



VRV/VRF – A Consultant’s Perspective

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Introduction

- Design considerations for the sizing and selection of VRF/VRV
- Sizing considerations, and diversity allowances on system sizing.
- Energy efficiency compliance requirements, and considerations of the system performance
- Limitation of the VRF/VRV systems with respect to de-humidification and effect on system sizing and selection.



Design Considerations

- Types of projects suitable for VRF
 - Cooling capacity range?
 - Consolidated plantrooms
 - Extended pipe runs
- System selection
 - Heat pump vs heat recovery



Sizing Considerations

- Indoor units
 - Easy, just match your heat load
- Outdoor units
 - Get a bit trickier



Sizing Considerations

- Outdoor units
 - Heat pump vs heat recovery
 - Diversity on the system
 - Refrigerant concentration AS5149.1:2016 (the standard formerly known as AS1677)



Heat Pump vs Heat Recovery

Heat Pump

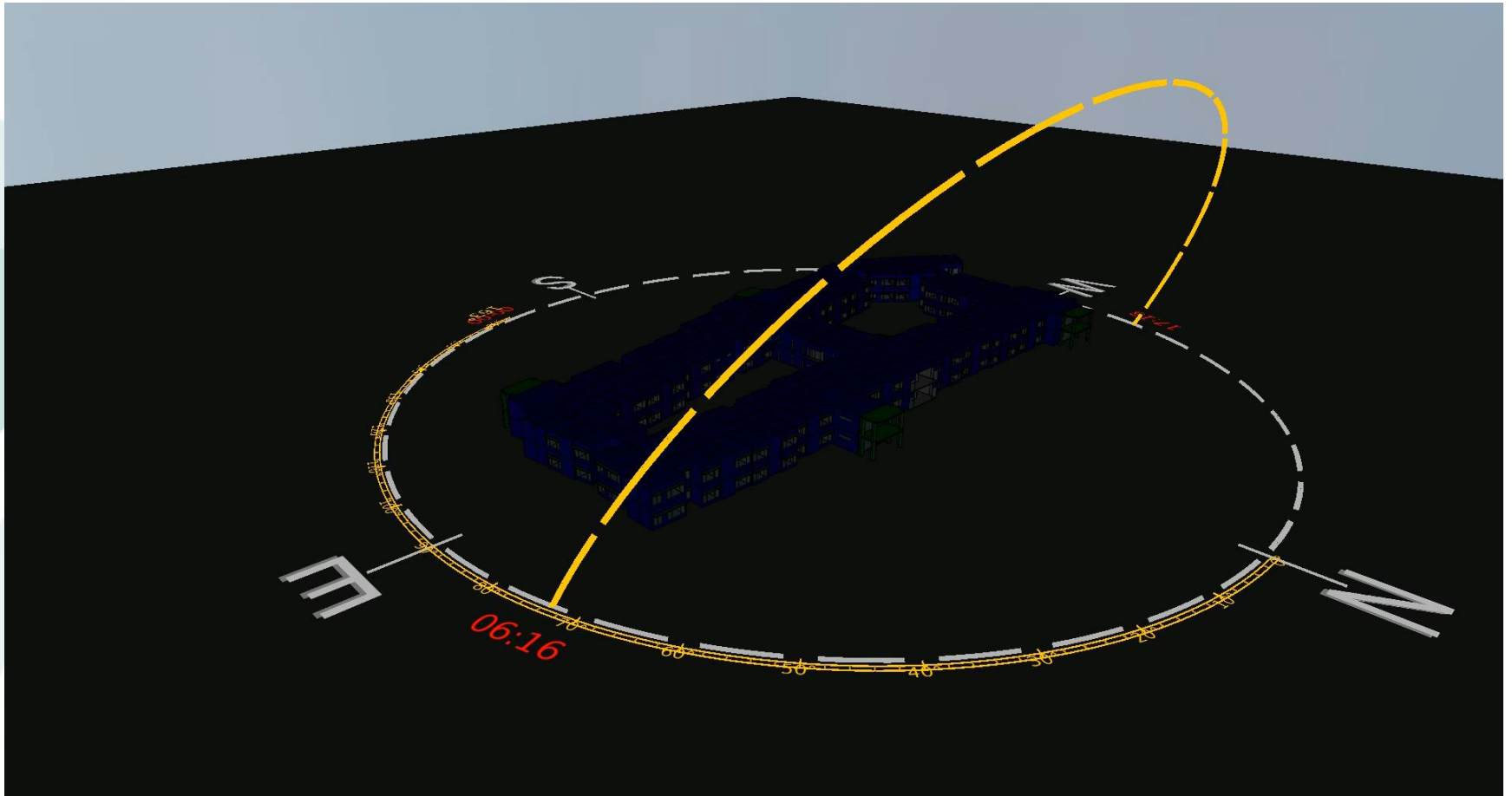
- Cheaper
- Less pipework
- Less refrigerant
- Only heating or cooling (master controller)

