OPTIMUM ENERGY

DISTRICT ENERGY

CASE STUDY / CENTRAL PLANT OPTIMIZATION

Thermal Energy Corporation (TECO)

Optimizing the largest district cooling system in North America, accommodating demand growth without adding capital equipment.

LOCATION	FACILITY	ENGAGEMENT	SOLUTIONS
Houston, Texas	Texas Medical Center (Two Plants)	Continuous Optimization	OptimumLOOP® + Plant Diagnostics

ANNUAL SAVINGS

$509K

per year

Annual electricity cost savings

ENERGY SAVINGS

14.6M

kWh per year

Annual electrical energy savings

CO2 REDUCTION

21.1M

lbs per year

Annual CO2 emissions reduction

Overview

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. The company partnered with Optimum Energy to identify optimization opportunities within an already highly efficient chilled water system, and achieved a 1.9-year simple payback while deferring multimillion-dollar capital expenditures for electrical generation capacity.

The Challenge: Reduce Peak Demand by 2 MW Without Adding Capital Equipment

TECO's two interconnected plants house 27 chillers and seven boilers serving 23.7 million square feet across 50 buildings and 17 institutions. With a 2020 peak load of 78,600 tons approaching the existing CHP system's capacity, TECO needed to cut demand fast without risking its perfect reliability record, maintained since 1992 across customers including cancer centers, children's hospitals, and Level I trauma centers.

The Solution: Condenser-Side Optimization and Chiller Staging Deployed in Under Eight Months

Optimum Energy's analysis showed the project would free up 2.1 MW, save 14.7 million kWh per year, and pay back in 1.9 years. Over eight months during the COVID-19 pandemic, the team deployed condenser-side optimization algorithms and a new chiller-staging methodology, while integrating Plant Diagnostics into TECO's daily operations.

- 27 chillers across 2 interconnected plants dynamically staged via OptimumLOOP®
- Condenser-side optimization algorithms and new chiller-staging methodology
- Plant Diagnostics integrated into daily operations for proactive maintenance

Results

Over the first seven months, the project saved 10.5 million kWh and cut consumption by 6%, with annual savings on track to exceed $500,000. Peak demand dropped by 2.1 MW, deferring millions in capital costs while maintaining 100% reliability.

DETAILS

Thermal Energy Corporation (TECO)

Operator of the largest district cooling system in North America, serving the Texas Medical Center, 50 buildings, 17 institutions, 23.7 million sq ft of highly controlled environments. TECO has maintained 100% reliability since 1992.

PLANT DETAILS

- 2 interconnected plants, 27 chillers, 7 boilers
- 8.8M gallon thermal energy storage tank
- Toshiba Distributed Control System
- 120,170 tons firm capacity; 341.1M ton-hours/yr
- OptimumLOOP® with condenser-side optimization
- Plant Diagnostics for continuous reliability monitoring

PERFORMANCE RESULTS (ANNUAL)

Energy Savings	14.6M kWh/yr
Peak Demand Reduction	2.1 MW
CO2 Reduction	21.1M lbs/yr
Year 1 Energy Reduction	6%

FINANCIAL RESULTS

Annual Cost Savings	$509,000
ROI	1.9 years
Capital Expenditures Deferred	Several years

> *"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."*
>
> — Steve Swinson, CEO, Thermal Energy Corporation

Results reflect seven months of verified performance (June through December 2020) annualized, with Year 1 projections based on measured efficiency gains. Peak demand reduction of 2.1 MW verified against ERCOT coincident peak records.