



Destination 2025 Special Series

The BioBusiness Alliance of Minnesota (BBAM) is working on implementing 11 recommendations from the Destination 2025 roadmap.

To help explain the significance of these 11 recommendations, BBAM has put together a special newsletter series, highlighting specific examples that align with the recommendations, to provide our stakeholders with a better understanding of what is to be accomplished.

This newsletter is part three of a four part newsletter series.

Recommendations In This BioBulletin

Food

- Convergence **pg. 1**
- Plant Engineering *******

Renewable Energy

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Renewable Materials

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*****Details on this recommendation to come in 2010.**

Something we have in common: Food

Food: Facilitate Convergence with Other Life Science Industries - As a \$3.1 billion market, food is big business in Minnesota. The state's agro-food industry, including plants and animals, is robust and sophisticated. The Destination 2025 process helped us understand the extent to which the food design and production industry crosses over all of the other life science markets. The food industry is related to both of the two major industry clusters, the medical technology cluster and the agricultural and biomass cluster.

"We were surprised at the level of convergence happening between food and the other bioscience industries in the state," said Dale Wahlstrom, BioBusiness Alliance CEO. "From functional foods supporting human health applications to food industry waste streams being utilized for biomass energy production, we are seeing heavy overlap with related industries."

During the Destination 2025 implementation process, a team of experts recommended forming a food advisory committee to recognize and manage the overlap between these sectors and support policies and programs that allow for

increasing innovation. The intent is to provide tactical leadership and identify sustainable business models to maintain or strengthen the food industry without slowing down progress in the related industries.

"There is a very large opportunity for Minnesota to take the lead in establishing a model of what the future can look like, and put in place the policies and mechanisms to drive the integration of these bioscience industries into balance," said Bill McCormack, retired Executive Vice President, the Schwan Food Company. "We want to support projects that increase innovation and turn challenges into profitable opportunities."

The project is still in the early stages, but has recruited Phil Minerich of Hormel and the following BBAM board members: Kurt Markham, Minnesota Department of Agriculture; Bruce Tiffany, Tiffany Family Farms; and Bill McCormack. The group is actively seeking additional members from academia and industry. Committee members will be asked to advise on upcoming biomass supply chain and diabetes industry cluster projects, among others.



Above: A soybean field from Bruce Tiffany's farm in Redwood Falls, Minnesota.

Combustible biomass is on fire in Minnesota

Renewable Energy: Establish a combustible biomass industry - As a first step to help build a robust biomass-based economy, Minnesota needs to develop a combustible biomass industry.

A potential gap exists in Minnesota's ability to reach its 25 x '25 renewable portfolio standard (www.25x25.org); however, by establishing a combustible biomass industry that leverages the state's forest and agricultural resources, Minnesota can close that gap while creating immediate job opportunities.

Minnesota already has a combustible biomass industry, but due primarily to the lack of a complete supply chain and an incited market, its regional penetration has been limited. Despite this gap, some Minnesota companies have recognized the state's potential in establishing a combustible biomass industry and are working to further develop the industry.



Kandiyohi recognizes this potential. Focusing on solutions to energy and environmental challenges ranging from community-based sustainability planning to biomass electrical generation, Kandiyohi's recent renewable energy ef-

forts revolve around biomass.

They are a developer of biomass electricity and are building a 25-megawatt biomass facility between the cities of Rockford and Buffalo. This carbon neutral facility will be baseload, meaning the plant can deliver a constant amount of "clean" electric power. Also, all of the fuel sourcing will be done within a 50-mile radius, providing this region with approximately 20 jobs averaging an income of \$63,000.

Michael Krause, President and Director of Strategy and New Projects at Kandiyohi, sees demand for renewable energy increasing even in the current economic environment. "There is a diverse demand for renewable energy [in heating, electricity, and transportation] along with the factors of climate change that are driving this industry," says Krause.



Above: Ash tree. On May 14, 2009, the Emerald Ash Borer (EAB) was confirmed present in the South Saint Anthony Park neighborhood in St. Paul. EAB is an insect that attacks and kills ash trees. The adults are small, iridescent green beetles that live outside of trees during the summer months. The larvae are grub or worm-like and live underneath the bark of ash trees. Trees are killed by the tunneling of the larvae under the tree's bark.

