



Central Plant Optimization

University Achieves Record-Breaking Plant Efficiency Using AI

Company Name: California State University - Dominguez Hills

Result: 48% Improved Plant Efficiency

January 2024 - December 2024

Overview

The facility management team at California State University Dominguez Hills (CSUDH) is driven by a core commitment to continually reduce campus energy usage through modern technology. To this end, they have partnered with facil.ai to improve their chiller performance.

Before facil.ai's involvement, the three chillers operating in the CSUDH central plant were achieving roughly 0.7 kW/ton energy efficiency. After a two-week ramp-up period for facil.ai, CSUDH started consistently seeing chiller energy efficiency of approximately 0.3 kW/ton, while improving zone temperature comfort in the spaces and equipment served by the chillers.

Nine months later, the chillers are performing better than imagined at record lows of 0.19 kW/ton (almost 20 Coefficient of performance). These results happened while Kenny Seeton, the Director of Central Plant Operations at CSUDH was on vacation, because facil.ai runs quietly in the background with little to no facility intervention required.

For reference, [ASHRAE 90.1](#) standards define "best performance" at 0.45 kW/ton --- beyond that was previously unheard of.

Key Results

Plant Efficiency

Improved plant efficiency by 48%

In 2022, the baseline efficiency was 0.86 kW/ton. The efficiency with facil.ai is now 0.45 kW/ton

Cost Savings

Saved \$243,639 USD annually

The university saved almost a quarter of a million dollars on electricity using facil.ai

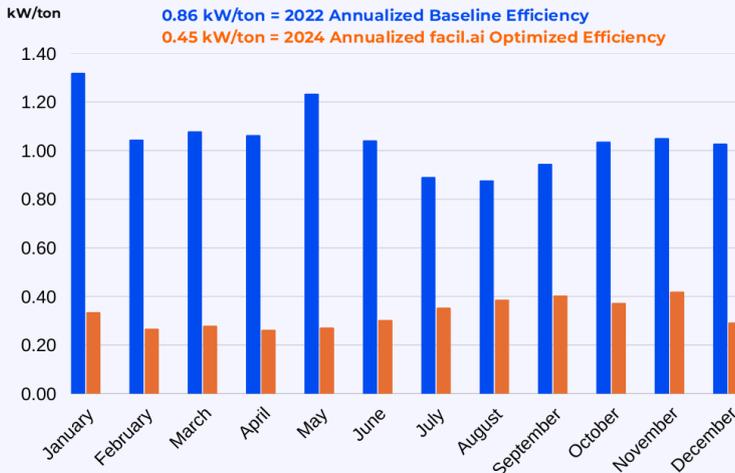
Improved Performance

Improved chiller output by 30%

The 1,000-ton chillers put out 1,300 to 1,400 tons of cooling (that's an additional 300-400 tons over the rated cooling capacity)

Jaw-Dropping Results

Improved Plant Efficiency by 48%
\$243,639 Annual Savings



ASHRAE standard 90.1 Chiller efficiency ratings:
0.72 kW/ton = Standard
0.65 kW/ton = Good
0.45 kW/ton = Best
*We reached "best" for total plant efficiency



Anytime someone challenges me about what facil is doing for us, I just tell them, 'Look at the data. Data doesn't lie.'

Kenny Seeton
Director of Central Plant Operations, CSUDH

Johnson Controls MetaSys system

No Additional Hardware

System Details

The Central Plant contains three, one-thousand ton, JCI/York YMC2 Electric, water-cooled chillers, four Towner cooling towers, each with eight cells of variable-speed fans, associated pumps, valves, and other supporting equipment. The central plant is controlled by the Johnson Controls Inc. Metasys Building Management System (BMS). One dedicated Network Supervisory Master (NAE4) supervises and controls the central plant/Chillers.



Set Up

The [facil.ai](https://www.facil.ai) Optimization solution was deployed using a software gateway running on an existing server at the campus. There was no additional hardware installed by facil.ai. The points in the JCI NAE were automatically discovered, classified, and tagged by the facil.ai interface. The first AI application implemented was the condenser water temperature reset process. Typically, this is hard-coded in the BMS as outside air wet bulb temperature + 5 degrees F. The AI-agent learned the optimum setpoint for holistic plant efficiency.

AI Strategy

The AI uses Adaptive Real-time Inference Learning. This is the AI-agents ability to Observe real-time data, Plan the best strategy, Act by sending a command to the BMS, then Learn from the resulting outputs. The AI-agent is continually adapting and learning, training itself to improve efficiency.

Initially, the system starts in learning mode. This is the first step, where the AI agent safely observes the various settings in the central plant and learns over time how best to dynamically configure and adjust the system precisely to increase energy efficiency. Within a couple of weeks, the AI agent has learned how to run the CP and starts making micro adjustments to increase optimization.

Over time the AI-agents continues to learn, constantly improving its own abilities and improving the efficiency and performance of the central plant, using a holistic approach to minimize energy use throughout the entire central plant.

Testimonial

“Anytime someone challenges me about what facil.ai is doing for us, I just tell them, ‘Look at the data. Data doesn’t lie.’” --Kenny Seeton, Director of Central Plant Operations.

For more information, visit facil.ai or contact danielle@facil-ai.com



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