 will need to be advanced biofuels, which include both cellulosic biofuel (including cellulosic ethanol) and biomass-based diesel. Biodiesel currently produced from seed and rendering oils is considered an advanced biofuel due to its greenhouse gas emissions reduction potential. The volume requirements for the various biofuels as required by RFS2 through 2022 are shown in the following chart* and graphic.

Year	Total	Conventional	Portion from advanced biofuels			
			Total Advanced	Cellulosic	Biodiesel	Other
2012	15.20	13.2	2.00	0.00865	1.00	0.99135
2013	16.55	13.8	2.75	1.00000	1.28	0.47000
2014	18.15	14.4	3.75	1.75000	a	1.00000
2015	20.50	15.0	5.50	3.00000	a	1.50000
2016	22.25	15.0	7.25	4.25000	a	2.00000
2017	24.00	15.0	9.00	5.50000	a	2.50000
2018	26.00	15.0	11.00	7.00000	a	3.00000
2019	28.00	15.0	13.00	8.50000	a	3.50000
2020	30.00	15.0	15.00	10.50000	a	3.50000
2021	33.00	15.0	18.00	13.50000	a	3.50000
2022	36.00	15.0	21.00	16.00000	a	4.00000

* - All volumes are in billion gallons

a - Biodiesel volumes to be determined year by year, always to be greater than or equal to 1 billion gallons



The Task Force received presentations on regulations, qualifications and the status of renewable biofuels. These presentations can be viewed through the MDA website, [NextGen: Biofuels Advisory Task Force](http://www.mda.state.mn.us/renewable/nextgen/nextgenbiofuelstf.aspx) (<http://www.mda.state.mn.us/renewable/nextgen/nextgenbiofuelstf.aspx>).

The Renewable Fuels Standard (RFS2) defines four categories of biofuels: Renewable Fuel, Advanced Biofuel, Biomass-based Diesel, and Cellulosic Biofuel.

1) Renewable Fuels with a 20% reduction in greenhouse gas emissions (GHG) vs. petroleum, and can include both ethanol and butanol made from corn starch. All fuels from existing conventional ethanol production facilities are grandfathered into this category. (from RFS2 definition: *Renewable fuel* means a fuel which meets all of the requirements of paragraph (1) of this definition: (1)(i) Fuel that is produced from renewable biomass. (ii) Fuel that is used to replace or reduce the quantity of fossil fuel present in a transportation fuel, heating oil, or jet fuel. (iii) Has lifecycle greenhouse gas emissions that are at least 20 percent less than baseline lifecycle greenhouse gas emissions, unless the fuel is exempt from this requirement pursuant to § 80.1403. (2) Ethanol covered by this definition shall be denatured as required and defined in 27 CFR parts 19 through 21. Any volume of denaturant added to the undenatured ethanol by a producer or importer in excess of 2 volume percent shall not be included in the volume of ethanol for purposes of determining compliance with the requirements under this subpart.)

2) Advanced biofuels offering at least 50% GHG reduction and are not ethanol produced from cornstarch. (from RFS2 rule: *Advanced biofuel* means renewable fuel, other than ethanol derived from cornstarch, has lifecycle greenhouse gas emissions that are at least 50 percent less than baseline lifecycle greenhouse gas emissions.)

3) Biomass-based diesel fuel meets the definition of either biodiesel or non-ester renewable diesel, and offers at least 50% GHG reduction. (from RFS2 rule: *Biomass-based diesel* means a renewable fuel that has lifecycle greenhouse gas emissions that are at least 50 percent less than baseline lifecycle greenhouse gas emissions and meets all of the requirements of paragraph (1) of this definition: (1)(i) Is a transportation fuel, transportation fuel additive, heating oil, or jet fuel. (ii) Meets the definition of either biodiesel or non-ester renewable diesel. (iii) Is registered as a motor vehicle fuel or fuel additive under 40 CFR part 79, if the fuel or fuel additive is intended for use in a motor vehicle. (2) Renewable fuel that is coprocessed with petroleum is not biomass-based diesel.)

4) Cellulosic biofuel offering at least 60% GHG reduction. (from RFS2 rule: *Cellulosic biofuel* means renewable fuel derived from any cellulose, hemicellulose, or lignin that has lifecycle greenhouse gas emissions that are at least 60 percent less than the baseline lifecycle greenhouse gas emissions.)

Analysis of Next Generation Biofuels

The task force focused on fuels for spark ignition engines that were considered to be commercially scalable in the near term. These fuels included ethanol, isobutanol 12 (12.5% isobutanol by volume) and isobutanol 16 (16.1% isobutanol by volume), renewable gasoline and cellulosic biofuel. Renewable gasoline is gasoline that is produced from renewable carbon feedstock and complies with the ASTM D4814 standard for gasoline. Renewable diesel is diesel that is produced from renewable carbon feedstock and complies with ASTM D975 for diesel engine fuel. Renewable gasoline or diesel is frequently referred to as “drop-in” fuel since it is chemically identical to the corresponding petroleum-based product. Cellulosic biofuel encompasses any number of potential fuels made from cellulosic materials through fermentation, thermochemical processes or a hybrid of the two.

Of those technologies, companies producing isobutanol and renewable gasoline or diesel are investing significantly to fully commercialize in the state.

Isobutanol

GEVO was the first commercial isobutanol plant in the nation and is located in Luverne, Minnesota. The biobutanol production is conducted with an add-on fermentation and separation system that has been added to an existing ethanol plant. The chemicals market is their primary focus, but fuels may also be a potential opportunity.

Butamax Advanced Biofuels, LLC, has signed letters of intent with eight ethanol companies owning eleven ethanol plants with a combined capacity of about 900 million gallons per year. Butamax would license the biobutanol producing technology to those companies. Two of these companies, Highwater Ethanol and Granite Falls Energy are located in Minnesota.

Renewable gasoline or diesel:

Four companies working on renewable hydrocarbons in Minnesota are Syngas Technology in Elk River, JetE in Roseville, Bepex in Minneapolis and Rational Energy in Plymouth.

- [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 this system shows it will address 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 planned 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](#) has designed a 30 MGY plant that can produce full ASTM specification D7566 aviation turbine fuel and/or D975 green diesel. The plant, which utilized fats and oils as feedstock, can be integrated into existing agriculture 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 distillers grains as feedstock for JetE’s renewable drop-in fuel.

