

AN 8 STAR HOME WILL USE 53% LESS ENERGY FOR HEATING AND COOLING COMPARED TO A 6 STAR HOME.

How do you compare value?

During the development of our modular system we researched the other housing options available to people in the Canberra region. We found that the inclusions, energy efficiency features and construction quality can vary greatly, making fair comparison difficult.

We empathise with people going through this process—a house is often the biggest purchase you will make in your life and it can be difficult to compare the available products, and the price you will pay for them. We compiled this Q & A to highlight areas to consider as you do your own research.

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1. What are the key principles you employ to achieve an efficient home?
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11. What kind of windows will you install?
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INCLUSIONS

18. What scope is there for choice within your inclusions?
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20. Do you include the cost of government planning fees and building certifier fees?

COMMUNICATION

22. What methods of communication and project tracking will you use during the design and construction process?

DESIGN

1. What are the key principles you employ to achieve an efficient home?
 - a. **Orientation:** understanding the sun's position is the key to designing energy efficient houses in our climate. A Jigsaw house is a light-filled home that harnesses the power of the sun over winter and protects you from the sun's heat in summer.
 - b. **Insulation:** appropriate levels of properly installed insulation are critical for creating a comfortable home. Just 5% gaps in insulation can reduce its effectiveness by 50%—Jigsaw houses don't have gaps!
 - c. **Minimising air leakage while allowing for good ventilation:** a highly insulated home is no good if inside air is constantly escaping through gaps in the building envelope. Our design approach and construction methods reduce the opportunities for air leakage. For example, we put few holes in the ceiling, avoid using unsealed downlights and carefully seal junctions and penetrations. Random, uncontrolled and expensive air leakage should not be confused with ventilation. Ventilation is planned during the design phase, controlled by you and very important for a comfortable home.
2. What are the most important design elements in your homes?

Our modular process was developed through workshops with locals from the Canberra region. During this process, community members emphasised four key elements: light, warmth, social spaces and connection to the outdoors. These four elements are a feature in every modular Jigsaw home. As architects, we use a considered approach to resolve the function and detail of each design so that your home has no 'awkward' spaces and 'feels right'. All of these things ensure that your home is highly liveable and enjoyable.

3. Do you use the services of a registered architect, or a draftsman?

Jigsaw Director, Andrew Verri, is a registered architect and all other Jigsaw design staff are registered, or working toward their final stages of registration. To become registered an architect must complete five years of university education followed by at least two years on-the-job experience. Registration is governed against a national standard and is achieved by proof of experience against specific competencies, interview, and examination. Currently there is no governing standard for someone who describes themselves as a building designer or draftsman. For an architect, design is a career and lifetime passion. All of our architects share a passionate interest in sustainable, liveable and affordable housing.

4. Is it easy to extend the home in the future?

Yes. Most people enter the home market by starting small and then moving somewhere bigger if the need arises. This is an expensive, stressful process that often uproots a family to a new community. Our modular homes can be designed for future expansion. Please discuss this with us if it is important to you.

ENERGY EFFICIENCY RATING (EER)

5. What EER does the home achieve?

All new Canberra house plans must achieve an EER of at least 6 stars. We aim for 8. An 8 star design requires 53% less energy per square metre for heating and cooling compared to a 6 star design. With good design, reaching 7+ stars is not difficult or expensive in our climate. As energy prices continue to rise, reducing your home's energy needs is no longer just an ethical choice, but also a smart investment decision. In the future, well designed, efficient homes will command premium prices. Jigsaw has extensive experience in the most affordable ways to achieve high performance homes.

6. Will the house be tailored to the Canberra climate?

Yes. Just like we dress for the temperature, set up a picnic out of the wind, or pitch a tent in the afternoon shade, it is silly to ignore these same elements when it comes to building. Canberra has a continental climate, with dry air, warm to hot summers, and cold winters. We experience cool westerly winds in winter and hot summer winds from the east through to the North West. The average maximum temperature in January is 28°C, but our dry air and elevation often brings cool evenings (perfect for purging built up heat and cooling thermal mass at night). The average maximum temperature in July is just 11°C, however, our crisp winter air leads to many clear sunny winter days (wonderful for naturally heating a home). To invest a large amount of money on a 'one size fits all' house is a poor investment. Our experience, research, and testing, is tailored to the Canberra region, and maximises the performance of your home in relation to heating, cooling, water management, moisture control, ventilation, daylight and shading, and longevity.

7. Do you test the building's thermal performance 'as built'?

Yes. Current Australian housing legislation only requires that the house design achieves an EER of 6 stars. Unfortunately, construction quality and last minute changes can significantly affect the actual performance of the home. Our in-house scientist tests all of our completed homes using thermal imaging and fan depressurization to ensure the building envelope is thoroughly insulated and properly sealed so that the house will live up to its energy efficiency potential. It's just as important to us, as it is to you, that we are producing the high quality buildings that we say we are.

8. What insulation do you use and where?

- R5 Bradford batts to ceilings.
- R2.5 Bradford batts to external walls (including adjoining garage if present).
- R2.5 Bradford batts between levels (if there is a second storey).
- R1.5 Bradford batts to internal walls.
- R1 polystyrene to the underside and vertical edge of the concrete slab.

A thoroughly insulated home will keep you cosy in winter and cool in summer.

9. Do you insulate the underside and the vertical edge of the concrete slab?

Yes. The slab of the house is part of the building envelope and in Canberra's climate it is important to insulate it to maximise thermal efficiency in the middle of the year. Heat from sunshine hitting an insulated slab on a winter's day will be captured and radiated back in to the house—rather than being lost to the earth below or to the cold air around the edge. Insulating the slab, particularly the vertical edge, is not a common practice among traditional builders, but is a simple and vital energy conserving technique in Canberra's climate. We use extruded polystyrene to insulate below the slab and along its edge. We believe every part of your home should work hard to make it comfortable and healthy.

