The Case for Green Buildings

Capturing the financial benefits

Prepared by
Institute for Sustainable Futures

For
The Attorney General's Department of NSW

Institute for Sustainable Futures
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Authors

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The NSW Sustainable Energy Development Authority (SEDA) and the Australian Building Greenhouse Rating (ABGR) Scheme, whose extensive library of case studies of commercial and public buildings we have cited in this report.
EXECUTIVE SUMMARY

Background

The NSW Attorney General’s Department (AGD) commissioned this report to investigate the case for sustainable or ‘green’ buildings. Part 1 examines the range of financial and other benefits associated with green buildings, through both new construction and refurbishment. It includes a wide range of Australian and international case studies, demonstrating how numerous organisations have ‘greened’ their building stock and the resulting financial benefits.

Part 2 outlines the organisational factors needed to successfully implement a green building program and recommends a process for the AGD to take its agenda forward. The AGD has shown considerable leadership in this area already and there is potential to build on this success. Public institutions have a valuable role to play, leading by example to help overcome perceptions of the difficulty of doing things differently. They also have a responsibility to maintain their buildings as a public asset rather than a liability. The AGD’s large stock of socially important, culturally significant and high profile public buildings makes this a particularly important role.

The case for green buildings

Buildings have a major impact on our environment and on the well-being of their occupants. Green buildings have a low ecological impact throughout their life, use resources efficiently and create healthier indoor environments. There is increasing pressure from the community to raise the standard of buildings and, in particular, to improve their environmental performance, especially as the range and availability of easy to use and reliable assessment tools grows.

In addition to this pressure, a number of business risks confront organisations that do not implement green building programs, including:

- The high probability of escalating energy tariffs (particularly for peak electricity use), water charges and waste disposal costs
- The introduction of energy provisions for non-residential buildings into the Building Code of Australia as early as 2006
- A number of State and local governments have or are considering minimum environmental performance ratings for new non-residential buildings
- The pressure for visible Government leadership and accountability, including the likelihood of mandatory Triple Bottom Line reporting for State Government departments
- Potential liability for consequences to the health of occupants of poorly designed buildings
- The likelihood of insurance premium levies for poorly performing buildings

There is a strong case to be made for keeping ‘ahead of the game’ to mitigate or minimise these risks. Fortunately, there is also a compelling business case for the greening of new and existing building stock, as this report demonstrates. Many examples exist now of the financial and risk management benefits for organisations, including the AGD’s own experience with energy and water management. These benefits include:

- Reduced energy, water and waste disposal costs
> Financial gains from carbon trading, rebates and tax credits that support green buildings
> Improved property value
> Potential insurance discounts for lower environmental emissions and reduced occupant health risks
> A more productive and content workforce
> Reduced vulnerability to and quicker recovery from, power outages
> Generating community goodwill by displaying public leadership.

While a green building approach sometimes incurs a small cost premium, usually less than 5% of the construction budget, it provides a range of substantial life cycle financial benefits. A recent study in the USA, which analysed 33 green buildings, found that:

*An upfront investment of less than two per cent of construction costs to support the ‘greening’ of the building yields life cycle savings of over ten times the initial investment.*

Potentially, green buildings can end up costing no more, and sometimes less, than conventional buildings.

It is vital when considering building-associated costs that a life cycle costing approach be adopted, as any new building and particularly, important public buildings such as courthouses, will be around for many years. The same concept applies to refurbishments of existing buildings. Investing in measures to reduce energy and water use (and savings of 50% or more are readily achievable), will provide a continuing financial return for the life of the building. The initial investment will often be paid back in five years or less.

In addition, numerous studies both in Australia and overseas have shown that over a building’s lifetime of 30–50 years, employee costs will swamp all other costs for a typical office building. Initial capital costs account for only about 2% of the total cost. Energy and water costs are 2%, other operational costs (maintenance, rent) are 4% and employee costs 92%.

Although courthouses will have different occupancy patterns and therefore employee and operational costs compared to standard office buildings, employee costs will still far exceed other lifecycle costs. Based on figures for two typical courthouses provided by the AGD, over a 60-year lifetime energy, water and maintenance costs will be 2%, capital costs around 30% and employee costs 68%.¹

¹ In Present Value terms, based on a discount rate of 5%. Employee costs include AGD staff, magistrates, prosecutors, etc.
A gain in productivity will therefore outweigh any small addition to construction costs and the healthy indoor environments provided by green buildings lead to demonstrated improvements in occupant wellbeing and productivity. Therefore, productivity improvements should not be overlooked when analysing the benefits of a green building. Other demonstrated benefits from green buildings include an improved capacity to absorb information and more effective decision-making, both vital elements in the proper functioning of the justice system.

Energy, water and waste savings are fundamental elements of green building design and are also important. As well as lowering operating costs they contribute to an improved working environment through greater comfort, natural lighting, improved air quality and so on.

**A new organisational approach**

To maximise these benefits it is essential that the green approach is integrated from the very start into any project, whether new construction or refurbishment.

*When just 1% of a building project’s upfront costs have been expended, up to 70% of its life cycle costs may have already been committed.*

The longer the delay in adopting a green approach, the fewer opportunities are available to mitigate life cycle costs, as illustrated in the diagram below.
A successful outcome therefore requires a new organisational approach to buildings and sustainability issues in general, including:

> An organisational commitment to sustainability that is explicit and integral to all the AGD’s operations

> A new way of defining value based on a life cycle perspective and embracing the ‘triple bottom line’ (financial, social and environmental benefits)

> Exploring and adopting innovative financing mechanisms

> Cost planning that supports greater initial investment and the allocation of capital to measures with high environmental benefits.

> Investment in innovative design processes that encourage efficient and high quality outcomes

> Project management and delivery systems that link contract documents, performance and payments to delivery of sustainability outcomes

It is strongly recommended that the AGD initiate a process to incorporate these elements into its operations and particularly into building project management processes. This process could begin with an implementation plan for ‘greening’ selected strategic AGD buildings (both planned and existing), based on a detailed examination of the associated opportunities and costs. An outline of potential next steps is included at the end of this report.

*Building green is cost-effective and makes financial sense today.*
## Abbreviations

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<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>ABCB</td>
<td>Australian Building Codes Board</td>
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<td>ABGR</td>
<td>Australian Building Greenhouse Rating Scheme</td>
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<td>BASIX</td>
<td>Building and Sustainability Index</td>
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<td>BCA</td>
<td>Building Code Of Australia</td>
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<td>BMS</td>
<td>Building Management System</td>
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<tr>
<td>DC&amp;M</td>
<td>Design Construct And Maintain</td>
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<td>EMS</td>
<td>Environmental Management System</td>
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<td>EPC</td>
<td>Energy Performance Contract</td>
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<td>ESD</td>
<td>Ecologically Sustainable Development</td>
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<td>GBCA</td>
<td>Green Building Council Of Australia</td>
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<td>GEEIP</td>
<td>Government Energy Efficiency Investment Program</td>
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<td>GEMP</td>
<td>Government Energy Management Policy</td>
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<td>LEED</td>
<td>The US Green Building Council's Tool For Rating Green Building</td>
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<td>NABERS</td>
<td>National Australian Building Environmental Rating Scheme</td>
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<td>NGAC</td>
<td>NSW Greenhouse Abatement Certificates</td>
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<td>PCA</td>
<td>Property Council Of Australia</td>
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<td>PFI</td>
<td>Private Finance Initiative</td>
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<td>REC</td>
<td><em>Renewable Energy Certificates</em></td>
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<td>SEAV</td>
<td>Sustainable Energy Authority Of Victoria</td>
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<td>SEDA</td>
<td>Sustainable Energy Development Authority (NSW)</td>
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<td>TBL</td>
<td>Triple Bottom Line</td>
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INTRODUCTION

The purpose of this report is firstly, to examine the wide range of financial benefits associated with a ‘green’ or sustainable approach to building and secondly, to identify opportunities for the NSW Attorney General’s Department (AGD) to implement the ‘greening’ of its new and existing courthouse buildings.

As the environmental and social benefits are already well documented\(^2\), the first section of this report focuses on the financial argument for green building, including the indirect value of various environmental and social benefits. It draws on a wide range of international and Australian data. Although the majority of the available information is based on commercial buildings, we have sought examples of public buildings, particularly courthouse buildings, where possible. The section covers:

- The potential for capital cost savings in new buildings
- Savings in operating costs over the building’s lifetime
- Savings related to improved occupant productivity and well-being
- Regulations and financial incentives that support green building
- Improved risk management (‘future proofing’)
- Improved investment value
- The indirect economic value of leading by example

The second section of this report focuses on how the AGD can take advantage of these opportunities and how best to implement the ‘greening’ of AGD building stock. It covers:

- Organisational commitment
- A new way of defining ‘value’
- Innovative financing mechanisms
- A new approach to cost planning
- Investment in quality design
- A new approach to project delivery

What do we mean by a ‘green’ building?

The term ‘green’ building is often used interchangeably with the terms ‘sustainable’ or ‘high performance’ building. Although there is no single agreed definition of what this comprises, there is a broad consensus regarding the general attributes. Green buildings have low ecological impact throughout their life cycle, with resource efficiency as one of their key attributes. They create healthier work and living environments, with more natural light and cleaner air and contribute to improved health, comfort and productivity\(^3\). They also address issues such as access to public transport and community facilities and are sympathetic to historical and social context.

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\(^2\) For instance, in Australia buildings are currently responsible for approximately 30% of raw material use, 42% of energy use and 40% of air emissions (Commonwealth of Australia, 1999, Building for Growth: Key initiatives of the Building and Construction Industries Action Agenda). This is reason enough to re-assess our approach to new building and retrofitting existing buildings. From a social perspective, we spend about 90% of our lives in buildings and can benefit greatly from the improved quality of the indoor environment that is a principle of green building.

The key to green buildings is that they cost less to run and operate differently. Contrary to current opinion, green buildings do not need to look different or ‘alternative’. As Bill Bordass argues in Cost and Value: fact and fiction: “To regard green buildings as special may not help the cause: what counts is not what they are, but the better outcomes which result from effective combinations of strategy, design, production, handover and management”. A holistic approach is important to achieving a green building. For the best and most cost effective results, sustainability principles must be integrated from the outset.

**Growing evidence of a sound ‘business case’**

Both overseas and in Australia, evidence of a sound business case for green building is growing and previously unseen opportunities are being recognised, as the key findings from recent reports show:

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<tr>
<td><strong>The Costs and Financial Benefits of Green Building</strong>, (Kats, 2003), USA:</td>
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<td>“Historically, both private firms and public agencies do not recognise the full financial value of green buildings. They usually acknowledge some of the benefits from lower energy and water use, but completely ignore or critically undervalue other, often significant, financial benefits of green buildings during the design and construction decision-making process.”</td>
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<td><strong>The Economic Case for ‘High Performance Buildings’</strong> (Johnson, 2000), USA:</td>
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<td>“A compelling case can be made for high performance or ‘green’ buildings purely on the economics alone. Thus, like so many good examples of environmental strategy, most of the environmental benefits can be had for ‘free’. Because of this, building owners should pursue high performance buildings whether they wish to be particularly ‘green’ or not. To make this case, we must look at the full economics rather than limiting our decision-making to only a portion of the total economic ‘picture’.”</td>
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<td><strong>Cost and Value: fact and fiction</strong> (Bordass, 2000), UK:</td>
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<td>“Buildings need to get greener faster. Fundamentally, there is no conflict between this and better human satisfaction and business performance: the triple bottom line – all are trying to do more with less: replacing materials, energy and wastage with information. …Change is in the air and it is vital we break the vicious circles and make buildings greener faster. There is massive potential for doing so, even without radical change – there is so much waste in the system”</td>
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<tr>
<td><strong>Economics of Sustainable Building</strong> (Mackley, 2002), Australia:</td>
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<td>“There are significant and multiple benefits available to all buildings by taking a sustainable approach to design and development.”</td>
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8 Bordass, W. op cit

9 Mackley, C. J. op cit. Caroline Mackley is a senior cost planner with Bovis Lend Lease, whose research on building environmental performance has been presented internationally.
A compelling case for the AGD

As the agency responsible for the design, construction and maintenance of a vast and diverse portfolio of building stock, the AGD is in a prime position to reap the multiple benefits of ‘greening’ its properties.

The AGD’s building stock represents an extremely valuable, long-lasting and high profile asset. Therefore, ensuring the buildings perform as well as possible, or at least designing-in flexibility so they can be adapted over time, is economically and strategically important. As AGD building stock typically has a much longer life than the average conventional building,10 ‘future proofing’ the buildings to ensure they remain public assets rather than become liabilities is particularly important.

Investments in improved performance will return benefits over the building’s lifetime, reducing future recurrent costs. It is much cheaper and easier to get things right during construction of new facilities or refurbishments than it is to fix problems after they have been created. Failure to capture energy and resource-saving opportunities is equivalent to wasting public money.

For new buildings, enormous potential exists to reduce recurrent costs through good design. For a marginal initial investment to support the ‘greening’ of the building, life cycle savings of over ten times that investment can be achieved.11 Commissioning innovative new green buildings also represents a high profile opportunity to demonstrate leadership to the community.

Existing buildings represent the major proportion of AGD stock and constitute a massive capital investment. Their operating efficiency has a major cumulative impact. Improvements in performance and rates of return are easily calculated for upgrades and provide a strong basis for financing.

Smart management can offset some of the higher capital costs associated with greening buildings with other measures that actually save money. Smart management will also bring down costs over time by identifying better ways to achieve sustainability objectives, the potential to sell savings to energy retailers (for example through the NSW Greenhouse Benchmarks program), economies of scale and so on. These opportunities are discussed further in the body of this report.

Now is an opportune time to implement a program for the ‘greening’ of AGD buildings. Environmental awareness is rapidly gaining momentum, internationally and throughout Australia. Commonwealth and State Governments are already moving to demand better performance and greater accountability from the public sector in regards to green building. In NSW, regulatory changes and a range of public and private sector initiatives reflect the push towards greener building development.

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The increasing momentum of the ‘green building’ movement in Australia:

The newly formed Green Building Council of Australia (GBCA) held its inaugural conference in 2003 and already has a wide membership of industry and government bodies. The GBCA’s mission is to develop a sustainable property industry for Australia and to drive the adoption of green building practices through market-based solutions.

