
# Eco Design Advisor Conference 2024

Andrew Eagles
Chief Executive, New Zealand Green Building Council

Christchurch September 2024

# Our vision


greenstar NABERS NEW ZEALAND homestar® homefit Fit for living | He haumaru NZGBC TE KAUNIHERA HANGANGA TAUTAIAO

Architects, Designers, Engineers, and other advisors

Product Manufacturers and Distributors

Property Developers, Owners, Occupiers and Investors

Local Authorities, Higher Education, Research Institutions

Property Professionals, Tenants and Related Property Interests


Contractors, Builders and other Construction Professionals

## Advocate

A stronger, fit-for-purpose **Building Code**

**Government leadership** on sustainable design, construction and operation

**Action** on embodied carbon

Central and local Government **regulatory submissions and advice**

**Member input** on advocacy efforts and campaigns

## Collaborate

**700+ members**

**Future Thinkers** student and young professionals network

**Industry advisory boards**

**Consultation** on certification updates and advocacy

Sharing and **celebrating industry success**

Input into **NZGBC Board and governance**


## Educate

Industry **training**

Professional **qualifications** for Green Star, Homestar, NABERSNZ, HomeFit

Regular **webinars and industry events**

Trusted **research and reports**

## Rate

**Independent, third-party** certification

**Green Star, NABERSNZ, Homestar, HomeFit, Carbonzero**

Created **alongside the sector**

**Regularly reviewed and updated** with industry

**Benchmarking** efforts to inspire change & improvement

Our commitment to improving
Aotearoa's existing homes

# HomeFit

**Developed with the support of the private and public sectors committed to healthier homes.**

Fit for living

**FOUNDING PARTNERS**

**PARTNERS**

**SUPPORTED BY**

NZGBC TE KAUNIHERA HANGANGA TAUTAIAO

# Self-assess using the free HomeFit Online Check

## An assessment of an existing home in 20 easy questions

Fit for living

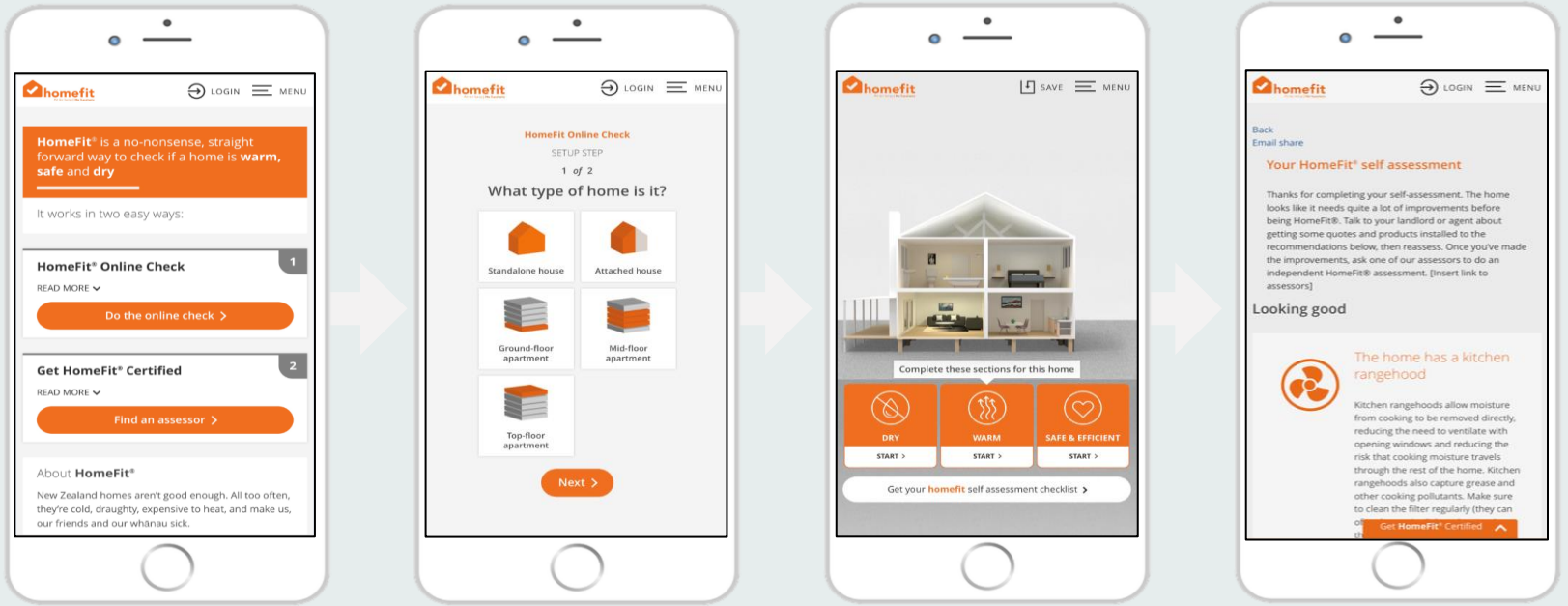
- Warm, Dry, Efficient
- Provides checklist of suggestions for improvements

Developed with housing and health professionals in mind

Aligns with the Healthy Homes Standards

Handy for homebuyers and tenants, or renovators looking to improve their current home.

