

MASON-DIXON FARMS – GETTYSBURG, PA

SYSTEM DESIGN

When Richard Waybright leads tours of Mason Dixon Farms, visitors frequently hear the farm's motto: "Change is inevitable, success is optional." For decades, visitors have clearly seen that Mason Dixon has embraced change and followed a path of innovation to success. For example, Mason Dixon Farms responded to the energy crisis of the late 1970s by exploring 'cow power' to make the farm energy self-sufficient.

In 1979, Mason Dixon Farms began operating the first plug flow digester at a commercial farm. For over 25 years, the farm has produced enough electricity to meet its own demands, with excess sold to the grid. Today, a total of three digesters produce biogas that fuels up to five engine-generator sets that reliably produce electricity in excess of 95 percent of the time.

Automatic scrapers push manure and bedding into collection pits. From there, manure is pumped into the three digesters. Heat recovered from the engines heats water that is circulated through the digester to increase biogas production, which is estimated to be 120,000 ft³/day. Excess heat is also used for home heat on the farm.

PROJECT BENEFITS

Mason Dixon Farm's digester project includes the following benefits:

- Increased revenue from the sale of electricity
- Composted manure is used as bedding material, saving bedding expense
- Sale of digester solids as soil amendment generates revenue
- Application of nutrient-rich slurry to over 3,000 acres of silage greatly decreases the need for commercial fertilizers and lime, and increases the crop yield on the irrigated land in dry periods



Photo: Penn State University Cooperative Extension



Photo: Pennsylvania Dept. of Agriculture

"Our farm has been 'cow powered' since 1979. Our cows not only provide the public with a healthy and wholesome product, they provide our farm with our electricity needs."

*—Richard Waybright
President, Mason Dixon Farms
(Quoted at Dairy Farming Today.org)*

- **Population Feeding Digester:** 2,400
- **Baseline System:** Storage Lagoon
- **Digester Type:** Horizontal Plug Flow
- **System Designer:** Dick and Bert Waybright
- **Biogas Use:** Cogeneration
- **Generating Capacity:** 600 kW