

# CANBERRA

## LOW CARBON HOUSING

# CHALLENGE

OPEN TO ALL ARCHITECTS

FOR PROJECTS IN THE ACT  
+ SURROUNDING REGION

## FREQUENTLY ASKED QUESTIONS

- We encourage you to 'dive in' and use the app
- Use the ⓘ tabs in the app and there are support videos
- Reach out to us if you have a question
- We will routinely post answers to your questions here
- **Request a 1 on 1 modelling session with eTool [here](#)**

# FREQUENTLY ASKED QUESTIONS

Final version (22Oct21)

## THE BASICS:

- 1. Do I have to SAVE my work?** No, this is done for you
- 2. Can I accidentally RESET my model?** No, there are multiple steps before you can reset.
- 3. Why is there a RESULTS button and a CUSTOMISE button side by side?** You can go to 'results' anytime OR you can 'customise' an aspect of the design – it's interactive. When you start modelling, the initial design and it's results reflect the base case house that eTool and the competition organisers have established.
- 4. Can I model my landscape and block size?** No, the lifecycle app focus is on the house ONLY and excludes the wider block, its landscape and outdoor structure such as greenhouses or garden sheds. The landscape irrigation scenarios within the app are to inform water consumption.
- 5. Can I model my locally sourced materials?** For competition purposes your model is not granular for local level materials, but we encourage entrants to describe local materials use, as this will help us to profile the benefits! The capability of the eToolLCD engine sitting behind RapidLCA means this feature will be added in the future.
- 6. What do I do if I can't find my exact material or building system in the menus?** In most instances you will be able to use a similar equivalent (see proxy list last page) menu item because the impact on the overall model will be negligible. If you are unsure then email [support@etoollcd.com](mailto:support@etoollcd.com) and [registrar@lowcarbonhousing.com.au](mailto:registrar@lowcarbonhousing.com.au).
- 7. Can I put in a raked ceiling and where are ceilings accounted for in the app?** The ceiling is always in with the roof template and for multi-storey houses, the ceiling is also in with the upper floor template. For raked ceilings, we ask that you input the average ceiling height where prompted.
- 8. Where are footings accounted for and will a suspended ground floor slab or timber be added?** Your footing structure is in with walls, and yes, suspended/framed ground floor templates can be found in the app.

Design Name  
Example of near 100% improv

Dwellings  
1

Bathrooms  
2.5

Type of Carpark  
Garage

Floors  
1

Gross Floor Area (m<sup>2</sup>)  
169.6

Occupancy Date  
01/06/2022

Energy Monitoring  
Integrated

Thermal Rating  
NatHERS 7.5 Star

Natural Lighting  
High

Water Supply  
Rain Water Supplemented - All Garde

Water Treatment  
Mains Connected

Electricity Supply  
Mains Connected

Shower Head Fittings  
3 star (7.5- 9.0L/m)

Toilets Fittings  
3 star (6.5L/flush, 3.5/half flush 4.0L/

Tapware Fittings  
3 star (7.5 - 9.0L/min)

Washing Machine  
5.0 star (7.5L/kg clothing washed)

Dishwasher  
5.0 star (8.57L/wash for 10 place setting dishwasher)

