Valuation of Green Buildings: Greed Or Fear?

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So far, the green building valuation debate has focused on the greed aspect through the increasing value of green buildings. The following paper contends that the debate should now focus on the fear aspect through the decreasing value of non-green buildings.

Whilst there is an increasing number of green buildings in Australian capital cities, the number of non-green buildings is much greater and likely to remain so for a very long time.

The average age of the CBD office stock in Brisbane is 25 years, in Sydney is 28 years and in Melbourne is 31 years with the replacement rate for office stock being less than 3% pa (JLL, 2005). Research by Reed and Wilkinson (2008) found that nearly half of the Melbourne CBD office stock is over 50 years old (Table 1).

Age (Yrs Since Construction)	No of Buildings	Proportion of Total Stock
<10	7	2%
10-25	66	20%
26-50	95	29%
>50	158	49%
Total	326	100%

Melbourne CBD Office Buildings According to Age
Source: Reed and Wilkinson (2008)
Table 1

The green building valuation debate so far has focused on issues associated with determining the value of new green buildings. However, issues associated with the

valuation of non-green buildings in the future may also pose a challenge with a much greater potential financial impact on the Australian property market.

The green building valuation debate, to date, has focused on the greed aspect through the increasing value of green buildings. However, it may be contended that the debate is now moving to focus on the fear aspect through the potential for the decreasing value of non-green buildings.

With approximately 90% of the Australian commercial property market designed before the introduction of accepted green rating systems (Reed and Wilkinson, 2007), what might be the impact on the value of non-green buildings of an increasing stock of green buildings?

Greed Aspects – Increasing Value of Green Buildings

With green buildings originally being thought to cost more to build than non-green buildings, there was an expectation that green buildings should have a higher value than non-green buildings, with Myers et al (2007) noting:

> "Current promotional research of sustainability tends to assume that the incremental capital expenditure on sustainable attributes increases the market value of the building on a basis of a dollar of capital expenditure for another dollar of value."

Whilst evidence is starting to emerge to confirm the performance benefits of green buildings in the US, there is relatively little quantitative evidence yet available in Australia.

CoStar (2008) note a study of 1300 US green buildings, comprising 351m sqft, compared with non-green buildings of similar size, location, class, tenancy and age which found that green buildings outperform non-green buildings in occupancy, sale price and rental rates. Green buildings were found to command a rent premium of US$2.40-$11.33psfpa, have 3.6%-4.1% higher occupancy and to sell for an average of US$61-$71psf more than non-green buildings.

Further, New Buildings Institute (2008) analyzed the measured energy performance of 121 LEED New Construction buildings and found that projects certified by the LEED program averaged 33% energy performance improvement over non-LEED building stock.

The limited number of sales of green buildings in Australia has made the expected premium for green difficult to quantify in practice, leading to research in the area of green building value to date being largely anecdotal or theoretical (Reed and Wilkinson, 2007; Myers et al, 2007).

Improved working environment	Reduced building operating costs	Reduced facilities maintenance costs	Greater capital cost
▼	▼	▼	▼
Greater demand for space	Lower operating expenditure	Lower operating and/or capital expenditure	Causes lower initial return on capital
▼	▼	▼	▼
Higher rents, less vacancies	Increases the net income	Increases net income or decreases capital	▼
▼	▼	▼	▼
Positive impact on value	**Positive impact on value**	**Positive impact on value**	**Negative impact on value**

Value Impact of Environmentally Efficient Buildings
Source: Boyd (2006)
Table 2

A range of influences on the value of a building have been identified with the premise that each is superior in a green building, leading to justification of higher value. Boyd (2006) takes an holistic view of such influences through a triple bottom line approach (Table 2) but notes:

> "It is too simplistic to conclude that change will always, or even frequently, have a positive impact on the capital value. What is important is that the impact of enhanced environmental factors on space users is explicitly examined."

