

VRF: What is it and how does it work?

A case study

Presented by:

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Agenda

- Introduction
- What is VRF/VRV?
- Why should you be using this technology?
- Comparison between manufacturers
- Comparison to other systems
- Case study
- Questions?

About the presenters

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What is VRV/VRF?

- VRV® – Variable Refrigerant Volume (Daikin)
- VRF – Variable Refrigerant Flow (Mitsubishi, LG, Sanyo, Samsung, Toshiba)
- VRV is a system developed and designed by Daikin Industries and means "variable refrigerant volume". Daikin protected the term VRV so other manufacturers use the term VRF "variable refrigerant flow". In principle they both work the same and are extremely efficient, reliable, energy saving ways to heat and cool all types of buildings with minimum installation time or disruption.
- The volume or flow rate of refrigerant is accurately matched to the required heating or cooling loads thereby saving energy and providing more accurate control.
- In short, they are probably the best systems currently available for mid to large application with EER's in the 15-20 range.

Why VRF?

- Flexibility of the system.
- Ease of installation.
- Life of equipment.
- No water pipes in the building.
- Energy savings \$\$\$

Why not?

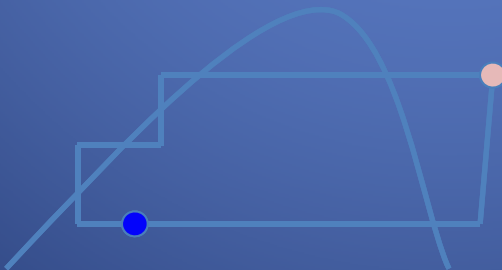
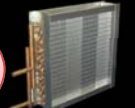
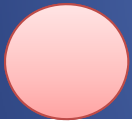
- High initial capital investment compared to PTAC or split systems.
- No need for diversity in system designed.
- System needed is too small or too large.
- Retraining of maintenance mechanics.

The Manufacturers

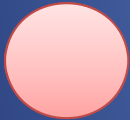
- AHRI standard 1230 rates the EER for VRF systems.
 - http://www.ahridirectory.org/ahridirectory/pages/vrf/VRFDirectory_20110916.pdf

	3 Pipe System	2 Pipe System
Manufacturers	Daikin, LG, Sanyo, Toshiba	Mitsubishi
Layout	Vertical	Horizontal
Branch controller	One master plus one per zone	One master only
Thermostats	Wide range	Wide range
Piping	Reduce after a take-off	Never changes

