



# High Rise Residential HVAC

## Who's paying the bills?





## Who and how to bill?

- Central Laundry
- Centralised Hot Water
- Gardens
- Lifts
- Gymnasium
- Pool



## Who and how to bill?

- Split systems
- Water cooled package units
- VRV
- Chilled/Hot Water
- Central Thermal Plant with Tri-gen

Disclaimer – These opinions has been based on discussions with major developers and builders. In all cases any reference to strata titles, strata fees and strata by-laws should be referred to legal counsel specialising in these areas.





# Split Systems

- Pros
  - Easy
  - Unit often installed by builder and novated to strata owner
  - Strata owner responsible for maintenance and replacement
  - Power from apartment power board
  - All power paid to by strata owner
  - Competitive pricing
- Cons
  - Condensing units on balcony
  - Remote condensing units limited by refrigerant run length
    - Long power runs from apartment



# Water Cooled Package Units

- Pros
  - Compact
  - Unit often installed by builder and novated to strata owner
  - Strata owner responsible for maintenance and replacement of package unit
  - Power from apartment power board
  - No refrigeration pipework
  - No height restrictions
- Cons
  - Cooling tower power
  - Water treatment
  - Condenser water pump power
  - Compressor in the apartment
  - Less manufacturers/competition
  - Mixed use building NABERS separation
    - Additional pumps
    - Additional cooling towers





# VRV/VRF

- Pros
  - Increased pipe length
  - Reduced plant space
  - More energy efficient
  - Can be air or water cooled
  - Lowest noise levels
- Cons
  - Only fan power comes from tenant board
  - Can't novate to tenant as they can't replace with generic
  - Who maintains
  - Failure in one apartment can affect entire system
  - Heat recovery systems increase cost
  - PPD option (energy apportioning) but can it be implemented successfully
    - No incentive to turn off



# Chilled/Hot Water

- Pros
  - Quietest
  - Higher efficiency
  - Could novate to tenant
    - Only the fan coil unit
    - May unbalance system
- Cons
  - Only fan power comes from tenant board
  - Larger maintenance requirements
  - High cost
  - Thermal metering is possible (\$\$\$) but can it be implemented successfully
    - No incentive to turn off
  - Mixed use building NABERS separation
    - Additional pumps
    - Additional cooling towers
    - Additional chillers
    - Additional HHWU
    - Very complex metering, thermal and electrical





# Central Thermal Plant with Tri-gen

- Pros
  - Same as Chilled water
  - Diversified over larger population
  - Diversified over different building uses
  - Greater choice of heat sink
    - Absorber
    - DHW
    - HHW
- Cons
  - Same as chilled water
  - Even higher cost and maintenance
  - Specialised onsite operation team
  - Thermal metering is possible (\$\$\$) but can it be implemented successfully
    - No incentive to turn off
  - NABERS rules for shared services/tri-gen

