



Welcome to today's CHBA Net Zero Webinar!



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The CHBA Net Zero Team



Housekeeping

- **This webinar is being recorded.** CHBA Members can access the Net Zero webinar archive at www.chba.ca/NZwebinars. (Recording + slide deck.)
- You will be in “**listen-only**” mode for the duration of the webinar.
- After the presentation we will have time for questions. **Please use the question section of the dashboard** throughout the webinar and they will be relayed to the presenter(s).

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Our Next Webinar

June 15 from 10:30-11:30 PT / 1:30-2:30 ET

IAQ and the CHBA Net Zero Homes: What do they deliver?

Presented by:

- Brett Cass, Program Coordinator, Net Zero Energy Housing, CHBA
- Gord Cooke, President, Building Knowledge Canada,
- Doug Tarry, President, Doug Tarry Homes, and
- Sonny Pirrotta, National Sales Manager- HVAC Solutions, Life and Devices Solutions Division, Panasonic Canada Inc.



Homeowner concerns around home indoor air quality, comfort and energy costs were raised continuously throughout 2020, amplified by the pandemic. Due to this heightened awareness, the Net Zero Technical Committee took a closer look at the aspects in our program that helps to achieve one of our key brand promises: exceptional indoor air quality for healthier living. Join us for this webinar to learn more about why indoor air quality is so important, key control strategies, and how Net Zero Homes are able to deliver better indoor air quality than a code-built home.

Register at chba.ca/NZwebinars



Today's Webinar

May 20 from 10:30-11:30 PT / 1:30-2:30 ET

How do the CHBA Net Zero Homes measure up to NBC Tier 5?



Presented by:

Brett Cass, Program Coordinator, Net Zero Energy Housing, CHBA and
Liz Wynder, Technical Advisor, Codes and Standards, CHBA

Canada is on the path to advancing its energy codes in residential construction. The 2020 National Building Code (NBC) will support higher degrees of energy performance in homes through a tiered energy code with the most stringent tier intending to approximate 'Net Zero Energy Ready'.

With over 600 Net Zero and Net Zero Ready labelled homes across the country, the CHBA has performed a detailed analysis comparing these homes to the proposed Tier 5 metrics of the NBC. Join us for this webinar to learn how the CHBA Net Zero and Net Zero Ready Homes measure up.

Recording & slide deck will be available at chba.ca/NZwebinars





Introduction

- **CHBA Net Zero Home Labelling Program**

- Voluntary
- Active since 2015
- Over 600 homes labelled to date

- **National Building Code Part 9.36.**

- Proposed “tiered” requirements developed by the Standing Committee on Energy Efficiency
- Tiers intended to align with levels achieved by existing voluntary programs

Tier	Intended Alignment
1	NBC 9.36. 2015 (ERS 78)
2	R2000 (2005) (ERS 80)
3	Energy Star
4	R2000 (2012) (ERS 86)
5	Net Zero Energy Ready



How do Codes Canada Define Net Zero Energy Ready?

- SCEE working definition:

“A net-zero energy ready building is a building with a high-performance envelope whose annual energy requirements are minimal and could be offset by renewable energy.”

- Did not formally define with intensity or improvement metric.



Does Tier 5 equal Net Zero Ready?

- Code targets selected based on estimates

Later...

- Some Net Zero Ready homes data explored
 - No adjustments made to proposed code requirements
 - Data from one high-volume builder discounted

Then...

- Further changes made to code requirements and metrics

This presentation will summarize how Net Zero Ready Homes compare to the proposed requirements.



CHBA Net Zero Label Technical Requirements

- Follows EnerGuide Rating System procedures.
- CHBA Net Zero
0 GJ home, using installed on-site renewable energy generation.
- CHBA Net Zero Ready
0 GJ home, on-site renewable energy system is modelled but not yet installed.
- Envelope Efficiency
Airtightness less than 1.5 ACH@50pa.
33% better than that of the reference house.
- Cooling criteria
If no mechanical cooling, annual cooling load $< 2 \text{ MJ/m}^3$, or model standard AC unit.



National Building Code Part 9.36.

- Proposed vs Reference
- 1. Envelope Improvement**
 - Heat loss through conduction, air leakage and ventilation
 - 2. Energy Improvement**
 - Excludes lighting and appliances
 - 3. Peak Cooling Load**
 - Cannot be greater than the reference house

- **Additional details:**

- Full benefit of heat pump space heating
- Small volume relaxations
- Airtightness testing “optional”

Target Metric	Applicable Energy Performance Tier				
	1	2	3	4	5
Envelope Improvement	N/A	≥5%	≥10%	≥20%	≥40%
Energy Improvement	≥0%	≥10%	≥20%	≥40%	≥70%
Cooling	✓	✓	✓	✓	✓

