



June 2012

# Variable Refrigerant Flow System

## Emerging Technology Field Test Participation Details

### Purpose of Field Test

The purpose of this field test is to develop a method to verify electricity savings for Variable Refrigerant Flow (VRF) systems with optimized ventilation systems (e.g., dedicated outside air systems with exhaust air heat-recovery and demand controlled ventilation).

### Emerging Technology

VRF systems are inverter driven heat-pumps with multi-speed fans, electronic expansion valves and sophisticated control algorithms. Some VRF systems are capable of simultaneous heating and cooling, providing heat recovery between zones. The combination of VRF and optimized ventilation systems results in significant fan, ventilation and part-load heating and cooling savings.

### Requirements & Specifications

Projects must be installed in an existing, electrically-heated commercial building

#### *VRF and ventilation system retrofits must have the following features/characteristics:*

- Heat-pump or heat-recovery with inverter driven compressor(s), minimum 12.3 integrated energy efficiency ratio and 3.4 coefficient of performance at 47 F.
- Optimized ventilation loads, through dedicated outside air system, exhaust-air heat-recovery, demand controlled ventilation, or other strategies.
- Commissioned systems serving over 90% of the building area.
- BPA is currently aware of the following manufacturers products that meet the above requirements, but new products may become available: Daikin, LG, or Mitsubishi.

#### *Customer must perform the following:*

- Follow the requirements of the Limited Availability Emerging Technology Field Test Projects section of the Implementation Manual.
- Complete online surveys and facilitate survey completion by installing contractor and end user.
- Provide 24 months of pre- (baseline) and 12 months of post- (VRF system) billing data to BPA.
- Facilitate access to site and M&V data for BPA.

### Savings & Reimbursement

The VRF system savings and reimbursement are calculated according to the commercial, retrofit custom projects reimbursement rate of \$0.20/kWh. The following table shows the resulting reimbursement per unit.

Occupied hours per year	Savings (kWh/ton)	Reimbursement (\$/ton)
2,000-4,000	1,000	\$200
4,001-8,760	1,500	\$300

### Participation Limits

This field test will be limited to the first 10 VRF systems. Customers who wish to participate must complete and submit the online **ET Field Test request**. BPA will update the website monthly with the number of approved requests.

