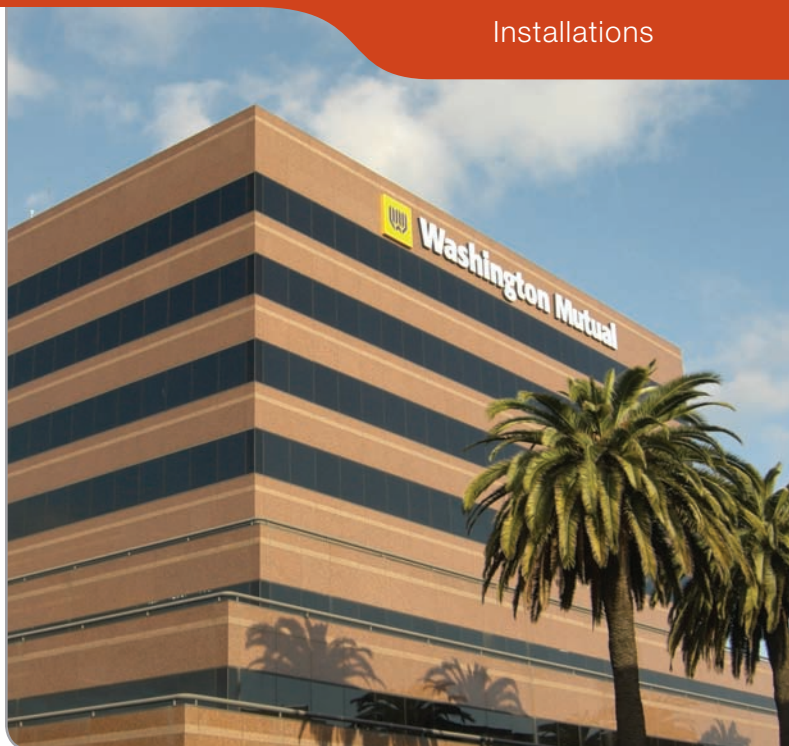




OPTIMUM INSTALLATIONS

WAMU



BUILDING STATEMENT/CHALLENGE

The Washington Mutual Building, located in Stockton, California established an energy efficiency initiative that included two objectives addressable by Optimum Energy:

1. Lowering overall energy consumption thereby, lowering monthly electrical bills,
2. Minimizing system fluctuations both above and below set temperature points.

The building, now owned and operated by the City of Stockton, is a 315,000 sq. ft. commercial office building serviced by a central plant and dual-duct air handlers.

The central plant has 2x450 ton variable speed York chillers, 2x20 hp variable speed primary-only chilled water pumps, 2x25 hp variable speed condenser water pumps, and one 2-cell cooling tower with 2x15 hp variable speed fans.

RESOLUTION

Step one in the plan was to reduce the building energy usage by replacing the PID control sequences with OptimumHVAC so that they would achieve less than a 0.50 kW/ton annual average wire-to-water efficiency. This included benchmarking the plant's unoptimized efficiency level. The results found that the whole-plant efficiency was at a respectable 0.823 kW/ton.

After implementing OptimumHVAC software, the central plant's kW/ton decreased by 0.34 kW/ton, a 42% decline in chiller plant energy consumption. Since then the plant has operated at below 0.5 kW/ton on an average annual basis.

Step two was to improve air handler temperature control. Before OptimumHVAC was installed, the chilled water valves in the air handlers had a tendency to hunt, oscillating back and forth without meeting the set point.

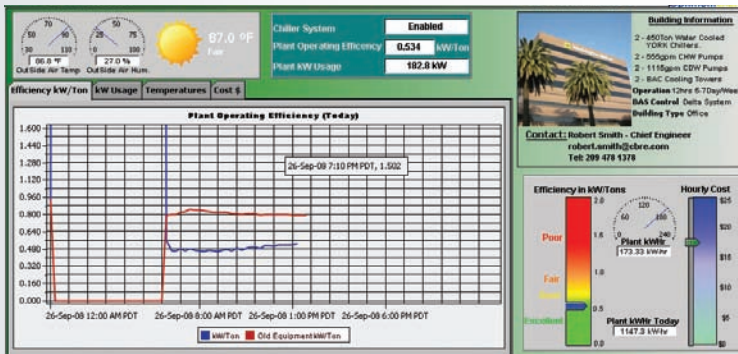
OPTIMUMHVAC FROM OPTIMUM ENERGY



The OptimumHVAC kW/ton assessment chart helps determine the operational efficiency of existing chiller plants.

Prior to installation, the WAMU building was operating at 0.823 kW/ton. Post-installation, the building is operating at 0.48 kW/ton, an improvement of 0.34 kW/ton.

AFTER IMPLEMENTING THE OPTIMUMHVAC SOFTWARE, THE CENTRAL PLANT'S KW/TON DECREASED BY 0.34 KW/TON, A 42% DECLINE IN CHILLER PLANT ENERGY CONSUMPTION.



OptimumHVAC/Performance Assurance Monitoring shows real time energy efficiency usage levels, daily and monthly dollars saved, and CO₂ reduction levels and is accessible to both technical staff and Optimum Energy engineers.

This created instability in the system and discomfort to occupants since the system was never running at its designed capabilities. Once OptimumHVAC was installed and optimized the central plant, the air handlers' valves ceased hunting. This led to more stable zone temperatures and increased valve and actuator life.

Overall, the addition of OptimumHVAC led to the elimination of inefficient cycling, and lowered the building's energy consumption and associated electric bill by \$45,000 a year. The simple payback of the HVAC retrofit project was under 3 years.

COST/BENEFIT INFORMATION

The cost/benefit information is a quick snapshot of the building savings realized year to date.

- Annual cost savings: \$45,000.
- Annual electrical usage savings: 360,000 kWh.
- Peak demand reduction of 40 kW.
- Annual CO₂ footprint reduction totaling 455,000 lbs.
- Annual reduction of dangerous pollutants: SO₂ and NO_x.

ABOUT OPTIMUM ENERGY

Optimum Energy's reliable, Ultra High Performance HVAC optimization software applications are guaranteed to reduce energy consumption and operating costs with no impact on occupant comfort. OptimumHVAC is based on patented Hartman Technologies and is designed to significantly improve operating efficiencies in centrifugal chilled water plants and variable air volume air handler systems.

OptimumHVAC is delivered in a multi-protocol appliance that is easily connected to, and compatible with, all Building Automation Systems, and can be installed by any licensed mechanical or controls contractor. OptimumHVAC tracks building performance remotely and measures and verifies equipment operations and savings on both a real-time and historical basis via our OptimumHVAC Performance Assurance Services.



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Optimum Energy Motto:

Do Good. Do Well. And Prove It.

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