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10 An 80-year life is specified for new buildings, and a large proportion of existing courthouses are over a century old. In comparison, the average life of a conventional office building is said to be around 30–50 years.
The recent development of a range of green building rating tools, which allow achievements to be quantified, promises to accelerate industry’s progress towards best practice. The tools include Green Star, the Australian Building Greenhouse Rating (ABGR) scheme and the National Australian Building Environmental Rating Scheme (NABERS).

Some of Australia’s leading developers are beginning to establish their own initiatives. For example, Australand Holdings recently signed a memorandum of understanding with Sydney Water to commit to a reduction in water use of at least 35% for all new developments. Australand will report publicly on progress on an annual basis.

Failure to act now, despite the increasing pressure, could result in the AGD being seen as merely complying rather than showing leadership and public responsibility. To date, the AGD has shown considerable leadership, by implementing energy and water efficiency upgrades in five courthouses, implementing energy performance contracts in 35 courthouses and reporting a 9.23% reduction in energy consumption across its portfolio in 2002–2003. Further strategies are in place to achieve a 25% overall reduction from 1998–1999 energy usage by 2005–2006, to meet the NSW Government Energy Management Policy (GEMP) targets.

However, opportunities exist to boost the AGD’s leadership profile and take this success further, by making the commitment to sustainability explicit in all policy and operational procedures and by engaging all AGD staff in this process. Investing in a comprehensive strategy for the greening of the AGD portfolio could be a high-profile aspect of the commitment to sustainability. As part of this strategy, effective benchmarking procedures could be put in place to allow comparison with similar facilities outside the organisation, so that AGD achievements can be fully recognised in a comparative context.

Solid organisational commitment is required to realise the full potential of these opportunities. It is not possible to develop expertise and capture the benefits without being fully involved and committed to continuing involvement.

**Initiatives undertaken by the AGD’s Victorian counterpart:**

The Victorian Department of Justice has implemented an environmental management system (EMS) that covers all its operations, including offices, custodial facilities, emergency services, community correction services and courthouses. As part of the EMS, ecologically sustainable development (ESD) principles are incorporated into all new buildings and major refurbishments and an allowance is allocated to ESD measures in the budgets of capital projects. The department has emphasised in its policy statement that it will actively involve all employees in creating a more environmentally responsible organisational culture.

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12 The upgrades resulted in annual savings of around $130,000 (an internal rate of return of 12.1%)
14 Source: Attorney General’s Department of NSW Energy Management Strategy 2003–2006 prepared by Environment Unit Asset Management Services, 24/09/03. GEMP targets are for 25% reduction from 1995/96 levels by 2005/06. The AGD report measures reductions from 1998/99, because baseline 1995/96 data is “erroneous”. Strategies for further reductions include an awareness campaign, additional energy performance contracting, office accommodation energy audit and upgrade, an investigation into ‘out of hours’ energy use, training and planning/design initiatives.
15 It is highly likely that targets for government programs will change from percentage savings to benchmark targets to overcome the perverse incentive to ‘not do too much too soon’.
16 Department of Justice Environmental Management Policy (2003) Victorian Department of Justice
1. THE CASE FOR ‘GREENING’ NEW AND EXISTING BUILDINGS

When examined on a life cycle basis, the ‘greening’ of new and existing buildings makes sound business sense. A 2003 US study, described as “the most definitive cost benefit analysis of green building ever conducted”\textsuperscript{17}, found that:

\textit{An upfront investment of less than two per cent of construction costs to support the ‘greening’ of the building yields life cycle savings of over ten times the initial investment.} \textsuperscript{18}

The report concluded that despite data limitations and the need for additional research in various areas, building green is cost effective and makes financial sense today.

Green buildings cost less in recurrent expenditure and provide a range of financial, environmental and social benefits that conventional buildings do not. The financial benefits of green buildings include lower energy, water and waste disposal costs, savings from increased productivity and health and lower environmental and emissions costs.\textsuperscript{19}

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The Green Building Council of Australia lists the key benefits of green building as:
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- Lower development control costs, improved risk mitigation and management, higher tenant retention, lower renovation costs, faster lease-up periods, lower overheads, higher returns, more flexible space planning, more productive and healthier environments, access to financial incentives and tax credits, a baseline measure to earn carbon credits, lower insurance costs, increased interest by Ethical Investment Funds and a better industry image.\textsuperscript{20}
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\end{tabular}
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Some of the financial benefits, such as savings in water and energy bills, are readily measurable now. They are tangible and are standard budget inclusions. Other financial benefits, like worker health and productivity, are less tangible and probably far more significant than savings on building services, as is demonstrated in this report. These less tangible benefits are the current focus of extensive Australian and international research and trials. As Bill Bordass argues in \textit{Cost and Value: Fact and Fiction}:

\textit{Over 25 years, the capital cost of an office building can be dwarfed by factors of 5–10 by those of operation, maintenance and alteration; which in turn are 10% or so of the salaries of the occupants. From this viewpoint, penny-pinching on capital cost is silly if it adds to running costs; or reduces occupant satisfaction, productivity or value added.}\textsuperscript{21}

While the breakdown for courthouses will differ from those for office buildings, the principle holds true that staff costs are by far the greatest cost for most buildings. The following sections outline in detail the wide range of financial benefits related to the ‘greening’ of new and existing buildings.

\textsuperscript{17} Quote by Aileen Adams, Secretary of California’s \textit{Sustainable Building Task Force}, in the foreword to the study. The \textit{Sustainable Building Task Force} represents over 40 California State Government agencies.
\textsuperscript{18} Kats, G, et al (2003) op cit
\textsuperscript{19} ibid
\textsuperscript{21} Bordass, W. (2000) op cit
1.1 The potential for capital cost savings in new buildings

Summary

Although there is no simple answer to the question “How much does a green building cost?” they do generally have slightly higher capital costs. However, green buildings can in some cases end up costing no more (and occasionally less) than a conventional building, provided that a sustainability allocation is factored into the design budget and costs during construction are re-allocated to elements with high environmental benefits. The potential for green buildings to be cost-competitive upfront is increasing, as the building industry’s grasp of sustainability evolves, ‘green’ materials and technologies become more accessible and cheaper and designers and tradespeople become more familiar with their application.

The transfer of air conditioning budgets to building envelope budgets, in order to reduce the heat load on the building, is a typical example of how construction costs may be re-allocated for more efficient outcomes. Attention to passive design, building envelope and lighting energy efficiency can downsize or even eliminate the need for air conditioning plants and ductwork. This often results in lower capital costs as well as an increase in lettable or productive floor space.

Other opportunities to reduce capital costs include adaptive re-use of major portions of existing buildings on-site, or disassembly and re-use/recycling of building components. This avoids landfill fees, which are already expensive in NSW and set to increase over time. Using water efficient fixtures, which allows pipes to be downsized, can also contribute to cost reduction.

Reducing capital cost — some Australian examples:

The Department of Juvenile Justice saved $67,000 on the capital cost of the Dubbo Juvenile Justice Centre, built in 1998, by installing an energy efficient ground source heat pump for air conditioning rather than a conventional system. The annual operational savings are $36,000.

The Victorian Department of Justice reduced construction waste removal costs by more than half on the Dandenong Police and Courts Complex, built in 1994. A program of waste minimisation, recycling and re-use led to a capital saving of around $73,000.

Manly Hydraulics Laboratory in Sydney, built in 1998, achieved capital savings of $220,000 (after the inclusion of various passive design solutions), based on the deletion of the air conditioning plant to fully air condition the main building. Recurrent yearly savings are around $12,000.

There are also examples of buildings in Australia where ‘green’ outcomes have been achieved within normal commercial constraints and conditions. Examples

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22 ‘Passive design’ is the term given to energy efficient climate-responsive design, which takes into account such things as building orientation, shading, natural ventilation and the thermal performance of materials used.


25 ibid

26 ibid
include ABS House in Canberra, DIMIA in Canberra and the Parramatta Police Centre in Sydney. The capital costs of these projects are consistent with the costs of conventional office buildings in the same class.  

**Capital costs consistent with conventional building — a NSW example:**

*The NSW Police Service* headquarters in Sydney, due for completion in 2004, is designed to use 30% less energy and 30% less water than a typical office building, but will cost around the same to construct. In an innovative arrangement expected to deliver high levels of building performance, the developer will design, construct and maintain the building for 15 -years.

Successful outcomes like all these require a firm commitment to sustainability, which must be reflected in the cost planning, a life cycle approach to costing, an integrated design process and a willingness to depart from traditional methods and assumptions. This is true both for new construction and for major upgrades. We explain more about this in Part 2 of this report.

Regardless of whether the building itself ends up costing more, the design process for a green building will undoubtedly cost more. There are three reasons for this. Firstly, because green buildings respond to their local context, more modelling and assessment is necessary at the design stage. Secondly, an integrated design process involves an iterative approach with a broader group of people and therefore potentially more time. Finally, this new way of working has a learning curve cost for designers, builders, tradespeople and clients. Learning curve costs for all parties reduce as experience grows.

However, not only is the design process a small part of the total budget, it is also where most opportunities to reduce recurrent costs lie. The savings and improvements resulting from a marginal extra investment in design can often be significant right from the start.

**What does this mean for the AGD?**

With smart management, the AGD may be able to achieve new ‘green’ buildings that cost no more and potentially even less to construct than a conventional building.

However, this requires a greater injection of funds in the early stages of the project, to support an integrated design process and clever management of the capital budget so that some of the higher capital costs associated with greening buildings can be offset by other cost-saving measures. The quality of the overall project management has a significant bearing on whether or not a green building costs more to construct.

It must be noted, however, that any desire to reduce capital costs should not be at the expense of achieving recurrent savings over the building’s lifetime. Currently, capital costs dominate building economic costing, but they are not the dominant cost over the life of a building.

To make the argument for the marginal but necessary design budget increase, the AGD has the opportunity to adopt life cycle costing processes internally to evaluate

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See section on Case Studies.

29 NSW Department of Public Works and Services (1998) op cit.
the potential returns and to use examples of new ‘green’ government buildings to demonstrate the real capital and operating savings that are possible. The Victorian Department of Justice’s policy to allocate a percentage of capital budgets (for new buildings and upgrades) towards implementing sustainable principles could be a useful precedent.

Section 2 contains more information on setting up an integrated design process, using life cycle costing and managing the cost plan during construction.
1.2. Savings in operating costs over the building’s lifetime

Summary

Green buildings use less energy and water and create less waste. Guaranteed reductions in energy and water costs (and potentially waste disposal costs), over the life of the building constitute a major financial benefit. This highlights a particularly significant opportunity for organisations such as the AGD, which have control over the design and management of their own facilities and can therefore influence recurrent costs and reap the benefits. The reduction in recurrent costs associated with greening new and existing buildings also reduces investment risk and increases the asset value of the building.

Operational cost savings allow attractive rates of return to be achieved on any initial extra investment associated with making the building more resource efficient. For example, a high-performance green building that has been designed to be energy efficient from the start can use up to 70 per cent less energy than a conventional building, resulting in attractive rates of return and a speedy payback period for the capital investment.

A recent financial analysis conducted for the Australian Building Codes Board (Dempster, 2003) recommended any investment in building energy efficiency attracting a rate of return of seven per cent or more as financially viable. This equates to a payback period of around fourteen years and is largely due to the low risk associated with investment in making buildings energy efficient. The study found that “there are many situations where investments in energy efficiency should be regarded as virtually risk-less investments” and at most, “no more than half as risky as the average investment in productive assets by Australia’s listed companies”.

In Australia, a “highly-featured” green office building will generally require a capital investment in the range of 3–5% over standard gross construction costs. However, these buildings achieve operational cost savings that provide initial returns in the order of 8–15%. Significantly, these returns exceed the seven per cent threshold recommended by Dempster, lending weight to the argument that green buildings make sound business sense.

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31 7% is the average post tax nominal required return. Ranges given in the study are as follows:
   - Post tax nominal required return (investments in the energy efficiency of low risk sectors): 5.4 - 6.5%
   - Post tax nominal required return (investments in the energy efficiency of high risk sectors): 7.0 – 8.3%
   - Post tax real required return (investments in the energy efficiency of low risk sectors): 2.8 – 3.9%
   - Post tax real required return (investments in the energy efficiency of high risk sectors): 4.3 – 5.6%
   - Figures are based on a debt to total funding ratio of 0.6-0.7.
32 The key driver of the rate of return, apart from taxation and structural financial parameters, is the risk profile of the investment. The report argues that investments in the energy efficiency of buildings are somewhat insulated from cyclical fluctuations in economic activity and are therefore relatively low risk. Adequate lighting and thermal comfort are essential to any business and the related energy requirements are relatively fixed regardless of how well the business itself is doing. Energy savings are delivered with almost complete certainty, as ‘fixed savings’ on ‘fixed costs’.
34 The estimates given are based on buildings with features such as façade operability, displacement mechanical systems, indirect lighting systems and integrated atriums. However, inclusion of these particular features represents just one of many approaches to achieving a sustainable building.
35 Mackley, C. J (2002) op cit
In addition, robust ‘no frills’ green buildings without all the features described above, but designed using sustainability principles with a clear adaptability strategy (for future technology upgrades and changes in use), may not require such high premiums whilst providing very attractive rates of return. Premiums for green building, as previously mentioned, will decrease over time as the building industry evolves.

There is a lag between action and reporting in the green building sector. In Australia, we are now seeing an exponential rise in the number and calibre of green building projects in design and under construction. Some examples include the City of Melbourne’s Council House 2 administration building, considered to represent ‘world leader’ standard in green building, 30 The Bond in Sydney, Brisbane Square in Brisbane and Central West in Adelaide, considered to represent ‘Australian excellence’ in green building.36 Although it is too early to obtain cost data on these projects, it is well documented that the buildings’ owners see sound financial sense in commissioning ‘greener’ buildings. These new projects benefit from more advanced technologies and increasing industry experience. It seems reasonable to expect even better performance from these new projects than the significant achievements we are able to document from earlier projects.

**Operational cost savings in energy — a well known international precedent:**

The ING bank in Amsterdam, a landmark green building built in 1987, helped to position ING as a leader in corporate responsibility. The cost of integrating ‘green’ technologies into the building was $US 865,200 (total construction cost was $US 53.8 million), yet the annual energy savings are approximately $2.9 million, resulting in a three month payback on energy efficiency alone.

