

Eco-Selector

a Guide to Materials Selection

April 2006

Introduction

The Eco-Selector is provided to assist builders and designers choose environmentally preferred materials to fulfill a component of the building controls for Aurora. The eco-selector is based on assessments made on the main impacts of the materials that make up a home. According to this analysis, the materials in this guide are minimising some aspect(s) of embodied energy, resource consumption, and toxicity and/or biodiversity impacts when compared to standard materials.

This guide demonstrates the availability of environmentally improved materials. It is not comprehensive and we invite manufacturers to submit other products for inclusion if they meet these criteria. Details should be faxed to the Centre for Design at RMIT University for assessment, on

(03) 9639 3412

October 2004



Floor structure



Framing



Wall cladding



Roof cladding



Fittings and finishes



Landscaping

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Disclaimer

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Contact details for suppliers were current at the time of publication (March 2004.)

Guide for Builders

Overview

The purpose of this document is to assist builders and designers to comply with the materials requirements in the Design Controls for Aurora. A minimum number of 10 materials with a combined 'ECO-Score' of 80 points will need to be specified in order to have the building design approved by the Design Review Panel. A minimum number of points must be specified from each building element type:

- Floor structure – 20 points
- Framing – 10 points
- Wall cladding – 20 points
- Roof cladding – 15 points
- Fittings and finishes – 10 points
- Landscaping – 5 points.

The Guide's main aim is to help architects, designers, builders and specifiers shortcut the materials sourcing process. Its broader aim is to help create a more sustainable physical environment by increasing the use of environmentally preferable materials.

Additional product information is available on the Eco-Specifier (www.ecospecifier.org) website. The site contains free information on 100 eco-preferable products or if you subscribe to the website, over 900 products become available. The Eco-Specifier has however created its list of products based upon a different set of criteria to the Eco-Materials Selector.

ECO-score card

Builders are required to complete the Eco-score card which accompanies this document. This will demonstrate how you have complied with the requirement for specification of environmentally-improved materials.

Invoices must be provided to VicUrban for confirmation that materials specified in the approved design drawings have been used in the actual building. Builders failing to do this will attract fines as set out in the Builder Agreement entered into with VicUrban.

Random checks will be carried out to ensure that builders are complying with the materials component of the design controls.

If substitution of materials is necessary due to supply chain difficulties, the substituted materials must have the same ECO-Score as the material it replaces. If this is not possible and the resultant total ECO-Score is less than the approved design, other materials must be specified from the Guide so that the house design's total ECO-Score is still 80.

Please note: For credit to be given, the material has to be used for 90% of the building element involved.

Methodology

Materials have been included in the ECO-selector because they are minimising some aspect(s) of embodied energy, resource consumption, toxicity and or biodiversity when compared to standard materials. Weightings have then been applied to material categories.

A. Highly recommended (high positive weighting):

A high positive weighting indicates that the product is highly recommended for the following reasons:

- Can significantly reduce environmental impacts
- Have little or no cost premium
- Fit with standard industry practice; and/or
- Are innovative, leading edge products.

B. Recommended (low positive weighting)

A low positive weighting indicates that these products also have potential to reduce environmental impacts and should be used wherever possible.

C. To be avoided if possible (negative weighting)

These products are widely recognised as having high environmental impacts and substitute materials are available.

Cost indicator

There is a column to give a general indication of the cost as compared to cost for standard product.

Less than the cost of a standard product

- Saves money
- = Approximately equivalent to the cost of a standard product
- + Costs more than a standard product

Definitions

Approved timbers must meet one of the following criteria:

- Third party certified - Forest Stewardship Council or Australian Forestry Standard
- Plantation softwood or hardwood
- Recycled; or
- Bamboo. Builders must provide satisfactory documentary evidence from suppliers to support claims about third party certification, plantation-grown or recycled.

Approved insulation

Preference is for insulation that has some recycled content (e.g. recycled polyester) or is made from natural fibre or with a percentage of natural fibre. The main types are:

*Cellulose insulation (wet spray or coated)

*Cellulose-wool

*Recycled polyester batts

*Polyester batts

Mineral wool batts

Glasswool batts

(*sisalation needed)

For space-tight applications or where for other reasons these systems are not practical use:

- Air-cell thermal-reflective insulation
- Foil-board XPS rigid insulation
- Closed-cell rigid EPS insulation using no CFC blowing agents

As a general rule it is highly recommended to provide an air barrier between insulation products and the indoor environment to prevent migration by agents (such as formaldehydes) which may be irritants or allergens to sensitive individuals.

Embodied energy is the amount of energy used in the raw material extraction, production of products and materials.

Passive Design is building design that addresses solar thermal considerations in order to reduce the need for mechanical heating or cooling.

Rainforest timber: for a list of rainforest timber species to avoid and their conservation status see either:

www.cites.org or www.unep-wcmc.org

Recycled plastic products must meet the definition of 'recycled' in the Australian Standard for environmental claims (AS/NZS ISO 14021: 2000):

- It must be either pre-consumer recycled material which is material diverted from the waste stream during a manufacturing operation, or post-consumer recycled material which is recovered from households, commercial, industrial or institutional facilities.
- It excludes regrind which is capable of being recovered within the same process.

Thermal mass is the ability of a material to absorb heat. A lot of heat energy is required to change the temperature of high density materials like concrete, bricks and tiles. They are therefore said to have high thermal mass. Lightweight materials such as timber have low thermal mass.

Acronyms

EE Embodied energy

GJ Gigajoule

VOC Volatile organic Compounds

LOSP Light Organic Solvent Preservative

CCA Copper Chrome Arsenate

Floors Structure



The floor structure is a very important and essential part of a home. There are two

types of floor structure systems: the 'slab on ground' and the suspended timber floor. Environmentally the issues with these systems are:

Slab on ground:

- Uses a lot of high embodied energy cement and steel
- Chemical termite protection leaches into the ground and contaminates it.
- By selecting the products in this chart you have the potential to reduce the Embodied Energy (EE) in the slab on ground system by more than half (i.e. from 1.4GJ/m² to 0.6 GJ/m²). For a 150m² home you are saving 95 GJ of energy or enough to power a home for over one year.

