



Office works

Umow Lai's new Melbourne tenancy is the first in the state, and one of just two in Australia, to have achieved a 6 Star Green Star – Office Interiors rating. However, as **Sean McGowan** reports, the space retains an undeniable low-key look and feel. It's a sustainability star without the bling.

When Umow Lai set about fitting out its new Melbourne office in late 2006, it did so in the knowledge that to practice what the consultancy preaches meant pushing the boundaries of ecologically sustainable design and delivering an outcome that was both commercial and cost-effective, while achieving the best possible result for its staff.

The resulting space has since seen the consultancy break new ground by achieving the ultimate 6 Star Green Star – Office Interiors v1.1 rating, which according to Shane Esmore, Umow Lai director and head of sustainability, reinforces its reputation and expertise in the area of sustainable engineering.

"If we were going to put the effort into doing a fit-out, we wanted to do

one that represented who we are and demonstrated what we do. We decided early on we'd target the 6 Star rating," he says of the firm's decision to relocate to a larger space to cater for its growing staff numbers.

"When you look at the productivity gains we are achieving, it's paying for itself quite easily."

"Primarily, we wanted to provide a much better working environment for our staff, particularly focused around the indoor environment quality. We also wanted it to be something that was very accessible from a commercial point of view, so that

any commercial client could look at it and say that's something they could do."

By delivering on its Green Star objective and improving the indoor environment of the office, tangible improvements in office productivity have followed, proving that sustainability extends beyond the environment.

Results from independently conducted pre – and post-occupancy studies, details of which are due for release in coming months, demonstrate a strong increase in satisfaction for the work space and indoor environmental quality among staff, with overall office productivity increasing by 13 per cent.

Adding further to this achievement is the fact it was done in a "not-so-green" base building.



The meeting room makes good use of natural light. In another meeting room phase-change material is used to control temperature.

And while the HVAC design includes an array of impressive sustainability innovations, this 1256 sq m inner-suburban office dismisses the notion that world's best practice must be a reinvention of a traditional office space.

BIO-FILTRATION WALLS

The inspiration for Umow Lai's most striking features – its five bio-filtration walls – came from the ongoing research work the team conducts on new technologies around the world.

Having identified bio-filtration as an innovative and effective method of improving indoor environment quality, Esmore traveled to Canada's University of Guelph near Toronto, where the technology had been developed and commercialised.

After striking up a relationship with inventor Professor Alan Darlington,

Esmore came back with the knowledge required to implement a similar design here.

"I suppose the inspiration was looking for something for our tenancy that was a bit different and showed some innovation," he explains. "We wanted to use plants, but in a different way and a way that would improve the indoor environment quality a bit more."

These bio-filtration walls are an Australian first, reengineered from a Canadian design to suit the Umow Lai office application and the different plants that would be used in Melbourne.

Each of Umow Lai's five bio-filtration walls are covered with plants specifically chosen for this purpose, with the plants' roots positioned in a layer of coir matting, which is sandwiched between two layers of a synthetic porous material. The plants

are supplied nutrient-rich water via a dripper line.

Behind the system, perforated ducts draw contaminated air from the office through the plant's root systems. Micro-organisms living in symbiosis with the roots break down the volatile organic compounds (VOCs) from the air, and in so doing improve the air quality before being re-circulated back into the office.

With indoor air frequently containing more than 300 different VOCs, each of the five systems are strategically located throughout the office to provide the most benefit.

"They're working well," says Esmore. "It also provides a bit of a wow factor. Given this is not a wow-fit-out from an architectural perspective, we wanted to show some of the sustainability in a way that would communicate it well, and they were a good fit."

OUTSIDE AIR INCREASED

With increased outside air volumes critical to improving indoor environment quality and subsequently productivity, Umow Lai committed from the outset to design a ventilation system that not only met these requirements, but did so efficiently while working within the limitations of the base building's plant.

"One of the problems we identified early was that because the base building supplies the air conditioning, we couldn't get an increase of fresh air. It wouldn't have handled the capacity and the impost on the base building would have been such that it [the plant] wouldn't tolerate it," explains Esmore.

"So the solution we found was to install air-to-air heat exchangers. The base building [owners] were happy to install them because they didn't result in any additional capacity or energy consumption."

"But probably the biggest thing we've learned is in terms of doing the Green Star rating from the other side in terms of it being your own rating and some of the frustrations that can occur, particularly when you are getting to the high end of the range."

The units chosen are an air-to-air counterflow plate heat exchanger, with this system providing outside air delivery rates 150 per cent above the statutory minimum AS1668.2 while at the same time limiting energy consumption. This is achieved by taking the outdoor air through the heat exchanger and exchanging its energy with the spill air from the office.

Having engaged the builders early in the piece, the Umow Lai team was also able to have the base building's facade modified on the fit-out floors to include sashless, double-hung windows that are openable and used for mixed-mode climate control.