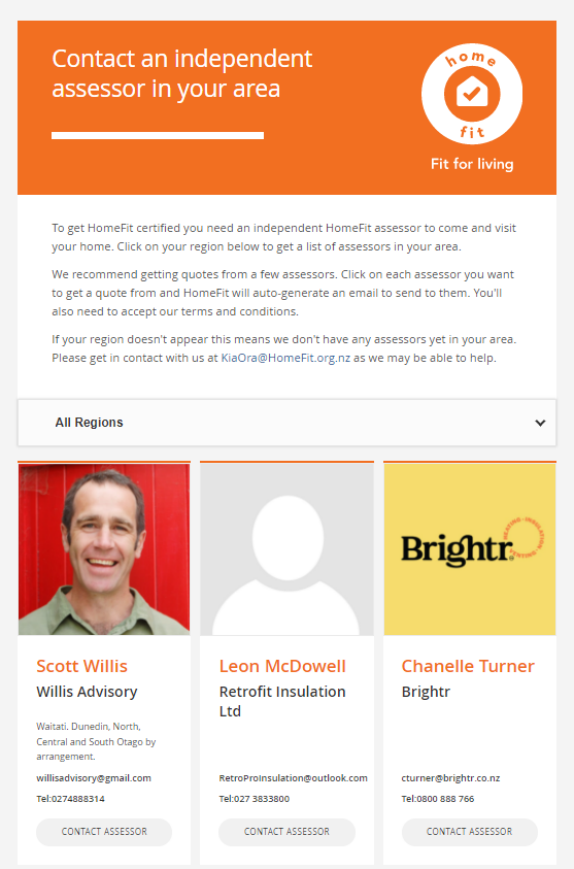
Great to promote to improve knowledge



# Independent HomeFit Assessors

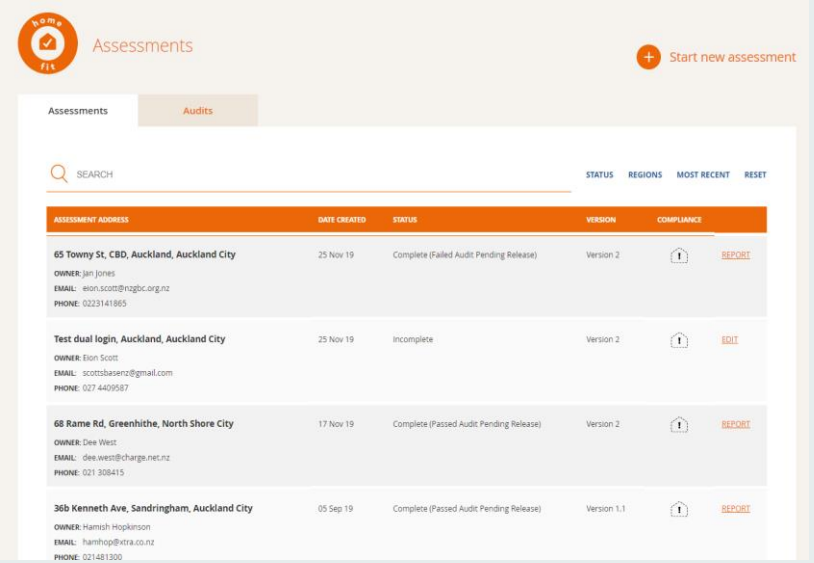
## Certify compliance with an independent assessment

- Assessments are audited and registered with the NZGBC
- Online directory of assessors nation wide
- Trained and accredited by the NZGBC
- Potential for councils to publish on LIMs
- Property listings including independent certifications for new and existing homes and buildings




Fit for living

## HomeFit Assessor webapp



homestar

# Reducing risks, improving returns & living our values

Better homes, proven
Kāinga pai ke atu, tūturu

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# Kāinga pai ke atu, tūturu

## Better homes, proven

**20,000 homes being built to Homestar**

**Finance options are attractive**

homestar

- Energy, moisture, winter and summer comfort

- Water efficiency, stormwater management

- Construction and domestic waste

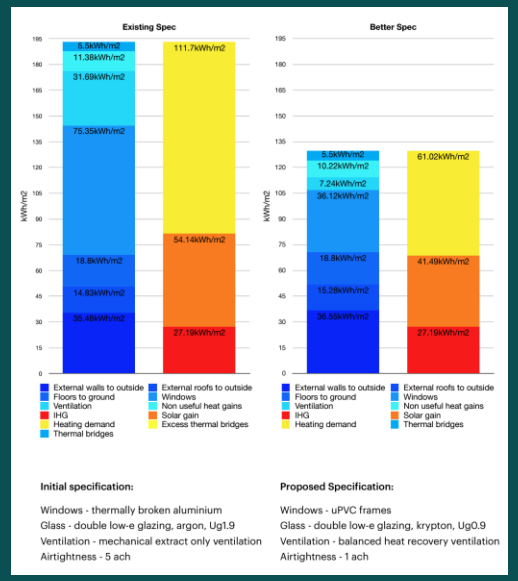
- Sustainable and healthy materials

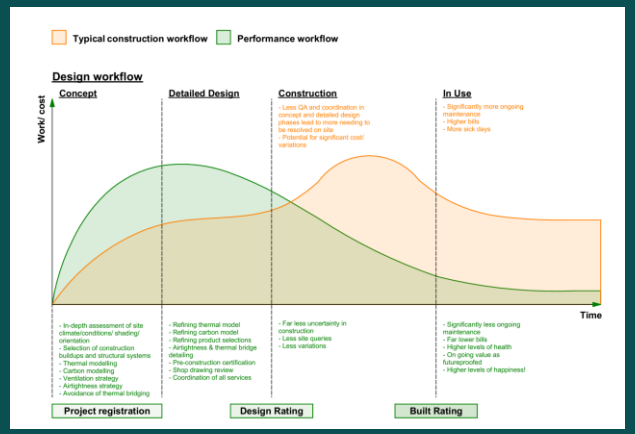
- Site amenity and access to public / active transport


## A new free practical guide on how to build low carbon healthy homes

Verifying to Homestar ensures

- ✅ moisture control = less mould in the home
- ✅ less overheating = stopping dangerous temperatures
- ✅ decent air quality = better health & less headaches
- ✅ access to significantly lower interest development finance
- ✅ efficient fossil fuel free homes = helping solve New Zealand's energy crisis.




Cost tends to be 0 to 1.5% uplift over building to building code

Homestar Design Guide (nzgbc.org.nz)

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homestar

# Roadmap to retrofitting existing homes

Everyone has the right to a decent home. A decent home is **safe, warm, dry**, affordable, accessible and culturally adequate. It is **supported by necessary infrastructure such as water, and accessible to key services and facilities such as education, health providers, and community**….

Without a decent home, it is difficult to contribute to society. Because housing is so vital to our mana and wellbeing, it is a human right.