Hints

- ✓ 30% slag and/or fly ash in cement in most applications does not extend drying times
- ✓ Specify recycled aggregate to concrete suppliers
- ✓ Seek higher than 50% recycled/extender content cement— up to 90% can be achieved
- ✓ Insulate around slab edge and ensure compatibility with the termite protection system you are using
- ✓ Alcohol can be added to the top of the poured slab to help cure it and improve the dry time for high recycled content cement.

Suspended timber floor:

- Avoiding gluing of timber floors is recommended to enable recycling at end of life
- Chemical termite protection leaches into the ground and contaminates it
- Polyurethane pre-coat not as preferable as beeswax or nut oil coating.
- Requires substantial concrete for footings and extra bricks due to the extra building height
- Costs more energy to heat in winter (unless well-insulated) and requires more cooling in summer in Melbourne's climate.

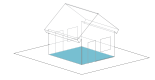
For the suspended timber floor by selecting plantation timbers you are reducing the potential impacts on biodiversity, and by selecting low EE concrete and bricks you will be reducing energy consumption and greenhouse emissions.

Hints

- ✓ Insulate under the floor
- ✓ Expose slab if you are using thermal mass for passive design

Please be aware also that formwork can contain hardwood rainforest timber often in a veneer over pine.

Floors and Footings



Floor Structure

Element	Environment benefit	Product	Company contact	Cost	Score
The following table is as a guide only. The concrete mix will depend on the engineering strength requirements of the design used. A mix can be designed with the following companies to suit your purposes.					
Slab on Ground					
Concrete – whole product	Concrete contains recycled aggregate and fly ash and slag. Reduced resource use and lower embodied energy.	Green concrete	Boral 03 9508 7111 up to 60% recycled agg & fly ash	More than 30% recycled content cement may be +	Recycled aggregate = 10
	Reduced resource use and lower embodied energy cement due to use of recycled content. Contains up to 60% recycled aggregate (100% possible in some locations), 100% recycled water and up to 60% recycled content cement.				% of recycled content and blended cement: 80%= 18 60%= 15 50%= 14 40%= 12 30%= 10 Max score possible: 28
	Reduced resource use and lower embodied energy cement due to use of recycled content cement. Contains 100% recycled coarse aggregate, recycled content cement (fly ash) – whatever percentage specified by builder.	Concrete	Campbellfield Concrete 03 9357 3861		
	Reduced resource use and lower embodied energy cement due to use of recycled content. 100% recycled aggregate, 100% recycled water and recycled content slag cement as specified.	Concrete	Central Premix Concrete 03 9303 9112		
	Reduced resource use and lower embodied energy cement due to use of recycled content. 25% recycled aggregate, 100% recycled water and 30% recycled content fly ash cement.	Concrete	Hansen Construction Materials 03 9274 3700		
	Reduced resource use and lower embodied energy cement due to use of recycled content. Contains up to 60% recycled content cement, 100% recycled aggregate, 100% recycled water, reduces waste as uses by product (pebbles).	Concrete	Hy Tec Industries 1300 550 499		
	Reduced resource use and lower embodied energy cement due to use of recycled content. Contains 100% recycled aggregate and 30% recycled content cement.	Ecomax	Readymix 131 188		

Framing

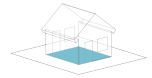
Wall Cladding

Roofing

Fittings

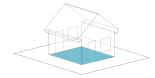
Landscaping

Floors and Footings



Element	Environment benefit	Product	Company contact	Cost	Score
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Slab on Ground					
Blended	Supplementary cementitious materials added (either fly ash, blast furnace slag, silica fume, or a combination of these). This reduces resource use and waste products and embodied energy. These additions can increase strength depending on % and application.	Slag Blend	Anacon laboratories (Pronto) 03 9646 5520		Dependent on % recycled content specified.
		Blend 35 (35% slag)	Cement Australia 03 9688 1920		80% =
		Blended Cement (Blend of fly ash and slag up to 80%)	Independent Cement & Lime 03 9676 0000		60% =
		Blended Cement concrete (up to 80%)	Readymix 131 188		50% =
		Up to 40% slag/fly ash, or 10% silica fume. With 100% recycled aggregate	Hy Tec Industries 1300 550 499		40% =
		Supply powder:	Blue Circle 03 5241 8291		30% =
		Slagment	Blue Circle 03 5241 8291		
		Triple Blend Fly ash	Blue Circle 03 5241 8291		
		Blended Cement	Blue Circle 03 5241 8291		
		Fly ash	Ash Development Association 02 4228 1389 Fly ash Australia 02 9956 3861		
		Slag	Australian Steel Mill Services 02 4425100		
			Australian Slag Association 02 4425 8466		

Floors and Footings



Floor Structure

Element	Environment benefit	Product	Company contact	Cost	Score
If your current supplier is willing to fill your order but needs to obtain the supplementary materials/recycled content to make concrete. Contact:					
Slab on Ground					
Recycled aggregate	Reduces raw material extraction by recycling. Can have variable strength quality. Check with supplier.	Recycled crushed concrete	Alex Fraser 03 9369 7388 Boral 1300 650 564		10
Fibre reinforcement in concrete	Alternative to steel reinforcement in concrete mix. Lower embodied energy.	BarChip Synthetic Reinforcing Fibre	Elastoplastic Concrete 03 9785 2055		1
Reinforcement	Reduces embodied energy and resource consumption by using up to 85% recycled content.	Mesh and bar products	One Steel 03 9357 8855	=	4
	Reduces embodied energy and resource consumption by using 100% recycled content	Mesh and bar products	Smorgons ARC 03 9279 5566	=	5
	Reduced embodied energy and resource consumption through use of up to 100% recycled content. Imported from New Zealand.	Mesh and bar products	Vic Mesh 03 8795 6666	=	5
Chairs and mesh support	Reduces embodied energy and resource consumption by using over 50% recycled content	Modfix reo chairs (100% recycled content)	Modfix 03 9586 7600	=	2
		Plastic reo support	Smorgons ARC 03 9279 5566	=	1
		Vic Mesh reo chairs (100% recycled content)	Vic Mesh 03 8795 6666	=	2
Membrane	Reduces embodied energy and resource consumption as has 100% recycled content	Slab membrane	Plastic Technology 03 9462 2011	–	1
Formwork	Less impact on biodiversity (no imported hardwoods)	Formply (hoop ply face)	Boral 03 9790 1790	=	5
	Less impact on biodiversity (no imported hardwoods)	Formply (Radiata face) Product still being developed	Carter Holt Harvey 1800 335 293	=	5
Waffle pods	Reduced use of resources and use of waste material that would have gone to landfill otherwise	Used Tyres	Minibah Recycling 03 9799 6277	–	5
	Resource use reduction and further reduction through a product made from recycled tyres	E-Pod concrete slab system	Ecoflex 02 4940 0178	–	5
Full waffle pod system	Reduced use of resources and use of waste material that would have gone to landfill otherwise	SlabTech system: Tyres System including reinforcement, membrane, etc	Neumann Steel 07 5589 9111	+	5

