

# Sustainability in the Commercial Property Sector



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## 1.1 Sustainability – the business context

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### 1.2 Industry overview: sustainable development, 'green' buildings and building rating schemes

Worksheet 1.2A Characteristics of sustainable property development

Worksheet 1.2B Environmental benchmarks

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## 1.3 Climate change, global warming and the built environment

# 1.0

## Section 1 overview

This section introduces the concept of sustainability and describes its application and importance within the commercial property sector.

The commercial property sector is not alone in facing the challenge to better understand and integrate sustainability into business activities and asset management. Sustainability has already prompted a change in approach to day-to-day business in some aspects of property management, and industry leaders are integrating it into their core business functions. This has created new expectations among industry stakeholders and across the broader community.

### 1.1 Sustainability – the business context

Explains the concept of sustainability and sustainable development in the context of the commercial property industry.

Lists common drivers for making a commitment to sustainability and developing the business case.

Discusses the impact of sustainability on building valuation.

### 1.2 Industry overview: sustainable development, 'green' buildings and building rating schemes

Lists characteristics of sustainable property development, and attributes of 'green' buildings.

Discusses green building benchmarks and provides an overview of green building rating schemes: NABERS and Green Star.

[Worksheet 1.2A](#) Characteristics of sustainable property development

[Worksheet 1.2B](#) Environmental benchmarks

### 1.3 Climate change, global warming and the built environment

Provides a very brief background on the causes and effects of global warming.

Presents a bullet-point summary of the potential impacts of global warming on the built environment.

(For information about adapting to climate change see section 2.4 of this Guide.)

# Sustainability – the business context

# 1.1

## What is ‘sustainability’?

The concept of sustainability in the commercial property industry is being shaped and driven, as in most other industries, through the basic framework of sustainable development.

In essence, sustainable development refers to:

‘development which meets the needs of the present without compromising the ability of future generations to meet their own needs’.

*From Our Common Future, The Bruntland Commission, 1987, World Commission on Sustainable Development.*

This internationally accepted definition has been in place since the early 1990s, but the term sustainability has become popular more recently – partly due to its social, environmental and economic applications. The challenge is to achieve sustainability in the context of development and not to dismiss it as a contradiction in terms – or merely use it as ‘greenwash’.

## Increasing awareness of sustainability

The global environmental agenda is a significant driving force in catalysing community awareness and expectations. Reducing the ecological footprint and carbon emissions of the built environment, in the context of increasing population and urbanisation, is an imperative.

- In recent years the impacts of climate change have focused attention on greenhouse gas emissions from the property sector. Most of these come from the consumption of electricity derived from burning coal as well as the use of natural gas.
- The embodied energy in the production and transportation of goods and services needs to be taken into consideration when evaluating the sustainability of the supply chain engaged in the property sector.
- Drought has also contributed to wider concern and greater efforts to make commercial buildings more water efficient.

## What’s in this section

**What is ‘sustainability’?** p1

**Environmental rating schemes** p3

**Creating value** p4

**A risk-based approach** p6

**Further information** p6

## Sustainability Advantage

Sustainability Advantage is a business support service from the Department of Environment and Climate Change NSW (DECC). It is designed to help businesses understand sustainability, successfully manage their operations to achieve better environmental outcomes and add business value.

If your organisation joins Sustainability Advantage, specialist consultants will be appointed to help you improve in the following areas of business sustainability:

- vision, commitment and planning
- resource efficiency
- environmental risk and responsibility
- external stakeholder and staff engagement
- supply chain management
- climate change.

Participants in Sustainability Advantage are organised into groups of like organisations or in supply chain groups, for example the Stockland cluster and Goodman cluster of businesses. Take this opportunity to network with your industry and supply chain.

For more information please contact Business Partnerships on (02) 8837 6000 or email [sustainbus@environment.nsw.gov.au](mailto:sustainbus@environment.nsw.gov.au)



- The continuing rise in costs of waste disposal to landfill are influencing both the construction and operation of commercial buildings. Responsibility must also be taken for the appropriate disposal of wastes, including those which may still be accepted in landfill but may risk leakage of pollutants into groundwater.
- There is greater recognition of the influence of indoor environment quality on workplace health and productivity, itself a major determinant in business profitability.

These are strong drivers which all contribute to the business case for action. The business case is being further stimulated by broader recognition of the need for immediate action on climate change. (See Section 2: 'Becoming a Sustainable Organisation'.)

Industry bodies are responding. The Property Council of Australia (PCA) has begun promoting 'sustainability' as an alternative to the longer standing principles of sustainable development. The PCA calls for a 'triple bottom line approach to business, balancing environmental, social and economic accountability'.<sup>1</sup>

## Defining sustainability in the commercial property sector

There is no single, accepted definition of sustainability within the commercial property sector. However, a range of environmental tools is available to help organisations develop their own criteria and work towards greening their property portfolio, acquisition or tenancy in the context of their business goals, corporate values and organisational culture.

The scope for defining sustainability and integrating it into an organisation-wide policy or business statement is the basis of the industry overview in Section 1.2 of this Guide.

Aspects of sustainability that are becoming more common throughout the commercial property sector include:

- recognising that the environmental impacts of the sector – including impacts on climate change and potable water availability – are significant, and that mitigation of those impacts must take a beyond-compliance perspective
- accepting the link between property and social infrastructure, including the creation of a sense of place, contribution to social amenity and the inherent relationship between healthy workplaces and increased workforce productivity
- acknowledging that business value, including but not limited to economic value, can be created by a committed and comprehensive approach to:

## Drivers for environmental sustainability in the commercial property sector

- Lowering operational costs (more efficient use of labour, energy and raw materials and reduced waste disposal costs)
- Preventing and reducing environmental liabilities (reducing need for clean-up, minimising potential for fines or compensation)
- Lowering employee turnover (reducing recruitment costs and increasing efficiency)
- Retaining talented staff (through improved reputation and support for community infrastructure)
- Avoiding delays to project approvals (decreasing cost of approvals and likelihood of delays to new projects)
- Meeting community expectations (avoiding or reducing costs of liaison, media coverage, technical studies, or compensation through community consultation and collaboration)
- Meeting customer expectations (avoiding or reducing exposure to highly competitive market conditions)
- Increasing perception of the alignment with Premium or Grade-A quality
- Increasing shareholder value (better managing community and customer perception, reducing potential for incidents and potential for liabilities)
- Increasing access to capital (greater attractiveness to financial lenders through reduced exposure to liabilities, and meeting the expectations of ethical funds)
- Limiting exposure to new regulation (due to reputation, community and political recognition)

(continued p 3)

<sup>1</sup> Sustainable Development Guide: A Roadmap for the Commercial Property Industry, Property Council of Australia, 2001

- using resources (such as energy, water and materials) in an efficient manner and sustainably where possible
- anticipating and managing risks and opportunities across all levels of an organisation
- recognising that all stakeholders, internal and external, expect improvements in economic, social and environmental performance.

