How To Select Windows

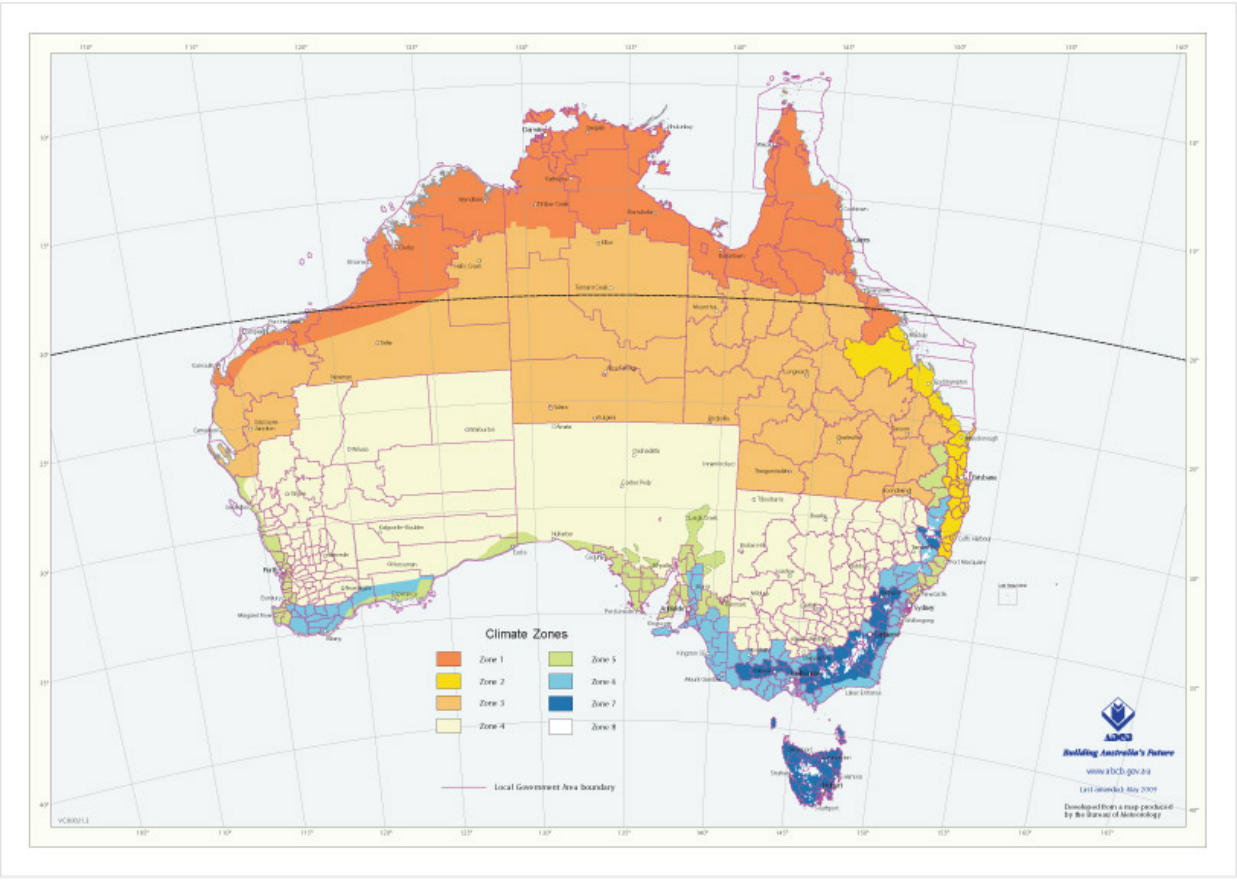
How to Select a Window for Your Climate Zone

As Australia is a wide and diverse country it can be difficult to select the best window for your climate. For this reason the Australian Window Association (AWA) and the Australian Glass and Glazing Association (AGGA) are developing an industry-wide strategy to deliver more sustainable residential buildings through energy-efficient windows and doors.

The SWA project has run over 4000 simulations in all eight BCA climate zones in three house types with a wide range of windows to show the impact of high performance windows on the energy efficiency or star rating of the home. All results have been peer reviewed by a panel of Australian and International scientists.

