

CASE STUDY / CENTRAL PLANT OPTIMIZATION

Georgia Institute of Technology

HVAC optimization reaps savings and insights into daily plant operations, funded by a state-guaranteed energy savings performance contract.

LOCATION

Atlanta,
Georgia

FACILITY

10th St. & Holland
Chiller Plants

ENGAGEMENT

Design-Build
(GESPC)

SOLUTIONS

OptimumLOOP® +
OptiCx®

PROJECTED ANNUAL

\$1.5M

per year

Projected annual utility cost savings across both chiller plants

ENERGY SAVINGS

17.5M

kWh per year

Annual electrical energy savings, more than a third of plant consumption

CO2 REDUCTION

31M

lbs per year

Annual CO2 emissions reduction at the chiller plants

Overview

In 2016, Georgia Institute of Technology received permission from the state of Georgia to enter into a Guaranteed Energy Savings Performance Contract (GESPC) and receive a \$7.7 million loan to tackle energy and water conservation, as long as the project could pay for itself within seven years.

Optimum Energy performed a rigorous audit and scoped a project that would modernize and optimize both plants. On the first day after commissioning, energy consumption dropped from 1.0 kW/ton to 0.65 kW/ton across the combined 28,152 tons of cooling capacity. Georgia Tech anticipates saving nearly \$1.5 million a year in energy costs.

The Challenge: Prove Guaranteed Savings Sufficient to Repay a State Loan in Seven Years

Optimizing the chiller plants was clearly the right project, but the team had to prove to the state of Georgia that the project would provide enough savings to repay the loan, and find a solution provider that would guarantee them.

An investment-grade audit (three months, four years of operating data) confirmed the commitment. The project also had to meet Georgia Tech's strict network security requirements.

The Solution: State-of-the-Art Efficiency Upgrades Plus Room for Campus Growth

The GESPC project replaced two old chillers with one larger, state-of-the-art unit and added 26 VFDs on chillers, pumps, and cooling tower fans. The project reconfigured pumping from primary-secondary to variable primary, significantly reducing energy use.

To meet network security requirements, Optimum developed a way for the cloud-based OptiCx® solution to monitor plant operations without direct network access, with data passing through VPN-protected data loggers every five minutes.

- Two old chillers replaced with one larger, high-efficiency unit (10th Street Plant)
- 26 VFDs installed on chillers, condenser water pumps, and cooling tower fans
- OptimumLOOP® delivering 0.65 kW/ton on Day 1 (down from 1.0 kW/ton)

Results

After nine months, Georgia Tech is on track to save \$1.5 million annually in energy costs while cutting consumption by 17.5 million kWh, more than a third, and saving 31 million pounds of CO2 per year.

DETAILS

Georgia Institute of Technology

A leading public research university in Atlanta, GA, with 7.2 million sq ft of conditioned space served by two central chiller plants: the 10th Street Plant (northern campus) and the Holland Plant (southern campus).

PLANT SCOPE

- 10th Street Plant: 16,196 tons (northern campus)
- Holland Plant: 11,956 tons (southern campus)
- 28,152 tons total capacity across two plants
- 2 old chillers replaced with 1 high-efficiency unit
- 26 VFDs installed (chiller, pumps, cooling tower fans)
- ABB Info90 BAS with OptimumLOOP® + OptiCx®

PERFORMANCE RESULTS

Day 1	
Efficiency	0.65 kW/ton (from 1.0 kW/ton)
Electrical Energy Savings	17.5M kWh/yr
Electrical Demand Reduction	25,818 kW
CO2 Reduction	31M lbs/yr

FINANCIAL RESULTS

Projected Annual Utility Savings	\$1,500,000
Annual Operational Cost Savings	\$271,827
GESPC Funding	\$7.7M
Estimated ROI	5 years

"By keeping the equipment operating at maximum efficiency, we're saving money, and that's what the optimization project is really about. I expect the plants to continue to improve and perform at a more efficient level than today. As we add more research buildings, we'll need more chilled water capacity, and we'll definitely start off with optimization."

— Donald P. Alexander, P.E., Facilities Design & Construction Institute Engineer, Georgia Tech

Projected savings are based on nine months of post-installation measurement and verification. Annual figures are annualized from verified performance data. Funding provided through a State of Georgia Guaranteed Energy Savings Performance Contract.