Chaiwatanatorn (2006) adopts a similar approach to detailing the positive influences on value inherent in green buildings (Table 3). Myers et al (2007) summarize previous research noting that sustainable criteria impact on value through rental growth, depreciation, risk premium and cash flow, leading to increased market values and higher relative investment returns.

Focusing on the capitalization of income approach, Reed and Wilkinson (2007) note that both the net operating income and the capitalization rate may be enhanced through sustainability, with the tenant willing to pay higher rent with lower occupancy costs and a reduction of the risk in the all risks yield (or capitalization rate) rationalizing that:

- a lower level of obsolescence may contribute to decreased risk and a lower capitalization rate;
- higher perceived maintenance costs may contribute to higher risk and a higher capitalization rate; and

- lower operating costs may contribute to decreased risk and a lower capitalization rate,

though cautioning that potentially being perceived as too green may contribute to possibly increased risk and a higher capitalization rate. Chaiwatanatorn (2006) also focuses on the lower expected risk profile of green buildings compared to conventional buildings in driving capitalization and discount rates lower.

Valuation Variable	Impact Summary	Impact Detail (impact on green building compared to standard building)
Income/rent	Expected higher rental growth	Expected increased tenant demand leading to rent premium based on: - energy efficient building, reduction in carbon and other emissions; and - improved indoor environment quality, employee productivity.
Outgoings	Expected lower outgoings growth	Expected lower outgoings growth: - reduced energy costs: electricity and gas; - reduced water and sewerage costs; - lower repair and maintenance costs due to the use of more durable, low maintenance materials; - reduced cleaning and waste management costs due to recycling; and - reduced legal and insurance costs as green buildings reduce the risk of health and liability claims.
Vacancy Rate	Expected lower vacancy rate	Expected increased tenant demand.
Capitalization and Discount Rate	Expected lower capitalization and discount rate	Expected lower risk exposure of green buildings in terms of: - higher expected rental growth; - lower vacancy rate; - lower outgoings growth; and - lower obsolescence.
Overall	Expected higher valuation for green buildings	

Influences on the Value of Green Buildings
Source: Chaiwatanatorn (2006)
Table 3

The challenge of measuring the impact of green issues in valuation is widely noted, with Chaiwatanatorn (2006) commenting that the benefit of reduced energy, water costs and repairs and maintenance costs are easy to measure, but lower vacancy rates and increased rents are harder to measure.

To evaluate the impact of sustainability on investment property assets, Boyd (2006) undertook a case study to test sensitivity of value to the enhancement of key environmental or social variables, through the use of industry focus groups of property professionals to provide opinion based source data for analysis.

This data was applied to a cash flow valuation of an office property and the resulting total return observed, finding that enhanced environmental features potentially increased total return marginally (9.53% to 9.70%), but enhanced social features and a combination of enhanced environmental and social features decreased total return (Boyd (2006)), commenting:

> " . . . based on current market evidence, the difference between the returns achievable on an existing prime grade office building and a similar building, which is environmentally and socially enhanced, is minimal."

Accordingly, it may be contended the proposition that green buildings should have a higher value than non-green buildings was starting to be questioned. Further, the premise that rather than green buildings being of a higher value, non-green buildings may be of a lower value, had previously been mentioned in passing by several authors but not examined in detail.

However, the issue of decreasing value in non-green buildings emerged very clearly from research for the "Valuing Green" report commissioned by the Green Building Council of Australia (Green Building Council of Australia, 2008).

Based on an extensive literature search, case studies and interviews with some 50 industry leaders, the researchers found that, whilst the proposition that green buildings should have a higher value still had support, greater attention was now being paid to decreases in value in non-green buildings. The report found the key value drivers of green buildings to be long term rental growth rates, tenant retention, future proofing and operational cost savings, with findings concerning capitalization rates and discount rates conspicuously absent. Interestingly, future proofing was considered to be the protection afforded by green buildings against the risk of rising energy costs, market rejection of non-green buildings and tightening regulations on building sustainability performance.