## Sustainable organisations

To be sustainable in the longer term, organisations – particularly those driven by the value of their reputation – need to adopt sustainability and the principles of triple bottom line performance as key business performance measures.

### Triple bottom line performance

Triple bottom line (TBL) performance refers to social, environmental and economic performance. Some aspects of property sustainability fall across one or more of these criteria. For example, the relationship between property and public or private transport networks involves environmental issues such as vehicle emissions, social issues in terms of health resulting from exposure to transport pollutants, and economic issues in terms of cost of transport to property occupants.

To become sustainable and continue to deliver high levels of performance, organisations must embed sustainability principles and practices into their business culture and demonstrate the benefits and achievements to their stakeholders.

In this context, sustainability is often seen as an attribute that supports differentiation of an organisation within its marketplace. For more information see Section 2: 'Becoming a Sustainable Organisation'.

## Environmental rating schemes

The concept of sustainability is emerging steadily in the property sector. This is driven partly by the development of environmental rating schemes for buildings. Most recently the concept of a 'green' building has been included in the rating for 'Premium' or 'Grade-A' commercial office space by the Property Council of Australia.

The Property Council of Australia's 2006 *A Guide to Office Building Quality* includes assessment criteria using the DECC's NABERS and Green Building Council of Australia's Green Star ratings. Essentially, neither a 'Premium' nor 'Grade-A' new office building should be promoted as such unless it has achieved as a minimum a 4-star Green Star rating and 4.5-star NABERS Energy rating. For more information about the rating schemes see Section 1.2 of this Guide.

The business case for sustainability is now established and being integrated into the marketing language for commercial buildings.

### Drivers (continued)

- Avoiding or reducing litigation risks and costs (improving defence against claims and reducing risk of penalties)
- Limiting exposure to increased environmental charges for carbon emissions and use of landfill for waste management
- Improving access to land, resources, people (supporting longer-term business growth through sustainability)
- Achieving longer term product and service sustainability, as a producer and consumer, by greening the supply chain, also reducing exposure to short-term market expectations.



### Build it into your kit bag

'What I am seeing now is that many businesses around the world are either willing, or being forced, to build another operating principle into their kit bag – and that is: to do what they do well, but do it in a sustainable fashion.'

Ross Taylor, Global Chief Executive Retail and Communities, Lend Lease Group (*Australian Financial Review*, 11 October 2006)



## Creating value

Organisations wishing to demonstrate commitment and progress in this area must focus on developing sustainable property programs that aim to create or enhance property values – to the fund, to the client and to the organisation as a whole, including its reputation – in both the short and longer terms.

### Establishing the metrics

Wherever possible, the value created needs to be made tangible to property owners, investors and tenants. The challenge is to identify and standardise metrics which will enable social and environmental performance to be equated with financial metrics on the property's balance sheet. Efforts to do this are underway, but there are not yet formulas or models which have been accepted globally by the property industry.

So far, economic considerations that can be quantified – for example impacts of energy and water savings on operational budgets, or capital investment impact on property value – remain the only tangible and directly accounted financial references to sustainability.

However, it is imperative that the value of sustainability is demonstrated to building owners, investors and occupiers. Valuation models for commercial buildings recognised by owners or investors can be used to demonstrate this.

### Sustainability valuation model

The valuation model below illustrates the positive impact of sustainability initiatives on a typical A-grade, Sydney CBD, single-tenanted office building.

	Before upgrade	After upgrade
Gross effective rent	\$560/m <sup>2</sup>	Unchanged at \$560/m <sup>2</sup>
Outgoings	\$150/m <sup>2</sup>	Reduced by \$3.32/m <sup>2</sup> : \$146.68/m <sup>2</sup>
Upon lease expiry	6 months letting up (50% retention)	Allow 3 months letting up (50% retention)
Capitalisation rate	6.75%	Unchanged at 6.75%
Capitalisation approach	\$176.8 m	\$178.0 m
Discounted Cash Flow (DCF) approach	\$177.1 m	\$181.0 m
Adopted value	\$177 m	\$180.0 m
Capital expenditure Year 1	\$400,000	\$720,115



### To Investa, sustainability simply makes good business sense

'Investa owns and manages over \$7 billion of commercial office property and is a sustainability leader in the Australian property industry.

For Investa, sustainability means adopting business strategies and practices that meet the needs of the Group and its stakeholders today while protecting the human and natural resources that will be needed into the future.

Investa's sustainability practices are targeted at:

- fostering innovation
- improving identification and management of risks
- elevating recognition of changes in the business environment
- enhancing reputation and engendering trust and confidence with those with whom we deal
- strengthening employee alignment and motivation
- reinforcing access to capital through greater disclosure.'

[www.investa.com.au](http://www.investa.com.au)



### Modelling for upgrades

'The Jones Lang LaSalle valuation model (table on the left) describes the capital impact of a series of good practice lighting, HVAC and commissioning upgrades on a typical A-grade Sydney CBD office building. The upgrades at an additional capital expenditure cost of \$320,115, were found to create \$99,700 savings in annual outgoings. The initiatives added \$3 million in capital value and provided a return of almost 10 times the investment. They also raised the NABERS Energy rating by one star, which would make the building more attractive to tenants.'

Jones Lang LaSalle. For more information see *Assessing the Value of Sustainability*, Jones Lang LaSalle, February 2006, [www.joneslanglasalle.com.au/NR/rdonlyres/1659B752-E030-43EC-BF63-E8E06F9A5A94/0/assessingvalue\\_whitepaper2006.pdf](http://www.joneslanglasalle.com.au/NR/rdonlyres/1659B752-E030-43EC-BF63-E8E06F9A5A94/0/assessingvalue_whitepaper2006.pdf)

The benefits of energy efficiency and reduced energy costs to building owners and tenants are proven. However, measurements of the value created by a more sustainable approach to managing and developing property need to broaden their scope beyond resource efficiency. For example, the industry would benefit from greater efforts to measure impacts of waste reduction and, in particular, workplace productivity.

When valuing property that does not meet the standards of sustainability the market requires, valuers will need to take care that they allow for sufficient capital expenditure to carry out the upgrading works that will be required. Conversely, the more sustainable the property the less that will have to be spent in altering it.

See also Section 3: 'Sustainability and Property Management', particularly Section 3.1: 'Incorporating sustainability into decision making', and Section 3.2: 'Sustainability and property acquisitions'.

### Linking building environment to productivity

Many property organisations and tenants recognise that workplace productivity is linked – directly or indirectly – to the quality of the built environment. Building improvements, such as better lighting or access to sufficient fresh air, are likely to have a positive effect on productivity. It appears that small increases in productivity and staff retention can lead to significant monetary savings in tenants' workforce costs.

### Supporting the business case

The challenge facing the industry is to develop the capability to measure and promote the value created by the more intangible aspects of sustainability, such as:

- impact on corporate reputation
- capacity to attract ethical funding
- savings associated with retention of valued staff or attraction of more progressive staff due to an organisation's proven sustainability record.

