Moving to 7 Stars and the new housing landscape

Tips to help achieve 7 Star compliance

Rational for the move to 7 stars homes

To improve the thermal performance and the uptake of more efficient electrical appliances of new housing stock the Federal Government through the Australian Building Codes Board commenced a process of costing upgrades for housing Class 1 and apartments Class 2.

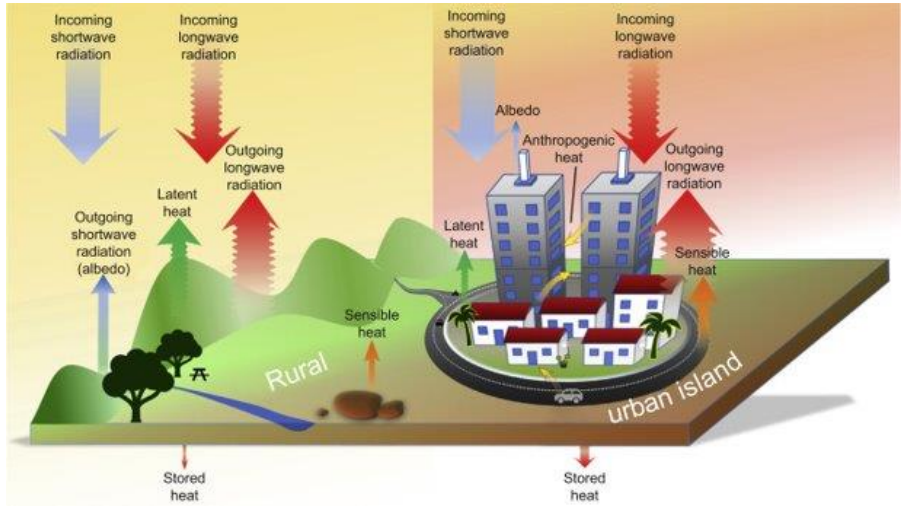
This supports Governments decarbonisation goals.

What has changed with the NatHERS climate files?

Moved from using climatic data over 60 years to more recent climatic data for a 20 year period for revised NatHERS climate files as previous data no longer reflects climatic changes and the impact of urban heat island effect.

How does this influence energy ratings?

- NatHERS star bands have now been adjusted to reflect projected heating and cooling loads for the 69 climate zones.
- 6 star performance you might have obtained previously may or may not achieve the same result today, due these nuances.



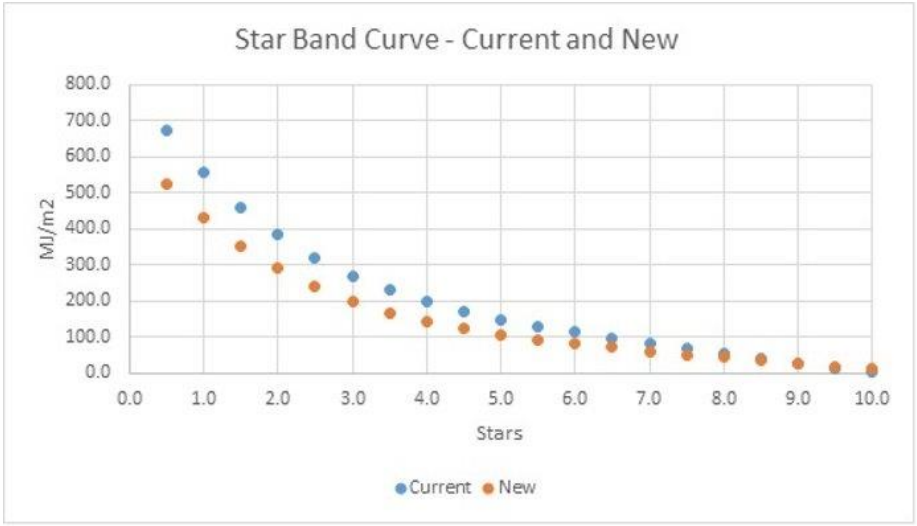
Source: [Researchgate]

Can't we use the same designs and still achieve 7 stars?

Hmmm it will depend on the design and the site orientation!

Due to the change in the NatHERS star rating bands and the new 7 star requirements for thermal performance, some designs may not be able to be used on ALL orientations, without significant expense.

Therefore, you will have to do more design work on the ratings under 7 star, than you did under the 6 star.