From the SWA project there have been three Simple Guides to Window Selection Developed. These guides focus on providing the information to allow you to select the best windows your climate. The three guides cover heating areas (BCA Climate zones 6, 7 & 8), cooling areas (BCA Climate zones 1, 2 & 3) and mixed areas (BCA Climate zones 4 & 5).

Download the guide for your local Area at the bottom of the page.



BCA Climate Zone Map - Courtesy of ABCB

How to Select a Window for an Energy Report

Nationally, there are a wide range of energy simulation tools and processes however they all have the same purpose, that being to maximise the efficient use of the home. Energy Reports specify the materials and design characteristics to be used in the construction of the building. With respect to windows, the report will specify any number of given performance levels to meet.

What is needed to comply?
The report will list one or many values for windows, these being U value and SHGC. In order to comply the window system must perform to the set parameters. It's important to note, that these values are 'whole window values', not glass alone.

When looking for a U value, it's important to find a window with a U value Lower than or equal to specified. The SHGC must be within 10% of the set value. For help searching for windows, visit our advanced search engine which has these calculations and many more features built in. Search 'Residential Products'.

Does the material or glazing specified on the report matter?
No, the material or glazing given on the report is used as an indicator to show 'typical' windows in that range. Many window manufacturers have alternative solutions which still achieve the same or better performance values. When looking for a window, search on U value and SHGC to ensure you comply.

SWA - Guides

- SWA - Climate Zones 1, 2 and 3 (2.1 MB)
- SWA - Climate Zones 4 and 5 (2.0 MB)
- SWA - Climate Zones 6, 7 and 8 (2.0 MB)

A Simple Guide to Sustainable Windows

Hot Climate Zones 1,2 & 3

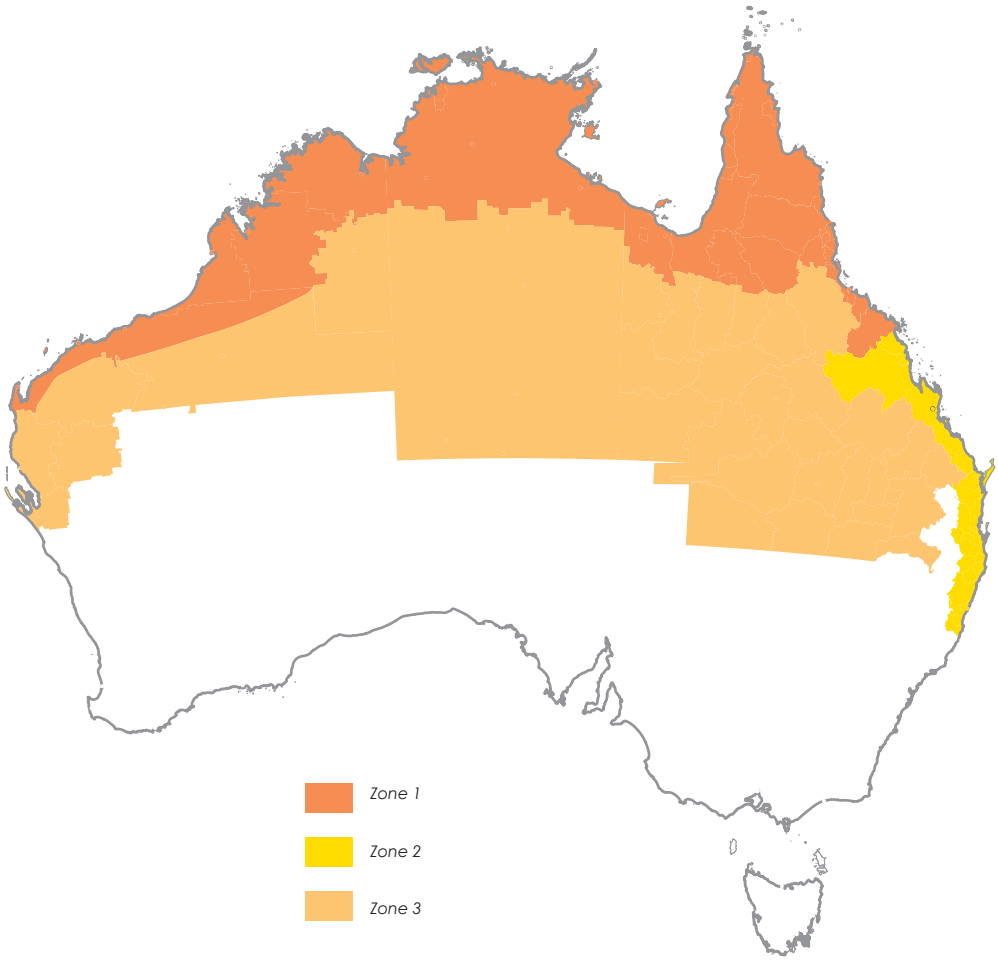
Areas included in these climate zones are Northern Australia, Brisbane, Darwin