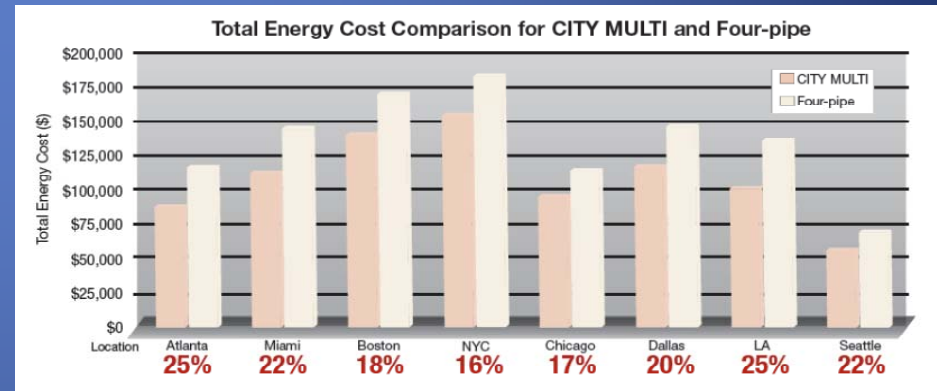
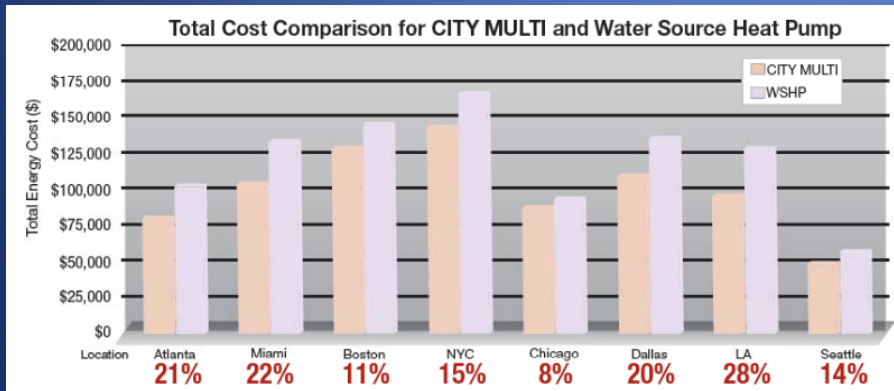
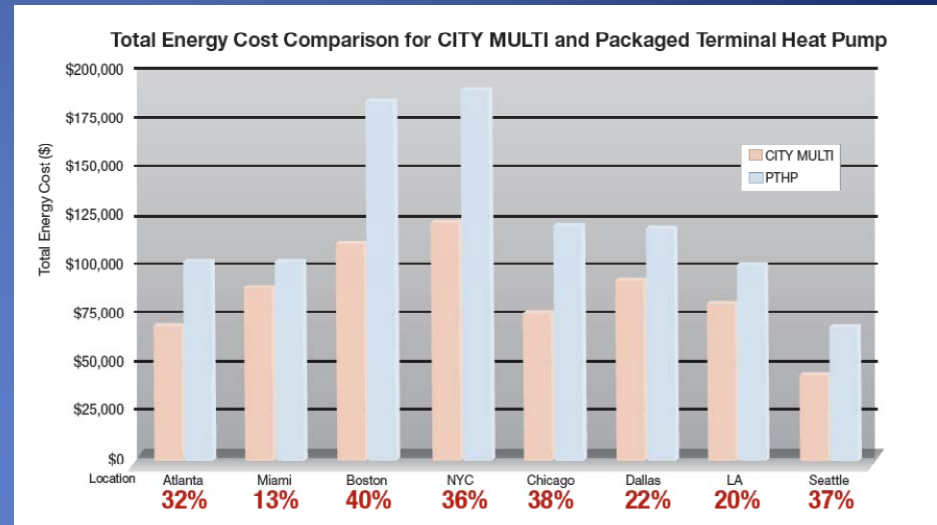
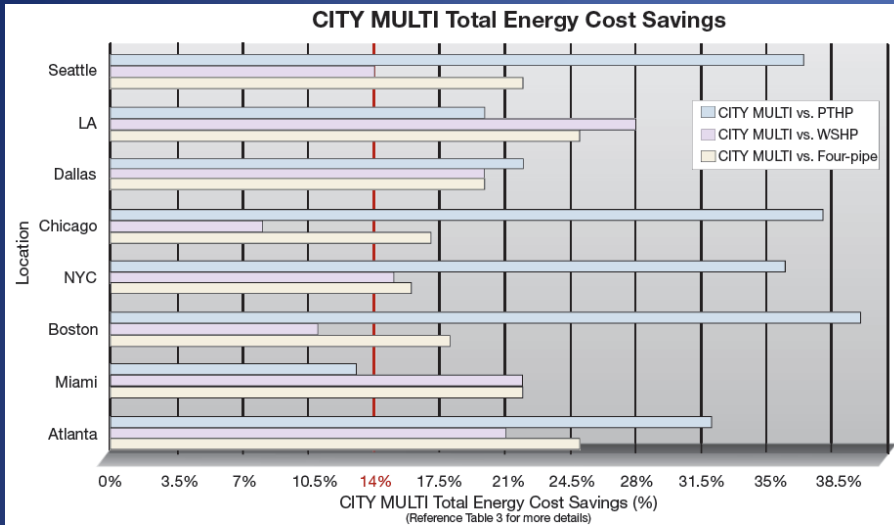
VRV at work – 100% cooling



