

CORN PRODUCTS INTERNATIONAL 700 KW STEAM TURBINE

CHP FACTS

Location:

Winston Salem, NC

Generation Equipment:

- Steam Turbine
- 700kW 480V Synchronous Generator
- 1,000 ton Absorption Chiller

Estimated Installation Cost:

\$380,000

Annual Savings:

\$170,000

Simple Payback:

2-3 years

Fuel:

Wood



PROJECT OVERVIEW

Corn Products International had benefited from the 1986 installation of its original CHP wood fired boiler unit used to generate power and provide heat/steam for the process. The success of this CHP system paved the way for further energy conservation projects.

The initial 1986 CHP design utilized a pressure reducing valve (PRV) to supply low pressure (10 psig) steam to the process from the 150psig steam header. Energy dissipated in utilizing the PRV can be extracted by a steam turbine and converted into electricity. This is a known and proven application that can benefit from the installation of a back pressure steam turbine. This application does require approximately 10% more steam to operate both the turbine and the process. In 1993, a single stage Coppus steam turbine with a 480V synchronous generator was installed in parallel with the existing PRV. The paralleled installation of this new system assures a continued supply of low pressure steam during normal maintenance of the new back pressure turbine generator.



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REASONS FOR CHP

The extraction of starch from corn and the production of finished products is highly energy intensive process. Corn Products continues to investigate new ideas to help reduce its energy cost/usage to stay competitive in the market place. A back pressure turbine generator set offered a clear economic benefit by generating electricity from steam energy that would otherwise be wasted through the 150 psig to 10 psig PRV.

CHP EQUIPMENT

The electrical system at Corn Products International starts with the delivery of 12,400V of electricity from the local utility company and which is distributed throughout the plant via numerous 2400V and 480V substations. The new Turbine Generator installed consisted of the following:

- One Coppus Steam Turbine 700hp 3600rpm
- One Synchronous Generator output 700kW 480V 3phase
- Electrical Panel
- System Metering and Relays

CHP OPTION

The new CHP system has been in continuous service since 1993 with only minor maintenance downtime to perform normal PM's and minor repairs. During these infrequent outages the original PRV is utilized to maintain low pressure steam to the process. The reliability and performance of the system has exceeded original expectations with minimal operation/maintenance issue and no process interruption. Based on these results, Corn Products plans to continue operating it in the future.

PROJECT INSTALLATION

The new CHP projected and actual budget was \$380k. The project success is attributed to thorough engineering resulting in minimal issues during installation, startup and normal operations of the new back pressure turbine generator.

ADDITIONAL FACTS

Installation was completed by local contractors under the direction of Plant Engineering and normal PM's are carried out by the Corn Products International staff. The new CHP system reduced the purchased electrical requirements for the facility as well as reduced the pollutants generated by the local coal fired utility that supplies the plant with electrical power.