What Window Do I Choose?

Window Types
Aluminium
Aluminium Thermally Broken
Timber
uPVC
Fibreglass
Composite

What Glass Do I Choose?

Glass Types
Tinted
High Performance Tint
Tinted Low-E (low gain)
Tint IGU
Tint IGU Low-E (low gain)



About SWA Project

The Australian Window Association (AWA) and the Australian Glass and Glazing Association (AGGA) are developing an industry-wide strategy to deliver more sustainable residential buildings through energy-efficient windows and doors. The SWA project has run over 4000 simulations in all 8 BCA climate zones in 3 house types with a wide range of windows to show the impact of high performance windows on the energy efficiency or star rating of the home. All results have been peer reviewed by a panel of Australian and International scientists.

About the Houses

Houses were specified with R2.0 wall insulation plus reflective foil laminate (RFL) and R5.0 ceiling insulation.

Although the insulation is in excess of the current BCA, these insulation levels were implemented so that non-window heat transfer would be minimised, thus accentuating the sensitivity of the houses to window performance.

The results would not be credible if the houses were under-insulated to start with. Except where noted all houses had concrete slab-on-ground floors, brick veneer external walls and plasterboard internal partitions. It is well known that, for a given house, its annual energy performance for heating and cooling depends on its orientation. To account for this, each house was simulated four times with the house rotated progressively around the four cardinal directions. This yielded an average performance.

About Energy Efficiency

Choosing energy efficient windows will make your home more comfortable, dramatically reduce your energy costs and help to create a brighter, cleaner and healthier environment.

Windows are possibly the most complex and interesting elements in the fabric of our homes. They provide light and fresh air and offer views that connect our interior living spaces with the great outdoors. However, windows can represent a major source of unwanted heat gain in summer and significant heat loss in winter.

Windows can severely impact the heating and cooling loads of a building. Between 46%-61% of a home's heating energy can be lost and between 79%-86% of its heat gained through windows. Improving their thermal performance increases comfort and reduces energy costs and Australia's greenhouse gas emissions.

A Simple Guide to Sustainable Windows

Hot Climate Zones 1,2 & 3

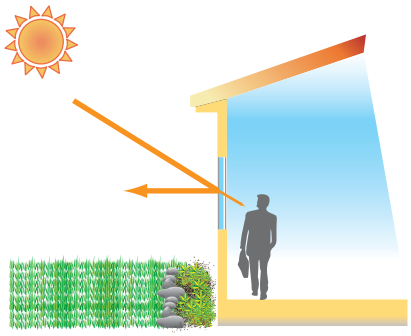
Areas included in these climate zones are Northern Australia, Brisbane, Darwin

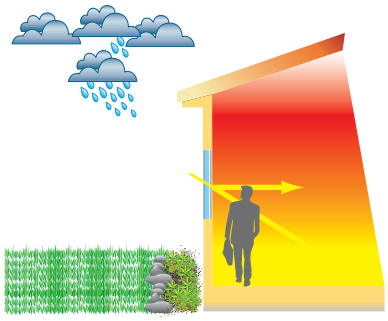
Considerations	Keep solar radiation out of the home Retain coolness of air-conditioned air
Preferred U-Value	Low
Preferred SHGCw	Low
Other Factors	Windows with high operable areas to maximise opportunity for air movement for natural cooling
Star Impact	SHGCw optimised (tinted) - has the potential to improve up to approximately 1 star. U-Value - has the potential to improve up to approximately 0.25 stars for each unit reduction in U-Value. Ventilation - has the potential to improve up to approximately 0.25 stars per additional 20% of openable area.
Heating/Cooling Impact	Each star corresponds to reduction in Heating/Cooling requirements of 15% to 30% on pre improved level. Star uplift due to reducing SHGC reduces cooling load but may marginally increase heating load in cooler months.
Cost and Green House Gases (GHG) Savings	Approximately 3,000MJ of energy saved per star, mostly cooling - worth about $150-$250 and up to 0.35t of GHG. (Based on Brisbane, 240m^2 house)

