

CH₂ Setting a new world standard in green building design

Design snap shot 02: Business Case

Summary

Introduction

This snap shot discusses the business case for the development of CH₂ (Council House 2). Several options were considered by the Council to meet accommodation needs. Each was considered based on how well they met Council objectives, including the need to meet responsible investment criteria.

Drivers for looking at new accommodation

The drivers for making it a leading-edge green building were:

- 1 City of Melbourne's role in Australia and internationally as a leading green organisation
- 2 The greenhouse, energy and waste policies guiding the environmental performance of the organisation
- 3 The desire to be a lighthouse project which would demonstrate the achievements of a 'green' building integrated with the urban environment and the community

The staff related drivers were:

- 1 The existing accommodation was reaching the stage where it no longer met statutory regulations, specifically occupational health and safety and disabled access
- 2 To retain the administration's presence in the existing precinct
- 3 To promote staff wellbeing and effectiveness

The financial drivers were:

- 1 A low risk, and high return investment over a 50 year life
- 2 Meeting the 150% return on bond rate requirement for investment funds
- 3 To future-proof the accommodation (avoiding obsolescence)

Choosing to do CH₂

With these drivers in mind, four options were considered:

- 1 Refurbish and stay at current buildings – Town Hall, Commonwealth Bank building, Council House, Parking and Traffic Building.
- 2 Lease alternative space.
- 3 Buy alternative space.
- 4 Redevelop Council House.

At this stage the Tivoli car park site (site of CH₂), was not included because it was considered too small to accommodate all Council staff.

The accommodation options which were put forward were assessed based on the following criteria and weighting:

- Building location – 20%
- Building efficiency and effectiveness – 15%
- Building services performance – 20%
- ESD – 15%
- Energy rating – 8%
- Car parking – 5%
- Lease structure – 10%
- Developer capacity to deliver – 7%

A redevelopment of Council House (the existing administration building) achieved the highest score of 92%. The location was moved to the Tivoli carpark site when the original plans to redevelop Council House were considered in more detail. It presents the lowest risk to the Council with an estimated saving of \$13 million dollars. The cost for CH₂ will be \$51 million for the building excluding fit out.

Of this, 20% is earmarked as additional works for the Environmentally Sustainable Design (ESD) features of the building. Pay back on this investment estimate is 11-20 years.

The other major part of the business case was expected cost savings from energy and water, plus increases in the effectiveness and wellbeing of staff.

	%	Amount	Savings (\$/yr)
Effectiveness and wellbeing improvement	4.9%		\$1,120,000
Energy savings	85%	330kwh/m ² /yr	\$270,000
Water savings	80%	50kl/day	\$60,000

* The figures quoted are based on 2004 costs of salaries, energy and water.

Table 1. AEC study

Lessons

The main lesson from developing the business case is the importance of the long term view. The City of Melbourne expects it and its staff to benefit from the building for at least the next 50 years.

The main benefit from CH2 is the improved wellbeing and effectiveness of staff. Energy and water savings, although important for environmental performance and sustainability, pale in comparison to the social savings of healthy and effective staff.

More detail

The business case for the City of Melbourne was developed at several levels. In the mid 1990's the Council received \$200million from the sale of their share in the local electricity retail company, CitiPower. With this money an investment fund was established for municipal projects. Long-term investments, such as buildings, are considered as a wise and secure choice for the Council. Therefore, when considering the accommodation requirements of City of Melbourne employees over the next 20 years, a thorough study was done on the best value option between:

- 1 Refurbish and stay at current buildings – Town Hall, Commonwealth Bank building, Council House, Parking and Traffic Building
- 2 Lease alternative space
- 3 Buy alternative space
- 4 Redevelop Council House site

At this stage the Tivoli car park site (site of CH2), was not included because it was considered too small to accommodate all council staff.

This study was presented in June 2002 as a report to Council. It outlined the results of an evaluation of future Council accommodation options:

Option 1 – Refurbish and stay at current buildings

This option required major works to all buildings to bring them up to the required occupational health and safety standards. Additional funds would be needed in order to achieve the energy and environmental targets required by the Council.

Option 2 and 3 – Lease or purchase alternative space

Expressions of interest were sought from the market on potential sites which could offer the amount of space the City of Melbourne required. Of the 16 expressions of interest received three were pursued in greater depth. Each was assessed on their cost over time and their ability to meet the sustainability requirements set by the Council (as outlined below).

