

Fremont City Schools
HVAC MEETING
Thursday, January 22, 2009
9:00 a.m.

Attending: David Chambers, Greg Edinger, Tim Ellenberger, Jim Fails, Red Haslinger, Gordon Keck, Tim Lehman, Curt South, Dr. Kim Theller, Jim Wagner

Power Point Presentation – Overview of available of heating-cooling systems

I. Water Source Heat Pumps (15-20 yr. life expectancy)

- outside classroom space-takes less floor space
- located above ceiling or below
- most energy efficient
- long term maintenance higher
- noise level higher
- higher installation cost

Discussion on how cost is affected w/geothermal

II. Variable Air Volume (VAV) – Fan Powered/Reheat (35-40 yr. life expectancy)

- above ceiling
- boilers (flex water/cast iron/high efficiency condensing)
- chillers outside air cooled station
- heat recovery lowers costs
- consistent noise level
- central air handling – lose larger area if goes out
- noise level could be higher than LEED acceptable

III. VAV – Hot Water

- no fan in terminal – done by air handler
- very energy efficient
- noise levels
- air flow mixing

Discussion:

With all systems each space has own thermostat

All provide same amounts of outside air, etc.

FAN – Constant air flow quantity, filter at each terminal, fan/motor each terminal

REHEAT – Variable air flow, AHU filter only, AHU motor only

Similar building operation, life expectancy, req. components, installation costs

IV. Thermal Storage – Partial Ice Storage System

- Takes advantage of “off peak” electric rates if available w/utility company
- Must consider night time noise in residential neighborhood
- Full storage system
- Partial storage system – reduce size of chiller-not time (not just night time use) more bang for buck

V. Dedicated Heat Rec. Chiller – Heat off chiller used in areas where needed

VI. Displacement Ventilation

- Air delivered low to floor at low velocity
- Better indoor air quality
- Requires 2 independent systems

VII. Active Chilled Beam System

- Heating/Cooling in ceiling system
- Key is positive operating cost savings
- Water not as cold
- Reduction in air flow requirements
- Alternative chilled water sources
- No motor to cool

VIII. VRV – Newer Technology (25-30 years life expectancy)

- Heat recovery simultaneous heat & cold
- Multiple outdoor units
- Circulating refrigerate – certified maintenance people

SUMMARY:

Heat Pump	Least Per Year	Minimal Annually Heavy Long Term
VAV Reheat	Most Per Year	Medium Annually Medium Long Term
Displacement	Less than VAV Reheat	Minimal Annually Minimal Long Term
Chilled Beam	Slightly more than HP	Minimal Annually Minimal Long Term
VRV	Same as VAV Reheat	Minimal Annually Medium Long Term

NOTE: All roofs designed to be solar ready per OSFC