Framing

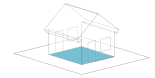
Wall Cladding

Roofing

Fittings

Landscaping

Floors and Footings



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Element	Environment benefit	Product	Company contact	Cost	Score
The following table is as a guide only. The concrete mix will depend on the engineering strength requirements of the design used. A mix can be designed with the following companies to suit your purposes.					
Slab on Ground					
Waffle pods	Reduced use of resources (through the use of less concrete and sand in slab due to void formers)	One Slab	One Steel 03 9357 8855	=	2
		Polystyrene waffle pods (40% recycled content)	Foamex Manufacturing 03 9720 4200	=	
		Waffle pod slab system (polystyrene)	Relux Slabs 03 9509 9533		
		Polystyrene waffle pods	RMAX 03 9318 4422	=	
		Polystyrene waffle pods	Vic Mesh 03 8795 6666	=	
		ARC Pod (Polystyrene waffle pods & beam spacers)	Smorgon Steel 131 557		
		Polystyrene waffle pods	Hunter Pod Supplies 02 4966 3959		
		Polystyrene waffle pods	The Waffle Pod People 02 9831 7762		
Suspended timber framed floor					
Floors	Using plantation or recycled or FSC certified reduces impact on biodiversity	Radiata pine	Carter Holt Harvey 1800 335 293	=	5
	Uses plantation, recycled or FSC certified reduces impact on biodiversity	Radiata pine	Bunnings Building Supplies 03 9408 9100	=	5
	Using plantation timber reduces impact on biodiversity	Hoop Pine	Hyne Wholesalers 07 4121 1211	=	5
	Imported timber from hardwood plantation in Brazil.	Lyptus	Pine Solutions 132 321	+	5
	Imported plantation grown Sydney Blue Gum		Matthews Timber 02 9874 1666	+	5
Wood flooring and cladding	Hard wearing and treated by environmentally preferred LOSP	LOSP treated pine (rather than CCA treated)	The Pine Centre 03 9354 3665	=	5
Stumps	Concrete stumps last longer, are naturally termite resistant and if recycled content cement used, has excellent environmental performance.	Concrete stumps	Various local suppliers	=	2
Joists / bearers	Composite I shaped beam which reduces resource use	Composite I beam with timber and steel	TecBeam 03 9794 8155	=	5
	Using plantation, recycled or FSC certified reduces impact on biodiversity	Posi-STRUT	Mitek P/L 03 9730 5555	=	5
	Using plantation, recycled or FSC certified reduces impact on biodiversity	Posi-STRUT	Gang Nail 03 9763 4444	=	5

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Floors and Footings



Element	Environment benefit	Product	Company contact	Cost	Score
Suspended timber framed floor					
Joists / bearers	Reduced biodiversity impact as products are plantation pine products with recycled content steel fittings. Company also recycles packaging.	Prefabricated Timber Wall Frames	Dahlsens 03 8831 8300	=	5 <small>(plantation pine products only will gain a score)*</small>
		Prefabricated Timber & Steel Floor Trusses			
		Prefabricated Timber Floor Trusses			
		Prefabricated Roof Trusses			
	Using plantation, recycled or FSC certified reduces impact on biodiversity however there can be low level emissions from the synthetic resins can be used in the production of LVL. Both products are designed to reduce resource consumption	I beam & LVL.	Various suppliers	=	5
Termite protection	Being a physical barrier there is reduced risk of chemical leaching, contamination and toxicity issues. Suitable for low allergen design.	Kordon termite barrier: Membrane with enclosed termiticide	Bayer Environmental Science - Kordon 1800 634 913 03 5336 0529	+	5
	Being a physical barrier there is no chemical leaching, contamination and toxicity issues	Stainless steel mesh around slab penetrations	Termimesh 08 9249 3868	+	5
	Being a physical barrier there is no chemical leaching, contamination and toxicity issues	Barrier to termite ingress	Granitgard 1800 032 549	+	5
	Brush on or gun in physical termite barrier. It is made from rubber modified bitumen and is water based and non toxic.	Blockaid	Granitgard 1800 032 549	+	5

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Framing



Almost all residential houses use either timber or steel for wall and roof framing. There are some environmental issues with both framing techniques.

Steel:

- Steel is very high in EE. Recycled content reduces this, although steel for house frames currently contains only a small proportion of recycled material.
- Steel is also less thermally efficient than timber, as steel can create a thermal bridge between internal and external elements, increasing heating and cooling energy use.
- On the positive side, steel is durable and recyclable at end-of-life.

Hints

- ✓ If you use steel ensure the detail of the roof and insulation deals with thermal bridging, eg strip of timber over the steel beam – if not this can reduce effectiveness of insulation by up to 30%.
- ✓ Use steel in structural situations only where plantation timber or composite elements are not suitable, i.e. long spans or when the timber member may be too deep dimensionally.

Timber:

- Timber framing can involve the use of non-plantation (i.e. biodiversity effecting) material.
- Timber has lower EE than steel.