These options were evaluated on:

- Building location – 20%
- Building efficiency and effectiveness – 15%
- Building services performance – 20%
- ESD – 15%
- Energy rating – 8%
- Car parking – 5%
- Lease structure – 10%
- Developer capacity to deliver – 7%

Option 4 – Redevelopment of Council House

This option allowed the Council the flexibility to meet all their requirements as it would be a newly constructed building, allowing the ESD components as well as other Council requirements to be integrated at the “easiest” phase – the planning and design stages of development.

A redevelopment of Council House was seen as the most viable and responsible option (score of 92%) due to its qualitative best value and net present value calculations. In addition to this, the building was seen to add to the Council's staff environment as it could be designed around principles of worker comfort.

Movement of design to Tivoli site – CH2

Once the preparations for redevelopment of Council House began in early 2003 (option 4), it was determined that the employees at Council House would need to be relocated for a two to three year period. The cost of this relocation led the project team to consider the adjacent site for the new building (Tivoli carpark). This decision reduced the risk, and cost of the project by over \$13 million. The new site would result in a smaller building, but would still provide most of the benefits of the original plan, with a better orientation.

Providing a Business Case

The project team had to demonstrate that CH2 was a sound investment for the Council. The strength of the case presented to the Finance Director was based on the investment fund, which is administered in a conservative portfolio, part of which is in property. Director of Design and Urban Environment, Professor Rob Adams, describes the discussions with Director of Finance, Mark Anderson and how the business case was presented:

The key...was our Director of Finance Mark Anderson. We needed to convince Mark that we were not going to build CH2 because we were good designers or good project managers, or for that matter that even that it was good urban design.

What was needed was a business case that used Council's investment funds. This fund provides over \$200m which can be invested on strategic projects as long as they give a return of 150% of the current bank rate.

Being a local government, it would be untenable to use monies from Council rates. Therefore Council needed to show through a rationalisation of the property holdings within the investment portfolio that they could provide a sounder investment for Council by constructing CH2. Some of the current building stock is aging and consists of a number of small buildings distributed throughout the City. The suggestion was that using this prime central city site for a building with low ongoing operating costs, in particular low energy consumption, would be a better investment for Council. It was argued that as the building contains a mixture of carparking, retail and administrative offices, it would hold its value over its life. Given its construction and energy savings it would be a good investment for the City. Professor Rob Adams, Director Design and Urban Environment, City of Melbourne

The project was supported by Mr Anderson and given the formal approval by the City of Melbourne's councillors.

Costs and benefits

Using contemporary financial models and practices, the costs approximated 20% more than an equivalent commercial building, due to the innovative sustainability features. A conservative estimation is this will be repaid in about 10 years; a very attractive proposition for a long term investment by a council looking to use the building for over 50 years.

The cost breakdown is:

- \$29.90 million for the base building excluding fit out and sustainability costs;
- \$11.30 million sustainability features;
- \$2.80 million demonstration and education process;
- \$7.1 million Council specific requirements (eg security system and building automation system)

Minimising risk

Rigorous risk assessments were performed for every innovative decision and element incorporated into the building. For example, to determine that the chilled ceiling elements would effectively cool the space, the ESD consultants carried out extensive analysis using Computational Fluid Dynamics (CFD) modelling. This required an understanding of the heat loads expected, thermal mass effects, night purge effects and the effectiveness of the provision of chilled water. This risk assessment process provided two main outcomes:

- 1 A constant source of chilled water is required for elements to work effectively. Therefore, the phase change material (PCM) tanks are backed up by an extra chiller.
- 2 Examination of the expected heat loads over one year (then extrapolated over ten years with climate data) found that by providing 95% coverage of cooling loads instead of 100%, the building would save \$600,000 in plant costs per year. This translates to the cooling system underperforming for only a few days per year. Figure 2 illustrates the savings made by providing 95% of cooling coverage.