Te Kāhui Tika Tangata. Human Rights Commission

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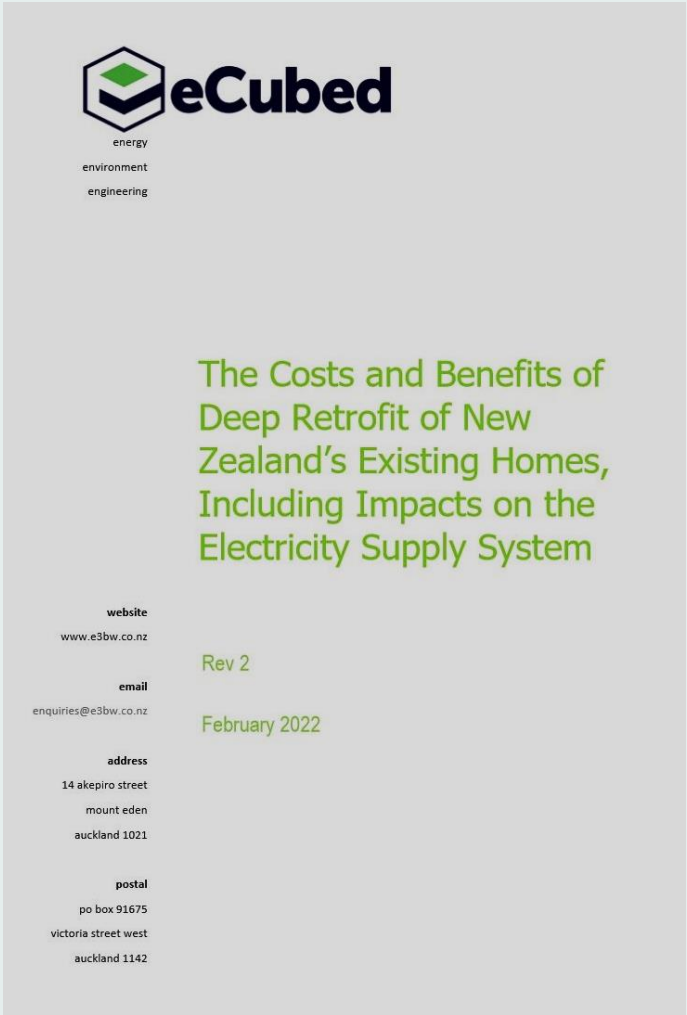
# Background

With NZGBC input BERL surveyed overseas programmes for reducing carbon footprint of existing homes

EECA / NZGBC researched applicability of deep retrofit to NZ housing stock

Also excited by HEEP 2 examination. We look forward to those findings

Better speakers on all those research programmes

# Benefits of retrofit

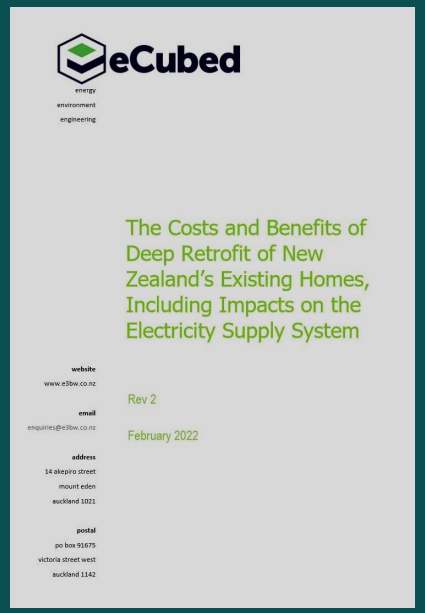



**Table 13: Summary NPV costs and benefits of deep retrofit packages using 5% discount rate ($k)**

| Starting heating regime | | Underheated | | | MidUnder | | | Realistic | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Level of insulation achieved | | New H1 | Homestar | EnerPHit | New H1 | Homestar | EnerPHit | New H1 | Homestar | EnerPHit |
| VillaBungalow | Insulation costs | 26.3 | 68.2 | 70.2 | 26.3 | 68.2 | 70.2 | 26.3 | 68.2 | 70.2 |
| | Electricity supply benefits | -0.5 | -3.6 | -4.5 | -3.8 | -6.5 | -7.3 | -6.4 | -9.1 | -10.0 |
| | Health benefits | -28.4 | -28.4 | -28.4 | -3.8 | -3.8 | -3.8 | -0.6 | -0.6 | -0.6 |
| | Net benefits | -2.6 | 36.3 | 37.3 | 18.8 | 58.0 | 59.1 | 19.3 | 58.6 | 59.7 |
| Mass Housing | Insulation costs | 23.7 | 38.8 | 56.1 | 23.7 | 38.8 | 56.1 | 23.7 | 38.8 | 56.1 |
| | Electricity supply benefits | -0.2 | -1.2 | -2.5 | -2.0 | -3.1 | -4.3 | -3.6 | -4.7 | -5.9 |
| | Health benefits | -28.2 | -28.4 | -28.4 | -3.8 | -3.8 | -3.8 | -0.6 | -0.6 | -0.6 |
| | Net benefits | -4.7 | 9.2 | 25.2 | 17.9 | 31.9 | 48.1 | 19.5 | 33.5 | 49.7 |
| 1970s House | Insulation costs | 71.5 | 98.3 | 106.3 | 71.5 | 98.3 | 106.3 | 71.5 | 98.3 | 106.3 |
| | Electricity supply benefits | 0.0 | 0.0 | 0.0 | -1.4 | -1.3 | -1.6 | -4.3 | -4.3 | -4.6 |
| | Health benefits | -27.1 | -26.6 | -24.8 | -3.8 | -3.8 | -3.8 | -0.6 | -0.6 | -0.6 |
| | Net benefits | 44.4 | 71.7 | 81.6 | 66.3 | 93.2 | 101.0 | 66.7 | 93.5 | 101.2 |
| Post 1978 House | Insulation costs | 71.5 | 98.3 | 106.3 | 71.5 | 98.3 | 106.3 | 71.5 | 98.3 | 106.3 |
| | Electricity supply benefits | 0.0 | 0.0 | 0.0 | -1.4 | -1.3 | -1.6 | -4.3 | -4.3 | -4.6 |
| | Health benefits | -27.1 | -26.6 | -24.8 | -3.8 | -3.8 | -3.8 | -0.6 | -0.6 | -0.6 |
| | Net benefits | 44.4 | 71.7 | 81.6 | 66.3 | 93.2 | 101.0 | 66.7 | 93.5 | 101.2 |

DeepRetro_CBA_10.xlsm

Key points

- When focusing on insulation – highest BCR are in easy to treat homes (suspended floors and attics) in colder climates that are currently underheated – around 100-000 to 200,000 homes.
- Govt funding of deep retrofit should focus on those in fuel poverty
- Research only included insulation measures, not systems
- Costs go down significantly if retrofit aligned with other work

# NZGBC wanted to examine this issue

**And set out a pathway forward. Why?**

More than 200,000 homes have mould or dampness.

Another 200,000 homes in other deciles have similar problems.