If the industry can quantify more of the drivers listed above, and therefore more effectively demonstrate the economic benefits of sustainability, this will help to build the business case for allocating resources to sustainability initiatives.



### Defining sustainability at Colonial First State Global Asset Management

'As part of its Sustainability Strategy developed in 2004, Colonial First State Global Asset Management (then Colonial First State Property) realised the need to define what sustainability meant to the organisation and in the context of its vision and values. The following was adopted:

#### Vision

Colonial First State Global Asset Management will set the standard in property funds management and corporate real estate by implementing sustainable business practices which deliver value and demonstrate environmental stewardship while being responsive to the expectations of society.

#### Definition

Sustainability, through corporate governance and business practices, means Colonial First State Global Asset Management is able to deliver value to its investors, tenants and clients by investing in, developing and managing property while:

- utilising resources in an efficient manner
- anticipating and managing risks and opportunities across all levels of business,
- recognising the expectations of stakeholders with regard to economic, social and environmental performance.'

Colonial First State Global Asset Management,  
[www.cfsgam.com.au](http://www.cfsgam.com.au)

## A risk-based approach

The concept of risk underpins many aspects of sustainability.

- What are the risks associated with steering a sustainable building through aspects of its design, construction, operation, refurbishment and disposal?
- What is the risk to an organisation's reputation if its stakeholders don't perceive its actions as supporting sustainability?
- Will climate change result in more regulation?

Sustainability programs and initiatives generally take a risk identification and mitigation approach, and this is a good way of discovering potential for improvements that can extend performance well above compliance. Organisations can benefit by integrating sustainability objectives into their standard risk assessment processes. There are many synergies between sustainability and risk management at both the higher corporate governance level and the asset management level.

## Further information

- Australian Building Codes Board, [www.abcb.com.au](http://www.abcb.com.au)
- Australian Cooperative Research Centre for Construction Innovation, [www.construction-innovation.info/](http://www.construction-innovation.info/)
- Green Building Council of Australia Green Star rating scheme, [www.gbca.org.au](http://www.gbca.org.au)
- International Council for Research and Innovation for Building and Construction, [www.cibworld.nl/website/](http://www.cibworld.nl/website/)
- Jones Lang Lasalle Sustainability White Papers, March 2005 and February 2006, [www.joneslanglasalle.com.au](http://www.joneslanglasalle.com.au)
- National Australian Built Environment Rating System, NABERS, [www.nabers.com.au](http://www.nabers.com.au)
- Property Council of Australia, [www.propertyoz.com.au](http://www.propertyoz.com.au)
- Royal Institution of Chartered Surveyors:
  - 'Sustainable Property Investment and Management', September 2008, [www.rics.org](http://www.rics.org) and
  - 'Financing and valuing sustainable property: we need to talk', April 2007, [www.rics.org/Practiceareas/Property/Valuation/FiBRE%20of%20Sarasota%20event.html](http://www.rics.org/Practiceareas/Property/Valuation/FiBRE%20of%20Sarasota%20event.html)
- Colonial First State Global Asset Management, [www.cfsgam.com.au](http://www.cfsgam.com.au)
- Investa Property Group, [www.investa.com.au](http://www.investa.com.au)



## 1.2

# Industry overview

## Sustainable development, 'green' buildings and building rating schemes

### Context: the full life cycle

What constitutes sustainable development from a commercial property perspective? This question generates a lot of discussion throughout the industry. (Definitions of sustainability are discussed in Section 1.1 of this Guide.)

Well-designed, enduring and environmentally friendly buildings, commonly referred to as 'green buildings', are not the sole expression of sustainable property. They are a culmination of a process which must recognise and generate added value throughout the full property life cycle. Sustainable property also encompasses the property's physical and social interaction with its surroundings and the communities upon which it has an impact.

There are many industry-generated design tools and building rating schemes and this section of the Guide refers to some of the Australian ones. Building rating schemes are also discussed in Sections 3.4 and 4.1, and see also Worksheet 4.1B: 'Choosing the appropriate environmental rating tool'.

### Stakeholders' perceptions

The term 'sustainability' brings to mind a range of different perceptions and expectations from different stakeholders. The following perceptions are typical:

- **Traditional investors** view a property as sustainable if their investment continues to deliver sound financial results.
- **Ethical investors** consider the performance of a property as sustainable if it meets their environmental and social expectations, as well as providing a good return on investment.
- **Owners** consider their property sustainable if it continues to deliver against revenue targets, minimises its outgoings and grows in capital value, thereby being attractive to retain in the portfolio.
- **Designers** view sustainability as a performance area which demonstrates energy efficiency, good 'green' design, responsible material applications and achieves all users' requirements.

#### What's in this section

**Context: the full life cycle** p1

**Stakeholders' perceptions** p1

**Why does sustainability matter?** p2

**Characteristics of sustainable property development** p3

**Attributes of 'green' buildings** p4

**Green building benchmarks** p5

**Green building rating schemes** p5

**Further information** p7

#### Worksheet 1.2A

Characteristics of sustainable property development

#### Worksheet 1.2B

Environmental benchmarks

- **Tenants** view sustainability in the context of accommodation that provides a good indoor working environment for staff, efficient layout, reduces potential health risks and is accessible to public transport.
- **Regulators** consider a property sustainable if it exceeds occupational health, safety, fire and environment regulatory requirements and can be used to demonstrate sustainable design and construction to the market.
- **Local residential or business communities** associate a buildings' impact on its social, visual and physical amenity as a measure of sustainability.
- **Members of the general community** expect commercial property to 'do the right thing' and reduce its contribution to major environmental and social issues such as adapting to climate change and water conservation.

Sustainable property needs to satisfy all of these perceptions and expectations to be recognised in the market as truly sustainable.

## Why does sustainability matter?

In Section 1.3 the potential impacts of climate change and global warming on the built environment are considered (IPCC 2007). But what of the impact of the built environment on climate change? To what extent is our commercial built environment exacerbating the effects of climate change and global warming?

Following is a summary from 'Capitalising on the building sector's potential to lessen the costs of a broad-based GHG emissions cut' – a report prepared for the Australian Sustainable Built Environment Council (ASBEC) by the Centre for International Economics, Canberra and Sydney, September 2007.

### The building sector is responsible for a large proportion of Australia's GHG emissions – and can make a major contribution to meeting a deep cuts target

*Without change, Australia's greenhouse gas (GHG) emissions will continue to grow at a rapid rate. They are currently projected to reach an estimated 915 million tonnes by 2050. However, the Australian Business Roundtable on Climate Change (BRCC) reported that it is possible to achieve a 60% reduction in GHG emissions by 2050 while maintaining strong economic growth, and that with early action, the economic impact by 2020 would be modest.*

*Almost a quarter (23%) of Australia's total GHG emissions are a result of energy demand in the building sector. The building sector, comprising residential and commercial buildings, houses a large proportion of Australia's economic activity. This study extends the*



### Principles for a sustainable commercial property market

In 2006, a Sustainable Building Leaders Project defined a set of principles that underpin the pathway to a sustainable property market:

- 'Business is not the enemy of the environment – it is a key player in solving environmental problems.
- Sustainability is not a cost burden for industry and consumers. It is an investment that will deliver not only public good outcomes for the environment but also improved economic performance for organisations.
- Sustainability is integrated into core business designs rather than an add-on after the core business decisions have been made.
- A sustainable market is an informed market that understands the economic, environmental and social costs and benefits of buying decisions over the whole building life cycle, and invests for long-term value.'