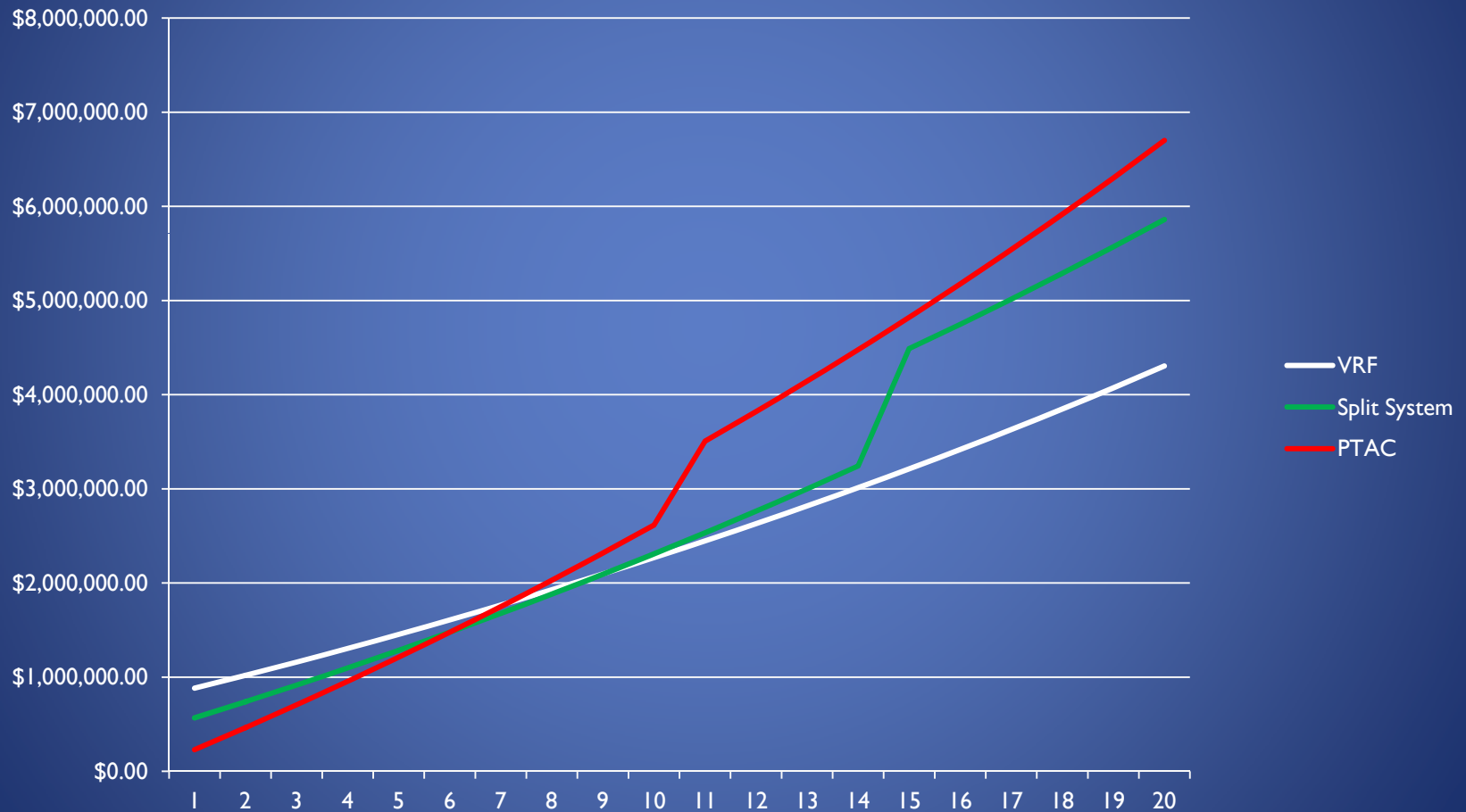
VRV at work – 50:50



Data from Energy Pro



Cost model for New Residence Halls



The facts

- Renovated 1960's building – Downs Hall.
- 2 Pipe original system to the building.
- 14.81% electrical consumption reduction.
- 43% natural gas consumption reduction.
- Simple payback of 17.9 years. Excluding design and demolition costs, 16.7 years.

Questions?

