



**MIDWEST  
CHP  
APPLICATION  
CENTER**  
In Partnership with  
the US DOE

# University of Michigan 45.2 MW CHP Application

## Project Profile

### Quick Facts

**Location:**  
Ann Arbor, Michigan

**Facility Type:**  
University Campus – Multiple Buildings

**Maximum Electric Demand:**  
In winter 35 megawatts, in summer 48 megawatts

**Generating Capacity:**  
45.2 megawatts (MW)

**Primary Fuel:**  
Natural Gas

**Operation Schedule:**  
24 hours a day, 7 days a week

**Local Electric Utility:**  
Detroit Edison

**Began Operation:**  
1914



University of Michigan Turbine Room

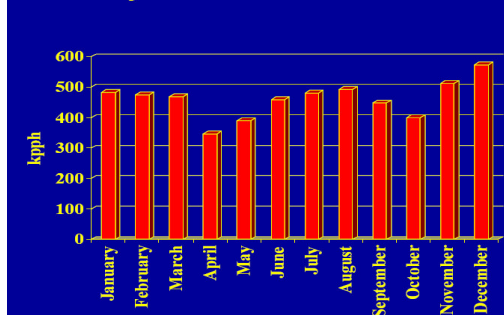
### Project Overview

Though the University of Michigan has been providing its own thermal capacity since 1887, the University did not cogenerate until after building the present plant in 1914. Currently, the University's Central Power Plant provides 45.2 MW of electricity via 3 Worthington generators. The CHP system provides steam and electricity to the Central Campus, steam only to the Medical Campus, electricity only to the South (Athletic) Campus, and nothing to the North Campus. The three generators capture steam from six conventional boilers and two Zurn HRSGs (connected to two Solar combustion turbines).

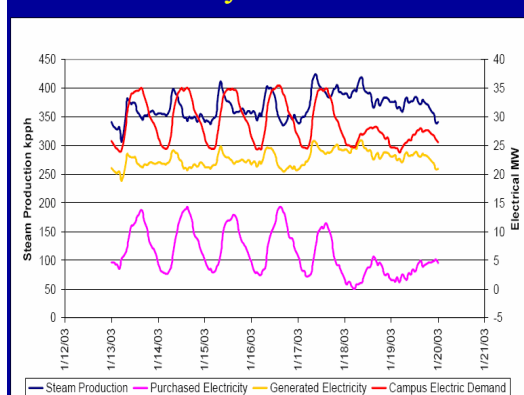
As the University's electrical production is steam dependant, maximum electrical generating capacity is rarely employed since it fluctuates based on the University's steam needs. The central plant provides about 75% of the peak central campus demand and about 66% of the total annual electric consumption, as well as 100% of its steam needs. Need for steam actually increases during the summer, as it is converted into cooling via absorption chillers. Supplemental electrical requirements are met through three 25 MW connections to Detroit Edison.

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### Monthly Steam Peak Demands



