green building council australia

Productivity Commission
Inquiry into Energy Efficiency

Submission by
Green Building Council of Australia

The Green Building Council of Australia has provided this paper to contribute to and stimulate ideas. The Council offers its services to the Government should it require clarification of the information contained within this submission.

Background

The Green Building Council of Australia (GBCA) was established in 2002 to promote sustainable development in the property industry and to drive the adoption of green building practices through market based solutions.

The GBCA supports and promotes energy efficiency as part of the holistic approach to green buildings.

The property industry is well placed as a conduit for delivering significant long-term greenhouse gas abatement and demand management. The industry represents building owners, investors, financiers, managers, developers, builders, valuers, insurers, suppliers, miscellaneous service providers and institutions and, most importantly, occupiers. In effect, the property industry's value chain links every other sector. Measures that use the property industry as its conduit will therefore have long-term, broad-based impacts.

To assist the property in its transition the GBCA has developed a comprehensive, industry-owned, national, voluntary environmental rating scheme, known as Green Star. Green Star evaluates environmental initiatives of buildings based on a number of criteria currently including energy and water efficiency, quality of indoor environments, resource conservation, emission reduction, ecology, transport and management. Green Star rating tools relate to different phases of the building life cycle (design, fit out and operation) and to different building classes (office, retail, industrial, residential etc).

At the end of 2004 the GBCA will have Green Star rating tools for all phases relevant to commercial class 5 office buildings. The GBCA continues to develop Green Star tools for other building types.

Green Star addresses energy efficiency through assigning credits to rewarding initiatives that allow building owners and occupants to better monitor and/or manage their energy consumption which may lead to changing their behaviour and to reduce excess power generation and transmission capacity of electricity suppliers to meet peak demand.

This paper has drawn from the following attached publications:

- *Environmentally Sustainable Building Challenges and Policies*, Organisation for Economic Co-operation and Development (OECD), 2003
- *Costs and Financial Benefits of Green Buildings. A report to California's Sustainable Building Task Force* October 2003 Principal Author: Greg Kats, Capital E

Building Sector Energy Consumption

Buildings consume large quantities of energy, accounting for around 25 – 40% of final energy consumption in OECD countries. Energy consumption is increasing in the property sector and it is predicted that this trend will continue. Space heating and cooling account for the largest share of this energy consumption. In Australia, heating, ventilation and cooling account for around 43% of energy consumed in commercial buildings (OECD, 2003).

The Australian Commercial Building Sector *Greenhouse Gas Emissions 1990 – 2010 Executive Summary Report* 1999 states:

'The use of electricity is responsible for 89% of commercial buildings' greenhouse gas emissions. Specific operational energy applications principally responsible for greenhouse gas emissions are cooling (28%), air handling (22%), lighting (21%) and heating (13%). Heating, ventilation and air conditioning (HVAC) and lighting thus account for 84% of commercial building sector greenhouse emissions.

Building shell performance has a large impact on the heating, cooling and illumination requirements for commercial buildings. Improvements in the thermal, daylighting and natural ventilation performance of commercial building shells will reduce greenhouse gas emissions. Increasing the efficiency of artificial lighting will reduce emissions directly by lower energy consumption, and indirectly through lower cooling requirements.

The commercial 'office' building was found to be the most significant building type, responsible for an estimated 27% of total sector emissions in 1990. Hospitals formed the next largest group at 13%'.

Apart from consuming large amounts of energy during operation, buildings consume a considerable amount of energy during construction. The OECD (2003, p22) notes that:

The impact of the building sector on energy use is not limited to energy used for the operation of buildings. A considerable amount of energy is also used in construction activities, including the manufacturing and transportation of building materials. In Japan, it was estimated that construction activities, including refurbishment work, account for about 10% of total CO2 emissions. Another analysis in the UK indicates that the transportation and manufacturing of building materials each account for 3% of final energy consumption.

Energy Efficiency

What is the scope for cost-effective energy efficiency improvements in buildings?

Improving the energy efficiency of buildings translates to reducing the quantity of energy required to satisfy certain needs that owners and users have in terms of internal environment and services. Various design elements affect energy efficiency, from very basic elements such as the orientation and shape of the building structure which influence the heat gained from daylight, to detailed elements such as the method of sealing joints between building components.

