
AUSTRALIAN
ZERO CARBON
HOUSING
CHALLENGE

FREQUENTLY ASKED QUESTIONS

The Australian Zero Carbon Housing Challenge is an initiative based on the Canberra Low Carbon Challenge that began in 2021. The questions you see here are drawn from participants of Canberra version and the Pilot conducted prior to this launch.

They are grouped into useful topics OR you can search using key words and FIND.

- We encourage you to 'dive in' and use the app
- Use the **?** tab in the app and this will link to the support page and here you will find support videos
- In the support page there is also the ability to submit a question about the use of the app
- This document will be routinely updated with your questions and answers

Request a peer-to-peer modelling session with Cerclos here

THE BASICS:

GETTING STARTED AND DESIGN INFO

1. **How do I sign in?** Refer to Video 1 (Quick start demo) and the general guidance document

2. **Do I have to SAVE my work?** No, this automatically done as you progress through the app

3. **Can I accidentally RESET my model?** No, but you can choose to redesign at any time, even after submitting results.

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 structures such as greenhouses, uncovered decks, open pergolas or garden sheds. The landscape irrigation scenarios within the app are to inform water consumption. Note that unenclosed covered areas such as an entry portico or garages are included.

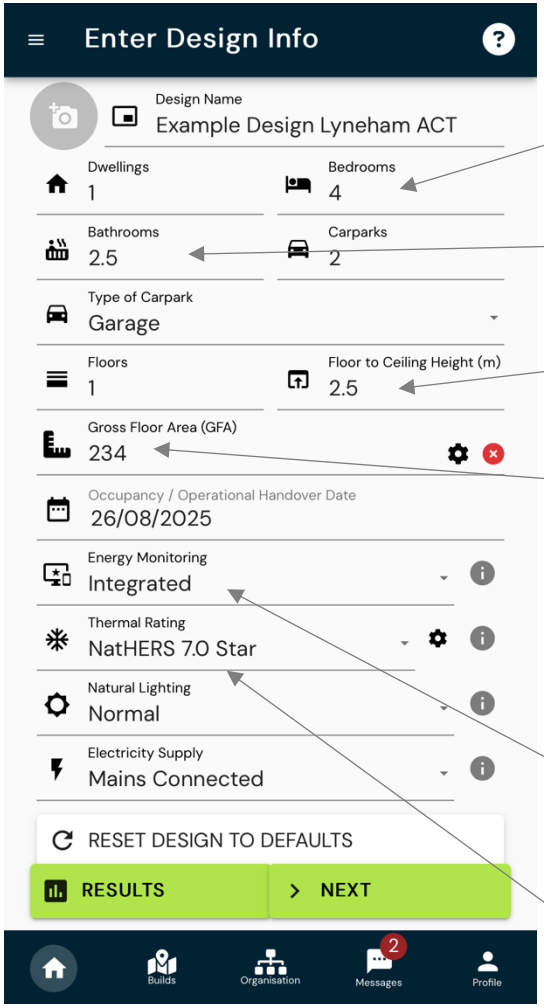
5. **When adding in the general design details, there isn't an opportunity to increase occupant numbers in the design. I've added 3 bedrooms for a family of 4 yet the results are based on 2 occupants.** Occupancy can improve carbon performance since the functional unit is kgCO_2e per occupant per year, but it also increases the impacts in the operational stage. That said, I think it's important to clarify some Life Cycle Assessment (LCA) principles.
   In reality, the number of occupants in a dwelling can vary significantly over its service life. Even if a house is designed for a specific number of occupants, this number is uncertain in practice. In this project, the service life of the dwelling is 55 years. A realistic approach in LCA is to model using reliable statistics rather than assumptions, as conditions can change and assumptions may become irrelevant over time.

LCA evaluates environmental impacts over the entire life of the asset, and occupancy directly affects operational inputs such as energy and water use. Many factors influence occupancy over a building's life—people may move houses for work, purchase new properties, go on holidays, or experience changes in family size. Since LCA considers the number of occupants using operational resources each year, using industry-average statistics is the most realistic way to model the asset over its life.
I understand that study authors want to model the design as accurately as possible; however, for variables like occupancy, the recommended approach is to use ABS data. This provides a standardised, fair estimate of dwelling occupancy across different projects and ensures comparability between LCA studies. Below is an example subset of data:

Occupants per Dwelling	1 Bedroom	2 Bedrooms	3 Bedrooms	4 Bedrooms	5 Bedrooms	6 Bedrooms
Australia (ABS)	1.32	1.78	2.5	3.26	3.82	4.0

6. **What is the basis for the 55-year life expectancy in this Challenge? 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. 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. The modelled 55 years offers a realistic life expectancy average, based on typical Australian industry assumptions which ranges between 50 - 60 years. We encourage Challenge 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!