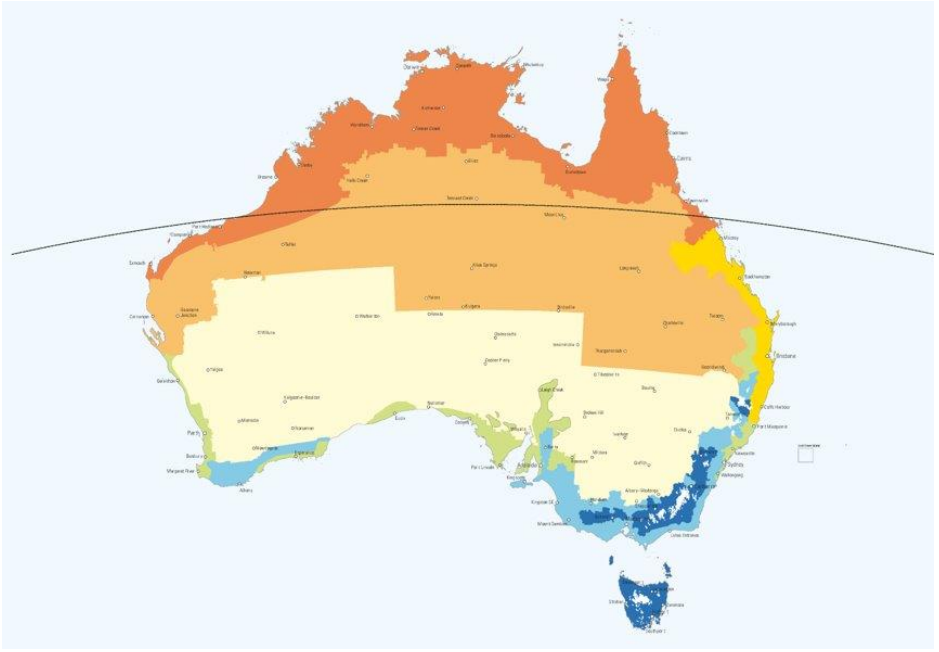


Source: NatHERS

Understand the climates heating and cooling load

First ask your energy rater if the proposed site requires more heating or cooling.

Understanding this will allow you to focus more of your effort on that climate requirement.Text body goes here



Source: YourHome

Different climates requires different strategies

In a **heating climate** then designs should seek to embrace solar passive features to enable solar heat gain in winter and use shading to avoid the solar heat gain in summer. This should be coupled with good levels of insulation in the walls, ceilings and subfloor and good performing windows.

In a **cooling climate** then focus on shading, good ventilation, including cross flows, openable windows, ceiling fans and venting. This should be coupled with good performing windows and insulation in the ceiling, walls and subfloor.

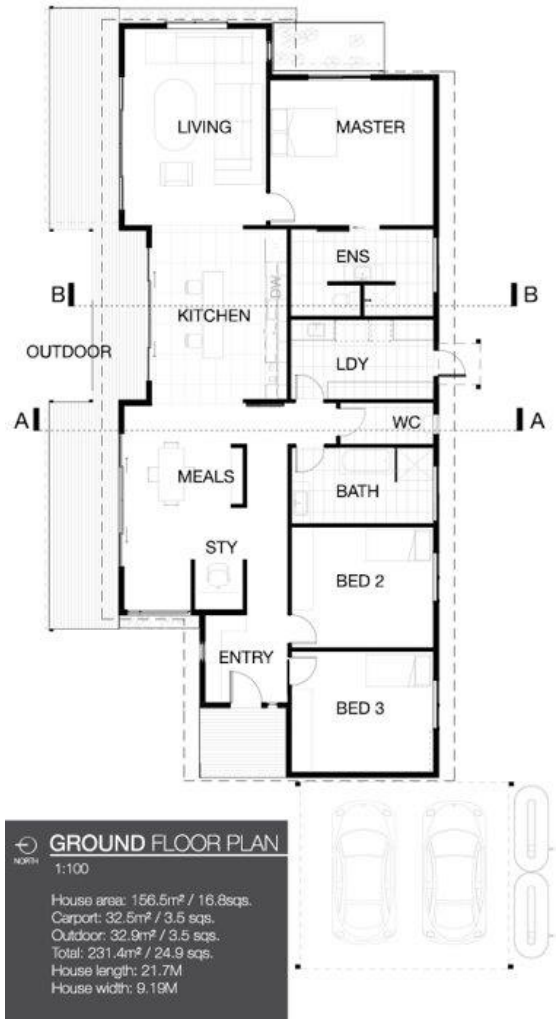
How to reduce the cost of meeting 7 stars?

- Get Energy Raters involved early in the design response to maximise the design for 7 star.
- Accept that perhaps not ALL of the design range will be suitable on every orientation.
- Identify which designs may need to be limited to a specific orientation.
- Where possible match an array of designs with the selected blocks.
- Size the windows according to orientation, the room use and natural light requirements.