- Since early 2007, Bepex has been working with raw biomass suppliers, utilities, and investors. It has conducted extensive research and development to bring an industrial-scale biomass torrefaction and densification production technology to market. The Torrsys technology developed through operating a 1.44 ton/day, continuous-phase biomass torrefaction and densification pilot plant is being commercially marketed by Bepex to satisfy multiple feedstock needs of the bioenergy industry. Bepex has also developed a novel fast pyrolysis reactor that is capable of converting diverse raw biomass and torrefied biomass to bio-oil in a vapor form as needed to produce full specification ASTM standard biomass-based fuels. Bepex has designed and released the pilot scale fast pyrolysis reactor unit for fabrication and installation in its laboratory facility. This unit will be available for testing and demonstration in the first quarter of 2013.
- Rational Energies in Plymouth is in commercial-scale production using pyrolysis gasification technology to convert plastics separated from municipal solid waste into synthetic crude feedstock; used for the production of a full spectrum of ASTM fuels. The company considers their waste-plastic-to-fuel biocrude oil process a commercial bridge to the goal of producing biomass-to-ASTM standard fuels.

Federal Approval Process

Federal approvals needed for biofuels blending

Fuels must meet a number of requirements at the federal level to be sold in the marketplace. These include:

- Vehicle and emissions system compatibility (per the Clean Air Act Section 211(f))
- Human health (Registration – per CAA Section 211(b) – Health Effects Testing)
- Policy (Renewable Fuels Standard (RFS) requirements and qualifications)
- Water quality (Underground storage tank regulation)

In addition to requirements at the federal level, there are also requirements at the state level, American Standard Testing Method (ASTM) requirements, and safety (Underwriter’s Laboratory (UL), manufacturer’s certifications, etc.) that must be considered.

Pertaining to federal fuel regulations, there are two ways for a fuel to be approved for use:

- Vehicle and emissions system compatibility
 - Fuel must be substantially similar to certification fuel used to certify 1975 and later model year vehicles.
 - The EPA currently defines substantially similar (“SubSim”) to be up to 2.7wt% oxygen and no metallic additives

OR

- Fuel must receive a waiver (§211(f)(4))

- Examples of this are E10, E15 (partial waiver), and the Octamix waiver

A waiver from §211(f)(4) requires three things:

1. Vehicle manufacturer concerns
2. Emissions
3. Health concerns

Vehicle manufacturer concerns –

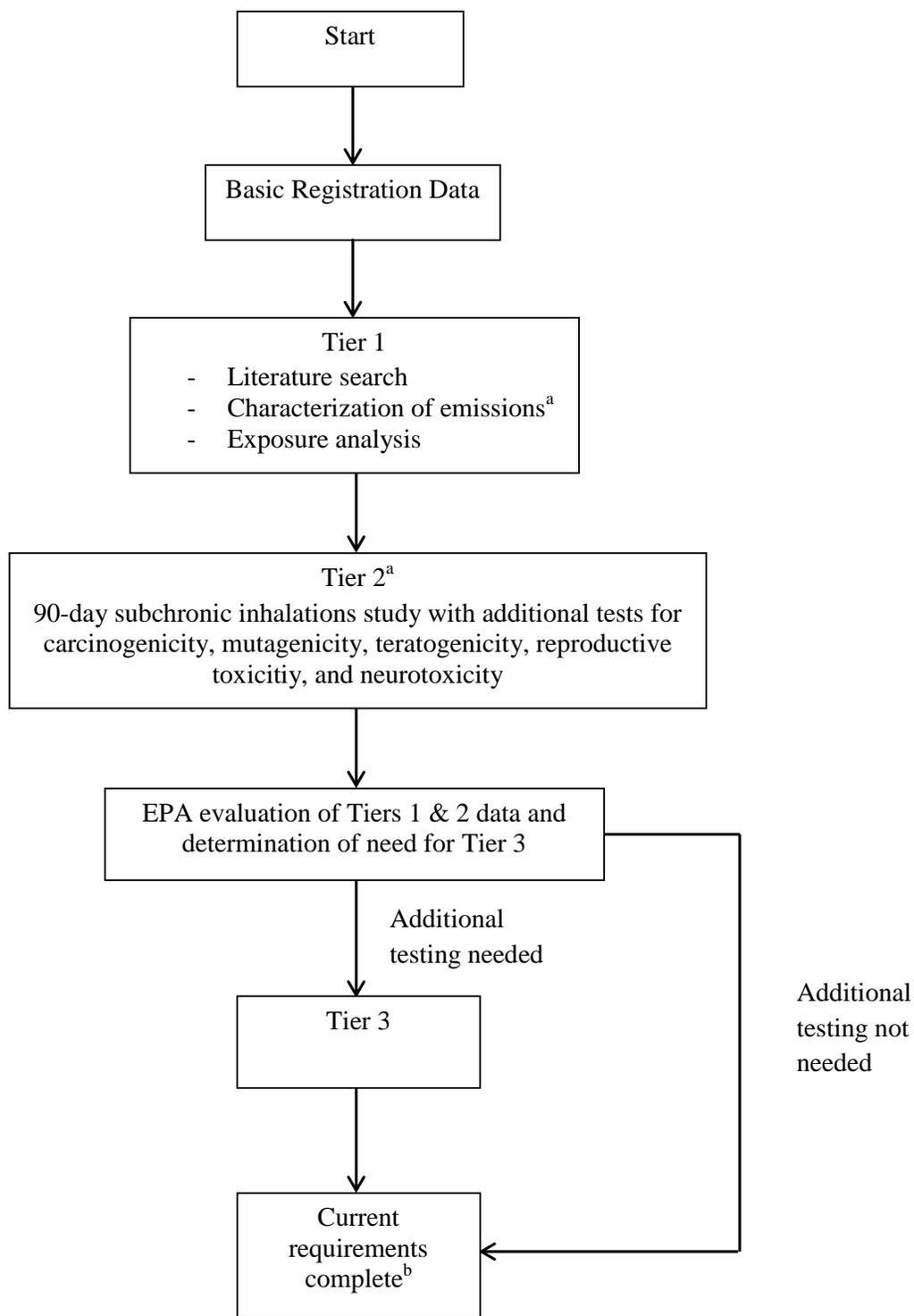
- 1) Effects on vehicles – the fuel must be shown to not cause defects in the vehicles or equipment with which it will be used. This could range from damage to the engine to compatibility of engine parts with the new fuel.
- 2) Fleet study – the fuel is tested in matching vehicles of the same type and compared after so many miles of use.
- 3) Driveability – the vehicle is tested in a number of conditions with the new fuel.