Notes:

1. *This information is a guide only.*
2. *For more specific information refer to your window or glass supplier or the WERS Website (www.wers.net)*
3. *For window selection, Australian Building Code requirements and energy raters will specify actual U-Values and SHGCw for BCA-DTS or simulation tools such as AccuRate, FirstRate 5 or BERS Pro.*

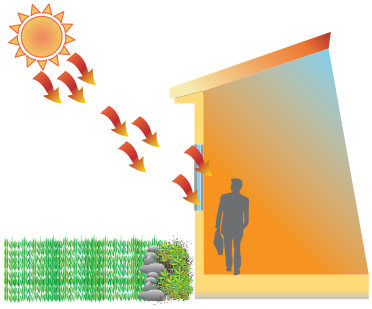
U-Value (U_w)





U-Value (U_w) measures how readily a window conducts heat. It is a measure of the rate of non-solar heat loss or gain through the assembly. The rate of heat is indicated in the terms of the U-Value of a window assembly which includes the effect of the frame, glass, seals and any spacers. The lower the U-Value, the greater a window's resistance to heat flow and the better its insulating value.

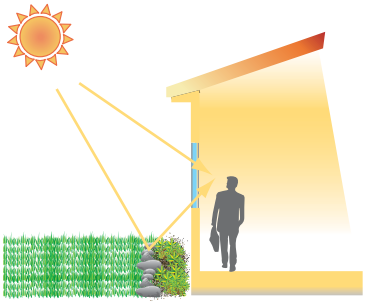
Solar Heat Gain Coefficient ($SHGC_w$)



Solar Heat Gain Coefficient ($SHGC_w$) measures how readily heat caused by sunlight flows through a window. The SHGCw is the fraction of incident solar radiation admitted through a window, both directly transmitted, and absorbed and subsequently released inward.

$SHGC_w$ is expressed as a decimal between 0 and 1.
The lower a window's $SHGC_w$, the less solar heat it transmits.

Visible Light Transmittance (Tv_w)



Visible transmittance (Tv_w) measures how much light comes in through a window. It is an optical property that indicates the amount of visible light transmitted.

Tv_w is expressed as a decimal between 0 and 1.
The higher the number, the more light is transmitted.

