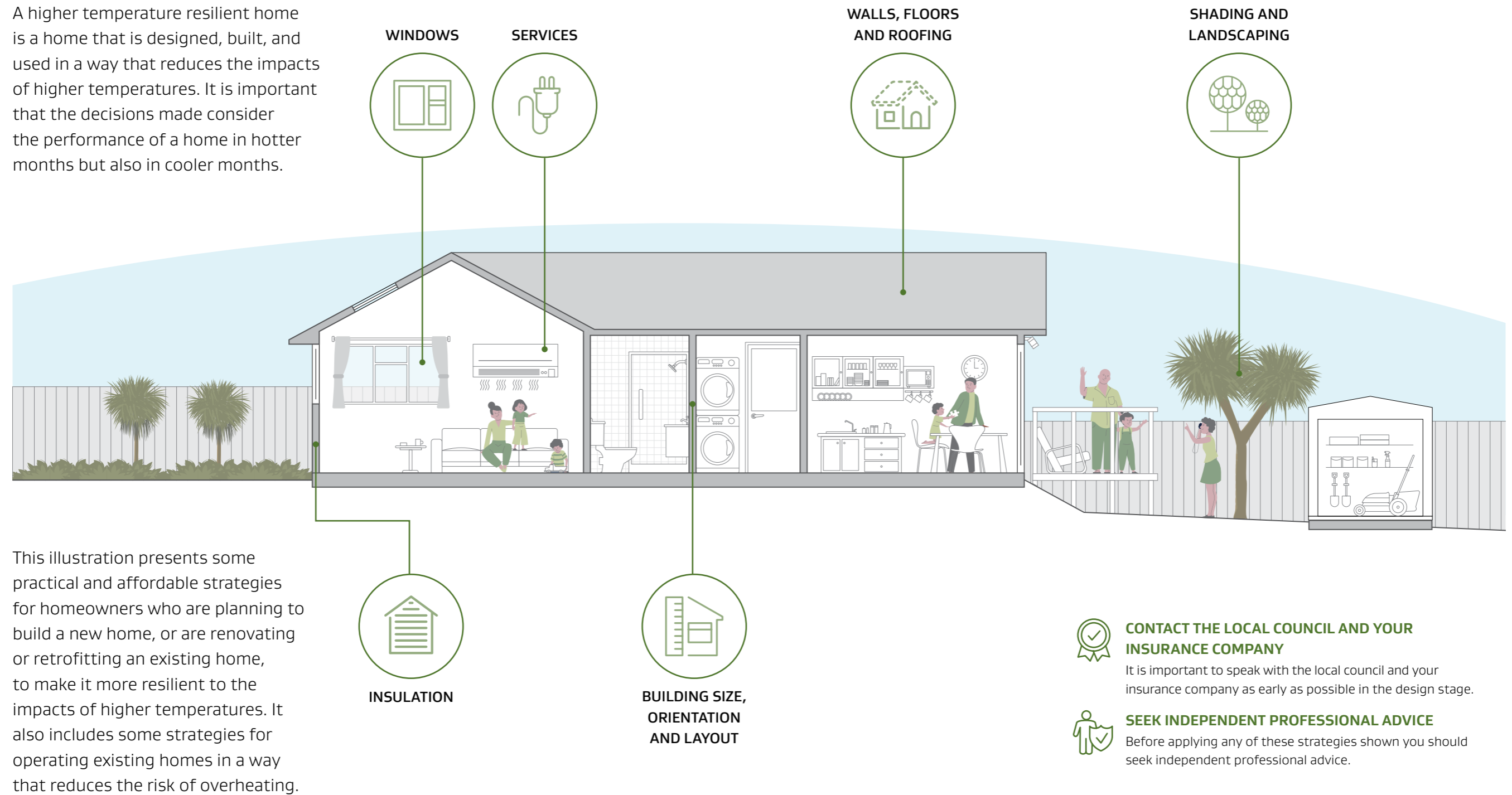




HIGHER TEMPERATURE RESILIENT HOME

A higher temperature resilient home is a home that is designed, built, and used in a way that reduces the impacts of higher temperatures. It is important that the decisions made consider the performance of a home in hotter months but also in cooler months.



This illustration presents some practical and affordable strategies for homeowners who are planning to build a new home, or are renovating or retrofitting an existing home, to make it more resilient to the impacts of higher temperatures. It also includes some strategies for operating existing homes in a way that reduces the risk of overheating.