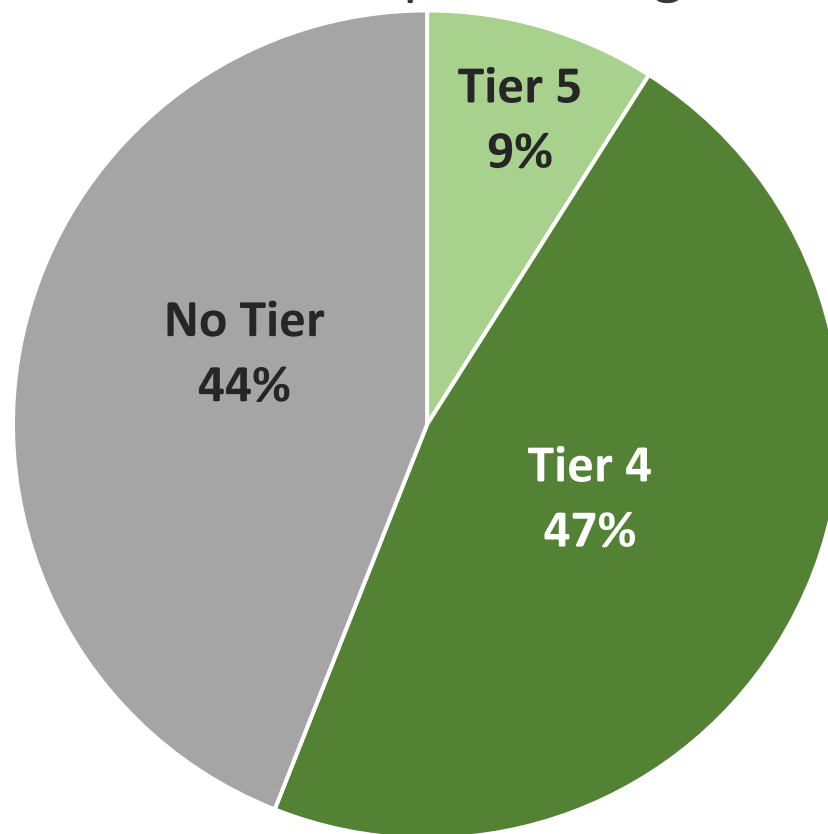


Comparison Approach

- Models for CHBA Net Zero labelling use slightly different assumptions than Code
- Re-run calculations
 - in Housing Technology Assessment Platform (HTAP)
 - for 447 homes
 - 2020 proposed code assumptions
 - no PV
- Thanks to
 - Alex Ferguson at NRCan CanmetENERGY
 - Chris McLellan and Alex Bigonesse at NRCan OEE

What We Found : Headline

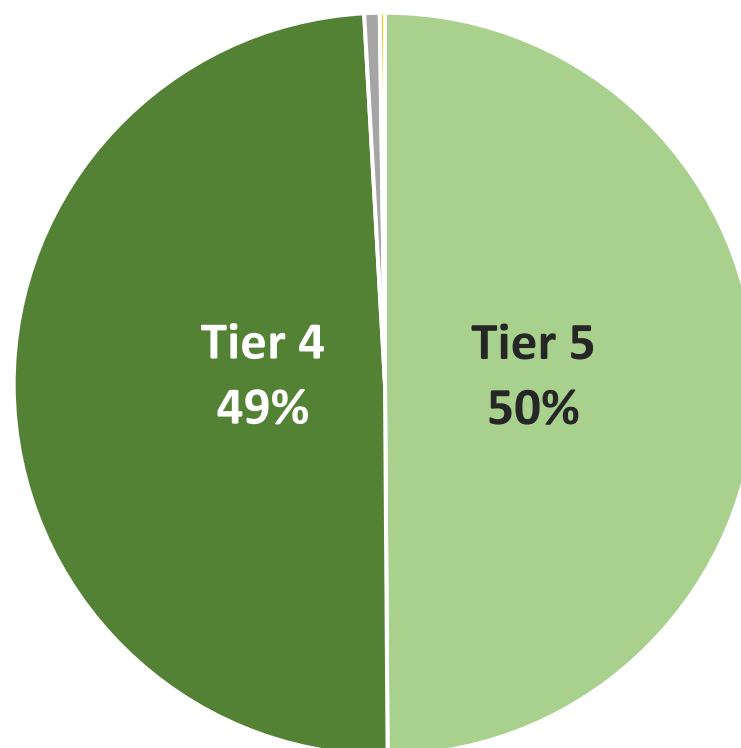
Compliance of CHBA NZr Homes
with **all** Proposed Targets



