



CHP
TECHNICAL ASSISTANCE
PARTNERSHIPS

POET Biorefining's Ethanol Plant Ladsonia, Missouri 15 MW CHP System

Project Overview

The Missouri Joint Municipal Electric Utility Commission (MJMEUC), in partnership with POET Biorefining (POET) in Ladsonia, MO maintains a 15 Megawatt Combined Heat and Power (CHP) system. In normal operation, the power from the CHP system feeds directly into the power grid that serves the local area, and steam and electricity is supplied to the POET facility, which annually produces 65 million gallons of ethanol.

The CHP system utilizes one 15 MW natural gas-fired turbine and one heat recovery steam generator (HRSG) that captures the exhaust heat from the gas turbine to produce approximately 61,000 lbs/hr steam that can satisfy nearly two-thirds of the steam requirement of POET for its ethanol production. The ethanol plant also has two natural gas-fired boilers of 120,000 lbs/hr of steam capacity that supplement the steam provided by the CHP system during normal operation and can meet the full plant need for steam when the CHP system is down for any reason, including routine maintenance. The power from the CHP system provides electricity to the local area as well as to the ethanol plant.

Quick Facts

LOCATION: Ladsonia, Missouri

MARKET SECTOR: Ethanol Production

ETHANOL ANNUAL CAPACITY: 65 million gallons

PROCESS STEAM NEED: 105,000 lb/hr at 125 psig

PRIME MOVER: Natural Gas-Fired Turbine

CHP GENERATION CAPACITY: 15 MW

HEAT RECOVERY EQUIPMENT: Heat Recovery Steam Generator (HRSG)

PRIMARY FUEL: Natural gas

CHP MAXIMUM STEAM OUTPUT: 61,000 lb/hr at 125 psig

IMPLEMENTATION COST SPLITS:

MJMEUC: All CHP Equipment

POET: Building, water/steam system controls

ANNUAL COST SPLIT:

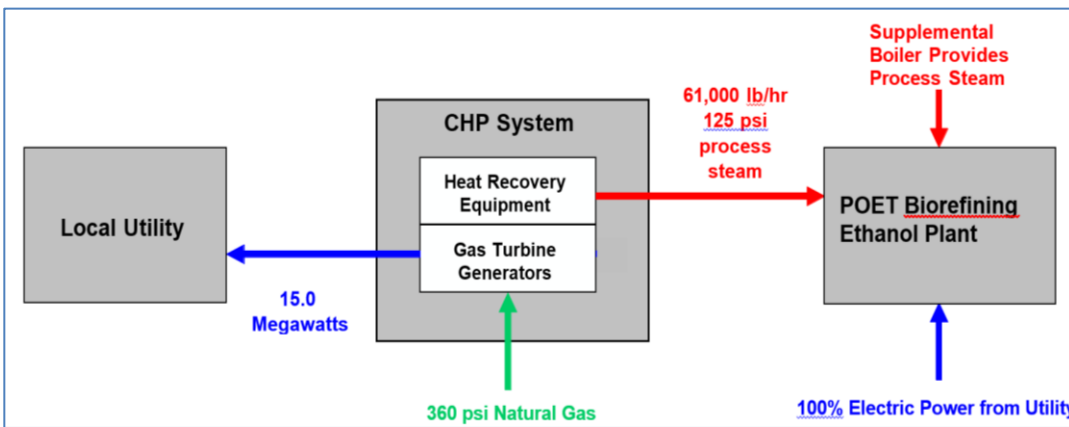
MJMEUC: 54% of fuel cost and 100% of O&M Cost

POET: 46% of fuel cost and 100% of water treatment

ETHANOL PLANT ENERGY SAVINGS: 20%

ENVIRONMENTAL BENEFITS: Ethanol produced meets EPA "Efficient Producer" Target of >20% GHG reduction compared to gasoline

BEGAN OPERATION: 2006



CHP System Flow Diagram

In 2005, MJMEUC approached POET with the idea to investigate CHP as a joint partnership. After reviewing several CHP options, they decided on a 15 Megawatt CHP system that would be built on-site at the POET facility but purchased, operated and maintained by MJMEUC. The only initial cost to POET would be for the boiler, the building expansion to house the boiler portion of the CHP system, water and remote controls.



Aerial View of POET Biorefining

POET and MJMEUC entered into a unique agreement by which they split the cost of the natural gas consumption by the gas turbine. POET continues to pay 100% of the O&M costs for water treatment needed for steam generation. POET benefits by utilizing the entire waste heat from the gas turbine to produce up to 61,000 lb/hr of steam at 125 psig. This arrangement is a win-win situation for both entities. It is benefiting POET by reducing its annual natural gas costs by over 10% and by improving the carbon intensity of its ethanol. It benefits MJMEUC by decreasing the fuel costs for the generated capacity by 46% and receiving full credit for providing electricity to the local power pool.

"This has been a great CHP partnership that has provided cleaner base load electricity 24/7 and lower carbon liquid fuel for over a decade. Farmers have benefited from higher corn prices, and drivers and electric customers have benefited from lower energy costs while also reducing GHG emissions."
Steve Murphy, General Manager.

Benefits of the CHP System at the Ethanol Plant

- The ethanol plant saves over 10% of its fuel costs, while satisfying over 60% of its process steam load.
- MJMEUC saves 46% of the fuel cost for generating 15 MW of electric power vs. simple cycle.
- The system uses 26% less fuel than typical on-site thermal generation and purchased electricity.
- The system enables the ethanol plant to meet the EPA target of reducing GHG emissions by more than 20%.

Accolades

In 2009, the U.S. Environmental Protection Agency recognized the MJMEUC for reducing energy consumption and greenhouse gas emissions at a ceremony in the Region 7 office. An Energy Star Combined Heat and Power (CHP) Award was given for its combustion turbine-based system located at the POET Biorefining ethanol plant in Laddonia, Mo.

"EPA is proud to recognize the outstanding pollution reduction and energy efficiency innovations of this project by presenting this award. The heat recovery system is contributing to a cleaner and healthier environment."
William Rice, Acting Regional Administrator.

For More Information

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