They comprise 25% of all homes in Aotearoa

The Zero Carbon Roadmap for Aotearoa's Buildings has been successful

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| NZ DEP DECILES 7 TO 10 | | | REST OF DECILES | | ALL |
|---|---|---|---|---|---|
| **Total all regions** | **Total households** | **Households with mould and/or dampness** | **Total households** | **Households with mould and/or dampness** | **Households with mould and/or dampness** |
| Bungalow | 56,384 | 17,732 | 89,247 | 18,953 | 36,684 |
| State House | 147,664 | 47,622 | 222,114 | 47,984 | 95,607 |
| 1970s house | 96,511 | 31,086 | 146,619 | 31,364 | 31,364 |
| Post 1978 | 354,336 | 115,625 | 540,629 | 115,886 | 231,512 |
| **Total** | **654,895** | **212,065** | **998,609** | **214,187** | **426,255**[96] |

Source: Adapted from BERL, 2023.[97]

# Housing related illness

800,000 existing homes were built before insulation became a requirement [1]

- Those with colder homes were more likely to be [2]
  - Renting
  - Disabled
  - Single parents
  - Māori or Pasifika

- Research undertaken in 2021 found [3]

  - 49% of homes had less than adequate insulation
  - 72% lacked any kind of ground moisture barrier
  - 76% were single glazed

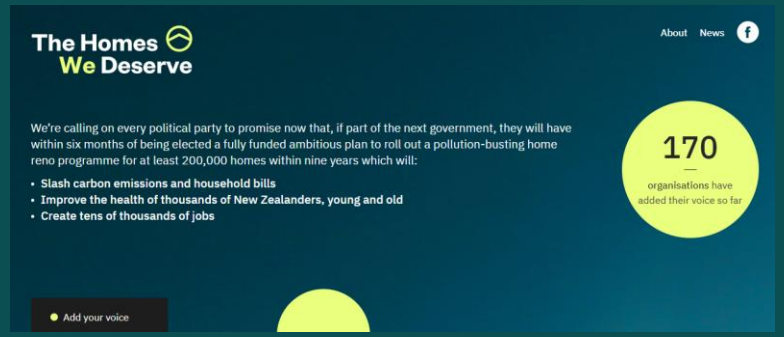
1 Beacon Pathway 2008 Housing Typologies Current Stock Prevalence
2 StatsNZ 2021 General Social Survey
3 White et al 2021 The condition of owned and rented housing in Aotearoa

# Why create a Roadmap for Existing Homes?

- Little action from government in this space
- Global trends indicate most existing homes will still be standing in 2050
- Ambitions and obligations for reduction in carbon are unlikely to be met unless all homes are close to net zero
- There are opportunity to improve
  - Information
  - Knowledge
  - Funding
  - Legislation –remove barriers that stand in the way of improving the quality of NZ homes

# Primary motivators:

# health & comfort

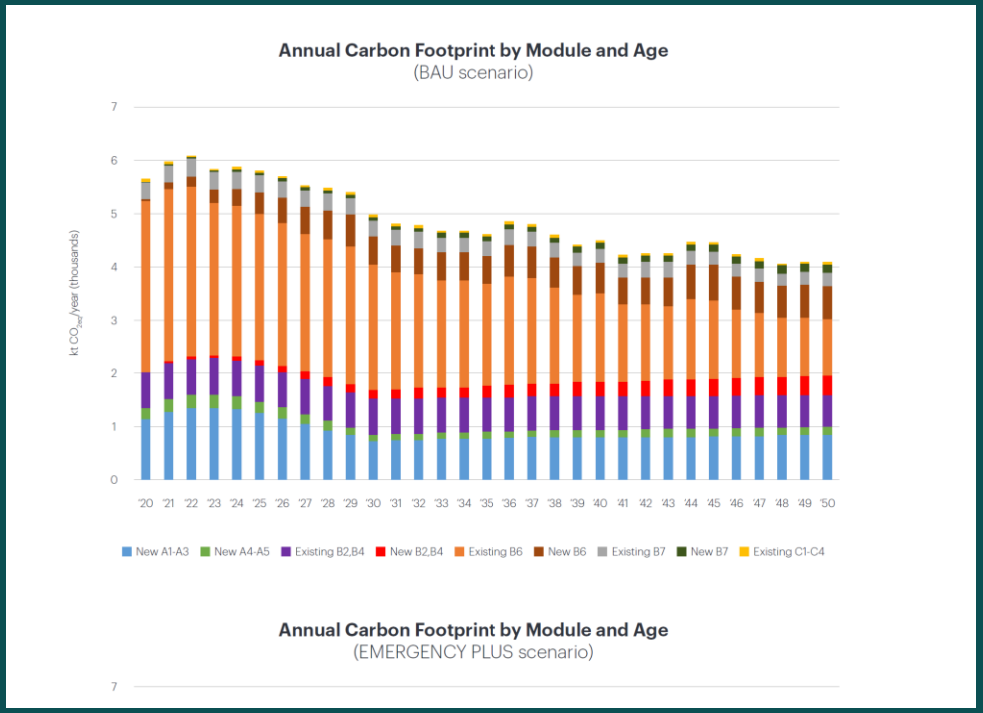



- The "Homes we Deserve" called for a deep retrofit of 200,000 of our unhealthiest homes – supported by 170 organisations
- Warmer Kiwi Homes and other programmes need bolstering
- Costs of deep retrofit are too high for owners and society to afford
- eCubed research shows best energy efficiency ROI from pre-1960s homes
- Identify those most in need, highest deprivation, coldest areas, most likely to benefit from deep retrofit

# Dual health and energy focus


- Health and reducing emissions are the two primary motivators
- Healthy Homes Standards, Healthy Homes Initiative, Warmer Kiwi Homes drive decent housing at the lower end, but need more regulatory and financial support
- BRANZ has identified existing homes as a major source of carbon emissions
- Average home has 5 times the embodied and operational emissions of the 2050 target
- Banks are asking for help with measuring carbon emissions

# For carbon reduction, shallow retrofit gives best return

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BRANZ has identified existing homes as a major source of carbon emissions

- Upgrade fabric (insulation, windows, walls) where cost effective (during renovation)
- Otherwise, focus on  shallow retrofit - electrifying houses and upgrading systems
- Banks can help financing shallow retrofits – calling for carbon measures
- Need a way to measure energy use (EPCs or similar)
- Subsidy scheme could then be rolled out, possibly by WKH, but at a vastly enhanced level of funding
- Backed up by national Voluntary Targeted Rate scheme

