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MICHIGAN STATE UNIVERSITY – EAST LANSING, MI

LARGEST ANAEROBIC DIGESTION SYSTEM ON A U.S. COLLEGE CAMPUS TO SUPPLY POWER TO SOUTH CAMPUS BUILDINGS

SYSTEM DESIGN

As part of Michigan State University (MSU)'s vision for campus sustainability and its campus energy transition plan, MSU and its partners constructed the South Campus Anaerobic Digester (SCAD). The single-tank complete mixed anaerobic digester will utilize approximately 17,000 tons of organic waste per year as feedstock to produce biogas. Complete mix technology was selected to provide maximum process control given the rich feedstock blend. The feedstock will include dairy manure from the MSU Dairy Teaching and Research Center; fruit and vegetable waste from a local food processor; fats, oil and grease from local restaurants; and food waste from campus dining halls and sports/entertainment venues.

The feedstock will be pumped into a central mix tank where the dairy manure and the other materials will be homogenized. The blended material is then pumped through a heat exchanger before going into the digester, which is an aboveground steel tank that can hold more than 450,000 gallons of liquid. The tank is kept air-tight with a flexible membrane, which seals in the biogas.

PROJECT BENEFITS

Michigan State University's digester project includes the following benefits:

- Renewable energy production
- Emissions reduction
- Odor control
- Landfill and wastewater diversion
- Enhanced fertilizer

Electricity generated from the biogas will be used to power 8 to 10 south campus buildings. The remaining digestate, a mix of solids and liquids will be pumped into a solid-liquid separator. Separated solids will be composted and the digestate will be land applied seasonally as carbon-rich fertilizer.



"This is one of the largest digesters on a college campus in the country. It'll generate 400 kilowatts of electricity every hour, which is enough electricity to power roughly 250 houses. To give a campus perspective, the digester could completely power Holmes Hall."

—Dana Kirk, Ph.D., P.E.
Michigan State University

- **Population Feeding Digester:** 180 milking head & 180 heifers
- **Baseline System:** Storage Tank
- **Digester Type:** Complete Mix
- **Co-Digestion:** Fruit and vegetable waste; fat, oils and grease; and campus food waste
- **System Designer:** MSU, Anaergia Inc. and 2G CENERGY®
- **Biogas Generation:** 170,000 ft³/day
- **Biogas Use:** Cogeneration
- **Generating Capacity:** 2.8 million kWh per year
- **Project Funding:** MSU Foundation