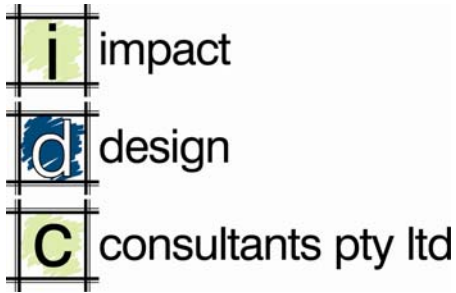


welcome kit

high impact for the client - low impact on the environment



Dear prospective client,

Thankyou for considering impact design consultants for your building project.

We pride ourselves on meeting the clients' expectation in design, budget, environmental impact and sustainability for the long term.

Enclosed within this pack is important information relating to the services impact design consultants can offer, depending upon the level of detail you require.

Soon you will be meeting with one of our team to discuss your project in more detail, obtain an understanding of the site and the potential council regulations we may need to consider.

This meeting is an important start to your project as we need to identify your needs, requirements, affordability and timing.

We have included 2 forms for you to initiate the design process, the "client-wishlist" and a "what you need to know" checklist, the client-wishlist is an important document that will identify your initial needs in a priority format and discuss how you may furnish or equip the room.

Make sure you fill out this form, return it to our office before your appointment and design consultation.

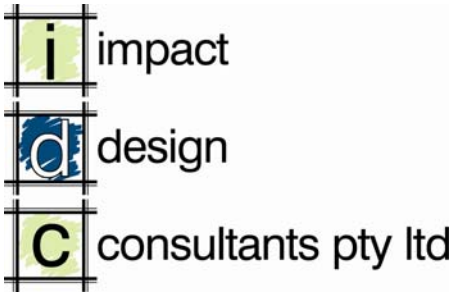
The "what you need to know" checklist is a guide to the entire design and building process, this can be used to keep in touch with the designer and builder, but also be a helpful checklist to ensure the important items are completed and your project is running on time. (this checklist can be used no matter who the designer may be!)

To assist us with servicing you better we would appreciate you reading the information enclosed.

Yours faithfully,

Darren Whelan
Managing Director

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vision statement

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mission statement

impact design consultants strives for a consumer friendly experience that provides the client an informative and honest understanding of the design and building process.

the design documentation will be of a professional standard and our processes allow for client participation so as the end product meets the expectation of the original brief.

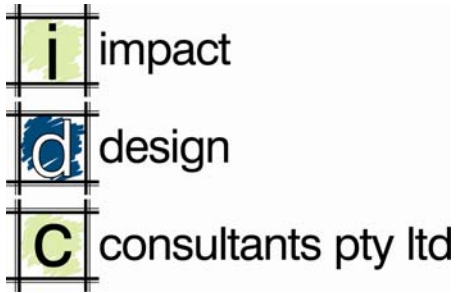
our focus on cost effective design and construction methods provide an opportunity to communicate budget constraints in the early stages of design and will also consider long term cost effective advantages to be taken up particular to energy efficient construction.

our team enjoys the challenge of new and interesting design and is committed to ongoing training, new product initiatives and building industry exposers.

impact design consultants considers the issues of the environment and will provide resources to explore a more sustainable outcome.

our commitment to the client, to meet their needs, to assist through the entire building project is at the fore-front of our plight.

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services

impact design consultants offer a full service of architectural design and building design consultancy, our services include:

conceptual designs

- 3d visualisations – “life like” 3 dimensional computer drawings
- Presentation drawings – hand coloured
- prepare concept drawings based upon client brief and/or ideas to better understand the overall design building project

drafting services

- basic drawing package with minimal drawing documentation to achieve building permit and satisfactory for builder to start quoting from. Usually a client will have good knowledge of their layout and a sketch prepared to work from.
** minimal design consultation is included in this process*

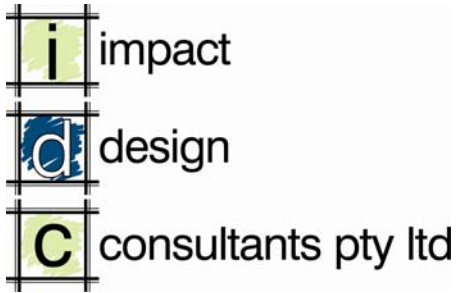
design services

- extensive drawing package which can include any of the following: conceptual design, draft working drawings, fixture and fitting schedule, final working drawings, which encompasses client contact and involvement throughout the entire design phase
- preparation of associated working drawings for detailed construction, joinery and other particular design requirements
- administrate other associated consultants relating to the project, such as soil testing, structural engineering, arborist reports, energy reports, etc. etc.
** our goal is to have an end product that has met the clients' needs, has considered the budget and a design that has a positive impact to the environment*

planning applications

- act on behalf of the owner to assist in the planning process
- prepare initial drawings for statutory planning pre-application meetings
- report and prepare required documentation for planning submission
- follow through with planning application process to achieved required client results (if required by client)

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services continued

feasibility studies

- look at client requirements for potential development
- investigate options to best suit the clients budget requirements and project outcomes
- prepare preliminary drawings based upon client brief

contract administration

- work with building surveyors to achieve the required project building permit
- prepare reports for modification to the current building laws and local municipal by-laws
- administrate the building contract on behalf of the client/owner

other services we can facilitate

- soil testing
- energy reports
- structural/civil engineering
- title search
- landscape designs
- arborist reports
- feature land surveys
- re-establishment surveys
- site analysis surveys

resources located at our office can also be sort giving potential clientele information about building commission based documents such as:

- building in Victoria – a consumer’s guide
- 5 star houses are better houses
- owner-builder information and education kit



impact



design



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Client - Wishlist

DATE

CLIENT

NAMES:

ADDRESS OF SITE:

BUILDING TYPE: RESIDENTIAL/COMMERCIAL/INDUSTRIAL/OTHER: (circle one)

PROJECT TYPE: RENOVATION/EXTENSION/NEW BUILDING/REFURBISHMENT/OTHER: (circle one)

The wishlist enables you to write down your project requirements and to prioritise these requirements into 3 key areas:

1. "must haves"
2. "would likes"
3. "optional items".

