DANE COUNTY COMMUNITY DIGESTER – WAUNAKEE, WI

A SHARED SYSTEM DESIGNED TO REMOVE PHOSPHOROUS

BACKGROUND/OVERVIEW

The Dane County (Wisconsin) Community Digester was built in partnership with the county, the state and three adjoining family dairy farms. A fourth farm may be added in the future.

The Dane County Community Digester project grew out of a study committee looking at ways to improve water quality in the four major lakes in Dane County. The committee suggested eliminating phosphorous run-off from surrounding farm fields; the mechanism was a manure digester using advanced technology to substantially remove phosphorous. Construction of the digester began in August 2010 and the facility began operating in early 2011.

THE ANAEROBIC DIGESTION SYSTEM

Approximately 80,000 gallons of manure per day are piped in from the three adjacent dairy farms. Some food wastes, restaurant waste grease and glycerin are trucked in to the site.

The Dane County Community Digester is unique in that it is the first centralized or "community" digester in Wisconsin accepting manure from multiple farms. In addition, it is the first digester in Wisconsin built primarily for water quality reasons to remove phosphorous from the watershed. Digestate is routed through a high-performance centrifuge to provide advanced phosphorus removal. This process isolates approximately 60 percent of the phosphorous in the solid digestate. Solids are used for bedding on farms outside the watershed and liquids are piped back to the farms for land application. The electricity generated is sold under an advanced renewable tariff to Alliant Energy, a utility operating in Wisconsin. Captured heat from one genset is used exclusively to dry separated solids, killing much of the bacteria and making a better bedding product.

Photo: Clear Horizons

The Dane County Community Digester has resulted in an estimated 90 metric tons of phosphorus removal from the watershed since 2012. In addition, odors from the three farms are greatly reduced, improving the quality of life on the farms and in their communities.

- **Digester Type:** Complete mix
- **Co-Digestion:** Food wastes, restaurant waste grease and glycerin
- **System Owner/Operator:** Clear Horizons, LLC
- **Biogas Generation:** 432,000 ft^3/day
- **Generating Capacity:** 2,200 kW.
- **Biogas Use:** Electricity is sold under an advanced renewable tariff to Alliant Energy.
- **Funding:** $13 million total project cost - $4 million tax credit and $3.3 million state water quality grant

CHALLENGES

The system has been successful limiting the amount of phosphorous entering Dane County's lakes and streams. Along the way, there have been a series of setbacks that provide insights for future projects.

First, the digester had manure leaks resulting from a combination of factors, including an unusually cold winter that caused above-ground joints to break. The fittings have all been replaced to avoid this problem in the future.

Another related problem was inadvertent recirculation of liquid digestate, causing pipeline and vessel clogging. Additionally, because the influent volume and characteristics were different from the digester design criteria, the measurements of phosphorus removal were initially below expectations. Once this recirculation problem was addressed, the digester operated within its design parameters.

Last, the digesters were unable to operate at full capacity due to sand that built up in the vessels. Beginning in early 2015, operators shut down and cleaned the vessels. All three digesters should be working at full capacity by the end of July 2015.

Photo: Clear Horizons

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PROJECT BENEFITS

The Dane County Community Digester has resulted in an estimated 90 metric tons of phosphorus removal from the watershed since 2012. In addition, odors from the three farms are greatly reduced, improving the quality of life on the farms and in their communities. This facility overcame difficulties to successfully adopt innovative features—including pipeline delivery of manure from neighboring farms and centrifugal phosphorus removal—and provide an example for future projects.