A Simple Guide to Sustainable Windows

Mixed Climate Zones 4 & 5

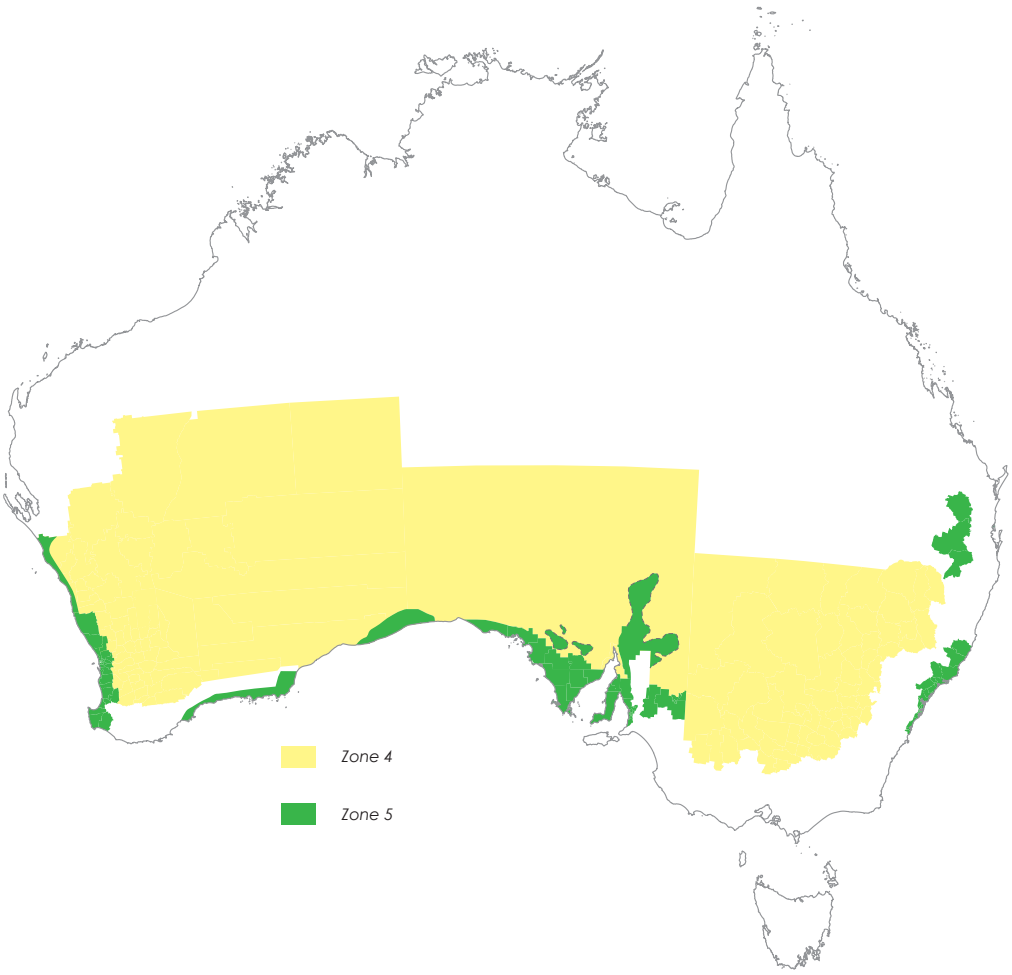
Areas included in these climate zones are Sydney, Perth and Adelaide

What Window Do I Choose?

Window Types
Aluminium
Aluminium Thermally Broken
Timber
uPVC
Fibreglass
Composite

What Glass Do I Choose?

Glass Types
Tint
Tint + Clear Low-E
Tint + Clear IGU
Tint + Clear IGU Low-E



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About the Houses

Houses were specified with R2.0 wall insulation plus reflective foil laminate (RFL) and R5.0 ceiling insulation.

Although the insulation is in excess of the current BCA, these insulation levels were implemented so that non-window heat transfer would be minimised, thus accentuating the sensitivity of the houses to window performance.

The results would not be credible if the houses were under-insulated to start with. Except where noted all houses had concrete slab-on-ground floors, brick veneer external walls and plasterboard internal partitions. It is well known that, for a given house, its annual energy performance for heating and cooling depends on its orientation. To account for this, each house was simulated four times with the house rotated progressively around the four cardinal directions. This yielded an average performance.

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Windows can severely impact the heating and cooling loads of a building. Between 46%-61% of a home's heating energy can be lost and between 79%-86% of its heat gained through windows. Improving their thermal performance increases comfort and reduces energy costs and Australia's greenhouse gas emissions.

A Simple Guide to Sustainable Windows

Mixed Climate Zones 4 & 5

Areas included in these climate zones are Sydney, Perth and Adelaide

Considerations	Balance the benefits of solar heat gain in winter against keeping cool in summer. Use mid-range solar control Reduce heat flowing through windows (in & out) over course of year
Preferred U-Value	Low
Preferred SHGCw	Mid Range (or ideally tuned by elevation)
Other Factors	"Season-specific" physical shading of windows (e.g. eaves over Northern-facing windows) Windows with adequate openable area for ventilation
Star Impact	SHGCw optimised (clear to tinted) - approximately 0 to 0.5 stars U-Value - approximately 0.33 stars for each unit reduction in U-Value Ventilation - little impact beyond the average of 20% openable area
Heating/Cooling Impact	Each star corresponds to reduction in Heating/Cooling requirements of approximately 20% to 30% on pre improved level. Star uplift due to reducing SHGCw reduces cooling load but may increase heating load in cooler months. In general U-Value improvements act to reduce heat and cooling loads
Cost and Green House Gases (GHG) Savings	Approximately 3,000MJ of energy saved per star, mostly cooling - worth about $250 and up to 0.4t of GHG. (Based on Sydney/Perth/Adelaide, 240m^2 house)

