



N4893 Highway C  
Kewaunee, WI 54216  
920.388.3333  
[kims@pagelsponderosa.com](mailto:kims@pagelsponderosa.com)  
<http://pagelsponderosa.com/>



P.O. Box 69  
Chilton, WI 53014  
920.849.9797  
[info@DVOinc.net](mailto:info@DVOinc.net)  
<http://www.dvoinc.net/>

**Prepared by:**



222 S Hamilton St. Madison, WI 53703  
<http://www.renewwisconsin.org/>

## *Wisconsin's Largest Family-Owned Dairy Converts Manure into Useful Energy for the Farm and Surrounding Communities*

Pagel's Ponderosa Dairy is located in Kewaunee, Wisconsin, 30 miles east of Green Bay. Now the largest family-owned dairy operation in the state, the Pagel farm dates back to 1946, when Carl and Garnet Pagel established a farm with only eight cows. When John Pagel took over the farm in 1980, the herd had grown to 65 cows, and under John's management, the dairy operation has grown dramatically. Now known as Pagel's Ponderosa, the dairy milks nearly 4,600 cows and possesses 4,000 heifers and 400 calves as of 2012.

The family's mission to provide a safe, wholesome dairy product encompasses more than just milk production. The Pagels also strive to maintain a healthy environment for its cows as well as the surrounding community. For instance, Pagel's employs a rotational method of planting for their 7,500 acres of arable land, helping to maintain soil quality and decrease the amount of erosion. Moreover, the 3,000 tons of corn silage that are harvested daily in autumn are stored in on-site feed bunkers. This practice cuts down on transportation costs and reducing the amount of CO<sub>2</sub> released into the atmosphere.

In keeping with its commitment to environmental stewardship, Pagel's decided in 2008 to incorporate anaerobic digestion into its manure management approach. "It is important that we are not contributing pollutants to our rivers, streams, lakes or our groundwater," said Pagel. The farm hired DVO Inc. (previously GHD Inc.), an anaerobic digester designer and installer based in Chilton, to build the system. Before the digester was built, dairy manure had been treated in open lagoons that allowed methane—a potent greenhouse gas—to escape into the atmosphere. Now that methane is captured before it enters the atmosphere, and refined into a generator fuel.



### Digester Specifications

- Model: Mixed plug flow digester
- Generation Capacity: 1.6 MW
- Average output: 9,750,000 kWh/yr
- Utility: Wisconsin Public Service
- Year of installation: 2008
- Designer & Installer: DVO Inc.
- Incentives:
 

REAP	\$99,950
Focus on Energy	\$500,000
1603 Treasury	\$999,588
<b>Total</b>	<b>\$1,599,538</b>



### Further Information:

#### Ag Annex Online

“Pagel power: Wisconsin dairy using combined plug flow and mixed digester to produce electricity and bedding”

Margaret Land - April 2011

<http://www.agannex.com/anaerobic-digestion/pagel-power>

#### TerraPass

“Pagel's Ponderosa Dairy Biogas Utilization Project”

January 1, 2009

<http://www.terrapass.com/carbon-offset-projects/full-project-listing/pagels-ponderosa-dairy-biogas/>

The manure is now stored in two reception pits, where it comingles to create a consistent feedstock. The feedstock then moves into the digester (204 ft. by 144 ft. by 16 ft.), where the methane-rich biogas is produced after about 28 days. Melissa Van Ornum, marketing manager at DVO, described the development of the Pagel’s digester: “Where we’re unique is we’ve combined the two traditional types [of anaerobic digesters] into one. We have the plug flow shape, but at the same time, we also take some of the biogas off the top and inject it in the bottom. That causes a lifting and a mixing motion.” With this design, the DVO digester allows for a much greater range of suspended solids content than would be possible with a traditional plug flow. Once the biogas leaves the digester, it is cleaned up and prepared for generation.

DVO initially installed an 800 kW generator in 2008, but replaced it with a 1.6 MW unit in 2011 to accommodate larger herd sizes as well as the potential for continued growth of the farm. Over its two-year operating life, the smaller generator produced over 12 million kWh of energy. “At 800 kilowatts, we were making about 25 percent more electricity than what we’re using on the farm itself,” Pagel said. In comparison, the new 1.6 MW generator produces nearly 10 million kWh each year, almost twice the output of the older unit. That quantity of electricity is sufficient to supply not only the dairy’s own consumption but also the nearby communities of Kewaunee and Casco. With the increase in system output, the digester became not only a sound environmental practice, but also a very economical one.

Besides the valuable biogas, the digester also yields a solid material that can be used either as odor-neutral bedding for cows or an environmentally friendly fertilizer that regenerates soil. In fact, Pagel’s packages a portion of that material as a weed-free soil amendment for gardening. The digester has also become a nice addition to the Pagel’s educational tours that attract the attention of local school districts, statewide dairy farmers, and the general public. By introducing visitors to the digester and other environmentally conscious practices, Pagel’s Ponderosa hopes to encourage others to implement similar projects across Wisconsin.