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CONTACT THE LOCAL COUNCIL AND YOUR INSURANCE COMPANY
 It is important to speak with the local council and your insurance company as early as possible in the design stage.
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SEEK INDEPENDENT PROFESSIONAL ADVICE
 Before applying any of these strategies shown you should seek independent professional advice.

HIGHER TEMPERATURE RESILIENT HOME

AN EXISTING HOME

When altering or repairing an existing home, consider including higher temperature resilient design features.

Homes are altered for several reasons. It may be to add an extension, alter the internal layout, or to increase the performance of the home by adding insulation or upgrading windows. Cooling and heating homes can be expensive. By including resilient design features, some of these costs may be reduced.

A NEW HOME

New homes need to comply with the Building Code. The Building Code sets the minimum performance requirements for buildings. Building better than the minimum that is required by the Building Code will result in a more resilient home.



APPLIES TO NEW HOMES ONLY

All other strategies apply to both new and existing homes



WINDOWS

- Design window size, location, and openability for optimal cross ventilation
- Consider higher level openable windows (for example, a clerestory window) to give heat a way to escape (known as stack ventilation)
- Open windows once the outdoor temperature drops below the indoor temperature in the evenings or early morning to cool the house down. This is called purge ventilation
- Consider including windows that can be securely left open when nobody is home
- Window restrictors are necessary on upper floors to stop young children from falling, but can limit ventilation. Consider solutions such as sashes for these windows.
- Reduce or carefully consider the area of glazed areas in the design
 - Reduce or remove skylights, or provide blinds for them
 - North facing windows should be largest as they can let in desirable heat from the sun in winter. Eaves, overhangs and awnings can be designed to block the sun in summer while letting in winter sun
 - East facing windows allow morning sun and some heat
 - South facing windows will provide consistent light and limited heat
 - West facing windows allow light and heat in the afternoon and are most difficult to passively manage as the sun is low in the sky and the house has already been heated by the sun throughout the day
- Identify and choose windows with the correct solar heat gain coefficient
 - This coefficient is an indication of how much of the sun's heat can pass through glazing
 - The lower the number, the more shading the glazing provides
 - The solar heat gain coefficient can be different on each façade



INSULATION

- Insulate the walls, under the floor and the roof to at least the minimum required by the Building Code. Insulation can be installed either on the underside of the roof, or on top of the ceiling. If the insulation is installed on the underside of the roof, this will prevent the roof space from heating up.



BUILDING SIZE, ORIENTATION AND LAYOUT

- Design the layout and form to enable adequate passive cross ventilation
- Design the internal layout and form to reduce large areas of unshaded north and west facing windows
- Consider the areas that need the most light and heat. Rooms on the south side may be cooler, and rooms on the north or west side of a home may be warmer.



WALLS, FLOORS AND ROOFING

- Choose building materials that are UV stabilised and tested for New Zealand conditions
- Ensure that the home is airtight so that it will take less energy to heat and cool
- Darker façade colours can attract more heat. Use lighter colours on roofs and walls
- Consider applying a solar or heat reflective paint to walls and roofing
- Thermal mass (for example, exposed polished concrete floors) can be used to absorb heat during the day.



SHADING AND LANDSCAPING

- Choose thermally backed or thermacell insulated blinds (also known as honeycomb blinds) or curtains
- Use wide eaves or awnings on the north side to provide horizontal shading when the sun is high in the sky
- Use movable vertical shading for east and west
- Add shade sails or other structures like a pergola to reduce the amount of heat from the sun on the north and west sides of the house while still providing dappled light
- Wide eaves or awnings will shade the summer sun, for effective all year-round shading consider louvered shutters
- Plant deciduous trees on the north side of the house to act as a shade in summer, but still allow sun through in winter.



SERVICES – VENTILATION, HEATING AND COOLING

- Providing the ability to ventilate a home to maintain a comfortable indoor temperature in warmer months is important. Although homes should be designed to maintain a healthy indoor temperature passively most of the time, heat pumps are an efficient way of providing additional heating and cooling when needed.
- Design for passive crossflow ventilation by considering the width and layout of the house, and the sizing and placement of opening windows and doors
 - Consider a mechanical ventilation (preferably with heat recovery) system, especially in homes where windows cannot be opened (like in areas where there are issues with outside noise, where security is a concern, or in townhouses or apartments where openable windows are limited to two or three façades)
 - Install a heat pump that is sized correctly for the space. Set to cooling only in warmer months, rather than 'automatic' which will both heat and cool a space. Consider setting the cooling temperature to a higher temperature (for example 24 or 25°C) to reduce energy use
 - Limit internal heat gains. For example, insulate hot water cylinder pipework, and turn off appliances that aren't in use.