Hints

- ✓ Ortech Industries' Easiboard can be used to replace internal stud walls. It is not generally used in load bearing situations, and there can be issues with service access and finish. It has an extremely low EE, and walls can be erected cheaply and quickly.
- ✓ If you can use finger joined timber this allows you to use smaller pieces of wood and saves on resources.
- ✓ Specify recycled, plantation or third-party certified timbers

Framing



Element	Environment benefit	Product	Company contact	Cost	Score
Steel framing					
House Frame	High EE but durable, 20% recycled content and 100% recyclable	Steel house made from ZINCALUME®	BlueScope Steel 1800 022 999	=	5
	High EE but durable and recyclable.	Steel house frame	Stratco Australia P/L 08 8349 5555 03 9761 6922	=	5
Thermal Spacer	Cuts energy and heat loss but is made from styrofoam	Deckmate thermal spacers	Aerodynamic Developments 1800 051 100	=	5
Timber Framing					
Studs, Noggins, Plates	This uses plantation timber, which is renewable and has less impact on biodiversity	MGP pine	All timber merchants	=	5
Beams	Resource reduction as this replaces standard beam with an 'I' shaped beam. It is made from engineered wood and structural plywood which is recycled or reconstituted wood plywood that has been laminated.	Hybeam made with Hyspan LVL	Futurebuild CHH 03 9258 7600	=	5
Structural framing	Plantation pine timber framing	Rhino Framing	Pine Solutions 03 9706 6174	=	5
Beams	Plantation pine timber	LVL Beams	Pine Solutions 03 9706 6174	=	5
Truss	Plantation pine timber	Truss	Bendigo Trusses 03 5448 4300	=	5
Various timber products	Plantation timber	CHH products	Bowens 03 9796 3003	=	5
	Plantation timber	Radiata pine	Peuker and Alexander 03 9309 1777	=	5
Lintels					
Lintels	Uses recycled steel so lower resource Steel lintel Smorgons ARC use and EE	Steel lintel (Galintel)	Smorgons ARC 03 9279 5566	=	5
		Galintel	McKerns Steel 03 5446 9202		
	This uses plantation timber, which is renewable and has less impact on biodiversity	Laminated Veneer Lumber	Carter Holt Harvey 1800 335 293	=	5
	This uses plantation timber, which is renewable and has less impact on biodiversity	MGP Pine	All timer merchants	=	5
	This uses plantation timber, which is renewable and has less impact on biodiversity	Slash Pine	Hyne Wholesalers 07 4121 1211	=	5
	Plantation timber	Timberstrand LSL	Pine Solutions 03 9706 6174	=	5
Various timber products	Plantation timber	Radiata pine	Peuker and Alexander 03 9309 1777	=	5

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping



The use of high EE products is discouraged, where possible, throughout the project. If they are designed to last a long time and to be very efficient this can offset the embodied energy. Environmental issues associated with cladding types:

Bricks:

- Fired clay bricks are very high in EE and their use as a cladding material should be minimised where possible.
- If you choose bricks from an efficient firing manufacturer, you can reduce the embodied energy from 10 – 25 GJ /1000 bricks to 5-5.5 GJ/1000 bricks.

Hints

- ✓ Using lime based mortars makes it easier to recycle at the end of life
- ✓ Buy pre scored bricks for more accurate splitting
- ✓ Store half bricks in one area for reuse
- ✓ Avoid use of raked mortar joint – use ironed or flush as this will make the wall last longer and stop moisture entering the wall
- ✓ Use second-hand or ‘seconds’ bricks where practicable
- ✓ Avoid using acid to wash bricks clean – use high pressure water instead
- ✓ Avoid painting brickwork

Timber:

- Suggested timber cladding, fibre cement sheet cladding and their derivative systems, considerably lower embodied energy if selected over brickwork.
- The main environmental issue is the impacts associated with harvesting timber from native forests.

Rendered finishes:

- Render finishes on a polystyrene substrate have some benefits, but at the expense of higher EE and reduced ability to recycle at end of life.

Wall Cladding



Element	Environment benefit	Product	Company contact	Cost	Score
Insulation					
Thermal Spacer	Stops energy and heat loss but is made from styrofoam	Deckmate thermal spacers	Aerodynamic Development 1800 051 100	=	10
Bulk insulation	100% recycled polyester	Thermowool batts	John Stubbs 03 9899 7876	=	10
	100% recycled polyester	Insulation products made from wool or polyester	A&A Discount Insulation 03 9315 6975	-	10
	Polyester and thermally efficient	Greenstuf-Autex	Available most hardware stores	=	10
Insulation	Low embodied energy due to recycled content	Polybat Insulation	Allied Woolmen Insulation Group Vic in 2004	=	10
	National fibre, low emission	Higgins Jute Wall insulation	Higgins 03 97 444 102	=	10
	Stops energy and heat loss, significant recycled content	Glasswool Batt, blanket and noise board, foil insulation	Insulation Solutions 03 9797 1320	=	10
Wool batt	Non toxic	EcoBatt	4 Seasons Homes Insulation 1800 677 355	=	10
Insulation	Stops energy and heat loss	Various	Merino Insulation 1800 807 777	=	10
Glass wool insulation	Stops energy and heat loss	Glasswool thermal insulation pink batts	Tasman Insulation 03 9580 8900	=	10
Rock wool or glass wool insulation	Stops energy and heat loss	Bradford insulation	CSR Bradford 1800 023 380	=	10

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Wall Cladding



Element	Environment benefit	Product	Company contact	Cost	Score
Brick veneer					
Damp proof course	100% Recycled plastic	Builder's film	Plastic Technology 03 9546 2855	–	1
		Polyethylene Dampproof course	Cromfords 03 9397 3724	=	1
Bricks	Lower embodied energy compared to other bricks and efficient manufacturing process	Clay brick	Austral bricks (Nubrik) 03 9801 1122	=	15
			Boral Bricks 13 30 35		
			Selkirk 03 9546 2855		
		PGH Bricks	CSR PGH 13 15 79		
Concrete blocks	Lower embodied energy than bricks and reduced amount of concrete used	AAC Hebel blocks	For distributors call CSR 1300 369 448	– for first floor application with scaffold and jenny lift same or less cost to rendered and painted brickwork \$5/m2	18
	Lowest embodied energy, about 1/8 of clay bricks	Concrete blockwork	C&M 03 9305 3922	= for first floor application with scaffold and jenny lift same or less cost to rendered and painted brickwork \$5/m2	18
Recycled Bricks	Reduced resource use through recycling and no chemicals used in cleaning process	Second hand and recycled bricks	Paddy's Bricks 03 9687 2338	=	20
Weather-board					
Weather-boards	Less biodiversity impact and low resource consumption as it is recycled	Shiplap hardwood weatherboards in range of species	Shiver Me Timbers 03 9379 5993 * ask for recycled timber – company also supplies virgin timber	–	15
Ply Sheet Cladding	Less biodiversity impact as it comes from a plantation	Ecoply shadowclad	Carter Holt Harvey 1800 335 293	=	10
Weather-boards	Weatherboards coated with cement and sand but uses PVC fittings	Primeline weatherboards	James Hardie 131 103	=	10
Steel Weather-board cladding	High EE but durable with 20% recycled content and 100% recyclable	Colourbond	BlueScope Steel 1800 022 999	=	5

