

# Thermal Energy Corporation (TECO) Optimization Case Study



OptimumLOOP® delivers operational efficiencies and beats expected cost savings



Houston, TX

**District Energy**

Industry

**5+**

Years with Optimum

**\$509,000**

Annual Operations  
Cost Savings

**1.9 Yrs**

ROI

## Project Details & Scope

**Facility:** Thermal Energy Corporation (TECO), Houston, TX

**Customers:** 23.7M sq ft across 50 buildings, 17 institutions

**Industry:** District Energy (Largest in North America)

**Plants:** 2 interconnected plants

**Chillers:** 27 chillers

**Boilers:** 7 boilers

**Storage:** 8.8M gallon thermal energy storage tank

**Control:** Toshiba Distributed Control System

**Total Capacity:** 120,170 tons

**Ton Hours:** 341.1M ton-hours/yr

**2020 Peak Load:** 78,600 tons

**Solution:** OptimumLOOP® + Plant Diagnostics

**Installation:** 2020 (completed in under 8 months)

**Peak Demand Reduction:** 2.1 MW

**Energy Savings:** 14.6M kWh/year

**CO<sub>2</sub> Reduction:** 21.1M lbs/year

## Executive Summary

Thermal Energy Corporation operates the largest district cooling system in North America, providing reliable thermal services to the Texas Medical Center campus in Houston. Over four years, TECO's peak chilled water demand grew by 9,000 tons, with another 9,000-ton increase forecasted in the following three years.

TECO found that improving efficiency was the most cost-effective way to manage this growth while continuing to meet its mission of delivering economical, reliable thermal services. The company partnered with Optimum Energy to identify optimization opportunities within an already highly efficient chilled water system.

## Challenge: Further Optimize an Already Reliable System

TECO's two interconnected plants house 27 chillers and seven boilers that pipe chilled water and steam to 23.7 million square feet of highly controlled environments across 50 buildings and 17 institutions. With 120,000 tons of firm capacity and a 2020 peak load of 78,600 tons, power demand had grown enough to push the plant beyond the existing combined heat and power (CHP) system's capacity.

TECO has logged 100% reliability, with no unplanned outages, since 1992. With customers including a cancer center, a children's hospital, two Level I trauma centers, and major research facilities, the stakes for maintaining that record are extremely high.

TECO's goals for the project were to:

- Lower peak demand by 2 MW, keeping the entire plant within the existing CHP plant's load capacity
- Avoid spot purchasing of power from the utility
- Assure reliable grid power
- Provide kWh savings every day of the year with a simple payback under two years
- Avoid charges associated with coincident peak days

Maintaining 100% in-house power production through its CHP systems was a top priority. Reducing peak demand by 2 MW gave TECO the runway needed to develop a new master plan and determine the path forward for adding generation capacity.

“Part of my interest in this project was to reduce electrical consumption. That’s money that can be applied to other uses. This solution helps us be smart, be energy conscious, and run the right equipment at the right set points,” says Jason Berrio, TECO’s VP of Plant Operations.

## Solution: Optimization Plus Business Continuity Services

Optimum Energy calculated that the project would free up 2.1 MW of peak power, save 14.7 million kWh per year, and achieve a 1.9-year simple payback. A team of engineers from TECO, Optimum Energy, and Toshiba deployed OptimumLOOP® safely during the COVID-19 pandemic in under eight months, completing the work in time to realize efficiency gains before the summer peak season.

The solution focused on condenser-side optimization algorithms and a new optimized chiller-staging methodology. ERCOT records each user’s peak usage from June through September to set the following year’s demand charge, making it critical to reduce peak load before that window.

As part of the project, TECO also integrated Optimum Energy’s Plant Diagnostics tool into its daily work processes, enabling the team to identify otherwise invisible reliability and efficiency opportunities and better prioritize maintenance efforts.

*“The monthly analytics reports are very valuable. They give us insights into potential problems with our machines—starting with overall efficiencies and then diving deeper into details like approach temperature degradation on the chillers. Combined with Optimum’s experience from other sites, we get a different set of eyes to help drill down into what the machines are telling us.”*

— Mike Manoucheri,  
VP of Engineering & Maintenance,  
Thermal Energy Corporation

## Result: Savings, Reliability, and Deferred Capital Costs

Over the first seven months of operation (June to December 2020), the project saved nearly 10.5 million kWh, reducing energy consumption by 6%, at an estimated cost savings of \$356,000. TECO is on track to save more than \$500,000 in the first year and can delay multimillion-dollar capital expenditures for electrical generation capacity by several years. The system now runs with more consistent operating procedures across all shifts, a key contributor to long-term reliability.

“The collaboration between Optimum Energy and TECO has allowed us to accommodate load growth without adding capital equipment. This is always the first choice, and the efficiency gains provide savings every day of the year. This is a win-win for Optimum Energy, TECO, and TECO’s customers,” says Steve Swinson, CEO of TECO.

## Plant Details

### Plant Overview

**Plants:** 2 interconnected

**Chillers:** 27 chillers

**Boilers:** 7 boilers

**Storage:** 8.8M gallon thermal storage tank

**Control:** Toshiba Distributed Control System

### Capacity

**Firm Capacity:** 120,170 tons

**Annual Load:** 341.1M ton-hours/year

**2020 Peak Load:** 78,600 tons

### TECO Campus

**Space:** 23.7M sq ft conditioned

**Buildings:** 50 across 17 institutions

**Annual Energy:** ~350M kWh electricity

## Project Benefits

- 14.6M kWh/yr in annual electrical energy savings
- 21.1 million lbs CO<sub>2</sub> reduced annually
- \$509,000/yr in electricity cost savings
- Improved business continuity
- Enhanced maintenance prioritization
- Automated, consistent operations across all shifts
- Deferred multimillion-dollar capital expenditures