

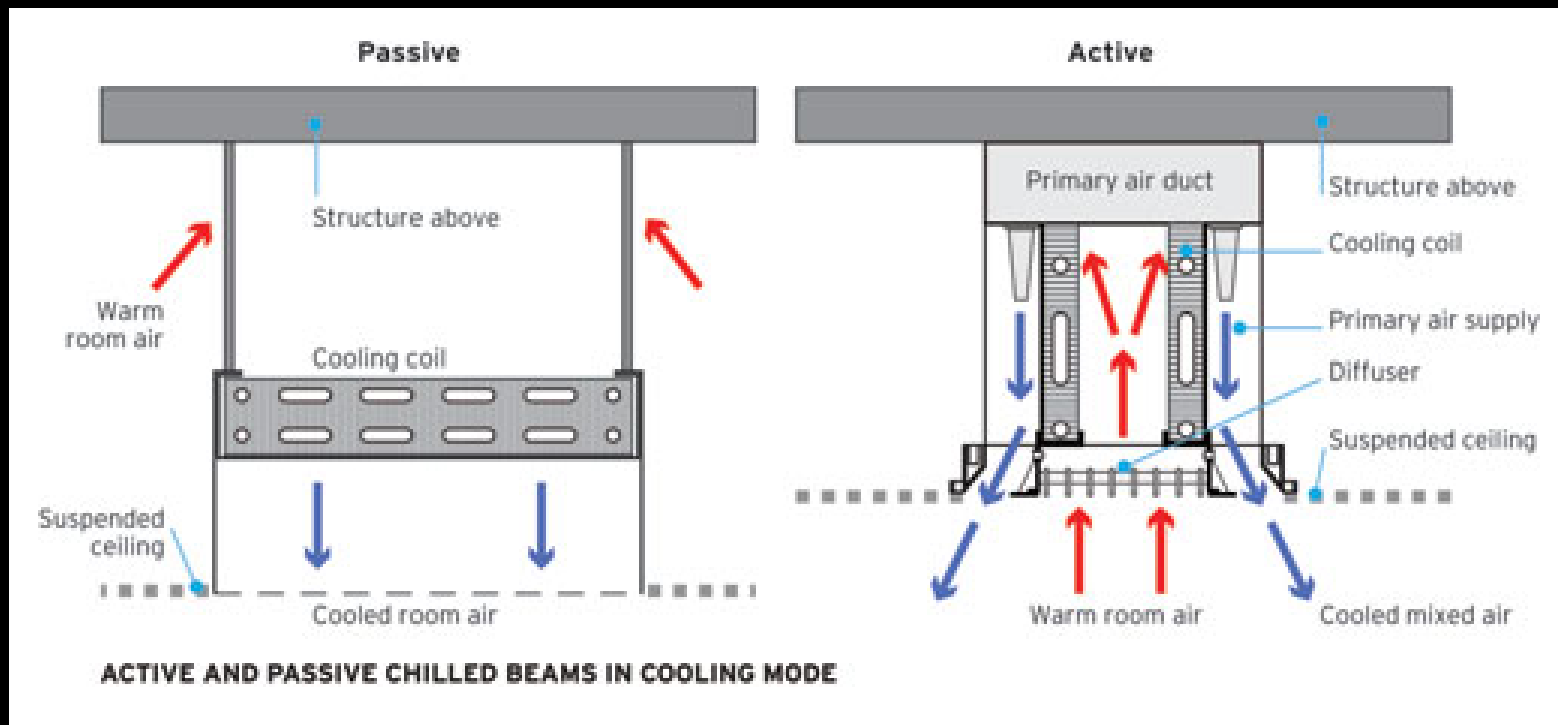


# What's Driving HVAC Developments?

- **Sustainability – energy/ water Heating Ventilation Air Conditioning**
  - 40 -70% of energy use in commercial buildings
  - $\approx$  30 % of water use in commercial buildings
- **Amenity and Productivity**
- **Risk**
- **Cost !**

# Chilled Beams

- ‘Ceiling’ Cooling usually in Conjunction with Displacement Ventilation
  - low energy and improved IEQ
- Active or Passive
- Large Scale
- Small Bore Piping, Valves and Coils
  - blockages; filtration and back flushing
  - noise; de-aeration
- European Technology Transfer
  - construction / installation



**Chilled beams** are either passive or active. Both types rely on convection for cooling, but active beams are integrated with ventilation air supply

Images courtesy of SmithGroup



# Chilled Beams

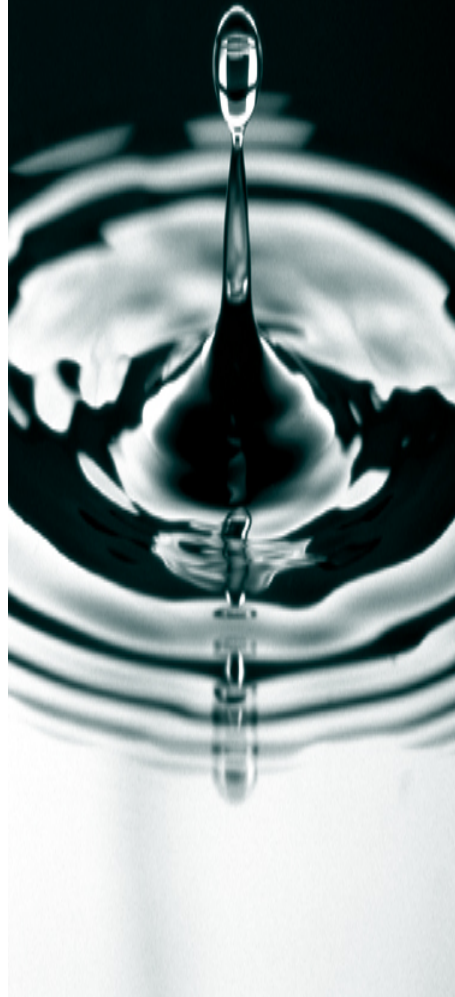
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# Cooling Towers

- ‘Free Physics’
- Adiabatic Coolers
- Fluid Coolers
- Water Reuse
  - recycling, filtration, reverse osmosis etc
  - reclaim sources
- Water Management Plans
  - water Balances
  - metering



# Water Reclaim/Reuse Systems



- Black Yellow Grey and Rain
- Examples: The Gauge, ANZ HQ, Council House 2 – Leading Green Buildings

*‘Reclaimed water used in or available to the building for use in the building or elsewhere’*

- various technologies and challenges
- high cost /site ‘supply’ issues / commissioning / set up / limited reuse applications / operating costs

# Refrigeration

- High Efficiency and Absorption Chillers
- New and Alternative Refrigerants
- Refrigerant Containment and Reclaim
- Legislation
  - management, licensing, training - ARCTick™



# Installation and Commissioning

- **Installation**
  - new coupling systems or new applications
  - pre fabrication
  - materials
  - water and gas metering
  - carbon footprint
- **Commissioning**
  - Green Star and CIBSE
  - Commissioning Management Plans
  - performance outcomes

# HVAC Developments

**Drivers = Sustainability/Amenity/  
Productivity/Risk/Cost**

- Chilled beams
- Cooling towers
- Black Yellow Grey Rain water reclaim/ reuse systems
- Refrigeration
- Installation, commissioning methodologies