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Wall Cladding



Element	Environment benefit	Product	Company contact	Cost	Score
Cladding					
Concrete and expanded polystyrene wall system	High thermal performance due to insulating qualities. Need to specify high recycled content cement	THERMOMASS wall system	Composite systems 03 9824 8211	–	15 with recyc content
	Insulative properties – high thermal mass. Need to specify high recycled content cement.	ICF Insulated concrete walling system with plastic formwork	ICF contracting 03 9846 4841	–	15
Rendered wall system	Good insulation qualities and resource efficient product – using Styrofoam and concrete	Unitex Thermal Wall System	Unitex 03 9706 5279		5
Internal stud walls (nonload bearing)	Low EE and a renewable material. Use of a waste product. Acoustic and thermal insulation properties.	Durra Panels	Ortech Industries 1800 805 919 03 9580 7766	–	5
Steel wall cladding	High EE but durable with 20% recycled content and 100% recyclable	Wall cladding made from COLORBOND® steel	BlueScope Steel 1800 022 999	=	5
Fibre Cement Sheet	Low EE and resource use reduction	Harditex	James Hardie 131 103	=	10
		Linea			
		Primeline			
	Lower EE and good energy efficiency.	James Hardie vertical cladding	James Hardie 131 103	=	12
	Low EE and resource use reduction. There is PVC in it.	Texturebase sheet	CSR 02 9844 7935	–	10
Rendered wall system	High emissions. Better insulating, is rendered so has higher EE.	Maclad System	Melbourne Acrylic Coatings 03 9558 5568	–	10
	Lower EE than brick and masonry walls.	Rendaline	CSR 02 9844 7935	+	1
		CMX wall system	James Hardie 131 103		
		Rendered wall cladding system	GRN Wallboards 03 9314 9966		

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Roof Cladding



There is very little environmental difference between sheet metal roofing and concrete tiles. The decision will depend on design issues.

The environmental issues are:

Steel Roofing:

- High embodied energy, but low maintenance and light weight (less supporting structure and transport), help to reduce its impact
- High recyclability at end of life

Tile Roofing:

- High embodied energy unless using concrete tiles;
- Industry standard for battens is hardwood (biodiversity impact)

Hints

- ✓ Use light colours for roofing to improve passive thermal comfort
- ✓ It is important to ventilate roof spaces if using dark coloured roofing
- ✓ If using tiles, select concrete tiles in preference to fired terracotta, for lower Embodied Energy
- ✓ Encourage alternatives to hardwood battens, especially for tile roofs
- ✓ Ensure compatibility with capture and use of rainwater – including design of gutters to limit leaf litter build-up and design of roof to minimise pipework to tank

Roof Cladding



Element	Environment benefit	Product	Company contact	Cost	Score
Insulation					
Bulk insulation	100% recycled polyester	Thermowool batts Insulation products made from wool or polyester	John Stubbs 03 9899 7876	=	5
			A&A Discount Insulation 03 9315 6975	–	
	Polyester and thermally efficient	Greenstuf - Autex	Available most hardware stores	=	5
Insulation	Lower embodied energy due to recycled content	Polybat Insulation	Allied Woolmen Insulation Group 07 4948 1187	=	5
Insulation batt and blanket	Stops energy and heat loss	Glasswool Batt & Blanket	Insulation Solutions 03 9797 1320	=	5
Insulation batt	Natural fibre, up to R2.5, fire retardant, requires no special fixing – standard screws	Higgins Jute Ecoblanket	Higgins 03 9744 4102	=	5
Wool batt	Non toxic, natural fibre	EcoBatt	4 Seasons Home Insulation 1800 677 355	=	5
Aircell insulation	Appropriate for smaller spaces	Aircell Insulation	Aircell Insulation 07 4155 1600	+	5
Insulation	Stops energy and heat loss	Various	Merino Insulation 1800 807 777	=	5
Glass wool insulation	Stops energy and heat loss	Glasswool thermal insulation pink batts	Tasman Insulation 03 9580 8900	=	5
Rock wool or glass wool insulation	Stops energy and heat loss	Bradford insulation	CSR Bradford 1800 023 380	=	5

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Roof Cladding



Element	Environment benefit	Product	Company contact	Cost	Score
Roof ventilation					
Cover for ceiling exhaust fans	Improves energy efficiency through self closing cover for exhaust fans. Recyclable. Saves up to 30% on heating and cooling costs	Draft Stoppa	Advantec SAM 02 6056 2822	=	5
Roof vent	Allows the roof space to cool reducing cost of cooling house	Acrylic Tilevent and Tilelite	AC Acrylic 03 9499 1282	– (30% trade price)	5
Roof Tiles					
Concrete Tiles	Lower EE than baked tile but sealants can be toxic	Concrete tile	Various suppliers	=	5
	High recycled content cement (80% slag) and lower EE than baked tile but sealants can be toxic	Concrete tile with recycled content cement	Alice Roof Tiles 03 5367 6212	– mention Aurora project	10
Steel Roofing					
Steel roofing	Lower EE than baked tile, less material needed	Zinc aluminium or colour coated steel	Various suppliers	=	5
	Lower EE than baked tile, less material needed. Locally manufactured, 20% recycled content, 100% recyclable.	Roofing made from COLORBOND® or ZINCALUME® steel	BlueScope Steel 1800 022 999	=	5

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping



Paint and joinery products are major causes of toxicity leading to poor indoor air quality. Where possible, alternatives have been suggested that produce less or no toxic emissions while still satisfying environmental and cost criteria. Environmental issues associated with fittings and finishes:

Woods:

- Formaldehyde emissions from MDF, plywood and particleboard are major contributors to airborne toxins in homes, although this off-gassing does diminish with time.
- Where possible, these materials may be sealed to reduce emissions, though this benefit only lasts as long as the seal remains intact.