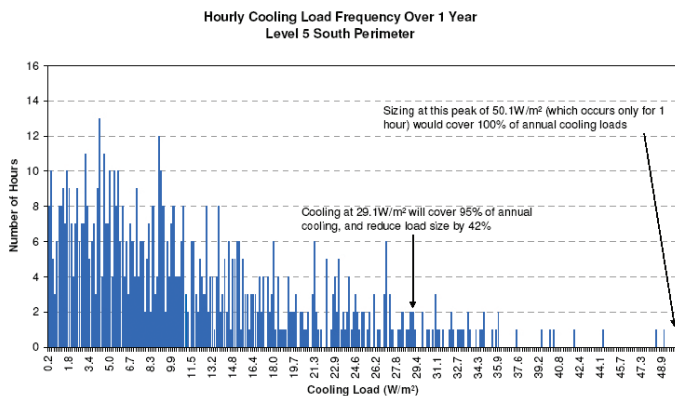


Figure 1. Graph showing wattage of cooling load and potential savings (AEC)

Future proofing

Future proofing is a term referring to how obsolescence can be avoided, or at least delayed as long as possible. CH2 is a project which minimises future risks. The project team have tried to forestall the pressures of the next 50 years and have asked the question ‘what are the main risks to the Council?’

In summary, they are:

- 1 Responsibility to City of Melbourne’s ratepayers
- 2 Increasing costs for water and energy
- 3 Differentiating themselves in the market for the best staff (‘war for talent’)
- 4 Addressing corporate social responsibility issues
- 5 Minimising Indoor Environmental Quality (IEQ) risks – in the US this is seen as one of the five main litigation risks facing organisation (i.e. people suing for becoming ill in a sick building¹)
- 6 Tools and systems to help them identify and categorise IEQ issues – give a more objective basis to a highly subjective area
- 7 Retaining existing staff (reducing staff churn)
- 8 Improving staff satisfaction
- 9 Having standards to allow demonstration of compliance.

¹ Insurance and Liability – The past decades’ conventional office design, construction, and operational practices have decreased the quality of the indoor office environment, resulting in new health concerns and associated economic costs and liability. The introduction of a multitude of new pollution sources into the workplace, combined with tighter building construction, has intensified air-quality problems. For example, poor indoor air quality can result from such factors as faulty air-conditioning systems, occupant-related pollutants, construction materials that emit high levels of volatile organic compounds, and poor maintenance practices. The U.S. EPA ranks indoor air pollution among the top five environmental risks to public health. Unhealthy indoor air is found in up to 30 percent of new and renovated buildings. US Department of Energy (www.sustainable.doe.gov/pdf/sbt.pdf last accessed 13/07/2004)

I think the industry would change when it realises the risk it runs. Not only environmentally, but health wise, with the buildings we design today. Rob Lewis, Project Superintendent, City of Melbourne

Wellbeing and effectiveness

Although the reduction in energy costs will be substantial, the greatest economic benefit is expected to be in increased effectiveness, and a reduction in absenteeism and staff turnover, which cost employers millions of dollars each year.

The productivity study by the ESD consultants, AEC, has shown that the expected improved air quality of CH2 could result in a 4.9 per cent increase in productivity, in part through reduced sick leave². It is predicted this will save the City of Melbourne up to \$1.12 million a year (for more information see Snap Shot 14: Indoor Environment Quality).

Many studies report increases in productivity as a result of people doing more with less. This is not the intention of the CH2 project or the Council. Through a better work environment, fresh air, natural light, low emitting materials and greenery, the City of Melbourne hopes to create a healthy place to work – a place where, at the end of the day, you feel that you have achieved what you wanted – that you have been effective.

The business case for the indoor environment quality strategies

The table below shows the potential financial savings reported on by AEC’s research. It shows that there is a potential \$351,340 annual saving based on a worst case scenario and \$1,121,653 in a more optimistic case, mainly arising from increased productivity and reduced illness days.

² AEC study – ACD – Rep010 – Productivity Benefits (second draft September 2003)

Possible area of savings for MCC	Annual cost attributed to factor	Conservative		Optimistic	
		Estimated % improvement IE at CH2	Predicted saving	Estimated % improvement IE at CH2	Predicted saving
Illness caused by office environment	\$153,142	90%	\$137,827	95%	\$145,485
Illness caused by home environment	\$61,256	0%	\$0	0%	\$0
Injury caused by office environment	\$30,628	5%	\$1,531	10%	\$3,063
Injury caused by non-office environment	\$61,256	0%	\$0	0%	\$0
Stress related to work	\$122,513	10%	\$12,251	15%	\$18,377
Non-work related stress	\$122,513	5%	\$6,175	10%	\$12,251
Reduced staff turnover due to dissatisfaction with IE (5% of total turnover)	\$66,055	10%	\$6,606	40%	\$26,422
Improved productivity (gain for each 1% improvement)	\$186,950	1%	\$186,950	4.9%	\$916,055
Total			\$351,340		\$1,121,653

Table 2. Summary of potential benefits from improved indoor environment quality (AEC)