Sustainable Buildings Leader Project, Melbourne Business School, 2006, Building Commission Victoria. For more information see [www.buildingcommission.com.au/www/html/813-sustainable-building-pathway.asp](http://www.buildingcommission.com.au/www/html/813-sustainable-building-pathway.asp)

*BRCC's analysis to include a more detailed analysis of the significant energy efficiency potential of the building sector. The building sector's contribution to GHG emissions is mainly driven by its end use of, or demand for, electricity. This is a key difference from many other sectors where the main issue is emissions from the supply of energy.*

*The building sector as a whole could reduce its share of GHG emissions by 30–35% while accommodating growth in the overall number of buildings by 2050. This can be achieved by using today's technology to significantly reduce the energy needed by residential and commercial buildings to perform the same services. For example, by replacing equipment with more energy efficient models, at the natural replacement rate, and upgrading the performance of the building shell.*

*Detailed 'bottom up' analysis of energy efficiency opportunities suggests that net cost savings can be achievable in the medium to long term. Rather than a cost per tonne of GHG abatement, many energy efficiency options have a positive financial payback in addition to providing abatement benefits. The payback period can vary from a matter of months to many years. This finding is consistent with a large collection of case studies within Australia and overseas.*

*The economy-wide analysis conducted in this study takes a conservative approach by using a cost neutral assumption rather than including any additional returns on energy efficiency investment that may be available.*

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Australian Sustainable Built Environment Council (2007)

## Setting their own benchmarks

Several commercial property owners are setting their own performance goals. For example, in 2008 Stockland set a target of 8% reduction in electricity consumption and greenhouse gas emissions for its Australian office portfolio.

Stockland, [www.stockland.com.au](http://www.stockland.com.au)

## National Greenhouse and Energy Reporting Scheme

The National Greenhouse and Energy Reporting Scheme (NGERS) was established in July 2008, in accordance with the *National Greenhouse and Energy Reporting Act 2007*. The scheme requires major power producers and consumers to record their emissions. Over the next three years, the emissions threshold for mandatory carbon accounting will reduce, requiring many major property institutions to report their energy consumption. The Australian Government's draft policy on emissions trading was released in December 2008.

NGERS fact sheet:  
[www.climatechange.gov.au/reporting/](http://www.climatechange.gov.au/reporting/)

## Characteristics of sustainable property development

In order to be considered sustainable, property development and property management need to address the range of issues listed below – comprehensively and at an early stage in the development process. See Worksheet 1.2A for further explanation of these issues.

### Landuse, urban form and urban quality

- Good urban design
- Good and attractive site design
- Reuse of land and buildings
- Appropriate density

### Transport

- Convenient access to public transport
- Facilities for pedestrians and cyclists

## Business and community

- Local labour and skills
- Local procurement
- Community involvement
- Community facilities
- Designing for community
- Equality and diversity
- Health and wellbeing
- Safety and security
- Accessibility

## Environmental protection and enhancement

- Supporting biodiversity
- Avoiding and minimising pollution to air, water and land
- Noise abatement

## Resources

- Energy efficient design
- Renewable energy
- Water conservation
- Low-impact building materials
- Minimising waste to landfill.

## Attributes of 'green' buildings

Green buildings share common performance attributes which distinguish them from other buildings. These attributes include:

- being recognised or rated as part of a green building scheme such as the National Australian Built Environment Rating System (NABERS) or the Green Building Council of Australia's Green Star rating (see 'Green building rating schemes', below.)
- having energy and water saving action plans in operation, designed to make sure that energy efficiency and water efficiency performance levels are achieved and maintained, and greenhouse gas emissions are reduced
- having integrated building management systems with comprehensive metering that track and report energy, thermal, indoor environment quality and water use performance against agreed best practice benchmarks
- being a healthy place to work in with high levels of staff satisfaction and productivity



## City Mayors join forces: C40

'C40 is a group of the world's largest cities committed to tackling climate change. Cities have a central role to play in tackling climate change, particularly as cities bear a disproportional responsibility for causing it ... cities consume 75% of the world's energy and produce 80% of its greenhouse gas emissions.

In 2005, representatives of 18 leading world cities met in London to discuss joining forces to tackle global warming and climate change. The representatives saw the need for action and cooperation on reducing greenhouse gas emissions and pledged to work together towards achieving that goal. At the end of the conference, a communiqué was signed which recognised the need for cities to take action and to cooperate on reducing climate emissions.

The cities also promised a number of action points, including most notably the creation of procurement policies and alliances to accelerate the uptake of climate-friendly technologies and influence the marketplace.

In August 2006, the initiative was further strengthened when former President Clinton and the former Mayor of London Ken Livingstone announced a partnership between the Clinton Climate Initiative and the Large Cities Climate Leadership Group (since then renamed 'C40'). This new partnership pledged to reduce carbon emissions and increase energy efficiency in large cities across the world.'

[www.c40cities.org](http://www.c40cities.org)

- consuming fewer non-renewable resources compared to buildings of equivalent size and location
- producing less waste in construction as a result of an effective waste minimisation and recycling plan
- supporting the recycling industry during their operation through an active tenant-driven resource recovery and recycling program
- being located so as to maximise access by public transport, bicycles or alternate fuel vehicles
- discharging fewer emissions to the atmosphere, both at source and as a result of energy generation elsewhere
- causing minimal disturbance to site ecology and to neighbouring residential communities,
- contributing to the community's sense of place and general wellbeing.

In addition, truly sustainable buildings should maintain their place in the market and endure so they attract good income without the need for major expenditure for upgrade or maintenance, or in the extreme case, demolition and replacement.

Buildings that win awards for only some of these characteristics, typically greenhouse performance for example, should not be considered 'green', only greener than other buildings that have not achieved similar levels of performance.

## Green building benchmarks

The Australian commercial property industry has yet to consolidate a set of agreed benchmarks that cover the whole range of sustainable development criteria.

For some aspects of sustainable development there are good practice or best practice benchmarks set by regulators, industry associations or utility providers. Examples of these are set out in Worksheet 1.2B. They can be used to benchmark commercial property from both a design and operational perspective. More detailed information about these benchmarks can be obtained from the promoters listed in the Worksheet.

Green building rating schemes are helping to establish a recognised set of design and construction performance levels which are suitable for a benchmarking exercise. Over time these ratings may become default benchmarks.

## Green building rating schemes

Green building rating schemes are tools for evaluating the environmental performance of a building during design and occupation. In recent years the number of voluntary green building rating schemes has increased worldwide. Not all schemes deal with the same content nor do they all focus on the full property cycle. Some are suited to the design and construction stage and others to the building occupation stage.