Hints

- ✓ Low emission MDF options and alternatives are available.
- ✓ Use whole woods wherever possible.

Finishes:

- Oil based finishes will give off VOC emissions. This will affect the applier more than the home owner as it mostly dissipates in 1 – 6 months.
- Chemically sensitive people will be affected longer.
- Use natural oils or beeswax rather than products containing solvents or synthetics.
- Simple non-toxic finishes may be used to seal interior and many exterior woods.
- Acrylic render systems and non-toxic, durable paints for external walls are widely available and used in the industry. Many options are listed.

Rule of Thumb – the priority is to use mechanical fixings and minimise painting, then water-based finishes, glues, adhesives and paint where possible.

Insulation:

- The important thing is to use the right R value insulation.

Hints

- ✓ Make sure your insulation covers the space entirely
- ✓ Insulate roof right up to the edge of the ceiling (but stop insulation contacting the roof). A combination of foil under the roofing material with an airspace below it and bulk insulation on the ceiling works very well in Melbourne.

Fittings and Finishes



Element	Environment benefit	Product	Company contact	Cost	Score
External Paint					
Paint	Lower toxicity and less emissions. Very durable	Granital mineral paint	Keim distributor 02 9211 6644	+	6
		BIO Paints Wall paint	Energy and Water Solutions 02 9519 0433	+	6
			Going Solar 03 9348 1000	+	
Water-based paint	Lower toxicity, less emissions, water based less EE	Taubmans	Bristol 03 9518 0700	+	6
		Maxishield Solashield	Haymes 1800 033 431	=	
		Murowash and Pentimento (limewash)	Murobond 02 9906 7299	=	
Render	Lower toxicity less emissions, water based less EE	Acrylic Render	Dulux 132 377	+	6
		Granosite	Wattyl 132 101	+	
		Cement based and coloured renders	Rockcote 1800 267 737	+	
Finish for brick, masonry, concrete and fibre cement	Acrylic paint, durable	Taubmans Outdoor Colour range Look and feel of render	Taubmans 131 686	+	6
Timber finish	Lower toxicity and less emissions. Stain needs reapplication	Organoil	Mitre 10 Advice line 136 310	+	6
			Bunnings Building Supplies – Epping 03 9408 9100		
		Uvex Exterior Timber Finish	Haymes 1800 033 431	+	
		Woodguard	Evergard Industries 03 9762 9588	+	
Timber finish	Lower toxicity and less emissions. Very durable	Woodman's specialised timber coatings	Victorian distributor 03 9762 9588	+	6

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Fittings and Finishes



Element	Environment benefit	Product	Company contact	Cost	Score
Internal Paint					
Paints	Low toxicity paint, low emission	Range of limewash, acrylic, milk, mineral and silicate paints	Porters Paints 1800 656 664	+	6
		i.d range: untinted = 99.7% VOC free	Wattyl 132 101		
	Lower toxicity less emissions, water based paint	Breatheasy	Dulux 132 377	+	6
		Taubmans	Bristol 03 9518 0700	+	
		Dubron	Livos Australia 02 4782 9009	+	
		EcoStyle	Rockcote 03 9308 7233	+	
		Ecosil	Keim distributor 02 9211 6644	+	
		Organoil	Mitre 10 Advice line 136 310	+	
			Bunnings Building Supplies – Epping 03 9408 9100	+	
		BIO Paints	Going Solar 03 9348 1000	+	
		Auro paints	Going Solar 03 9348 1000	+	
		Maxi Wash	Solver Paints 03 9484 6100 (distributor Preston)		
		Acrylic Trim	Haymes 1800 033 431	+	
		Easy Washable Silk, Ceiling White, Acrylic sealer undercoat	Haymes 1800 033 431	=	
	Low toxicity paint	Oikos acrylic paints	Oikos distributors 1300 303 802	+	6
	Low toxicity paint	Acrylic paints	Wattyl 132 101		6
Timber and wood products					
Particalboard flooring	Pine plantation timber	Particalboard flooring	D&R Henderson 03 9768 3320	–	5
Floors	Plantation but transport distance is a negative impact	Hardwood (Oak, Oak Rustic, Mahogany Beech, Jarrah, Ash, Beech, and Nordic White)	Swedish company Tarkett 03 9764 1711	+	2

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Fittings and Finishes



Element	Environment benefit	Product	Company contact	Cost	Score
Timber and wood products					
Floors	Re-milled hardwood timber which is recycled and salvaged wood	Hardwood in range of species	Shiver Me Timbers 03 9397 5993 * ask for recycled timber – company also supplies virgin timber	–	5
	100% recycled hardwood timber	Hardwood tongue and groove flooring	Nullarbor Forest Timber Industries 03 9484 9215	=	15
	Regenerates quickly, as strong as hardwood	Bamboo	BT bamboo distributor: Riband floors 03 9888 5635	=	5
	Regenerates quickly, as strong as hardwood	Bamboo	Living Choice Group 03 9546 6115	=	5
			Bamboo Australia 07 5447 0299	=	5
			Style Plantation 08 9244 8888	–	5
			Bamboo Floors Australia 1800 042 150	=	5
	Regenerates quickly, as strong as hardwood	Bamboo (imported)	PlyBoo (USA company) PLYBOO@aol.com	+	5
	Regrows quickly, as strong as hardwood. Laminate improves water resistance.	UPI Bamboo Flooring	Universal Polymers Australia 08 8241 7890		
Lining	Imported Forest Stewardship Council Plywood and Blockboard	E1 EcoCore Plywood and EcoCore Blockboard	Ecocore 02 9652 0187	=	3
Timber and wood products					
Various timber applications	Independently third party verified plantation Vic Ash – lower biodiversity impacts	VicAsh FSC certified	Hancock, Druin West 03 5134 4377	=	5
Board and Ply	Exceeds Industry standard low emission and plantation timber	E0 board and Ply	Brims Wood Panels 03 9763 6700	=	5
MDF	Exceeds Industry standard low emission and plantation timber	E0 Alpine MDF – export only but could change with increased demand	Alpine MDF Industries 03 9663 5833	+	5
Hoop pine plywood	Plantation timber and low emission	Board and ply	Carter Holt Harvey 1800 335 293		3
			Brims Wood Panels 03 9763 6700		3
Pine particleboard	Pine plantation timber	Particleboard	D&R Henderson 03 9768 3320	=	3