**Operational cost savings in energy and/or water — new buildings in Australia:**

The 60L Green Building in Melbourne uses two thirds less energy than a conventional commercial office building and around 90 per cent less water,38 resulting in substantial operational cost savings (figures not yet available). It was recognised for its commercial viability when it was awarded the 2003 Victorian Premier’s Award for Business Sustainability. It was built within a 5% cost margin compared to a similar conventional building.

The Henry Deane Building in Sydney, tenanted by the Department of Infrastructure, Planning and Natural Resources, uses one third less energy than the average CBD government office building. By focusing on the two highest energy consumers in office buildings, lighting and air conditioning, energy savings of around $82,000 per annum have been achieved. The high technology lighting system, using high efficiency T5 luminaires with electronic ballasts and daylight sensors, paid for itself in just twelve months.39

120 Edward Street in Brisbane, a 21-storey commercial office building built in 1999, achieved a payback of less than five years for its investment in water and energy saving initiatives. Operational cost savings are in the order of $166,000 per annum (or around $10

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36 The former two buildings were given pre-assessment ratings (of 6 and 5 Green stars respectively) in the Green Building Council of Australia’s pilot of the GreenStar rating tool. The latter two have made a pre-commitment to achieving 5 Green stars. A rating of 6 Green stars is defined as ‘world leader’ standard and a rating of 5 Green stars is defined as ‘Australian excellence’. More information is available at [www.gbcaus.org](http://www.gbcaus.org)


See section on Case Studies. Energy savings quoted are for a 9000 square metre net lettable area.
Opportunities for reducing building operating costs are not restricted to new buildings. The NSW Sustainable Energy Development Authority (SEDA) has achieved energy savings of up to 20 per cent on buildings retrofitted through its Energy Smart Business Program. These energy efficiency investments have attracted an average internal rate of return of 39 per cent\textsuperscript{42}. Even greater opportunities for recurrent savings are likely when the scope of the retrofit is broadened to include water efficiency and indoor environment quality.

**Operational cost savings in energy and water — retrofits of existing Australian buildings:**

The NSW Attorney General’s Department has already had considerable success in applying energy and water efficiency to part of its portfolio. An upgrade across five courthouses has resulted in annual savings of around $130,000 and an internal rate of return of 12.1 per cent. The upgrade focused primarily on lighting and air conditioning but included modifications to the building management system, installing water saving devices and reducing the size of gas and water meters.\textsuperscript{43}

The McKell Building in Sydney, offices of the NSW Department of Commerce, invested $71,950 in energy efficiency with a payback period of 14 months. An additional $13,000 invested in water efficiency led to an annual saving of $15,000 in water costs.\textsuperscript{44}

Northern Sydney Health used energy performance contracting to undertake energy upgrades in the Royal North Shore Hospital. These upgrades were undertaken in the areas of lighting, heating, ventilation and air conditioning systems and water consumption at a cost of almost $1.3 million. The yearly savings were guaranteed at $266,575 but were exceeded in the first year by more than $52,000 delivering an internal rate of return of 21.9 per cent.\textsuperscript{45}

**Operational cost savings in energy — retrofits of existing Australian buildings:**

Newcastle City Council invested in a power factor correction for its Administration Centre that helped to reduce the building’s peak load, leading to savings of $36,000 a year. A $52,000 lighting retrofit achieved a 47% reduction in office lighting energy use.\textsuperscript{46}

Lithgow Correctional Centre invested $46,450 in energy efficiency through identifying operational, equipment and energy purchasing practices that would reduce recurrent costs.

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\textsuperscript{40} ibid
\textsuperscript{41} ibid
\textsuperscript{44} NSW Department of Public Works and Services (1998) op cit
See section on Case Studies. Energy savings quoted are for a 9000 square metre net lettable area
The investment was paid back in eight months. Bankstown TAFE invested $77,380 in a similar program, with a payback period of three years.47

The former Department of Land and Water Conservation invested $104,400 in energy efficiency measures for the Land Titles Office in Sydney. The initial investment was paid back in 17 months, with continuing annual savings of around $75,000.48

The State Library of NSW signed an energy performance contract for $600,000 over six years with guaranteed yearly savings of $104,000 over the life of the contract. The rate of return achieved was 21 per cent.49

Investa Property Group saved $185,000, or over 16% of total energy costs at one commercial property in Sydney, by reducing air conditioning operating hours, installing controls that more efficiently manage after hours lighting and retro-fitting office space lights with energy efficient bulbs.50

ING improved the energy efficiency of the MLC Centre, a large commercial property in Sydney. New lighting controls have saved an estimated 35% in average floor lighting costs in the building.51

Star City Casino in Sydney undertook a lighting project that cost $2,500 and resulted in yearly savings of around $61,000. The lighting project simply involved removing one tube from the twin tube lights in the car park (the original lighting far exceeded the minimum specified in the Australian Standard), delivering a 2488% internal rate of return. The air conditioning system in the casino was adjusted to link outdoor air intake with the number of people in the building. The project cost $41,500 and delivered annual savings of $110,000 (a 268% internal rate of return).52

Operational cost savings in water — retrofits of existing Australian buildings:

The NSW Department of Corrective Services implemented sustainable water management measures at the John Morony Correctional Centre in South Windsor, leading to yearly water savings of $25,200. Additionally, sewerage discharge was reduced by approximately 50 per cent.53

At Camperdown Children’s Hospital in Sydney, water savings worth over $220,000 a year were achieved by fixing leaks, installing water saving devices and reducing the size of meters.

At Lavarack Army Barracks in Townsville, water savings of $153,000 a year were achieved for an implementation cost of $230,000.54

What does this mean for the AGD?

The AGD’s building stock is an extremely valuable asset and although the AGD has already explored the opportunity to reduce operating costs through water and

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47 NSW Department of Public Works and Services (1998) op cit
48 ibid
50 Energy Smart Case Studies (accessed October 2003)
53 The Sustainable Energy Development Authority op cit
54 NSW Department of Public Works and Services (1998) op cit
55 ibid
energy efficiency upgrades in some of its courthouses, there is potential to take this much further. By developing a comprehensive strategy for the ‘greening’ of both new and existing AGD building stock, the AGD can show leadership and ensure significantly reduced recurrent costs long into the future.

More analysis is required to determine the most appropriate implementation strategy, in terms of where to focus effort and financial resources. However, it is clear that new and existing buildings both deserve attention for different reasons.

For the AGD’s new buildings (i.e. buildings in the planning or design stage), enormous potential exists to reduce recurrent costs through good design. When just one per cent of a project’s upfront costs are spent, up to 70 per cent of its life cycle costs may already be committed. Because new buildings are such a small proportion of AGD stock and require a comparatively marginal extra investment to support their ‘greening’, it is recommended that the capital budgets of all new buildings be augmented for this purpose. As previously noted, the Victorian Department of Justice allocates a budget for ESD measures in all capital projects.

For existing AGD buildings, there is an opportunity to greatly reduce recurrent costs through upgrades and refurbishments. The operating efficiency of existing buildings has a major cumulative impact and effective improvements can be made by targeting existing problems and inefficiencies. The Commonwealth discussion paper Economical and Environmental Life Cycle Costs of Building reported:

In the short term, retrofits are the easiest way to improve economic and environmental performance. Existing building stock represents massive capital investment that continues to have life cycle implications. The change in economic and environmental performance is easily calculated for retrofits and provides a strong basis for financing.

Properly structured benchmarking and monitoring has the potential to deliver large savings and help to set priorities for fixing existing problems and improving performance.

A multi-criteria approach to guiding investment decisions is recommended, so that rates of return are considered in conjunction with the range of beneficial impacts associated with the measure. Resulting recurrent savings can be used to help fund an ongoing roll-out of the ‘greening’ of the AGD portfolio. We suggest that any energy efficiency measure providing a rate of return of 7 per cent or more be considered as a financially viable investment (whether applied to upgrades or new buildings). This figure is based on the findings of a detailed financial analysis of energy efficiency in buildings (Dempster, 2003). The study did not model water efficiency in buildings but the level of investment risk upon which the 7 per cent threshold is based, is similarly low. In addition, water is a finite resource and governments are already introducing limits on water use to conserve supplies and defer the need for more infrastructure. Therefore, it is reasonable to adopt a similar (and potentially even lower) threshold for water efficiency measures.

A small number of AGD sites are tenancies, rented from other organisations. Opportunities exist to develop guidelines for tenancy selection, linked to the

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56 Victorian Department of Justice, Department of Justice Environmental Management Policy (2003)
57 NSW Department of Public Works and Services (1998) op cit
58 7% is the average post-tax nominal required return, based on a debt to total funding ratio of 0.6–0.7. If the AGD is required to calculate returns on a basis of zero debt/100% equity the required rate of return would be higher.
environmental performance of the base building (and the fit-out if this is provided as part of the package). The existence of rating tools for building performance now makes this process easier. KPMG and Ernst and Young are two companies that have recently linked their tenancy requirements to a specified level of environmental performance, reducing their operating costs by doing so. The AGD already has plans to develop sustainability guidelines for fit-out of its existing tenancies, which is a positive step forward.

Section 2 contains more detail on implementation, including indicative cost premiums for ‘green’ capital works and accessing finance.
1.3. Savings related to improved occupant productivity and well-being

Summary

More is spent on paying the people who will work in the building over its useful life than on its design and construction. This is why the health, comfort and productivity of the building’s occupants are so significant in economic terms. Good indoor environment quality is a key principle of green building design and only has to increase productivity by 1% to offset the entire annual energy bill for a building owner. There are numerous published testimonials, studies and reports concerning the benefits of both new and refurbished green buildings in terms of productivity and reduced absenteeism and illness. Demonstrated productivity benefits include more effective decision-making, a critical element for the AGD in the proper functioning of the justice system.

For many years, the approach to improving the workplace environment for office workers has focussed on improving levels of ‘comfort’ as defined from a narrow perspective of air conditioning systems. This has led to the adoption of ever more sophisticated and centralised control systems, rather than examining what it is that makes people uncomfortable. Consequently, a large percentage of building occupants, commonly in excess of 50 per cent, are unhappy with their workplace. A common complaint is lack of control over their working environment.

In addition, ‘unhealthy’ buildings with excessive levels of indoor pollutants have resulted in numerous cases of sick building syndrome (SBS), partly owing to poorly designed and maintained air conditioning systems. The problems of headaches, respiratory illness, allergies and so on associated with SBS are well documented, although the direct financial aspects are usually hidden in absenteeism, lowered productivity and higher medical costs. The lost productivity cost of SBS in NSW alone is estimated to be hundreds of millions of dollars per year. It is important to note that substantial damages have been awarded in the USA for health problems attributed to SBS and poor indoor environmental quality and a number of compensation cases have been brought before various legal jurisdictions in Australia.

The provision of a healthy, comfortable and more satisfying workplace needs an integrated approach to achieving indoor environment quality. This includes attention to:

- Use of non-toxic low emission materials
- Improved daylighting, artificial lighting and lighting controls
- Improved thermal comfort and ventilation control
- Indoor air quality monitoring
- Thorough commissioning and maintenance procedures.

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59 NSW Department of Public Works and Services (1998) op cit. Over a 30 year time period, 2% of building costs are capital costs, 6% is spent on operation and maintenance, and the remaining 92% is spent on salaries.
60 ibid
61 NSW Parliament Legislative Assembly Standing Committee on Public Works Report 52/7 Sick Building Syndrome, April 2001
62 ibid
Apart from the obvious benefits for the occupants, even small gains in health and productivity resulting from a healthy green building are highly significant financially. Over a 50-year life of a typical commercial office building, employee costs will outweigh all other costs (including capital and building operating costs) by a ratio of around 10 to 1. A study by the NSW Department of Housing and Construction found that:

...life cost studies for typical office buildings over a 30–50 year period had shown that 92% of the total cost is for the employees within the building. The initial capital cost accounts for a meagre 2% whilst other operational costs...only accounted for 6% of total life costs.\(^{63}\)

Similar findings in the USA prompted the following comments from the US General Services Administration:

These figures show that the greatest opportunity for workplace gains is in improving the performance of the people in the space, not cutting the cost of the workplace. This makes a compelling argument for life cycle cost analyses that include the effects of workspace on the building population when determining the cost benefit of workspace elements.\(^{64}\)

Although courthouses will have different occupancy patterns and therefore employee and operational costs compared to standard office buildings, employee costs will still far exceed other lifecycle costs. Based on figures for two typical courthouses provided by the AGD, over a 60-year lifetime operational costs for energy, water and maintenance will be 2%, capital costs around 30% and employee costs 68%. This indicates that, despite comparatively lower staff densities, real financial returns to the AGD through productivity gains will be highly significant.

