

Building Materials

Building design for a sustainable future

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- GECA (Good Environment Choice Australia)
- Life Cycle Assessment (LCA)

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Mandatory Requirements

Council's Best Practice Standard.

This fact sheet will assist you in making informed decisions about the materials you select for a project to help minimise their impact on the environment.

Why do we need to carefully consider our choice of Building Materials?

Building construction currently consumes between 30-50% of raw materials worldwide. With significant growth taking place in the building sector, the burden being placed on limited resources is increasing – resources that one day will run out.

What's more, ongoing fitouts, extensions and / or refurbishments increase the environmental impact during a building's life cycle.

As a result, we need to make more informed choices with regard to the impact that material sourcing will have on the environment. These impacts will accumulate through:

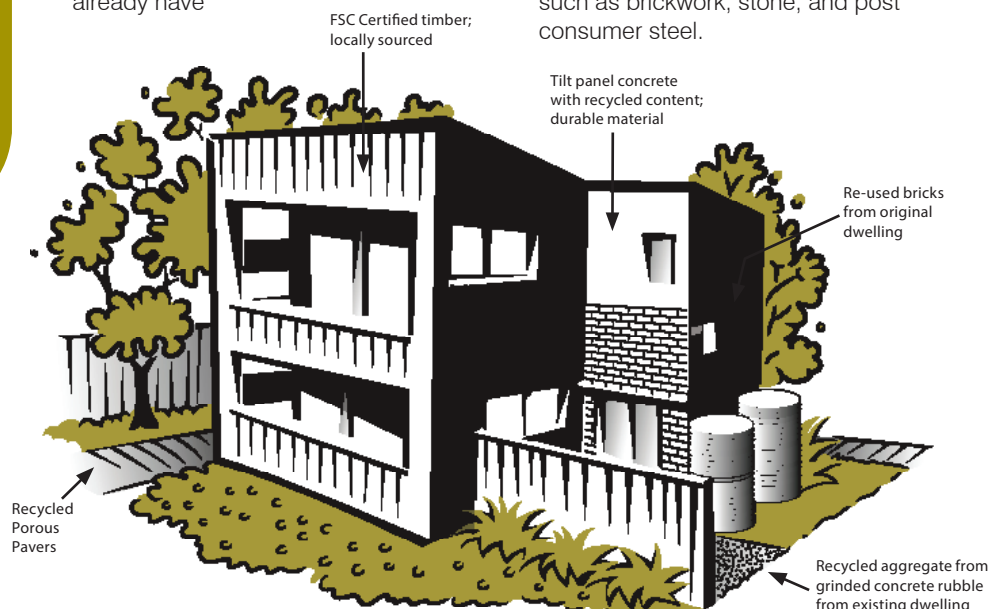
- harvesting of raw materials
- a material's high embodied energy
- on-going maintenance requirements
- inability of materials to be recycled.

How will my choice of Building Materials benefit me?

By making informed choices about the materials you use in the construction and fitout of buildings, you can:

- assess the viability of reusing what you already have

- save on construction, refurbishment and maintenance costs
- design buildings that have a longer life span, by nominating durable materials such as brickwork, stone, and post consumer steel.



How does my choice of Building Materials impact on the environment?

Embodied energy

Many natural resources and building materials require mining, processing, refining and ultimately manufacturing, transport and delivery before they are utilised in construction. The energy used during these processes is commonly known as embodied energy.

The embodied energy of building products varies dramatically. For example, new or virgin aluminium window frames require up to 90 times more energy than timber window frames to produce. Generally, non recycled metals contain the highest embodied energy, followed by plastics and other materials with a high chemical content. Natural construction materials such as timber, brick and render contain the least embodied energy.

To reduce the embodied energy of a typical building structure, specify:

- metal produced from post consumer waste
- concrete blends that include a percentage (e.g. 30 percent) of recycled content (cement extender including fly ash or blast furnace slag)
- concrete that incorporates recycled aggregate wherever possible.

The sourcing of locally produced materials and products which are lower in embodied energy will also help in minimising their impact through reduced transport requirements.

Retaining and re-using existing materials

Embodied energy can be minimised by retaining and re-using existing building structures and materials, particularly if demolition of existing structures is required.

Therefore, consideration should be made to re-use the existing materials within a new development in either their existing state or in a revised/renewed state. For example, crushed hard materials such as bricks and concrete may be re-used as aggregate. But also when building new, future recyclability through easy disassembly should be considered.

Consideration should be given to composite materials which are more difficult to recycle than raw materials. For example, facade and roof structures that are easily disassembled, are more likely to be reused than those that would be damaged when taken apart.

If none of these options are possible, then ensuring that most existing materials are recycled and re-used off site should be the next option.

Specifying recycled materials

Where practical, specifying recycled materials is a more sustainable practice than compared to specifying new materials. Not only will the material's life span be extended and in turn reduce the amount of waste going to landfill, it can also be used as a key design feature of your project. For example, recycled timber can often be reused as new flooring and decking.