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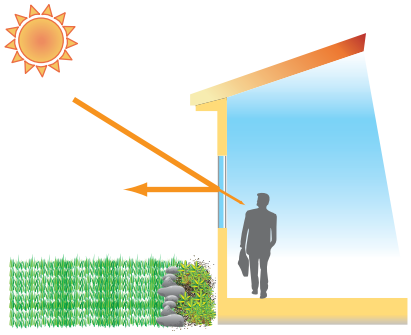
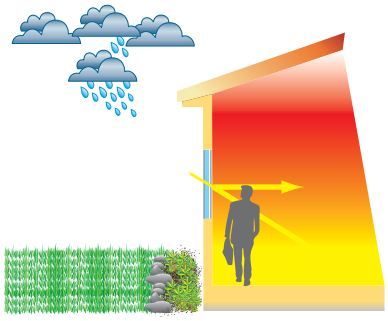
U-Value (U_w)





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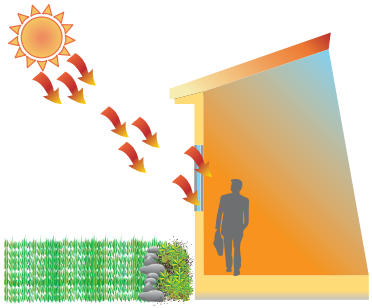
Solar Heat Gain Coefficient ($SHGC_w$)



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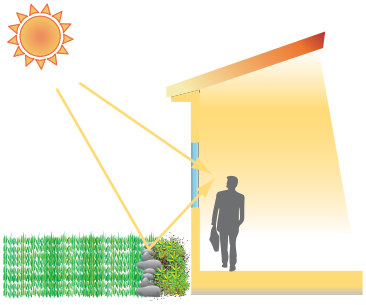
Visible Light Transmittance (Tv_w)



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A Simple Guide to Sustainable Windows

Cold Climate Zones 6, 7 & 8

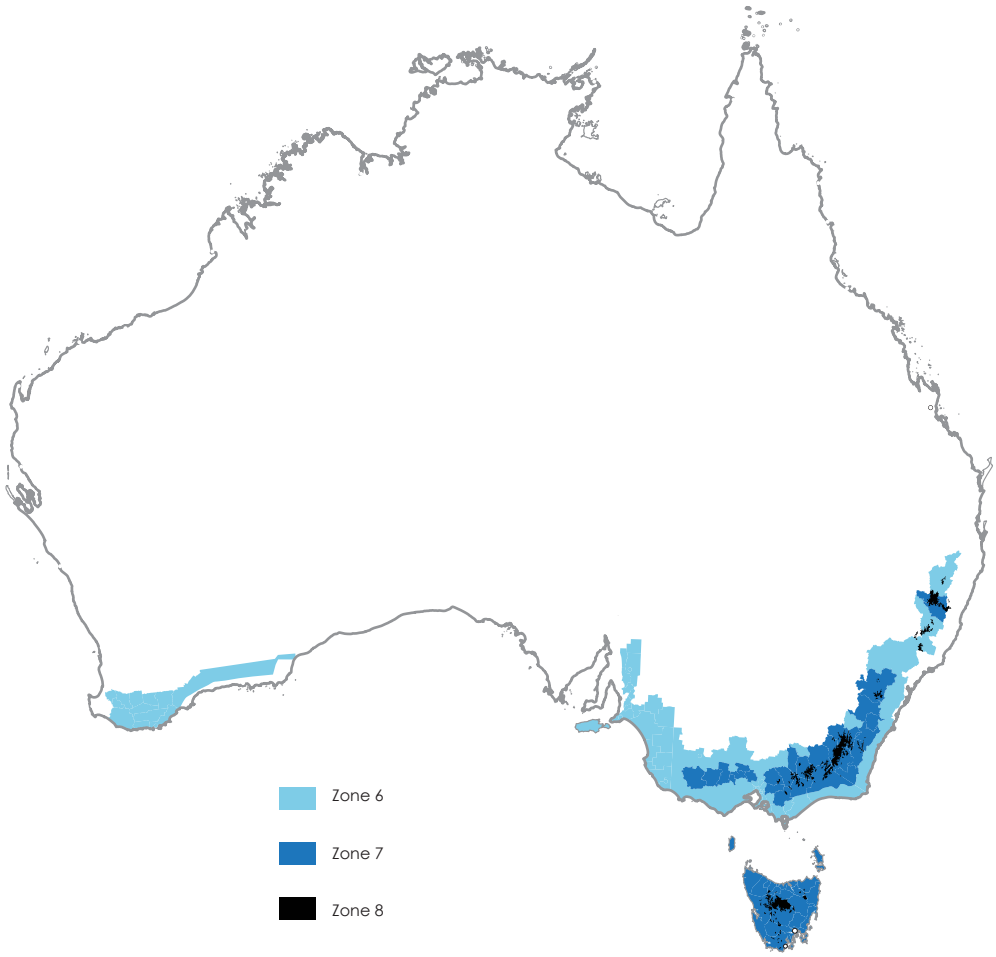
Areas included in these climate zones cover most of Victoria, Australian Capital Territory, Tasmania, and some Southern parts of New South Wales and Western Australia

