SAN ANTONIO ENERGY LEADERSHIP/ TEXAS RENEWABLS 2003

Human Comfort and Daikin VRV system

Nov. 20, 2003

TAKATOSHI İSHIGURO

DAIKIN VRV[™] is ...

Variable Refrigerant Volume

Do we need constant room temperature ?

Yes... No...

We need comfort ! Depending on Activity Age Sex Philosophy Environment



What is Daikin VRV System

Minimize the number of outdoor units (compressors) Maximize the number of controls (indoor comfort)





Higher Energy Efficiency for Cooling at Medium Demand than at Peak Demand

160% 85F 150% **91F** 140% 131 129 124 124 130% 123 117 103F 120% 111 110 105 110% 100 680 San Antonio Summer Design 100% 595 Temp 97F 510 90% 75% 425 90 80% 340 340 75% of total operation **Operation Hours** 255 hours-less than 70% of full load of Main Machine 70% (EPA Energy Star Office Buld. Simulation) 170 85 60% 70 0 10 20 30 40 50 60 80 90 100 **Cooling Demand (%) Peak Cooling Demand**







System Comparison



Conventional Air Source Split Heat Pump

1 indoor unit for each apartment, with corresponding outdoor unit. The total is 12 outdoor units.



Daikin VRV system

1 indoor unit for each apartment, with 1 outdoor VRV heat pumps for each of the 4 units in each building. The total is 3 outdoor units.

Case Study; Villas del Norte - Schematic Plan







Case Study; City of Nagoya – Life Cycle CO2

- Location: Nagoya City, Japan
- Gross Area: 1,457 m2
- System Description: VRV System

vs. Gas Engine Heat Pump (Existing System)

Life Cycle CO2 Camparison (Small Municipal Office)



Case Study; City of Nagoya – Life Cycle CO2

- Location: Nagoya City, Japan
- Gross Area: 13,640 m2
- System Description: VRV System

vs. Gas Fired Absorption Machine (Existing System)





ワシントンホテル用途別割合比較(3)