Insulation can play an important role in thermal efficiency

Insulation aids to reduce the flow of heat in buildings.

- When coupled with room orientation for optimum solar access in heating climates it is the least cost material that can help towards improved thermal efficiency.
- Insulation in cooling climates are key to reducing the entry of unwanted heat.



Source: Green Design Solutions

Insulation in heating climates

- Ceiling insulation helps to retain internal heat gained or added in winter, which minimises heat loss.
- Whilst you will need to put the minimum R value in the ceiling, say R5.0, you might want to consider increasing this to R6.0 as this will provide greater occupant comfort.
- Wall insulation also helps to retain internal heat gained or added in winter, and the larger area of wall construction the more coverage of insulation and comfort. But an insulated dark box is not an option and penetrations in the wall construction are the weakest point of the building fabric.
- Underfloor insulation aids in reducing heat loss to the cooler environment.
- Insulating at external building junctions, voids and at lintels will help to make the home more comfortable for the occupants.

Insulation in cooling climates

Ceiling insulation helps to reduce heat gain entering the home.

Couple this with a pliable building membrane on the roof will help to reduce the amount of solar heat entering the ceiling space.

Wall insulation also helps to reduce heat being absorbed through the wall profile.

Underfloor insulation helps to reduce heat entering the home.

Pliable Building membrane

- Couple bulk insulation with a pliable building membrane to help manage the amount of heat entering the ceiling space in the summer.
- PBM (sarking, wrap) is an important element brick veneer and clad homes.
- Locate PBM on the walls and install as per NCC requirements to reduce air leaks.
- Locate PBM on the roof to reflect heat and reduce water entry and install as per NCC requirements for water proofing and ventilation.

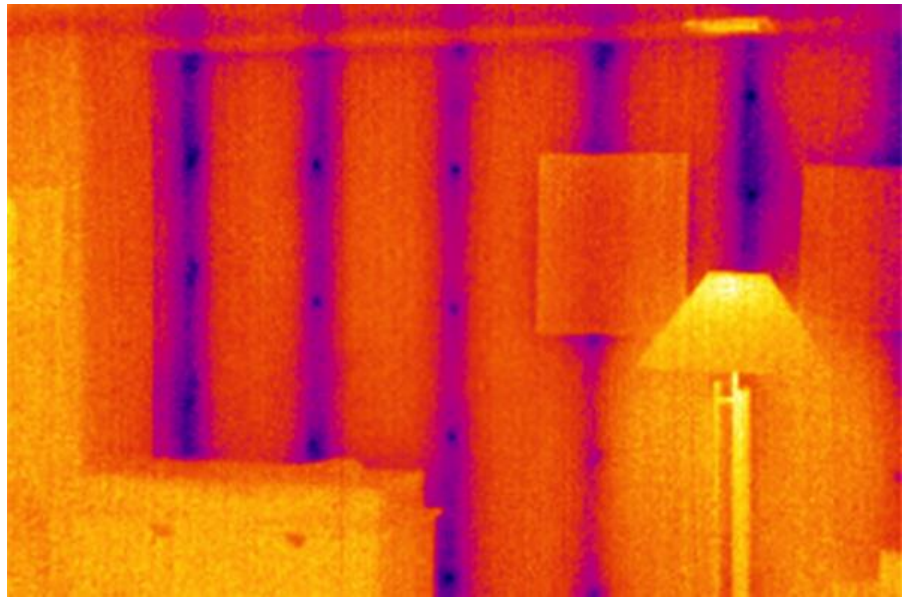
Seal it right!

Manage thermal bridging in the building envelope

Where a material enables heat to be transferred through it more easily than those around it, this is referred to as thermal conductivity and the material creates a bridge for heat transfer both gain and loss.

Work with the energy rater to introduce design features and materials that mitigate thermal bridging, particularly in steel framed constructions.

AVOID this!