*Only 9% of
CHBA labelled
NZr homes met
all three of the
Tier 5 targets*

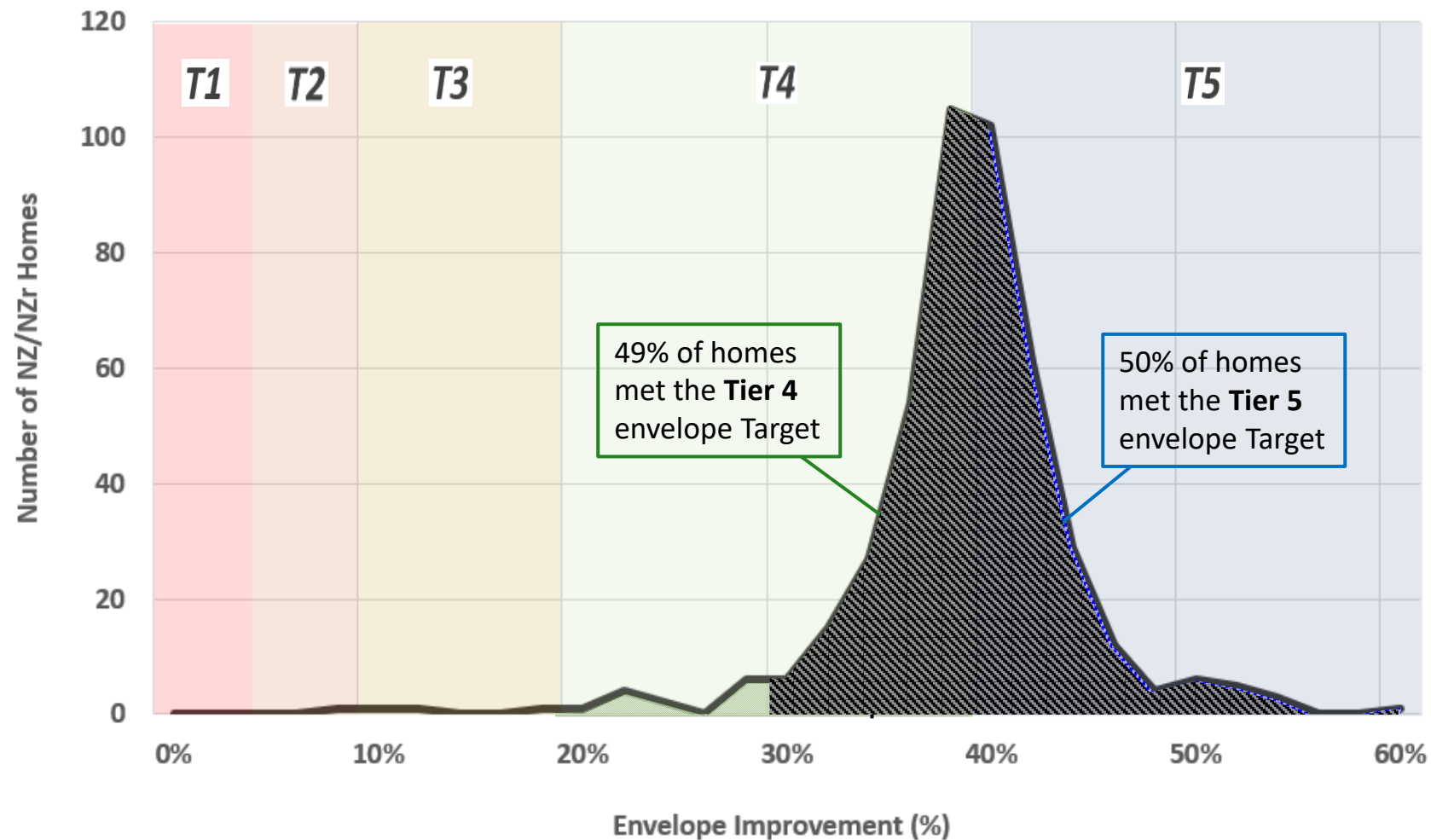
What We Found : Envelope

Compliance of CHBA NZr Homes
with **envelope** target



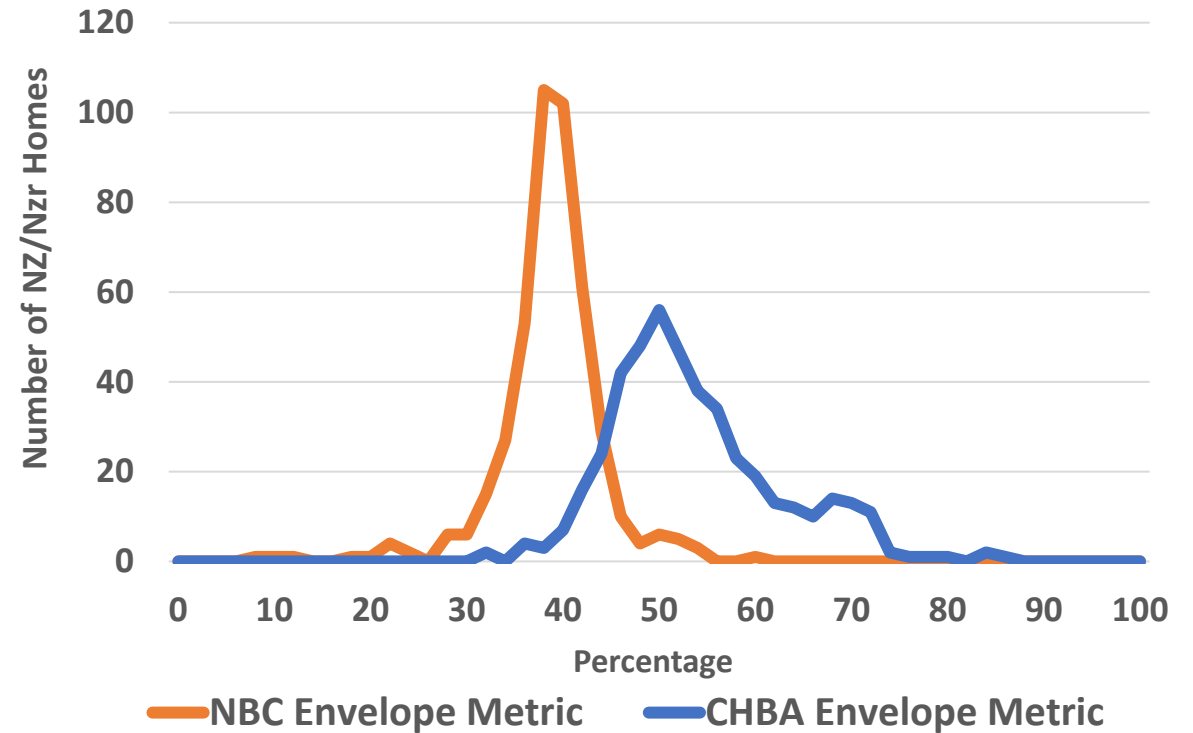
*Only half of
CHBA labelled
NZr homes met
the Tier 5
envelope target*