The basic design principles for an energy efficient building are:

- to ensure that the orientation and location of the building on the site maximises passive solar potential;
- to minimise the energy demand for operation by optimising the design of building envelopes;
- to maximise the use of transitional and renewable energy technologies and sources; and
- to install energy efficient plant and equipment for residual energy demands.

It is worth noting that energy efficiency should extend to incorporate Life Cycle Assessment of building components and procurement. The OECD (2003, p24) states that:

As the energy efficiency of buildings progresses, attention has increasingly been directed toward energy use at the construction stage – including manufacturing of building materials. The energy consumed directly and indirectly during the process of producing goods and services is generally referred to as embodied energy. In the context of building construction, this refers to the total energy consumed in the processing of materials, manufacturing of building materials and components to be assembled on site, the transportation of building materials to the site, and their assembly on satisfy certain needs that owners and users have in terms of internal environment and services.

The GBCA supports the promotion of energy efficient design initiatives. Green Star deals with energy efficiency awarding credits for environmental initiatives.

The GBCA supports the development of Life Cycle Assessment methodology for the inclusion of embodied energy as a consideration of building environmental impact. To this end Green Star rating tools award credits for cement replacement and recycled steel to address the significant embodied energy impact of these standard building products.

What are the economic benefits and costs to specific firms of cost-effective energy efficiency improvements?

Economic benefits of energy efficient improvements include:

- Reduced operating costs – however due to the low cost of electricity, cost savings may be minimal.
- Improved performance – marketing benefits, potential for attracting government and corporate tenancies.
- Building and equipment lifecycle – due to upfront cost disruption, energy efficiency is sometimes considered during major upgrades and refurbishment when savings can be demonstrated to flow to the initiator or financer.
- Reduced demand on electricity infrastructure – avoid or delay the cost of upgrading infrastructure

Economic costs of energy efficient improvement include the hidden costs of adoption of energy efficiency improvements including monitoring, reporting and initiating and continually driving behavioral change.

The Costs and Financial Benefits of Green Buildings A Report to California's Sustainable Building Task Force, October 2003, Principal Author: Greg Kats, (p. 27) states that:

Green building energy savings primarily come from reduced electricity purchases, and secondarily from reduced peak energy demand. The financial benefits of 30% reduced consumption at an electricity price of $0.11/kWh are about $0.44/ft^2/yr, with a 20-year present value of $5.48/ft^2. The additional value of peak demand reduction from green buildings is estimated at $0.025/ft^2/yr, with 20-year present value of $0.31/ft^2. Together, the total 20-year present value of financial energy benefits from a typical green building is $5.79/ft^2. Thus, on the basis of energy savings alone, investing in green buildings appears to be cost-effective.

The GBCA's Green Star rating tools for commercial class 5 buildings include credits for sub and tenancy metering, energy efficient management systems and demand management initiatives.

The GBCA is seeking financial support to produce a Cost and Financial Benefit of Green Building report similar to the USA report to present relevant information to the Australian market.

What effect would cost-effective energy efficiency improvements have on greenhouse gas emissions?

Cost effective energy efficiency reduces greenhouse gas emissions.

Many international policy instruments that have been implemented with an aim to reduce green house gas emissions from new buildings are related to energy efficiency improvement. They are expected to reduce the energy used for the operation of buildings, which accounts for a significant proportion of energy use in the building sector.

What other environmental benefits would result from cost-effective energy efficiency improvements?

Cost-effective energy efficiency measures, particularly in relation to "air-tightness" and heating, ventilation and air conditioning (HVAC) systems, in buildings can significantly influence the indoor air quality. The OECD (2003, p28) state that:

Health problems resulting from indoor air pollution have become one of the most acute environmental problems related to building activities.

Relatively high levels of pollutants, arising from building materials and components (i.e. finishes, paints, and backing materials), can pose various health problems, such as irritation of the eyes, nose and throat, headaches and dizziness. Studies of human exposure to air pollutants conducted by the US Environmental Protection Agency indicate that indoor air levels of many pollutants may be 2.5 times – and occasionally more than 100 times – higher than outdoor levels. These high levels of indoor air pollutants are of particular concern because it is estimated that most people spend as much as 90% of their time indoors (US Environmental Protection Agency, 1995). Similarly, a survey conducted in 7 European countries found that people spend 88% of their time indoors (Cochet, 2001).