"The base building wasn't targeting Green Star," Esmore says. "It's not a particularly green building – it's a fairly good example



Five bio-filtration walls remove volatile organic compounds from the air.

of a typical suburban commercial office building, and that was attractive to us too because we wanted to make it [the fit-out] commercially accessible.

"We were able to work with the base building architects to get these openable windows put into our fit-out floors, as well as a few things that we were able to do by getting in early and working with the builders."

Along with the bio-filtration walls, energy recovery ventilation and openable windows, high induction diffusers are used to enhance air-change effectiveness. Dedicated exhausts have been positioned in printing areas to help remove carcinogens at their source.

PHASE-CHANGE SOLUTION

One of the other major innovations in this fit-out is the incorporation of phase-change material as a method of temperature control in one of the office's three meeting rooms.

This room was not easily able to be conditioned by the base building's air conditioning system due to the office layout. Rather than add the cost and

energy penalty of independent air conditioning, the design team took the opportunity of installing phase-change material.

The material chosen, a microencapsulated wax imported from Germany, is positioned on a metal tray below the ceiling. Microscopic in size, each plastic sphere contains a wax storage medium that melts as the temperature increases, absorbing the room's heat, before solidifying again as the temperature decreases.

"It's a fairly inert product and something we could lay into the ceiling fairly easily," Esmore says. "It was designed to change phase at around 23°C which suited the application well."

Although no formal validation of the performance of the room has occurred as yet, anecdotal evidence suggests the solution is working as designed.

REACHING FOR THE STARS

In meeting the Green Star requirements for a 6 Star Office Interiors rating, careful selection of materials with low VOC and formaldehyde content was critical.

COVER FEATURE

This included reused and recycled PVC-free material for electrical and communications cabling, and the reuse of workstations, storage cabinets, tables and chairs from Umow Lai's previous tenancy.

Naturally, by reusing furniture, unnecessary waste is avoided, with Green Building Council of Australia research claiming 32 per cent of all landfill can be attributed to fit-out and refurbishment churn.

Modular carpet tiles were also chosen, both for their low VOC emissions and high recycled content, having been manufactured to an EMS14001-accredited environmental management system, which incorporates minimisation of waste, energy, emissions and materials.

Along with joinery constructed from certified, environmentally innovative products, partitions are made from plasterboard featuring at least 95 per cent recycled content (85 per cent gypsum, 10 per cent cellulose fibre).

Energy and water efficiency was also a critical element of the fit-out's 6 Star achievement.

Energy savings in the HVAC design were achieved through the aforementioned use of the energy recovery ventilation system and mixed mode ventilation, while a CBUS PIR occupancy-controlled daylight-dimmed lighting system and optimised single T5 fluorescent luminaires reduce lighting energy. This is complemented by the widespread use of daylighting, 20W metal halide fittings where halogen downlights would normally be used, and LED wall lights as points of interest.

FYI

Phase change material: **Microencapsulated wax imported from Germany**

Diffusers: **Holyoake**

Heat exchangers: **Air Change**

Water: **Low-flush taps, showers, toilet pans, urinals to reduce water consumption.**

Air conditioning: **Local control of air conditioning, allowing staff to adjust or disable systems as required.**



All bathrooms feature water saving measures.

Water efficiency is gained through the use of waterless urinals on level 4, which save 100,000 litres per unit annually; low-flushing urinals on level 5, and flow restrictors on all tap and shower fittings.

Other measures include the collection of condensation from the air handling unit coils, which is plumbed back to the bio-filtration walls for re-use, and grey-water recycling, which is also used in the bio-filtration walls and toilets.

The office also features a bicycle storage facility for staff, and is strategically located to nearby train and tram services, adding to its sustainability focus.

Esmore says the consultancy has learned a great deal from being on the "other side" of a Green Star project.

"We've learned a lot about the technologies we've used, and minor teething problems [encountered] which we've been able to put into our work. We've also been able to try different things that perhaps clients are more sceptical about, and been able to demonstrate them here," he says.

"But probably the biggest thing we've learned is in terms of doing the Green Star rating from the other side in terms of it being your own rating and some of the frustrations that can occur, particularly when you are getting to the high end of the range."

Esmore believes the success of Umow Lai's fit-out will not only enhance the consultancy's sustainability credentials, but encourage others to seek similar office interior treatments because of the commercial viability demonstrated.

"We are proud of the fact that we have put our professional knowledge and expertise into practice in our offices," says Esmore. "Green buildings that are designed and operated properly and are user-responsive will deliver staff comfort and improve productivity.

"When you look at the productivity gains we are achieving, it's paying for itself quite easily." ■

PROJECT TEAM

ESD consultant: **Umow Lai**

Builder: **Walton Construction**

Base Building Architect: **Architectus**

Interior Designers: **Design Inc and Kyle Design**

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