What We Found : Envelope



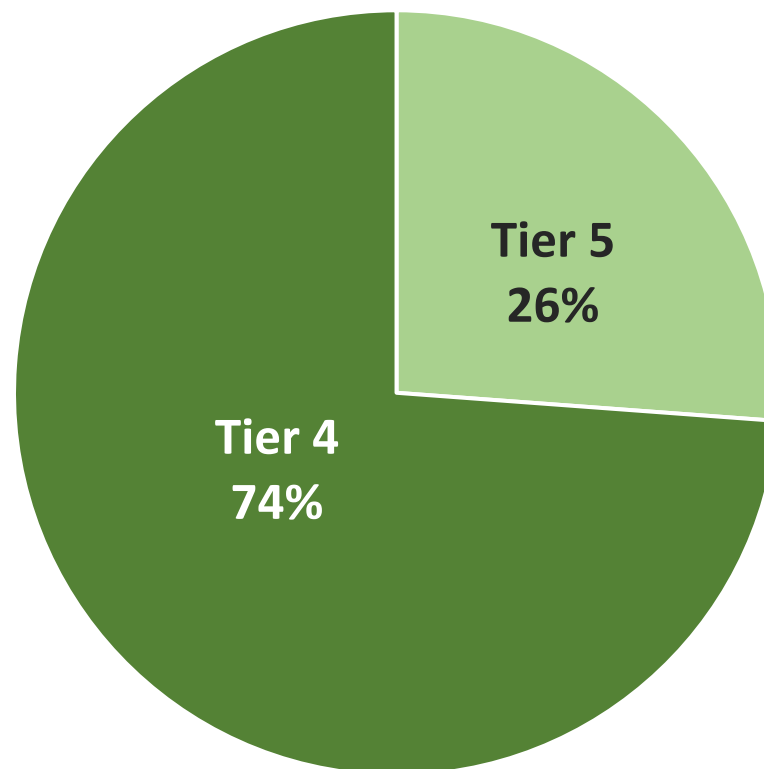
Envelope Metric Differences

- **Code Envelope Metric** uses annual gross space heat loss
- **CHBA NZ Program Metric** uses normalized space heating energy load