Following are some tips while entering design data (refer also to guidance document).



TIP: If it is a bedroom but used as a study count it as 1 bedroom. If it is a study or family room that doubles as a bedroom add 0.5 for each

TIP: For a laundry or powder room with a toilet/WC add 0.5

TIP: If ceilings vary in height or are raking, input average ceiling height

TIP: GFA includes external wall thickness, unenclosed covered areas attached (such as covered entry portico, garages, covered attached areas). Exclude unenclosed/open air car spaces, uncovered decks and pergolas from your GFA totals.

TIP: If the house has a digital meter or PV solar system then select Integrated.

TIP: For a 7.1 or 7.2 rating – round down. For a 7.3 or 7.4 - round up.

7. **Can you please assist and also advise if I should be entering the three dwellings into the same 'Lot' in RapidLCA or separately. As they will likely have differing reduction targets and methodology in retrofitting etc.** Whether you add the three dwellings under the same lot or separately depends on a few factors, mainly how you want to report the impacts. If you need three separate reports — one for each dwelling — then it's best to model each dwelling individually. Another consideration is the NatHERS rating. If all three dwellings are assumed to have the same rating (with the same heating and cooling demand), then it's fine to model them together in one lot. If their ratings differ, the recommendation is to model them separately and adjust this parameter accordingly. It's also worth thinking about differences in dwelling design. For example, if one dwelling is single-storey and another is two or three storeys, the software will automatically include or exclude stairs and assume a certain number for each dwelling. You can adjust the template quantities to correct this, so it's not a major issue, but it's something to keep in mind. In both cases, you'll still be able to customise template quantities and add new templates if required.

DESIGN STAGE AND ENERGY RATINGS

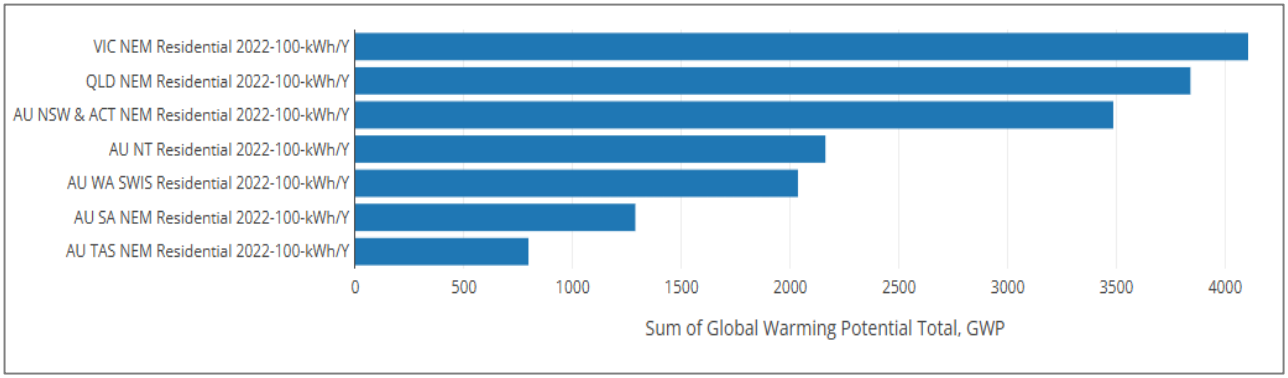
8. **What if my Passivhaus certification or DA/BA is in-progress?** An email or letter from your Passivhaus Certifier stating that the certification is proceeding will be sufficient. Generally evidence for your records that the certification is to the level expected.

9. **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

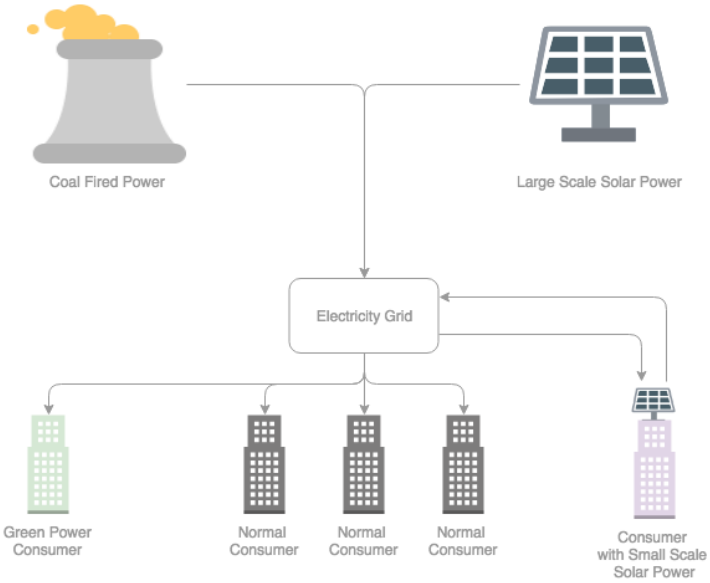
   The NatHERS website also has links where you can obtain a notional rating.