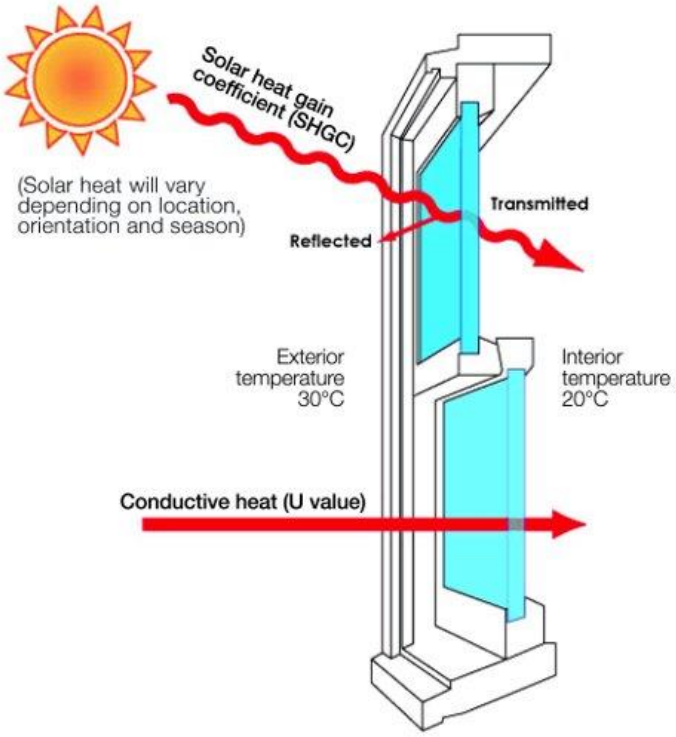


Source: Envirotechture

Solar heat gain and Uvalue explained

For simplicity when we discuss windows it captures the frame, glazing, spacings and seals.

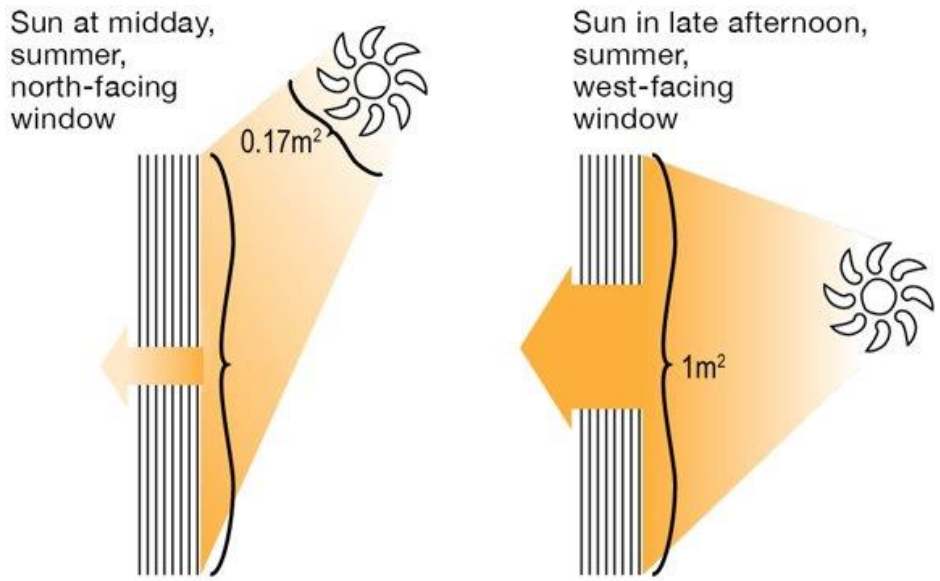
- **Solar Heat Gain co-efficient** (SHGC) relates to the fraction of solar heat gain that can be absorbed or transmitted through unshaded windows, doors or skylights. Measured from 0 - 1 with the lower number resulting in less heat gain.
- **Uvalue** is the measure of heat that transfers through the window. It is the insulation qualities of the window, and the lower the Uvalue the less heat is gained.
- Work with your energy rater to determine the optimum window and door selection and glazing, to provide cost effective solutions.



Source: YourHome

Influence of glazed areas

- Remember heat moves to cold! Windows can lose heat and gain heat throughout the building envelope of the home.
- In heating climates orientate windows to receive solar heat gain in the winter and shade to avoid unwanted summer heat gain. If needed, choose high performing windows in the living areas; and the least performing windows in the utility (unheated rooms).
- In cooling climates focus on reducing solar heat gain, so glazing that has a low solar heat gain co-efficient, along with shading of the windows.
- Whilst low Uvalue windows can have a relative increase in insulation benefits than those with higher Uvalue, when compared to an insulated wall they will lose and gain more heat.
- Selecting windows that have a low SHGC will be particularly important for the east and west windows, where the suns angle of incidence on the surface is greater.