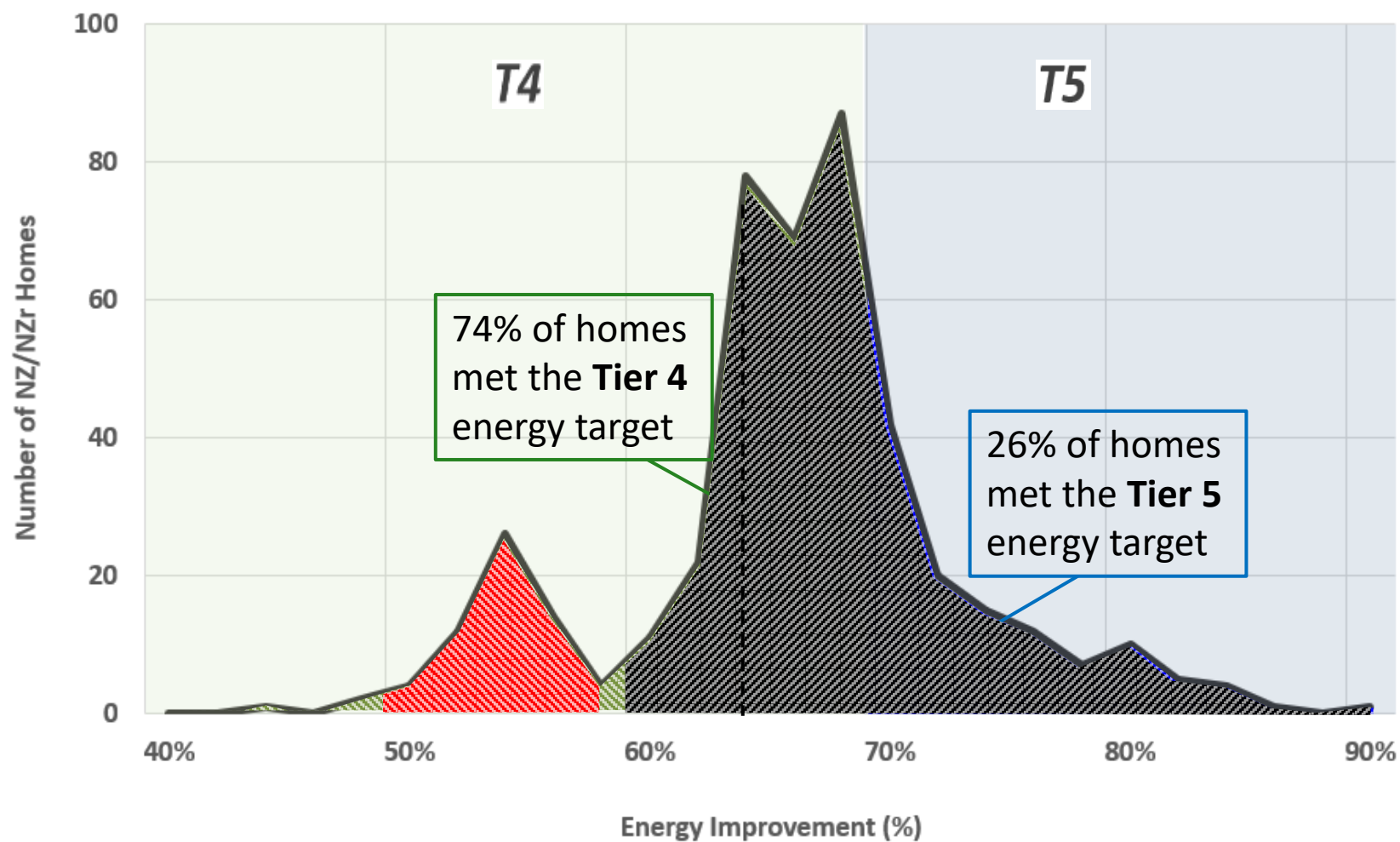
What We Found : Energy

Compliance of CHBA NZr Homes
with **energy** target



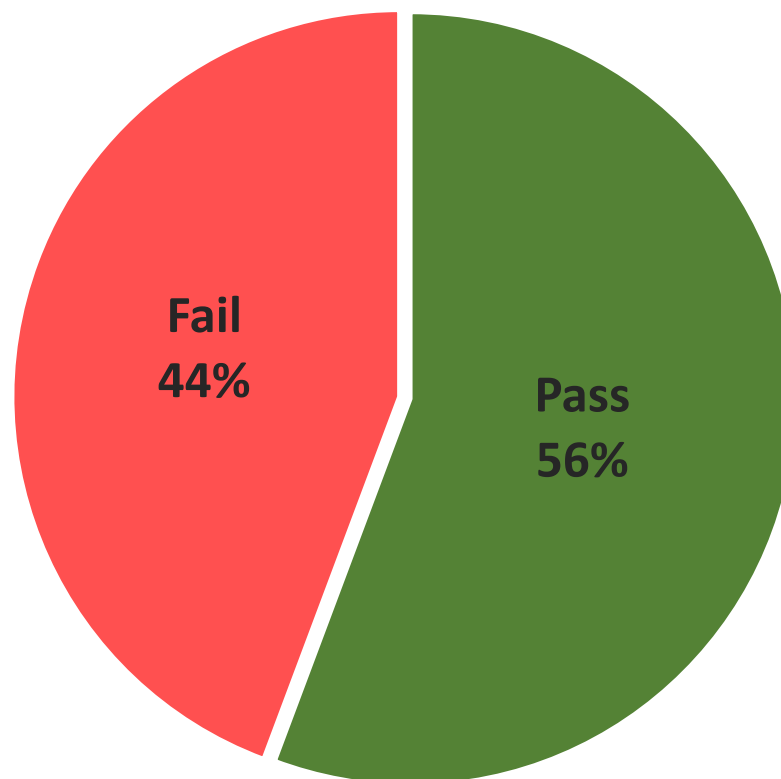
*Only about ¼ of
CHBA labelled
NZr homes met
the Tier 5
energy target*

