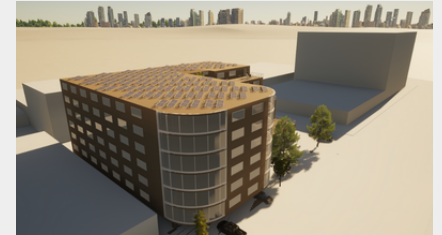




# Monash Sustainable Buildings ECO OFFICE



## PROJECT SUMMARY

According to the Property Council of Australia, building spaces in Melbourne's Central Business District (CBD) were still half empty in November 2022 despite the lifting of work from home recommendations earlier in the year. This trend was a result of companies downsizing to accommodate remote staff and a shift away from the CBD to fringe suburbs. The latter being popularised by maintaining accessibility to public transport and amenities, whilst benefiting from the slower pace and increased connectivity of the suburbs.

For those who spent significant time at a desk over COVID-19 lockdowns, the appeal to work entirely or partially remotely continued, even after work from home restrictions were eased. As such, there is a need for flexibility in space rental and in the size of offices. The main target market for this design is office workers, specifically individuals or companies seeking coworking arrangements. We have created a tiered coworking business model that will give members access to different spaces depending on what best suits their needs. All floors have an open plan concept with modular furniture, and in some cases moveable walls, to encourage customisation and efficient use of spaces.

## DESIGN STRATEGY

Drawing inspiration from the Living Building Challenge, Green Star and the WELL Rating Scheme, combined with our team's, Monash Sustainable Buildings, personal values, our final project outcomes are: health and happiness, high-performance, circularity and education. These goals were iterated on over the competition and were selected on our team's larger goals as well as our intentions with this design.

### TECHNICAL SPECIFICATIONS

- R-values:
  - Wall: R6.6
  - Foundation: R6
  - Roof: R12.7
  - Windows: R2
- HVAC: Water recycling, cooling tower, HRV unit
- Onsite PV: 225 kWh

### PROJECT DATA

- Location: Melbourne, Victoria, Australia
- Climate Zone: 3C
- Lot Size: 21,797 ft<sup>2</sup> (2025 m<sup>2</sup>)
- Building Size: 104,840.5 ft<sup>2</sup> (9740 m<sup>2</sup>), 7 storeys
- Occupancy: 450 people (233 ft<sup>2</sup>/person)
- Construction Cost: 16,857,875 USD (25,000,000AUD)
- Energy Performance: 51 kBtu/ft<sup>2</sup>/yr
- Embodied Carbon (lifetime): -13.89lbs CO<sub>2</sub>e/ft<sup>2</sup>  
(-6.78E+01 kg CO<sub>2</sub>e/m<sup>2</sup>)

## PROJECT CONTESTS

### Architecture

Eco Office balances between serving office workers and the local community. We used green architecture, connection to nature and large windows, with a window to wall ratio of 40% to minimise energy losses, to boost the occupants' mental wellbeing. We also included flexible furniture options, food and beverage stores and wellness spaces.

## Engineering

We leveraged passive design principles to reduce the building's energy consumption and mechanical loads. We also focused on building circularity, completing comprehensive life cycle analysis and implementing onsite rain- and grey- water management.



## Market Analysis

Our team undertook detailed research into how to best design and market to our target audience. We focused on creating a strong narrative and design goal refinement to guide our design decisions and shape our final outcome.

## Durability and Resilience

Our office building makes use of sustainable, durable and aesthetic building materials. Proper installation of green thermal insulations and strategic fire safety planning will mitigate the effects of potential onsite fires.

## Embodied Environmental Impact

We conducted a life cycle assessment from cradle to cradle. Eco Office maximises use of local low carbon, durable and natural, reclaimed, recycled or recyclable materials. This reduces upfront transport and manufacturing related emissions, as well those associated with building component maintenance throughout its operational life.

## Integrated Performance

Selected systems are integrated within the building's envelope. Onsite energy generation and storage, passive design elements and minimisation of active HVAC using mechanical ventilation to recover 92% of indoor heat have ensured a balance between occupant comfort and achieving the target EUI.

## Occupant Experience

We have combined principles of universal design and research of local office building trends to ensure an optimal building experience for all people. The office is wheelchair accessible, has intuitive signage and centred elevators to minimise occupant maintenance. We integrated automated systems such as HVAC, lighting and security.

## Comfort and Environmental Quality

Plant based phytoremediation systems will be used to improve air quality, and reduce active heating, cooling, and ventilation loads. We also employed natural and automated circadian lighting and materials with natural finishes, as well as achieved noise reduction through sound insulation materials in the wall and floor layers.

## Energy Performance

Our design adheres to specific aspects in the Green Star building certification so that it has potential to be sustainably accredited by Green Star. We have optimised the building design and measured key performance targets of EUI using DesignBuilder. To improve insulation, we decided to use double glazing windows with argon gas and e-coating. For heating, 18 air to water 35kW heat pumps with a system coefficient of performance (COP) of 4 will improve energy efficiency. For cooling, a cooling tower will be used to reduce pollution. We will incorporate solar tariffs so that we have an indication of excess energy that can be imported back into the grid, to generate savings that can be considered in payback period calculations.

## Presentation

Our team will give our final presentation to our team's alumni and industry experts at our annual Industry Night. This will help us to refine our speeches, practise our public speaking skills and get diverse perspectives on our final design.