This will allow impact design consultants to further understand your needs. It will also assist with how you may furnish or equip the room/s.

"must haves"

ROOM NAMES	FURNITURE/EQUIPMENT IN ROOM	OTHER ISSUES TO CONSIDER

"would likes"

ROOM NAMES	FURNITURE/EQUIPMENT IN ROOM	OTHER ISSUES TO CONSIDER

"optional items"

ROOM NAMES	FURNITURE/EQUIPMENT IN ROOM	OTHER ISSUES TO CONSIDER
other items to consider in your project		
services you believe you may require		other services we can facilitate
<input type="checkbox"/> drafting service <input type="checkbox"/> conceptual designs <input type="checkbox"/> priority service (refer conditions) <input type="checkbox"/> design services <input type="checkbox"/> planning applications <input type="checkbox"/> feasibility studies <input type="checkbox"/> contract administration	<input type="checkbox"/> soil testing <input type="checkbox"/> energy reports <input type="checkbox"/> structural/civil engineering <input type="checkbox"/> title search <input type="checkbox"/> landscape designs <input type="checkbox"/> arborist reports <input type="checkbox"/> feature land surveys <input type="checkbox"/> re-establishment surveys <input type="checkbox"/> site analysis surveys <input type="checkbox"/> interior design – colour consulting	
resources located at our office can also be sort giving potential clientele information about building commission based documents such as: <ul style="list-style-type: none"> • building in Victoria – a consumer’s guide • 5 star houses are better houses • owner-builder information and education kit • <i>priority service – quick turn-around on drawing documentation requires upfront payment of total fees including 10% for priority service, this will prioritise project placement within our programming. (subject to project type and council requirements)</i> 		

building and design – what i need to know

The following checklist will assist you with the entire process of building your project, from initial designs through to the time you move into your new building.

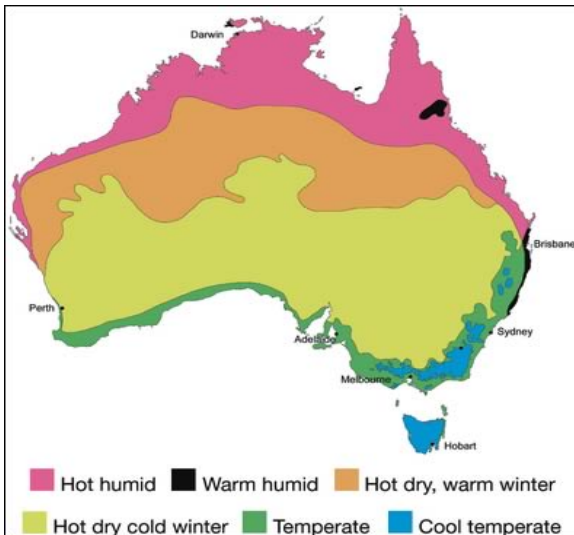
Tick (✓) the box if the service is required, cross (x) the box if the service is not required.

1. INITIAL DESIGN PROCESS	DESIGNER: CONTACT No.:
<input type="checkbox"/> design meeting conducted / /	<input type="checkbox"/> copy of title to designer / /
<input type="checkbox"/> site visit by designer conducted / /	<input type="checkbox"/> sewer plan to designer / /
<input type="checkbox"/> design brief taken / /	<input type="checkbox"/> existing plans available and passed onto designer / /
<input type="checkbox"/> concept plan received / /	<input type="checkbox"/> council information obtained / /
<input type="checkbox"/> concept plan approved / /	<input type="checkbox"/> other information / /
Comments:	
2. DESIGN PROCESS	DESIGNER: CONTACT No.:
<input type="checkbox"/> draft working drawings received / /	<input type="checkbox"/> soil test received / /
<input type="checkbox"/> draft working drawings accepted / /	<input type="checkbox"/> structural engineering received / /
	<input type="checkbox"/> civil engineering received / /
<input type="checkbox"/> draft working drawing updates received / /	<input type="checkbox"/> feature land survey received / /
<input type="checkbox"/> draft working drawing updates accepted / /	<input type="checkbox"/> re-establishment survey received / /
	<input type="checkbox"/> site analysis survey received / /
<input type="checkbox"/> final working drawings received / /	<input type="checkbox"/> energy report received / /
<input type="checkbox"/> final working drawings accepted / /	<input type="checkbox"/> arborist report received / /
	<input type="checkbox"/> landscape design received / /
<input type="checkbox"/> final working drawing updates received / /	<input type="checkbox"/> interior design – colour schedule received / /
<input type="checkbox"/> final working drawing updates accepted / /	<input type="checkbox"/> traffic engineering received / /
	<input type="checkbox"/> other / /
	<input type="checkbox"/> other / /
Comments:	
3. PERMIT PROCESS	OTHER LOCAL AUTHORITY APPLICATIONS