What We Found : Energy



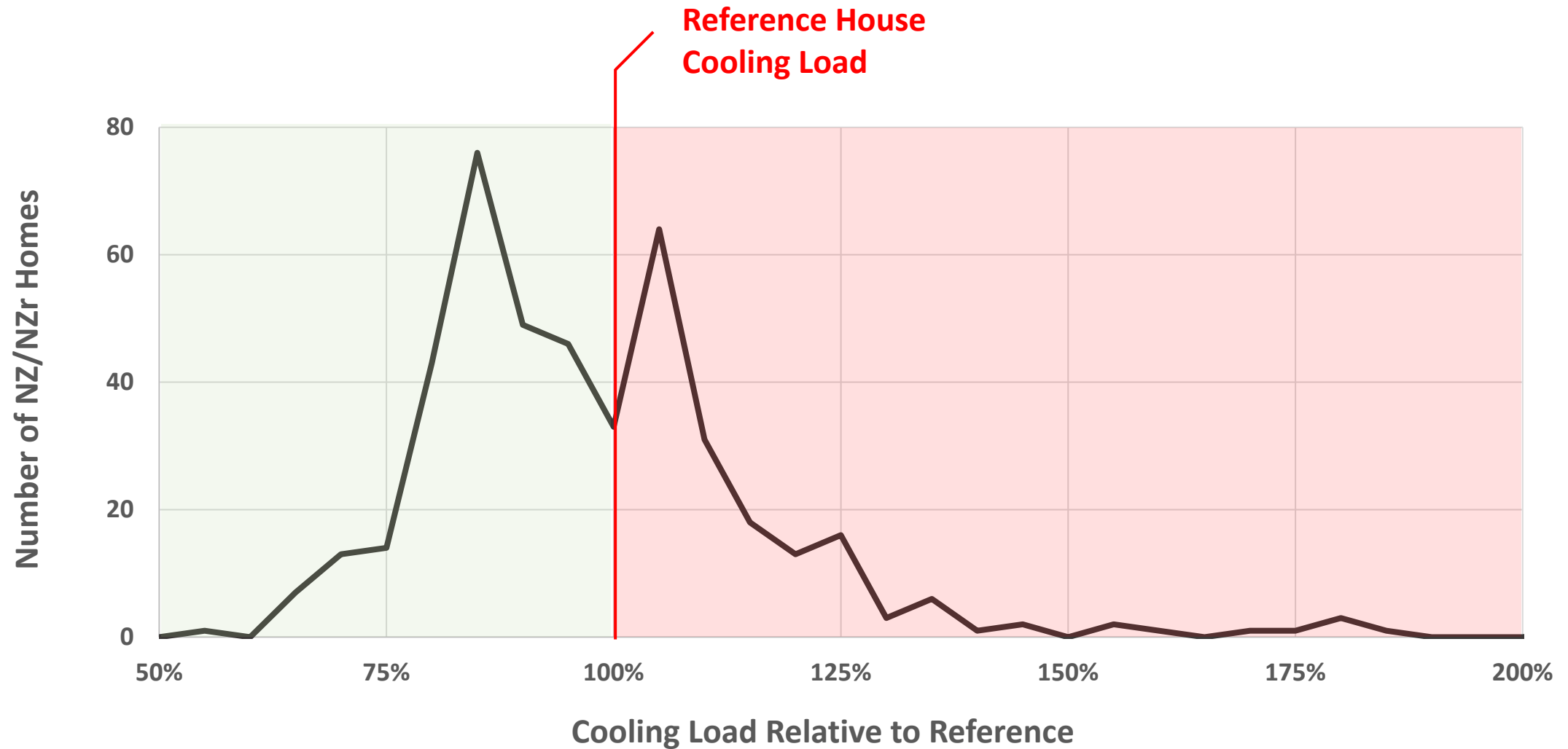
What We Found : Cooling

Compliance of CHBA NZr Homes
with **peak cooling** target

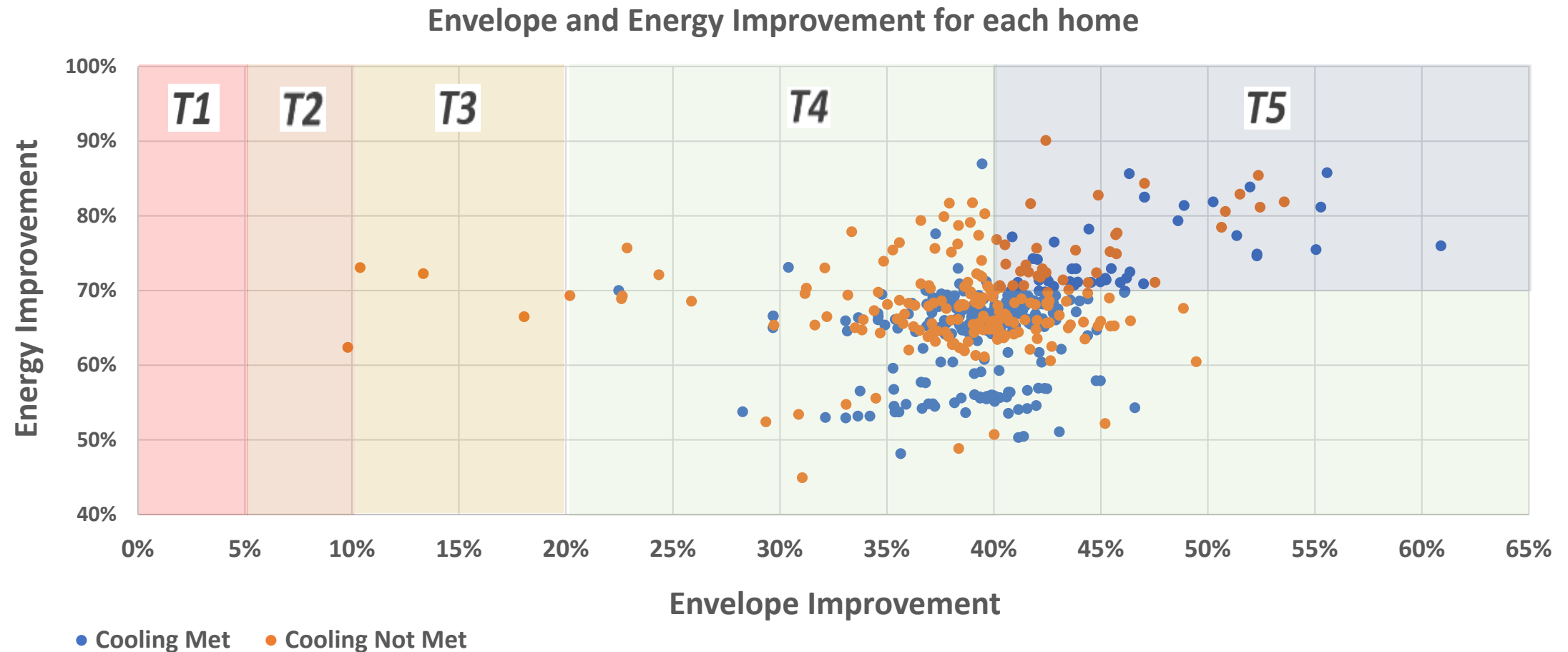


*Only 56% of
CHBA labelled
NZr homes met