ELECTRICITY SUPPLY

10. **What is the variance between the electricity supply in each state?** Refer to support article RapidLCA Electricity Grid Impacts. https://support.rapidlca.com/rapidlca-electricity-grid-impacts/. In summary, electricity grid emissions vary across Australia because each state uses a different mix of energy sources. Tasmania has the lowest emissions, with most electricity coming from hydropower and other renewables. South Australia is also relatively low, thanks to a large share of wind and solar. Victoria and Queensland have the highest grid intensities, as they still rely heavily on coal—brown coal in Victoria and black coal in Queensland. New South Wales is slightly lower but still mostly coal-based. New South Wales and the Australian Capital Territory share the same electricity grid and are both part of the National Electricity Market (NEM). This means the same amount of electricity can have different carbon impacts depending on where it is used. Overall, the grid is gradually getting cleaner as more renewable energy comes online.
    For more details on Australia electricity generation, you can refer to the Australian Energy Statistics: https://www.energy.gov.au/energy-data/australian-energy-statistics/electricity-generation



11. **What is the source of the ACT electricity grid? I expected a better result as it has been publicised that it is 100% renewable.** The ACT has committed to purchasing 100% green power which is important for incentivising the renewable energy industry to produce more clean energy. However, this doesn't mean that the ACT's grid is only powered purely by renewable energy. This is because the ACT is still being powered by the existing grid where the distribution of renewable energy is not so clear-cut. The electricity grid is usually a mix of renewable and fossil fuel sources even though consumers choose to purchase green energy. The following demonstrates this.



To avoid double counting, international standards dictate that green power energy purchase agreements should not be modelled in LCA but the average grid intensities for that region be used instead. This is why you will find that your operational energy impact for your LCA may still be quite high. For more detailed explanation on how Green Power works, please refer to this support post:

https://support.etool.app/index.php/knowledgebase/greenpower-renewable-energy-purchase-agreements-in-lca/

We think this article offers a good precis on the ACT electricity grid: https://www.abc.net.au/news/2019-10-01/act-is-100-per-cent-renewable-but-what-does-that-mean/11560356

12. **I'm keen to know if Cerclos have yet added functionality for off grid projects? We're always trying to calculate the embodied energy of our off grid systems, and cancel out all lifetime energy use, without having the pay back of being grid connected. The last time we checked, this still couldn't be done.** Unfortunately, that option isn't available yet. Users can model off grid dwelling using eTool, which is a more comprehensive tool. For RapidLCA, we are looking to integrate this functionality in the future, but it's not available at this time.

WATER BALANCE INPUTS:

13. **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).

14. **I have a polyethylene tank and what does auto scale mean, and should it be OFF for the water tank?** Auto scale for the tank can be turned off and the actual size in litres used.

INTEGRATED SERVICES:

LIGHTING, HEATING AND COOLING

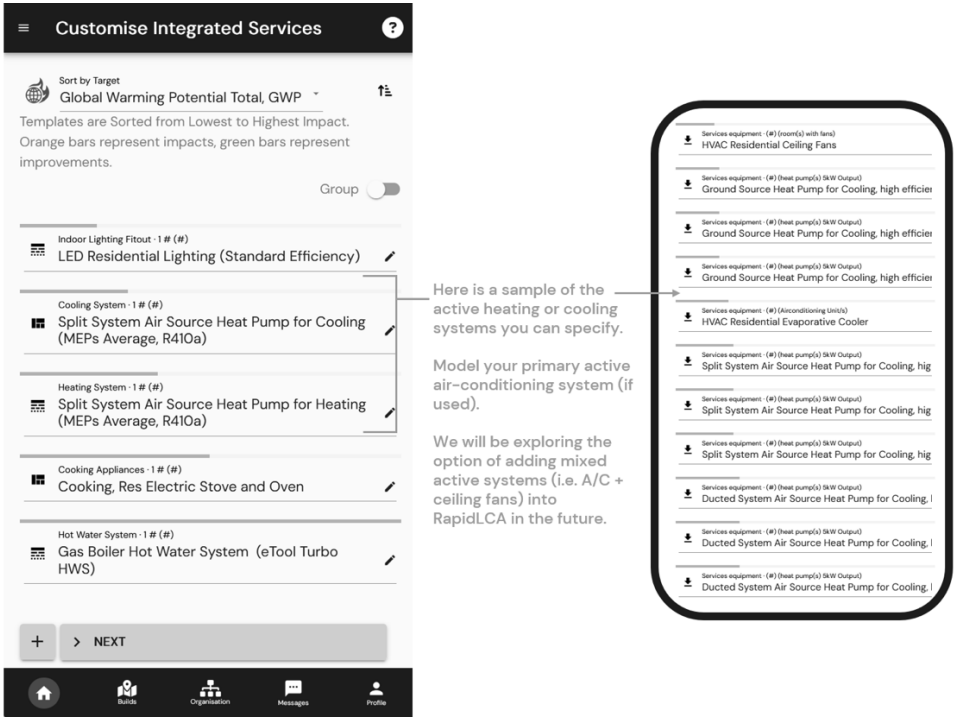
15. **Is the natural lighting performance round the wrong way ("High" and "Limited" selections assumed 1.4 and 2.2 hours per day runtime respectively)?** These numbers are correct because high natural light leads to lower artificial lighting run time, and this has been clarified in the app.

16. **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.

17. **Can you include advice in the app on how to calculate lumens per watt so that a menu selection can be made?** Cerclos will add a support post to help entrants. Template descriptions will include lighting levels (lumens per m2) and advice on how to calculate efficacy (lumens per watt) from lighting spec sheets.

18. **We are reusing the existing ducted heating and cooling. I couldn't put it at 0.01 because the use stage would still count so I wasn't sure what to do for this**. The template includes both the embodied impact and the operational impact, and if you remove the template, you'll remove everything. In this case, the recommendation is to keep the item, even though it's reused, because the upfront carbon impacts (those linked to a new item) are very small. For context:
    - Operational impacts account for 95.5% of the total impact of the template.
    - Refrigerant recharge during the dwelling's service life represents 2.37%.
    - While Upfront carbon impacts represent only 0.8% of the total impact.

19. **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. Several templates have been added to expand the active heating/cooling selections. See below.



20. **Under HVAC and Heating, we have included a ducted heat pump for heating but this also does cooling do we also include this under HVAC cooling? Seems like counting twice, note that we also have included ceiling fans.** We intentionally keep the HVAC system separated so that users can see the impacts of heating and cooling separately and analyse their contributions and potential savings. Please note that the embodied impacts are very minor compared to the operational impacts, which are the primary focus we aim to highlight. For context, operational impacts account for 95.5% of the total impact of the template and the split between heating and cooling demand will vary between locations. Therefore, our recommendation is to keep heating and cooling templates separate, as the operational impacts are calculated individually.
Regarding ceiling fans, their impact is very minor. If both a ceiling fan and a split system are included for cooling, we recommend including only the split system. To model improvements in operational impacts, it's better to adjust the thermal rating at the Design Details level. If you have the NatHERS cooling and heating demand, you can either directly add the quantities in RapidLCA or select the achieved star rating. Typically, including a ceiling fan can help achieve a higher star rating, so this is how you can capture the operational improvement.

PLUG LOADS:

INTERIOR FIXTURES AND FITTINGS

21. **It appears that joinery might be included under Appliances as an average. This house although small would possibly have a higher than average joinery inclusion - is this an issue or is there a way to account for this.** In Rapid LCA, this is considered a default assumption for a dwelling. The template currently included is:
Standard cabinetry for a medium sized kitchen. Cupboards, shelves, draws, bench and pantry cupboard made of laminated board, includes hardware and plastic. Assembly & wall tiles included. Fittings & equipment included.

Does NOT include: *Material impacts & operational energy for appliances (cooking, refrigeration, dishwashing), Floor coverings/finishes, Operational energy for extraction fan.*
If you think an allowance for additional joinery is necessary, you could consider adding the "Kitchen Cabinetry Only, Laminated Particle Board – medium sized" template.