![Lifecycle costs for a typical NSW courthouse](image)

Figure 1: Lifecycle costs for a typical NSW courthouse

A gain in productivity will outweigh any small addition to construction costs and the healthy indoor environment provided by green buildings leads to demonstrated improvements in occupant wellbeing and productivity. This does not mean that energy, water and waste savings are not important. They are fundamental elements of green building design that contribute to an improved working environment through greater comfort, natural lighting, improved air quality and so on. Other

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\(^{63}\) NSW Department of Public Works and Services (1998) op cit  
\(^{64}\) US General Services Administration, “The Integrated Workplace: An Overview”, p32
demonstrated benefits include improved capacity to absorb information and more effective decision-making, both vital elements in the proper functioning of the justice system. An autonomous (on-site) power supply, a feature of many green buildings, can also have a positive impact on productivity by reducing the likelihood of power blackouts to near zero. This risk is often overlooked at the design stage, but even one hour of productive labour saved during a power outage can be worth more than the cost of lighting an office all year.65

The conclusion is that a healthy, productive workplace is an integral part of the value creation process for an organisation and should no longer be considered a separate overhead item that can be sacrificed to reduce capital costs. Rather, the issue is how to reliably estimate the expected productivity gains from a green building, as measures of productivity for office or ‘knowledge’ workers can be difficult to establish. Fortunately, there are now enough rigorous studies available to be able to make reasonably reliable if somewhat conservative estimates of the health and productivity benefits of green buildings:

<table>
<thead>
<tr>
<th>Examples of productivity increases (of up to 20%) and reductions in absenteeism (of up to 40%):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ongoing research at Carnegie Mellon University in the US indicates that in controlled studies of a range of speed and accuracy performance measures such as typing, calculations, proofreading, comprehension and so on, productivity increased by an average of 7% with good lighting, 1.8% with good ventilation and 1.2% with good thermal comfort.66</td>
</tr>
<tr>
<td>A survey by the US National Energy Management Institute estimates productivity gains of 1.5% in healthy office buildings are possible and probably very conservative.67</td>
</tr>
<tr>
<td>The Internationale Nederlanden (ING) Bank headquarters in Amsterdam has cut worker absenteeism by about 20% and uses only 10% of the energy of its predecessor.68</td>
</tr>
<tr>
<td>The US VeriFone Company retrofitted a building to cut indoor pollutants and improve general environmental quality, resulting in a reduction in absenteeism of 40% and a productivity increase of 5% compared to an existing facility next door.69</td>
</tr>
<tr>
<td>Following a lighting retrofit in the building occupied by its drafting staff, the Pennsylvania Power &amp; Light Company found a productivity improvement of 13% and a sick leave rate drop of 25%, reducing the payback time for the investment to 70 days.70</td>
</tr>
<tr>
<td>The Lockheed Missile and Space Company constructed a new building to reduce energy consumption through improved use of daylight. The design halved energy costs but these savings were dwarfed by savings from a drop in the absenteeism rate of 15%.71</td>
</tr>
</tbody>
</table>

A study performed by the Heschong-Mahone group looked at students in three cities and found that those in classrooms with the greatest amount of daylighting performed up to 20% better.72

68 NSW Department of Public Works and Services (1998) op cit
70 NSW Department of Public Works and Services (1998) op cit
71 ibid
better than those in classrooms with little daylight. The study was controlled for several potentially confounding factors such as socio-economic class.

A study at Herman-Miller indicated an increase of up to 7% in worker productivity following a move to a green, day-lit building.

A Lawrence Berkeley National Laboratory study found that US businesses could save as much as $58 billion in lost sick time and an additional $200 billion in worker performance if improvements were made to indoor air quality.

A number of research projects are collecting data on other human resource aspects of green buildings, such as attracting and retaining employees, which could have significant financial benefits, but most of these are at too early a stage of investigation to reliably quantify.

What does this mean for the AGD?

In addition to significant reductions in absenteeism, productivity improvements are also measured in terms of accuracy, attention to detail, critical thinking and decision-making—all of which are critical to the functions carried out within AGD buildings. This aligns with the Director General’s commitment to cultivating a motivated and productive workforce within the AGD and the recent focus on improvements in both court performance and environmental protection.

To quantify potential productivity gains for the AGD through improved indoor environment quality, the US National Energy Management Institute’s conservative estimate of a 1.5% productivity increase appears to be a reasonable starting point. The annual savings due to a one per cent increase in productivity in a typical courthouse will far outweigh its annual energy costs.

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75 Kats, G et al (2003) op cit

1.4. Regulations and financial incentives that support green building

Summary

There is an increasing range of both regulatory requirements and incentives for greening all types of buildings. Incentives can assist in reducing capital costs associated with greening new and existing buildings and meeting regulatory requirements. It is certain that more incentives to encourage green buildings will be made available in the future, such as streamlined approvals, financial rebates and tax credits. This is already happening in Europe and the USA. In Australia, particularly now that a range of agreed green benchmarking tools exists, pressure is mounting from various quarters within the public and private sectors to provide appropriate incentives. These incentives will support the business case for greening new and existing buildings in a number of ways.

Regulations and minimum requirements

Regulations are used to ensure the construction and refurbishment of buildings to a minimum environmental standard. Most activity to date has been in the residential sector, where mandatory, minimum water and energy efficiency standards are being implemented by many State and local governments. A large number of NSW councils have set minimum energy and water efficiency ratings for new dwellings in their development control plans. The NSW Government has developed BASIX, a tool for measuring the sustainability of residential buildings. It is proposing to set a minimum BASIX score for all new dwellings by mid-2004. In Victoria, new houses will require a 5-star energy rating, water-efficient fittings and either a solar water heater or a rainwater tank from mid-2005.

This trend will inevitably spread to the non-residential sector. Australia currently lags behind many other countries in developing such regulations. Measurement tools such as the Australian Building Greenhouse Rating (ABGR) and the Green Building Council’s GreenStar now make benchmarking easier and facilitate the implementation of minimum standards. Some existing and proposed measures in NSW include:

> A NSW Parliamentary Standing Committee has recommended a minimum ABGR of 4.5 stars for all new government buildings being constructed and all government leased accommodation. Few buildings have achieved this level of performance so far.

> The City of Sydney has mandated a minimum 4.5 star ABGR for all new office developments costing more than $5m.

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78 The Department of Infrastructure, Planning and Natural Resources is implementing a Building & Sustainability Index (BASIX) which will mandate water and energy use reductions for new residential buildings in July 2004. New homes will be required to use 40% less water and 25% less energy than the current ‘business as usual’ benchmark. The energy use reduction target will increase to 40% in July 2005. More information is available at www.dipnr.nsw.gov.au
80 The ABGR website lists only 5 buildings across Australia that have achieved 5 star performance and 3 that have achieved 4.5 star performance (as of Jan 2004, based on whole building ratings) www.abgr.com.au
Many government departments and private businesses already specify minimum standards of energy and water efficiency for new buildings. For example, the NSW Police Service required the developer of its new headquarters to sign a Commitment Agreement with SEDA to deliver a 4.5 star building. The developer's bonds and rent reviews have been tied to achieving 4.5 stars.\(^{81}\)

The Commonwealth Government is committed to introducing energy provisions for non-residential buildings in the Building Code of Australia (BCA) in mid 2006. Furthermore, the Australian Building Codes Board (ABCB) has commissioned a study of international sustainability requirements and developments, to investigate the potential to introduce a range of sustainability regulations to the BCA.\(^{82}\)

**Sustainability issues to be considered for regulation by the ABCB include:**

- Durability; embodied energy; operating energy; use of renewable energy; materials selection; choice of appliances; construction and demolition waste; climate change; adaptability (renovation vs. deconstruction); accessibility; indoor air quality; water quality; water efficiency; urban salinity; site selection; biodiversity.\(^{83}\)

### Development and financial incentives

There is an increasing range of development and financial incentives to support green buildings. Some existing and proposed measures in NSW include:

- The **NSW Government Energy Management Program** (GEMP) was launched in August 1996 and aims to help NSW government agencies reduce the amount of greenhouse gas they are responsible for producing, and to help reach the Government's energy reduction targets of 15% of the 95/96 levels by 2001, and 25% of the 95/96 levels by 2005. All Schedule 1 agencies purchasing electricity off the NSW Supply '777' electricity contract are also required to purchase a minimum of 6% accredited Green Power.

  The NSW Treasury supports GEMP through a $20 million fund to finance large efficiency upgrades costing more than $500,000 through Energy Performance Contracts (EPC's) and smaller energy efficiency projects through the Government Energy Efficiency Investment Program (GEEIP). The funding is available as an advance to all budget-dependent Government agencies that undertake an EPC or GEEIP project in their facilities and is paid back through the energy cost savings.

- The **Commercial Office Building Energy Efficiency Initiative**, a partnership between the Sustainable Energy Authority of Victoria (SEAV) and the Property Council of Australia (PCA), is providing funding of up to $60,000, plus in-kind contributions, toward the design of new buildings or major refurbishments that achieve a minimum 5 Star energy performance rating using the Green Building Council's Green Star rating tool as well as meeting a separately specified energy target. The project partner must provide matching funding, 50 per cent of which may in-kind. If the project is implemented, they will refund up to 50 per cent of the matching funds.

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81 Salmon, S. *The Australian Building Greenhouse Rating Scheme*, Presentation to the AEEMA Cleaner Greener Smarter National Conference Melbourne 14–16th October, 2002


83 Ibid.
effectively reducing the partners’ financial contribution to zero. At present this is only available in Victoria.

> **Renewable Energy Certificates** (RECs) issued to building owners for installation of renewable energy sources such as solar water heaters and photovoltaic arrays can be traded on the market. The amount of the effective ‘subsidy’ depends on the market value of the RECs at the time (currently $30–40 per REC). Each Megawatt-hour (MWh) of electricity production displaced is awarded one REC.  

> The NSW *Greenhouse Gas Abatement Scheme* sets and regulates mandatory targets for abating the emission of greenhouse gases from electricity production and use and sets greenhouse compliance benchmarks.**NSW Greenhouse Abatement Certificates** (NGACs) are used as a mechanism to support the Scheme. Each abatement certificate represents a one tonne reduction in carbon dioxide-equivalent greenhouse gas emissions. NGACs can be created for certain demand side measures that reduce greenhouse gas emissions, such as energy efficiency, fuel switching and on-site generation. NGACs created are transferable and can be traded with electricity retailers to assist them to achieve their greenhouse benchmark. The Property Council of Australia supports this NSW Government initiative.

> The Property Council of Australia has called on governments to halve stamp duty for buildings that achieve a 4 Star or better ABGR.**SEDA’s Energy Smart Buildings Program** provides technical assistance and support for the development and implementation of energy efficiency measures in State government owned buildings in order to demonstrate the benefits of energy efficiency. A similar program is available to private businesses.**Sydney Water’s Every Drop Counts Business Program** offers assistance to customers who spend more than $70,000 per year on water related charges. It provides assistance in diagnosing water use practices, developing a water use improvement plan and helps with implementation through discounts, subsidised water audits and ongoing support.

**What does this mean for the AGD?**

There are advantages and opportunities for the AGD in relation to regulations and incentives. Firstly, being well-informed about impending regulations and staying ‘ahead of the game’ makes it easier and smoother to comply with regulations when they come into force and helps advance the case for green buildings by demonstrating what is achievable. Secondly, there is the opportunity to use existing incentives to minimise financial outlays and take advantage of programs that provide technical support. Thirdly, there is the opportunity to engage with and provide critical feedback on proposals for new regulations and incentives to ensure they are consistent with the AGD’s needs.

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85 www.greenhousegas.nsw.gov.au  
86 Property Council of Australia, *Initiatives for Sydney, November 2002*  
1.5. Improved risk management (‘future proofing’)

Summary

There are a number of significant risk management benefits associated with green building development, largely related to managing future change and avoiding liability. Because of growing environmental awareness, legislative changes requiring a ‘greener’ approach to building development are imminent. As resources become increasingly scarce, resource-efficient buildings will become an even more valuable asset. Flexibility to adapt to evolving green technologies and changing occupant requirements, a principle of green building, becomes particularly significant in a time of such rapid change. In an increasingly litigious society, concerns over liabilities related to the health impacts of poorly designed buildings and the cost of global warming also provide an incentive to move toward green buildings.

In this context, the greening of new and existing buildings reduces investment risk, increases the building’s life span, value and income and may also affect lending rates, insurance rates and the ability to lease.\(^8\)

Ironically, risk is often cited as a reason for avoiding a more innovative or sustainable approach to building. This is related to:

- Litigation fears associated with innovation, due to an absence of ‘tried and tested’ precedents
- Fear that something may go wrong and cost a lot to be fixed
- The pressure for shorter term, predictable procurement periods
- The greater responsibility and duty of care on the building owner if the building is autonomous (or partially autonomous) from mains services.

However, these perceived risks will decrease over time as sustainable building becomes a mainstream practice and Government has an opportunity to play a leadership role in this transition. The use of autonomous or semi-autonomous services options (such as on-site water treatment, fuel cells etc) can be managed by service agreements and these systems offer productivity benefits through the additional reliability they bring.

Industry and investors are increasingly concerned about future proofing their businesses and investments against imminent changes in legislation related to the greening of buildings. To avoid the potential costs of bringing non-conforming buildings up to standard, many developers and investors are realising it makes better business sense to lead the market. Those who choose to move towards best practice now will avoid the cost penalties associated with an enforced and rapid change of practice.

Already, society is starting to face a range of challenges associated with the increasing cost of electricity and worsening grid constraints, water shortage and waste disposal issues. Water and sewage services are likely to increase in price as governments try to provide stronger incentives to save water and defer upgrades of sewerage infrastructure. A green building, by embracing the principles of low ecological impact, resource efficiency and lower dependence on infrastructure, minimises many of the risks related to decreasing resource availability and the rising costs of resources/waste disposal.