the peak cooling
target*

What We Found : Cooling



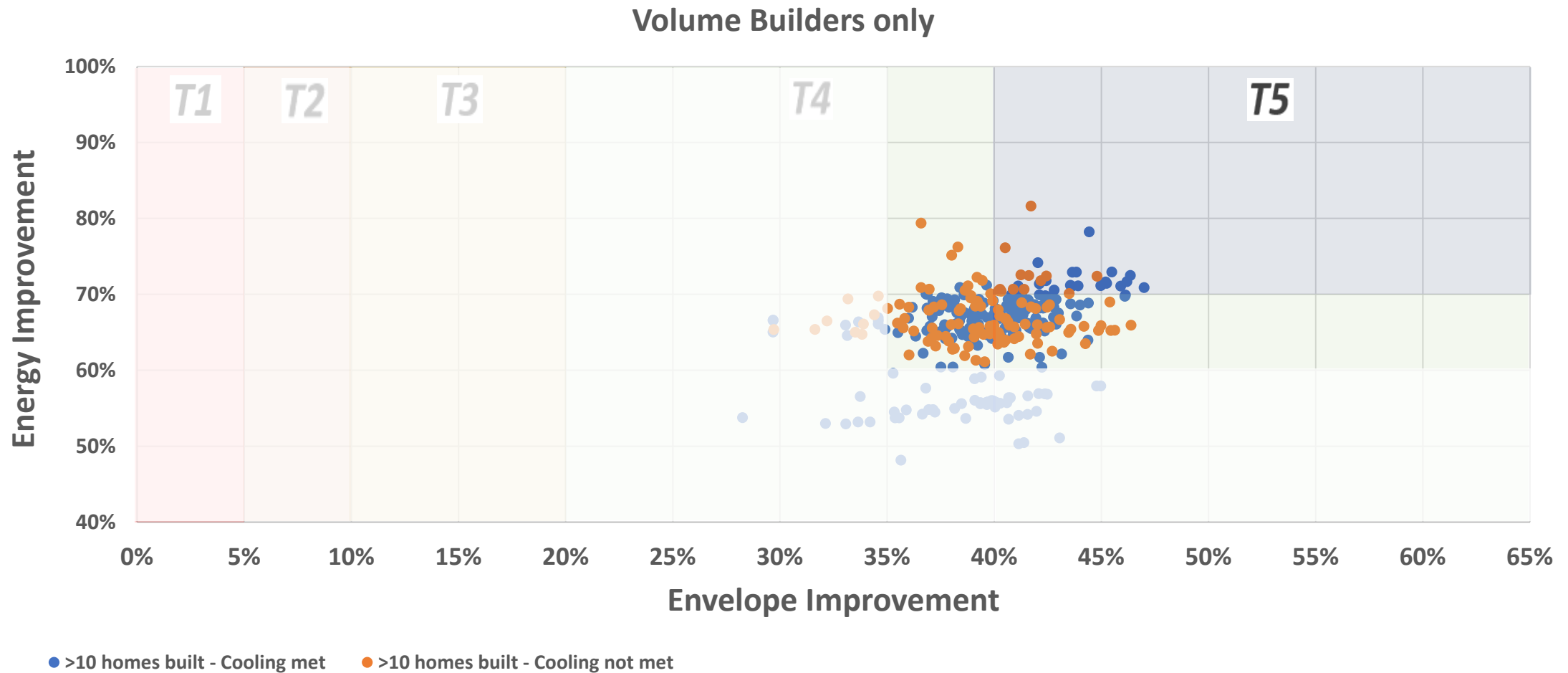
What We Found : All Targets





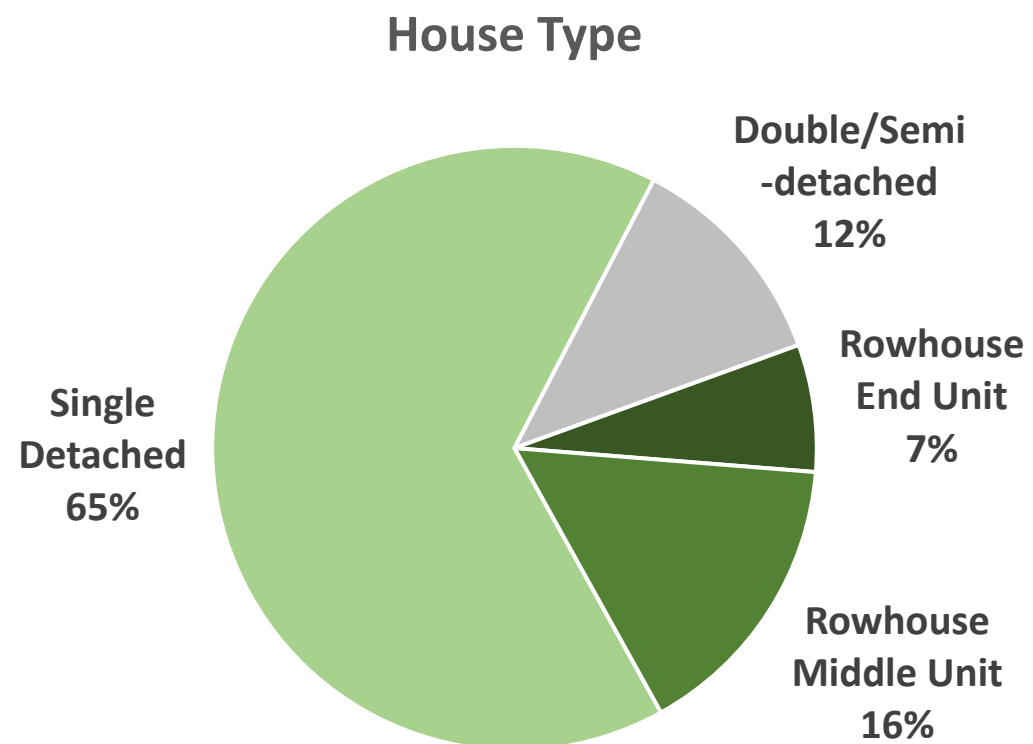
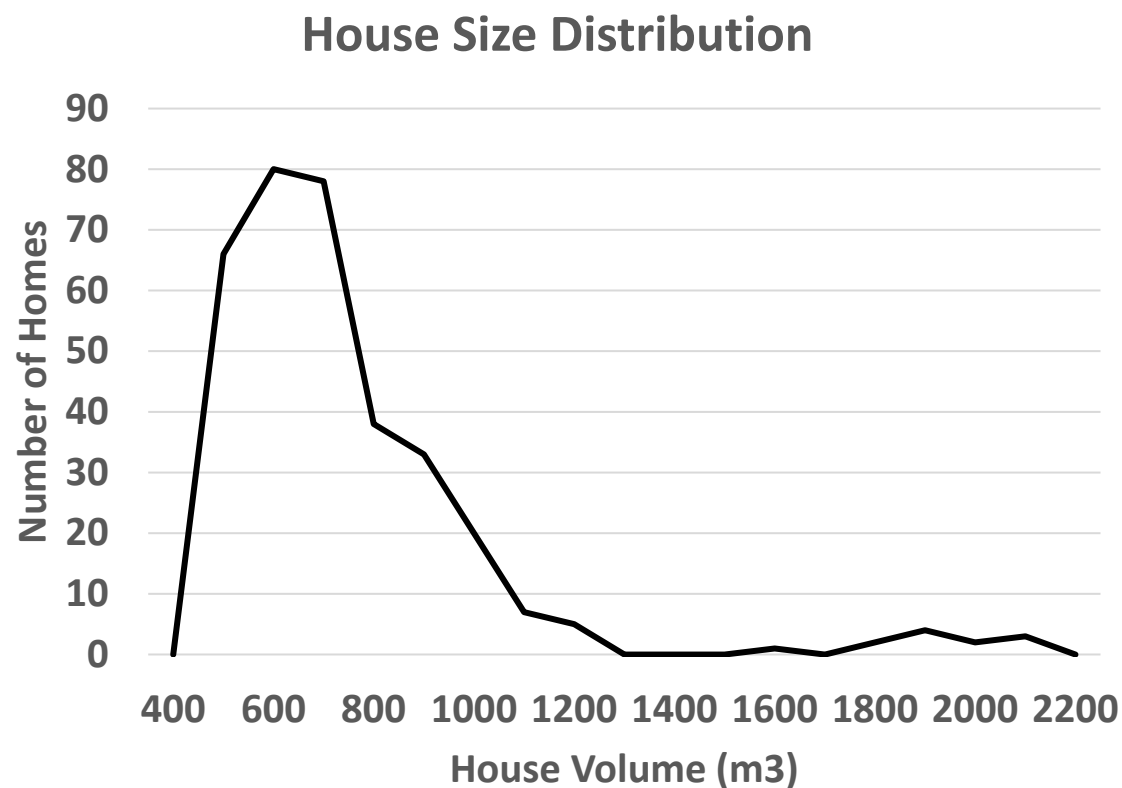
What We Found :

