CASE STUDY

CopperTree Analytics

Connecting **Buildings** | Connecting **People**

SUBSTANTIAL SAVINGS UNVEILED THROUGH HEAT RECOVERY CHILLERS IN A STATE-OF-THE-ART HOSPITAL

CLIENT **OVERVIEW**

The hospital, inaugurated in February 2021, was strategically established to alleviate the surge in hospitalization demands stemming from the ongoing pandemic in Ontario. Achieving full operational status by June 2021, the construction investment amounted to approximately C$1.7 billion. The impressive 11-storey facility is strategically positioned on a sprawling 25-hectare property. Noteworthy is the Central Utility Plant (CUP), a pivotal structure housing the majority of the hospital's mechanical and electrical infrastructure, encompassing chillers, cooling towers, boilers, and transformers.

BENEFITS

In aggregate, these operational enhancements yield a combined potential saving exceeding CAD$27,000 annually. Beyond the financial benefits, these optimizations translate to a noteworthy reduction in energy consumption, with an estimated 270,000-kWh decrease. This reduction in energy usage corresponds to a substantial environmental impact, equating to a decrease of approximately 220,000 kg of CO2 gas emissions.

THE PROJECT

In assessing the energy infrastructure of our client's building, a notable challenge has been identified regarding the utilization of heat recovery chillers capable of simultaneous heating and cooling. Currently, the building relies on main chillers for cooling and boilers for heating, with consistent heat generation from medical equipment and specific heating needs for high-temperature domestic hot water (sanitary washing) and normal-temperature water (washrooms) throughout the year. Notably, a Building Automation System (BAS) program is absent, hindering the optimization of the system's operation.

THE CHALLENGE

A critical observation has emerged from the current operational practices, where heat recovery chillers are found to be running with reduced heating in winter and increased cooling in summer. Contrary to Kaizen analysis findings, it becomes apparent that heat recovery chillers demonstrate superior efficiency in heating during winter compared to boilers, while exhibiting lower efficiency in cooling than the primary chillers during summer. An important consideration arises from this analysis – the operation of heat recovery chillers for heating results in the production of free cooling. This underscores the significance of prioritizing their operation in winter over summer. Aligning with Kaizen principles, this adjustment not only enhances operational efficiency but also capitalizes on the benefits of recovery chillers during periods of low demand in winter.

THE SOLUTION

To address the identified challenges, we propose an automated heat recovery operation facilitated through the Building Automation System (BAS), eliminating the need for manual intervention from facility management. The revised operational model seeks to optimize the utilization of heat recovery chillers by prioritizing full operation during winter and ceasing operation during summer.