Emissions – the fuel needs to show that it will not harm vehicle pollution control equipment over its useful life (defined as 120,000 miles). Tests involve vehicles accumulating miles in the laboratory on a dynamometer and having emissions checked periodically, with these results compared to results for the vehicle on the standard fuel.

Health concerns – it must be shown that the fuel will not cause health problems in human beings. Once a fuel is approved in all these categories, it is granted a waiver. Fuel and additive manufacturers must register their formulations with the EPA. This registration requires submission of health effects data at various levels (Tier I / Tier II / Tier III). These registrations are for up to a maximum additive content volume, and the maximum content must be consistent with SubSim or an existing waiver.

All fuels and fuel additives must go through the health effects testing prior to the producer reaching greater than \$50 million in sales per year. Tier I testing consists of determining changes in exhaust and evaporative emissions relative to a defined reference fuel and a literature search on the health effects of species only present in the fuel with the new additive. Tier II is an assessment of the health implications of any of the new emission species detected in the Tier I testing; this may include both expert evaluation of existing data as well as animal exposure testing. If the Tier I and Tier II studies do not fully address any potential health concerns, EPA may direct additional studies to be performed as Tier III. The flow chart depicting the EPA Tier Process is included below.

Overview of EPA Evaluation Tiers



^a Required unless adequate data exists.

^b EPA retains the authority to require additional testing if new concerns arise.

Current status of federal approvals

Current EPA biofuel registrations include the following: ethanol, biodiesel, methanol, n-butanol, isobutanol, renewable gasoline and renewable diesel. Of those, a few more details are available:

Ethanol – E10: Gasoline blended with up to 10% ethanol by volume may be offered for sale for all light duty vehicles. E15: Gasoline blended with up to 15% ethanol by volume may be offered for sale for model year 2001 and later vehicles through the partial waiver through the EPA.

Isobutanol – currently can blend to “SubSim” (2.7wt% oxygen, which is 12.5vol%); 3.7wt% oxygen (16.1vol%) is pending.

Isobutanol at 12.5% volume is currently going through Tier I and Tier II testing (which it must to be sold in quantities over \$50 million dollars in sales per year) through information submitted by GEVO. A response from the EPA is expected shortly.

Butamax is currently working with the EPA on a 16.1% blend approval, having submitted their Tier I and Tier II information in April, 2012.

Isobutanol already has an approved pathway in the RFS when made with corn starch through fermentation.

Renewable gasoline – a product that would qualify as gasoline per ASTM D-4814 can be used as a direct replacement for gasoline provided it meets the “SubSim” criteria. It would also require EPA Tier I and Tier II testing according to Dave Kortum, an environmental engineer in the Compliance Division with the Office of Transportation and Air Quality of the U.S. EPA.

Blending of biofuels with E10 – federal law currently does not allow for the sale of E10 blended with additional oxygenated biofuel (e.g. 10% ethanol + 5% isobutanol) because the addition of additional oxygenated biofuel would exceed oxygen by weight threshold for subsim (2.7% oxygen by weight). A waiver with the EPA would be required for such a fuel. Getting a waiver generally takes a number of years and costs millions of dollars.

Policy Recommendations

The goal of the task force was to protect what Minnesota has developed as a biofuels industry while exploring how to expand and encourage the use of all biofuels towards increased petroleum replacement. There was broad consensus that Minnesota should strive to maintain and enhance its position in biofuel development and support.

After discussions of the task force over the first two meetings, the group began addressing possible policy recommendations at the third meeting on October 31st, 2012. The group strongly felt a unanimously supported recommendation would be most beneficial to the industry. The idea of a plan that offered a slow transition from a technology specific mandate to a robust, inclusive biofuel standard was met with wide approval.

The proposal put forth below establishes a floor for biofuels use in the State that will increase biofuel gallons used while gradually transitioning from ethanol to generic biofuel support. The proposal sets the long term goal of increasing the biofuels sector and transitioning from the ethanol mandate to general support for all biofuels, specifically including, but not limited to, ethanol, biobutanol and renewable gasoline.

Mutual Agreement from 12-12-12 Meeting

Objective	Current Policy	Proposed Policy
Define biofuels	Minnesota policy currently requires ethanol blending.	<p>In order to aid in achieving federal Renewable Fuel Standard goals, Minnesota should define biofuel for purposes of state requirements as including, "all renewable fuels that have approved pathways under RFS2, and that have been approved for sale by the U.S. EPA."</p> <p>Minnesota should follow RFS2 definitions for categories of fuels, including "renewable fuel," advanced biofuel," "biomass-based diesel" and "cellulosic biofuel."</p>
Overcome policy barriers to market entry for non-ethanol biofuels in Minnesota.	<p>Current policy requires that all gasoline sold or offered in Minnesota be blended with ethanol at:</p> <ol style="list-style-type: none"> 1. 10% ethanol by volume; or 2. 2. The maximum percent of ethanol by volume authorized in a waiver by US EPA 	<p>Require that all gasoline sold or offered for sale in Minnesota must satisfy either clause (1) or clause (2) below:</p> <ol style="list-style-type: none"> 1. Contain at least 10.0 percent denatured ethanol by volume; or the maximum percent denatured ethanol by volume for which a full waiver exists from the United States Environmental Protection Agency; <p>or</p> <ol style="list-style-type: none"> 2. Contain at least 10.0 percent of an "advanced biofuel," "cellulosic biofuel" or "renewable fuel" for which an approved pathway and full waiver for sale exists from the United States Environmental Protection Agency; or the maximum percent of any "advanced biofuel," "cellulosic biofuel" or "renewable fuel" by volume for which an approved pathway and full waiver has been granted by the U.S. EPA.

Mutual Agreement from 12-12-12 Meeting

Objective	Current Policy	Proposed Policy
Expand the market for "advanced biofuels" and "cellulosic biofuels" in Minnesota.	Requirement that "all gasoline sold or offered for sale in Minnesota must contain at least . . . 20% ethanol by volume . . . (or) . . . The maximum percent of denatured ethanol by volume authorized . . . By the United States EPA."	See Biofuels Policy Recommendation on next page.