Efforts to increase energy efficiency and reduce greenhouse gas emissions, coupled with the lack of adequate ventilation, have sometimes exacerbated the indoor air problem by making buildings

more air-tight. The air-tightness of buildings, however, varies from country to country, depending on such factors as regional differences in building methods and whether or not (and when) measures for upgrading air-tightness were introduced. This means that indoor air pollution has become an issue in different countries at different times. While Northern European countries became aware of "sick building" issues in the late 1970s or early 1980s, other countries did not perceive this to be a problem until very recently.

Many factors affect the concentration of pollutants inside buildings. In the case of pollutants related to building materials like formaldehyde, the main determinants of concentration are usually the quantity of pollutants contained in building materials, temperature, humidity and fresh air ventilation. In general there are two approaches to lowering concentration levels. It is widely argued that the most effective approach is to eliminate or reduce the pollutant sources inside buildings. Nonetheless, increasing the exchange of indoor air with outdoor fresh air can also mitigate indoor pollution problems.

The GBCA is concerned that the health and well being of occupants and indoor environment quality needs to be considered when addressing energy efficiency.

The GBCA strongly recommends the following indoor environment quality provisions be considered when addressing energy efficiency:

- ***ventilation effectiveness***
- ***carbon dioxide monitoring and control***
- ***daylighting***
- ***daylight glare control***
- ***high frequency ballasts***
- ***electric lighting levels***
- ***external views***
- ***individual thermal comfort control***
- ***asbestos***
- ***thermal modeling***
- ***indoor air pollutants***

What would be the private and social costs of achieving these benefits?

In addition to alleviating failing electricity infrastructure, demonstrated through recent brown and black outs around the country, the private and social benefit of improved energy efficiency is improved air quality due to the high reliance in Australia on fossil fuel generated electricity.

The Costs and Financial Benefits of Green Buildings A Report to California's Sustainable Building Task Force October 2003 Principal Author: Greg Kats, Capital E Report (p. 30) states:

Reduction in electricity use means lower emissions of pollutants (due to avoided burning of fossil fuels to generate electricity) that are damaging to human health, to the environment and to property.

Air pollutants that result from the burning of fossil fuels include:

- *Oxides of Nitrogen (NOx) – a principal cause of smog.*
- *Particulates (including PM10) – a principal cause of respiratory illness (with associated health costs) and an important contributor to smog.*
- *Sulfur Dioxide (SO2 or SOx) – a principal cause of acid rain. (SOx and SO2 are functionally the same for the purposes of this report.)*
- *Carbon Dioxide (CO2) – the principal greenhouse gas and the principal product of combustion.*

Additional fossil fuel related pollutants include reactive organic compounds (ROC) and carbon monoxide (CO). These pollutants are not evaluated here because California power plant emissions represent 0.24% and 0.33%, respectively, of the statewide emissions totals and their values in other building aspects are small. Volatile Organic Compounds (VOCs) may have significant value but are not calculated in this report. A more comprehensive analysis should evaluate the costs of a fuller set of these additional pollutants, including mercury.

There are at least three ways of valuing the costs of air pollution associated with burning fossil fuels: 1) The direct costs of pollution effects on property, health and environment can be calculated and then allocated on a weighted or a site-specific basis. 2) The cost of avoiding or reducing these pollutants can be used as a way to determine market value of pollutants. 3) The market value of pollutants can be used if there is an established trading market.

The report concludes:
Each of these approaches has limitations and no one is universally "correct."

The GBCA supports the establishment of trading markets. The GBCA supports the NSW Governments initiative which allows the Australian Building Greenhouse Rating Scheme (ABGRS) to be used by property owners to calculate greenhouse savings and claim carbon credits.

The GBCA supports the review of electricity pricing to incorporate environmental and social externalities and for the pricing to reflect a value for these costs and implications.

Barriers and impediments to improving energy efficiency

Are there barriers and impediments in the market for energy?

- No incentive for electricity supply companies to provide energy efficiency services
- Energy efficiency improvements are not being adopted due to the relatively low cost of electricity
- Negotiated price agreements for the supply of electricity rather than user pays
- Changes to electricity price has limited impact on consumption of end user

The Green Building supports the conclusions of National Framework for Energy Efficiency

- ***Amend existing market regulatory framework to give equitable treatment to demand and supply-side responses;***
- ***Introduce national energy efficiency target scheme and provide market drivers to assist the transition to increased energy efficiency;***
- ***Government to adopt stringent energy efficient targets.***

To what extent do market failures create barriers and impediments to energy efficiency improvements?