10. What kind of heating and cooling system will you install in our home?

Jigsaw homes require minimal heating over winter and little to no active cooling in summer. Our modular standard includes an electric panel heater, and ceiling fan, to the main living area, as well as under-tile heating to the bathroom. We will simulate the thermal performance of your home's exact design, orientation and construction and discuss upgrade and downgrade options with you.

WINDOWS

11. What kind of windows will you install?

You have a choice. Windows are essentially big holes in your insulated walls and can greatly compromise the thermal performance of your home. At Jigsaw Housing we strongly encourage our clients to invest in double glazing to reduce heat loss over winter and heat gain over summer. We also suggest clients consider a frame type other than straight aluminium which is highly conductive and tends to trigger condensation. The default option in our modular homes is double glazing with composite aluminium/PVC frames. You have the option to upgrade to more expensive, higher performance options or to downgrade to cheaper windows if your budget is tight. We will help you with these

decisions using thermal performance modeling of your particular design so that you can weigh the cost against the thermal benefit. We don't install single glazed windows as we believe they are a poor choice for homes in our climate.

12. Do you position windows to maximize northern sunshine in winter and cross ventilation in summer?

Yes. We have a set of guidelines that are applied to all modules as they are arranged to suit your block and lifestyle. These guidelines maximize the home's potential for passive heating over winter and passive cooling over summer.

13. Has the house been designed to capture views and provide good connection to the outdoors?

Yes. Our guidelines also include a requirement for visual connection to the street and entry area for passive surveillance and large north facing windows/sliding doors connecting to the garden and outdoor entertaining areas. We try to provide every room with an outlook that enhances the design.

BUILDING DURABILITY AND HEALTH

14. How do you protect the house against termites?

We use a physical barrier system called Termimesh. We believe that an impregnable physical barrier is a better solution than using chemical treatments. Its effectiveness is guaranteed for at least 10 years; chemical solutions may start to lose effectiveness in as little as three years.

15. What method of moisture/condensation control do you use?

As housing energy ratings have improved and the use of insulation has increased, moisture control has become an important issue. We install vapour-permeable membranes in the roof and walls rather than foil sarking. When adequate levels of bulk insulation are installed, reflective foil sarkings offer little thermal benefit and their impermeability can create condensation problems within wall and roof spaces in cold winter climates like Canberra's. This condensation can lead to mould growth in your walls and cause serious structural degradation. To reduce the chances of warm moist air entering the walls and roof we ensure that the internal building envelope is well sealed and that exhaust fans are installed in areas generating lots of moisture. If water vapour does get into the walls or roof it can escape through the vapour-permeable membrane, preventing any moisture damage to the structure.

16. Do you use low VOC paints?

Yes. VOC stands for volatile organic compounds. Studies have shown that VOCs can have compounding long-term health effects. While VOCs can be found in many places in a home, one of the most effective ways to significantly reduce them is to use low VOC paint.

17. How long is your structural and non-structural warranty period, and your maintenance service period?

Our structural warranty period is six years after completion. Our non-structural warranty period is two years after completion. ACT regulations require that within 65 days of the date of practical completion, the owner must provide the builder with a written list of the claimed defects, if any, in the built works. The builder must rectify the defects resulting from work or materials not being in accordance with the contract within 15 days of the 65 day period. Jigsaw Housing makes a commitment that is over and above the ACT regulation: we will come back after six months to check in with you and fix any outstanding issues. In addition to the six month check, we would like to meet with you after a year to discuss your homes energy use and evaluate its thermal performance.

INCLUSIONS

18. What scope is there for choice within your inclusions?

The cost estimates for our modules and house plans are based on a 'Jigsaw standard' set of inclusions that we believe to be quality selections on a sensible budget. From here, clients can choose to upgrade or downgrade certain selections. Your choices are made via our interactive online client system, so that you can choose to upgrade or downgrade, item by item, in your own time. Each item is accompanied by relevant information so that you can make well-informed decisions. Many other home building companies will price their houses based on their most basic inclusions, and only offer upgrade options. We start with selections we consider to be good quality and value for money and give you the power to tighten, or expand, your budget in different areas.

19. Do your inclusions cover fencing, letterbox, clothesline, light fittings, fly screens, paving, decking, driveway, and service connections?

Yes. We endeavour to be as comprehensive and transparent as possible with our inclusions and everything is listed in our online client communication/project tracking system. The 'Jigsaw standard' set of inclusions does not include security systems, microwaves, fridges, or curtains/blinds/pelmets.

20. Do you include the cost of government planning fees and building certifier fees?

No. We leave this responsibility to the client as these approvals and certifications are between you, and the relevant authorities. To ensure transparency and quality they should be independent of the building company. Having said this, we will provide all necessary documentation for these approvals, and guide you through the process, as well as informing you of the cost of these fees from day one.

COMMUNICATION

22. What methods of communication/project tracking do you use during the design and construction process?

We use a user-friendly, online system that allows you to log in and see everything in one place: selections, plans, ongoing communication, fees, timeline, construction progress, photos, scheduled meetings, and more. This provides us with an open, efficient and reliable stream of communication, and provides our clients with all the information they need for each element of the project. No question or concern can be missed or forgotten.

A FINAL WORD

Jigsaw developed the modular approach because we saw that the Canberra community needed better access to sustainable, livable, and affordable homes. We are much more than a building company; we are a team of likeminded professionals pursuing our shared passion to make energy efficient housing mainstream. Many of our clients become long term friends. We look forward to meeting you and helping you solve your housing puzzle.