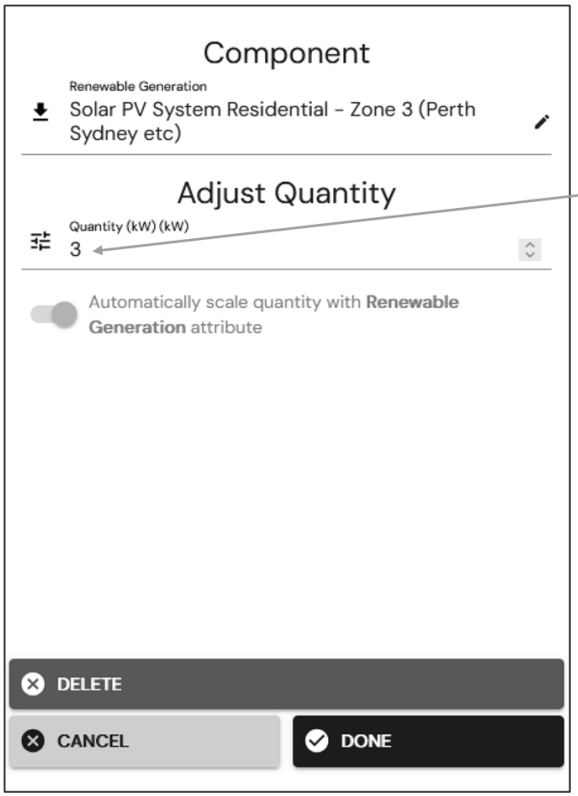
OUTDOORS SERVICES:

SOLAR PV SYSTEM, SWIMMING POOLS, WATER TANKS, OUTDOOR LIGHTING

22. **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.etool.app/index.php/knowledgebase/greenpower-renewable-energy-purchase-agreements-in-lca/. For the Challenge, we provide guidance on additional solar options that may apply to your designs (see overleaf for applicable criteria and kW maximums).

23. **It seems like there's been a hefty update to the power of offsetting? Just knowing from previous projects that we've modelled which have quite easily been 'LCA neutral' with small 5kW PV systems, whereas this one which I expected to be even better is only reaching 85%. Has the metric on this changed or is it because the grid is ever greening? (I know offsetting isn't great to rely on - I'm just curious about the changes).** Regarding your question on power offsetting, we've updated the project Benchmark with the latest data. One update was an increase in the solar system considered, which raises the renewable energy contribution in the Benchmark. Users compare their designs against the National Residential Benchmark, which represents typical Australian dwellings and provides a fair comparison for assessing savings. PV solar input assumes that 40% of

detached and semi-detached houses have a 6.6 kW system, which is the maximum size without requiring a three-phase connection (x10). You will notice that the input area in the app for solar already has 1kW.



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

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

- 1-2 bed house = 3kW max
- 3 bed house = 5kW max
- 4 bed house = 7 - 10kW max

STRUCTURE

MAIN BUILDING COMPONENTS & MATERIALS

24. **Can I model my locally sourced materials?** For Challenge 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 eTool engine sitting behind RapidLCA means this feature will be added in the future.

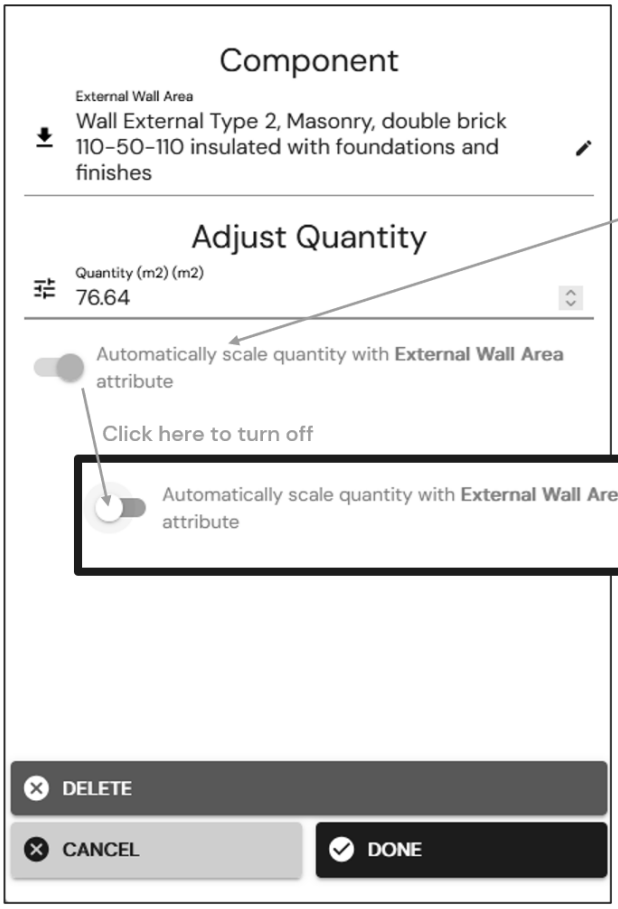
25. **What do I do if I can't find my exact material or building system in the menus?** In most instances you will be able to use a similar equivalent (see proxy list last page) menu item because the impact on the overall model will be negligible. If you are unsure, then submit a support request at support.rapidlca.com and email registrar@lowcarbonhousing.com.au.

