Executive Summary:

Diamond K Feeds, LLP is a family farm located in southeast Minnesota in Winona County. The farm is primarily focused on dairy production and has been in the Kreidermacher family for over 100 years. Diamond K is a five generation farm-family operation owned by Alan Kreidermacher and his wife Patricia who are the current third generation. All five of their children, four sons and a daughter, are involved in some capacity. Jeremy and Daniel, are joint owners and operators with Alan and Pat. Andrew has a satellite trucking business hauling milk from the dairy to the processor and bringing feed commodities in. Peter, a computer technician, and Debra, a Certified Public Accountant, provide technical expertise as well as help with the summer field work. There are also eight fifth generation Kreidermachers who "help" around the farm as much as they are capable of. Having a sustainable business strategy is important to assure the vitality and continuation of the family business.

There is a role for everybody, regardless of age, on a sustainable family farm. The digester will help sustain the farm from one generation to the next.
The Kreidermacher family is excited to be working on a project to produce green electrical power. A methane digester that is being built on the dairy site will utilize manure from the dairy cows to produce methane which will power a 350 kW generator. Biomass residue from the digestion process is then reused as bedding for the dairy. The project provides an additional useful capacity to the manure generated on the farm then solely as fertilizer for the crops. Using methane gas as a source of power also removes a source of concern for the environment. Once the methane has been collected in the digester it will be piped to a generator that is expected to produce 354Kw per hour. The dairy will utilize approximately 35% of the electricity and the remainder will be sent to the grid for public consumption. The power delivered to the grid will be enough to provide power for approximately 472 average homes.

One of the most exciting things about this type of green power is the fact that the power is produced using a product that is available 365 days of the year, no crop acres are taken out of food production to produce the fuel source, and the digested manure that comes out of the digester is an even more valuable product than in its original state. Once the product leaves the digester vessel the solid particles are separated out and make a very good bedding product for the animals, eliminating the need to bring in truckloads of other products. The digestion process kills most pathogens that might be in the manure as well as most weed seeds so that they do not sprout and grow when put back on the crop land. The liquid portion is used as stabilized fertilizer on the crop land. Nutrients in the liquid are readily available for plant uptake unlike raw manure which needs to compost in the ground for 1 to 3 years before the nutrients are available to plants. Last, but certainly not least, much of the odor is eliminated making the fertilizer a much more public-friendly product. Decomposing biomass creates methane, and some other gases, that are unpleasant. Nearly half of raw cow manure is undigested biomass from the corn and hay that the cows eat. The anaerobic digester breaks down the undigested biomass within the manure and captures the methane thereby removing the associated odors.

Our digester project will greatly reduce the environmental footprint of our dairy and hopefully will help to further the use of livestock waste as a valuable green electric power source. This will improve the sustainability of the farm and allow the continuation of the family farm which has been a cornerstone of Minnesota’s agricultural tradition.

**Technical Progress:**

In 2005 Diamond K was fortunate to be chosen as a recipient of a grant from the Renewable Development Fund (RDF) through Xcel Energy, to build our methane digester. Milestone 1 of the project has been completed which includes the power purchase agreement with Xcel Energy for the purchase of the excess power not used by the dairy and the securing of all additional financing to complete the project. In addition to the RDF grant the project will be funded with a grant from the Minnesota Department of Commerce, a no-interest loan from the Minnesota Department of Agriculture, and a conventional loan from AgStar Financial.
The development of biomass electricity is very valuable in the search for alternative electric energy sources. A generator powered by fuel from a biomass source is capable of producing electricity at any time versus solar or wind which are intermittent. This means both the power company and the public can rely on the electricity being there when needed. The advantage of using a digester to provide the power source for the electrical generation is that manure from cattle is a readily available source that is produced continuously by the animal so that there is a steady supply of fuel. The component in the manure (methane gas) that is captured by the digester to power the generator is an environmental concern. The use of this methane gas to produce electricity takes it from a concern to a value for the public. The value of livestock manure versus other biomass sources is two-fold. First, there is no additional fuel consumption used to produce the manure. Second, there are no crop acres that are taken out of food production. With the growing population worldwide we can’t afford to use any of our productive crop land for any use other than to grow food. The manure that has finished its cycle through the digester is available as a stabilized organic fertilizer for use in crop production reducing the need for commercial fertilizers.

**Additional Milestones:**

Diamond K Feeds has also completed project design and permit requirements required in milestone 2. The digester was designed by RCM International of Berkley, California, a firm with 20+ years of methane digester experience. A conditional use permit to build the digester has been obtained from Winona County.

The generator has been ordered and is ready to be delivered for milestone 3. Delivery is expected in August. The construction manager has been retained from Resource Engineering and all major project construction contracts have been completed. The digester vessel floor has been poured and the walls will be done within the first part of June.

**Project Status:**

Overall project construction is approximately 50% complete and is on schedule for start-up late in the summer of 2013. The rainy spring has delayed the start of work this year by about 3 to 4 weeks.

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