**There is not one scheme that is better than all the others** across the whole property life cycle. Each tool has a viable role at a particular stage of the cycle, and can help to quantify or qualify various aspects of sustainable property development and management. **Across the schemes there is not a consensus about what constitutes sustainable development.** Rather, each scheme highlights aspects of sustainability and performance levels that are considered good or best practice and representative of sustainable development.

Consequently, the schemes have to be used intelligently and in a manner that is relevant to the particular application and its market. When properly understood, the rating schemes can provide helpful evidence to support the business case for sustainability as well as providing guidance to the project team.

In Australia, there are currently two rating systems available to communicate the sustainability of commercial buildings. NABERS, a government initiative to measure the performance of buildings, and Green Star, an industry initiative to encourage and promote sustainable building design.



## NABERS

NABERS, the National Australian Built Environment Rating System, was developed and is managed by DECC on behalf of the Commonwealth, state and territory governments. NABERS ratings measure and compare the actual environmental impact of existing buildings.

To meet the different needs of building owners, managers and occupants, NABERS ratings are available for the base building, tenancy or whole building. Owners and managers can report on the environmental impacts under their control, such as energy use for lifts and air conditioning, water consumption and treatment of waste. Building occupants can report on the impacts of light and power in their tenancy, waste generation and separation of recyclable materials.

NABERS quantifies the environmental impact of a building, and benchmarks it against other buildings, awarding a rating out of 5 stars for each environmental impact criteria. A 2.5 star rating indicates average performance, while a 5 star rating represents a highly efficient building. A rating is calculated using 12 months data from the building in operation, such as energy and water bills. However, it is possible to commit to achieving a rating for a building that is under construction, through the Commitment Agreement process.

Benefits and outcomes of rating a building with NABERS include:

- quantifying performance – setting a baseline for improvements and tracking performance over time
- managing the environmental impacts of a building or an entire portfolio
- reliable, third party endorsement of environmental credentials
- reporting performance to stakeholders
- attracting tenants or potential owners
- demonstrating commitment to sustainability and good corporate citizenship.

NABERS ratings for offices include:

- NABERS Energy – previously known as the Australian Building Greenhouse Rating (ABGR)
- NABERS Water
- NABERS Waste
- NABERS Indoor Environment.

The NABERS Transport rating for offices is under development. NABERS also offers ratings for homes and hotels, and ratings for retail centres, schools and hospitals are under development.

Official ratings are supplied by NABERS Accredited Assessors. Ratings can be estimated using the online calculators, although a self-assessed rating cannot be promoted. For information on NABERS ratings, to find an Accredited Assessor or to try the online NABERS calculator, go to [www.nabers.com.au](http://www.nabers.com.au)

## Green Star

Green Star is managed by the Green Building Council of Australia, a not-for-profit building industry organisation established to encourage the adoption of green building practices. A Green Star rating is awarded to buildings that demonstrate best practice or better sustainable design.

The following Green Star certified ratings are available:

- 4 Star Green Star (score 45–59):  
Best Practice
- 5 Star Green Star (score 60–74):  
Australian Excellence
- 6 Star Green Star (score 75–100):  
World Leadership

The following Green Star rating tools are available for offices:

- Green Star Office Design v3
- Green Star Office As Built v3
- Green Star Office Interiors v1.1

A Green Star rating is achieved by implementing design initiatives from a list of options covering a range of different environmental issues such as energy, water, transport and materials. Credit points are allocated based on the chosen initiatives.



The rating is calculated from the combined credit points achieved across all environmental issues, so can be achieved either by consistently good performance across all environmental issues, or by high performance in some areas offsetting lower performance in others.

A 6 star rating is achieved by a number of good building design initiatives. Certified ratings are only available to buildings that achieve 4 stars or greater. With careful construction, management, operation and maintenance, the initiatives chosen could lead to environmental benefits such as low energy and water use, and a healthy and comfortable indoor environment.

For more information on rating a building with Green Star, or becoming a Green Star accredited professional, go to [www.gbcaus.org.au](http://www.gbcaus.org.au)

## Building Code of Australia

The Australian Building Codes Board (ABCB) is considering how to integrate sustainability into future versions of the Building Code of Australia (BCA) by recognising a broader spectrum of energy efficiency initiatives. The ABCB accepts the need to define sustainability within the construction industry and create an implementation framework for sustainability which supports the construction and property management industries. The ABCB also recognises the need to develop a strategy for sustainability education.

For more information about energy efficiency provisions for multi-residential and commercial buildings go to [www.abcb.com.au/go/whatweredoing/workprogram/projectsae/energy/eecommercial](http://www.abcb.com.au/go/whatweredoing/workprogram/projectsae/energy/eecommercial)

Section 3 of this Guide includes further detail on the general features and applications of the major green building rating schemes available in Australia.

## Further information

- Green Building Council of Australia (GBCA) Green Star rating scheme, [www.gbca.org.au](http://www.gbca.org.au)
- National Australian Built Environment Rating System, NABERS, [www.nabers.com.au](http://www.nabers.com.au)
- Property Council of Australia, [www.propertyoz.com.au](http://www.propertyoz.com.au)
- IPCC 2007: *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M L Parry, O F Canziani, J P Palutikof, P J van der Linden and C E Hanson (Eds), Cambridge University Press, Cambridge, UK, [www.ipcc.ch](http://www.ipcc.ch)
- 'Capitalising on the building sector's potential to lessen the costs of a broad-based GHG emissions cut', prepared for the Australian Sustainable Built Environment Council (ASBEC) by the Centre for International Economics, Canberra and Sydney, September 2007
- The National Greenhouse and Energy Reporting Scheme (NGERS) fact sheets and guidelines, [www.climatechange.gov.au/reporting/](http://www.climatechange.gov.au/reporting/)

## Worksheets

Review and use these Word documents:

- 1.2A Characteristics of sustainable property development
- 1.2B Environmental benchmarks

## Worksheet 1.2A

# Characteristics of sustainable property development

Use the following checklist to determine whether a property development could be considered 'sustainable'. This checklist is not a substitute for a design or operational performance rating scheme.

Land use, urban form and urban quality	Applicable?
<b>Good urban design</b> – creating precincts that are designed to encourage and facilitate safe pedestrian movement, link logically with surrounding areas and be complementary to those areas.	
<b>Good and attractive site design</b> – designed to meet the needs of the end users, with consideration given to how the buildings, infrastructure or open space will be used in practice, while (although subjective) also creating attractive spaces.	
<b>Reuse of land and buildings</b> – using a 'brown field' or contaminated site in preference to a 'green field' site. Reusing buildings on site, either by refurbishing all or part of a building or by recycling demolition material.	
<b>Density</b> – having the appropriate density for the location, such as high density around transport nodes, and minimising impacts associated with noise, traffic congestion and privacy.	
<b>Transport</b>	
<b>Access-related issues</b> – having good access to public transport, being situated close to local amenities.	
<b>Active transport</b> – providing for cyclists and pedestrians.	
<b>Business and community</b>	
<b>Local labour and skills</b> – encouraging or giving preference to local labour through the construction process or during the lifetime of the completed development. Providing training as part of the development process that will also help to increase the local skills base.	
<b>Local procurement</b> – (ideally) sourcing materials locally or through local suppliers where economically viable.	
<b>Community involvement</b> – creating interest and preferably buy-in from local stakeholders, achieved in part through community consultation and engagement initiatives over and above those required by the development approval process.	

