CITY OF FRESNO RECLAMATION FACILITY

FRESNO-CLOVIS REGIONAL WASTEWATER RECLAMATION FACILITY, FRESNO, CA

SYSTEM DESIGN

The City of Fresno is located in California's Central Valley. The Fresno/Clovis Regional Wastewater Reclamation Facility (RWRF) serves 510,000 people in Fresno and the surrounding area. The RWRF is the fourth largest municipal wastewater facility in Northern CA, with a treatment capacity of 88 Million Gallons per Day (mgd), equivalent to a volume of water that could cover a football field to a height of more than 19 stories. The RWRF is a conventional activated sludge treatment facility. A full facility description is available on Fresno's website.

The RWRF operates a total of 13 complete mix mesophilic digesters of various capacities: (2) 926k gallon, (3) 860k gallon, (3) 1.14 million gallon and (5) 1.87 million gallon digesters. In 2015, the digesters produced 507 million standard cubic feet of raw biogas. The digester gas can be used in three different ways. The first choice is to combust the biogas in a combined cycle electrical power generating facility, which consists of (2) 3.3 MW gas turbines and a 2.0 MW steam turbine. In 2015, the facility produced 21,261 MWh of electricity using a blend of digester gas and purchased natural gas. The second choice is burn it in a 400 HP 150 psi hot water boiler used to heat the digesters. The third option is to flare it.

Fresno is located in a prime location to co-digest with a variety of agricultural and food processing wastes. The facility accepts Fats, Oil, and Grease (FOG) and other High Strength Wastes (HSW) from local food processors, such as turkey blood and syrupy-type wastes. Fresno is constantly trying out new waste sources; most recently, operators experimented with post-consumer food waste and glycerin from a biodiesel operation.

Tanker trucks deliver HSW to three 16,000-gallon receiving tanks. Each tank has a dedicated feed piping system equipped with rock traps, chopper pumps, and an automated truck unloading system. After receipt into the tanks, an equal amount of primary sludge is added.

The mixture is then fed into one of the 5 largest digesters. After the initial biogas boost, gas production and efficiency increases for ~24 hours depending on the quantity and strength of the load received. The increased gas production offsets natural gas purchases.

- **Feedstock processed:** wastewater, FOG & HSW
- **Digester type:** complete mix mesophilic
- **Capacity:** 13 digesters of various capacities
- **Through put:** 900k gallons sludge/day & 7.7 MG HSW in 2015
- **Biogas generation:** ~1.4 million cubic feet per day
- **Biogas uses:** co-generation & boiler heat
- **Generation in 2015:** 21,261 MWh/year*
  *includes natural gas

> ""Feeding a digester FOG is like giving a child candy-- It almost instantly puts the digester into overdrive!"
>
> -- Kevin Norgaard, Supervising Professional Engineer

PROJECT BENEFITS

The Fresno-Clovis 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 California's central valley, one of the richest agricultural areas of the world.

Co-digestion has realized the following additional benefits:

- Better solids dewatering
- Reduced solids volume
- Increased digester efficiency
- Increased biogas production
- Diverted organic waste from landfills, reducing landfill-methane emissions and minimizing truck-hauling emissions.
- 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.