26. **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.

27. **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.

28. **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 drawings. By doing this, the range of house

typologies and their different shapes and sizes will be best represented. auto scale and take-offs tips below.



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

If you're NOT modeling an early stage design, we recommend that you turn autoscale OFF and enter areas taken from your drawings or CAD/BIM model.

The example here is walls, but this also will be needed for:

- Roof
- Walls
- Floors and floor finishes
- Air-conditioning systems
- Rainwater tanks
- etc

Don't forget to check the number of doors!

29. **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.

30. **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). Alternatively, if there are no similar materials you can Request a specific template.

31. **We added a carport which had the steel structure and steel roof, but I couldn't find the same wall makeup of just steel structure and steel cladding.** If you want to model a carport only, without including an additional garage area, you should enter the GFA of the house excluding the carport and set the number of cars to zero. This is important because the number of cars affects how the app calculates material impacts for walls, roof, and floor of a portion of the garage.

    Then, you can add the carport at the Structure level as you described. I've added the "*Carport – Poured concrete floor (100mm), steel post, steel covering*" template, which includes:
    Covering – Steel sheeting (Trimdek)
    Steel Beam – Rectangle profile (100x50x0.55mm)
    Steel Beam – Rectangle profile (150x50x0.55mm)
    Gutter – Steel
    Gutter end caps – Steel
    Steel post – Square profile (75x75x4mm)
    Poured concrete – Landscaping 40MPa
    Barge capping – Steel

32. **Some of the roof options have a pitch nominated and others don't – does this make a major impact on the assessment?** Steeper roofs require more roofing material because the surface area is larger than a flat plan view. The difference in the impacts won't be significant.

33. **Are there ways to reflect different building membranes other than foil? In the NCC there's more shift to non-reflective Class 4 vapour barrier. I've looked at the LCA impact in another software years ago and the impact was only about 3% of the wall construction. This would be a similar vapour barrier to the Passivhaus level of water tightness. In the instance of the existing home, I have nominated the refurbished metal roof option.** If you cannot find the suitable option, I've enabled the following template as a proxy: Vapour Barrier/Damp Proof Membrane (DPM)/Geotextile - Roof Covering, Polyethylene, 0.2mm (m2)

34. **Shading devices are part of a NatHERS rating and attached to the building envelope. Is there a way to reflect this?** For shading devices, if it is a permanent installation, it can be included. It will not significantly affect the overall impacts, as the operational benefits are the primary contribution in this strategy. Use the "Timber Solar Shade Awning or Pergola" template for this purpose.

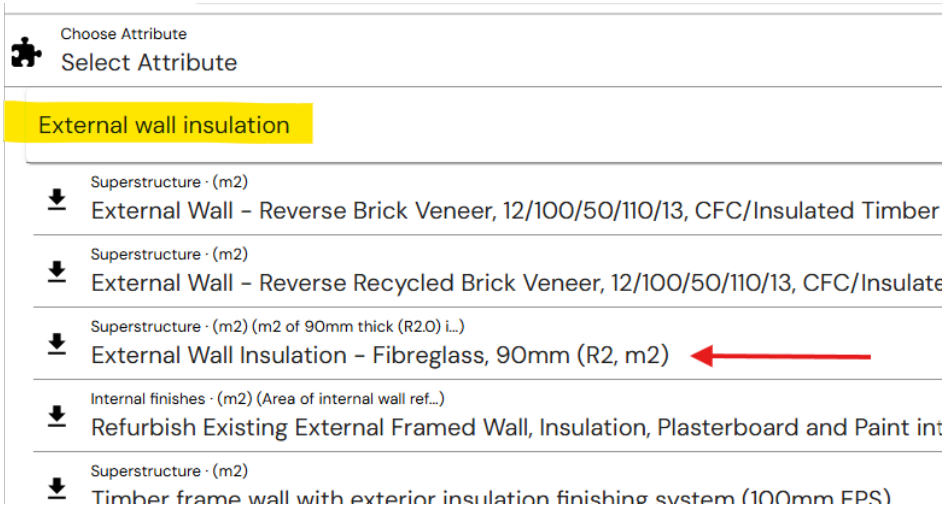
EXISTING BUILDINGS

35. **How do I account for a demolished house in a '<u>knock down rebuild</u>'?** To avoid 'double counting', your life cycle assessment should not include the demolition efforts/impacts of the previous house. This is in conformance with International ISO Standards.