Garden Type  
Dripper garden bed and no lawn

Rainwater Pump Type  
Undefined

RESET DESIGN TO DEFAULTS

**TIP: add '0.5' for each study or family room, if it doubles as a bedroom; this will help your model**

**For a Lndry or powder room with WC, add '0.5'**

**TIP: GFA includes external wall thickness and covered car spaces. Exclude unroofed car spaces from your GFA totals**

**TIP: if ceilings vary in height or are raking, then input the average height**

**TIP: For a certificate at 7.1or7.2 round down. If at 7.3or7.4 round up etc.**

**Within the Entrant Checklist, nominate your WELs certified fitting if you are higher than 3stars**

**If you don't know your washing machine or dishwasher water star rating then nominate 5stars**

Bedrooms  
4

Carparks  
2

Ceiling Height (m)  
2.5

- 9. What is the basis for the 55 year life expectancy in this competition? Shouldn't we be striving for quality buildings with a much longer lifespan, especially when we are trying to reduce carbon footprints?** Agree longevity is key for good design. This is an interesting topic and one that eTool has researched extensively in the past. If we are to build longer lasting homes how do we achieve that? Studies conducted in Australia (Kapambwe et al., 2009) and the US (Athena Institute, 2004) indicate that less than 10% of buildings are demolished due to reaching the end of their structural service life. In over 90% of demolitions the most dominant factors are “redevelopment” and “buildings ceasing to meet owner’s needs”, so redevelopment potential and adaptability, rather than durability, are key to life span. Though the modelled 55 years offers a realistic life expectancy, based on the data, we encourage competition entrants to describe design features which they feel extend the life of their building, and this will help us to profile alternatives to the ‘knock-down rebuild’ culture!


#### **EXISTING BUILDINGS:**

- 10. How do I account for a demolished house in a ‘knock down rebuild’?** To avoid ‘double counting’, lifecycle assessment does not model the previous house. This is in conformance with International ISO Standards.
- 11. How do I model the existing materials in an alterations and additions project and do I apply a longer lifecycle for existing elements?** This is a great point. The method we are proposing is to actually discount the impacts of the pre-existing parts of the building. You can use the refurbishment templates to quantify your existing house envelope upgrades by floor, wall, roof and ceiling. Watch this video on modelling refurbishment: <https://support.rapidlca.com/modelling-refurbishments/>

#### **APPROVALS AND ENERGY RATINGS:**

- 12. What if my Passivhaus certification or DA/BA is in-progress?** An email or letter from your Passivhaus Certifier stating that the certification is proceeding will suffice. We will also accept **DA/BA ready** drawings.
- 13. Triple glazing and 140mm wall frame for Passivhaus?** We have requested templates for these items.
- 14. What if I don't have a EER certificate?** We suggest you seek guidance on the star rating of a YOURHOME design template that best fits with your design: <https://www.yourhome.gov.au/house-designs#Canberra>

## WATER EFFICIENCY AND WELS:

- 15. When selecting the water efficiency of an appliance or fitting, do you go off the WELS star value or the L usage value?** We go off the L usage, assuming the upper end of the consumption. Water fittings such as toilets and taps link the star rating and water consumption. Showerhead WELS ratings, on the other hand, are less intuitive due to apparent overlap in water consumption across 3/4star categories. For example, the 4 Star WELS rating for showers indicates “Spray force and coverage” so should imply a superior shower with the same water consumption as a 3 shower. Refer to WELS. The app help now explains the advantages of selecting 4 star vs 3 star (use the  button in the app).
- 16. I have a polyethylene tank and what does auto scale mean and should it be OFF for the water tank** We have requested other RW tank materials. Autoscale for the tank can be turned off and the actual literage used.

## LIGHTING, HEATING AND COOLING:

- 17. Is the natural lighting performance round the wrong way (“High” and “Limited” selections assumed 1.4 and 2.2 hours per day runtime respectively)?** These numbers are correct because high natural light leads to lower artificial lighting run time, and this has been clarified in the app.
- 18. Can I select a range of Indoor Lighting Fittings?** Entrants should choose the lighting efficiency that best represents the average of their fittings. Existing code requirements and phasing out of incandescent and halogen fittings have achieved the majority of lighting efficiency gains. Hence you will notice that changing between lighting efficiency options is not a large driver of further reductions.
- 19. Can you include advice in the app on how to calculate lumens per watt so that a menu selection can be made?** eTool will add a support post to help entrants. Template descriptions will include lighting levels (lumens per m<sup>2</sup>) and advice on how to calculate efficacy (lumens per watt) from lighting spec sheets.
- 20. Can we have a few additional heating/cooling menu items (infrared or hydronic wall heating) and advice on the split between heating/cooling?** Have added some information to the app help page on how we calculate the split. Will also add a detailed support post on heating and cooling calculations. A ½ dozen templates have been added to expand the active heating/cooling selections. See overleaf.

