



# Shands Hospital

## 4.3 MW CHP & District Heating/Cooling System

### Project Overview

Shands HealthCare Cancer Hospital is located on the University of Florida campus in Gainesville, FL. Shands selected Gainesville Regional Utilities (GRU) to design and build an on-site energy center for the hospital to ensure power quality and reliability.

The GRU South Energy Center is comprised of a CHP system that delivers district heating and cooling to the hospital as well as reliable power. The CHP system is housed in a structure designed to withstand Category 4 hurricane force winds.

The facility uses a combustion turbine for the prime mover, producing 4.3 MW of electricity while the heat recovery steam generator provides steam for the building and aids with the production of chilled water. The 4.3 MW natural gas CHP system provides 100% of the hospital's electric and thermal needs. This allows the site to operate at a total thermal efficiency of 75%.

### Reasons for Installing CHP

The GRU South Energy Center provides many benefits for the hospital, including:

- Enhanced quality of power assuring smooth, continuous operation of clinical devices
- Two electrical feeds from difference substations in the power grid provide 200% electrical redundancy
- Emergency Generators provide for black start of combustion turbine generator and as a third back-up for Life Safety Systems
- The Energy Center is 75% efficient at primary fuel conversion to useful energy, compared to typical grid efficiency of 30%
- Significant reductions in NO<sub>x</sub>, SO<sub>2</sub>, and CO<sub>2</sub> emissions
- Points from the CHP system helped the hospital achieve LEED Gold certification from the U.S. Green Building Council

### Quick Facts

**LOCATION:** University of Florida, Gainesville, Florida

**MARKET SECTOR:** Hospital/University

**FUEL:** Natural Gas

**MAX CAPACITY:** 4.3 MW

**IN OPERATION SINCE:** 2009

**USE OF THERMAL ENERGY:** Heating & cooling

**EQUIPMENT:** 4.3 MW Combustion Turbine, 14,500 lb/hr Heat Recovery Steam Generator, 3 Centrifugal Chillers, Combustion Turbine Inlet Cooling, 30,000 lb/hr Packaged Boiler

**JOINT PROJECT BY:** Shands Healthcare, Gainesville Regional Utilities, Burns & McDonnell

**ENVIRONMENTAL BENEFITS:** eliminates SO<sub>2</sub> emissions, reduces NO<sub>x</sub> by 95%, and reduces CO<sub>2</sub> by 58% (equivalent to removing 4,365 vehicles from the road each year)



## Equipment and Configuration

### CHP Components

- 4.3 MW Combustion Turbine (Solar Turbines Mercury 50)
- Turbine Exhaust Diverter Valve
- Heat Recovery Steam Generator (14,500 lbs/hr)
- Combustion Turbine Inlet Cooling Coils
- Thermal Device Exhaust Stack

### Chilled Water

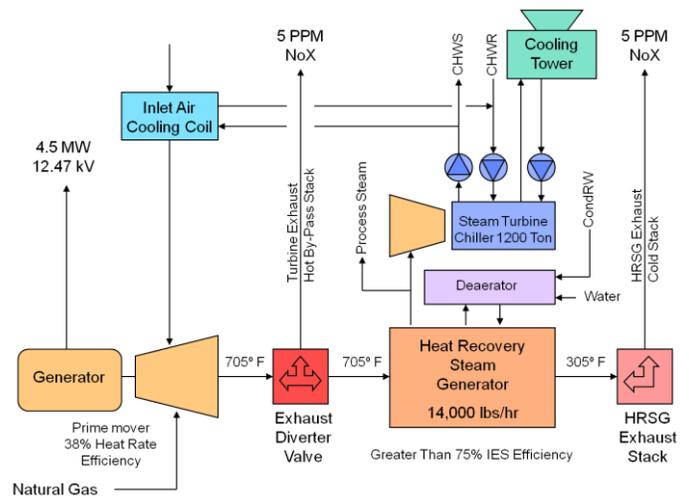
- Two Electrical Centrifugal Chillers (1,500 tons each)
- Chiller Water Variable Primary Pumps
- Steam Turbine Centrifugal Chiller (1,200 tons)

### Heating

- Standby Packaged Boiler (30,000 lbs/hr)

### Emergency Generation

- 500 kW Black Start Engine Generator
- 2,250 kW Emergency Engine Generator



*Shands Hospital CHP System: gas turbine, heat recovery system, chiller, backup generator*

## Collaborative Partnership



This CHP project was developed through a collaborative effort between Shands Healthcare, the University of Florida, Gainesville Regional Utilities, and engineering firm Burns & McDonnell.

GRU financed, owns and operates the South Energy Center as part of a 50 year agreement to provide electricity, steam, and chilled water to the hospital. The hospital accrued \$30M in capital savings from not building its own central plant. Burns & McDonnell provided architecture, engineering, procurement and construction management services for the \$45M project.

The South Energy Center is expandable to meet planned future growth of the hospital and will also serve chilled water to the larger South Campus area under development. In 2010, the Environmental Protection Agency recognized GRU with an Energy Star CHP Award for the South Energy Center's energy efficiency and outstanding pollution reduction.

## For More Information

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More Case Studies: <http://www.southeastchptap.org>  
[www.energy.gov/chp](http://www.energy.gov/chp)

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