Kandiyohi is also helping the state deal with the destruction caused by the emerald ash borer among Minnesota's 900 million ash trees. These ash trees can provide the state with 500-1,000 megawatts of energy – a large opportunity for electricity production.

Another organization producing "clean" energy is Visiam, LLC – converting waste to energy.

In 2007, the EPA reported that US residents generated 4.6 lbs. of Municipal Solid Waste (MSW) per person per day, adding up to a total of 254 tons of MSW for the year. The total MSW generation has almost doubled in the past 30 years.

Visiam recognizes this growing issue and has responded with a technology to convert as much as 80 percent of MSW into "clean" energy for the community's use. Unlike others in the industry, this Minnesota company uses waste-to-energy

(WTE) processes that are not only efficient on a large scale but are also viable for processing waste for communities as small as 30,000 residents.

Companies like Kandiyohi and Visiam demonstrate that Minnesota is moving forward with the development of a combustible biomass industry that can help strengthen the state's biomass-based economy.



Thank You!

The BioBusiness Alliance of Minnesota would like to say THANK YOU to all the companies and individuals who participated in the agricultural and biomass cluster newsletter. For more information on the companies listed in this issue of The BioBulletin, check out the following web sites.

Kandiyohi
Visiam
DNR
The Nature
Conservancy

www.kandiyo.com
www.thinkvisiam.com
www.dnr.state.mn.us
www.nature.org

Segetis
Natur-Tec
Draths
Harold Stanislawski

www.segetis.com
www.natur-tec.com
drathscorporation.com
www.fergusfalls.com

Turning Minnesota's biomass into a source of energy

Renewable Energy: Create a biomass management system - Although Minnesota is well-positioned in the production of biomass and the conversion of biomass to heat and power, there are opportunities for further application in many regions of the state. Agricultural and forest resources provide a strong base for biomass. Moreover, forest-product producers are among the largest producers of energy from solid fuel combustible biomass.



Prairie grasses can also be used as a renewable energy source, and both the Minnesota Department of Natural Resources (DNR) and The Nature Conservancy are working to develop the applications of Minnesota's prairie lands. If prairie grasses become a viable option as an energy crop, Minnesota's prairie grassland will need to increase production to support demand.

The DNR manages 5.5 million acres

– about 10 percent – of Minnesota's land with three major focuses:

- Management and conservation of natural resources
- Regulation of outdoor recreation
- Development of commercial uses for natural resources

The third point focuses on utilizing natural resources to create a sustainable quality of life – in this case, enhancing the state's overall production of bioenergy. Bioenergy, the use of biomass materials as an energy source, can provide renewable energy to Minnesota while reducing costs for the DNR.

For example, the DNR is working closely with the University of Minnesota – Morris in the area of land management. Post harvest, prairie grass is brought to the university's campus for renewable energy production.

With the objective to find the most strategic way to move forward with Minnesota's natural resources, the DNR must find a balance between conservation and energy efforts.

Mark Lindquist, Biofuels Program Manager at the DNR, believes that the renewable energy industry is shifting toward new and innovative uses of biomass within the ethanol industry. "More facilities are positioned to incorporate biomass," claims Lindquist.

To further help Minnesota move forward, the DNR is also trying to educate people on the reality of biomass.

Another organization working with

Minnesota's grasslands is The Nature Conservancy. With over 50 years of experience with Minnesota's fresh water, forests and grasslands, the Nature Conservancy is no stranger to the state's ecosystems.



They understand the need for renewable energy, and this past year they hired Neal Feeken – their first-ever renewable energy coordinator – to help develop on-the-ground projects that demonstrate the potential of bioenergy to benefit natural grasslands and local economies, as well as for reducing greenhouse gas emissions.

The Nature Conservancy encourages the use of diverse grasslands for energy because it produces higher quantities of biomass and is a cheaper route because fertilizer isn't needed. Feeken believes that Minnesota is a leader in this area due to the quantity of biomass located throughout the state.

Not only does Minnesota as a whole benefit from bioenergy, but farmers can increase their profits by working on diverse lands and thereby transforming the use of less productive areas.

Embracing Minnesota's position in biomass management can further develop the biomass industry and help the state most effectively turn to biomass as a viable energy source.

