Eco-Building Cuts CO2 87%, Electricity 82%, Gas 87% and Water 72%: Eco-Building - Council House 2 (CH2) New Municipal Office Building

SUMMARY

Melbourne Council House 2 (CH2) is a multi-award winning and inspirational building that has reduced CO2 emissions by 87%, electricity consumption by 82%, gas by 87% and water by 72%. The building purges stale air at night and pulls in 100% fresh air during the day. The building exterior moves with the sun to reflect and collect heat, and turns sewage into usable water. The building has improved staff effectiveness by 4.9% and will pay for its sustainable features in a little over a decade.

WHAT IS IT?

Council House 2 is a 10-storey office building for about 540 City of Melbourne staff, located at 240 Little Collins Street, Melbourne Australia. It has ground-floor retail spaces and underground parking and was officially opened in August 2006.

HOW DOES IT WORK?

CH2 has been designed to copy the planet’s ecology using the natural 24-hour cycle of solar energy, natural light, air and rainwater, to power, heat, cool, and water the building.

- **Heating**: CH2’s north façade has 10 dark colored air ducts that absorb heat from the sun; the hot air rises taking the stale air up and out of the building. The south façade has light-colored ducts that draw in 100% fresh air from the roof and distribute it down through the building. The west façade has louvers made from recycled timber that move according to the position of the sun and are powered by photovoltaic roof panels.

- **Water**: CH2 takes about 100,000 liters of toilet water every day from a nearby sewer in Little Collins Street. This sewage is then processed, along with sewage from the building, through a multi-water treatment plant on site. The system filters out the water and sends the solids back to the sewer. (City sewers typically hold about 95% of water, this water is a burden to the system and would otherwise be wasted). The
extracted water is treated using a micro-filtration system that creates A-grade clean water suitable for non-drinking uses. Some of the recovered water is used for water-cooling, plant watering and toilet flushing, the rest is used in other council buildings, city fountains and used to water plants.

- **Technology:** The sustainable technologies used in CH2 are not new, but they have never been used collectively before in Australia. They include:

| parking Spaces: | 80 |
| showers for cyclists: | 9 |
| car spaces: | 20 plus one disabled space |

- **Goods and Services:** Contractors, service providers and companies supplying products are required to meet strict standards of sustainability in their products and services. As a result CH2:

  - has the largest per capita expenditure on green products across all categories, including recycled, energy saving, water-saving and non-toxic products;
  - won the UN Association of Australia World Environment Day Awards.
BUILDING COSTS

Total building costs $51.045 million, including:
• $29.9 million for the base building (2,334$/m² or 58.5% of cost)
• $11.3 million for sustainability features (884$/m² or 22.1% of cost).
• $2.8 million on education and demonstration (218$/m² or 5.5% of cost).
• $7.1 million on requirements specific to Council use, such as special design and communications (553$/m²) (13.9% of cost).
FINANCIAL SAVINGS
Total financial savings of $1.45 million annually, including:
• $1.12 million through effectiveness and wellbeing improvement.
• $330,000 in electricity, gas and water
CH2 will pay for its sustainability features, worth $11.3 million, in a decade.

ENERGY EFFICIENCY
The building consumes 373,012 kWh of electricity and 65,963kWh of gas annually. Compared to the previous Council building (c1970), this equals savings of:
• 82% electricity consumption
• 87% gas consumption
• 72% mains water supply
• 4.9% improvement in staff effectiveness as a result of the healthier building (clean fresh air and non-toxic finishes)

APPLICATION

CH2 has been successful because it has taken a ‘ground up’ green design approach, for example:
• designers considered the best environmental options and solutions
• recycled products such as concrete, cement, steel and timber were used in construction
• sustainable and energy savings products were used at every point
• a formal accreditation system was set up requiring all contractors, service providers and companies supplying products, to meet strict standards of sustainability in their products and services.