CH2 has been designed to reflect the planet’s ecology, which is an immensely complex system of interrelated components. Just as it is impossible to assess the role of any part of this ecology without reference to the whole, CH2 comprises many parts that work together to heat, cool, power and water the building, creating a harmonious environment.

This navigational tool allows interactive viewing of the innovative and interconnected design elements of CH2, building on a series of 22 Fact Sheets available on this website. The Fact Sheets show how the building works during the day and night, and in winter and summer modes.

See:

>> FACT SHEETS - HOW THE BUILDING WORKS
>> THE CONSTRUCTION + FITOUT PHASE
>> THE CH2 DESIGN PROCESS + LESSONS LEARNED
Wind driven cowls will generate electricity during the day.

**Turbines**

**Summer Mode**

**Night Mode**

**Winter Mode**

**Day Mode**

**Roof Top Energy**
Includes photovoltaic cells, solar hot water panels, a gas-fired co-generation plant and wind powered turbines.

**Healthy Air**
100% outside air supply via vertical ducts deliver air floor by floor to sealed access floor plenum.

**Shower Towers**
Air and water falls to provide cool water for building reticulation and cool air to supplement ground floor and retail cooling.

**Chilled Ceilings**
Occupants experience ‘coolth’ by radiating heat to chilled ceilings overhead.

**Displacement Air**
Fresh air fed at low speed through controllable floor vents.

**Exhaust**
High level ceiling exhaust ensures complete emptying of warm air in ceiling spaces.

**In indoor env. quality**

**Phase Change Material**
Water is piped to phase change plant for re-cooling.
**Wind Cowls**
Assist purge ventilation by drawing air from individual floors through north ducts.

**Thermal Mass**
Heat build up in the concrete ceilings from the days activities is removed by the cool night air.

**Night Purge**
During the night purge windows automatically open - cool night air cools down the internal space.
Shading + Light

Light shelf + balcony floors provide horizontal shading from northern sun.

Ambient and direct daylight bounces off external and internal light shelf.

Vertical planting

Green north facade and roof top assists shading, glare + air quality.

Access to nature enhances productivity by relieving stress.

Water collection

WATER INITIATIVES

ENERGY INITIATIVES

ENERGY SYSTEMS

INDOOR ENV. QUALITY

Glen control

Landscape planting to window mullions helps reduce city glare.

Heating mode

Heated water pipes only required during early winter mornings.
timber shutters
Operable, vertical timber shutters provide full summer shading while still allowing filtered daylight and views.

summer terrace
Edge space for thermal buffer, social interaction and vertical circulation.

the bark
Protects the inner facade from direct exposure by the elements. Fresh air naturally ventilates the toilets.

water mining
A multi-water treatment plant will harvest water from the Little Collins st. sewer.
Instead of supplying the office spaces with about 85% recirculated air, as is normal in typical variable air volume air conditioning systems for office buildings, CH2 will not recycle any air. All the air supplied to the office spaces will be 100% filtered fresh air drawn from roof level, supplied via the south ducts and exhausted via the north ducts.

Displacement air
Boundary layer created by displacement air supply.
Occupant and equipment heat plumes

Healthy air
100% outside air supply to sealed access floor plenum

Exhaust
High level exhaust exit ensures complete emptying of warm air in ceiling spaces.
Exhaust plenum at slightly negative pressure, induced by north flues’ ‘stack-effect’ and wind-powered turbines.

Floor diffusers
Floor mounted, user controlled air diffusers with ‘twist’ outlets, encourages air to mix, improving circulation.
CH2 is a healthy building, with clean, fresh air and non-toxic finishes helping staff stay healthy, alert and effective at work. Physical and visual access to nature is encouraged by providing shared edge spaces for social interaction or private escape.

- **Sun Control**: High angle sun protected by 1m balcony extension and light shelf.
- **Glare Control**: Controlled by internal blinds and screens at window line.
- **Vertical Greenery**: To balcony sides screen low angle sun + filter glare.
- **“Green” North Edge**: Provides opportunity for daily interaction with nature.
- **Deep Splayed Window**: Reveals reduce glare.
- **Shared Space**: Edge space for breakout, social interaction and circulation.
Energy Flows

- Low energy computing
- Low energy lighting
- Electricity from co-generation
- Heat from co-generation
- Heat recovery
- Solar hot water
- Solar photovoltaic cells
- Wind turbines
- Shower towers
- Phase change material

see fact sheet

ENERGY SYSTEMS
TURBINES
SHOWER TOWERS
CHILLED CEILINGS

16degC 
piped from phase change plant

thermal mass
Passive cooling: thermal mass in concrete slab during daytime absorbs excess heat from the space.

chilled ceilings
Active cooling: chilled ceiling panels absorb radiated heat from equipment and occupants.
Radiant cooling descends into the workspace at around 18 deg C.

19degC 
piped to phase change plant for re-cooling

rising warm air 
convective cooling
some convective cooling occurs over chilled ceilings

descending cool air 
convective cooling

low energy equipment
significant energy savings by use of low energy equipment and lighting

EDC2
Much effort has been invested in ways to cool, rather than heat, the building. This is because human activity and electronic equipment give off vast amounts of heat. The building and its air-conditioning system are designed to capture and use that heat so the major need for energy is for cooling.

“chilled beams”
Glass heats up from solar radiation and ambient air temperature.
Chilled water runs through filament radiator coils.
Heat gain is absorbed by falling chilled air from chilled beam.

water pipes
Floor mounted heated water pipes draw in cool air and heat - providing rising current up face of glass.
The rising heated air reduces heat loss at window face.
Solar radiation is mainly reflected - some heat gain is allowed to enter the space to help boost heating for colder mornings.
Lower floors receive less daylight than upper floors so windows on the north and south facades are larger on the lower floors than the upper ones. This allows the total amount of glass to be minimised, reducing energy loss, while maintaining desirable natural light levels.

Shading to control sun and glare will be used on the north, east and west facades.

**Light + Shading**

- **Light shelf**
  - Ambient and direct daylight bounces off external and internal light shelf.

- **Shading**
  - Light shelf + balcony floors provide horizontal shading from northern sun.
  - Internal upward rolling retractable blind controls high level glare.

- **Timber screens**
  - Manually adjustable vertically sliding timber screens block direct low angle sun and maintain views.

**Vertical green shading**

Vertical greenery to balcony sides screen low angle sun + filter glare.

**Ambient and direct daylight bounces off external and internal light shelf.**

**See fact sheet**
About 100,000 litres of black (toilet) water a day will be extracted from the main sewer in Little Collins Street. The sewage, along with any generated on site, will be put through a multi-water treatment plant. The treatment plant and building rainwater collection will supply 100 per cent of non-drinking water for water cooling, plant watering and toilet flushing needs.
Breakout balconies, winter gardens and roof tops are extensively landscaped to provide occupants access to nature. Recycled water is used in vertical gardens running the full height of the northern façade. The vertical gardens assist with shading, glare and air quality. Plants will be grown from special planter boxes built into the balconies on every storey.

**Landscape**

- **Glass Louvres**: Adjustable glass louvres allow the sun's heat to be trapped during winter for a warm winter garden environment. In summer, louvres are opened for maximum ventilation.
- **Timber Shutters**: Opened in winter for filtered light and vertical air movement. In summer, shutters track sun for full shading.
- **Double Height Winter Garden**: Encourages air movement and social interaction between floors.
- **Landscape Tree**: Provides glare control, movement for visual pleasure, shade and healthy air quality. Access to nature enhances productivity by relieving stress.
- **City Outlook**: Opened in winter for filtered light and vertical air movement. In summer, shutters track sun for full shading.