### Weekly Production



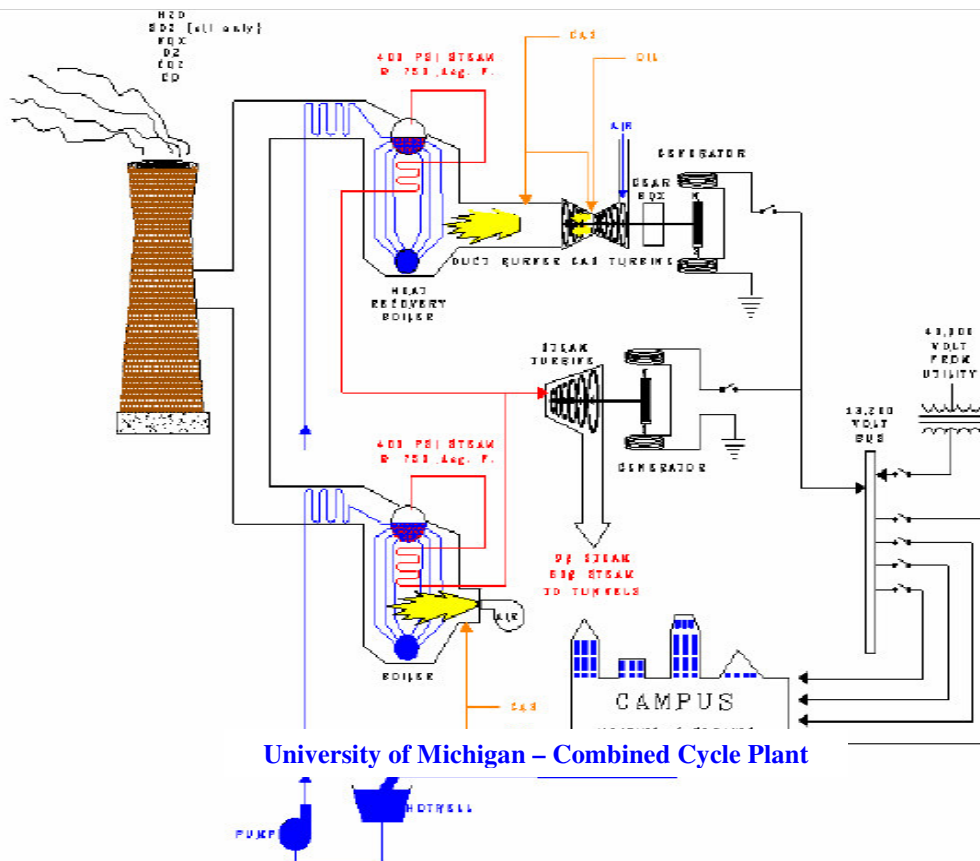
## Key Points

- University of Michigan engineering staff provides all maintenance with a few exceptions. The gas turbines have a maintenance contract for all but routine work, and major overhauls of steam turbines require contract millwrights. Repairs to boiler pressure parts are contracted to qualified firms.
- Mr. Weakley, U of M Utilities Results Engineer says that the University has been very pleased with its CHP system, which has “saved the University millions of dollars per year in electrical costs,” and “\$5.3 million in 2004” alone. In his opinion, one of the major keys to the success of the U of M system was the early construction of a central system that allows CHP and economies of scale which would not be practical if starting today.
- As the University produces all its own steam, it must continue to purchase natural gas to run the boilers despite the fuel’s current elevated price. As of September 2005, it is still economical to generate electricity from the steam during on peak hours, but off peak utility charges are beginning to become competitive.

**The plant provides 75% of campus peak electrical demand, and 66% of annual electric consumption**

**100% of steam needs are covered**

**“The system has saved the University millions of dollars per year in electrical costs.”**



University of Michigan – Combined Cycle Plant

## Power Plant Equipment

Housed in the Central Power Plant, the University’s CHP system comprises the following:

- 6 conventional gas/oil fired boilers from Combustion Engineering, Wickes, Murray and Foster Wheeler (1,000,000 lb/hr of steam capacity total)
- 3 Worthington back-pressure/extraction steam turbine generators rated at 12.5 MW each
- 2 gas/oil Solar combustion turbines (3.7 & 4 MW)
- 2 Zurn Heat Recovery Steam Generators (HRSGs) with supplemental gas firing (65,000 lb/hr each)

## For further information, contact:

Shepherd Advisors  
2488 Antietam Drive  
Ann Arbor, MI 48104  
Phone: (734) 665-5410  
[www.shepherdadvisors.com](http://www.shepherdadvisors.com)

Midwest CHP Application Center  
851 S. Morgan Street  
Chicago, IL 60607-7054  
Phone: (312) 413-3835  
Fax: (312) 996-5620  
[www.CHPCenterMW.org](http://www.CHPCenterMW.org)