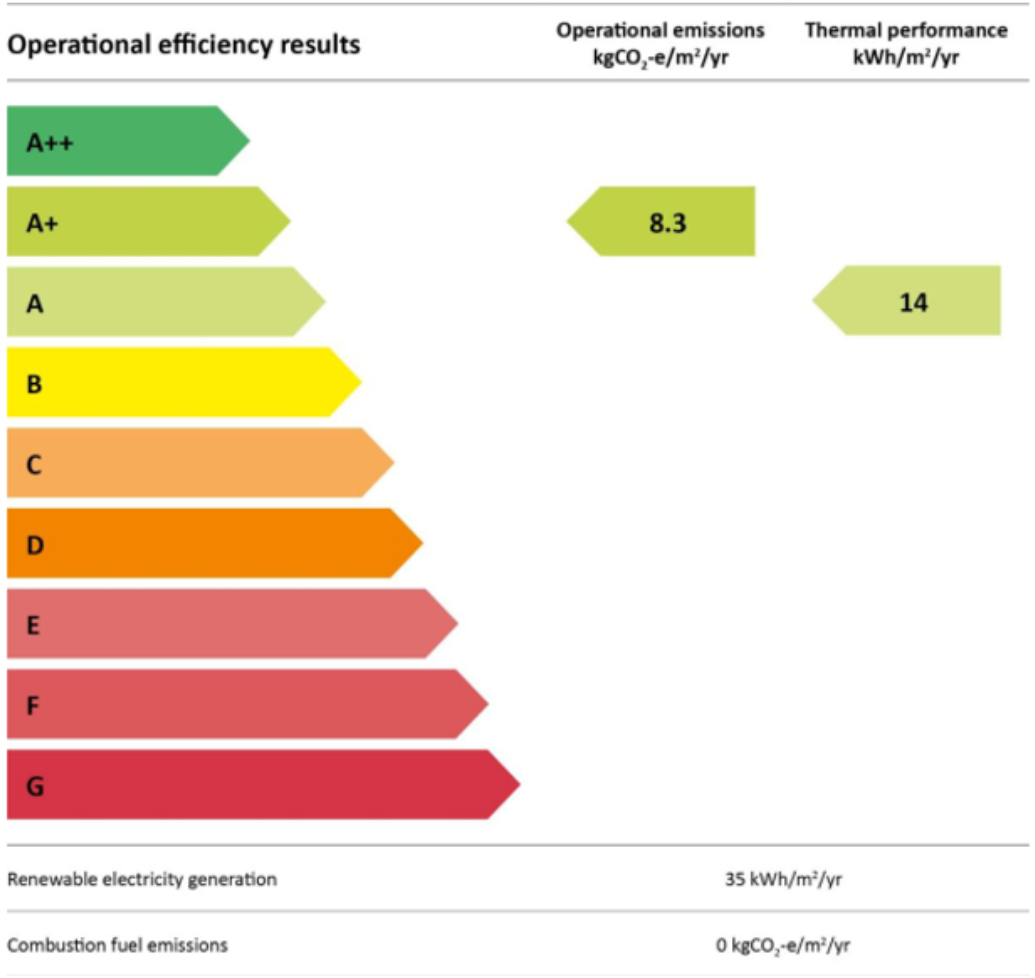
# How do we get there?

Identify homes and target subsidies, measure energy use (EPCs)

Subsidy scheme - different levels depending on income

Vastly enhanced level of funding, possibly similar to Irish co-funding scheme

Backed up by a national VTR scheme



# Major finding - NZ needs a two tier approach

| | DEEP | SHALLOW |
|---|---|---|
| HOMES | • 1960's or older<br>• Cold regions & those in deprivation index<br>• 100-200,000 homes | 1960s-2000s<br>Able to pay, all regions<br>+600,000 homes |
| MEASURE | • Fabric & systems<br>• $50,000 – 80,000 | Systems/electrification<br>$10,000 - 20,000 |
| POLICY | • 100% Government funding | Funding - Expand Warmer Kiwi Homes<br>Finance - National Voluntary Targeted Rates scheme<br>Ban gas, require EPCs at point of sale or rental |
| FOCUS | • Health & Productivity | Reduce carbon emissions |

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# Putting existing homes on a high-performance pathway:

## Retrofitting our existing homes to improve health, productivity and progress towards net zero

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## Recommendation 1: Implement a wide-scale deep retrofit programme

We are calling for a government-led, **fully funded programme to retrofit Aotearoa New Zealand's 200,000 coldest homes.**

The impacts of undertaking 200,000 deep retrofits will be profound, not just for the health of those households targeted by the programme, but for upskilling industry, improving supply chain capacity and choice, and driving down costs of materials and products that will be critical to the retrofits we need to hundreds of thousands more existing homes (see Recommendation 2).

We suggest that because the benefits of such a programme largely accrue to the health and wellbeing of occupants, this programme could come fully or partially from the health budget.

A wide-scale deep retrofit programme will target Aotearoa New Zealand's 200,000 coldest homes, both rentals and owner-occupied, and fully-fund their complete transformation with ceiling, underfloor and wall insulation, double glazing, airtightness, and ventilation as well as upgrading services such as space and hot water heating and lighting where appropriate.

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# Putting existing homes on a high-performance pathway:

## Retrofitting our existing homes to improve health, productivity and progress towards net zero

| DEEP RETROFIT | THERMAL COMFORT/HEALTH BENEFITS | EFFICIENCY/ CARBON SAVING BENEFITS | COSTS | EASE OF INSTALLATION (SEE APPENDIX C FOR DETAIL) |
|---|---|---|---|---|
| Fabric insulation (Homestar® standard) | High | Medium | $$$$ | Easy to difficult depending on house typology |
| Double glazing (H1 standard) | High | Low | $$$$ | Moderately difficult |
| Balanced ventilation | High | Low | $$$ | Moderately difficult |
| Air/vapour control layer | Medium | Medium | $$$ | Difficult |

$$$$ = $10,000-20,000 $$$ = $5000-10,000 $$ = $1000-5000 $ = Under $1000

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**Putting existing homes on a high-performance pathway:**

**Retrofitting our existing homes to improve health, productivity and progress towards net zero**

# Recommendation 2: Implement a wide-scale shallow retrofit programme

We are calling for a government-led, **partially subsidised, shallow retrofit programme** to improve hundreds of thousands of other existing homes, predominantly aimed at reducing energy use as the sector's contribution to our climate change targets.

We need to encourage the electrification of our existing homes if we are going to achieve net zero carbon by 2050.

Funding for this programme will require investment from the emissions reduction plan budget.

WKH and other programmes (see Appendix A) have made measurable improvements to homes and significant improvements to health and wellbeing outcomes for their occupants.

