



HINES ENERGY COMPLEX

Turbine Inlet Air Chilling with Thermal Energy Storage



Duke Energy's Hines Energy Complex boasts North America's largest turbine inlet air chilling (TIAC) system with thermal energy storage (TES).

Stellar Energy designed the custom solution for Duke Energy to boost plant capacity when hot and humid ambient conditions degrade turbine performance at peak demand, and to increase available power during peak demand through the use of thermal energy storage. By chilling the inlet air to a consistent 50°F, the TIAC system provides Duke Energy with reliable, best day performance every day, regardless of ambient conditions.

The system charges the TES tank with cold water during low-peak, low-cost hours, and discharges the chilled water to run the chiller plants during the high-peak, high-cost consumption period. When power is needed most, operators have the flexibility to turn off the chillers and run chilled water from the TES tank to eliminate parasitic load and increase available power.

The overall design provides enhanced accessibility for operators and maintenance staff with wide walkways and roll-up doors at the end of each chiller module. In addition, the system makes use of clean condensate water to reduce the environmental impact typically associated with cooling tower makeup water, including minimizing externally sourced water use and related chemical treatment.

Stellar Energy's custom solution provides more than **220 MW** of augmented power—in excess of the designed output—and solidifies the Hines plant as the leading power producer for Duke Energy in the state of Florida.

QUICK FACTS

Market:	Power Generation and Utilities
Design:	Modular
Scope:	Design and Fabrication
Owner:	Duke Energy
Location:	Bartow, Florida, USA
Project Schedule:	March 2015 – July 2017
Original Plant Capacity:	1912 MW Combined Cycle
Augmentation:	220 MW
Tonnage:	26,850 TR
Design Inlet Temp.:	50°F / 10°C
Gas Turbines:	2 – Westinghouse 501FC 2x1 4 – Siemens 501FD 2x1 2 – GE 7FA 2x1
Thermal Energy Storage:	17.5 million gallons



KEY BENEFITS

- Increased output by **220 MW**
- Increased **operational flexibility**
- Reduced **operating expenses**
- Increased **reliability**
- **Environmental considerations**