Significantly, while the authors support the proposition that green buildings should have a higher value:

> "The findings of the literature search, stakeholder survey and discussions with owners and developers of the case studies confirm that the higher value of Green Star buildings is starting to be felt in property valuations, through factors such as lower building operating costs, ease

> of sale and rent, tenant retention and improved overall occupancy rates."

they qualify this support with comments on the potential value impact of green buildings on non-green buildings:

> "Similarly, it is still too early to quantify the value impact for non-Green Star buildings. Whilst lower rental rates, rental growth rates and higher capital expenditure may be anticipated for non-Green Star buildings, there is, to date, limited rental and sales evidence to allow a valuer to accurately determine the value impact."

> "Relative to Green Star buildings, non-Green Star buildings may suffer from lower rental rates, rental growth and higher long term risk with greater potential capital expenditure requirements resulting in decreasing value."

The key findings of the research included that respondents believe investment performance of green buildings will exceed that of non-green buildings over the medium to longer term and (significantly) that those non-green buildings which utilize high volumes of utilities (water, power, etc) due to design are most at risk of being adversely affected in value.

Though finding an expectation that green buildings would outperform as investments, the researchers caution:

> "Such outperformance may result from income and value growth in Green Star buildings, progressively decreasing income and value growth in non-Green Star buildings *or a combination of both*." (italicized by author)

Fear Aspects – Decreasing Value of Non-Green Buildings

An evolution in thinking about the relative value of green buildings would appear to be underway, with a greater focus now emerging on the premise that it may not be that green buildings have a higher value but it may be that non-green buildings have a lower value.

Reed and Wilkinson (2007) explore such a transition in thinking by floating the notion of a premium for green buildings and a discount for non-green buildings.

Aspects of the depreciation and obsolescence of non-green buildings have been noted by several authors. Reed and Wilkinson (2007) note that tenants may, in future, prefer to be located in green buildings leading to a higher churn rate in older, non-green stock such that the risk of depreciation and obsolescence may be increased for some owners of non-green buildings, commenting:

> "With the greatest single influence on risk in the form of depreciation and obsolescence, every building must be individually assessed to identify the influence of sustainability."

The authors go on to consider obsolescence, noting that conventional valuation analysis focuses on three primary forms of obsolescence (physical, functional and economic) though other forms also exist (such as legal) with a further form potentially existing, sustainable obsolescence. If a building does not meet market expectations of incorporating a level of sustainability, it may suffer increased obsolescence causing a loss of value or depreciation.

Chaiwatanatorn (2006) extends such thinking, noting that green buildings are subject to different rates of depreciation than non-green buildings in terms of physical, functional and economic obsolescence.

Whilst Reed and Wilkinson (2007) provide a high level review of how sustainability affects depreciation and obsolescence (Table 4), the extensive existing body of research into the impact of depreciation and obsolescence on building value is succinctly summarized by Hoesli and MacGregor (2000). The authors define depreciation as a:

> "loss of rental income (and hence capital value) of an ageing property when compared to an equivalent new property"

noting that, as technological change accelerates, so do occupiers requirements and the life span of many buildings decreases through obsolescence. As this happens, the impact of deprecation on value becomes more pronounced with higher expected depreciation leading to greater risk (more vacancy, etc), higher risk premium and higher capitalization rates and discount rates.

Property Type	**Lease Length**	**Refurbishment Frequency**	**Current Exposure to Obsolescence**	**Anticipated Effect of Changing Perception of Sustainability****
Office	Medium	Medium	High	Medium*
Retail	Short	High	High	Low*
Industrial	Long	Low	Low	Low
Residential	Short	Varying	Low	Low-Medium

* would vary in other sectors
** would vary according to net or gross leases and which stakeholder (eg tenant, owner)

Sustainability, Depreciation and Obsolescence - High Level Review
Source: Reed and Wilkinson (2007)
Table 4

Accordingly, the increasing availability of green buildings may lead to an acceleration in the obsolescence and depreciation of non-green buildings. As non-green buildings decrease in value increasingly more rapidly due to the rate of depreciation being exponential (rather than linear), the outperformance of green buildings may become much more pronounced.