36. **How do I model the existing materials in an <u>alterations and additions</u> 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/

37. **How do we capture pump in wall insulation, where we aren't refurbishing the plasterboard or repainting etc? I've found insulation by itself, but it seems to need to be connected to another attribute. I selected 'other' and now I'm not sure where it's gone.** If you are keeping the whole wall and only adding insulation, you should either remove the existing template or assign 001 to it, and then add a new template just for the insulation for the total area.
To find the template, you can either:
Select the relevant attribute to see what's available — in this case, the template is under "External Wall Area", or
Simply type keywords for the template you're looking for. For example, typing "External wall insulation" will bring up the correct template, as shown in the image on the following page.



38. **Is there a way to provide input for the existing double brick external walls and then add a separated out amount for adding for improved thermal performance add (new) XXXsqm 40mm external Woodfibre + lime render.** Refer to previous. For the existing wall you can either remove the area of the external wall retained or add a template for that area of the wall with the quantity 0.001, this will allow you to keep the template if you wish to see materials but won't include impact for that area as the quantity is very small. For the new material you can add a new entry for the specific material, we have available external wall insulation and another template for Wall finish, 10 mm render (lime) that you can explore.

39. **We have retained an external masonry wall but added externally 45mm timber battens, 40mm PIR rigid insulation, breather sheet, then either weathertex boarding or reclaimed timber boarding. Wondering what is the best way to account for this?** In this case, the external wall can be removed. If there isn't a suitable template that covers all the materials to be added, the materials can be added separately. I've reviewed the options, and the following templates can be included. Please make sure to read the description of each template for details on what is included.
    - External Wall Insulation - Fibreglass, 90mm (R2, m2)
    - External Wall - Superstructure, Timber Columns with Timber batten screen (m2)
    - Wall Cladding, 19mm Weatherboard (Softwood e.g Cedar), no finish, m2

40. **I'm always confused by what the different symbols mean beside wall structures (the one that looks like a plan vs layers as a graphic icon). Some wall types show twice in the list but with different symbols, and I'm never sure whether to delete one and just list the wall type once, or whether these symbols mean they need to be counted twice in different 'categories'.** Thanks for your feedback on this. The icons don't have any specific meaning — they're just there to separate one template from another, which is why they alternate. The wall template appears twice to make it easier for users to add different types of external walls. If the wall type is the same, you can either:
    Leave it as is (with the same material and quantity, or just update the quantities), or
    Delete, or assign 0.001 to one template and the full area to the other.

This setup is also useful in refurbishment projects. For example, you can add the area of a new wall in one template and use 0.001 in the other to represent the reused wall. Our recommendation is to assign 0.001 rather than deleting the template. This way, the template remains in the design and can be reused if you want to make changes or test different options. If you delete it, you will need to re-add the template later.

41. **Where the existing ceiling is to be refurbished, do we have control over the type of insulation?** We have the Refurbish Ceiling, Internal, Replace Insulation, Plasterboard and Paint which include mineral wool. We do not have an option to change the type of insulation at this point but it won't affect the overall impacts much.

42. **How do we show under floor insulation if there is added insulation under existing timber subfloor.** To add Floor insulation, we do have the "Lowest Floor, Refurbished Raised Floor, New insulations only", or the "Re-stumping and New Insulation" option.

43. **In a roofing renovation how do we show reinsulating of an existing roof with minimal other change.** There are a number of options that could be used. Set the roof area to 0.001 then add Ceiling Insulation – Fibreglass, 100mm (m2), o alternatively use Refurbish Ceiling, Internal, Replace Insulation, Plasterboard and Paint.

44. **For windows, is there an option of using something like Australian Retrofit Double Glazed Windows - Magnetite which sometimes can be used to improve existing single glazing to double glazing.** From what we understand, the magnetite product isn't a true double glazing unit, it's essentially an acrylic sheet retrofit without an inert gas layer between the panes. So, while it does provide some thermal improvement, it's likely not as effective as a proper double-glazed unit. For LCA purposes, we'd suggest making conservative assumptions regarding the thermal improvement, as the actual performance will depend on user behaviour (i.e. not forgetting to reinstall the retrofit after opening/closing windows or not damaging the retrofit). Currently, there isn't a dedicated template for this product, but a practical approach is to model the retrofit using a uPVC framed single glazing proxy, while noting that the service life would likely be shorter than a standard double-glazed unit.