Sustainably sourced timber

The high demand for wood products worldwide has led to large-scale illegal and unsustainable logging practices in some countries. With this in mind, we should all ensure that the timber products specified for a building development are sourced from renewable resources.

When specifying timber, ensure that it is certified through an accredited forest certification scheme such as the Forest Stewardship Council (FSC), or the Australian Forest Certification Scheme (AFCS).



How does my choice of Building Materials impact on the environment?

Third party certification

Many materials and products that claim to be “environmentally friendly”, “green” or “sustainable” often do not live up to their claim. The most effective way to choose a sustainable product or material is to check for certification under a recognised standard such as ISO (International Organisation for Standardization) 14000 Environmental Management and ISO 9000 Quality Management. Choosing a material or product with either certification will ensure that production processes have been conducted to satisfy the requirements set out in the standard. In the case of ISO 9000, the quality and management systems of the supplier has been conducted independently by a third party to ensure that the standards have been met.

When specific information about a material is not available you should investigate the base materials to get an understanding of their production processes.

The recommended hierarchy in selecting materials for a project should be based on the following order:

- re-use existing materials where practical
- re-use recycled materials
- nominate materials that have minimal processes involved in producing them from their natural state
- nominate locally sourced materials
- select materials that are durable, long lasting and require minimal maintenance throughout their life cycle
- select materials that can be recycled.

Ecospecifier

Ecospecifier is a web based resource that provides a list of recognised third party endorsed eco-products and materials, technologies and resources. The website has recently been made accessible to the public at no cost and is a leading global supporter of sustainable development and life-cycle assessed green product information.



Have you considered the resources consumed by the products you are using?

GECA (Good Environment Choice Australia)

Promotes the production and consumption of environmentally preferable products and services, thereby reducing environmental harm.

Life Cycle Assessment

Life Cycle Assessment is an emerging methodology that assesses the environmental impact of building materials by measuring the amount of resources required at the development, transport and disposal phases of their lifecycle. In other words, a cradle to grave analysis. Whilst Life Cycle Assessment is the most accurate methodology for assessing the environmental impacts of buildings, it is not currently a viable option for small scale individual buildings.

“Taking your time when choosing construction materials will allow you to tick as many boxes as possible: aesthetics, durability, insulation, low toxicity, low embodied energy and easy recyclable.”

How does my choice of Building Materials impact on the environment?



Mandatory Requirements and Council's Best Practice Standard

Environmental Sustainable Design (ESD) Principles

There are two levels of compliance when it comes to ESD principles – mandatory and best practice.

Mandatory Requirements

A new development or renovation must meet Australian Standards and the Building Code of Australia (BCA) requirements.

Council's Best Practice Standard

To meet best practice standards, there are a range of factors that need to be taken into consideration. When submitting planning permit application drawings, you must indicate materials on elevations and sections, and provide any supporting sustainability verifications in your Sustainable Design Assessment (SDA) or your Sustainable Management Plan (SMP).

Embodied Energy

Have efforts been made to reduce the embodied energy of the materials chosen?

- Has a commitment to substitute some cement content of concrete with fly ash or slag been outlined? (Note that there are construction program implications to this strategy due to increased curing time of the concrete.)
- Limited or no use of aluminium, zinc and other high embodied energy metals and materials in general, especially in a design with intended high turnover (e.g. retail).

Habitat Destruction

- Has a commitment to source timber from a sustainably managed source, with proof of audit trail been provided?

Recyclability / Reusability

Can the materials selected be recycled or re-used? In Australia?

Toxicity

- Have efforts been made to avoid materials which are toxic in manufacture and use? e.g. PVC, Chrome, MDF.

Transport

- A commitment should be made to give preference to locally made materials first, then Australian made, then internationally made.
- Where possible, specify materials that are shipped by sea rather than air.

Suitability

- Are the materials selected suitable for the intended application?

Maintenance / Durability

- Are the materials selected low in maintenance requirements and high in durability, relative to the chosen application and life expectancy of the development?
- Are low toxicity/pollution/energy use cleaning agents required for ongoing maintenance?

Developments, which seek to vary from these best practice standards, must demonstrate how their sustainable building materials have been selected.

Where can I find out more?

Technical Manual Materials

Your Home
www.yourhome.gov.au

Healthy Product Database

Moreland Greenlist
www.sustainablesteps.com.au

Ecospecifier

www.ecospecifier.com.au

Good Environment Choice Australia

www.geca.org.au

Green Building Council Australia

Design Tools Material Credits
www.gbca.org.au

Other Fact Sheets in this series are also available to provide guidance on the 10 Key Sustainable Building Categories. For further information on Building Materials, consider the Fact Sheets entitled:

- Waste Management
- Construction and Building Management