Mutual Agreement from 12-12-2012 – Biofuels Policy Recommendation					
Year	Projected Gasoline Sales (in billions of gallons)	Target Biofuel Percentage	Total Biofuel to be Used (in millions of gallons)	Ethanol Minimum	Other Biofuel Allowable
				Ethanol Aggregate (in million gallons)	Other Biofuel Aggregate (in million gallons)
2013	3.093	10%	309	90%	10%
				278	31
2015	3.066	14%	429	80%	20%
				343	86
2017	3.036	18%	546	70%	30%
				382.5	163.9
2020	3.026	25%	757	60%	40%
				454	303
2025	2.968	30%	890	0%	100%
				0	890

To facilitate this new biofuels “mandate,” the taskforce recommends the creation of new incentives to foster investment in infrastructure for higher blends and research and production of advanced biofuels. The legislature should create new incentives to encourage:

1. Production in Minnesota of “renewable biofuels”, “advanced biofuels” and “cellulosic biofuels”; and
2. Deployment of infrastructure necessary to meet state biofuel blending goals.

A last provision involves the formation of an ongoing taskforce. This task force would be overseen by the Minnesota Department of Agriculture, and contain an interagency component dedicated to elimination of barriers to the accelerated introduction of higher biofuel blends approved for use by the U.S. EPA into the marketplace. A current example would be the fuel E15, composed of 15% denatured ethanol and 85% gasoline by volume, which has an EPA waiver for light duty vehicles model year 2001 and newer. Such a group would bring together the pertinent state agencies, trade associations, fuel manufacturers and distributors, and environmental, policy organizations to troubleshoot the implementation of the fuel in question. Such a group would have a similar composition to the state’s Biodiesel Task Force which is now tasked with advising on similar issues regarding biodiesel and its blending into the diesel fuel supply of Minnesota.

The group unanimously agreed that this was the best path forward, as it allows for certainty for ethanol producers over the next decade while encouraging the growth of new biofuels. The outcome of the policy would be a 30% share of the transportation fuels marketplace in Minnesota to the most economical and/or nationally required biofuels. The group believes this policy mirrors and is supported by the federal Renewable Fuel Standard.

This plan met with the approval of all parties represented – this list includes:

- Great Plains Institute
- Natural Resources Research Institute
- The Agricultural Utilization Research Institute
- The Minnesota Bio-Fuels Association
- The Minnesota Corn Growers Association
- The Biobusiness Alliance of Minnesota/Life Science Alley
- LLJ Consulting and Business Development
- Syngas Technology, LLC
- Butamax Advanced Biofuels LLC
- GEVO
- Butrolix
- VerdeNero LLC
- Highwater Ethanol, LLC
- Chippewa Valley Ethanol Company
- AI-Corn Clean Fuel
- Minnesota Ethanol Producers Association
- Minnesota State University Mankato, Department of Automotive and Manufacturing Engineering Technology
- Ralph Groschen, Advisor to and former Business Analyst with the Minnesota Department of Agriculture

Appendix to Task Force Report:

Biofuels Advisory Group member roster by name, affiliation and position.

Vincent Copa, Chippewa Valley Ethanol Company, Process Engineer

Randall Doyal, Al-Corn Clean Fuel, C.E.O.

Don Fosnacht, Natural Resources Research Institute (NRRI), Director – Center for Applied Research and Technology Development

Tim Gerlach, Minnesota Corn Growers Association, Executive Director

Duane Goetsch/Chris Goralski, Syngas Technology LLC

Ralph Groschen, Minnesota Department of Agriculture, Biofuels Program Manager, retired

Jack Huttner, Huttner Strategies LLC. Replaced by Glenn Johnston of GEVO for the 4th meeting (representing GEVO)

Valerie Jerich, Minnesota Ethanol Producers Association (MEPA)

Larry Johnson, LLJ Consulting and Business Development

Bruce Jones, Minnesota State University Mankato, Department of Automotive and Manufacturing Engineering Technology, Professor and Chair

Brendan Jordan, Great Plains Institute, Director of Bioenergy and Transportation Programs

David Kittelson, University of Minnesota, Mechanical Engineering , Professor

Brian Kletscher, Highwater Ethanol , LLC, CEO/GM

Gregg Mast (replaced by Dale Wahlstrom) representing the Biobusiness Alliance of Minnesota

Don Mattson, Butrolix , Chairman and CEO

Gary Mead, Minnesota State University Mankato, Department of Automotive and Manufacturing Engineering Technology

Doug Root, Agricultural Research Utilization Institute (AURI), Senior Scientist of Biomass & Renewable Products Technologies

Tim Rudnicki, Minnesota Biofuels Association, Executive Director (MBA)

Lanny Schmidt, University of Minnesota, Chemical Engineering, Professor

Adam Schubert, Butamax Advanced Biofuels LLC, Strategy and Regulatory Affairs Manager

Luca Zullo, Verde-Nero LLC, Principal

NextGen Energy Grant Program

The 2011 Grant Program

Grant Proposal Development

The 2011 Minnesota Legislature appropriated \$2.5 million to the Minnesota Department of Agriculture (MDA) for advanced bioenergy grants through the NextGen Energy Board.⁶ The legislation also included certain eligibility criteria for the grant program—for instance, by law specifies that grants to private entities are limited to \$500,000 and to nongovernmental entities \$150,000. That summer, the Board developed objectives and criteria for the grants through a series of meetings and a polling survey. The survey asked Board members to rank the importance of a variety of goals for the grant program, such as stage of project development, type of technology, environmental and economic factors, etc. The survey results indicated the Board's preference for a wide range of project types including early-stage R&D as well as construction-phase projects and both high- and low-risk projects. These results and Board discussions led to the development of the final Request for Proposals (RFP).

Grant Review and Recommendations

In September 2011, MDA issued the RFP; applications were due on November 4th. Throughout the open application period, MDA received numerous questions that were posted and answered in an FAQ posting on MDA's website. MDA received a total of 18 eligible applications. A technical review team was convened that included one bioenergy staff person from each of the state agencies represented on the NextGen Board (the Minnesota Departments of Agriculture, Employment and Economic Development, Commerce, Natural Resources and the Pollution Control Agency). The members of the technical team spent approximately two weeks reviewing and scoring proposals independently, based wholly on the criteria set out in the RFP. The team then convened for meetings over a period of three days to review proposals as a group, adjust scores as needed to determine a final group score, and finally rank the proposals in order of those that best met the criteria.