Market failures include:

- Energy efficiency improvements are not being adopted due to the relatively low cost of electricity
- Energy efficiency improvements largely driven by in-house sustainability programs rather than substantial savings
- Lack of market recognition of energy efficiency (tenants are not demanding energy efficient buildings)
- Lack of knowledge/consideration of the Australian climate in the design of buildings and in particular HVAC systems.
- Immature market of energy efficient technology

Policy Options for cost-effective energy efficiency improvements

What should be the NFEE's role?

The GBCA contributed to the National Framework for Energy Efficiency stakeholder feedback requests and it supports the development and implementation of a national agenda to address energy efficiency. The Role of the NFEE is to ensure there is a strategic implementation plan is developed and implemented with commitments to facilitate the transition to improved energy efficiency in context with social and environmental needs as well as business.

How do Australian energy efficiency programs compare with specific overseas programs? What characteristics make specific programs more efficient and effective?

Two relevant reports have been attached to provide information in response to this question.

- *Environmentally Sustainable Building Challenges and Policies*, Organisation for Economic Co-operation and Development (OECD), 2003
- *Costs and Financial Benefits of Green Buildings. A report to California's Sustainable Building Task Force* October 2003 Principal Author: Greg Kats, Capital E

To what extent do current prices for energy accurately reflect the costs of supply, including externalities?

The GBCA believes current prices for energy do not accurately reflect the costs of supply, including externalities.

What effect does price uncertainty have on investment in energy efficient technologies?

The GBCA believes there is no effect, there are no price signals and the market is focused on capital cost not life cycle cost. In addition there is significant confusion for practitioners to purchase 'efficient' equipment without regulated labelling.

What are the costs and benefits of demand management and time of day pricing?

The Costs and Financial Benefits of Green Buildings A Report to California's Sustainable Building Task Force, October 2003, Principal Author: Greg Kats, (p.27) states that:

California's shift to dynamic electricity pricing and demand responsive buildings indicates an important future role for green buildings in helping to reduce energy and environmental costs. Several utilities across the country….have successfully provided financial incentives to customers to cut power consumption as a way to reduce and flatten load and avoid or delay the cost of building and/or operating additional generating capacity.

California has become the national leader, and is developing dynamic pricing policies and programs to cut costs, increase system efficiency, and create a more intelligent and efficiently

used electricity grid. California is helping residents and businesses install metering and control systems to support increased response to price signals to cut power usage through such measures as load shifting, moving air conditioning to before peak periods, and demand reduction measures such as lowering lighting levels. These measures, now proven ways to cut energy costs by rewarding price responsive customer load management, are being expanded to increase customer, utility, and state benefits. Green buildings are ideal candidates for demand responsive load management because they already typically include relatively advanced metering and energy management systems. If, as seems likely, green building continues to grow very rapidly, these buildings should comprise an important part of California's strategy to expand demand responsive load management. In addition, the US Green Building Council should consider adopting policies that encourage green buildings to include metering and energy management systems. These systems allow buildings to more readily participate in and secure the financial benefits of demand responsive power pricing and grid management.

Mandatory Reporting of Energy Efficiency

Information on the energy efficiency of plant and equipment and technologies should be mandated and managed by the Commonwealth.

The GBCA cautions regulators to select energy efficiency in isolation of other factors such as health and wellbeing and indoor environment quality. Mandatory reporting on energy efficiency could increase overall environmental impact.

Mandated minimum efficiency standards should be applied for all new Commercial, Residential and Government Buildings.

Minimum Standards

The GBCA supports the Australian Building Codes Board developing minimum standards (energy, water, waste and indoor environment quality) within the Building Code Australia to achieve national consensus and avoid State and Territory variations and additions.
The OECD (2003, p65) believes that including energy efficiency standards within existing codes and inspection processes reduces administrative costs.

Education

Education programs should include essential training and awareness programs that support the implementation of changed practice and also more discretionary activities to assist in developing transformation processes in the professions and the training institutions.

The construction industry spends the least amount of any sector on professional development. One of the key barriers to education and learning is that many engaged in the professional services operate out of small to medium enterprises or are sole practitioners.

The GBCA calls for Government support for education programs which target practitioners and address green building professional development needs.

Incentives to develop and adopt new technologies

The effectiveness of the current R&D concessions could be increased to encourage 'green' property development by means of the following:

- Increase the accelerated expenditure of R&D expenditure from 125% to 250%.
- Provide further incentive for taxpayers to undertake R&D activities.