The 2009 International Bioenergy Days

The renewable energy conference that took place in Mankato, Minnesota last fall will be held this year in Lidköping and Trollhättan, Sweden on Sept. 28-30, 2009. This is the place where managers, entrepreneurs and decision-makers from Sweden, the rest of Europe and the USA meet to pursue their common interest in bioenergy technology and business opportunities. Sign up today at www.bioenergydays.com.



BBAM works to improve the future of Minnesota by stimulating growth in the bioscience industries. If you value Minnesota's quality of life and/or work within its bioscience industries, please contact Jeremy Lenz to discuss the ways you can support BBAM's mission.

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Petro-based chemicals are out, green chemistry is in

Renewable Materials: Establish an industry to engineer and produce products from bio-renewable materials - Renewable materials are simply defined as materials that are made from biological sources, which include biochemicals, biofibers, biopolymers and biodegradable plastics.

In most cases, a renewable materials company develops new chemicals from biobased materials that have unique, and hopefully enhanced, properties when compared to traditional petrochemicals in similar applications. This is the general strategy of Segetis, a renewable materials company operating in Golden Valley, Minnesota.



Above: Segetis. The company's approach enables use of non-food agricultural and forestry feedstocks for production of sustainable materials.

The products Segetis is developing will have clear value propositions to consumers on health, environmental impact and performance that cannot be derived from petro-based chemicals.

Jim Stoppert, CEO of Segetis, has started four companies in Minnesota. He hopes to see Segetis become a major green chemical company over the next 5 years.

"We have a world class team at Segetis and what we're doing is very exciting," said Stoppert. "The chemicals we're creating are safer than your standard chemistry products and they're still functional and cost effective."

Alternatively, drop in replacements for existing petrochemicals can be produced using renewable resources as a feedstock. Draths Corporation, a former Minnesota renewable materials company now located in Michigan, pursues this strategy, and as oil prices rise, more companies are likely to follow suit. The advantage to this is in the familiarity and infrastructure already present throughout the supply chain.

Northern Technologies International Corporation, located in Circle Pines, develops, markets, and sells material science-based products and technical services that

Natur-Tec®
Sustainable Biobased Materials
www.natur-tec.com



Above: Natur-Tec products provide sustainable alternatives to conventional plastics.

are environmentally-friendly. One of the company's business units, Natur-Tec, focuses on engineering and manufacturing biobased and compostable plastics targeted at replacing traditional, petroleum-based plastics. Natur-Tec's portfolio for bioplastics includes flexible film, foam, rigid injection molded materials and engineered plastics. Biopolymer resins are produced using the company's proprietary ReX Process, enabling the production of 100% certified biodegradable and compostable finished products.

Becoming a world leader in renewable materials is likely to take significant work, but market dynamics and Minnesota's current position are favorable to the development of this young industry.

"Growing Biobusiness in West Central Minnesota"

Renewable Materials: Establish an industry to engineer and produce products from bio-renewable materials - As more people take the initiative to "go green," the demand for green products has extended beyond energy. Renewable materials hold the potential for replacing a variety of everyday products with more environmentally sound alternatives.

The community of Fergus Falls, located in West Central Minnesota, is working to explore these possibilities in manufacturing. Two years ago, the city made biobusiness part of its strategic plan for the future that was recently made into a document titled, "Growing Biobusiness in West Central Minnesota."

The collaborative piece was drafted by

Harold Stanislawski of the Fergus Falls Economic Improvement Commission and his board, Guy Fischer of Becker County, and Stephen Larson of DEED.

The document aims at aligning the efforts of both public and private stakeholders and identifying priorities in moving forward with biobusiness. According to Stanislawski, "It is a broad-based strategy for the region, but it is rooted in private sector success because of that sector's integral role in driving the biosciences."

The community has responded favorably to the biobusiness plan. According to Stanislawski, a small group of leaders are currently exploring how they might utilize the region's excess manufacturing capacity to construct products with renewable ma-

terials. Packaging of food and consumer goods is one area in which they see opportunity.

Moving forward, Stanislawski said, "We need to determine which renewable products potential buyers would purchase and what premium they would pay above the cost of carbon-based products."

If they find significant demand for renewable products, Fergus Falls will provide technical assistance to aid the manufacturers in meeting the necessary product specifications.

"We appreciate BBAM's help in guiding the plan and giving it more direction," said Stanislawski. He hopes West Central Minnesota will soon have an economic core rooted in biobusiness.