In late November, the technical team provided an electronic summary of its findings to the NextGen Board; Board members then had one week to review the summary and request full proposals for further review. On December 8th, the Board met to hear detailed input from the technical team and make its final recommendation to the Commissioner.⁷ The team provided a broad overview of all project proposals, followed by a more detailed presentation on the top-ranking proposals. The team suggested that eight proposals best met the criteria and should be considered by the Board for funding. The Board voted to recommend those eight projects to the Commissioner; then, based on grant negotiations between those eight grantees and MDA, the Board voted to give the Commissioner authority to fund subsequent projects should funds remain. In the end, a ninth project was added by the Commissioner.

2011 Bioenergy Grant Recipients

The Commissioner of Agriculture ultimately funded nine projects for a total of \$2.4 million.⁸ These projects were chosen based on the degree to which they met the eligibility requirements and criteria

⁶ Laws of Minnesota 2011, Ch. 14, Sec. 3, subd. 4.

⁷ By law, the Board recommends projects to the Commissioner of Agriculture; the Commissioner makes the final decision on projects that receive funding.

⁸ By law, the Minnesota Department of Agriculture is allowed to assess an administrative fee for the NextGen Grant Program. MDA chose to charge fees at a level of 4%, distributed evenly across projects.

established in the RFP; by law, the Board and Commissioner are also required to make a “good faith effort” to choose projects that represent a variety of projects and are widely distributed across the state.⁹ The projects are as follows:

Koda Energy LLC, Shakopee, MN - \$480,000

The funds will pay for construction of a biofuels staging and processing facility in Scott County. The facility will aggregate and process (drying, size reduction) various biomass fuel stocks for use in Koda's CHP biomass facility located seven miles from this new facility. Fuel stocks include urban wood waste (a contract in place with the city of Minneapolis), agri-byproducts and potentially dedicated energy crops.

Update: Koda has completed spending on their project, with all equipment purchase for the staging facility due to be operational by the end of February.

West Central Renewable Ammonia Development, Bloomington MN - \$450,000

The grant will fund a second-stage feasibility study for a proposed biomass- to-ammonia plant near Willmar, MN. This project would convert 95,000 tons of biomass to 45,000 tons of anhydrous ammonia annually. The feasibility study will encompass the tasks of biomass supply and crop development, site preparation, vendor pricing and selection, process integration, marketing development, and financial analyses.

Update: Quarterly progress reports have been filed but no request for reimbursement has been made through the third quarter of 2012. Project lead Cecil Massie has reported that match funding is progressing well and with that will come submissions for reimbursement. The feasibility work on the first stage pelleting facility is almost complete.

SarTec Corporation, Anoka, MN - \$400,000

SarTec invented the Mcgyan technology that is used by Ever Cat Fuels, a three million gallon capacity biodiesel production plant in Isanti, Minnesota. SarTec plans to design and construct a smaller scale, on-farm processing plant using the existing Mcgyan technology. The unit will be tested and operated by farmer-partners with the intent of having them either using the fuel on their farms, or selling it to blenders.

Update: Re-allocated money from closed projects increase SarTec's total grant amount to \$438,000. Through the fourth quarter 2012 they have spent 50% of allocated grant funds. The on-farm biodiesel unit is almost complete with testing and troubleshooting to begin shortly.

Al-Corn Clean Fuel, Claremont, MN - \$248,000

Al-Corn is researching the integration of second-generation biofuels production within their existing and/or an expanded ethanol plant. In partnership with JetE of St. Paul, the facility would produce on spec renewable jet and/or diesel fuel (made from a mix of crop oil and animal fats) in addition to corn ethanol. The results will provide a production roadmap that other ethanol producers will be able to use.

⁹ Laws of Minnesota 2011, Ch. 14, Sec. 3, subd. 4.

Update: 63% of funds have been spent through the fourth quarter 2012. Interim Report #1 (of 2, with an additional final report) was filed in May. Work on equipment sizing and costs, along with the project life cycle analysis are both 90% or more complete.

Renville Renewable Energy LLC, St. Paul, MN - \$220,000

Funds will support the development of Phase 2 costs for an anaerobic digester and associated systems located adjacent to a poultry facility in Renville. The project proposes to use multiple waste streams - both agricultural processing and production wastes - collected from the Renville area as co-digestion material. Biogas will be cleaned to the standard of pipeline grade natural gas. Also included in the study will be the production of nutrient-rich liquid and solid byproduct (crop nutrients) from the digester effluent.

Update: Extra funding was allocated to this project in December giving a new total of \$258,000. The project has recovered 15% of grant funds through the third quarter 2012. A pilot study to collect data on nutrients in effluent and gas production was conducted in the fourth quarter, supplying much useful data to the project. Much of the work done in the preliminary data task of the project is either completely or half complete through the third quarter.

Northern Excellence Seed LLC, Williams, MN - \$200,000

This project builds on the installed 150-kW biomass gasification unit already installed on Northern Excellence's Williams site. The award will help make this system operational using the company's seed screenings. Syngas from the gasifier will provide the energy to produce electric power that will be sold to the grid.

On June 29 Brent Benike, project lead sent notice that the grant money was being returned. A trouble with securing matching funds was cited as the reason for abandoning the project.

Central Lakes College and Ag Energy Center, Staples, MN - \$193,000

This grant award at Central Lakes College is a continuation of previous funding (including NextGen 2008). Various oilseed crops (camelina, spring canola, winter canola, high oil soybeans, sunflowers) or planting methods (camelina/soybean double cropping) will be grown and converted to biodiesel at the site using small-scale processing technology. Feed trials will be conducted using the meal products created from oil extraction. A commercial planting of miscanthus, the winner of CLC's biomass crop trials, will be established, harvested and processed for biofuel.

Update: Re-allocated money from the closing of Northern Excellence Seed project increased CLC's total to \$201,000 following the re-allotment from the August Board meeting; funding increased to \$240,000 following re-allotment in December. Sixteen percent of grant funds have been expended through the second quarter. Project leader Bob Schafer has communicated that all is going well with the project and that the extra funding is greatly appreciated.