- Cooking Appliances - 1 # (Households cooking energy)  
Cooking, Res Electric Oven Induction Stove Op&Em
- Hot Water System - 1 # (240L Electric heat pump h...)  
High Efficiency Heat Pump (HWS\_App)
- Indoor Lighting Fitout - 1 # (Fully Fitted Building)  
LED Residential Lighting (High Efficiency - 110lm/watt)
- Cooling System - 2 # (heat pump(s) 5kW Output)  
Split System Air Source Heat Pump for Cooling, high efficiency (COP/EER 4.4, R410a)
- Heating System - 1 # (heat pump(s) 5kW Output)  
Split System Air Source Heat Pump for Heating, high efficiency (COP/EER 4.4, R410a)

HERE is a sample of the active heating (or cooling) you can include.

Model your primary active A/C (If used).

COMING SOON, eTool is exploring mixed active system solutions such as split system, ceiling fans plus heat panels etc.

- Services equipment · (#) (heat pump(s) 5kW Output)  
Ducted System Air Source Heat Pump for Heating, higher efficiency (COP/EER 3.8), R410a Refrigerant
- Services equipment · (#) (Whole Building fitout)  
Electric under floor heating
- Services equipment · (#) (Whole Building fitout)  
Electric wall or ceiling panel heating
- Services equipment · (#) (Whole Building fitout)  
Gas hydronic heating
- Services equipment · (#) (heat pump(s) 5kW Output)  
Ground Source Heat Pump for Heating, high efficiency (COP/EER 5.5), R134a Refrigerant
- Services equipment · (#) (heat pump(s) 5kW Output)  
Ground Source Heat Pump for Heating, high efficiency (COP/EER 5.5), R32 Refrigerant
- Services equipment · (#) (heat pump(s) 5kW Output)  
Ground Source Heat Pump for Heating, high efficiency (COP/EER 5.5), R410a Refrigerant
- Services equipment · (#) (Heating Unit/s)  
HVAC Residential Gas Heater, Flue, High Efficiency (75%)
- Services equipment · (#) (Heating Unit/s)  
HVAC Residential Gas Heater, Flue, Med Efficiency (67%)
- Services equipment · (#) (Heating Unit/s)  
HVAC Residential Gas Heater, flue-less
- Services equipment · (#) (Airconditioning Unit/s)  
HVAC Residential Ground Source Heat Pump
- Services equipment · (#) (Heating Unit/s)  
HVAC Residential Heater, Hydronic Air Sourced Heat Pump
- Services equipment · (#) (Fireplace)  
HVAC Residential Wood Heater, Open Fireplace
- Services equipment · (#) (Heating Unit/s)  
HVAC Residential Wood Heater, Slow Combustion
- Services equipment · (#) (heater(s))  
HVAC Residential Wood Pellet Heater
- Services equipment · (#) (heat pump(s) 5kW)  
Split System Air Source Heat Pump for Heating, Average Efficiency (COP/EER 3.65), R134a Refrigerant

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## RENEWABLES AND THE NATIONAL ENERGY GRID:

