







BUILDING OPTIMIZATION PROJECT RESULTS SUMMARY

BrainBox AI's unique technology combines advanced artificial intelligence and cloud computing to enable the world's most advanced autonomous commercial heating, ventilation and air conditioning (HVAC) solution. BrainBox AI merges deep learning algorithms on existing HVAC functionality to automate the modulation of each component, significantly reducing a building's total energy costs and carbon footprint, while improving occupant comfort and extending HVAC equipment service life.

BrainBox AI is currently impacting over 100,000,000 sq. ft. of commercial real estate globally. Check out some of the results we have achieved for various building types around the world.

ENERGY, EMISSION & RUNTIME REDUCTION CASE STUDIES

	 Shopping Center Australia	 Office Tower ON, Canada	 Residential Multi-Family Tower ON, Canada	 4 Retail Outlets QC, Canada	 Grocery Store QC, Canada	 Shopping Center ON, Canada
Square Footage	275,556 sq. ft.	300,000 sq. ft.	25,000 sq. ft. <i>Only controlling common areas and central plant</i>	20,000 sq. ft.	60,000 sq. ft.	80,000 sq. ft. <i>Only controlling common areas</i>
Controls System	Optergy by Alerton BMS	Automated Logic BMS	Distech Controls BMS	Salus Thermostats	Honeywell BMS	Reliable Controls BMS
Annualized energy savings	36% 198,416 kWh \$28,607 AUD <i>on HVAC equipment</i>	29% 309,000 kWh \$86,859 CAD <i>on HVAC equipment</i>	25% 254,875 kWh \$32,624 CAD <i>on HVAC equipment</i>	15% 20,808 kWh \$1,050 CAD <i>on total electricity bill</i> 19% 8,300 m ³ \$3,800 CAD <i>on total gas bills</i>	3.5% 160,000 kWh \$9,000 CAD <i>on total electricity bill</i>	6% 31,740 kWh \$2,512 CAD <i>on total electricity bill</i> 7% 6,967 m ³ \$1,710 CAD <i>on total gas bills</i>
Annualized carbon emissions reductions	388 metric tons	218 metric tons	91.2 metric tons	15 metric tons	80 kg <i>(low GHG hydroelectric power)</i>	34 metric tons
Average Runtime Reduction by Equipment Type	Mall Heat Pump Fan: 41% Library Heat Pump Fan: 35% Shop Heat Pump Fan: 42% Condenser Pumps: 60%	Baseboards: 95.9% FPB supply fan: 26.5% Cooling tower fan: 35.5% Heat exchanger pump: 12.7% Heat exchanger steam valve: 9.4%	Chiller: 21.8% Chilled water pumps speed: 20% Chilled water pumps power consumption: 45% Hot water pumps energy consumption: 50.1% FCU fan: 57% FCU heating/cooling stages: 55% FCU ON-OFF commands: 52%	Heating Stage – Fall: 41% Cooling Stage – Fall: 71% Heating Stage – Winter: 18%	RTU Fan: 17.78% RTU Cooling: 3.68% RTU Heating: 18.75%	RTU Fans: 3% Heat Pumps: 14% Boiler: 10% MUA Heat Coils: 40%

HVAC EQUIPMENT RUNTIME REDUCTION CASE STUDIES



**Office Building
MD, USA**

**Hotel
Ireland**

**Office Building
Australia**

**Office Tower
AB, Canada**

**Shopping Center
QC, Canada**

**Office Tower
TX, USA**

Square Footage

100,000 sq. ft.

28,000 sq. ft.
Only controlling common areas

125,400 sq. ft.

262,000 sq. ft.

510,000 sq. ft.

1.5M sq. ft.

Controls System

Honeywell BMS with
Tridium AX BMS

ABB Cyclon BMS

Niagara AX BMS

Enteliweb BMS
(Delta Controls)

Automated Logic BMS

Tridium Niagara AX BMS

Average Runtime Reduction by Equipment Type

AHU (Fan Status): **24.1%**
AHU (Cooling Coil): **6.9%**
VAVs (Fan Status): **17%**
VAVs (Heat Stage): **22.2%**

AHUs Supply Fans: **14.8%**
AHUs Heating Coils: **13.6%**
Exhaust Fans: **13%**

Fresh Air Handling Unit
(Fan Operation): **20.5%**
Fresh Air Handling Unit
(Cooling Coil Modulation): **26%**
Chillers: **29%**
Chilled Water Pumps: **29.8%**
Cooling Towers: **39.2%**
Cooling Towers Pumps: **29.5%**

AHU Supply Fan: **3.7%**
Boiler: **19.3%**
AHU Cooling Valve
Modulation: **58%**
Radiator Modulation: **48%**

RTU Supply Fan: **33.5%**
RTU Heating Stage: **62%**
RTU Cooling Stage: **5%**
VAV Reheat Stages: **30%**
VAV Global Reheat
Utilization: **78%**
Overall Fan Coil Units: **61%**

AHUs Total Cooling
Valves: **20.9%**
AHUs Total Supply Fan
Start/Stop: **14.2%**
Chillers Total Energy
Consumption: **12.7%**

INTERESTED IN LEARNING MORE ABOUT BRAINBOX AI?

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