Jerry Jennissen, Jer-Lindy Farms, Brooten, MN - \$137,000

The funds will be used to improve operation of the current anaerobic digestion system on the farm. The system in place has been operational since 2008. Some of the improvements include use of additional substrate to improve gas production, an innovative genset design to improve overall efficiency in output of electricity to the grid, and improved quality of the digester's cattle bedding co-product.

Update: Sixty-four percent of grant funds have been spent through the third quarter. Ninety percent of the work on improving biogas production is complete; seventy-five percent of the work on electrical efficiency. The next genset is mostly built and will be installed soon.

Rural Advantage, Fairmont, MN - \$72,000

The grant will fund a Phase 1 feasibility study and business plan to assist Prairie Skies Biomass Co-op in developing operational procedures, membership policies and feedstock contracts for a 300 ton/day torrefaction facility in Madelia, MN. The facility would convert raw agricultural biomass to an advanced biofuel to be sold to offsite markets.

Update: Through the third quarter the project has spent 65% of allocated funds. Work on the feasibility study is complete; remaining tasks include steering committee, business plan and organizational procedures remain.

University of Minnesota: Natural Resources Research Institute, Duluth, MN - \$77,000

Funding was granted to this project at the Board meeting in August. The project is investigating the use of hydrothermal pretreatment techniques to produce value-added biofuels from Minnesota biomass. Hydrothermal pretreatment makes use of compressed hot water. The process is hoped to improve the characteristics of the biomass in many important, financially advantageous ways. Various Minnesota biomass types, including wood species and ag crops and residues are being investigated.

No money had been spent at this writing.

Grant Management Process

MDA is responsible for overseeing and monitoring the NextGen Energy Grant Program. MDA follows the State of Minnesota's grant monitoring guidelines; it also employs some of the Department's own policies and procedures.¹⁰

By law, the current funding for NextGen grants is available through June of 2013. NextGen grantees will be required to submit quarterly progress reports to MDA through this time period. Grantees will also submit invoices with documentation on a quarterly basis; MDA will pay grantees incrementally based on these quarterly reports and invoices. Per state policy, MDA is also required to conduct at least one monitoring visit per year.

The NextGen Board will also receive a quarterly update from MDA on the status of NextGen grants. MDA also plans to ask each grantee to attend Board meetings periodically to provide in-person reports to the Board.

Progress and Changes in the 2011 Grant Program

On June 29, 2012, Northern Excellence Seed advised the MDA that they would not be pursuing their grant project. Options were drawn up for consideration by the NextGen Board that looked at funding additional projects by going to the next projects from the original scoring ranks, or distributing funds to projects that were not fully funded. At the August 16 meeting, the decision was approved to fund the next two projects on the list, the University of Minnesota – Natural Resources Research Institute and

¹⁰ See the Office of Grants Management's page for [Minnesota Grants Management Policies and Statutes](http://www.admin.state.mn.us/ogm_policies_and_statute.html) (http://www.admin.state.mn.us/ogm_policies_and_statute.html).

Environmental Technologies. The remaining funds from the Northern Excellence project were given to Central Lakes College Ag and Energy Center, the last project to be funded with additional funds that had remained in February.

On November 21, 2012, Environmental Technologies informed the program administrator that they were unable to secure match funding for their project since conditions had changed since the original request for proposal submission. Because of the late stage of the grant projects (with projects needing to be complete by June 30, 2013) it was suggested to the Board that the funds returned be offered equally to the four projects that were not fully funded. One of those four projects, West Central Renewable Ammonia Development declined the extra funding leaving the funds remaining to be distributed between the other three projects. This decision was affirmed at the January 10, 2013 Board meeting.

Progress for individual projects is listed in the previous section. At this writing 40.8% of the total funds encumbered (almost \$1 million of the \$2.4 million encumbered) has been claimed.

The 2008 Grant Program

The 2007 Minnesota Legislature appropriated \$3 million for NextGen Energy grants to bioenergy projects.¹¹ Projects awarded during the first cycle were completed or terminated by June 2011, when the appropriation expired. Descriptions of the final status of these projects can be found in last year's NextGen Energy Board Report to the Legislature.

Recommendations and Action Items

In 2010, the NextGen Energy Board adopted new recommendations to meet its strategic vision and objectives.¹² The Board did not establish new recommendations in 2011 or 2012 in an effort to focus on the new grant program. The following provides a brief summary of the Board's recommendations and action items to date:

Recommendation #1: Coordinate efforts and programs in support of biofuels development

A. Action Item: Work across agencies to create an inventory of state, federal and utility programs and other organizations focusing on bioenergy development; outline roles and responsibilities; identify synergies and/or duplication; recommend potential partnering and/or coordination efforts/programs.

Status: The Minnesota Department of Employment and Economic Development (DEED) serves as the lead agency for a new multiagency collaboration called Minnesota Business First Stop (MBFS). MBFS builds on the Green Enterprise Assistance statute 116J.438 and Governor Dayton's first Executive Order (11-04), as well as supporting legislation from 2011 on 150-day permitting. It is designed to assist businesses who are developing, expanding or siting in Minnesota to navigate multiple state resources

¹¹ Following additional actions taken by the Minnesota State Legislature in 2008, approximately \$2.7 million was available for the 2008 NextGen Energy Grant program.

¹² The Board's 2008 recommendations are no longer outlined here. Please reference reports from 2008, 2009 and 2010 for details and updates on those recommendations.

and expedite business needs. The partner state agencies include the Minnesota Departments of Agriculture, Commerce, Revenue, Economic Development, Labor and Industry, Natural Resources, Transportation, the Iron Range Resources and Rehabilitation Board, and the Minnesota Pollution Control Agency.

Examples of work done this past year by MBFS include:

- Initial meetings to discuss needs with bioenergy companies and the MBFS team. These included Syngas Technology LLC, West Central Renewable Ammonia Development and Renville Renewable Energy LLC.
- A permitting template established using West Central Renewable Ammonia Development as an example.
- Commissioner's field trip to Golden Valley (with the Lieutenant Governor also in attendance) visiting a number of Minnesota-based biopolymer companies. These included BioAmber, Reluceo, XLTerra and Segetis.

B. Action Item: Research programs and policies for biofuels development in other states and identify potential benchmarks or models for Minnesota.