<input type="checkbox"/> town planning permit applied	/ /	<input type="checkbox"/>	/ /
<input type="checkbox"/> town planning permit received	/ /	<input type="checkbox"/>	/ /
		<input type="checkbox"/>	/ /
<input type="checkbox"/> building dispensation (report & consent) applied	/ /	<input type="checkbox"/>	/ /
<input type="checkbox"/> building dispensation (report & consent) received	/ /	Contacts:	
<input type="checkbox"/> build over easement sewer authority received	/ /		
<input type="checkbox"/> build over easement stormwater authority received	/ /		
<input type="checkbox"/> building permit applied	/ /		
<input type="checkbox"/> building permit received	/ /		
Comments:			
4. BUILDERS QUOTING PROCESS			
<input type="checkbox"/> builder 1 quote received	/ /	1. builder	
<input type="checkbox"/> builder 2 quote received	/ /	2. builder	
<input type="checkbox"/> builder 3 quote received	/ /	3. builder	
<input type="checkbox"/> builder 4 quote received	/ /	4. builder	
5. BUILDER CHOSEN:		CONTACT NO.:	
<input type="checkbox"/> builders quotation accepted	/ /		
<input type="checkbox"/> builders contract received	/ /	<input type="checkbox"/> 1 st stage payment for construction (date paid)	/ /
<input type="checkbox"/> builders contract accepted and signed	/ /	<input type="checkbox"/> 2nd stage payment for construction (date paid)	/ /
		<input type="checkbox"/> 3rd stage payment for construction (date paid)	/ /
<input type="checkbox"/> builders start date - forecast	/ /	<input type="checkbox"/> 4th stage payment for construction (date paid)	/ /
<input type="checkbox"/> builders start date - actual	/ /	<input type="checkbox"/> 5th stage payment for construction (date paid)	/ /
<input type="checkbox"/> builders project timing	days		
<input type="checkbox"/> builders contract delays (written variations only)	days	<input type="checkbox"/> certificate of occupancy issued	/ /
		<input type="checkbox"/> other certificates and warranties issued	/ /
Comments:			

INTRO & CLIMATE

The planet is changing, and whether you believe in global warming or not, there only exists a finite stock of resources. And even more importantly, the health of our children, and the effects of pollution and environmental destruction on their growth and existence, is unquestionable. As a company representative of the building industry, we want to play our part in minimising as much as possible, our impact on the environment, and ultimately doing all we can to ensure a healthy existence for future generations. This booklet has been put together and provided to you as a resource to help you understand the part we play as designers, and you as the client. As well as going through some of the implications and issues we deal with as responsible designers, we have provided a list of internet based resources at the end of this document. They will allow you to further investigate the topics we have discussed here.



Victoria falls into three climatic zones, them being hot dry cold winter, temperate and cool temperate. The Melbourne metropolitan area falls within a temperate zone. The State as a whole experiences a wide range of climatic conditions. These range from the hot summers of the Mallee to the winter blizzards of the snow-covered alps, and from the relatively dry wheat belt to the wet eastern elevated areas. Conditions of extreme summer heat may be experi-



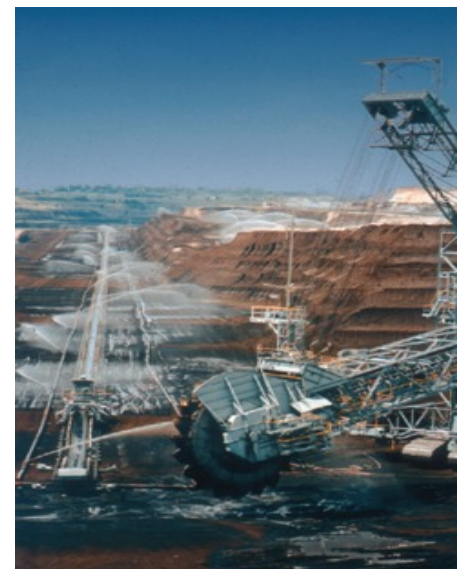
enced throughout the State except over the Alpine areas. February is the hottest month of the year, with January only slightly cooler. Average maximum temperatures along the coast, are in the low 20s. Temperatures fall rapidly during the autumn months and then more slowly with the onset of winter, with average maximums being lowest in July. Night temperatures are like the maximums, being highest in February. In mid-winter, average July minimums are between 6° C and 8° C along exposed parts of the coast and in Melbourne's CBD. Other climatic factors to effect Victoria, including Melbourne, can involve varying quantities of rainfall, wind, humidity, thunderstorms, dust, bushfires, snow, drought, flood & flash flooding.

No auxiliary heating or cooling is required in a temperate climate with good design and favourable siting.

The climate we live, no matter where we are in the world, dictates how we should design our homes. Modern technology and transport has allowed us to overcome the constraints of local materials and any bursts of severe weather, be it a cyclone or drought. As a result of our local climate, there is a sensible way to design a home in order to work with the climate and weather, so as to limit our impact on the surrounding environment we occupy, as well as the effect on our pockets through saving money on energy consumption. Our temperate environment enables the following design factors to work best in our

climate.

- The use of solar passive design principles.
- High thermal mass solutions are recommended.
- Use high insulation levels.
- Maximise north facing walls & glazing.
- Minimise east & west glazing.
- Use heavy drapes with sealed pellets to insulate windows.
- Minimise external wall areas, especially east & west.
- Use cross ventilation & passive cooling during summer.
- Encourage convective ventilation & heat circulation.
- Site new homes for solar access, exposure to cooling breezes & protection from cold winds.
- Draught seal thoroughly & use entry airlocks.
- Use reflective insulation to keep out summer heat.
- Use bulk insulation to keep heat in during winter. Bulk insulate walls, ceilings and exposed floors.