To set Aotearoa New Zealand's existing housing stock on a path to net zero, while improving comfort, health, and cost of living outcomes, WKH should be substantially expanded to include additional measures to reach more households, support further energy efficiency improvements and replacement of gas space and hot water heating and gas cooking appliances.

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**Putting existing homes on a high-performance pathway:**

**Retrofitting our existing homes to improve health, productivity and progress towards net zero**

**Expand the package of measures**. While insulation and heating are two of the most impactful measures, and have been the focus of WKH and its predecessors, a more comprehensive package of measures will deliver cost-effective outcomes for energy hardship, health and comfort, and emissions. Additional measures should include:

- **Home Assessment.** Include an independent home assessment before and after each WKH package to contribute to a national data set and form the basis for future deeper retrofit planning.
- **Hot water cylinder retrofit insulation and controls.** According to the BRANZ House Condition Survey[43] nearly 500,000 homes have older cylinders that would benefit from a 'wrap'. Insulating these cylinders would save in the region of $40 million annually in electricity costs and reduce carbon emissions by around 20,000 tonnes per year.
- **Installing efficient and effective kitchen and bathroom ventilation.** Install efficient bathroom fans (powerful and quiet) that operate on timers (or continuously) and kitchen fans that can be run intermittently (e.g. exhausting smoke quickly) or quietly removing moisture for longer periods at lower speed (e.g. kitchen rangehoods with motors located in the ceiling space).
- **Basic draught stopping and double layer curtains.** WKH should refer households to local community providers that have access to curtain banks and stocks of simple and cost effective draught stopping products. For example, organisations such as Community Energy Action, Habitat for Humanity and Sustainability Trust operate curtain banks and provide a range of draught-stopping products at low or no cost.
- **Fund building repair and improvement work to**


tonnes per year.

- **Gas system replacement.** Subsidise the replacement of gas heaters with heat pumps and replace gas hot water systems with electric-based systems. The funding for 7,500 heat pump hot water systems included in Budget 2023[44] should be scaled up significantly. These systems offer efficiencies up to three times that of conventional electric storage water heaters or gas water heating.
- **Downlight replacement.** Older downlights are usually energy inefficient halogen or incandescent models with open fittings, bringing in potentially damp and unhealthy air and allowing heat to escape to the roof cavity. Replacing them with either IC-rated LEDs or removing them altogether (and fitting ceiling mounted lights) results in a win-win outcome with improved energy efficiency as well as allowing improvements to the ceiling insulation. Budget 2023[45] made provision for LED lighting in WKH but must go further to address the issues with older downlights.
- **Fund building repair and improvement work to support home retrofit programmes.** Funds for repair work was included in Budget 2023[46] for WKH and is also a critical element of a deep retrofit programme. Currently homes with walls, cladding or roofing in bad repair are not eligible for WKH, meaning the homes in most need of help can fall through the cracks. This element of the programme will need to be scaled and funded appropriately.
- **Expand funding to include heating for bedrooms as well as the main living room.** The overnight temperature of bedrooms has a higher impact on health outcomes for occupants. The World Health Organisation suggests that the optimal overnight temperature should be 18oC for healthy adults and 20oC for bedrooms of young, old, and unwell people.[47] In many homes in Aotearoa New Zealand, bedroom temperatures are below 16oC.

A summary of **critical measures for deep and shallow retrofit measures** is outlined on the next two pages and in more detail at Appendix C.


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# Recommended actions

- Implement a **deep retrofit programme** for 200,000 of our worst performing homes
- Radically expand the **Warmer Kiwi Homes subsidies** for a shallow retrofit programme
- Roll out a **national rates funding programme** resourcing local authorities to provide the balance of funding & encourage banks to extend their low interest finance terms


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# Free up funding for retrofit

## Voluntary Targeted Rates helped many homes

NZGBC proud that our advocacy, with others was successful at allowing a carve out of the CCCFA

Only some councils provide VTR schemes – lets enable all kiwi whanau to benefit

### New Zealand banking products that support healthier homes:

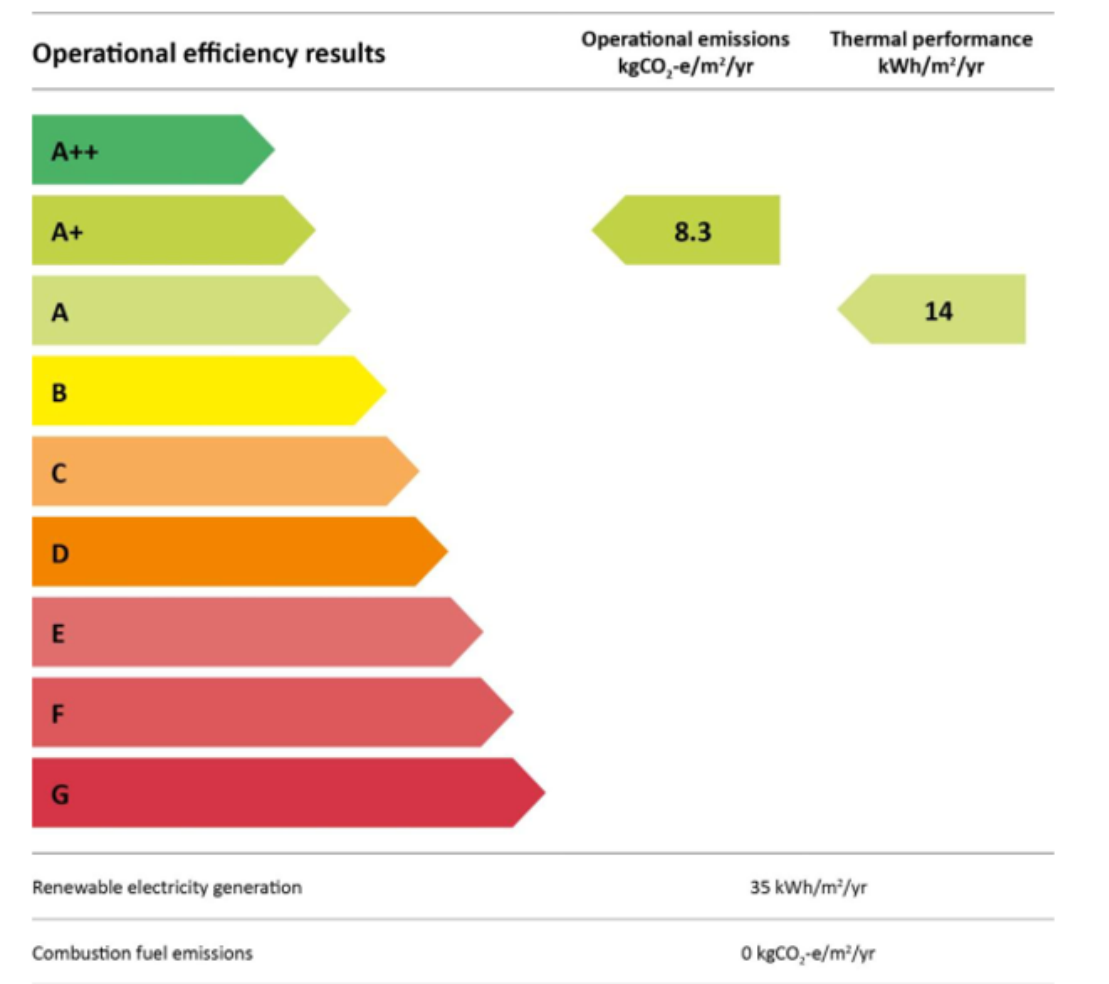
- ANZ Good Energy Home Loan[54] of up to $80,000 at 1% pa interest – fixed rate for 3 years.
- ASB Better Homes Top Up[55] of up to $80,000 at 1% pa interest – fixed rate for 3 years.
- BNZ Green Home Loan Top-Ups[56] of up to $80,000 at 1% pa interest – fixed rate for 3 years.
- Westpac Greater Choices Home Loan[57] of up to $40,000 at 0% interest for 5 years.
- Kiwibank Sustainable Energy Loan[58] offers a grant of up to $2000 (paid over 4 years) on loans for an approved renewable energy system – solar PV, small scale hydro, wind energy or geothermal, at 8.25% pa interest.