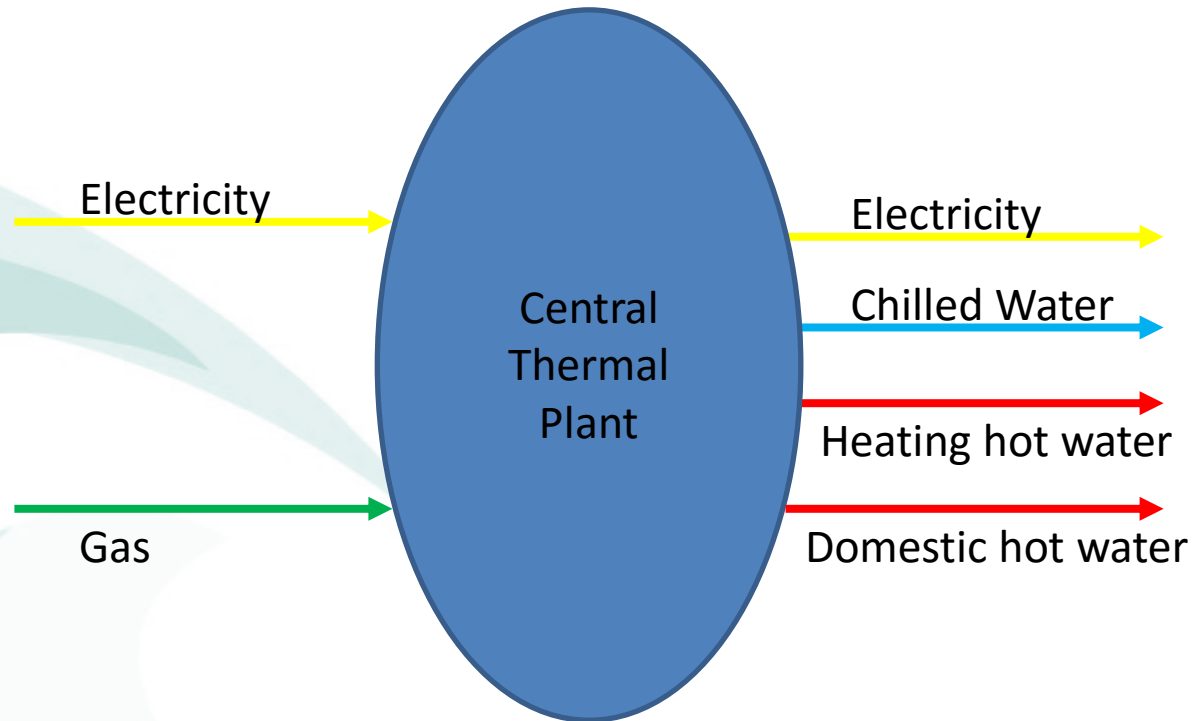






# NABERS for Central Thermal Plant

## Simple Model



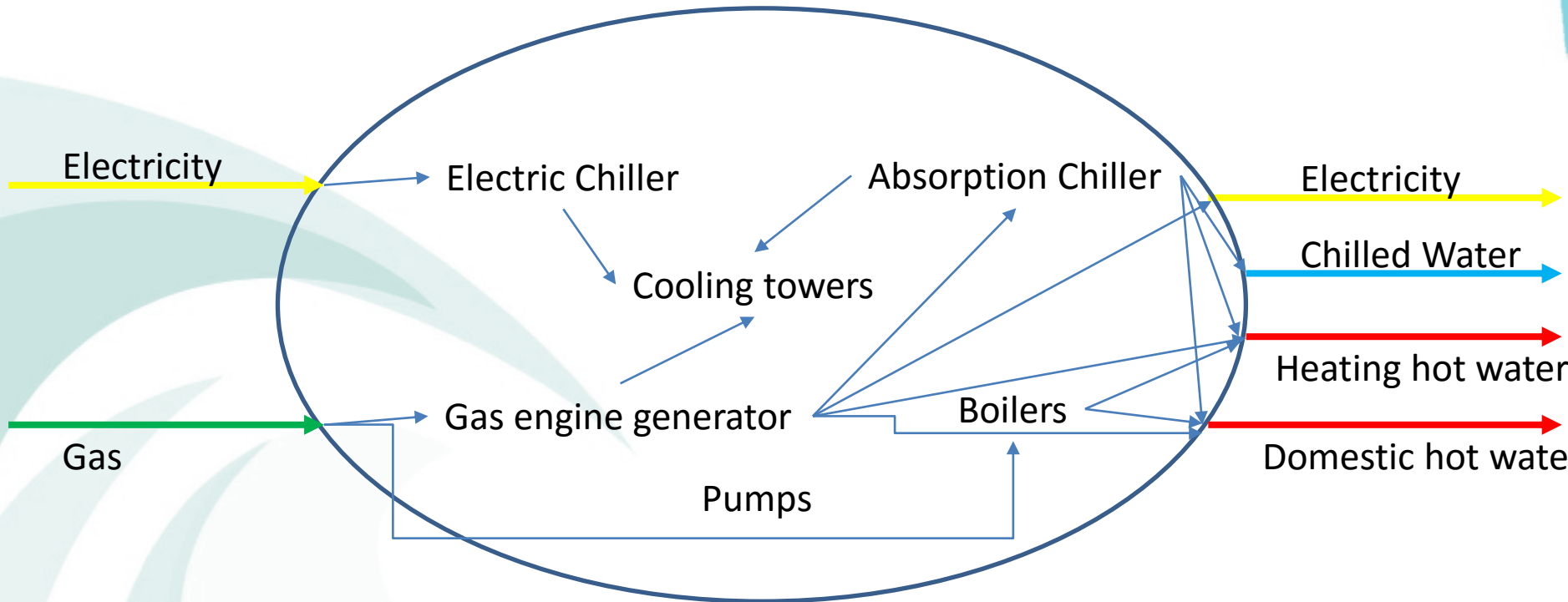
How many kWhr/MJ/\$ per kWhr of Service?





# NABERS for Central Thermal Plant

More Real Model



Central Thermal Plant

How many kWhr/MJ/\$ per kWhr of Service?





## So who pays?

- \$/sqm strata fees
  - No incentive
- Thermal Energy Supply Agreement (TESA) between provider and Strata Plan
  - Accurate monitoring of thermal and utilities
  - Strata Plan is incentivised to encourage energy efficient practise of tenants



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