- Extend the definition of R&D activities and simplify the application process.
- Provide more companies with access to the R&D concessions.

Although the measures outlined above would encourage the development of all 'green' technology, it would also encompass the development of green technology that could be utilised by the building industry.

The GBCA encourages consideration of the R&D concessions outlined above. In addition, the Government could provide additional tax concessions to encourage the take up and utilisation of new green technology within the building sector. For example:

- ***By allowing R&D incentives to be transferred from the company that incurs the R&D expenditure to subsequent users; and***
- ***Providing tax concessions to users of new technology e.g. by way of increased deductions.***

The GBCA recommends that the Government should maintain a register for sustainable technologies and efficient equipment. This register should be overseen by an expert panel of industry representatives. Once an item is entered on the register it can be used by other industry sectors in meeting efficiency targets and applying for tax and R&D concessions.

Additionally funding could be provided to support market penetration of specific technologies such as the Commonwealth Solar Cities Initiative which provides funding to support significant penetration of solar technologies.

Financial Incentives

Demand Management Fund

A Demand Management Fund should have priority sector basis and include existing commercial office buildings as a priority. The short-term funding should be from energy utilities and State Government however longer-term funding should be identified to extend the funding to other sectors of the property industry.

There are essential considerations in the design of effective demand management measures for the property industry. As a general principle, measures should positively influence the behaviour of industry, investors and consumers so that their investment, purchasing and operating decisions consider the impact of efficiency and result in significant reduction in energy supply demand and peak demand.

The GBCA believes Demand Management Funds should target property owners and provide incentives for immediate action and therefore address existing commercial building efficiency as well as promote initiatives in all new commercial and residential developments.

The GBCA believes that Demand Management Funds should be viewed as a temporary measure to mobilise consumers, to prepare for new regulations and to promote energy efficient technologies by creating a larger market than would exist otherwise.

The GBCA believes that eligibility criteria be established and encourages the Government to establish a Demand Management Fund(s) with a priority focus on the commercial property sector (owners of office, retail and hotels). The eligibility of buildings to apply for funds to invest in efficiency should be based on a balance between efficiency gains and 'first in first opportunity basis'.

Emissions Tax

Emissions tax potentially generates a widespread incentive (that is, sets the marginal costs) for greenhouse gas abatement, both long and short term. However, it is the position of the GBCA that an emissions tax is a blunt policy instrument.

The GBCA acknowledges that the OECD (2003, p73) believes that energy taxes with recycling may be the best way of dealing with the efficient use of embodied energy and supports ongoing discussion and engagement regarding an emission tax.

Revenue recycled from a carbon tax would be used to fund emission abatement activities, and programs aimed at addressing the market failures present (ie close the 'payback gap') whilst discouraging free riders.

It is understood that a carbon tax may serve industries providing greenhouse gas abatement products and services, and the introduction of an emissions tax may provide growth opportunities as emissions taxpayers explore ways to reduce their liability.

Emissions tax should be applied economy wide and, if existing taxation infrastructure can be used, the administrative costs and complexities would be reduced. Abatement actions and costs undertaken by individual companies or sectors are not immediately apparent under an emissions tax and would need to be balanced with the simplicity of the administrative system and incentive programs.

Fiscal Incentives

The taxation system must be reviewed at federal, state and local level to remove incongruous taxes and imposts and create incentives to reward demand management and peak loading initiatives for the property industry.

Australia should look to examples of international fiscal incentives for guidance regarding initiatives for the property industry including:

- State Based Green Building Tax Credits
- Land Tax abatement for existing commercial office buildings efficiency outcomes (Demand Management)
- Utility rate abatement for demand management (energy and water)
- Efficient Technology or Practice Tax Credits
- Accelerated Depreciation on environmental investments – providing a financial advantage, through accelerated depreciation, on selected equipment or technologies which deliver Demand Management objectives.
- The creation of an investment relief scheme to permit developers and building owners to deduct a certain percentage of the relevant investment costs in energy efficiency and sustainable technology of their taxable income or awards a % reduction for best practice sustainable development. The structure used would operate in a similar fashion to a pooled development fund.

It should be noted that past and current programmes have generally performed well in addressing the opportunities that improved energy efficiency can bring to the industrial, commercial and residential sectors. However, they have not performed well in stimulating investment in available options for demand management abatement and sustainable technology due to the split incentives and the risk associated with the performance of new technology. This must be recognised and the Demand Management Fund could act as a trigger offering significant incentives to stimulate market uptake of efficiency initiatives.