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CONSERVATION— With water becoming a scarcity over the past 30 years, water conservation has become a priority in our day to day lives. Dam levels are at record lows, natural springs are drying up and once thriving ecosystems are drying up. As far as the function of a house and its site is related, most conservation is easily achieved through careful selection of water wise fixtures, fittings and household goods As well as having native species in the gardens and the use of a grey water recycling system. The market contains a plethora of water conservation products and systems, and with a Victorian Government rebate available, these become a wise choice.

A tap leaking at the rate of one drip per second will waste more than 12,000 litres of water per year.

Another factor in saving water, is the fact that many of our water delivery systems are aging amongst our modern developments. Many old taps and pipes continue to leak undetected, wasting an unknown quantity of water. When it comes to renovating or extending an existing house, it may pay to have the existing plumbing checked, and instead of re-using old toilets and the like, perhaps upgrading them to a more water efficient product.

COLLECTION— Rainwater tanks and storage systems come in a wide range

of styles and materials. Some of the available tanks and storage systems are:

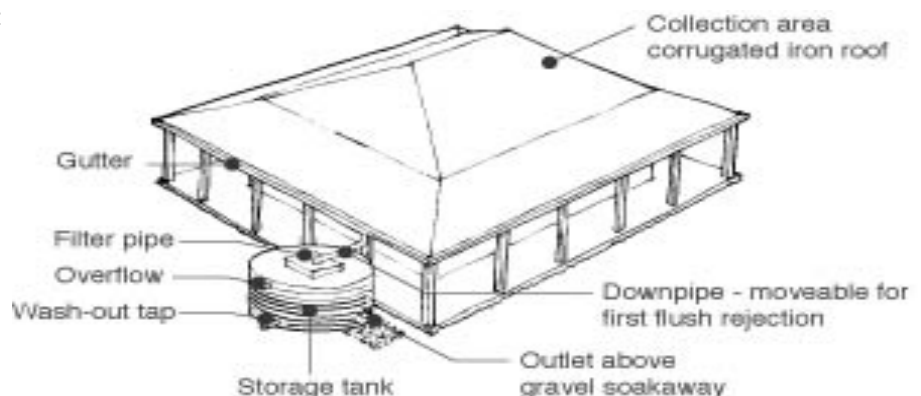
- corrugated iron tanks, an above ground storage system with a traditional look and comes in an array of sizes.
- polyurethane & fibre reinforced tanks, similar to the above tank, but in some instances can be placed below ground. Very durable.
- slimline polyurethane & corrugated iron tanks, come in a variety of shapes, sizes & colours. Great for smaller block sizes & easily blended into landscaping.
- bladder tanks are a flexible & low profile bladder that sits on the ground and is best concealed under a house or deck, they can be custom sized to suit an available space.
- underground systems are a modular submersible tank that come in a variety of sizes, shapes & configurations.

A recent study has found that rain water tanks are a more cost effective alternative to other water saving measures.

Some of the benefits of installing a rainwater tank is that a tank allows you to control and monitor your own water storage, reduce the need for new dam construction, conserve any remaining flows in rivers, reduce the energy use in

pumping water & thereby lowering greenhouse gas emissions, allow greater flexibility through times of drought, save on water bills and add value to your property.

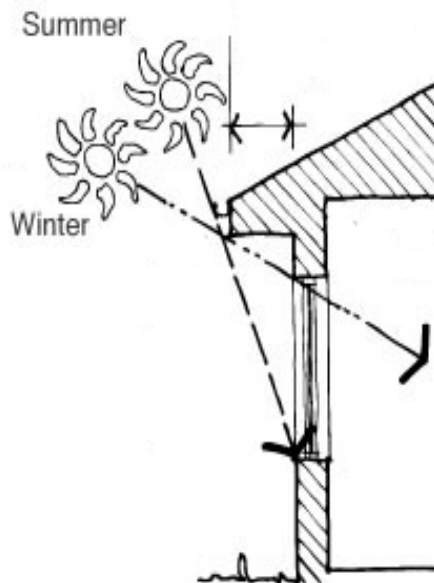
GREY WATER— Rules and regulations of grey water systems differ between the states and territories. There are three broad categories of grey water systems. The simplest being the diversion system, this method requires the least management but is potentially the most hazardous. The diversion & filtration method utilises a filter mechanism outside the house, this method provides a basic straining system removing any particles of hair etc from the water, providing for better irrigation options than the diversion system. The Diversion and treatment systems are more complex and vary from highly mechanised systems, such as aerated wastewater treatment systems (AWTS), to sand filters. Check to see if your chosen system requires approval by local councils or water authorities. The advantage of installing a treatment system is that the water will have a far lower nutrient and solids content, as well as having a reduced pathogen load. Treated greywater can be used safely in more direct irrigation systems, such as dripper lines, and possibly inside the house for toilet flushing and laundry washing. Treatment systems can be expensive to install and often require a lot more room than filter systems. Any greywater system should be further planned with your plumber and council.



