

Industrial Bombardier (Canadair Facility)



The blue-grey SolarWall® panels were selected by the architect to be a dramatic contrast with the white colored canopy at Bombardier's Canadair facility in Montreal, Canada.

Background

The Canadair aircraft assembly plant in Montreal is the site of the world's largest solar air heating system. The solar installation was integrated into extensive renovations needed to improve indoor air quality and the appearance of the aging complex.

The SolarWall® technology was chosen as an efficient and cost effective method to provide the required ventilation air and heating. The collector provides a high absorptivity in a handsome blue-grey tone, selected by the architect to contrast with the white colored canopy, which also acts as a manifold to ensure an even distribution of incoming air across the entire panel area. The overall intention was to redesign the building so that it was energy efficient, and esthetically attractive.

The SolarWall system was installed in place of conventional exterior cladding. Therefore, when calculating the savings rate, only the incremental cost of the system was considered. (In 1996, the total incremental costs were \$29/m² or \$285,000, which yielded a payback of only 1.7 years.)

Results

There are two sections of the building with SolarWall cladding; one faces 40° east of south the other 50° west of south. The total perforated area is 8,826 m² (95,000 ft²) plus an additional 1700 m² (18,300 ft²) canopy. Twenty-nine fan and duct systems with a total capacity of 1,071,000 m³/h of supply air were also added.

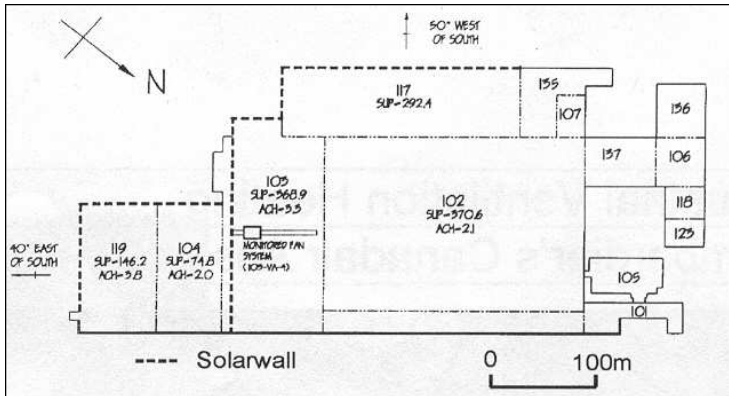
The SolarWall system reduce the use of fossil fuels in five capacities:

- Active solar heating
- Recapturing wall heat loss and returning it to the building
- The insulating effect of the absorber reduces heat moving out through the building wall
- The cooling effect of ventilation air introduced at ceiling level reduces heat loss through the roof
- The same effect lowers the exhaust air temperature

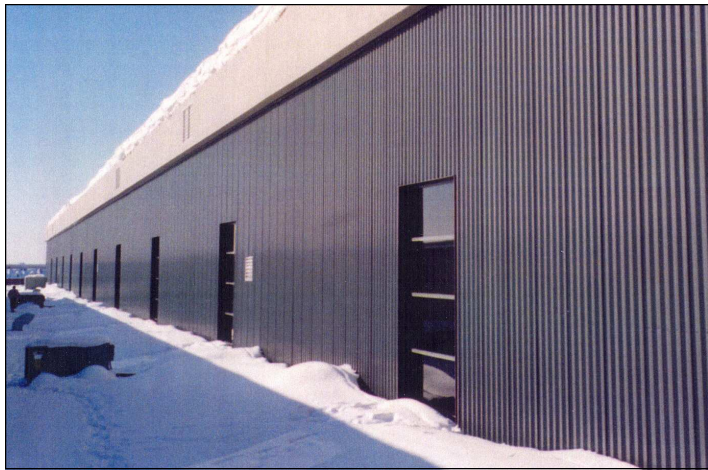
The total savings accruing from lower natural gas and electricity usage were calculated to be nearly \$170,000 per year; and this was at 1996 energy prices. *This means that in the 10 years since the installation, Bombardier as a company has saved well over \$2 million in reduced energy costs from this one project alone!*



At the time of the installation, the Canadair SolarWall system was unique in several ways: It was a lighter color than the black typically used at that time; it was installed on two walls facing southwest and southeast instead of a single south wall; and it combined two types of fan systems. One system included a recirculating damper that uses ceiling air to heat ventilation air to the desired temperature, simultaneously modulating ventilation airflow. The other system operates at a constant airflow and uses supplementary gas fired make-up air heaters to heat at night, or as required.



Canadair schematic showing the sixteen building complex with a total floor area of 116,000 m²



Architect: Desmarais, Cousineau, Pilon, Yaghjian, St-Jean, Rogers — Montreal, Quebec, Canada

Results

The SolarWall system was monitored by Natural Resources Canada and the following savings were established.

Total System Performance - from CANMET's monitoring report.

Units	Active Solar	Other Savings	Total
KWh/m ² /day	1.23	1.44	2.67
GJ/m ² /year	1.21	1.42	2.63
Entire System			
GJ/year	10,678	12,531	23,210
\$/year	70,688	82,955	153,600

There are also additional electrical savings associated with the solar air heating installation because less power is required to draw air through the SolarWall panels than through the conventional roof top make-up air units. This savings was estimated at \$13,500, which combines with the thermal savings of \$153,600 to yield a total annual savings of \$170,000 (using 1996 energy prices).

Bombardier decided to proceed with this installation at their Canadair facility after the success of other SolarWall projects at their Valcourt facility in Quebec. When the company was asked about having the world's largest solar air heating system, Jacques Martel, Canadair's Director of Plant Engineering stated: "We didn't do this on the basis of being the world's largest, but the SolarWall really gives us more for our money."



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