Prairie Skies Bioenergy Project -- Summary

Contact: Linda Meschke 507.238.5449 October 2011

The *Prairie Skies Bioenergy Project* is an integrated bio-refinery that will convert sustainably grown and managed feedstocks into advanced biofuels [D-4814 gasoline and D-975 diesel]. The first phase, a torrefaction facility, is planned to be completed by 7/1/2016. The second phase is a high pressure gasifier followed by the third phase a fuels refinery. Torrefaction provides a method to convert multiple types of biomass into a consistent higher quality "universal" feedstock.

The torrefaction facility associated with the Prairie Skies Bioenergy Project will be a 300 ton per day facility and will be able to convert multiple biomass feedstocks to a torrified material or solid, advanced biofuel. Planned feedstocks include native grass mixes, short rotation willow, poplar, alfalfa, corn stover, miscanthus and small grain straw [mainly wheat]. New plantings will be targeted to marginal lands or priority landscape positions. Seventy five percent of the feedstock supply is expected to be produced within a 25 mile radius of Madelia with the balance coming from outside that area. See map at the end of this document.

The facility is planned to be co-located next to an agricultural processing facility in Madelia, MN that can utilize the steam and electricity produced in later stages of the facility. The facility is proposed to have three days of feedstock supply onsite, three months supply on company storage and the balance stored on farm.

Torrified material can be sold to offsite markets. Examples of facilities that will be able to utilize this "universal" feedstock include any facility that utilizes coal currently, bio-products facilities, pellet plants and gasifiers. Having a stable, consistent feedstock supply allows facilities to operate very efficiently. When phase two of the Prairie Skies project is built, the torrified material will be used on site [high pressure gasifier] and excess sold to other markets.

When all three phases of the facility are complete the facility will produce 3,525,000 gallons per year of D-4814 gasoline, 775,000 gallons per year of D-975 diesel and 5,675 tons per year of anhydrous ammonia which could be sold to local farmers.

The initial torrefaction facility (300 ton/day) requires a capital investment of 22M\$ and will create 45 jobs and directly generate ~15M\$/yr in economic activity. The feedstock supply value chain is expected to generate an additional 75 jobs in the region. Addition of the power and heat generation facilities requires an additional 50M\$ in capital, creates an additional 50 jobs, and generates ~30M\$ in direct economic activity.

Engineers for the project are Syngas Technology, LLC, Elk River, Minnesota. Contact Duane Goetsch at <u>dgoetsch@syngastechnology.com</u>.

Prairie Skies Biomass Co-op, a local cooperative, decided in April 2011 to pursue being the facility owner. Over the next few months they will be further analyzing the project and

preparing to offer shares for sale to interested growers and supporters of the project. Persons interested in supplying feedstock or supporting the project should contact Linda Meschke at 507.238.5449 or <u>linda@ruraladvantage.org</u> to get on a list.

The following charts indicate the crop mix, tonnage and acres that are anticipated to be used at the torrefaction facility. Woody materials from river riparian areas and from tree removal activities, such as Emerald Ash Borer impacted trees, will also be utilized, as available.

Prairie Skies Feedstock Supply Strategy												
	% of supply	Tons	Acres									
Native Grasses	35%	38,325	19,162	at 2 T/A [12,775 at 3 T/A]								
Corn Stover	25%	27,375	13,688	at 2 T/A								
Alfalfa	10%	10,950	2,190	at 5 T/A/YR [2 cuttings]								
Miscanthus	10%	10,950	913	at 12 T/A								
Small Grain	10%	10,950	5,475	at 2 T/A								
Straw												
Woodies- Short	10%	10,950	2,736	912 A x 3 12 T/A								
Rotation Willow,				[Willow-harvested every 3 years;								
Cottonwood,				Poplar & Cottonwood @ 8 -10								
Poplar				years]								
Totals	100%	109,500	44,164									
		Tons	Acres									

The diversity of the crops [feedstock] utilized allows the co-op to spread out their harvest schedule, reduce storage capacity and maximize labor usage.

Madelia Bio-Refinery Feedstock Supply Harvest Schedule												
Feedstock		0	Ν	D	J	F	Μ	Α	Μ	J	J	Α
Native Grasses												
Short Rotation Willow												
Wheat Straw												
Alfalfa -Fiber												
Miscanthus												
Corn Stover												

The following schematic illustrates the full bio-refinery proposed over three phases.



Prairie Skies Bioenergy Facility Planned for Madelia, MN

October 2011

Prairie Skies Bioenergy Facility Fuelshed A 25 Mile Radius of Madelia, Minnesota [75% of the feedstock is expected to be from this area]