Status: In March the Biobusiness Alliance of Minnesota released the Minnesota Roadmap: Recommendations for BioIndustrial Processing.¹³ The Roadmap was developed by The Bioindustrial Partnership of Minnesota, a group of businesses, government officials, and academics committed to the advancement of Minnesota's potential for development of advanced biofuels and biochemical industries. The report contains a chapter specific this action item titled Policy Development for Biodustrial Processing. The chapter contains a concise summary of biofuel policies – including financial incentives, offered by other states

The Department will continue to identify other state-funded programs for bioenergy; MDA also tracks ethanol and biodiesel mandates in other states.

C. Action Item: Build on and leverage Minnesota's assets and strengths in entrepreneurship and state agency resources.

Status: In addition to MBFS, DEED's nine regional Small Business Assistance Centers are available to assist entrepreneurs with loan applications or business plans that may be smaller or more local in nature.

Recommendation #2: Leverage federal programs that support the Board's strategic vision

A. Action Item: Align federal resources—such as federal Farm Bill grants and loans, and the federal Renewable Fuel Standard—with state programs and policies to capitalize on opportunities for Minnesota.

Status: State agency staff work to target federal opportunities for Minnesota by staying apprised of program details and deadlines and disseminating information to clients and stakeholders. Agencies have

¹³ This report can be found at the BioBusiness Alliance website:

<https://www.lifesciencealley.org/content/documents/BBAM%20Documents/MN%20BioIndustrial%20Processing%20Roadmap%20-%20FULL%20REPORT.pdf>

also provided letters of support to endorse various Minnesota entities applying for federal funds, as well as technical assistance during the grant application process. Staff also plans to continue working with industry and landowners to establish program areas in Minnesota for projects to benefit the state under opportunities like the Biomass Crop Assistance Program.

The RFS2 program is covered well by the Minnesota Roadmap. The subject was also covered in the Biofuels Advisory Task Force created under Minnesota Laws 2012, where the Minnesota ethanol mandate was examined in light of RFS2. The report is included in its entirety later in this report.

Recommendation #3: Improve public awareness/perception of biofuels through better and more current information

A. Action Item: Create a catalog of existing, current research and/or data on biofuels development and issues; identify knowledge gaps.

Status: The Agricultural Utilization Research Institute (AURI) which serves on the NextGen Board, is engaged in in-depth research on bioenergy development opportunities in Minnesota. [AURI's recent research reports](http://www.auri.org/help/research/) (<http://www.auri.org/help/research/>) are accessible online; Minnesota Renewable Energy Roundtable (MNRER) coordinated by AURI continues to serve as an important resource.

The University of Minnesota's Initiative for Renewable Energy and the Environment (IREE) was not renewed for funding from the Renewable Development Fund during the legislative session of 2012, the last year of funding coming in 2011.¹⁴ IREE's last round of grant applications was accepted through September, 2012. The program is now being wound down by the Institute on the Environment. [IREE's research portfolio](http://iree.environment.umn.edu/portfolio) (<http://iree.environment.umn.edu/portfolio>) will remain available until all projects are complete.

The Biofuels Advisory Task Force Report addresses the current state of biofuels in RFS2 and at the commercial/pre-commercial level in Minnesota, but does not delve into basic research into biofuel technologies outside the state or at the University level.

B. Action Item: Undertake research/data collection gaps identified by Action Item A.

Status: The Biofuels Advisory Task Force Report addresses the current state of biofuels in RFS2 and at the commercial/pre-commercial level in Minnesota. This is by no means comprehensive and does not take into account the myriad of bench-scale projects being conducted by Universities and small business startups.

C. Disseminate current, sound science on biofuels issues such as land use change, energy balance, food and fuel, etc.

Status: The Minnesota Department of Agriculture's Agricultural Marketing and Development Division engages in outreach and promotion of the state's biofuels mandates and programs. Staff regularly attends and presents at industry and policy events both locally and nationally; produces and distributes brochures, reports and other marketing materials on Minnesota's ethanol and biodiesel industries; and works with industry to stay up-to-date on noteworthy developments.

¹⁴ Laws of Minnesota 2011, Chapter 97, Section 3.

Recommendation #4: Engage in efforts to overcome regulatory barriers in bioenergy development

A. Action Item: Ensure state agency coordination throughout the permitting process.

Status: As mentioned above, the Dayton Administration established the Minnesota Business First Stop program under the leadership of DEED, in collaboration with DNR, PCA, MDA, Commerce, IRRRB and MNDOT. This interagency network will help guide a wide range of companies, including bioenergy developers, through state requirements and services. MBFS is a key mechanism for coordinating the delivery of state services to new business enterprises, including in the area of permitting.

The Minnesota Pollution Control Agency and the Minnesota Department of Natural Resources have each adopted a formal goal of making permit decisions within days of receiving complete permit applications. From March 4, 2011 (the date the law went into effect) through December 31, 2012, the MPCA also issued 96% of permits related to new jobs via expansion or new construction within the 150 day target (3531 out of 3666). For the same time period, the DNR has issued 99% of its permits (11,469 out of 11,590) within the 150 day timeframe.

The 150 day application goal was changed to a more stringent measurement of 150 day from the initial application on July 1, 2012.

B. Action Item: Establish outreach efforts to inform bioenergy developers of permitting requirements/processes at an early stage.

Status: The MBFS program will provide a key forum for early coordination between permitting agencies and bioenergy project developers. MBFS will enable partner agencies to increase awareness of projects and provide companies with a venue to meet with a range of state agencies. These meetings and referrals will accelerate the point at which companies can productively engage with permitting agencies.

The Minnesota Pollution Control Agency created a team of experts to assist Minnesota's ethanol industry with its environmental compliance issues beginning in early 2010. This team was comprised of three experienced staff members dedicated for one year to assist and educate the industry on its environmental responsibilities, practices and policies with the goal of increasing compliance rates. Assistance was offered through a variety of strategies such as voluntary audits, monthly newsletters, monthly web chats and in-person training.

Language was added to MS 116D.04, Subd. 2a was amended in 2011 to add language regarding permitting of ethanol/biobutanol facilities:

A mandatory environmental assessment worksheet shall not be required for the expansion of an ethanol plant, as defined in section 41A.09, subdivision 2a, paragraph (b), or the conversion of an ethanol plant to a biobutanol facility or the expansion of a biobutanol facility as defined in section 41A.105, subdivision 1a, based on the capacity of the expanded or converted facility to produce alcohol fuel, but must be required if the ethanol plant meets or exceeds thresholds of other categories of actions for which environmental assessment worksheets must be prepared. The responsible governmental unit for an ethanol plant project for which an environmental assessment worksheet is prepared shall

be the state agency with the greatest responsibility for supervising or approving the project as a whole.

