



# Simple plan takes nothing for granted

A creative, environmentally friendly office development would cost more and need a special kind of tenant,

writes **Mark Phillips**.

Imagine a new, premium-grade office building that not only recycles its own water and meets other environmental benchmarks, but also generates enough energy to produce zero net carbon emissions.

The creative minds of the global professional services company GHD had just such a dream, and have come up with a plan for a 19-level office tower that would stand above the landmark Richmond station on a site in Melbourne's inner east, and which would generate more energy from renewable sources than it needs.

Though the design is hypothetical, the project has shown that by using existing wind and solar-power technology, buildings can be designed to meet the challenges of climate change.

The good news is that GHD's claims that the 55,000 square metre building would generate zero net emissions stand up to scrutiny.

The bad news is that, at about \$165 million, it would be 20 per cent more expensive to construct than a conventional office building of the same dimensions.

GHD appointed a team to design the building, named Zero, as a contribution to the World Business Council for Sustainable Development's net-zero buildings initiative.

The project, run from GHD's Melbourne office, took seven months, and was treated exactly like any other construction and design project.

Using two six-star Greenstar-rated commercial buildings in Melbourne — the City of Melbourne's Council House 2 and Szcencorp's 40 Albert Road — as benchmarks, it set out to improve their performance by up to 30 per cent.

After considering a number of

locations, the team selected Richmond railway station, at the crossroads of Punt Road and Swan Street.

Architectural director Paul Thatcher said the site was very well known, had strong public transport links, and was ripe for redevelopment because of its "fairly dilapidated condition".

"We didn't want to approach a pristine site and do an intervention," he said. "We wanted a realistic, real-world, messy urban situation with congestion issues, related to the transport network and decentralised from the CBD."

The proposed building has a striking design with three distinct towers up to 19 levels high, providing 55,000 sq m of commercial space.

Mr Thatcher said the team had set out to prove that sustainable principles could be integrated with an aesthetic design.

The building would generate its own power from 70 wind turbines installed in several rows on the rooftop, and from 12,448 sq m of photovoltaic panels on the building facade's cladding and over the platforms of the railway station.

Combined Heat and Power Solar (CHAPS) technology would be used to generate hot water for heating in winter.

The building would generate almost 4 million kiloWatt hours of energy a year, a surplus of 64,821 kWh above its requirements.

Chief engineer Colin Berriman said Zero was a site-specific solution, and if the building were located several blocks in a different direction, another mix of energy sources would be needed.

He said all the technology was "off the shelf and available today".

But given the vagaries of Melbourne's weather, the building would sometimes have to draw power from the grid.

"Our approach was to use solar as much as we could," he said.

"The balance we made up with wind turbines, which are far cheaper, but far more erratic."

Other design features, such as a double-skin facade, natural

ventilation, low-intensity lighting and chilled beams would reduce energy requirements.

The environmental footprint would be further reduced by grey and black-water treatment to achieve zero net water consumption targets, the use of recycled and non-ozone-depleting building materials and on-site composting and waste separation for recycling.

An algae-based "carbon scrubber" would remove CO<sub>2</sub> from the building's interior when energy was drawn from the grid.

No on-site parking would be provided, to discourage car use, but the proximity to the railway station would be expected to mitigate the need for cars.

A large amount of bike storage space would be provided on-site.

In current dollars, the building would take 28 years to pay back the investment — well above both private and government benchmarks — but that assumes there is no carbon tax system in place. The introduction of an emissions trading system would reduce the payback time.

One of the main extra costs is the solar panelling that is essential for generating power.

Mr Berriman said the extra costs were specific to the site, and a zero emissions design could be cheaper or more expensive on a different site.

"The typical property developer would not contemplate something like this, but as the market shifts and tenants are prepared to pay more [for environmental sustainability], we're on the cusp of a change," he said. "It's certainly do-able and technically feasible but it's going to need an above-average landlord to manage it."

Although Zero is hypothetical, it has already had some spin-offs for GHD.

These include interest from the owner of a regional shopping centre in designing an extension that could make use of wind turbines and photovoltaics to generate all the energy for common areas.



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**Argument for sustainability . . . the hypothetical Zero project, which would stand above Richmond station in Melbourne's inner east.**