Source: YourHome

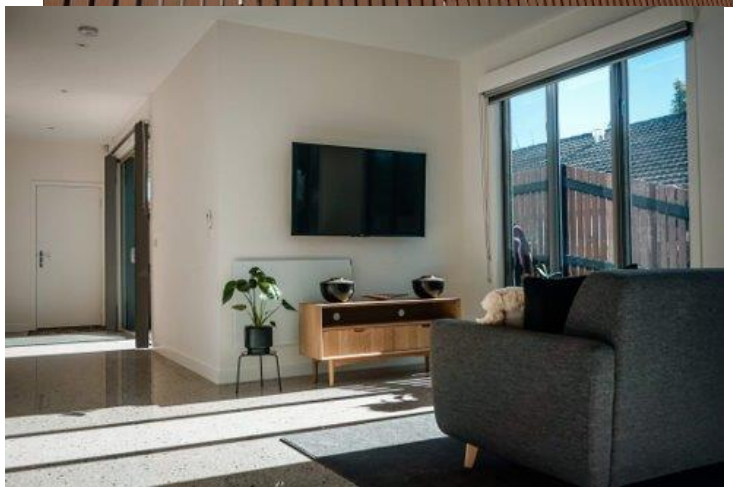
How to manage orientation

South orientation receives a fraction of solar gain on 22nd December. NB there is no solar gain in winter, only heat loss from the home.

In a heating climate:

- reduce the area of south facing windows;
- avoid having glazing to the ground;
- north shading should allow for winter heat gain;
- identify which windows or portion of windows will be shaded; and
- avoid extending the glazing to the underside of north eaves.

winter sun penetration



Source: Green Design Solutions

Other considerations for glazing

- Generally aim for is 22-26% of the floor area. For heating climates consider: 10-15% on the north, 2-5% on the east and west, and 5-7% on the south. If you have good orientation then this could be greater.
- Reduce repetitive windows, consider a singular window for the same area.
- Consider other options than covered alfresco's on the north in heating climates. Explore solutions to offer cover in summer and retract in winter.
- In a warm and hot climate install ceiling fans which can add towards the star rating.

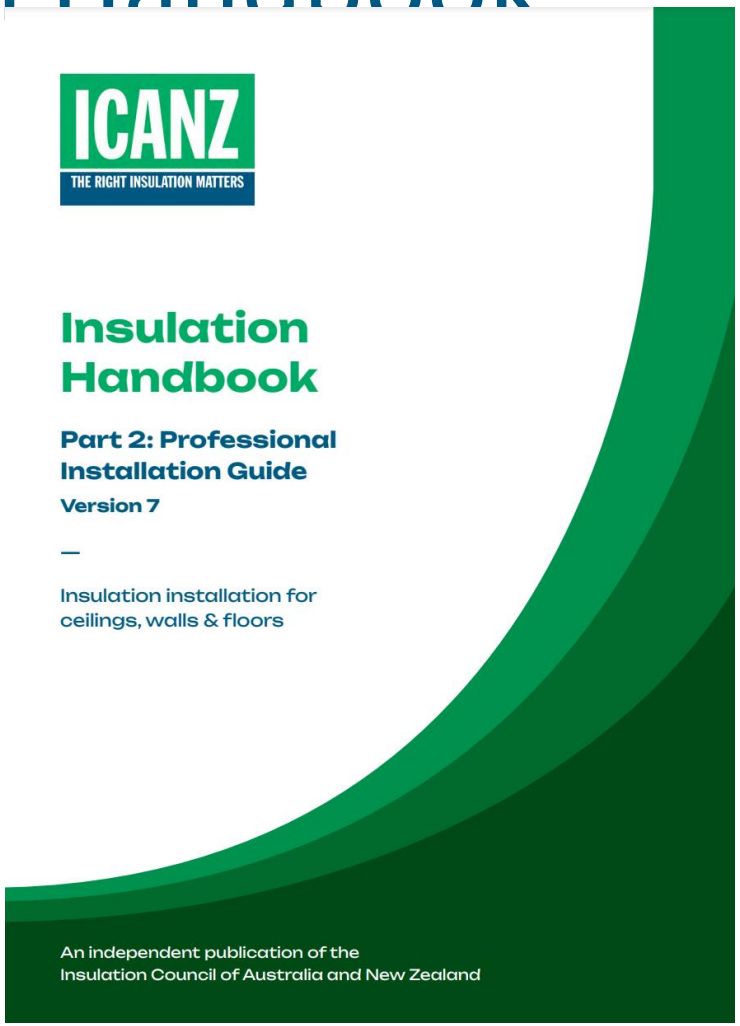
NB Great views to the west or the south, will potentially influence the area of glazing, and customers may choose to pay the $$$$ to respond to the view.

Work with your Energy Rater early in the design phase to get the best affordable solution, where required.

Latest version of the Insulation Handbook

ICANZ has just released the latest version of the Insulation Handbook Part 2: Professional Installation Guide.

This can be downloaded from https://icanz.org.au/resources/



Thank you for your time

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