



SOUTHEAST  
**CHP**  
APPLICATION  
CENTER

**CLEAN HEAT & POWER**

# COLUMBIA ENERGY CENTER

455 MW COMBUSTION TURBINE PLANT

## CHP FACTS

**Location:**

Gaston, SC

**Generation Equipment:**

GE 7FA gas-fired combustion turbine

**Output:**

455 MW (baseload)

609 MW (peaking)

**Installation Date:**

2004

**Estimated Installation Cost:**

\$365 Million

**Fuel:**

Natural Gas



## PROJECT OVERVIEW

The Calpine Corporation operates a 455 MW combined cycle power plant with cogeneration in Gaston, SC. It went online in May 2004 providing power to the local utility and steam to the nearby chemical plant, Voridian Eastman Chemical.

The two General Electric gas-fired combustion turbines provide 171 MW each. The heat is then recovered and run into a steam turbine. The heat from the turbine is then exhausted and provides steam at 1 million lb/hr to the chemical plant. This supply of steam allowed Voridan Eastman to shutdown their coal fired boilers.

## PROJECT AWARD

In June 2008 the plant received the Energy Star CHP award for pollution reduction and energy efficiency. At 54% operating efficiency, this plant is almost 10% more efficient than other generators in the state.



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## EQUIPMENT

- Two GE 7FA Gas Turbines (171.7 MW each)
- Nooter/Eriksen Heat Recovery Steam Generator
- Toshiba Steam Turbine

## CHP OPERATION

The facility now employs 25 full time people to run the 455 MW plant.

- Turbine Heat Rate: 9,900 kJ/kWh
- Turbine Flow of 445 kg/s at 601°C

## LOW NOX COMBUSTOR

The GE 7FA Turbines installed in the energy center have combustors that produce very low NOx and CO emissions. The GE DLN 2.6 combustor outputs less than 9 ppm, reducing exhaust clean up systems.



## CONCLUSIONS

Calpine operates a number of large scale natural gas CHP power plants. They often locate their plants near paper plants, petroleum refineries or chemical companies. Their need for process heat makes it mutually beneficial for CHP power plants to be located in close proximity.

<http://www.calpine.com/power/plant.asp?plant=191>

[http://www.gepower.com/prod\\_serv/products/gas\\_turbines\\_cc/en/f\\_class/ms7001fa.htm](http://www.gepower.com/prod_serv/products/gas_turbines_cc/en/f_class/ms7001fa.htm)

<http://www.industcards.com/cc-usa-carolinas.htm>

<http://www.power-technology.com/projects/columbia-energy/>

[http://www.gepower.com/prod\\_serv/products/gas\\_turbines\\_cc/en/f\\_class/index.htm](http://www.gepower.com/prod_serv/products/gas_turbines_cc/en/f_class/index.htm)

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