GDI AINSWORTH

CASE STUDY

# Optimizing Building Systems for Energy and Carbon Reduction

GDI Ainsworth's targeted HVAC and pumping upgrades that transformed energy efficiency at a Vancouver mixed-use tower.

## Project Details

**Location**
Vancouver , Canada

**Number of Buildings**
1 - 270,000 $ft^2$ mixed-use facility

**System Implemented**
HVAC and pumping system optimization, VFD fan retrofits, chilled water system reconfiguration, and control upgrades aligned with BC Hydro's Power Smart Program

**Project Goal**
Improve overall energy performance, reduce greenhouse gas emissions, and lower operating costs

## Impact at a Glance

- Reduced electricity consumption by approximately **35,000 kWh** per year
- Lowered greenhouse gas emissions by approximately **80 tonnes** of $CO_2$ annually
- Delivered **$41,500** in annual energy cost savings
- Achieved a simple payback of 3.2 years with BC Hydro incentives

## Challenge

The building's chilled water and air-handling systems were operating on constant-volume control strategies designed for peak retail demand, resulting in excessive pumping energy, chilled water blending, and unnecessary electrical consumption.

Additionally, constant-speed return fans created negative pressure conditions on multiple floors, driving further inefficiencies.

Burrard International Holdings required a solution that could improve performance while aligning with BC Hydro's Power Smart Program requirements.

## Methodology

Assessed chilled water distribution, pumping strategies, and air-handling performance

Identified inefficiencies caused by constant-volume operation and system blending

Evaluated pressure imbalances and fan control limitations

Designed targeted ECMs aligned with Power Smart program criteria

Implemented solutions focused on controllability, turndown, and after-hours optimization

## Solution

- Added control valves to allow chilled water flow modulation
- Reduced chilled water pump speed during after-hours operation
- Implemented minimum-flow operation after 6:00 p.m.
- Re-routed chilled water piping to eliminate return-to-supply blending
- Retrofitted supply and return fans with VFDs
- Enabled fan systems to maintain pressure setpoints at 50% of design airflow
- Optimized system sequencing to reduce pumping demand and electrical load

## The Ripple Effect

- **Lower operating costs free capital for reinvestment across the property portfolio**
- **Reduced carbon emissions support broader sustainability and decarbonization goals**
- **Improved system controllability enhances long-term asset performance**
- **Incentive-aligned upgrades provide a replicable model for future retrofits**