PASSIVE SOLAR

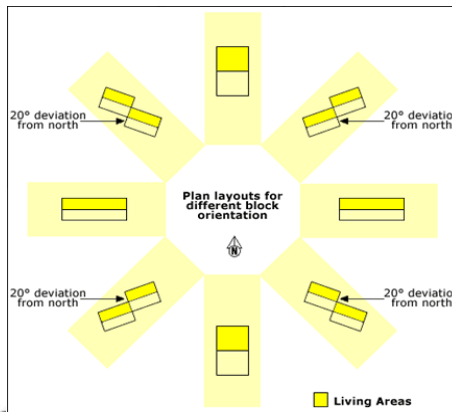
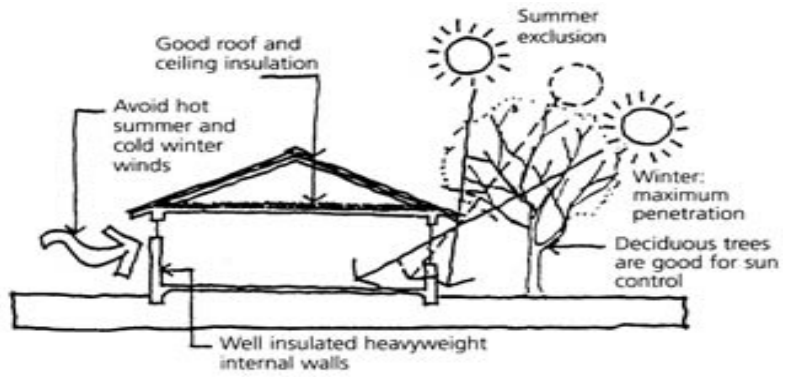
PASSIVE SOLAR entails designing a building so as to take advantage of the natural energy patterns from the climate for natural heating, cooling, lighting and overall living comfort. During winter in a temperate climate, the low northern sun can be utilised to heat a house during the day, heating thermal mass internally, which then slowly releases this heat in the evening. During summer the opposite applies, and we keep the sun off the thermal mass so that it stores 'coolth' to keep the house cool, as well as utilising the cool summer breezes to flush the house of heat. Summer is also when the eaves come into effect, keeping the sun off the walls and away from windows so as the prevent heating.

Many homes are built without eaves to save as little as \$2,500. Builders may then add an air-conditioner to counteract the overheating effects of the sun.



Glazing to the north walls also provides great natural lighting during the winter months, providing a brighter, happier home. Overall, the use of the natural elements to heat, cool and light a home provides it with an increased level of comfort, not to mention health benefits. ORIENTATION is a key factor when con-

sidering passive solar design at higher latitudes, the better the orientation, the better the energy efficiency of the house. Whether it be a new home or renovation, most homes can be orientated in a more favourable direction. Ideally, the living areas are best placed on the north side of the dwelling, with the highest amount of glazing also. This then places the bedrooms and other areas at the rear of the house, where less time is spent. Through the use of clerestory glazing light and winter heating can still be gained at the rear of the house, however not all renovations are open to such design elements.



All Australian climates require some degree of cooling.

THERMAL MASS– As a way of storing daytime heat, Thermal Mass allows this heat to be re-released back into the house at night to offset heat loss to colder night time temperatures. During summer, Thermal mass protected from the sun, preventing it from 'heating up', can release 'coolth' into the house as outside temperatures rise.

Generally, night time 'coolth'

is stored for use during the day in summer and conversely, daytime warmth from the sun can be stored to offset the colder nights in winter.

A few methods of incorporating thermal mass are possible. Concrete or tiled floors are a great way to store heat or 'coolth'. However if a floor using light weight construction is required or preferred, then thermal mass walls and other elements incorporated into design can also play a major role in storing heat or 'coolth'.

Put simply, design for passive solar heating/cooling is about keeping summer sun out and letting winter sun in.





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INSULATION

INSULATION— An important part of passive solar design, is the need to ensure good insulation is still applied. The aim is to prevent the house heating up in the first place in summer, and ultimately cooling in the first place in winter. Insulation plays an extremely important role in both instances. When dealing with insulation, we refer to it as a Value of R. This R represents the ability of a product or building element to resist the transfer of heat through it.

The higher the R-value, the better the thermal performance.

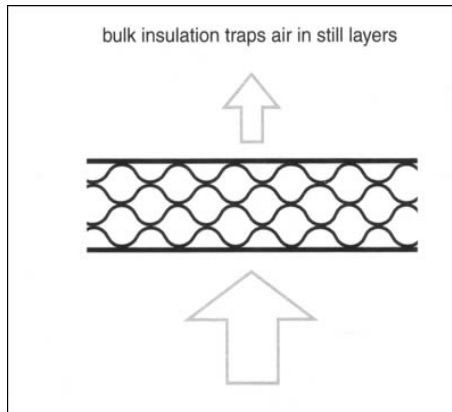
Different construction techniques provide different R values, as do different products. One of the biggest problems with aluminium window frames is that aluminium has an R value of 0, while timber window frames have an R value of between 0.12 and 0.25 for every 25mm of thickness. Aluminium comes into its own as a reflective insulation, reflecting 'radiant' heat, however, poor in resisting heat conduction.