Lets ask banks to extend the offer to 8 years allowing more kiwis the opportunity to improve their homes


# Recommended actions

- Implement a **deep retrofit programme** for 200,000 of our worst performing homes
- Radically expand the **Warmer Kiwi Homes subsidies** for a shallow retrofit programme
- Roll out a **national rates funding programme** resourcing local authorities to provide the balance of funding & encourage banks to extend their low interest finance offers
- Trial an **Energy Performance New Zealand Certificate** by 2026

## Better data & engagement




- Learn from overseas experience & create in partnership with housing sector, EDAs & others. (Great project for BRANZ funding, hint, hint)
- How the EPC could work - 2 scales
  -Thermal efficiency (how warm & dry)
  -Carbon emissions
- Ratings ultimately based on visit by trained professional.
- Indicative desktop ratings could be offered based on data already known – era of build, known upgrades & typle of home (stand alone, apartment etc)
- Ratings likely to be $200-$300
- For new - carried out as part of building consent

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# Advocacy


New Zealand is bound by law and trade agreements, to reduce carbon emissions in line with Paris Agreement.

NZ Climate Change Commission warn we are not on track.

> "20,700 kilo tonnes of CO2e of emissions reductions are needed by 2030 to meet the second emissions budget".

This will increase as climate policies (Clean Car Discount, GIDI & others) are rolled back.

Almost a third of those savings can be delivered by the built environment.

This is equal to taking over 600,000 petrol cars off the road for five years.

The policies;

- an improved Building Code
- phasing out gas
- making energy use transparent

will reduce costs for kiwi families and businesses, improve health and go on to save 93,000 kilo tonnes by 2050 (a saving of $19-39bn)*.

**OR**

...the NZ can pay hundreds of millions to fund other countries to reduce emissions (offsetting).


* Using Treasury's shadow carbon price


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## Align regulation to support healthy homes

- Mandatory upgrades to current building code when renovating walls (insulation & windows)
- Phase out gas & other fossil fuel burning stoves, space and water heating
- Align with OECD cousins - Mandatory assessment of EPC at point of sale & rental
- Healthy homes standard to include EPC & mandatory minimum rating & register
- Currently retrofit improvements need consent. Replacing like for like requires no consent. Move to UK approach with a certified person regime.
- As a community we need to make the case on jobs & assisting with energy crisis (needs more work)

# Recommended timeline

- 2025-30: Policy development, grow retrofit capacity (assessors, external wall insulation, retrofit double glazing)
- 2026: Pilot phase retrofitting 300 homes

  No new gas connections from 2026

  EPC developed WKH expanded
- 2028: EPC mandatory & 10,000 homes partial funded

  Regs - good windows & walls for major renos
- 2029: No replacement gas appliances
- 2030: 100,000 homes meet target EPC grade A
- 2035: 250,000 deep retrofits fully funded

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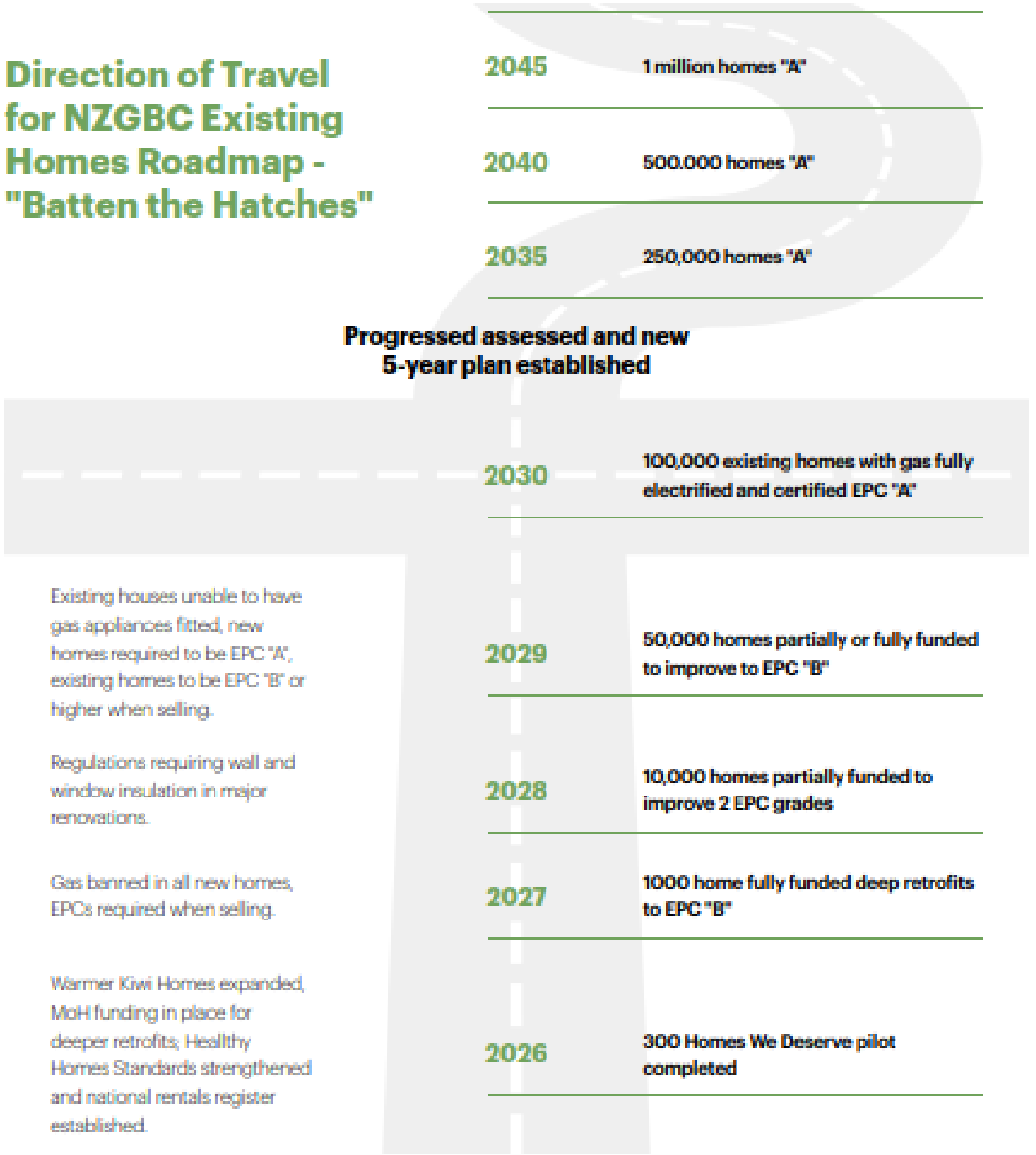