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Fittings and Finishes



Element	Environment benefit	Product	Company contact	Cost	Score
Varnish - interior					
Varnish	Low toxicity and therefore lower emission	BIO Varnish – Floor or All Purpose	Energy and Water Solutions 02 9519 0433	=	5
		BIO Paints Varnish	Going Solar 03 9348 1000	=	
		Auro Varnish	Going Solar 03 9348 1000	=	
		Estopol water based wood varnish	Wattyl 132 101	=	
		Simply Woodcare Aqualac stain & varnish	Haymes Paint 1800 033 431	=	
		Water based varnish	Bristol stores stock Feast Watson, Cabots, Intergrain	=	
		Water based varnish	Evergard Industries 03 9762 9588	=	
Plumbing					
Pipes	100% Recycled content	Polypropylene Stormwater Downpipe.	PPI Corporation 03 9791 3700	+	3
	49% Recycled content	Series 2000 Drainage Pipe	Hepworth Drainage 03 9874 0303	+	3
	Lower embodied energy and toxicity, HDPE content	All water pipes	Reece 03 9347 4433	+	3
	Recycled content, HDPE content	Flat pipe drainage system	Geofabrics 03 8586 9111	=	3
	100% Recycled content HDPE content	The Green Pipe (ag pipe)	Recycled Plastic Technology 03 5480 7060	–	5
	High recycled content HDPE pipe	Speckled pipe (alternative to Class2 concrete pipe)	Recycled Plastic Pipe 03 9804 7164	–	5
	Recyclable HDPE content pipes	Iplex Wavin Drainage pipes	Iplex available from all plumbing centres	+	3

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Fittings and Finishes



Element	Environment benefit	Product	Company contact	Cost	Score
Plumbing					
Pipes	Recyclable PP content pipes	Black Max range	Iplex available from all plumbing centres	+	3
	Recyclable polybutylene content storm water pipe	Stormwater pipe. Pro-Fit hot and cold	Iplex available from all plumbing centres	+	3
	Recyclable PE content pipe	Pro-Fit hot and cold	Iplex available from all plumbing centres	+	3
	HDPE content pipe	RAUDRIL PE drainage pipe	Rehau 03 9587 5544	+	3
	PP content pipe	REHAU HT – PP Wastewater System	Rehau 03 9587 5544	+	3
	HDPE, PE and PP content	Various products	Bruce Peacock Plumbing 03 9772 4889	+	3
Openings					
Windows (Aluminium)	Uses recycled aluminium	Windows	G James Glass & Aluminium Pty, 03 9219 2077	=	3
Windows (Timber)	Efficient resource use and energy efficient double glazed windows; wood sourced from pine plantations (Primex product only)	Energy rated Primex timber windows Primex is treated with LOSP and can't be stained.	Primex – Canterbury Windows 03 9558 5222	=	5
	Efficient resource use	Windows	Pickering Joinery 03 5243 4166	=	3
	Energy efficient	Tyrol tilt & turn double glazed windows	Paarhammer 03 5368 1999	=	5
	Recycled windows	Windows	Woodhill Timber Windows and Joinery 02 4228 8899	+	5
Windows (Aluminium)	Recycled plantation rubber and 15-20% recycled aluminium content	Windows	Geelong Windows 03 5278 5511	=	3
Windows (Aluminium)	Aluminium frame with recycled content, pre-primed and energy efficient glass	Sliding window	A & L Windows 03 8786 0000	Invoice must show recycled content	3

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Fittings and Finishes



Element	Environment benefit	Product	Company contact	Cost	Score
Doors					
External doors	Plantation timber used for frame instead of rainforest timber	Madison range only	Corinthian Doors 03 9794 1122	= <small>Invoice must specify the product used</small>	5
	Plantation timber Hoop pine	Door	Finlayson's Doors 07 3393 0588	=	3
	Plantation timber Door	Door	Lilley's Doors 03 9878 3688	=	3
Doors	100% recycled timber Door	Door	Nullabor Forest Timber Industries 03 9484 9215	=	3
Floor coverings					
Matting	Hard wearing, natural fibres	Sisal, seagrass and natural matting that rolls like carpet or as a mat	Floorspace 03 9822 4455	=	5
Linoleum	Durable, natural materials, low toxicity	Marmoleum	Forbo Flooring 1800 224 471	=	5
		Linoleum	Tarkett Sommer Linosom 02 9634 7373	=	5
Cork flooring	Renewable source from a recycled product. Polyurethane cured	Cork and rubber flat sheet flooring	Comcork distributor 02 9555 2131 03 9544 2288	=	5
		MJO Floating Cork floor	Premium Floors 03 9544 3911		
Tiles	Recyclable and durable	Amtico Stratica tiles	Amtico 02 9415 0200	=	2
Ceramic tile	High EE but good thermal properties if exposed to sun	Ceramic tile	Various Suppliers	=	2
Floating floors	Timber alternative	HDF: Kronotex Laminate	Fowles Carpet 03 9644 9090	=	2
Carpet	Recycled carpet	Recycled carpet	Melbourne Carpet Recyclers 03 9545 6588	-	3
Modular carpet	Recyclable and uses less material than broadloom. Specify low VOC glues	Interface Modular carpet	Interface 1800 804 361	=	2
		Ontera Earth Plus Modular carpet	Ontera 03 9682 6412	=	
Wool carpet	Natural material but not generally recycled in Australia	Feltex 100% wool, tufted loop range of carpets	Feltex 1300 130 307	=	2
Carpet	Durable	Woollen and nylon carpets	Godfrey Hirst 1800 630 401	=	2
	Vic Water Saver 05 for reduced water use in wet dying process.	White nylon. Various colours.			
	No wet processing required.	Statron Yarn systems			
	Fibre face and secondary backing materials made from natural fibres	Wool and wool blend range			
Carpet cushion	Carpet cushion made from polyurethane foam with 90% recycled content.	Carpet cushion	Dunlop flooring 1800 622 293		