An increasing demand for reliable power sources (due to a growing digital economy\textsuperscript{89} and important also in buildings where security is an issue) can have a significant impact on the long-term financial viability of a building. Green buildings with autonomous on-site power supply can reduce the risk of power outage to virtually zero. This minimises the likelihood of losing computer data and, as previously noted, even one hour of productive labour saved during a power outage can be worth more than the cost of lighting an office all year long.\textsuperscript{90}

Flexibility, another principle of green buildings, enables the ability to conserve resources and switch to sustainable sources later, (for example, in providing the ability to retrofit a new technology like photovoltaics, fuel cells or a waste water re-use system). Flexible design also accommodates changing technology requirements of occupants, such as IT cabling and changing workplace practices. As noted in the \textit{Resource Guide for Sustainable Development}:

\begin{quote}
\textit{Giving the building the ability to adapt to changing conditions reduces the risk associated with investing in the building. The same flexibility also increases the building’s expected life, income and value. In short, adding flexibility can create economic sustainability.}\textsuperscript{91}
\end{quote}

In an increasingly litigious society, concerns over liabilities are growing and can provide an incentive to move away from conventional solutions.\textsuperscript{92} Already, we are starting to face a range of challenges associated with the rising incidence of allergies and asthma. As previously highlighted, sick building syndrome is estimated to cost NSW hundreds of millions of dollars in lost productivity alone.\textsuperscript{93} There have been a number of instances and a number for courthouses, where poor building design or operation have had significant and damaging financial impact. A green approach to building, which includes attention to health impacts and indoor environment quality, limits risk and the potential for litigation.

\begin{quote}
\textbf{Examples of litigation related to poor indoor environment quality in courthouses:}

\textit{Polk County Courthouse, Florida.} A case settled in 1995 involved a suit between Polk County, Florida and the insurance company of the builders of the County’s eight-year-old courthouse. The court awarded the County nearly US$26 million to correct design and construction flaws that resulted in a high level of mould growth and caused occupant illnesses.\textsuperscript{94}

\textit{DuPage County Courthouse, Illinois.} In this case, the court found the County responsible for health-related complaints at its new courthouse due to improper operations and maintenance procedures.\textsuperscript{95}
\end{quote}

\begin{footnotesize}
\textsuperscript{89} Urban Environmental Institute (2002) \textit{Resource Guide for Sustainable Development}, Seattle, Washington State, USA. In the US, some developers have been able to charge a premium for power supply independent of the grid.
\textsuperscript{91} Urban Environmental Institute (2002) op cit
\textsuperscript{92} Yates, Alan (2001), “Quantifying the Business Benefits of Sustainable Buildings – Summary of Existing Research Findings (Extracts)”, Centre for Sustainable Construction, BRE.
\textsuperscript{93} NSW Parliament Legislative Assembly Standing Committee on Public Works Report 52/7 \textit{Sick Building Syndrome}, April 2001
\textsuperscript{95} Public Technology Inc, US Green Building Council, DOE, EPA, (1996) op cit
\end{footnotesize}
In addition, simple climate-responsive green design can also reduce potential liabilities. For example the provision of highly serviced accommodation, such as air-conditioned offices, requires more stringent regimes to ensure they are working properly. \footnote{Yates, Alan (2001), “Quantifying the Business Benefits of Sustainable Buildings – Summary of Existing Research Findings (Extracts)”, Centre for Sustainable Construction, BRE.}

Insurers are starting to recognise the synergies between green building and risk management. In the US, a number of forward-looking insurers have supported energy efficient and renewable energy technologies and there are instances when premium credits in the order of 10 per cent have been offered to building owners implementing selected energy savings strategies. \footnote{Kats, G, et al (2003) op cit}

**What does this mean for the AGD?**

Because the AGD’s building portfolio is widely varying in scale and location across the State, the AGD may face all the risks outlined above, needing to respond to rising energy, water and waste disposal costs, to the requirement for flexibility and changes in technology, and to liability associated with poor indoor environment quality. The impact of these risks is difficult to quantify precisely in dollar terms, but moving to a green approach to building will alleviate each of them whilst paying dividends in productivity and resource efficiency improvements.
1.6. Improved Investment Value

Summary

‘Green’ buildings, or ‘High Performance’ buildings as they are sometimes known, are becoming increasingly attractive to investors. The drivers of improved investment value are an increase in building value, an increase in access to finance and positive differentiation in a competitive market. Although some of these elements are (arguably) more relevant to private sector organisations, there are positive implications for the AGD. Additionally, improved investment value is increasingly relevant for the AGD with the move towards private-public partnerships in funding and also impacts upon the potential for AGD to sub-let office space to tenants in the future.

In many markets, green buildings already attract a premium price. In the US, the market value of green buildings is increasing, owing to growing market demand and tenant-perceived amenities associated with green building. This is being recognised by the appraisal markets, secondary lending markets and purchasers. Guaranteed savings in operating costs will increase a building’s value and the rate of return on investment.

Based on a standard market capitalisation rate of 10 per cent, yearly savings in operation and maintenance costs translate to a factor of 10 increase in the value of the building. Thus, a $100,000 per year saving in operation and maintenance increases the value of the building by $1 million. This effectively means that the immediate increase in property value is equal to the implementation cost of a sustainability measure with a 10-year payback. Therefore, failure to invest in all measures up to this level means losing capital value, let alone not reaping the long-term savings in operation costs.

As awareness of sustainable building grows, property valuers are beginning to take this into account in building valuations. The emergence of green building rating systems, which allow achievements to be quantified, will support this process. A good ‘green rating’ for a building may give it a better capitalisation rate than a non-green building. Even a small increase in capitalisation rate can equate to significantly higher valuations on sale or refinancing.

In Australia the market is responding, with green buildings attracting a premium in the residential sector and strong expectations that green commercial buildings will do the same. Paul Bannister, the energy efficiency consultant involved in the Parramatta CBD Greenhouse Leaders program, has noted that:

The typical Australian commercial building offers a range of opportunities for efficiencies and savvy building owners are likely to recognise an opportunity to reduce building outgoings...thereby increasing the asset value.

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98 Urban Environmental Institute (2002) op cit
101 For example, the Kogarah Town Square development in Sydney, which incorporates significant innovations in water and energy efficiency and materials use, has attracted premium sale prices. So has the energy efficient WaltCorp development at Green Square.
102 See Some recent Australian examples of private sector leadership (section 1.7) for details of the program
An increase in building value will increase the availability of finance for it, or from it. Development loans are normally calculated on some form of debt-value ratio, so higher valuations will increase the amount of finance (loan) available to a project and so reduce equity requirements. Greater access to financing can further add to the building’s value if it is being sold or refinanced.104

**Improving building value and access to financing — an international case study:**

*The Vancouver Island Technology Park* (VITP) in Victoria, British Columbia was redeveloped in a sustainable manner. The resulting operating cost savings of $35,000 translated to $350,000 in increased value (based on a capitalisation rate of 10%). This means that on a debt to value ratio of 75%, an additional $262,000 could be raised in financing.105

‘Green Loans’, offering lower interest rates for ‘green’ development, are already available for the residential market in Australia.107 It is therefore likely that a similar scheme will evolve for other building types with either lower interest rates or an increase in the allowable loan to cost or value ratio. If this becomes the norm, then banks and investors are likely to progress to requiring minimum ‘green’ ratings in order to qualify.108

Increased capital value aside, green buildings offer positive differentiation in a competitive market (this is an incentive when attracting tenants for office space, for example).109 Green building projects are attracting a growing number of investors keen to participate in, or be associated with ‘doing the right thing’. This is linked to the broader trend towards socially responsible investment, which grew by 32 per cent in Australia between 2001–2002110 and is underpinned in federal regulatory terms by *The Financial Services Reform Act 2001*. This Act requires all funds to report on the environmental and social performance of their investments.111 (benefits of positive differentiation are further discussed in section 2.1.)

**What does this mean for the AGD?**

The AGD, as a public sector organisation, has a responsibility to ensure that its building stock remains a public asset rather than a liability. Therefore, any opportunities to improve asset value through the ‘greening’ of its building stock

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105 Definition: Net operating income divided by the sales price or value of a property expressed as a percentage. It is one of many financial tools used by investors, lenders and appraisers to establish a reasonable purchase price for a given investment property in a specific market. Capitalization rates are developed by analysing the selling price, gross income and operating expenses of recent sales of comparable properties in a particular market place. ([www.invest-2win.com/caprate1.htm](http://www.invest-2win.com/caprate1.htm))


107 Bendigo Bank Website, [http://www.bendigobank.com.au](http://www.bendigobank.com.au), accessed 10/11/03. Bendigo Bank offers the ‘Bendigo Green Home Loan’. This loan offers a 0.5%pa reduction on the Bank’s Residential Variable Rate and no service fee, which could result in an interest saving of more than $10,000 over the life of the loan. To be eligible for this loan, a house design must have an energy efficiency rating of 5 stars under FirstRate or NatHERS.


109 Rocky Mountain Institute website, [www.rmi.org/sitepages/pid221.php](http://www.rmi.org/sitepages/pid221.php), accessed 19/9/03; *Doing well by doing good: The Benefits of Green Development*


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should be realised, particularly given the comparative longevity of AGD building stock. The AGD can use the argument of improved asset value, in conjunction with life cycle costing data, to convince treasury and/or private investors (in the case of public-private partnerships) to finance the 'greening' of its building stock.

A further option may be to sub-let tenancies in suitable AGD buildings, using the revenue to offset development costs. This approach gives the AGD scope to accommodate services needed by the local community and promote the concept of mixed-use development—both principles of sustainable development.
1.7. The indirect economic value of leading by example

Summary

A recent Commonwealth Government discussion paper, the Economical and Environmental Life Cycle Costs of Buildings, suggested as one of its key recommendations, that new government buildings should lead change as examples of best practice.\(^\text{112}\) Significant opportunities in this arena exist for the AGD, given that courthouse buildings are central to public life and a symbol of responsible decision-making. It is well documented that this type of leadership generates community goodwill and favourable public relations. Although the financial benefits are hard to quantify in dollar terms, they are a critical element of the business case for sustainability. 2004 has been declared ‘The Year of the Built Environment’ in Australia and is an opportune time to demonstrate leadership in this area.

A recently released Commonwealth Government report, Corporate Sustainability: an Investor Perspective included the following key findings:

Sustainability behaviours add value to commercial endeavour and make for good business sense, and sustainability is a particularly useful device for managing intangible assets such as brand and reputation. Benefits include human capital management, stakeholder management and product differentiation.\(^\text{113}\)

Newly developed environmental rating systems for buildings such as NABERs and GreenStar now allow green buildings to be distinguished and there are a growing number of state and national awards which recognise leadership in this area. For example, in 2003, the 60L Green Building Partnership won the prestigious Banksia Environmental Foundation\(^\text{114}\) Award for Leadership in Sustainable Buildings and the Victorian Premier’s award for Business Sustainability.

Some recent Australian examples of government leadership

The Commonwealth Department of Defence is actively pursuing the development of ‘green’ facilities as a high priority. The department is re-examining its approach to the construction business to integrate a "whole of life" analysis approach which is more supportive of the incorporation of ecologically sustainable development (ESD) principles.\(^\text{115}\) In 2002, the Department became a founding Board Member of the Green Building Council of Australia (GBCA) to help advance the acceptance of ESD principles in Australia’s property industry. Mike Scrafton, Head of the Infrastructure Division said, "We want to demonstrate leadership and showcase the best results. Our membership of the GBCA is just one of many environmental initiatives we have put in place to achieve our vision of becoming a leader in..."

\(^{112}\) NSW Department of Public Works and Services (1998) op cit


\(^{114}\) The Banksia Environmental Foundation, with Australia’s Prime Minister as its chief patron, is a national not-for-profit organisation that stages Australia’s best known and most prestigious environmental award program. Award categories include Government Leading by Example for a Sustainable Future and Leadership in Sustainable Buildings.


Three of Sydney's current ‘top 10 green office buildings’ are government buildings, according to a list unveiled by the NSW Energy and Utilities Minister Frank Sarton in January 2004. The Henry Deane Building and the heritage-listed Lands Building came in first and second place respectively and the Maritime Trade Towers also made the list.117

The NSW Police Service sees merit in commissioning a high performance green Headquarters building (which will receive 4.5 stars under the Australian Building Greenhouse Rating scheme), not only because it lowers the cost of their tenancy but because it is a positive step for their corporate reputation.118

The City of Melbourne’s new Council administration building has received a GreenStar pre-assessment rating of 6 stars, which equates to world leader status. According to Melbourne Lord Mayor John So, the City of Melbourne is striving to: “put Melbourne know-how and design on the international stage while creating a building that will return financial and environmental rewards for many long years to come.”119

Adelaide City Council has initiated, in conjunction with the State Government of South Australia, the Adelaide building Tune Ups project, a demonstration project that aims to position Adelaide as an internationally recognised sustainable city. Ten CBD office buildings will have their energy and water use measured, rated and reduced and a practical implementation plan will be developed for building owners.120

Some recent Australian examples of private sector leadership

In Australia, large property organisations such as Mirvac, Macquarie Listed & Unlisted Property Trusts, General Property Trust (GPT), Investa Property Group (IPG) and Colonial First State Property are making their building stock more energy efficient to build a desirable reputation for their improved environmental performance.121 IPG and GPT are two publicly listed entities that have incorporated sustainability into business operations, yielding financial benefits to shareholders. IPG is currently integrating sustainability principles across all parts of the business through detailed gap analysis. GPT has taken a slightly different approach to sustainability, focusing on particular projects and optimising the sustainable features of the developments.122

As part of the Parramatta CBD Greenhouse Leaders project, 10 building owners with commercial premises in Parramatta have volunteered to improve their energy performance, resulting in projected annual savings of about $450,000 across the 10 buildings. Participants include AMP Henderson, Colonial First State, Investa Property Group, Deutsche Asset Management, Industry Superannuation Property Trust, Stockland Property Trust, Mirvac, ANZ Property, Henderson & Horning and Parramatta City Council.123

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116 Defence achieving milestones in sustainable environmental management, article on Green Building Council Australia Website, www.gbcaus.org
117 The Australian Building Greenhouse Rating website www.abgr.com.au (accessed February 2004). The buildings were ranked according to their ABGR rating
122 Mays, S; and BT Financial Group (2003) op cit
Australia’s leading general insurer, Insurance Australia Group (IAG), has taken the first steps to incorporating sustainability into its business model. At the organisational level, IAG has implemented staff development programs and increased eco-efficiencies. In December 2003, IAG were awarded the Sustainable Company of the Year award at the 3rd Annual Ethical Investor Sustainability Awards. Nominations from seven high profile research groups were reviewed by an expert judging panel and IAG was chosen on the basis of significant achievements on a number of issues, including industry leadership and a comprehensive internal cultural shift.

Macquarie Office Trust has instituted an innovative contractual arrangement with its building facility managers to rate its buildings annually and improve building performance, achieving an energy reduction of 3,147,023 kwh across its NSW portfolio in 2003. On top of its efforts to improve building energy efficiency, Macquarie has purchased within the range of 10–15% accredited Green Power for each NSW building. Macquarie won the ABGR Corporate Leadership award at the NSW Government's 2003 Green Globes Awards.

KPMG has extended its commitment to environmental sustainability beyond requiring a 4.5 star greenhouse rating for its new building at King Street Wharf and will be implementing a holistic environmental policy in its new premises that emphasises the importance of energy and waste reduction. All of KPMG’s 1500 employees will be involved in the sustainability measures brought about by the new policy. KPMG’s NSW chairman, Chris Jordan, has publicly expressed his commitment to sustainability, adding that “leadership by example is the way to go.”

Ernst and Young has committed to achieving a 4.5 star greenhouse rating for three new spaces in Sydney, Melbourne and Perth, predicted to prevent over 25,000 tonnes of greenhouse gases from entering the atmosphere over the 10-year lease. Ernst and Young's Managing Partner Australia, Mr James Millar, noted that the climate change issue was important to the younger members of Ernst and Young's staff and very important to the company in retaining good staff.

What does this mean for the AGD?

The AGD is already showing considerable leadership in terms of equity and social justice. There is a focus on “flexible service delivery”, which includes designing buildings with easy access for all members of the community and providing healthy and pleasant indoor environments. When buying new property, the AGD already favours accessible sites near good public transport.