What Window Do I Choose?

Window Types
Aluminium
Aluminium Thermally Broken
Timber
uPVC
Fibreglass
Composite

What Glass Do I Choose?

Glass Types
Clear Low E
Clear IGU
Clear IGU Low E



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Cold Climate Zones 6, 7 & 8

Areas included in these climate zones cover most of Victoria, Australian Capital Territory, Tasmania and some Southern parts of New South Wales and Western Australia

Considerations	Maximise opportunity to exploit desirable solar heat gain for majority of year. Reduce heat flowing through windows (in both directions) over course of year.
Preferred U-Value	Low
Preferred SHGCw	High (or ideally tuned by elevation)
Other Factors	"Season-specific" physical shading of windows (e.g. eaves over North-facing windows)
Star Impact	SHGCw optimised (clear) - offers no improvement in stars (clear is baseline). U-Value - has the potential to improve up to approximately 0.3 stars for each unit reduction in U-Value. Ventilation - little or no star impact
Heating/Cooling Impact	Each star corresponds to reduction in Heating/Cooling requirements of approximately 20% to 30% on pre improved level. In general Improved U-Values act to reduce heating load throughout majority of the year, though may marginally increase cooling requirements in periods of hot weather
Cost and Green House Gases (GHG) Savings	Approximately 10,000 to 15, 000MJ of energy saved per star, mostly heating - worth about $300/year and approxtimately 1.0t of GHG. (Based on Melbourne/Hobart, 240m^2 house)

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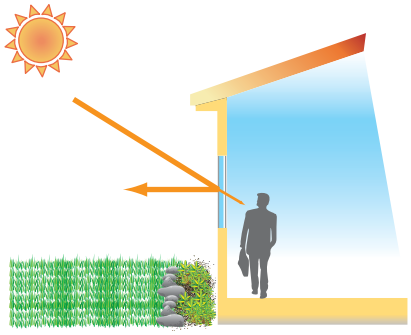

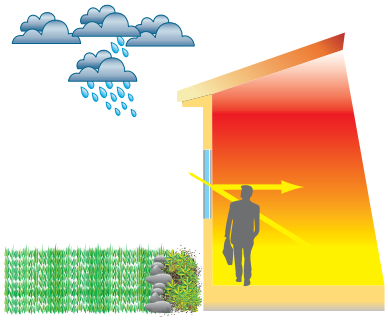

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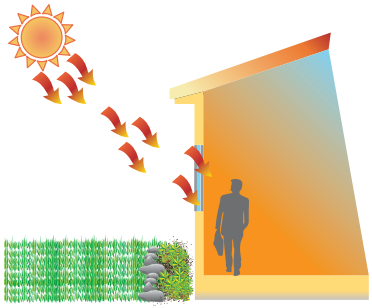

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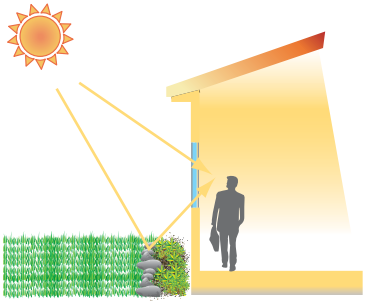

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