CASE STUDY

TREASURE COAST ENERGY CENTER

Treasure Coast Energy Center (TCEC) partnered with International Cooling Tower, Inc. (ICT) and Brentwood to enhance cooling tower performance and support increased energy output. By upgrading to Brentwood's ShockWave® fill and high-efficiency fans, the plant improved cooling capacity by 14%, reduced basin return water temperature by 2 °F, and gained 1.10 MW during summer operations. These enhancements translate to $1.45 million in annual net heat rate improvements.

OVERVIEW

Treasure Coast Energy Center is a 300-megawatt combined-cycle gas turbine power plant owned by Florida Municipal Power Agency (FMPA) and operated by Fort Pierce Utilities Authority (FPUA).

Commissioned in May 2008, the plant generates enough electricity to power approximately 60,000 homes. Its mission is to deliver reliable energy while optimizing operational efficiency.

PROBLEM

TCEC faced the challenge of adapting its operations to meet evolving efficiency and output demands. The plant sought to improve its cooling tower performance to support higher generation capacity, particularly during peak summer months when cooling demands are greatest. A key goal was to enhance the net heat rate, ensuring the plant could maximize its output while maintaining operational flexibility. To achieve these objectives, FMPA partnered with International Cooling Tower, Inc. (ICT) and Brentwood to develop a high-performance solution tailored to the plant's needs.

SOLUTION

FMPA and ICT collaborated with Brentwood to replace aging components with high-performance solutions. Brentwood's **ShockWave fill** was selected for its superior heat transfer capabilities, while new high-efficiency fans were installed to reduce energy consumption. The design and construction work, expertly managed by ICT, aimed to increase the plant's cooling capacity and operational flexibility.

By replacing components in four of the eight cells, the team achieved significant performance improvements. The data collection process adhered to **ASME PTC 23 standards**, ensuring accurate and reliable results.

Retrofit in progress: Three cooling tower cells at TCEC are upgraded with Brentwood's ShockWave film fill.

RESULTS

The initial upgrades to cells 2, 4, and 6, along with fan replacements in cells 2, 4, 6, and 8, delivered impressive performance gains:

- Cooling tower capacity increased by **~14%,** nearly equivalent to adding one additional cell.
- Basin return water temperature decreased by **2 °F.**
- Condenser backpressure was reduced by **~0.25 PSI,** leading to a **~1.10 MW** gain during summer operations.
- Average fan amperage decreased from **205 amps/fan to 178 amps/fan,** reducing energy consumption.

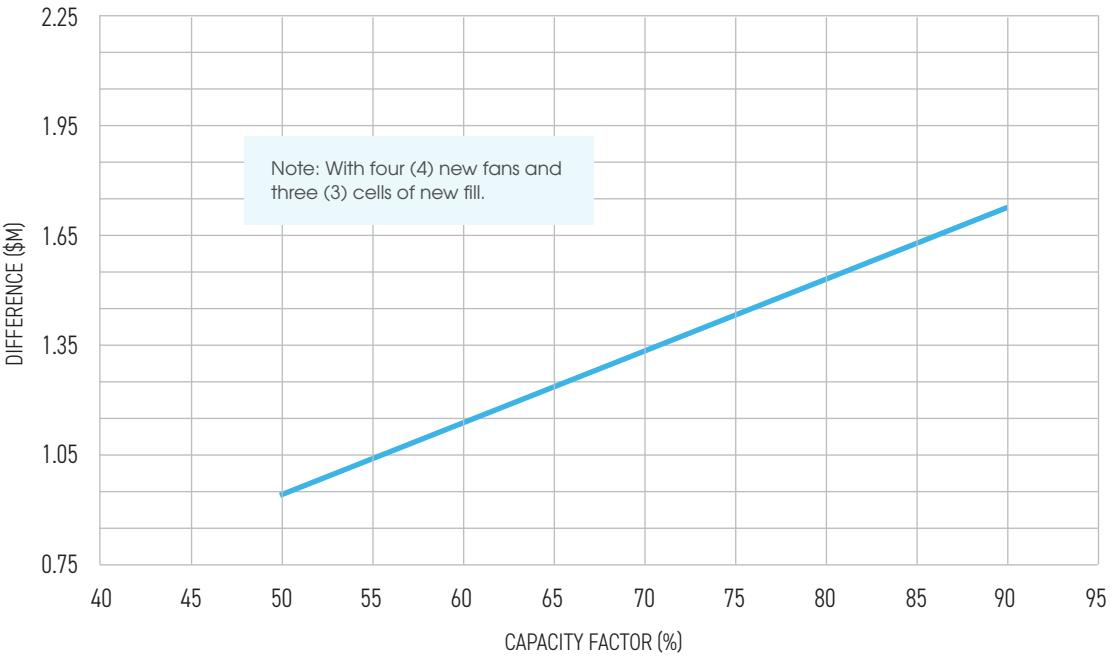
These results translate to an annual improvement of **$1.45 million** in net heat rate gains when operating at full load for 75% of the time.

Upon project completion, the project will be able to meet full load in the summertime with duct burners in service and three cells out of service, compared to the original design, which only permitted two.

"We chose Brentwood for their reputation in delivering high-performance products designed to enhance cooling tower efficiency. Their solution aligns with our goals of adapting operations to improve plant output and net heat rate, and we look forward to seeing its impact over time."

– Tim Jackson, Treasure Coast Energy Center Plant Manager

TCEC - Cooling Tower Project ROI Progress



Note that the chart is based on an electrical cost of 0.1137 $/kw.

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