45. **We have refurbished a roof where we have retained some plasterboard and insulation but have replaced soffits, fascia, gutters, and downpipes. There does not seem to be a separate area for soffits, fascia, gutters, downpipes - is this included in the refurbished ceiling element.** When only the roof edge elements require repair or upgrading, these can simply be excluded, as their contribution within the roof template is very minor and does not result in a significant overall impact. In this case, it is reasonable to consider the retention of the entire roof area. The main impacts are associated with the roof insulation, plasterboard, and roof covering.

46. **This project retained and refurbished all internal doors with only one new door. Do we need to account for the retained doors or just not include anything?** For retained doors, you can either remove them from the model or assign them a minimal quantity (e.g., 0.001) to reflect the benefit of retention. Only the new doors need to be fully included in the model.

FINISHES

INTERIOR FLOOR FINISHES

47. **For bathroom retrofits I'm assuming that they would get completely renovated in this instance and re-waterproofed, re-tiled. I would like to try and reflect this in the assessment.** The material impacts for bathroom are embedded in the design, including the wall tile, the bathroom equipment, and fitting and furnishings, what is available to be customised in the design is the floor finishes, which is covered under wet area, this means that all bathrooms are considered as new, this assumption is a conservative approach to make sure those impacts are captured, however in average represent a 1.2% of the overall impact of the design.

RESULTS

48. The end results look a bit different to how they were presented previously. I think a short explainer on what each of these mean would be useful somewhere for the Australian Zero Carbon Housing Challenge - whether that happens in the competition material or in etool. Here's a clarification of each target:

1. **Global Warming Potential Total (GWP Life Cycle) – 50%**
   This considers the entire life of the building, including all modules (A–D):
   - **Product stage (A1–A3)**: Raw material extraction, transport to manufacturer, and product manufacturing.
   - **Construction stage (A4–A5)**: Transport of materials to site and installation.
   - **Use stage (B1–B7)**: Maintenance, repairs, replacements, refurbishment, operational energy, and water use.
   - **End-of-life stage (C1–C4)**: Deconstruction, transport, waste processing, and final disposal.
   - **Beyond system boundary (D)**:
     D1: Benefits or credits from recycling, reuse, or energy recovery.
     D2: Exported energy.

   The 70% target reflects the potential for significant operational energy savings, especially when exported energy is considered.
2. **GWP Upfront Carbon (Excluding On-site Renewables) – 15%**
   This considers only the Product and Construction stages (modules A). While focusing on upfront carbon alone is not recommended—since some trade-offs may increase overall life-cycle impacts (e.g., more insulation increases upfront carbon but reduces operational emissions)—we recognise the importance of addressing emissions immediately when possible.

49. When you go to submit there are a number of options related to what stage you are at in either design and construction. I'm wondering what the difference is between RIBA and RICS WLCA? And which one to choose. The main difference is that the RIBA stages are

more granular while the RICS stages are slightly broader. You can see where they overlap. It doesn't really matter which one you choose as long as it's the stage that most accurately describes the stage of your project.

OTHER ITEMS

50. **Regarding the $/m2 can you please clarify what building elements should (or shouldn't) be included and which area (i.e., is it just the GFA)?** Build cost is defined as $/m2 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.

TEMPLATE (T) QUERY OR PROXY (P) TO USE

If you are unsure about which product or material system to select – check out this list:

HEATING AND/OR COOLING TEMPLATE		COMMENT (ANSWER OR PROXY TO USE)
Outside air intake with inline fan (AND for heating)	P	Use the "*Heat Recovery Ventilator…*" proxy
Elec underfloor tile heating (bathrooms)	P	Secondary heating, just choose one primary heating mode for now
EXTERNAL WALLS + CLADDING TEMPLATE		
Blade or courtyard walls	P	Use the nearest external wall template as a proxy
Weatertex Cladding option	P	Use 19mm Weatherboard (Softwood e.g Cedar), no finish, m2
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
INTERIOR WALLS TEMPLATE		
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
ROOF TEMPLATE		
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
WINDOWS 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
RAINWATER TANKS TEMPLATE		
Poly tanks and concrete tanks	note	Cerclos added a mix of tank types
FLOOR SYSTEMS OR FLOOR LINING TEMPLATE		
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^2

Still unsure? go to support.rapidlca.com and email registrar@lowcarbonhousing.com.au