As public awareness grows concerning the importance of a sustainable approach, there is a real and potentially high profile opportunity for the AGD to support the market transformation that is starting to occur. One of the key barriers to mainstreaming green building is the perceived difficulty of ‘doing things differently’. By creating precedents that demonstrate the possibilities and rewards, Government can play a leadership role and demonstrate willingness to take action on what has become a major community concern. There are opportunities to create these

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125 Ethical Investor Issue No. 29, December/January 2004.
precedents in relation to new buildings, upgrades to existing buildings and even choice of tenancy locations.

This aligns with the AGD’s commitment to cultivating community confidence. The AGD has embraced environmental protection and corporate governance in its mission, as ways of delivering a better service to the people of NSW.
2. WHAT DOES IT TAKE TO IMPLEMENT?

2.1. Organisational commitment

Summary

To be effective, the commitment to sustainability needs to be made explicit and become integral to the AGD’s operations and those of its consultants, contractors and suppliers. By creating a clearly articulated sustainability policy, the AGD has an opportunity to raise its public profile as an environmentally and socially responsible organisation. The ‘greening’ of all building stock could be a high profile aspect of this commitment. Ensuring cultural and fiscal support for implementation is critical to its success. Staff need to be included in policy development and adequately resourced to implement it.

Government, business and the community are increasingly seeing the adoption of sustainability principles as essential to ensure acceptable standards of living for all Australians in the future. The AGD is relatively advanced in this regard, with a commitment to social sustainability reflected in its vision “justice and equality for the people of NSW” and a commitment to environmental sustainability reflected by the conscious effort to reduce the impact of its operations on the natural environment.

However, there is scope to make the commitment to sustainability more explicit, by ensuring it informs policy and procedure at all levels and by ensuring it is well resourced. As Alan Pears notes in his paper Buying Green: Lessons from 60L and other building projects:

"Elegant principles and guidelines are not enough. Clear commitment, solid information, environmental expertise, appropriate resources and budgets and effective follow-through are all essential for success."

It is well recognised in business that the overall value of a package of sustainability features is worth more than the sum of the individual strategy impacts, contributing to ‘brand value’ potential. In other words, isolated strategies may not be enough; a committed, comprehensive and well-articulated approach to sustainability is more effective in terms of public recognition.

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KPMG’s commitment to sustainability was showcased recently in the Sydney Morning Herald (SMH). KPMG’s new office, as previously mentioned, was built with the aim of being one of Sydney’s most energy efficient buildings. Water efficiency was also incorporated, with flow control devices on taps. Chris Jordan, the NSW chairman, told the SMH: “Then I thought, why stop there? I looked around and thought we could implement a green policy throughout the office.” All staff are involved in the new sustainability measures, even at the most basic level. For example, polystyrene cups, plastic cutlery and wooden coffee stirrers are banned. Instead, everyone has been given a mug.

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To support the commitment to sustainability, specific procedures covering financial decision-making, procurement and the design and management of building stock need to be developed. As Bill Bordass observes in *Cost and Value: fact and fiction*, “greenness will only improve rapidly when it becomes a major priority in procurement, investment and building management”. Governments at all levels have a major opportunity to lead the way in this regard. One of the conclusions of *Buying Green: Lessons from 60L and other building projects* (Pears, 2003) is that:

**Governments have an important role to play, because they are meant to implement the peoples’ will, and the people want a green future. By leading on green purchasing, governments will bring down the costs of green solutions to a point where ordinary people and businesses can afford them.**

The paper also noted that governments can drive the ‘normality factor’ by regulating, offering incentives and helping industry to retool and retrain to deliver green solutions. Whilst the development of regulations and incentives is outside the AGD’s scope, the AGD can help to drive industry change through demanding greener buildings, products and services. A commitment to monitoring, benchmarking and reporting on progress is essential to optimising future performance.

**Example of a corporation playing an active advocacy role:**

Colliers International fitted out their new Sydney tenancy to be highly efficient, for which they were selected as a finalist in the NSW Government’s 2003 Green Globe awards. Colliers are showcasing what can be done to reduce greenhouse emissions and have taken over 120 clients and customers through their premises to learn how a more sustainable office can be achieved within commercial parameters.

The importance of achieving organisation-wide support for the commitment to sustainability cannot be underestimated and requires significant cultural change issues to be addressed. Advocacy and leadership from senior management is important, particularly in ensuring that all staff are engaged in the process and have the required support (training, resources, etc.) to implement sustainability objectives. We suggest creating a sustainability team within the AGD (which includes representation from senior management) whose specific purpose is to manage the process as a whole and support staff who are implementing the changes. This will ensure the commitment to sustainability is perceived enthusiastically rather than as an added workload for existing staff.

An inclusive process for developing and evaluating sustainability policy is recommended, with involvement of staff at all levels. This is particularly important for successful implementation, as it ensures that issues have been considered from a variety of perspectives, that any support needed has been identified and that there is a common understanding of objectives. With consultation, staff members are more likely to ‘own’ the policy and take pride in being part of a progressive organisation.

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134 Pears, A (2003) op cit
The benefits of engaging staff members in sustainability measures:

The Commonwealth Bank implemented a program of energy efficiency upgrades across its NSW portfolio, resulting in annual savings of $406,200 for an initial investment of $887,400. To support implementation, a comprehensive communication program was adopted to ensure that all staff understood and supported the objectives. The National Facilities Manager, Peter Torrisi, said “Staff commitment to this program has been overwhelming.. the benefits from this program have extended beyond dollar savings through energy efficiency to team building and workplace community improvements”.  

Commitments made by the Victorian Department of Justice:

The Victorian Department of Justice committed in 2003 to implement an Environmental Management System (EMS) covering all of its operations. The Department will actively involve its employees in creating a more environmentally responsible organisational culture, by understanding the environmental aspects of their activities and modifying operations where appropriate. The Department has committed to:

- Reducing resource use (including energy, water, paper and vehicle fuel)
- Minimising pollution and waste (through avoidance, reduction, reuse and recycling principles)
- Increasing use of environmentally preferable products and services
- Incorporating ESD principles into all new buildings and major refurbishments and allocating an extra budget for ESD measures in all capital projects
- Reducing energy consumption by 20% by 2005/06
- Requiring operational vehicles to be fuel efficient
- Increasing use of Green Power to 10% by 2005/06
- Regularly monitoring and reporting on environmental performance to both employees and the public

The Department will continually review its EMS and strive to improve its environmental performance against previous benchmarks. The Department sees this as an opportunity to demonstrate leadership in the community and improve staff morale.

137 Victorian Department of Justice Department of Justice Environmental Management Policy (2003)
2.2. A new way of defining ‘value’

Summary

To make the most of the opportunities presented in this report, any definition of ‘value’ must be based on a life cycle perspective and embrace what is known as the ‘triple bottom line’ (TBL). A life cycle perspective in the management of building assets avoids short-term decisions that are not cost effective in the longer term. TBL reporting allows social and environmental benefits to be adequately captured and valued alongside financial benefits and is becoming increasingly expected of private and public sector organisations.

Without a life cycle perspective the greatest opportunity for economic savings to be made, by reducing recurrent costs, is often missed. The importance of decision-making from this perspective is emphasised in *The Economics of Sustainable Building* (Mackley, 2002):

> As cost is such a critical determinant in relation to built facilities, it is essential that those responsible for making the key economic and design decisions on a project have an appreciation for both the initial and the long-term impact of their decisions.\(^{139}\)

**The importance of a life cycle approach: a simple analogy:**

Ink-jet printers are popular with consumers due to their low purchase price, (about $99), however, the ink cartridges cost around $69 on average to replace. The initial investment, however attractive, is effectively locking consumers into paying high recurrent costs—significantly higher than those associated with a more expensive laser printer. In the same way, a short-term focus can lock building owners into paying high energy and water costs.

Recent US studies have found that an upfront investment of less than two per cent of construction costs to support the ‘greening’ of the building yields life cycle savings of over ten times the initial investment,\(^{140}\) and that with each increasing level of sustainability incorporated into buildings, short-term costs increase but long-term costs decrease dramatically.\(^{141}\) A study conducted in 2000 identified a 15 per cent life cycle saving associated with bringing three standard buildings up to the sustainability levels specified for LEED\(^ {142} \) certification. The primary opportunities for savings were associated with energy efficiency, water efficiency and use of salvaged materials.\(^ {143}\)

Therefore, to make the case for green buildings, we must “look at the full economics rather than limiting our decision-making to only a portion of the total ‘economic picture’” (Johnson, 2000).\(^ {144}\) Capital costs currently dominate building economic

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\(^{138}\) ‘Triple bottom line’ refers to financial, social and environmental aspects of performance


\(^{140}\) Kats, G, et al (2003) op cit


\(^{142}\) *Leadership in Energy and Environmental Design* (LEED) is the US Green Building Council’s rating system, see [www.usgbc.org](http://www.usgbc.org)


\(^{144}\) Johnson, Scott, op cit
costing. Occupancy costs, one of the greatest building costs, are rarely considered in design or facility management.\(^{145}\) As the Commonwealth discussion paper *Economical and Environmental Life Cycle Costs of Buildings* (DPWS, 1998) found, \(^{146}\)

> Ironically, capital works determine the size of recurring budgets for years to come, but the latter are not usually factored into the design of new capital works. \(^{146}\)

The discussion paper also found that government procurement systems discourage life cycle investment considerations (despite the fact that the Government Procurement Agreement, resigned in 1997 by Australian State and Territory Governments, lists the incorporation of life cycle costing in procurement as one of its key obligations). It concluded that, ultimately, the operating and capital budgets of government need to be combined and that as an interim strategy government needs to use life cycle costing as the basis to finance ‘greener’ government buildings that show an acceptable economic performance. \(^{147}\)

The AGD is well placed to adopt the latter recommendation. A life cycle approach is often defeated in the marketplace because those who pay the upfront costs do not receive the benefits. \(^{148}\) However, this is not generally the case for government-owned buildings. There is a significant opportunity for the AGD to adopt life cycle costing and expand its definition of ‘acceptable economic performance’ to embrace lower rates of return than are currently used (see the recommendations in section 1.3).

Barriers often faced by government agencies include pressure to work within ever-tightening capital budgets and the need to ensure that political opponents are not able to expose ‘cost blow-outs’. Well-documented life cycle costing can minimise this risk, by demonstrating why higher capital budgets are acceptable and why such an approach is a good investment of public money. (Another approach could be to transfer the risk to the private sector through public-private partnerships, discussed further in section 2.3). Life cycle arguments for sustainable outcomes are increasingly being accepted by business with the broader trend towards socially responsible investment. The AGD has an opportunity to lead by example, to stimulate life cycle construction and procurement in the market as a whole. This was one of the key recommendations for government agencies by the Commonwealth discussion paper, *Economical and Environmental Life Cycle Costs of Buildings*. \(^{149}\)

### A new approach to assessing ‘value’ on a courthouse project, Victoria:

For the Latrobe Valley Police and Courts Complex, Victoria, ESD measures with a suitable payback period (generally less than 20 years) were approved by the Department of Justice. Where the payback periods were higher, or not apparent, the Department looked beyond the economic benefits to the environmental and social benefits. Karen Toirkens, the Department’s Environmental Manager, Portfolio Infrastructure Development, gave the following example:

> Rainwater recycling will not pay itself back within the lifetime of the facility, but we included it because of a number of (non-economic) reasons, including current pressure on scarce water resources, to enhance community awareness of sustainable technologies, because of

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\(^{145}\) NSW Department of Public Works and Services (1998) op cit

\(^{146}\) ibid

\(^{147}\) ibid


\(^{149}\) NSW Department of Public Works and Services (1998) op cit
a belief that Government should lead by example and to experiment with and support the market for emerging sustainable technologies. There is a growing awareness within the Department that projects should not be assessed solely on an economic basis.

It is already mandatory for government departments to report publicly on their performance in relation to energy efficiency. It is likely that this requirement will broadened to sustainability performance, in the form of TBL reporting. This was the focus of a recent Commonwealth report\(^{150}\) that outlines global reporting requirements. The Financial Services Reform Act (2001) requires all investment funds to report on social and environmental performance and many private and public sector organisations are already doing this. Voluntary public reporting of sustainability performance by the AGD would both demonstrate organisational commitment and ensure that procedures are well in place by the time reporting becomes mandatory.

2.3. Innovative financing mechanisms

Summary

To support the ‘greening’ of the building stock, finance mechanisms need to manage short term costs in ways that facilitate capture of long term benefits. For a start, recurrent savings from new green developments and upgrades should be reinvested into further greening initiatives. In addition, green development incentives can help to augment capital budgets and should be investigated on a project-by-project basis. There are several programs through which treasury funding can be accessed for energy efficiency upgrades. In addition, third-party finance may be accessed through public-private partnerships for both new buildings and upgrades. This model has potential to deliver high environmental performance by linking responsibility for design with responsibility for operating performance.

As a general principle, recurrent savings generated by the ‘greening’ of AGD building stock should be reinvested into the program, to support the ‘greening’ of new buildings and further upgrades to existing buildings. In addition, finance may be augmented through development incentives and rebates as outlined in section 1.4. Mechanisms for financing the greening of new and existing buildings are outlined below.

Upgrades to existing buildings

As discussed in Section 1.4, there are specific NSW Treasury programs available to finance energy efficiency upgrades to existing buildings with an internal rate of return (IRR) of 12 per cent or more through Energy Performance Contracts (EPCs) and the Government Energy Efficiency Investment Program (GEEIP).

There are other models besides the Treasury model for EPCs, including the shared savings model, where the EPC contractor borrows from a third party and therefore maintains the loan repayment obligation. Under this agreement, the EPC contractor and the customer share any savings left over after the loan repayments.\(^1\)

Third party financing can be used for upgrades not covered by Treasury-funded programs, as recommended by the Commonwealth discussion paper *Economical and Environmental Life Cycle Costs of Buildings* (DPWS, 1998).\(^2\) This model is suitable for funding energy efficiency upgrades which are considered viable on a life cycle basis but do not fit within current Treasury funding parameters,\(^3\) water efficiency upgrades and indoor environment quality upgrades.

