DAIKIN

CASE STUDY



EAGLE STREET "ZERO CARBON" INDUSTRIAL FACILITY

"We are truly at the leading edge of zero carbon building design in Ontario and at the forefront of helping decarbonize the commercial, industrial real estate space."

– Michael R. Hilson, Vice President of Investments at Crillion Investment Corporation

Overview:

The commercial real estate landscape is undergoing a significant transformation as sustainability becomes a top priority for investors, tenants, and developers alike. With buildings accounting for 40% of global energy use and 33% of greenhouse gas emissions, properties that integrate sustainable features — such as energy-efficient HVAC systems, solar panels, and green roofs — are gaining a competitive edge.

Properties designed and constructed according to high-performance principles and green building standards tend to have lower operating costs, increased property value, and higher tenant demand. Conversely, properties that fail to meet energy efficiency benchmarks or incorporate sustainable design principles risk becoming stranded assets, as they struggle to maintain competitive financing, while facing potential vacancies, declining rental income, and difficulty attracting tenants.

Eagle Street Industrial Limited Partnership understood the significance of aligning real estate design and construction with Environmental, Social and Governance (ESG) trends. With a long-term, sustainable focus in mind, they strategically set to design and build their new industrial facility as a model of eco-friendly construction.

By adopting the Zero Carbon Building (ZCB) Design Standard v3, they aimed to optimize operational and embodied carbon reductions and limit of fossil fuels, such as natural gas. This forward-thinking approach would position the Eagle Street facility as the first ZCB-Design v3 industrial space in Ontario, Canada.

To meet or exceed its operational carbon reduction and energy efficiency goals, Eagle Street Industrial Limited Partnership needed an HVAC system as technologically advanced and visionary as its industrial building design.

LOCATION:

Eagle Street Industrial Park
Cambridge

Ontario, Canada

AREA SERVED:

158,000 square feet

CHALLENGE:

Minimize the energy consumption and carbon footprint of a visionary industrial facility design with equally visionary HVAC solutions to enhance the property's long-term marketability

SOLUTION:

Rebel Applied® RTUs with revolutionary air-source heat pump and Gas Phase Filtration Technology

"Zero Carbon" Industrial Facility Features Rebel Applied Packaged Systems with Revolutionary Air-Source Heat Pump.

EAGLE STREET
INDUSTRIAL FACILITY

Solution:

After researching their options, the partnership worked closely with sustainability consultants at Ecovert to select Daikin's Rebel Applied® RTU with air-source heat pump, Gas Phase Filtration Technology, Low Global Warming Potential (GWP) R-32 refrigerant, and capacity boost inverter technology as the ideal HVAC system solution for their project.

At the heart of the HVAC solution are four Daikin Rebel Applied DHSA packaged rooftop units. The Rebel Applied boasts an exceptional EER of 11.0 and a Class 6 air leakage rating at +/-6 inches of static pressure to offer optimum cooling and heating performance while consuming significantly less energy than competitive systems. At its baseline, it's ideal for reducing carbon footprint and energy expenses. It boasts a low-GWP R-32 refrigerant, R-13 insulation cabinetry and integral thermal breaks. While already being an energy-efficient, sustainable solution, Rebel Applied's air source heat pump option made it the perfect fit for the Eagle Street project.

An air-source heat pump is a highly efficient heating system that transfers heat from the outside air, even in cold temperatures. Unlike traditional heating systems that burn fuel, heat pumps transfer heat. While traditional heat pumps have limited effectiveness in colder temperatures, Rebel Applied overcomes this challenge through its R-32 refrigerant operating envelope, additional outdoor coil surface, and the boost function of its inverter compressors. The solution for the Eagle Street project also includes supplemental indirect-fired gas heating with a modulating gas burner for occasions when the temperature drops below -10° C or about 14° F. A heat pump with a wide operating envelope and gas supplemental heat enables optimal system sizing. This approach maximizes electric operation for most heating needs, while the gas supplemental heating capability ensures comfort during extreme cold, eliminating the need for an oversized system.

The Rebel Applied solution also features Gas Phase Filtration Technology to clean return air. This technology removes contaminants like CO_2 and volatile organic compounds (VOCs), ensuring cleaner, healthier indoor air. By significantly reducing the need for outdoor air intake by as much as 80 percent, Gas Phase Filtration Technology can help maintain a comfortable indoor environment by providing greater humidity and comfort control while trimming annual HVAC energy expenses by up to 30 percent. This technology also aligns with evolving industry practices such as ASHRAE Standard 62.1's Indoor Air Quality Procedure (IAQP).

The Rebel Applied's design also features inverter scroll compressors, which operate at variable speeds according to cooling and heating requirements. Variable speed scroll compressors offer significant energy savings compared to traditional compressors, which operate at fixed speeds.

"The Rebel Applied heat pump RTUs represent the state of the art in HVAC equipment, including low-GWP R-32 refrigerant, inverter compressors for industry-leading efficiency and Gas Phase Filtration Technology to optimize ventilation," summarized Jeff Seewald, HVAC Systems Business Development Manager at Daikin Applied.

Outcome:

The Zero Carbon Building Design v3 industrial facility will consume 27% less total electricity, in terms of kWh/year, than a traditional industrial building. Additionally, the reduced operational carbon contributes to an 82% annual reduction in greenhouse gas emissions compared with a conventional industrial building. For 95% of the year, the building will use all electrical heating and cooling. It will only rely on supplementary gas heating for the remaining 5% of extreme weather days. The sustainable nature of the Eagle Street industrial facility will help any large multi-national corporation with ESG goals hit its carbon requirements while offering a best-in-class industrial setting for operations.







Left: Precast In-Progress
Right Upper: Precast Complete
Right Lower: Site Plan Aerial View