The above wall construction techniques give an R value but don't take into consideration the circumstance of use. Cavity brick for example, accounting for over 95% of Perth's construction, is perfect in autumn and spring, but poor in the extremes. Once they heat up during summer, due to the bricks ability to store heat, stay hot for days even after it has cooled off. To offset this, air-conditioning is required to prevent the inside leaf from heating in the first place, or cavity fill with insulation to increase the R value

WALL CONSTRUCTION	OVERALL R VALUE
Weatherboard	0.55
Brick veneer	0.51
Cavity brick	0.53
Solid brick (230 mm thick)	0.44
Solid concrete (100 mm thick)	0.23
Solid concrete (200 mm thick)	0.30
Aerated concrete (100 mm block)	0.78
Aerated concrete (200 mm block)	1.54
Mud brick (300 mm block)	0.40



and slow the heat transfer from the outside to the inside. Winter is reverse, once the bricks cool, and this effects the inside, the rooms in the house stay cold for days, even if the sun is shining outside. This is where good design comes into play, keeping the sun off the walls during summer in the first place, and allowing the sun into living spaces during winter to heat.

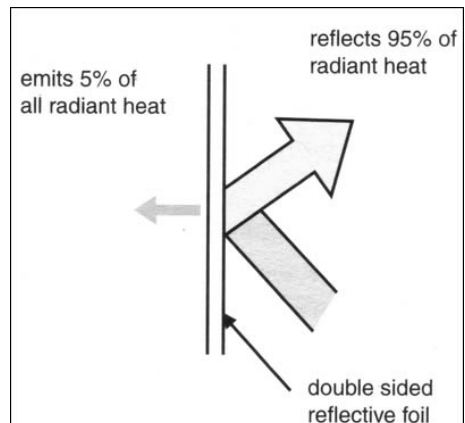


The same occurs here in Victoria with brick veneer construction that contains no insulation in the timber framing leaf of the wall. Too hot during summer, too cold during winter. The advantage of weatherboard, is that there is no brick to store the extremes, so while it may get extremely hot during a summer day, this heat dissipates quickly in the evening allowing a comfortable sleeping temperature. But reverses during winter, freezing temperatures for sleeping at night, but comfortable during the day as it heats quickly. Passive solar design then comes into play with all construction techniques, providing insulation is used, and natural elements taken into account, comfortable temperatures can

be achieved generally all year round with no help of artificial heating or cooling required. All states have regulations to adhere to when it comes to minimum R values in walls and ceilings. Victoria has a required minimum value of 3.0 for ceilings and 1.5 for walls.

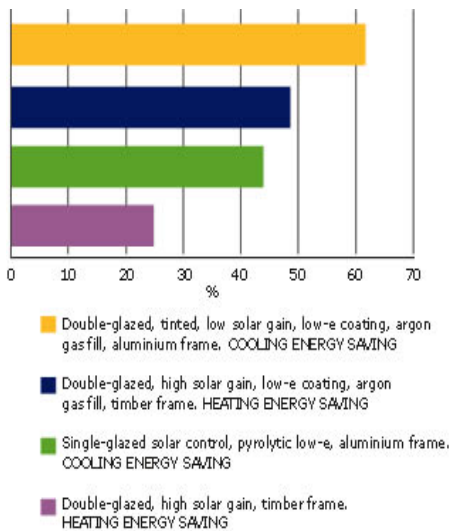
Save up to 45 percent of heating and cooling energy with roof and ceiling insulation.

Internal walls are not required to have any sort of insulation, but it is still an important factor to consider. With insulation in the internal walls, a house can be segregated into 'pods', enabling living areas, if being artificially heated or cooled especially, to be heated and cooled independently to the rest of the house, saving energy and costs. Another benefit to internal wall insulation is noise. Bulk insulation has a high acoustic properties. Especially important in a family home, or surrounding certain rooms of the house ie. Laundries, bathrooms.



GLAZING

GLAZING— Windows and doors (glazed or unglazed), play a huge part in the transfer of temperatures from out to in and vice versa. As well as allowing the flow of air, and natural light through rooms. Australia traditionally hasn't been a big utiliser of double glazing, whilst generally the rest of the world has, especially colder climates such as Europe. The benefits of double glazing speak for themselves, and the near future may bring a requirement that all glazing be double glazed in Australia. Especially when it comes to energy rating requirements. There are many factors to consider when selecting a window, some may include, finished glass treatment, material of window frames, single or double glazing and manufacturing costs. The following are tables that may help you in choosing a style or type of window.



Even with advanced glazing and framing systems, glass areas remain the single greatest source of heat loss and heat gain in a house.

Energy ratings are already playing a major role in glazing requirements. Energy raters are already requiring certain designs in certain areas to have double glazing on west facing walls, and can play a role in the amount of glazing a home has in total.

Some other factors to consider when dealing with window and glass selection are as follows-

- Internal thermal mass
- Air-tightness of frames & opening sashes
- Light transmittance
- Ventilation and placement of opening windows
- Noise control
- Any ongoing maintenance
- Condensation
- Life cycle costing
- Fly screening
- WERS energy rating



Unprotected single glazing	100%
Vertical or ventian blinds	100%
Unlined drapes or Holland blinds, no pelmet	92%
Heavy lined drapes, no pelmet	87%
Unlined drapes or Holland blinds, pelmets	79%
Double glazing	69%
Heavy lined drapes, pelmet	63%
Double glazing with low-e coating	57%
25mm Polystyrene shutters, good airseal	50%
Double glazing, heavy drapes, pelmets	47%

Single glazed industry typical aluminium	100%
Singe glazed thermally improved aluminium	87%
Single glazed timber or P.V.C	82%
Double glazed industry typical aluminium	72%
Double glazed thermally Improved aluminium	60%
Double glazed timber or P.V.C	54%