- 21. Can I model the impact of energy derived from a local solar farm? What if I designed for rooftop solar and it is installed in the near-term?** EN 15978 accounts for building integrated renewable generation, see: <https://support.etoollcd.com/index.php/knowledgebase/greenpower-renewable-energy-purchase-agreements-in-lca/>. For the competition, we provide guidance on additional solar options that may apply to your designs (see overleaf for applicable criteria and kW maximums).
- 22. What is the grid factor that is being applied to imported energy? Is this future looking with a grid factor associated with a 100% renewable national grid, an increase in energy storage and interstate transmission?** In summary, eTool follow the EN15978 standard which requires we use today's grid factors and is an effective method of modelling better designs. See: <https://support.rapidlca.com/rapidlca-electricity-grid-impacts/>. The following are also important considerations:
- The decarbonisation of the grid relies on distributed generation and storage such as roof-top solar so disincentivising distributed generation now would likely lead to delays in decarbonising the grid.
  - Energy efficiency and the associated demand reduction is also a core contributor to a decarbonised grid.
  - “Banking” carbon savings that rely on policy makers and energy utilities to set targets and deliver on these targets carries significant risk. Even in nations where grid decarbonisation ‘stretch’ targets have been set and where significant progress has been made, the targets / predictions are proving difficult to achieve. UK is a good example, as they have already halved their grid intensity and are targeting net zero with aggressive yearly targets between now and 2030. Although they’ve achieved a lot already they have also missed some of their targets.
- 23. What grid factor is being used for photovoltaics fed from the house to the grid and imported back into the house (including time of year/winter performance loss)?** RapidLCA has two different factors for the grid:
- Imported electricity (NSW / ACT NEM Average) including all scope 3 emissions which encompasses the grid infrastructure itself.
  - Exported electricity which is a credit for reduced generation (NSW /ACT NEM Average) only accounts for the generation impacts (or in this case credits) but not the grid infrastructure.
- So using solar power on site will have a larger ‘benefit’ than exporting it. At this stage these two factors are static rather than reflective of the generation average at the time of day the electricity is generated (but watch this space, real time grid factors and tariffs are on the eToolLCD / RapidLCA roadmap).

See overleaf for advice on modelling solar in the app.

Quantity (Other) (kW)  
7.7

For completed projects enter your kW performance within the app and include information on your selected rooftop solar at the Entrant checklist.


Alternatively, the following kW maximums apply to rooftop solar designed for in-progress projects, local solar farm serviced projects OR projects with near-term solar installation (under 5years):

1-2bed house	3kW maximum
3bed house	5kW maximum
4 bed house	7-10kW maximum



- 24. What is the source of the ACT electricity grid?** We think this article offers a good precis: <https://www.abc.net.au/news/2019-10-01/act-is-100-per-cent-renewable-but-what-does-that-mean/11560356>
- 25. How is the carbon intensity of the electricity grid accounted for in the model (using a 100m<sup>2</sup> 1star 5kW solar house example)?** The app follows the [EN15978](#) standard and uses AusLCI grid factors reconciled against [2020 NGERs](#). RapidLCA analyses some of the consequential impacts of house design across its overarching categories of *Energy*, *Materials* and *Construction*. eTool modelled a 100m<sup>2</sup> 1star house with 5kW of solar for us and the result was a 33% improvement on the baseline. We think this is a great example because it illustrates the contribution of energy efficiency and house size even when it's operating energy comes from renewables.

### **MATERIALS TAKE-OFFS (AREAS AND QUANTITIES) :**

- 26. Should I use the automatic calculations of wall, roof, floor, slab, window and ceiling areas in the app?** The app extrapolates envelope calculations based on 'typical' house floor to wall ratios. This is fine for modelling impacts at the early design stage but because entered projects feature areas/quantities that are refined or built, **you must input quantities as they appear on your stamped Building or Planning drawings.** By doing this, the range of house typologies and their different shapes and sizes will be best represented.
- 27. Regarding the external wall areas I assume these exclude the windows and doors. Are the measurements taken to finished floor level or to finished ground level?** Account for walls to floor level or floor rebate level. Exclude wall openings. The suspended ground floor slab and suspended timber framed floor templates will have their own wall base.
- 28. I can see that the GFA includes a garage/carport. But what about floor/walls/roof of this structure? In my case there's a slab, a colorbond roof and several masonry walls. But the assemblies differ from the house.** You can add more envelope types using the  symbol (bottom left corner). [Request a template prior to 30Aug.](#)
- 29. Regarding the \$/m<sup>2</sup> can you please clarify what building elements should (or shouldn't) be included and which area (ie, is it just the GFA)?** Build cost is defined as \$/m<sup>2</sup> for the house GFA (including its garage or carport). This mirrors the LCA parameters, which focus on the house, but exclude the wider site and landscape.

See overleaf for tips on autoscale and take-offs.

