Green Proving Ground Test Bed Project
Technology Fact Sheet

Category:

HVAC

Technology Name:

Variable Refrigerant Flow

What is this Technology?

Variable refrigerant flow (VRF) systems were invented in Japan more than 20 years ago, but new to the American market. VRF uses refrigerant as the cooling / heating medium, and allows one outdoor condensing unit to be connected to multiple indoor evaporators, each individually controllable by its user, while modulating the amount of refrigerant being sent to each evaporator.

Why is GSA interested?

Energy Savings – By operating at varying speeds, VRF units work only at the needed rate. Heat recovery VRF technology allows individual indoor units to heat or cool as required, while the compressor load benefits from the internal heat recovery. Energy savings of up to 55% are predicted over comparable unitary equipment.

Cost Effectiveness – This product is new to the North American market, and most HVAC designers and installers are not familiar with the technology. Current estimates show an initial cost 20 to 40 percent higher than a traditional split/heat pump HVAC system, but with a payback that should be life cycle cost effective.

Operations and Maintenance – VRF requires operations and maintenance consistent with other unitary equipment. VRF provides a greater degree of occupant control, which should improve occupant satisfaction with thermal conditions, typically the leading source of complaint.

Applicability – VRF systems are designed to be modular, making them applicable to a wide variety of facilities as an alternative to other unitary equipment. VRF technology holds particular promise for GSA's historic buildings because it relies on refrigerant piping, which requires fewer and smaller penetrations than other HVAC options, and enables the use of a large variety and configuration of inconspicuous indoor fan coil units.

Adapted from a report by Pacific Northwest National Laboratory