

## PROJECT BRIEF

# Lewis County PUD

## Variable Refrigerant Flow



June 2012

### Project Description

How does a public utility set an energy efficiency example when remodeling its 85-year old building? That was the problem faced by Lewis County Public Utility District (PUD) as it assessed how to make its headquarters building in Chehalis, Washington, more comfortable and energy efficient.

The 28,000 square foot Lewis County PUD office building is open weekdays between 7 am and 5 pm. Not only did the utility need to operate during the remodel, but the new heating, ventilating and air conditioning (HVAC) system needed to improve occupant comfort and save energy.

### Choosing a VRF System

According to the architect and mechanical engineer, variable air volume (VAV) systems, are the typical HVAC system for an office this size, but a variable refrigerant flow (VRF) system would be a “better HVAC solution, providing better comfort and lower electricity use at about the same first-cost.” In order to stay warm with the existing heat pump system, many Lewis County PUD staff used electric heaters under their desks. Electric heaters can be potential fire hazards and are not an efficient way to control space temperature. A new VAV system, designed to eliminate the need for electric heaters and meet ventilation requirements, would use more electricity than the existing heat pump system. A VRF system, capable of simultaneously heating and cooling, transfers heat from warm zone to zones calling for heat, was another option to improve the system efficiency and occupant comfort.



Lewis County Public Utility District

This type of VRF system typically costs \$12 more per square foot than a VAV system. This cost difference does not include site specific costs associated with a VAV system, such as additional electrical circuits, ductwork, structural modifications or the costs associated with maintaining building operation during construction. So, Lewis County PUD chose the VRF system, which will be more efficient and less intrusive during their remodel at about the same first-cost as a VAV system.

The new HVAC system will meet ventilation requirements with a dedicated-outside-air-system (DOAS). This DOAS will use existing ductwork and will recover heat from the exhaust air to pre-heat code-required ventilation air, increasing the energy efficiency of the HVAC system. The new HVAC system will be commissioned (verification of system performance as required by code) by the manufacturer’s representative.



## Utility Incentives

Since this project is Lewis County PUD's office building, utility incentives were not provided, but it is estimated that the new 56-ton VRF system, capable of simultaneously heating and cooling, will save 5,600 kWh per year. If you are considering installing a VRF system, check with your local utility about energy efficiency incentives.

## Feedback

### Owner:

*"We are very excited to get a system that will have so many temperature-control zones; we have been uncomfortable for many years."*

—Norm Goodbla, Energy Manager for Lewis County PUD

### Architect:

*"VRF was the best solution to improve tenant comfort, while minimizing disruptions during the remodel."*

—Norm Pfaff, Pfaff Architecture

### Engineer:

*"VRF is a great solution for existing buildings, especially older buildings where it may be hard to install a conventional, ducted system. Owners interested in VRF systems should only use contractors certified by the VRF manufacturer, and it's always a good idea to check a few references for some of their previous VRF projects."*

—Duane Lewellen, Rice Group

### General Contractor:

*"VRF systems are not the lowest cost system, but they are high-performance systems, and may have fewer comfort problems. As with all projects, space constraints are a problem for HVAC, fire sprinkler, electrical and plumbing trades; VRF systems minimize some of these issues because less space is required for ductwork."*

—Kevin Christensen, Christensen, Inc.

### Mechanical Contractor:

*"The only real issue I've seen with VRF systems is trying to control a VRF system with a Building Automation System (BAS). I recommend using a BAS to monitor the VRF system rather than trying to integrate the two systems. We have done about half a dozen VRF jobs and haven't received a single comfort call-back."*

—Lee Estes, Harbor Ventilation