New buildings

To finance new buildings, demonstrated returns on investment achieved by other recently built government buildings could be used as a lever to argue for the small but necessary increases in capital budgets that would enable new AGD buildings to do the same.

Alternatively, the mechanism of public private partnerships could be considered. This entails private sector organisations tendering to finance, design, build, operate and manage a government facility over a set period of time. Payments to the private

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\(^1\) This model is less commonly used, but may be of relevance if public private partnerships are to be explored. In this model, there is greater incentive for the contractor to maximise efficiency.

\(^2\) NSW Department of Public Works and Services (1998) op cit

\(^3\) A 12% internal rate of return is treasury’s current financing benchmark
sector organisation depend on its continuing to deliver the specified services to the agreed performance standards.

Because this model is incentive-based and allows the link between capital and operating costs to be made, it has the potential to deliver high environmental performance on an ongoing basis. As well, the risk is transferred to the private sector, which helps to overcome political barriers related to higher initial capital expenditure. As noted in the Commonwealth research paper, *Public Private Partnerships: An Introduction*:

"Much of the improved value for money comes from the fact that when private sector capital is deployed and is at risk-to, for example, the long term performance of public service delivery-the right commercial decisions are made about design, operating regime...whole-of-life asset costings, and so on."\(^{105}\)

Public private partnerships can take many forms. In the UK the most radical initiative is the Private Finance Initiative (PFI), where the public sector invites tenders to design, build, finance, operate and manage a facility, typically for 25-years. In Australia the most common model is known as Design Construct and Maintain (DC&M). Build Own and Operate, and Build Own Operate and Transfer are other approaches that incorporate the principles of DC&M.\(^{157}\)

**Third party financing helping to deliver ‘green’ outcomes in Australia:**

ABS House, Canberra, DIMIA, Canberra and the NSW Police Service building are predicted to achieve exceptional levels of energy efficiency through tripartite agreements between tenants, owners and building companies.\(^{158}\)

The NSW Police Service contracted an innovative developer, Multiplex, to design construct and maintain for 15 years a building that performs at 4.5 stars under the Australian Building Greenhouse Rating Scheme. The building will be rated annually and if a 4.5 star rating is not achieved, the NSW Police Service is compensated for the increased energy outgoings (compared to outgoings payable if the building had achieved the specified performance).\(^{159}\)

**An innovative government approach to financing green buildings, USA:**

The City of Seattle is considering floating public bonds to cover any incremental capital costs associated with the greening of state facilities. The bonds will then be repaid with facility operation and maintenance savings.\(^{160}\)

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\(^{154}\) As previously mentioned in 2.2, the need to ensure that political opponents are not able to expose ‘cost blow-outs’ is a barrier often faced by government agencies.


\(^{156}\) Bordass, W. (2000) op cit

\(^{157}\) More information is available in *Public Private Partnerships: An Introduction*, OpCit.

\(^{158}\) Mackley, C. J (2002) op cit


\(^{160}\) Johnson, Scott (2000) op cit
2.4. A new approach to cost planning

Summary

Providing a cost and project delivery process that supports the aspiration for high environmental performance is a key determinant in achieving successful project outcomes. Cost plans and project delivery plans for a building with a proposed high environmental performance do need to be different.¹⁶¹

To support quality outcomes, cost plans need to be based on life cycle and allow for an extra initial investment. An integrated design process for a green building or major upgrade does cost more than a conventional design process. Cost plans also need to accept longer return periods or paybacks than is current practice, in line with a life cycle approach. To ensure all available opportunities are captured, cost planning should be done in conjunction with design team members. During construction, cost plans should retain the flexibility to allow ‘sustainable cost transfer’, the reallocation of capital to items with high environmental benefits.¹⁶²

A sustainable design approach is characterised by a greater degree of communication, modelling, assessment and iteration (see section 2.5). This generally results in a longer or at least more resource intensive process, which needs to be reflected in the cost plan. The AGD needs to be willing to support a higher cost design effort, in recognition of the inherent long-term savings possible and to make the necessary funds available at the design stage of the project. A quality design process allows building performance and delivery cost to be optimised and it is likely that, if appropriately managed, the additional design fees will be returned to the bottom line of the building cost ten times over.¹⁶³

When capital budgets are pressured, money is typically shifted from areas perceived ‘less essential’ such as sustainability. This is why it is so important to factor a ‘green premium’ into capital works budgets and to ‘quarantine’ it from the rest of the budget so that it is used as intended. This could involve setting up a sustainability budget outside the core project budget.

Some indicative estimates are available for cost premiums on gross construction costs of green buildings. However, it is important to remember that there is no simple answer to the question “how much does a green building cost?”

Gross construction costs for a new green office building are typically in the order of 3–5% over standard gross construction costs, according to Caroline Mackey, a Senior Cost Planner with Bovis Lend Lease.¹⁶⁴ Other estimates for cost premiums range from less than two per cent to 15%. Generally, the earlier sustainability principles are incorporated into the design process the lower the cost.¹⁶⁵ In the US, the average cost premium for green building has been calculated at just under two

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¹⁶¹ Mackley, C. J (2002) op cit

¹⁶² Mackley, C. J (2002) op cit. Mackley suggests that the cost premium associated with the design process for a new green office building in Australia is in the order of 0.4–0.7% of gross construction costs. These figures are based on her experience and appear consistent with findings from other countries.

¹⁶³ Mackley, C. J (2002) op cit. Mackley suggests that the transfer of air conditioning budgets to building envelope budgets, in order to reduce the heat load on the building and hence the need for air conditioning, is a typical example of how costs may be re-allocated for more efficient outcomes.

¹⁶⁴ Mackley, C. J (2002) op cit. Mackley suggests that the cost premium associated with the design process for a new green office building in Australia is in the order of 0.4–0.7% of gross construction costs. These figures are based on current cost data from 33 US green buildings.

per cent, substantially lower than is commonly perceived. For the AGD, allocating a budget of 10% over standard design and construction costs for the greening of new courthouses would be a good starting point, although higher allocations may be advisable on strategic projects (this could be assessed on a case by case basis). The figures of 10-15% are supported by the Victorian Department of Sustainability and Environment in its guidelines for capital works projects. The 10% premium could be revised and potentially reduced over time as green building becomes more cost competitive and the AGD builds its capability to apply green principles to its buildings.

To support high environmental performance, the cost planning must be done in conjunction with other design team members to ensure that the available opportunities are captured and capitalised upon. This is a departure from standard practice and its importance should not be underestimated. It avoids two common problems, the tendency to oversize building services systems and the tendency to add ‘uncertainty factors’.

Unfamiliarity with green technologies and systems can make designers, architects and clients conservative when using them. They may oversize green building systems and not fully integrate them into the building, thereby reducing cost savings and other benefits. Similarly, cost estimators may add uncertainty factors for new green technologies they are not familiar with and these can compound, further inflating cost estimates. An integrated design and cost planning process where information is shared between consultants can overcome this. The Build Energy Smart Training Manual for Quantity Surveyors recommends that involving quantity surveyors in the design and construction process, particularly in the analysis of capital and recurring costs, is pivotal in the proper evaluation of options.

The principle of ‘sustainable cost transfer’ is a major part of cost planning for good environmental performance. It allows cost savings to be reallocated to elements with high environmental benefits. A typical example is the reallocation of mechanical and lighting systems budgets to building envelope budgets. A building façade designed to improve daylighting and reduce peak cooling demands (using shading, insulation, high performance glazing, etc) can allow lighting systems and air conditioning equipment to be downsized. Another common example is the reallocation of plumbing budgets to water efficient fixtures, which allows pipes to be downsized.

It must be noted that the financial savings are dependent on extra budget being allocated towards sustainability features in the first place. In one Sydney office building, shading and several other energy efficient measures originally designed to eliminate the need for air conditioning were deleted from the façade to in an attempt to achieve a ‘double saving’. As a result, the building performed poorly until the shading and other measures were added.

The cost plan needs to be flexible enough to allow optimum performance to be captured and needs to be done in consultation with the design team. Line-item budgets should be avoided, as green features then tend to be perceived as ‘optional

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166 Victorian Department of Sustainability and Environment (2003) Principles and Guidelines for Capital Works Projects
167 Mackley, C. J (2002) op cit
extras' and are often deleted when the budget is tightened. For example, it is advisable to have one single budget for ‘building envelope’ rather than separating out budgets for windows, insulation etc. The latter tends to result in cost cutting on less ‘visible’ elements like insulation, to the great detriment of building performance. As the environmental consultant to the 60L green building, Alan Pears, notes:

...in a complex system like a building, many value judgements are made but are not often seen as such. Each professional and tradesperson makes many decisions that influence the overall cost of the building that cannot easily be justified by financial evaluation: and very few are assessed on a life cycle costing basis. So the final building reflects the unconscious priorities of many people.

At 60L and in a number of other projects I have been involved in, overall costs were contained by changing priorities. For example, in one project, quite expensive bricks were specified by the architect. The project manager picked this up, and the client insisted on cheaper bricks (but still above average cost and quality) and reallocated the savings to green features: the savings from this one action covered the cost of most of the green features in the project.¹⁷⁰

¹⁷⁰ Pears, A (2003) op cit
2.5. Investment in quality design

Summary

Investment in quality design is crucial to the success of a project, whether it is a new building or a major retrofit of an existing building. This is because the opportunity to reduce almost all the follow-on costs exists almost completely at the design stage.\(^1\) When just one per cent of a project's upfront costs are spent, up to 70 per cent of its life cycle costs may already be committed.\(^2\)

Two important elements that support quality design are an ‘integrated’ design process and iterative building performance modelling. An integrated design process brings together a variety of interdisciplinary skills on a regular basis, starting from the very beginning of the project, to collectively identify synergies and opportunities. A greater degree of building performance modelling in the design stage allows the performance and delivery cost of the building to be optimised. Design briefs with clearly articulated performance targets and requirements are also necessary to ensure the desired building performance is delivered.

Compared to the money a building owner generally spends on the design of a building, much more is spent on construction and the greatest cost is paying the people who will work in the building over its useful life. The reason these figures matter, as previously mentioned, is because the opportunity to reduce almost all the follow-on costs exists at the design stage. Yet, this is a stage where the developer is often in a hurry to get the project moving and attempting to meet a budget target focused on capital cost.\(^3\)

![Diagram of life cycle cost mitigation potential over project stages](image)

**Figure 2: Opportunities to capture lifecycle cost savings**


\(^{2}\) ibid

\(^{3}\) ibid
Currently, money and time for design are typically restricted because the long-term performance of the building is not the main criterion. Fortunately, this is not the case for the AGD, which is in the relatively advantageous position of being owner, developer, operator and occupant of its buildings. Substantial opportunities exist to influence the long-term performance of buildings and reap the benefits.

As previously highlighted, unfamiliarity with green technologies and systems can make designers, architects and clients conservative when using them. In a conventional design process, designers may oversize green building systems and not fully integrate them into the building, thereby reducing cost savings and other benefits. This is the result of a process that does not facilitate good communication; the participants are not given sufficient opportunity to collaborate with other design disciplines and ask the right people the right questions.

An integrated design process, which brings the client, all the design disciplines and the builder together to collaborate regularly from the concept stage onwards, has great scope for reducing the environmental and economic costs of buildings. An interdisciplinary design framework brings together a greater level of skill and can identify design opportunities and synergies early in the process. Good communication between all the participants is the key principle.

### The benefits of a quality design process - an Australian example

In a unique and successful paradigm of ‘integrated’ design, a multi-disciplinary team with expertise in various aspects of green building was brought together for a two-week design workshop for Melbourne City Council’s CH2 administration building. The workshop established a conceptual framework for the development and produced the key strategies for the building design: its planning, envelope, structure and services. The building has achieved a pre-assessment rating of 6 stars under the Green Building Council of Australia’s GreenStar tool, which represents ‘world leader’ standard in green building.

There is also potential for the integrated design process to support stakeholder participation. There are a number of government and community organisations who need to be consulted during the design process for new courthouses and upgrades. The AGD already has some procedures in place to allow consultation to occur and there is scope to use the integrated design process as a vehicle to ensure consultation is fully inclusive and well managed.

The design process needs to be guided by a design brief and specification that clearly outlines targets and responsibilities in relation to the greening of the building. This is discussed further in section 2.6.

Greater modelling in the design stage allows conceptual designs to be substantially engineered to achieve good environmental performance, which usually means that the delivery cost of the design can be optimised. Comprehensive and competent modelling should check the context (building use, type of mechanical plant specified, etc) rather than make default assumptions.

The design and construction process for the first green building of a client or design firm is often characterised by significant learning curve costs. Therefore, it is generally advisable to select a design team with demonstrated experience in green

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174 NSW Department of Public Works and Services (1998) op cit
176 More information on Green Star and the CH2 building is available at www.gbcaus.org
building, particularly the process aspects, or at least to include specialist sustainability expertise in the design team and in a direct advisory role to the client.

Currently, incentives for designers to reduce the life cycle costs of the building are not common, as designers are generally paid a fee based on the capital costs of the facility. Opportunities exist to link design fees to performance incentives for operation and maintenance. This is discussed further in section 2.6.

Specific issues related to the ‘greening’ of courthouse buildings

The need to provide public, restricted and possibly high security areas within the one building for the safety of judicial and legal staff, defendants and witnesses is an important feature of courthouses that imposes restraints on the design options. For example, the need for independent circulation areas and separation of toilets to comply with these security requirements will result in larger buildings and duplication of facilities, which may not be compatible with the objectives of minimising energy and material usage. Likewise, security requirements can affect provision for natural ventilation by prohibiting easily accessible openings (such as louvre windows, for example) on parts of the façade.

However, high quality design can greatly reduce these impacts within the given constraints. There are a growing number of examples of green courthouses, both overseas and in Australia. In a brief internet search for green courthouses in the US, we identified at least eight existing LEED-registered courthouses and at least seven more currently under construction. (LEED is the US Green Building Council’s tool for rating green building). The new Los Angeles Courthouse, currently in the design stage, is expected to receive a Platinum LEED rating, which equates to world best practice. Currently, there are less than five buildings in the world with a Platinum LEED rating.

