

MAKING COMMUNITY HOUSING MORE SUSTAINABLE

> *Verney Ryan from Beacon Pathway illustrates why the community housing industry should be leading the way when it comes to healthy, sustainable living standards.*

New Zealand is faced with an inter-generational problem of inadequate housing, with community housing providers at the fore of ensuring all New Zealanders are well housed.

Community housing providers share common objectives that are unique in the housing sector. One is that achieving a positive outcome for the family living in the home is central – providing warm, dry, safe homes where the residents know that providers care about them. Another is that the homes are a long-term asset to the developer.

“ Homes are a long-term asset to the developer ”

Both of these objectives mean sustainability (at the home and development level) should be at the heart of community housing.

HOUSE LEVEL SUSTAINABILITY

The general principles of sustainable homes are that houses need to be warm and dry for the residents' health, and also use energy and water efficiently, reducing operational costs for residents as well as environmental impact.

There are obvious benefits for residents but also payoffs for developers. The following are Beacon Pathway's recommendations for sustainable homes:

WARMER HOMES

Good passive solar design – orient living areas to the north to maximise winter sun for heating; design for cross breezes and opening windows; shading from high summer sun to north and west (eaves, shutters, blinds, curtains).

High performance insulation to 'better' or 'best' standards:

- (a) Ceiling – R3.6 or R4 (zone 1 and 2); R4 or R5 (zone 3)
- (b) Walls – R2.4 or R2.6 (zone 1 and 2); R2.6 or R2.8 (zone 3)
- (c) Floor – R1.9 (zone 1, 2 and 3), under-slab and/or perimeter insulation

High performance low-e and argon-filled double glazing, and thermally broken frames.

The benefits of these features are passed onto residents. Homes are easier and cheaper to heat because there is less heat loss. This means these types of homes are warmer and healthier for clients.

“ Every dollar spent on insulation brings \$6 of benefits ”

The payoff for residents is in savings on power bills and medical costs. New Zealand research organisation Motu calculates

every dollar spent on insulation brings \$6 of benefits – ceiling and floor insulation could save a household \$3,110 in energy costs, hospital admissions and days off school/work.

BRANZ's Up-Spec website calculates passive solar design could save between \$50 per year in Auckland to \$200 per year in Invercargill for very little investment. While double glazing is a high-cost feature (between \$2,800 and \$4,600 per average house-lot of windows), it can reduce heating energy bills by between 20 and 24 percent.

The additional cost of insulating a concrete slab is between \$2,500 (insulating under the slab) and \$3,900 (insulating under and around the slab). However, industry is starting to offer properly insulated modern systems for little more than a normal raft slab. Upgrading insulation R value can add between \$200 (in the north) to \$1,600 (in the south).

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DRIER HOMES

More powerful extractor fans in bathrooms/wet areas with motion sensors/delay timer and duct diameter of 150mm.

Must be ducted to the outside of the dwelling, ideally with low decibel rating to encourage use.



This Housing Foundation home includes a 4,000 litre rainwater tank, collecting all the roof water, and providing water for garden and outdoor uses

Both residents and developers benefit from drier homes. Damp air is harder to heat – dry homes will cost less to heat, meaning residents can heat to healthy temperatures. Dry homes are also healthier – dampness causes condensation and mould, which is associated with multiple respiratory problems.

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Damp or mouldy homes lead to more than 35,000 nights in hospital with an associated cost of around \$35 million. This is not counting costs of time lost from work or school while patients are in hospital, nor does it include GP visits or pharmaceutical costs.¹

Lower maintenance costs due to a reduction in condensation and mould damage is the payoff for developers.

USING LESS ENERGY

Efficient space heating – use efficient minimum 5-star rated heat pump – and heat-pump hot water heating.
LED lighting throughout – use surface or pendant light fittings or opt for IC-4 rated downlights (which can be covered by insulation). Use outdoor lighting fitted with integrated daylight and motion sensing controls (where practicable).

Lower energy costs – whether power, gas or firewood – mean the house is operationally more affordable for residents, and leads to a more sustainable community for developers. Being able to heat efficiently with fewer concerns over cost means residents can live in warmer, healthier temperatures.

Heat-pump hot water systems are more expensive to purchase than a standard electric hot water cylinder (\$4000 to \$8000); however, their efficient operating costs mean they are a good, long-term investment.

Although bulbs may be expensive, each LED bulb can save between \$100 and \$300 across its lifetime compared to incandescent bulbs.

USING LESS WATER

Water-efficient fittings/appliances – showers (WELS 3 star), toilets (WELS 4 star), taps (WELS 5 star), dishwashers and washing machine (WELS 4 star).
Rainwater tank size of at least 2,000 litres, connected to as much of the roof as possible, and plumbed for use in the home to at least one toilet or laundry.