Heat Recovery

- Can provide simultaneous heating and cooling on the same system



Heat Pump vs Heat Recovery





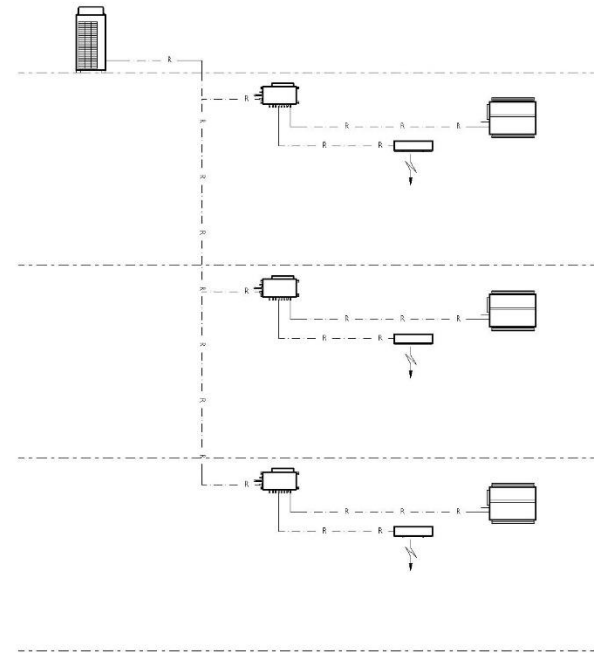
Energy Efficiency

- Minimum energy efficiency governed by
 - AS/NZS3823.1.4:2012 “Performance of electrical appliances - Airconditioners and heat pumps - Multiple split-system airconditioners and air-to-air heat pumps - Testing and rating for performance (ISO 15042:2011, MOD) “
- Otherwise known as the Minimum Energy Performance Standards (MEPS)



Performance

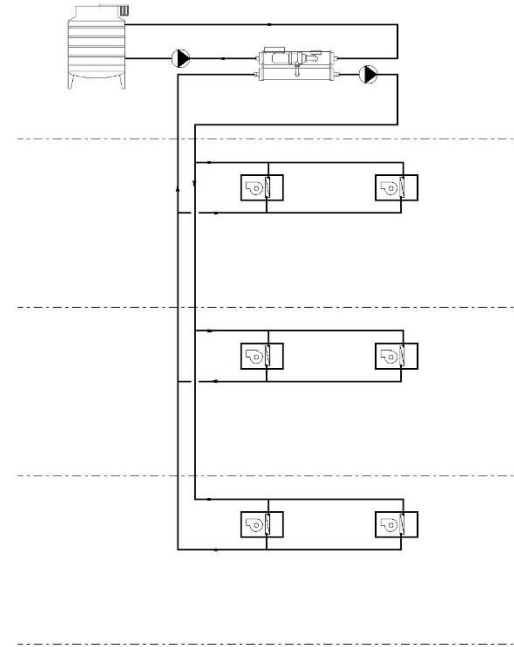
- Energy consumption stated in the manufacturer's literature will include:
 - Outdoor unit
 - Fan-coil units
- Under “nominal” conditions
 - Pipe length, elevation, temperature etc.





Performance

- Energy consumption will be for the chiller only
- Need to include parasitic loads
 - FCUs, AHUs
 - Pumps (CHW, CDW)
 - Cooling tower





Limitations

- De-humidification
 - High outdoor air applications (e.g. meeting rooms, theatre)
 - Similar to DX systems (i.e. limited coil depth, hence limited dehumidification)
 - Solution: Outdoor air processing unit