Cold climate variable refrigerant flow

DESCRIPTION

Variable refrigerant flow (VRF) systems are typically all-electric systems that use heat pumps to provide space heating and/or cooling. They use refrigerant to move heat between a variable speed compressor unit and individual indoor fan coil units to heat or cool zones in a building. New, low temperature air source heat pumps make these systems efficient in cold climates, providing heating even at outside air temperatures of -25 degrees Fahrenheit without having to resort to inefficient auxiliary electric heat.

VRF systems can condition multiple zones in a building, each of which may have different heating and cooling needs. Using sophisticated control technologies, VRF systems can modulate the amount of refrigerant sent to each zone independently and in tune with diverse and changing space conditioning loads, thereby increasing energy savings.

DEMONSTRATING THE TECHNOLOGY

Cold climate VRF systems are applicable to commercial buildings in climates with more than 6,000 heating degree days. It is most suitable to large buildings with multiple heating and cooling zones. Due to its low profile, VRF is also suitable for retrofit projects where physical space is a constraint. Participants in commercial new construction programs or commercial HVAC programs would be good candidates for testing and demonstrating this technology.

CRITERIA	VALUE
Electricity savings	1.42 kWh/ft^2
Cost savings	\$0.12/ft^2
Measure life	15 years
2017 simple payback	10 years
Carbon emissions avoided	9.8E-04 MT equivalent CO_2
How it saves energy	Distribution of heating and cooling using refrigerant instead of air, variable speed compressors and fans, zone-level heating and cooling providing only the needed heating and cooling without reheat, recovery of heat from cooling zones to heating zones
Non-energy benefits	Longer equipment life, lower maintenance, increased comfort, quiet, small footprint, flexible for changing space conditioning needs
Barriers to adoption	Capital cost; more applicable to large buildings

FOR MORE INFORMATION

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