

University of Maine Cuts the Carbon with Variable Refrigerant Flow Heat Pumps and Energy Recovery Ventilators



The University of Maine at Presque Isle was among the first American universities to join the American College & University Presidents Climate Challenge. As a signatory of the agreement, University president Donald Gillman committed the campus to a rigorous plan to reduce its carbon footprint. A unique HVAC renovation at Folsom-Pullen Hall was among the first success stories in the university's trek toward carbon neutrality.

■ FACTS

Customer:

The University of Maine at Presque Isle, USA.

Need:

Energy Efficient Ventilation System.

Solution:

A combination of a central energy recovery ventilator (ERV) and a variable refrigerant flow system (variable speed heat pumps).

“We have reduced the buildings carbon footprint by 63%”

Folsom-Pullen Hall is one of the primary educational buildings on the Presque Isle campus and includes classrooms, labs and the university's major lecture hall. It had not received any major mechanical upgrades since being built in 1966. For decades faculty and students were subjected to excessive mechanical noise and wildly fluctuating indoor temperatures, while the university had to pay the bill for substantial inefficiencies.

An in-depth evaluation conducted by Mechanical Systems Engineers of Yarmouth, Maine, showed a heat loss of 1,604,188 BTUH for the Folsom wing (assuming 15 cfm/occupant) during occupied cycles. The steam heated unit ventilators located on the outside wall in every space, did not incorporate any heat recovery. This, combined with insufficient sealing around the ventilators, accounted for 51% of this total heat loss when the units were in operation.

Not only were the unit ventilators an energy sieve, they were the source of some very intrusive rattling in classrooms and required constant maintenance.

Several solutions were considered for upgrading the HVAC system, but ultimately Kurt Magnusson, PE, of Mechanical Systems Engineers advocated a combination of a central energy recovery ventilator (ERV) and a variable refrigerant flow system (variable speed heat pumps). This solution would result in the best payback for the university while affording students and faculty the added benefit of air conditioning during summertime classes.



Decoupling the ventilation from the HVAC served a couple of purposes. First, a separately ducted ventilation system would eliminate most of the noise associated with conditioning the building. Second, it allowed for maximum energy recovery from exhaust air. A SEMCO FV-5000 energy recovery ventilator with an electric preheat coil proved ideal for this cold climate application.

The system responds to indoor and outdoor temperature fluctuations by adjusting the compressor speed to optimize energy usage. Inverter technology allows the system to heat and cool simultaneously, basically transferring the heat from the warm side of the building to the colder side.

“The variable refrigerant flow system and the SEMCO system work very well together,” said Kurt Magnusson. “This approach reduced the total amount of ductwork we needed because we’re using smaller air handlers. That results in significant fan energy savings and we’ve reduced the buildings carbon footprint by 63%.”

SEMCO

SEMCO is a unique indoor environment products manufacturer serving the key disciplines of air distribution, noise abatement, temperature, and humidity control in the commercial and industrial building markets. SEMCO was acquired by Fläkt Woods in 2007.

Fläkt Woods Group

Fläkt Woods is a global company providing solutions for ventilation and air treatment for buildings as well as fan solutions for Industry and Infrastructure applications.

Contact information

SEMCO
1800 East Pointe Drive
Columbia, MO, USA
65201-3508
dwpsales.semco@
flaktwoods.com
www.semcoinc.com
www.flaktwoods.com

SEMCO

1800 East Pointe Drive, Columbia, MO 65201-3508, USA

t 573-443-1481 f 573-886-5408

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