Substantial energy efficiency related abatement would stem from capital stock turnover (existing building) investments and their refurbishment and upgrade. Fiscal incentives are likely to be the most effective way to facilitate refurbishment that addresses efficiency or green building initiatives. The OECD (2003, p159) suggests a combination of capital subsidy coupled with an environmental labelling scheme as being an appropriate policy option for this category.

The GBCA supports a tax neutral outcome where fiscal incentives are created for rewarding abatement.

The GBCA recommends fiscal incentives for existing buildings refurbishment or retrofits should include accelerated depreciation, land tax abatement, utility rate abatement, local government abatement.

The GBCA supports interval metering and provisions that encourage energy distributors to consider and implement energy efficiency and demand management programs as alternatives to network investment.

Sectorial Issues

Any program must take into account the unique characteristics of the property industry. These are the:

- dominance of many small firms within the industry;
- heterogeneity and longevity of property assets;
- complexity of the supply chain; and
- lack of vertical integration within the industry.

One of the characteristics of the property industry is the trend to apply high discount rates to cash flows. This high discount is a product of the problems inherent in a complex supply chain with little vertical integration. The property industry's high discount rates discourage investment in energy efficiency measures with longer payback periods and encourage investment in measures that produce the lowest capital cost and short return on investment cycles commonly treated as a return on investment in less than 2.5 years.

Further Information

Green Star

The GBCA has developed an environmental rating system for buildings called 'Green Star'.

The Green Star environmental rating system for buildings was created to:

- Establish a common language;
- Set a standard of measurement for green buildings;
- Promote integrated, whole-building design;
- Recognise environmental leadership;
- Identify building life-cycle impacts;
- Raise awareness of green building benefits; and
- Reduce the environmental impact of development.
- The Green Star environmental rating system recognises and rewards Best Practice, Australian Excellence and World Leadership.

The focus for rating tool development has been commercial office buildings. To date rating tools have been developed for the design of commercial office buildings, Green Star - Office Design and for the construction of commercial office buildings, Green Star - Office As Built. A pilot rating tool for interiors, Green Star - Office Interiors, is being finalised and Green Star – Office Existing for asset owners is under development for release in early 2005.

Green Star will have rating tools for different phases of the building life cycle (e.g. design, construction and operation) and for different building classes (office, retail, industrial, residential etc). These rating tools will use the best regulatory standards to encourage the property industry to improve the environmental performance of development.

Green Star - Office Design Rating Tool

Green Star - Office Design evaluates the environmental potential of the design of commercial office buildings (base building construction or refurbishment).

Green Star - Office As Built Rating Tool

Green Star - Office as Built assesses the same design initiatives as Green Star - Office Design but the validation documentation differs in that it is retrospective and therefore evaluates those initiatives that are relevant to the construction of the building and are the responsibility of the contractor.

Pilot Green Star-Office Interiors

The pilot Green Star - Office Interiors tool will enable organisations to rate their tenancy fitout designs.

Development of Green Star

Green Star was built on existing rating systems and tools in overseas markets, including the British BREEAM (Building Research Establishment Environmental Assessment Method) system and the North American LEED (Leadership in Energy and Environmental Design) system. Green Star has established individual environmental measurement criteria with particular relevance to the Australian marketplace and environmental context. In addition, VicUrban, in its work with the Melbourne Docklands ESD Guide, provided the intellectual property to assist in the development of a local system.

Framework for Green Star Rating Tools

Each Green Star rating tool is based on a standard framework. Green Star establishes a number of categories under which specific key criteria are grouped and assessed. These categories include:

- Management
- Indoor Environment Quality
- Energy
- Transport
- Water
- Materials
- Land Use, Site Selection and Ecology
- Emissions

Within each category the credits awarded have an effective weighting by virtue of the number of credits awarded versus the total credits available. The credits available correlate with, but are not always linearly proportional to, the environmental impact.

Contact Details

Maria Atkinson
Executive Director
Green Building Council of Australia
Direct**:** 612 8252 8222
Fax: 612 8252 8223
E-mail: maria.atkinson@gbcaus.org
Address Lvl 4, 249 Pitt Street Sydney NSW 2000
Postal Address PO Box Q78QVB Sydney NSW 1230
Website www.gbcaus.org