<table>
<thead>
<tr>
<th>Victoria’s new green courthouse, currently being developed</th>
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</thead>
<tbody>
<tr>
<td>The Latrobe Valley Police and Courts Complex will incorporate a range of green features to reduce operating costs, minimise ecological footprint, improve occupant and visitor amenity and provide staff with the opportunity to work in an ecologically responsible manner. The specific expected outcomes include minimisation of energy consumption and greenhouse emissions, minimisation of mains water consumption and the reuse of wastewater on-site, a life cycle approach to minimising materials use and waste and attention to indoor environment quality (including occupant control of the indoor environment).</td>
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Applying green principles to heritage buildings

The large number of heritage buildings in the AGD’s portfolio presents both challenges and opportunities. Heritage buildings often incorporate design features that are compatible with the modern notion of green buildings such as durable low embodied energy materials, high thermal mass for temperature moderation, some degree of occupant control of the indoor environment, and narrow floor plans for natural lighting and external views. A recent assessment found the historic Lands Building to have the second highest ABGR of all NSW Government owned buildings\(^{178}\). Unfortunately, many older buildings have had some of these valuable features compromised due to inappropriate refurbishments over the years. Sensitive adapting and re-using existing buildings can save large amounts of building materials and reduce waste generation.

\(^{178}\) ABGR Bulletin Number 18, January 2004
In addition to these environmental features, heritage buildings and particularly public buildings such as courthouses are often of significant social and cultural value, especially in smaller communities. The challenge is how to adapt them to the modern working environment without compromising their heritage value or their inherent sustainability features, particularly as they generally were not designed with adaptability in mind. Where changes are necessary, they should be in accordance with the Burra Charter of Australia,\textsuperscript{179} which essentially requires that changes are compatible with the heritage values of the building and are reversible. Fortunately, modern technology and materials can make this task easier while at the same time remediating some of the possibly less desirable environmental aspects of older building such as inefficient lighting and water services.

**A cost effective new ‘green’ addition within a heritage complex, Sydney:**

The new headquarters building at the Victoria Barracks in Paddington represents the successful integration of a modern office building with the historical barracks from the colonial period. Built within a 4\% margin of a similar conventional building, the building won a medal in the 2002 Francis Greenway Green Building Awards.

The design represents a modern approach to creating a working environment that captures and retains the philosophical and historical qualities of the surrounding colonial architecture. It uses low technology to achieve low energy usage, improved indoor air quality through natural ventilation, maximum natural daylight and minimal reliance on artificial lighting. Building materials chosen integrate the new building into the existing environment and will not require periodic maintenance, hence reducing the whole-of-life costs of the building.

**Energy efficiency upgrade to a heritage-listed office, Sydney:**

A $79,000 package of energy saving initiatives at the heritage-listed Commonwealth Bank office in Martin Place, Sydney, has returned annual savings of $71,000. The initiatives include fine-tuning operations and implementing lighting and air-conditioning upgrades.\textsuperscript{180}

\textsuperscript{179} Marquis-Kyle and Walker, *The Illustrated Burra Charter*, Australia ICOMOS, 1992

2.6. A new approach to project delivery

Summary

The complexity of delivering a green building cannot be accommodated in 'business as usual' design and delivery programs. As Bill Bordass states in Cost and Value: fact and fiction, "To make progress we need an understanding that we have to look at process and players, not just product".\textsuperscript{181}

Planning and management must factor in appropriate timeframes for quality design, with room for the design team to challenge 'business as usual' assumptions. The design team should be involved in the development of the cost plan and given regular updates. To ensure that sustainability objectives are realised, contract documents must link payment to specific sustainability deliverables. Robust performance-based briefs for designers and contractors and on-site compliance checks are necessary. To ensure buildings perform as they should, good building management needs to be a priority and post-occupancy monitoring is essential to establishing a 'feedback' loop for optimising future building developments.

Process planning needs to take account of the additional design time, management time and cost necessary for good results where the greening of new or existing buildings is concerned. This is a key determinant in successful project outcomes.\textsuperscript{182} For the reasons outlined in the previous section, the design process will almost inevitably take longer and cost more compared to a 'business as usual' scenario and this must be factored into the project management plan. To allow life cycle cost planning to be done in conjunction with the design team, traditional cost planning periods will also need to be adjusted.

The life cycle cost plan, once it is developed in consultation with the design team, needs to be made known. In The Economics of Sustainable Building, Mackley advises: "Ensure the life (cycle) cost plan is known, understood, agreed and 'loved' by all team members. Regular updates can help guide the whole team."\textsuperscript{183}

Project delivery processes should support an open, transparent and co-operative engagement by all project participants,\textsuperscript{184} including the client. Because the project delivery process relies on a high level of participant engagement and strong intercommunication, those managing it need specific skills, including good facilitation skills. Learning curve costs can be significant and it is advisable to engage consultants with demonstrated experience in this process to either manage project delivery or support those managing it. The AGD could include a 'training element', to build the capacity of its own staff responsible for managing the delivery process. It may be advisable to require any external project managers (for example, Department of Commerce staff) to participate in this training on a project by project basis.

It is important to incorporate accountability mechanisms and performance incentives in contracts with all consultants and builders, to ensure the desired outcomes are achieved. The contract documents developed by the client must clearly outline

\textsuperscript{181} Bordass, W. (2000) op cit
\textsuperscript{182} Mackley, C. J (2002) op cit
\textsuperscript{183} ibid
\textsuperscript{184} ibid
performance targets in relation to the greening of the building, whether it is a new or existing building and link payment to achieving the specified performance.

In The Economic Case for ‘High Performance Buildings’, Johnson (2000) suggests that incentives be aligned between designers, builders, operators and building owners to support an integrated, whole systems approach to the greening of new and existing buildings. The result will be a process where all groups benefit, in addition to the environment.\textsuperscript{185} The AGD, having control over all these stages from design to building management, has an opportunity to align incentives for any subcontractors or consultants.

\textbf{Project management and delivery that supports effective outcomes}

The National, in Melbourne, a green building being developed ‘within strict commercial parameters’, owes much of its success to innovative project management and delivery mechanisms. Rosemary Kirkby, Joint Project Director for the National says, “This was a business and people project from the start not a building one. We wanted to challenge the traditional client, architect, developer and building owner relationship. Only a multi-disciplinary team that was prepared to invest in building and collectively sharing intellectual capital, working as one seamless team could have delivered such an exciting outcome for the National.” The team works holistically across all project elements with high levels of user engagement. The management of the process demands creativity, flexibility and cohesive teamwork from all involved. Incentives include shared savings.\textsuperscript{186}

Briefs and specifications should be robust and performance-based to allow design flexibility. Poor briefing can seriously erode performance outcomes, including environmental performance, because requirements and targets are not clearly set or the freedom for manoeuvre understood.\textsuperscript{187} A good brief requires effective dialogue, with the team and client getting to know each other through an iterative process that improves mutual understanding of the requirements. This process must get the right people to ‘own’ the problems that are relevant to them so that effective progress can be made.

\textbf{Robust, performance-based briefs and specifications that support the delivery of green buildings}

The Victorian Department of Sustainability and Environment (DSE) has released performance-based sustainability guidelines for capital works projects. The Environmentally Sustainable Design and Construction Principles and Guidelines cover both new construction and upgrades and provide comprehensive, leading edge strategies for reducing the environmental impact of building design, construction and operation. Clearly articulated performance targets are included and the responsibilities of the various project team members are clearly defined in the guidelines. Project management checklists ensure that opportunities to enhance sustainability are considered at all stages of the project development.\textsuperscript{188}

Specifications for the 60L Green Building in Melbourne thoroughly integrated environmental issues with other standard requirements. It was felt that an environmental ‘attachment’ would send the signal that green features were just an add-on, so detailed reference to all relevant environmental issues (including specific materials and products, measurable performance criteria and key procedures) was included in every relevant part of the specification. While some were concerned that such a detailed specification would scare off potential tenderers, this proved not to be the case. The detail of the specifications proved to

\textsuperscript{185} Johnson, S.D. (2000) op cit
\textsuperscript{186} National Australia Bank Website, \url{www.national.com.au/About_Us/0,,35196,00.html} and \url{www.nabgroup.com/0,,36733,00.html} (accessed November 2003)
\textsuperscript{187} Bordass, W. (2000) op cit
\textsuperscript{188} The guidelines can be downloaded from \url{www.dse.vic.gov.au}
be a critically important element and had they not been so thorough, some green features would have undoubtedly slipped off the agenda during negotiations in the implementation phase.\(^{189}\)

The AGD recognises the importance of good design briefs, having recently developed new ecologically sustainable development (ESD) guidelines that challenge designers to utilise natural ventilation and natural light to improve the indoor environment and to use environmentally sound materials in construction. Now, with the development of a range of rating tools and industry benchmarks, there is an opportunity to tie these requirements to specific performance-based outcomes.

It is also important to provide contractors with clear practical guidance on implementing sustainable outcomes (including information on products, systems and standards of workmanship). A general rule of thumb is that if a contractor has to make more than two telephone calls to achieve a sustainable outcome, it will not happen. Site management is also critical for effective implementation. Sustainability induction procedures (such as a mandatory video showing materials recycling procedures) like those used for occupational health and safety, are necessary if site workers are to deliver good practice.

On-site checks are crucial to ensuring delivery of the specified sustainability performance. Work that does not meet the sustainability performance criteria needs to be rejected, in the same way that work not conforming to other industry standards and codes of practice would be. The transition to sustainable practices represents a significant cultural change for the building industry and builders and tradespeople may not take contractual sustainability requirements seriously unless they see them being enforced.

**A simple guide that has supported builders to ‘green’ their practices:**

A materials flipchart, prepared for the builders of the Aurora Sustainable Housing project in Melbourne, showed builders where to source environmentally friendly materials for the project and how to use them. Builders and tradespeople were involved in the development of the flipchart to ensure the final product would respond to their needs, and in addition display panels showing both approved and unacceptable materials were prepared. The flipchart has been welcomed warmly by builders because it makes their job easier. In addition, the flipchart also allows economies of scale to be captured through planning and working with specific suppliers and has gone a long way towards promoting cultural change in the industry.\(^{190}\)

Innovative contracts can support greener outcomes by binding team members to each other for project delivery (known as ‘integrated contracts’) and by binding them to contractual environmental deliverables as previously discussed. Currently, the contracts typically used within the development industry support an emphasis on reducing capital costs without regard for life cycle costs. For example, Design, Document and Construct contracts give the design responsibility to the construction company that wins the tender. Unless specifically directed, the construction company has a priority to reduce upfront costs. There is pressure to reduce resources for design so that upfront savings can be made.\(^{191}\)

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\(^{189}\) Pears, A. (2003) op cit
\(^{190}\) Materials were developed by the Centre for Design, RMIT University
\(^{191}\) NSW Department of Public Works and Services (1998) op cit
A service contract, by incorporating accountability and performance incentives, encourages the contractor to provide a resource-efficient and appropriate service. A Design Construct and Maintain contract is a common example of a service contract for a new building, but there are other variations, which are described in section 2.3. Energy Performance Contracting is an example of a service agreement that can be used for upgrades to existing buildings. The AGD is already exploring opportunities in this area.

For green buildings to achieve their potential for both occupant satisfaction and performance, an adequate level of resources must be allocated to building management. This requires good ends-and-means dialogue, which explores the properties of the building and the priorities of the occupiers. A lack of adequate management and commitment from building users can be disastrous, as highlighted in The Economics of Sustainable Building (Mackley, 2000):

> It is also common experience that the absence of user commitment to achieving environmental aspirations and their delivery can see a complete failure in the operation phase.”

As Bill Bordass explains in Cost and Value: fact and fiction:

> Recent studies in the UK suggest that two types of situations perform well for building occupants: relatively complex-to-operate buildings which are very well managed, or relatively simple-to-operate self managing buildings in which occupants have the ability to solve their own problems. Typically, environmental performance predictions assume ‘fit and forget’, even for issues dependent on design/management and people/technology interactions. To make progress we must seek to put more in the ‘fit and forget’ box, while making sure that the remaining problems are ‘owned’ by the players most capable of dealing with them.

Monitoring and reporting on buildings after occupancy supports good management regimes and is essential to establishing a feedback loop for optimising future building developments. It is also needed to establish whether consultants and contractors have met performance targets for incentive payments. Sufficient metering and monitoring capability needs to be incorporated into the building services design. The building management system (BMS) needs to be flexible enough to allow problems to be identified and fixed.

### Good building management using rating and monitoring for feedback

Macquarie Asset Services has instituted an innovative contractual arrangement with their building facility managers to rate their buildings annually and improve building performance, achieving a reduction in their NSW building energy use of 3,147,023 kWh. They have installed ‘smart’ metering to accurately monitor energy consumption and they conduct a review of building energy consumption at monthly meetings.

Multiplex, contracted to manage the new NSW Police Service headquarters for 15 years, have adopted a holistic approach to the design and management of the building in order to deliver a building that performs at the specified level. Jon McCormick, the Managing Director of Multiplex Asset Management, says that one of the key mistakes managers make is in the...
operation of the BMS, using it as a “very expensive time clock” rather than a means of monitoring, controlling and minimising energy use whilst providing optimum comfort for tenants. He adds that “…it’s critical that you employ intelligent building managers, not just caretakers, so that you can continuously review and fine tune the building’s control strategy.”

It is possible to use techniques such as regression analysis to learn from existing buildings. This is based on identifying characteristics that tend to lead to low or high energy use and feeding the information into the design of new facilities or upgrades. Such an approach can also facilitate identifying existing buildings in the portfolio which have unusually high energy use, so that programs can target these buildings to capture maximum savings.

**POTENTIAL NEXT STEPS**

The Institute for Sustainable Futures would like to commend the AGD on its willingness to further its commitment to sustainability. The following diagram contains a potential program for implementing the ‘greening’ of the AGD building portfolio, beginning with this report (stage 1). One way to initiate a broader process of change (stage 3) is to use a small number of high profile buildings as a demonstration and learning opportunity (stage 2). The purpose of this process would be threefold:

- To achieve best practice sustainable outcomes at optimum value in each project, by identifying where the best opportunities lie and locking-in strategies and budgets at the critical pre-design stage to ensure these outcomes are realised.
- To build organisational capacity, so that knowledge and skills gained as a result of the project can be applied to future building projects.
- To demonstrate a serious commitment to sustainability to the public.

The diagram below is indicative only, as any program would need to be developed and refined in close cooperation with the AGD.

![Figure 3: Potential program](image-url)