Where water is metered, residents will save on water bills. Up-Spec calculates saving 93,000 to 120,000 l/year depending on tank size. Residents will also use less hot water so water heating bills will be lower. Rainwater tanks will make the development resilient in face of water shortages/drought or water supply breakdown.

¹ <https://www.otago.ac.nz/healthsciences/news/news/otago706037.html>



The houses in this Auckland development by the Housing Foundation were laid out in zipper lots to ensure the north-facing living areas of each house receive maximum sun. Garages were placed on the south side of each house

Fittings, toilets or appliances with higher WELS star ratings cost very little more than standard options, according to Up-Spec. A rainwater tank will cost \$4,700 for a 5,000 litre tank plumbed to laundry and toilet but provides a lifetime of savings, which will really add up in metered and charged areas.

ACCESSIBLE DESIGN

Lifetime/Universal Design – follow design standards set by www.lifemark.co.nz for accessibility.

Accessible design means units can be used by a range of residents in the future without further retrofitting. BRANZ research has shown the cost of building with Universal Design features is \$1,720, while retrofitting these at a later date would cost an extra \$16,990.

HEALTHY & ENVIRONMENTALLY-FRIENDLY MATERIALS

Use Environmental-Choice-certified and low VOC materials – including plasterboard, paints, insulation, carpets and floor coverings (equivalent international certification schemes may be used).

Choosing low VOC materials will benefit residents' health. Environmental Choice materials generally don't add to costs.

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DEVELOPMENT LEVEL SUSTAINABILITY

Sustainability at a development level is about looking at the wider context of the development as a whole. Developments need to fit into local neighbourhoods, reduce their environmental impact, be sited close to local transport options and local amenities, and offer tenants quality, choice and community.

Recent research for New Zealand's Building Research Levy² defined the core outcomes that New Zealand would want to see in its future medium-density developments (see below). Two tools – a site review/developer survey and a resident survey – were created to assess how well individual developments provided these outcomes, as a way to guide good practice. These outcomes are a great guide for community housing development too:

1. **Character, context and identity** – developing a site and buildings that integrate with, or relate to, existing building form and style in the surrounding neighbourhood.
This includes integrating with the local physical environment (e.g. slope and geographic features), reflecting local history and culture, using design to give a sense of identity, and being welcoming and accessible for residents and visitors.
2. **Choice** – the development provides for, and enables, occupancy for a diverse range of residents that can benefit from, and support, a thriving local economy.
This includes being close to important destinations and amenities, providing diverse typologies to attract diverse residents, offering affordability through dwelling options and financial instruments, and ensuring there is the infrastructure to support the population density.
3. **Connectivity** – connecting infrastructure enables safe, universal access via active mobility, and shared and private modes of transport within and through the site to identified key destinations.
This includes providing a range of active transport choices for residents, safety from vehicles on-site, accessibility for services, good signage for wayfinding, and appropriate parking provision and management.
4. **Liveability** – providing quality facilities and aiding positive interactions between residents and the wider community.
This includes having the flexibility to adapt units, providing storage, designing for integration of future technologies, designing for reduced noise and increased privacy, the inclusion of communal spaces where people can interact, offering security features such as lighting and active/passive surveillance, and the encouragement of resident interaction.
5. **Sustainability** – efficient and cost-effective resource use through design, behaviour and technological advancement.
This includes designing for a changing climate (sea-level rises, increasing temperatures, storms, etc.), the sustainability of individual homes/units (as previously outlined), providing recycling and composting options, and offering outdoor spaces for gardening and food production

SUSTAINABILITY IS THE OPPORTUNITY TO DO THINGS BETTER

Community housing providers have the opportunity to do things better than normal. Paying attention to the sustainability of houses will bring the benefits of warm, dry, healthy homes – that cost less to run – to their residents. They will also be houses that need less maintenance because they have been built to last, without the risk of potential damage by the cold and damp.

Paying attention to the sustainability of the whole development will mean less damage to the environment, the opportunity for residents to use public transport or walk to their destinations, and stronger communities that are stable and satisfied. This will reduce both direct costs and indirect costs over time, and play a part in the global fight against climate change.

Community housing providers can lead the way in making housing more sustainable.



Verney Ryan is a co-leader and lead researcher for Beacon Pathway. He has a broad background in urban planning, sustainable development, energy-efficiency, renewable energy and environmental resource management. He leads a range of applied research and demonstration projects for Beacon.

Verney has also worked extensively on projects to identify good practice in medium-density developments and sustainable housing, both new-build and retrofit, and is currently advising on the sustainability and resilience of *marae* (Māori meeting grounds).

² See Beacon Pathway http://www.beaconpathway.co.nz/new-homes/article/medium_density