<b>Community facilities</b> – including facilities for community use or designed for multiple users, helping to create a focus point for the community – could be the residential community as well as local business community.	
<b>Designing for community</b> – instigating processes which will facilitate a sense of community as the development matures. This includes considering how people interact and what generates a community, and providing space for people to meet socially and accidentally.	
<b>Equality and diversity</b> – designed to support social equality and cultural diversity. This is an important way of ensuring lasting sustainable development and is about fostering equality across the community through the development.	
<b>Health and wellbeing</b> – considering the quality of the indoor environment (see Section 3.8) and the impact this has on occupants. Aspects include providing natural and artificial lighting, reducing internal noise, managing internal air quality (ventilation and emission of pollutants) and maintaining services to avoid or reduce additional airborne contamination entering the building.	
<b>Safety and security</b> – designed to provide inherent safety and security including accommodation of mixed uses, overlooking walkways and car parks, encouraging ground level walk-through, and providing adequate night lighting.	
<b>Accessibility</b> – making the development accessible to a diversity of users including the disabled, mothers with young children, visually impaired and aged people. Much of this is subject to regulation and design codes, but sustainability can be improved through early attention to risks and opportunities during the design process.	

### Environmental protection and enhancement

<b>Supporting biodiversity</b> – considering and conserving ecological values including locally, regionally and nationally important species as well as retaining or improving habitat values.	
<b>Pollution to air, water and land</b> – focusing on minimising, mitigating or avoiding polluting emissions during construction and operation.	
<b>Noise abatement</b> – recognising that the ambient noise of the area or within the site will affect the quality of life and health of the occupants and those that live or work nearby. Using design and operational controls to mitigate detrimental noise impacts.	

## Resource use

<p><b>Energy efficient design</b> – taking advantage of the many technologies available to avoid energy wastage and track energy consumption during occupation. Efficient energy use is a key measure to reduce carbon dioxide emissions, thereby reducing the effects of global warming and climate change.</p>	
<p><b>Renewable energy</b> – generating renewable energy onsite. This will reduce reliance on more carbon-intense, fossil fuel-derived energy sources.</p>	
<p><b>Water conservation</b> – reducing the demand for potable water supplies and capturing and using rain, stormwater and wastewater. This may become mandatory for residential and commercial developments in the future. Current expectations focus on water efficient appliances and fittings, while new design ideas, including water sensitive urban design and water efficient technologies, are becoming more commonplace.</p>	
<p><b>Low-impact building materials</b> – considering the life-cycle environmental impact of materials used in the development to maximise the use of environmentally friendlier alternatives and reduce burdens on virgin material sources.</p>	
<p><b>Minimising waste to landfill</b> – in the design phase: reducing the creation of waste, using recycled or recyclable materials and supporting the recycling industry. In the occupation phase: instigating waste collection systems that help users to sort recyclable materials from residual waste which goes to landfill.</p>	

Adapted from the *Sustainable Design and Construction Toolkit*, London Development Authority, prepared by URS Europe 2005, [www.lda.gov.uk](http://www.lda.gov.uk)

## Worksheet 1.2B

## Environmental benchmarks

## Emerging sustainable development benchmarks for commercial office buildings

Performance area	Emerging good or best practice benchmarks	Promoter
Energy efficiency (base building electricity and gas)	Sydney best practice <b>313 MJ/m<sup>2</sup> NLA pa</b>	Property Council of Australia 2001
	Melbourne best practice <b>333 MJ/m<sup>2</sup> pa</b>	
	Brisbane best practice <b>385 MJ/m<sup>2</sup> pa</b>	
	Canberra best practice <b>369 MJ/m<sup>2</sup> pa</b>	
	Adelaide best practice <b>556 MJ/m<sup>2</sup> pa</b> (whole building)	
	Perth best practice <b>558 MJ/m<sup>2</sup> pa</b> (whole building)	
	Australian CBD average <b>581 MJ/m<sup>2</sup> pa</b>	Australian Building Codes Board 2004
Greenhouse gas emissions (base building)	NSW/ACT best practice <b>71 kg CO<sub>2</sub>/m<sup>2</sup></b>	NABERS (5 star rating)
	Victoria best practice <b>101 kg CO<sub>2</sub>/m<sup>2</sup></b>	
	Queensland best practice <b>77 kg CO<sub>2</sub>/m<sup>2</sup></b>	
	South Australia best practice <b>72 kg CO<sub>2</sub>/m<sup>2</sup></b>	
	Western Australia best practice <b>70 kg CO<sub>2</sub>/m<sup>2</sup></b>	
	Northern Territory best practice <b>31 kg CO<sub>2</sub>/m<sup>2</sup></b>	
	Tasmania best practice <b>83 kWh/m<sup>2</sup></b> (measured in energy)	
Water efficiency	Best practice <b>0.8 kL/m<sup>2</sup> NLA pa</b> Good practice <b>≤ 1 kL/m<sup>2</sup> NLA pa</b>	Sydney Water 2005
	3 Star – <b>1 kL/m<sup>2</sup> NLA pa</b> 4 Star – <b>0.75 kL/m<sup>2</sup> NLA pa</b> (best practice) 5 Star – <b>0.35 kL/m<sup>2</sup> NLA pa</b>	NABERS
	Australian best practice <b>0.5 kL/m<sup>2</sup> NLA pa</b> Australian average <b>1.125 kL/m<sup>2</sup> NLA pa</b>	Department of the Environment, Water, Heritage and the Arts (DEWHA)
Air quality health goals – pollutant concentrations	Formaldehyde <b>130 [μg]/m<sup>3</sup></b> Total VOCs <b>500 [μg]/m<sup>3</sup></b> Carbon monoxide <b>9 ppm</b> (8-hour average) Nitrogen dioxide <b>225 [μg]/m<sup>3</sup></b> Fine particulates <b>50 [μg]/m<sup>3</sup></b> Dust mite allergens <b>2-10 g/gram</b> house dust	National Health and Medical Research Council (NHMRC)