Unshaded single glazed window	100%
Double glazing	90%
Internal vertical blinds/open weave drapes	76%
Internal venetian blinds	55 – 85%
Internal holland blinds	55 – 65%
Tinted glass	*A 40 – 65%
Solar control film/reflective glass	*B 20 – 60%
Trees-full shade to light shade	20 - 60%
1.0 m Eaves over north wall	30%
External roller shutter	25 – 35%
External awning	25 – 35%
2m pergola over north wall with deciduous vines or shade cloth	20%
Outside metal blind or miniature louves parallel and close to window	15 – 20%



MATERIALS

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MATERIALS— The materials that clad the external walls of your house can be compared to the skin. It has a job to do, But as well as providing a skin to the houses structural elements, it provides bracing, insulation, water repellent, UV protection, a wind barrier and aesthetics. There is a huge range of materials on the market today, ranging from natural products, through to synthetic products and a mix of the two. All building materials and products contain what is referred to as Embodied energy. Embodied energy is the energy consumed by all of the processes associated with the production of a building, from the acquisition of natural resources to product delivery. This includes the mining and manufacturing of materials and equipment, the transport of the materials and the administrative functions.



Embodied energy is a significant component of the lifecycle impact of a home. And as much as materials keep out the elements, some have more benefits than others, for various reasons. ie. Timber has a low embodied energy amount but wears quickly poorly when exposed and compared to other products, while aluminium wears extremely slowly, it also contains the highest amount of embodied energy in its production. With this being an issue, most people choose to use an aluminium window frame, avoiding the re-painting maintenance required

from a timber frame for its protection. On the other hand, timber creates a feeling of warmth, comfort and has a natural look, that used over larger areas as weatherboards or panels, is easily maintained and creates the perfect aesthetics, balance and statement! Materials, historically, have been sourced locally and not travelled the great distances they do today. The life cycle of a material, that being the useful life of a product from mining to disposal, plays a big part in how much of an environmental impact a product has. Aluminium supporters argue that, once aluminium is mined, it is then 100% recyclable, offsetting its high amount embodied energy. But then you have to mould and fabricate the material into a product. Timber on the other hand, with a low embodied energy value, is the perfect material as far as the environmentally conscious is concerned. But that is soon offset when the client then chooses to use a tropical timber from the Amazon. The life cycle of this timber then becomes complicated, logged from unsustainable sources, then milled and transported great distances by truck, to be cut and treated into a product, and eventually put on a plane to be flown thousands of kilometres to be used in a house on the other side of the world. Bricks are a product from locally sourced materials, however due to them being a quarried material, leave a large hole in the ground and along the sides of hills. During the recent Perth property boom, a shortage of bricks soon arose. Instead of changing construction techniques to brick veneer, it was apparently more convenient to import bricks from the east coast of Australia.

MATERIAL	PER EMBODIED ENERGY
Kiln dried sawn softwood	3.4
Kiln dried sawn hardwood	2.0
Air dried sawn hardwood	0.5
Hardboard	24.2
Particleboard	8.0
MDF	11.3
Plywood	10.4
Glue-laminated timber	11.0
Laminated veneer lumber	11.0
Plastics - general	90
PVC	80.0
Synthetic rubber	110.0
Acrylic paint	61.5
Stabilised earth	0.7
Imported dimension granite	13.9
Local dimension granite	5.9
Gypsum plaster	2.9
Plasterboard	4.4
Fibre cement	4.8*
Cement	5.6
Insitu Concrete	1.9
Precast steam-cured concrete	2.0
Precast tilt-up concrete	1.9
Clay bricks	2.5
Concrete blocks	1.5
AAC	3.6
Glass	12.7
Aluminium	170
Copper	100
Galvanised steel	38

As can be seen, each product has its pros and cons. We have only touched on a couple of the more popular materials here, however many factors can be considered when choosing a material for your home.



ENERGY

ENERGY– With Global warming being such an issue in today’s society, new and improved methods for energy generation are popping up all over the world. Most aren't practical for a small suburban site, but as long as your house has a roof, then energy self sufficient energy generation is an option. The most obvious improvement a house can make, is to supplement its water heating with a solar hot water system. A solar hot water system can provide between 50% and 90% of your total hot water requirements. And with water heating accounting for about 30% of an average households energy use. Resulting in big cuts in greenhouse gas emissions, and big savings on bills. Government rebates and increased popularity are making solar hot water affordable, with a wide range of brands and systems now available. Other methods of harnessing the natural elements for energy production vary immensely. The more common method is the use of solar panels on the roof, just the same as solar hot water is situated. Solar panels (photovoltaic) for electricity production are advancing in leaps and bounds. And with renewable energy targets set, residential housing will be playing a big part in achieving this national goal through the installation of such systems. However, solar panels are still a little out of reach for many families as far as installation costs are involved. Other methods of energy production under certain circumstances, ie. rural setting with land, can include wind turbines in open areas or where a consistent breeze is prevalent, and micro hydro generators where a natural stream or spring is available.



Central heating can often heat a whole house, whether individual rooms are occupied or not. Space heating heats the one or two rooms that are in use.

	20 W CFL	100 W INCANDESCENT	65W HALOGEN
Running cost over 10,000 hours*	\$20	\$100	\$75**
Average life	10,000 hours	1,000 hours	2,000 hours
Purchase cost	\$25 1 lamp	\$5 10 bulbs @ 50c	\$20 5 lamps @ \$4
Total cost	\$45	\$105	\$95

As previously discussed, the majority of, and if not all in some unique circumstances, of heating and cooling, can be achieved through the clever planning and design of a house within its siting. However, if required, heating and cooling can still be done consciously and efficiently.