Hoesli and MacGregor (2000) further note that an alternative definition of depreciation is the proportion of stock that is removed from the market, introducing the concept of "cohort" or "vintage", arguing that the rate of depreciation is unlikely to be same for each of 60's, 70's and 80's stock. Fluctuations may be likely to emerge as whole vintages of stock become obsolete together.

The authors define obsolescence as a decline in utility not directly linked to deterioration (being physical usage (wear and tear) or to environmental factors (weather)), having a variable time pattern of impact. They identify four sub-categories of obsolescence:

- obsolescence of plant;
- functional obsolescence of structure;
- aesthetic obsolescence of structure as a result of changes in taste; and
- absence of complementary services,

each providing a mis-match between the services a property can provide and the requirements of occupiers resulting in a decline in utility.

Depreciation is then contended to be the combined effect of deterioration and obsolescence, which leads to falls in value being magnified.

Sustainability may be considered a form of obsolescence that causes a change in relative utility between non-green buildings and green buildings in meeting occupier requirements. Such changes are external to a property and a whole cohort of property may fall in value simultaneously. Such a fall may be likely to be small for many years and then have a substantial effect over a period of a few years, being related to the issue of vintage where, in any one year, properties of different ages and construction may be subject to very different rates of fall in value and in economic life.

Accordingly, one impact of sustainability may be to significantly change that which was previously understood to be the economic life of non-green buildings from different decades. For example, an 80's building may maintain an economic life of 50 years, but a 70's building may suddenly be reduced to 10 years and a 60's building may have a limited or negative economic life.

Valuation Issues

The shift in the green building valuation debate may, therefore, be contended to have moved from a consideration of how much greater the value of a green building should be

than a non-green building to how increasingly rapidly non-green buildings may fall in value as green buildings become more readily available.

Green Building Workshop 4 (green valuation, leases and productivity – capturing the benefits of green building), held at Melbourne Town Hall on 25th August 2004, considered that the valuation profession had not developed relevant tools and standards to value green buildings (Chaiwatanatorn, 2006).

However, the debate on the valuation of green buildings has clearly identified discounted cash flow to be the optimal method of valuation for green buildings (Reed and Wilkinson (2007), Green Building Council of Australia (2008)) as it facilitates cash flow transparency through the use of various rental rates, outgoings rates, growth rates, leasing/lease renewal/vacancy rates and capital expenditure allowances.

Reed and Wilkinson (2007) note that the use of discounted cash flow for the valuation of green buildings also allows adjustment for:

- a lower discount rate to reflect less risk;
- a lower reversionary yield to reflect less risk;
- possibly higher maintenance costs for specialized sustainable equipment (eg: cleaning);
- higher capital costs (eg: photovoltaic cells); and
- potentially higher levels of obsolescence after a 10 year period (ie: if building does not have the latest technology or if its sustainable technology is out of date).

The reverse may be applied to non-green buildings with an allowance for the inability to retain tenants, use of a lower rental growth rate and/or a higher outgoings growth rate, use of a higher discount rate due to more risk and so forth. Accordingly, the impact of depreciation on non-green buildings may be explicitly considered in a discounted cash flow valuation.

Though there may be an absence of sales evidence to clearly guide valuers on the relativities of the value of green buildings and non-green buildings, IVSC Guidance Note 9 (IVSC GN9) allows considerable valuer judgment to be applied to the key variables in a discounted cash flow where there are limitations to the available transactional evidence (Parker (2004)).