Performance area	Emerging good or best practice benchmarks	Promoter
Air quality health goals – pollutant concentrations (continued)	<b>NABERS thresholds:</b> Particulate matter (PM <sub>10</sub> ) <b>0.05 mg/m<sup>3</sup></b> Formaldehyde <b>0.10 mg/m<sup>3</sup></b> Carbon monoxide <b>10 ppm</b> Total VOCs <b>0.5 mg/m<sup>3</sup></b> Ratio of indoor airborne microbials to outdoor airborne microbials (measured as cfu/m <sup>3</sup> ) is <b>1</b>	NABERS
Solid waste	Total waste generated <b>≤149 grams/person/day</b> Total recycling of the materials generated <b>≥ 90%</b>	NABERS
PCA – A Guide to Office Building Quality – Environmental Performance	<b>Existing offices</b> <b>Premium</b> NABERS Energy accredited rating (See Note 1) Green Star (or similar) rating (See Note 2) <b>Grade A</b> NABERS Energy accredited rating Green Star (or similar) rating <b>Grade B</b> NABERS Energy accredited rating <b>New offices</b> <b>Premium</b> ≥ 4.5 star NABERS Energy accredited rating (See Note 1) ≥ 4 star Green Star (or similar) rating <b>Grade A</b> ≥ 4.5 star NABERS Energy accredited rating ≥ 4 star Green Star (or similar) rating <b>Grade B</b> ≥ 4 star NABERS Energy accredited rating ≥ 3 star Green Star (or similar) rating	Property Council of Australia
Proximity to public or alternate transport	<b>5% of building occupants have access to secure bicycle storage on the property;</b> <b>1 on-site shower for every 10 secure bicycle places;</b> <b>1 km or less walking distance to public transport during peak periods</b>	Green Building Council of Australia

Note 1: Including publishing on NABERS Energy website and supported by a management plan

Note 2: Green Star Existing Office rating tool (or similar rating tool)



## Property Council of Australia

The PCA provides a voluntary office building quality grading which includes environmental standards and other aspects of building performance that influence environmental outcomes. The following summarises the PCA's 2006 publication- *A Guide to Office Building Quality*.

Office quality grade matrix – environmental performance														
	NABERS Energy accredited rating (Note 1)	Green Star (or similar) rating (Note 2)	Full BMCS including on-floor control	Main plant BMCS	Lighting power consumption $\leq 12$ W/m <sup>2</sup>	Lighting power consumption $\leq 15$ W/m <sup>2</sup>	Full building management team on site	Full building management team on site (> 30,000 m <sup>2</sup> )	Remote building monitoring	Water demand submetering	Change room and showers	Waste recycling capability	4 star WELS-rated water fittings	Bicycle parking
Existing offices														
Premium	●	●	●		●		●			●	●			
Grade A	●	●	●			●		●		●	●			
Grade B	●			●		●			●					
New offices														
Premium	$\geq 4.5$ star	$\geq 4$ star	●		$\leq 10$		●			●	●	●	●	●
Grade A	$\geq 4$ star	$\geq 4$ star	●		●			●		●	●	●	●	●
Grade B	$\geq 4$ star	$\geq 3$ star		●		●			●	●	●	●	●	●

Note 1: Including publishing on NABERS Energy website and supported by a management plan

Note 2: Green Star Existing Office rating tool (or similar rating tool)

The PCA also provides the following listing of benchmarks for office building energy performance that are promoted as best current practice. It should be noted that other industry benchmarks, such as those being promoted by the Green Building Council of Australia, suggest more energy efficient standards are both achievable and desirable.

<b>Best practice existing office building energy benchmarks (2001)</b>				
Location	Building type	Tenancy (MJ/m <sup>2</sup> /yr)	Base Building (MJ/m <sup>2</sup> /yr)	Whole Building (MJ/m <sup>2</sup> /yr)
Sydney	All electric	225	313	538
	Gas heated	225	360	605
Melbourne	All electric	225	333	558
	Gas heated	225	444	669
Canberra	All electric	225	369	594
	Gas heated	225	518	743
Adelaide	All electric	225	331	556
	Gas heated	225	421	646
Hobart	All electric	225	321	546
Perth	All electric	225	333	558
	Gas heated	225	400	625
Brisbane	All electric	225	385	610
	Gas heated	225	430	655
Darwin	All electric	225	445	670

Source: Property Council of Australia's *Energy Efficiency Guidelines* 2001

For a breakdown of best practice energy consumption against key energy consumption area (HVAC, house light and power, lifts, hot water, tenant power etc., refer to PCA *Energy Guidelines* 2001 section 4).

Further information on the PCA's environmental initiatives can be obtained from [www.propertyoz.com.au](http://www.propertyoz.com.au)

# Climate change, global warming and the built environment

## 1.3

### Background

‘Climate’ is the average of prevailing weather conditions.

Climate change is not new, as evidenced by ice ages that have occurred approximately every 100,000 years. However, human population growth and dependence on fossil fuels to support industrialisation have been influencing the emission of greenhouse gases since 1750, and it is well known that greenhouse gases have a warming effect (see Figure 1).

Reference: IPCC 2007a

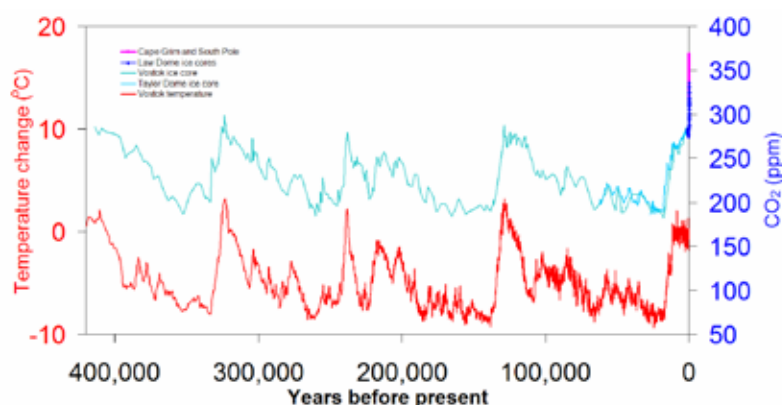


Figure 1: Global mean temperature anomalies, relative to present, and carbon dioxide concentrations (parts per million) over the past 420,000 years from ice core records. (David Etheridge, CSIRO, personal communication).

Reference: IPCC 2007a

Since the early 20th century there has been a global warming of about 0.7°C (Figure 2) and a rise in sea level of 17 cm. Most of the warming since the mid-20th century is very likely due to increases in greenhouse gases. Discernible human influences now extend to other aspects of climate, including ocean warming, continental-average temperatures, temperature extremes and wind patterns. There is a time lag in the effects of global warming: we are presently experiencing the consequences of accelerated carbon emissions from the 1980s.