Language was also added to MS§41A.105 defining “biobutanol” and “biobutanol facility.”

C. Action Item: Pursue legislative action to accelerate and facilitate the permitting process to avoid hindering bioenergy development in Minnesota.

Status: In progress.

See Recommendation #4, Action Item A.

Governor Dayton has also issued Executive Order 11-32 in 2011, directing the Environmental Quality Board to evaluate opportunities and make recommendations to accelerate the environmental review process. Permitting agencies continue to work on streamlining application and review processes.

The MPCA has been working with the MDA and its stakeholders on requirements for underground storage tanks in the state. The following procedures have been determined:

- For new and converted tank systems now starting to store ethanol/gasoline blends greater than 10% ethanol, UL certified or listed equipment is now more available allowing compatibility demonstration prior to placing the product into service.
- For older tank systems already storing ethanol/gasoline blends greater than 10% ethanol, based on limited available information, MPCA is developing an approach moving forward to allow compatibility demonstration through alternative options to ensure or return tank systems to compliance.

Appendix A: NextGen Energy Board Legislation

2010 Minnesota Statutes §41A.105

(created by Minnesota Session Laws 2007, Chapter 45, Sec. 47)

NEXTGEN ENERGY.

Subdivision 1. **Purpose.** It is the goal of the state through the Department of Agriculture to research and develop energy sources to displace fossil fuels with renewable technology.

Subd. 2. **NextGen Energy Board.** There is created a NextGen Energy Board consisting of the commissioners of agriculture, commerce, natural resources, the Pollution Control Agency, and employment and economic development; the chairs of the house and senate committees with jurisdiction over energy finance; the chairs of the house and senate committees with jurisdiction over agriculture finance; one member of the second largest political party in the house, as appointed by the chairs of the house committees with jurisdiction over agriculture finance and energy finance; one member of the second largest political party in the senate, as appointed by the chairs of the senate committees with jurisdiction over agriculture finance and energy finance; and the executive director of the Agricultural Utilization Research Institute. In addition, the governor shall appoint seven members: two representing statewide agriculture organizations; two representing statewide environment and natural resource conservation organizations; one representing the University of Minnesota; one representing the

Minnesota Institute for Sustainable Agriculture; and one representing the Minnesota State Colleges and Universities system.

Subd. 3. **Duties.** The board shall research and report to the commissioner of agriculture and to the legislature recommendations as to how the state can invest its resources to most efficiently achieve energy independence, agricultural and natural resources sustainability, and rural economic vitality. The board shall:

- (1) examine the future of fuels, such as synthetic gases, biobutanol, hydrogen, methanol, biodiesel, and ethanol within Minnesota;
- (2) develop equity grant programs to assist locally owned facilities;
- (3) study the proper role of the state in creating financing and investing and providing incentives;
- (4) evaluate how state and federal programs, including the Farm Bill, can best work together and leverage resources;
- (5) work with other entities and committees to develop a clean energy program; and
- (6) report to the legislature before February 1 each year with recommendations as to appropriations and results of past actions and projects.

Subd. 4. **Commissioner's duties.** The commissioner of agriculture shall administer this section.

Subd. 5. **Expiration.** This section expires June 30, 2014.

Laws of Minnesota 2011, Chapter 14

Sec. 3. DEPARTMENT OF AGRICULTURE ...

\$2,500,000 the first year is for bioenergy grants. The NextGen Energy Board, established in Minnesota Statutes, section 41A.105, shall make recommendations to the commissioner on grants for owners of Minnesota facilities producing bioenergy, organizations that provide for on-station, on-farm field scale research and outreach to develop and test the agronomic and economic requirements of diverse stands of prairie plants and other perennials for bioenergy systems, or certain nongovernmental entities. For the purposes of this paragraph, "bioenergy" includes transportation fuels derived from cellulosic material, as well as the generation of energy for commercial heat, industrial process heat, or electrical power from cellulosic material via gasification or other processes. Grants are limited to 50 percent of the cost of research, technical assistance, or equipment related to bioenergy production or \$500,000, whichever is less. Grants to nongovernmental entities for the development of business plans and structures related to community ownership of eligible bioenergy facilities together may not exceed \$150,000. The board shall make a good-faith effort to select projects that have merit, and, when taken together, represent a variety of bioenergy technologies, biomass feedstocks, and geographic regions of the state. Projects must have a qualified engineer provide certification on the technology and fuel source. Grantees must provide reports at the request of the commissioner. No later than February 1, 2013, the commissioner shall report on the projects funded under this appropriation to the legislative committees with jurisdiction over agriculture finance. The commissioner's costs in administering the program may be paid from the appropriation. This is a onetime appropriation and is available until June 30, 2013.

Appendix B: 2012-2013 NextGen Energy Board Activities

August 2012: Presentations from two 2011 NextGen projects; reallocation of grant funds; introduction to the Biofuels Advisory Task Force charge.

The new NextGen Energy Board met for the first time in August. Presentations were made by two 2011 grant awardees: Jerry Jennissen of Jer-Lindy Farms, Brooten, and Bob Peplin and Ray Davy of Agriwaste Energy (representing the Renville Renewable Energy project) from St. Paul. Kevin Hennessy

(MDA) presented options for redistribution of grant funds that were available due to the withdrawal of the Northern Excellence Seed Project – two additional projects were funded by the board and the last project funded in the first round received \$8,000. Greta Gauthier (MDA) presented the legislative charge for the formation of an advisory group to review the ethanol mandate. The group would be presenting its findings to the Board who would in turn be making recommendations to Commissioner Frederickson.

January 2013: Drop-in Biofuel Presentations; Review of Biofuels Advisory Task Force Report; Second Reallocation of 2011 Grant Funds.

Three Minnesota companies (all with some connection to current NextGen projects) presented to the Board: Luca Zullo for JetE of Roseville, Greg Kimball of Bepex in Minneapolis and Chris Goralski of Syngas Technology in Elk River. Assistant Commissioner Charlie Poster gave a summary of the Biofuels Advisory Task Force Report. Poster was the chairperson for the four meetings of the group. Kevin Hennessy (MDA) reported on a second redistribution of 2011 grant funds that had received comment from the Board via email.