Comparison of central heating system

SYSTEM TYPE	RUNNING COST	GREENHOUSE EMISSIONS
Hydronic zoned with wood / solar heat source	low	very low
High efficiency ducted natural gas	low	low
Hydronic zoned natural gas or heat pump	low	low
Ducted reverse cycle heat pump	medium	medium
In-slab high off-peak electric	medium	high

Gas heaters and efficient reverse cycle heat pumps produce as little as one third the amount of greenhouse emissions of standard electric heaters. With many heating and cooling options available, it is important to choose the right product for the right job. eg. Evaporative cooling systems, although more energy efficient than a split system air-conditioner, don't function in humid conditions.

Making it important to compare the efficiency and effectiveness of heating and cooling systems available.

Lighting is another area of importance related to energy use. Energy use associated with lighting in Australia, is increasing due to larger home construction and the installation of more light fittings per home. Some of the options available include; incandescent lighting, halogen lighting, fluorescent lighting,

and a new technology when referring to house lighting, the LED light. The incandescent light is the most wasteful of the lighting systems, with the majority of its energy used up as the production of heat. The halogen light, pushed by marketers as a low voltage option, is deceiving in that it is not low energy use. The halogen light utilises an energy pack/converter, which itself is high energy use, to downgrade the voltage. Making the halogen nearly as energy hungry as the incandescent bulb. The fluorescent lights, to which there exist multiple options, is the most energy efficient of the popular lighting systems. And as the table shows, although more expensive to setup, is cheaper over the life of the system. Another option, relatively new to housing is the LED (light emitting diode). The LED is more expensive but puts nearly all of its energy into lighting, and as a result produces nearly no heat.

Comparison of space heating systems

	RUNNING COST	GREENHOUSE EMISSIONS
High efficiency natural gas	low	low
Slow combustion wood heater	low	low
Reverse cycle heat pump	medium	medium
Off-peak electric storage	low	high
Electric portable heaters and panel	high	high

CONCLUSION

high impact for the client — low impact to the environment

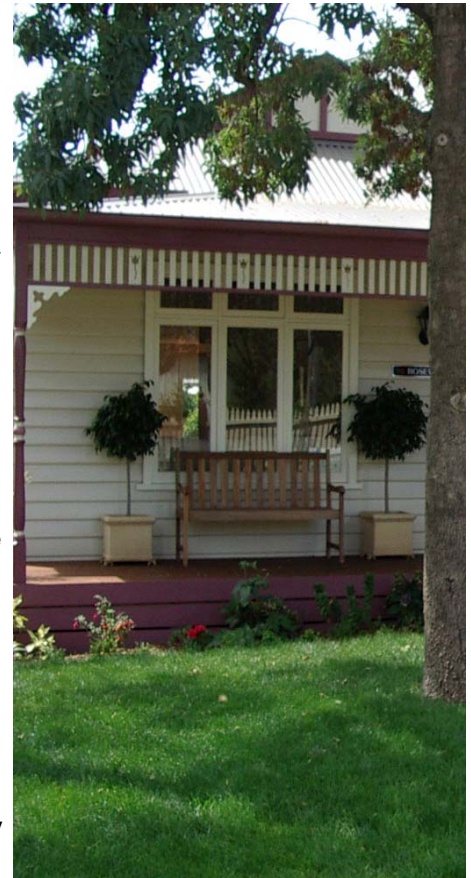
With the fast progression towards a sustainable society and less wasteful living, rules and regulations often lag behind the peoples progression towards the ideal. As a result, care needs to be taken when doing something out of the ordinary to your house. Experts need to be consulted with, and councils contacted to determine compliance with any current regulation. As the environment and resources become more precious, governments and councils will regulate many of the areas governing the construction of your new home.



It is already required that new homes are to be a certain energy rating before they can be approved for building, and renovations and additions are taking the same path. Much of what has been touched on is just a fraction of what goes into designing an energy efficient or sustainable house. The trend is towards each and every person having as little detrimental impact on his or her outside environment as possible, that includes the foot print that their home takes up. An aim of self sufficiency. A lot of what has been discussed is related to design, we are aiming to help you the client



understand what it means and why we design things how we do. It is not required to have a solar hot water system as yet, but if you can afford it, consider it. As stated, all houses are heading in the direction of having their own energy rating, at the moment it is more a question of when, not if. Not only will regulations govern housing construction in the future, but trends and peoples wants and needs will also. People are wanting to do what's right to make the planet a better place for their children and the future generations. And as this increases, people will begin to shop for energy efficient, water wise, sustainable houses for purchase, and investment. Not only does it make sense, but it increases the value of your home for resale, lowers your day to day costs when it comes to bills. With a side benefit of a better living environment. Many products on the market utilise harmful chemicals to make their product. Plastics are linked to increased oestrogen levels in humans. Paints and carpets can off gas for years after installation with links to childhood asthma. ACC treated timber has recently been banned due to high level of the carcinogens. These are just a couple of the issue related to synthetic building products. A lot of what can be done to a home to make it a better place to live, is not possible in all areas. Wind turbines aren't effective in an area that doesn't receive regular wind or breezes. Site size and orientation may limit any opportunities for passive solar design and our sole views to a site may be on the west wall of the house, creating lots of glass on the hottest time of the day, requiring some planning on our part, and liaising with you, the client, to satisfy your wants and needs.



i impact

d design

C consultants pty ltd

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