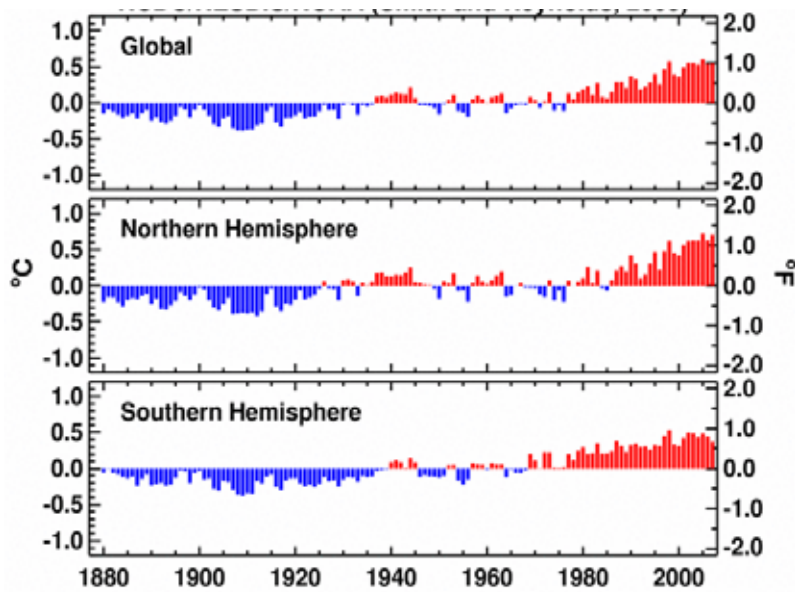


Figure 2: Mean temperature anomalies, relative to 1960–1990, for the global and both hemispheres from 1880–2007, [www.ncdc.noaa.gov/oa/climate/research/2007/dec/global.html](http://www.ncdc.noaa.gov/oa/climate/research/2007/dec/global.html)

In Australia, there has been a warming of about 0.9°C since 1950 (Figure 3), with less rain in the south and east and more rain in the north-west. The increased incidence of drought and wildfire in south-eastern Australia in the past 10 years is linked to drier and warmer conditions. This poses potential threats to both natural and built environments.

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*Reference: IPCC 2007b*

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*Reference: Lucas et al. 2007*

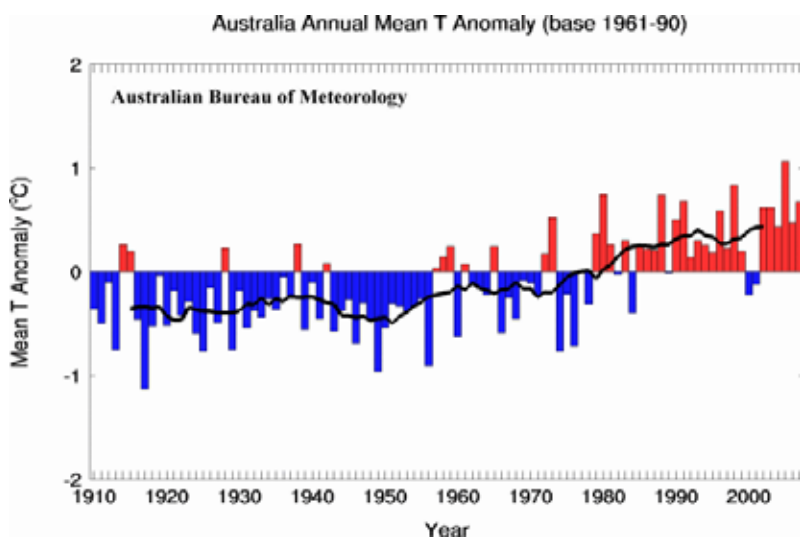


Figure 3: Australian mean temperature anomalies, relative to 1961–1990, from 1910–2007, [www.bom.gov.au/climate/change/amtemp.shtml](http://www.bom.gov.au/climate/change/amtemp.shtml)

Further global warming and sea level rise is anticipated. Projections for Australia include warmer and drier conditions, with more evaporation, more intense storms in some regions, longer and more intense droughts in some regions, more fires, stronger tropical cyclones, and less frost and snow.

In 1900, the world's population was 1.65 billion; in 1950 it was 2.52 billion. For 2005, the estimate was 6.47 billion; in 2050 it is anticipated that there will be 9.08 billion people living on this planet. More people, less water plus carbon emissions reduction compliance are already having an impact on where we build, what we build, how we build, how we refurbish, how we fit out and how we maintain. This, in turn, impacts on the supply chain and the amount of embodied energy in the goods and services we transport, supply and purchase.

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*Reference: IPCC 2007a*

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*Reference: CSIRO & BOM*

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*Reference: UN 2004*

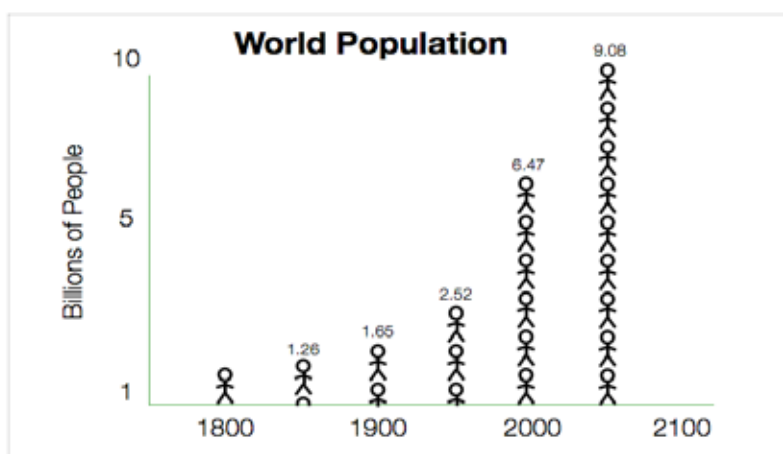


Figure 4: United Nations, World Population Prospects: The 2004 Revision

## Potential impacts on the built environment

There are a number of potential impacts on the built environment:

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*Reference: IPCC 2007b*

### Buildings

- More fire and storm damage
- More coastal inundation due to sea level rise and storm surges
- Implications for property values and insurance in risky areas

### Water

- Inadequate dam storage during droughts
- Inadequate stormwater capacity during floods

### Energy

- Increased peak demand for air conditioning – possible black-outs

- Reduced demand for heating
- Reduced water supply for coal-fired power stations

### Transport

- Road maintenance costs up 30% in Australia by 2100
- Inundation of road, rail and airport systems

### Emergency services

- Greater demand due to more extreme weather

## Value of sustainable property

The value difference between sustainable property and non-sustainable property will increase as environmental and social sustainability policies are upheld by all stakeholders while we work towards mitigating the impact of global warming and improving the working and living conditions in the built environment. There is increasing pressure to ensure that the environment within our buildings is healthy. We have been presented with an opportunity to 'get it right' and arrest the rate of carbon emissions that are warming our world to dangerous levels. See Section 2.4: 'Adapting to climate change' for information about responding to the risks and opportunities presented by climate change and global warming.

## References and further information

- *IPCC 2007a: Summary for Policymakers in Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Avery, M. Tignor and H.L. Miller (Eds), Cambridge University Press, 2007, [www.ipcc.ch](http://www.ipcc.ch)
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- *UN 2004: 'United Nations World Population Prospects: The 2004 Revision'*, Environmental and Social Affairs, Population Division, United Nations, New York, February 2005, [www.un.org/esa/population/publications/WPP2004/2004Highlights\\_finalrevised.pdf](http://www.un.org/esa/population/publications/WPP2004/2004Highlights_finalrevised.pdf)
- Australian Government Bureau of Meteorology, [www.bom.gov.au](http://www.bom.gov.au)