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## NZGBC acknowledges the following people and organisations for their input


- Accessible Housing New Zealand, Andre Lipa
- ANZ, Poppy Brinsley and Manesha Keshaw
- ASB, Radu Costin
- Bay of Plenty Regional Council, Marion Henton
- BRANZ, Mark Jones
- Brightr, Rosie Davison
- Christchurch City Council, Tony Moore
- Community Energy Action, Robert Linterman
- ECAN, Carly Cushman, Clare Pattison and Paul Hopwood
- EECA, Gareth Gretton
- Energy Smart, Richard Bruce
- Enstall, Nick Hall
- IONZ, Richard Arkinstall
- MBIE, Christian Hoerning, Mikey Smyth, Peter LeQuesne and Scott Russell
- Unitec – Te Pukenga, Roger Birchmore and Joey Pitivao
- University of Otago, Nevil Pierse
- Waihanga Ara Rau, Jacqui Neilson
- Wellington Regional Healthy Housing Group, Amanda Scothern


homestar

# Roadmap to retrofitting existing homes

Everyone has the right to a decent home. A decent home is **safe, warm, dry**, affordable, accessible and culturally adequate. It is **supported by necessary infrastructure such as water, and accessible to key services and facilities such as education, health providers, and community**….

Without a decent home, it is difficult to contribute to society. Because housing is so vital to our mana and wellbeing, it is a human right.

Te Kāhui Tika Tangata. Human Rights Commission

Better homes, proven
Kāinga pai ke atu, tūturu

NZGBC
TE KAUNIHERA HANGANGA TAUTAIAO

Roadmap to retrofitting existing homes


# Recommended actions

- Implement a **deep retrofit programme** for 200,000 of our worst performing homes
- Radically expand the **Warmer Kiwi Homes subsidies** for a shallow retrofit programme
- Roll out a **national rates funding programme** resourcing local authorities to provide the balance of funding & encourage banks to extend their low interest finance offers
- Trial an **Energy Performance New Zealand Certificate** by 2026

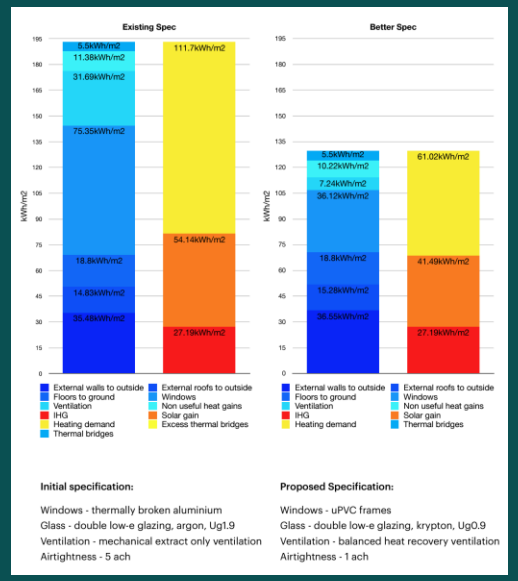
**Existing homes roadmap to be launched by mid October 2024**

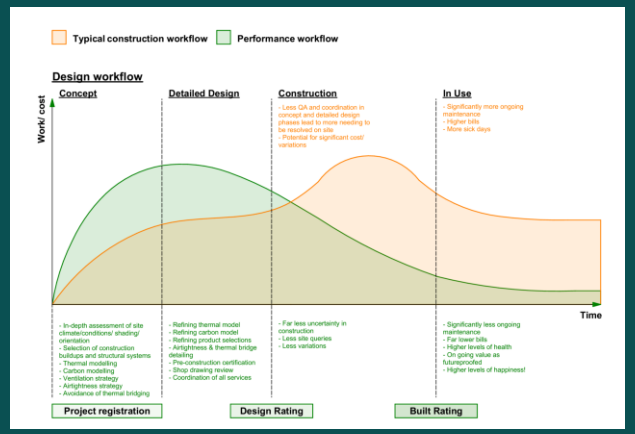
Thank you Sam Rowland the EDA team for today & Eion Scott, Jennifer Whittle


## A new free practical guide on how to build low carbon healthy homes

Verifying to Homestar ensures

- ✅ moisture control = less mould in the home
- ✅ less overheating = stopping dangerous temperatures
- ✅ decent air quality = better health & less headaches
- ✅ access to significantly lower interest development finance
- ✅ efficient fossil fuel free homes = helping solve New Zealand's energy crisis.




Cost tends to be 0 to 1.5% uplift over building to building code

Homestar Design Guide (nzgbc.org.nz)

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Hei konā mai
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