↓ Glazed Area  
Windows, Residential PVC Double Glaze, Fly Screens

Adjust Quantity

☰ Quantity (m2)  
33.21

↑ The app **AUTOSCALES** areas based on your house size/height.

We ask you to enter areas taken off from your drawings or CAD/BIM model

The example here is windows, but do this also for:

- Roof
- Walls
- Floors and floor finishes
- A/C
- RW tanks etc

Also confirm numbers of doors.

## TO TURN OFF AUTOSCALE:

↓ Glazed Area  
Windows, Residential PVC Double Glaze, Fly Screens

☰ Quantity (m2)  
17.3

**ON:**

Automatically scale quantity with **Glazed Area** attribute

↓ Glazed Area  
Windows, Residential PVC Double Glaze, Fly Screens

☰ Quantity (m2)  
17.3

**OFF:**

Automatically scale quantity with **Glazed Area** attribute

TEMPLATE (T) QUERY OR PROXY (P) TO USE	T or P	Comment (answer or which proxy applies)
<b>HEATING AND/OR COOLING</b>		
Outside air intake with inline fan (AND for heating)	P	Use the "Heat Recovery Ventilator..." proxy
Ducted HVAC Energy Recovery System (AND for heating)	T	eTool added this template
Elec underfloor tile heating (bathrooms)	P	Secondary heating, just choose one primary heating mode for now
Cater for heat/cool hybrid system or primary + 2ndary?	note	Choose one primary heating mode (hybrid active A/C will be introduced later)
Ducted A/C Bulkhead Units + Wall mounted A/C Units?	T	eTool added this template
<b>EXTERNAL WALLS + CLADDING</b>		
140mm frame (R4.0 insulation) + 35mm batten + metal face	T	eTool added this template but expect a minimal carbon impact
Metal cladding option for wall types	T	eTool added this template
Dintel retaining wall template (retaining walls generally)	T	eTool added some retaining walls
Blade or courtyard walls	P	Use the nearest external wall template as a proxy
Internal airtightness barrier and its battens	P	Airtightness reflects the NatHERs star bands operationally
Adding more insulation to a brick veneer/double brick external wall	P	Use "Refurbished existing external framed wall..." as the presence or absence of existing brick won't impact your embodied energy modelling
<b>INTERIOR WALLS</b>		
New timber stud internal wall with R1.5 insulation	P	Use the internal timber stud wall
Timber lining in lieu of plasterboard	T	Use "Wall, Internal, Framed, Timber Stud Plywood and paint finish"
Assuming MDF skirtings/architraves included	note	MDF skirtings are included
Refurb timber stud internal wall R1.5-2.0 insulation correct typo	note	Incorrected description resolved, thanks for picking this up
<b>ROOF</b>		
290mm rafters (ie, in lieu of trusses?) R5.0/R6.0 insulation	P	Use the truss roof as a proxy
Option for non-plasterboard ceiling lining such as plywood	P	Use plasterboard as a proxy; alternate ceilings are coming in the future
<b>WINDOWS</b>		
Triple glazed (per passivhaus request)	T	eTool added this template
uPVC high solar gain low e double glazed windows	P	Use the double glazed PVC windows proxy
Composite Timber and Aluminium frame	P	Use aluminium as a proxy
<b>RAINWATER TANKS</b>		
Poly tanks and concrete tanks	TBA	eTool added a mix
<b>FLOOR SYSTEMS OR FLOOR LINING</b>		
New waffle pod slab with R0.7 to underneath slab, R1.0 vertical edge	P	Use the existing waffle pod, negligible difference
New suspended timber floor with R2.0 insulation	P	Use "Elevated Floor, Timber Frame..." or "Lowest Floor, Timber Frame..."
Exist suspended timber floor with R2.0 insulation	T	Use "...Refurbished Raised Floor, New Insulation Only"
Bamboo flooring	P	Use timber floor proxy
Accounting for a reused concrete slab	P	Set the concrete slab impact to 0.00001m <sup>2</sup>