For example, assumptions of growth or decline in income must be premised on an analysis of economic and market conditions, rather than solely on comparable transactions, with all assumptions required to be likely, reasonable and supportable. Such support may include transactional evidence but may also include the published material of forecasters, specially commissioned reports, media reports, surveys of investor opinion, yield indices and so forth.

IVSC GN9 requires a valuer to carry out sufficient research to ensure that the cash flow projections and the assumptions that are the basis for the discounted cash flow model are appropriate and reasonable for the subject market. It is notable that the requirement is for sufficient research, being a much lower level requirement than for exhaustive or rigorous research. Assumptions may be invalidated if inappropriate, if unreasonable or if inappropriate and unreasonable, warranting careful consideration at the time of valuation to withstand potential subsequent challenge and investigation in a dispute resolution process.

Parker (2004) notes that IVSC GN9 argues that discounted cash flow as a forecasting technique should not be judged on the basis of whether or not the specific forecast was ultimately realized but rather on the degree of market support for the forecast at the time it was made.

IVSC GN9 further notes that it is the responsibility of the valuer to ensure that the controlling inputs are consistent with market evidence (being the historic and current view) and the prevailing market outlook (being the current and future view).

Accordingly, IVSC GN9 supports both a rear vision mirror approach and a crystal ball gazing approach to valuation, which will be particularly relevant in endeavoring to value non-green buildings subject to increasing levels of depreciation.

Conclusion

The shift in the green building valuation debate may, therefore, be contended to have moved from a focus on growth for green buildings to a focus on risk for non-green buildings.

The increasing impact of depreciation on the value of non-green buildings may be expected to come under much greater focus which, effectively, means the rationale for assumptions underlying discounted cash flows will also come under much greater focus.

Given that the availability of transactional evidence from the sale of green and non-green buildings may lag the requirement for valuations of each, valuers will need to form a view on the differing impact on key valuation variables, such as rental growth rates, terminal capitalization rates and discount rates, for green and non-green buildings in order to advise clients on trends in value.

The implications of the future valuations of green and non-green buildings are particularly significant for fund managers. Previous research has suggested that non-green buildings should increasingly struggle to find tenants, as well as suffer decreasing rental rates and increasing operating costs, so reducing the income return from the property. If non-green buildings fall in value increasingly quickly due to depreciation over time, then capital returns may become negative which, when added to decreasing income returns, may result in significantly falling total returns from non-green buildings.

For a fund manager with a high proportion of non-green buildings in a portfolio, the prospect of significantly falling total returns may be expected to cause considerable fear.

The Green Building Council (Green Building Council, 2008) notes that it is highly likely that a two-tiered market will emerge between green buildings and non-green buildings. It may be that Australia leads the world in the creation of such a two-tiered market in Canberra, where the distinction between green and non-green buildings is becoming much greater and may provide some much needed transactional evidence for analysis by market participants.

Sharing such analysis to improve valuer's understanding of the impact of sustainability on valuation is a key element of the Vancouver Valuation Accord (Globe Foundation, 2007). The Accord is an "Agreement to Address the Interrelationship of Sustainability and Value" with a commitment to review sustainability and valuation, including education, standards and practices, with the aim of improving understanding of their relationship and having a target reporting date of 2010. The Accord aims to facilitate the collaboration of clients, supporters, observers, stakeholders and professionals to agree on practices and standards, with open and transparent consensus creating consistent approaches to value, sustainability and valuation.

In "Surveying Sustainability: A Short Guide for the Property Profession", RICS provided guidance to its members (including valuers) specifically around sustainability (Fisher et al, 2008) noting prophetically:

> "Without doubt, the concept of Sustainability is one of the key challenges currently facing valuers. Promoters of Sustainability point to the 'added or premium value' such properties can offer, other observers the accelerated degree of obsolescence non-Sustainable stock may find itself subject to – but it is for valuers to provide the authoritative opinion."

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