Institutional

John Molson School of Business
Concordia University, Montreal

The SolarWall® PV/T ™ system spans the top of the new John Molson School of Business at Concordia University in Montreal. This is the world's largest SolarWall® PV/T™ system. The hybrid technology combines solar air heating and photovoltaic electricity in one building integrated system.

Background

The John Molson School of Business (JMSB) at Concordia University in Montreal is considered one of the top business schools in Canada. In 2007, plans for the construction of a brand new facility that would house the business school were underway, and the Solar Buildings Network at Concordia proposed the idea of demonstrating a new state-of-the-art hybrid solar technology—SolarWall® PV/Thermal—developed by Conserval Engineering. It combines the award-winning SolarWall® air heating technology with photovoltaic panels in one highly-efficient system. Natural Resources Canada provided funding for the project, and the design and installation commenced in late 2007. Conserval Engineering worked with the Solar Buildings Network on the project, as well as partners Day4 Energy, who custom designed the PV modules, and Sustainable Energy Technologies, who supplied the inverters.

Of all the energy produced in Canada, 50% is consumed in buildings *(NRCan Technical Report OEE 2952).* This emphasizes the importance of building integrated renewable energy systems—like the SolarWall PV/T system—that are able to cost effectively produce multiple forms of clean green energy from the same surface.

Solution

The two architect firms who designed the John Molson School of Business (KPMB and FSA) seamlessly integrated the SolarWall PV/T system into the exterior façade. The final result was an extremely impressive and modern looking solar system that caps the top floors and is clearly visible from the downtown city streets below.

The JMSB SolarWall® PV/T™ installation is a 100 kW system, producing 24.5 kW of electricity and over 75 kW of thermal heating.

A close up of the SolarWall® PV/T system's custom Day4 photovoltaic modules being installed over the black metal SolarWall® system.

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The SolarWall® component is 288 m^2 (3,100 ft^2) and will heat up to 15,000 CFM of fresh air. Three hundred and eighty-four PV modules (rated at 60 watts) were custom designed by Day4 Energy for this project. Additional energy monitoring and system controls were installed to accurately track the solar thermal and PV energy production for future analysis.

Results

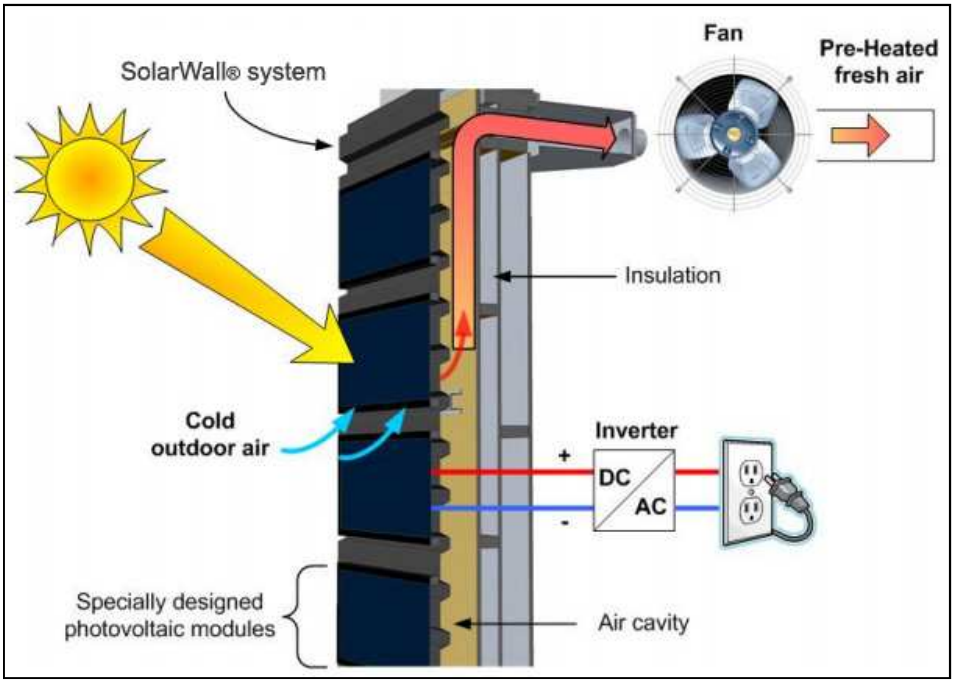
The SolarWall® PV/T system at the JMSB building is currently being monitored and results will be released in an annual report. On sunny days during the heating season, large amounts of fresh air will be heated with a temperature increase of about 20℃ (68℉). PV efficiency i s believed to have been improved by 5% compared to a traditional installation.

The hybrid system is expected to have an overall solar efficiency of near 60% (the rate of utilization of incident solar energy).

The JMSB building is LEED® registered and the largest SolarWall® PV/T™ system in the world.

"The construction of the new JMSB Building provided our researchers with an opportunity to integrate state of the art innovative solar technology into a building which will set new standards for construction"

-Judith Woodsworth, Concordia President and Vice-Chancellor



How It Works

The PV modules are mounted on top of the SolarWall® system, which becomes the racking system for the PV. The SolarWall system draws away heat from the back of the PV panels (which can be 2-3 times greater than the electrical output), this cools the PV panels and increases their efficiency. This heated air is drawn through the SolarWall system, into the air cavity, and then ducted into the building's HVAC system. This reduces the traditional load on the heating and ventilation system by using the pre-heated air.

**Images courtesy of Concordia University*

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