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Fittings and Finishes



Element	Environment benefit	Product	Company contact	Cost	Score
Miscellaneous					
Benchtops, lining boards, beams, window frames, joinery, and stair treads	100% Reclaimed and salvaged hardwood timber	Recycled timber	Nullabor Forest Timber Industries 03 9484 9215	=	3
Board suitable for furniture and kitchens	Pine plantation timber by product	DecoLine low pressure Melamine, various colours & textures	D&R Henderson 03 9768 3320		3
Benchtops	Hard wearing	Laminex	Laminex 132 136		
		Wilsonart Laminate	Parbury 1300 361 313		3
Cabling	Halogen free and fire performance cables – made from stiff mica glass tape	Pyrolex Ceramifiable cables	Olex Cables Australia 1300 556 539	+	10
Pre-finished board suitable for cabinetry & furniture	Surface finish emits zero VOC emissions. Low formaldehyde grade MDF significantly exceeds industry standard for formaldehyde emissions.	Element™ E0 - Low formaldehyde MDF panel pre-finished with a zero VOC emission Climate™ powder coating. Available in a range of colours, finishes and sizes.	Climate Coating 1800 256 111		

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping



The careful selection of materials for landscaping can also minimise environmental impacts.

Environmental issues associated with landscaping:

Timbers:

The issues for timber used in pavers, sleepers and fencing are:

- Concerns about the chemicals in CCA (copper chrome arsenate) treated timber leaching into the soil and water table
- Concerns about the impacts of timber harvesting (e.g. old growth forests).

Hints

- ✓ Use plantation, recycled or third party certified timbers for decking
- ✓ Look for alternatives to CCA treated timber, e.g. Light Organic Solvent Preservative (LOSP)
- ✓ Use recycled sleepers

Permeability:

This is an issue as compacted soil under impervious surface can become inert and infertile. Impermeable surfaces such as asphalt and concrete also increase stormwater runoff and potential for localised flooding.

Hints

- ✓ Use permeable materials for driveways and paths

Water Use:

In Melbourne gardens consumer around 35% of the average household's annual water consumption. Water sensitive design and planting will help to minimize overall water use.

Hints

- ✓ Plant drought-tolerant plants
- ✓ Install a water tank
- ✓ Reuse grey water through approved diversion systems

Landscaping



Element	Environment benefit	Product	Company contact	Cost	Score
Fencing	Alternative to CCA treated timber	LOSP treated timber	The Pine Centre 03 9354 3665	=	5
	100% recycled timber for fencing	Fencing	Fence busters 03 9725 3942	=	5
	Alternative to CCA treated timber	ACQ treated timber	Taylor Fencing 03 9764 3178	+	5
		ACQ treated timber fencing	Dauids Timber 03 9794 4777	+	5
		LOSP treated timber fencing	Diamond Creek Fencing 03 9438 2946 0412 031 210	+	5
Timber preservative	Copper treatment for wood (not as bad as CCA)	NatureWood ACQ (up to H3) treatment	Osmose 1800 088 809	+	5
	Light Organic Solvent Preservative (LOSP) treatment for timber fencing (not to be used on posts that go in the ground)	Protim H3 LOSP treated timber	Osmose 1800 088 809	+	5
	Tanalith E is rated to H4 (in ground applications e.g. fence posts)	Tanalith E	ITI Mark Mcfarlane State Manager 03 9392 8400. Craig Davies 02 8805 5000	+	5
Sleepers	Recycled red gum sleepers	Sleepers	Various landscape suppliers, specify recycled	=	5
Mulch	Made from recycled green waste and saves water	Mulch	Soilpower 03 9408 4555	=	5
	Organic mulch reduces water use	Mulch 'n' feed	Debco 1800 657 598	=	5
		Organic mulch	Evergreen Compost 03 9768 3635	=	5
	Recycled green waste	Recycled mulch	Tram Stop Garden Supplies 03 9435 1176	=	5

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping

Landscaping



Element	Environment benefit	Product	Company contact	Cost	Score
Decking	Alternative to CCA treated timber	ACQ treated timber decking	Dauids Timber 03 9822 9344		1
	100% recycled plastic	Anti-skid Decking	Repeat Plastics 03 9739 6919	=	5
	Made from non-virgin wood and recycled plastic	Modwood Decking	Modwood Technologies 03 9462 4333	+	5
Decking and beams	Plantation timber with copper content in the preservative	Preserveply and Norply	Norply 02 6632 2400	+	1
Sleepers, decking and fencing	Less toxic timber treatment. Check source of timber	Tanalith E treated timber	Koppers 02 9954 5411	+	1
Bench tops and Decking	Reclaimed and salvaged timber	Solid timber bench tops, decking, stair treads, skirting boards, posts and beams. company also supplies virgin timber - Range of species.	Shiver Me Timbers 03 9397 5993 * ask for recycled timber	-	5
Pavers	Improves soil permeability	Rubber pavers	Permapave 07 3284 6841	=	3
	Uses concrete containing waste products to reduce use of new cement	Concrete pavers	Island Block and Paving Co 03 6398 2088	=	5
	Permeable paving system	Hydrapave Concrete permeable paving system	Boral 03 9681 9722	=	3
	100% recycled timber	Red gum pavers	Fence busters 03 97253942	=	5
Paving Bricks	Improves soil permeability	Permeable bricks	Australbricks (Nubrik) 03 9881 3215	=	3
Driveway surface system	Improves soil permeability and reduces use of concrete	Grasspave	Atlantis Corporation 02 9419 6000	=	3
Lights	Use of solar energy reduces consumption of non-renewable energy	Solar powered outdoor lights Sunlight	Solar Systems 1800 061 164	=	5

Floor Structure

Framing

Wall Cladding

Roofing

Fittings

Landscaping