DES MOINES METRO WRF

DES MOINES METRO WASTEWATER RECLAMATION AUTHORITY, DES MOINES, IA

SYSTEM DESIGN

The Des Moines Metro Wastewater Reclamation Authority operates the Wastewater Reclamation Facility (WRF). In 2015, the WRF treated an average of 60 million gallons per day (MGD). The facility has six anaerobic digesters, with a combined capacity of approximately 16 million gallons (MG).

Solids collected during primary – and secondary treatment are processed in the facility's anaerobic digesters. The WRF uses 85% of the resulting biogas to fuel boilers and power internal combustion engines, which produced 14,171 MWh/year of electricity in 2015. The engine waste heat is recovered to heat the digesters and several facility buildings. The remaining digester gas is sold to a nearby vegetable oil refinery.

To boost biogas production, the Des Moines WRF has been co-digesting with high strength wastes (HSW) since the 1990s. Approximately 50 haulers from all corners of state deliver Fats Oil and Grease (FOG) and other HSWs, such as biodiesel waste and food processing facility wastes, including wastes from dairies, slaughterhouses and rendering facilities.

The haulers empty the HSW into a 140,000 gallon receiving tank. Before being fed into the digesters, the high strength waste is mixed with facility sludges. The slurry is injected into a digester at a 55% food waste/45% wastewater solids loading ratio.

The facility receives, on average, 40 tankers per day. Over the course of the year, Des Moines accepts 11.2 million gallons of FOG and 41.6 million gallons of other high strength organic wastes. By co-digesting with FOG and other HSWs, biogas production has more than doubled.

- **Feedstock Processed:** sludge, FOG & HSW
- **Digester type:** Complete mix mesophilic
- **Capacity:** Six 2.7 MG digesters
- **Throughput:** 0.4 MG sludge, 0.03MG FOG & 0.11 MG HSW per day
- **Biogas generation:** ~1,500,000 cubic feet per day
- **Biogas use:** Combined Heat and Power
- **Generation:** ~14,000 MWh/year

"Anaerobic digestion has proved to be a symbiotic relationship between WRA ratepayers and Iowa industries."

-- Larry Hare
Treatment Manager, Des Moines Metro WRA

PROJECT BENEFITS

The Des Moines digesters provide the following benefits:

- Ensure the facility meets regulatory requirements
- Control odors
- Produce renewable energy
- Create a nutrient-rich fertilizer product used on farms throughout central Iowa.

Co-digestion has realized the following additional benefits:

- Reduced solids volume
- Increased digester efficiency
- Increased biogas production
- Increased hauler availability, helping to ensure that grease traps are pumped at a greater frequency, keeping FOG out of the sewer system and lessening the chance of a sanitary sewer overflow.