Builders who've Built More Than 10 NZ Homes



What We Found :

Builders who've Built More Than 10 NZ Homes

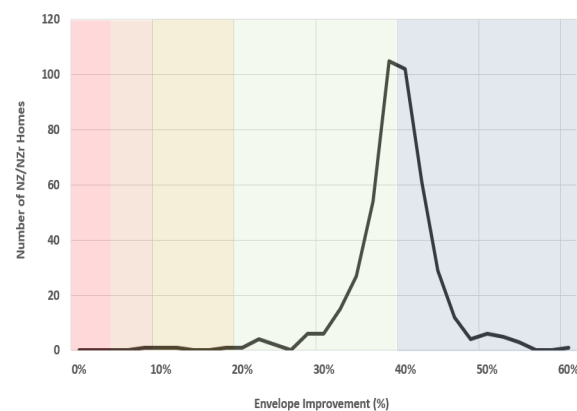




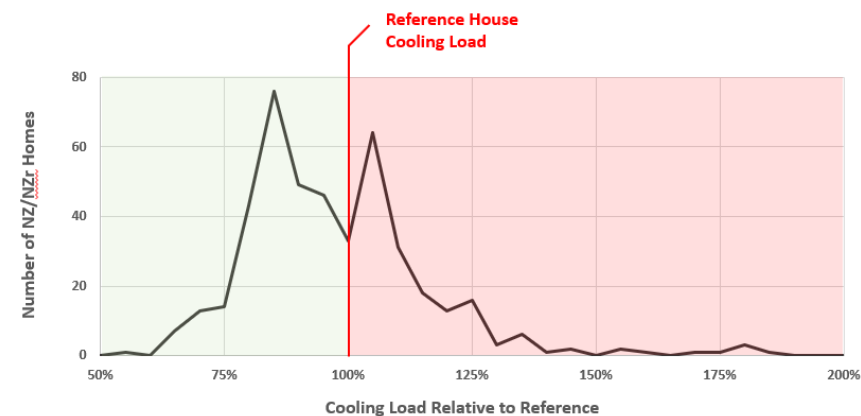
Member Survey

Qualitative Analysis: NZ Builder Survey

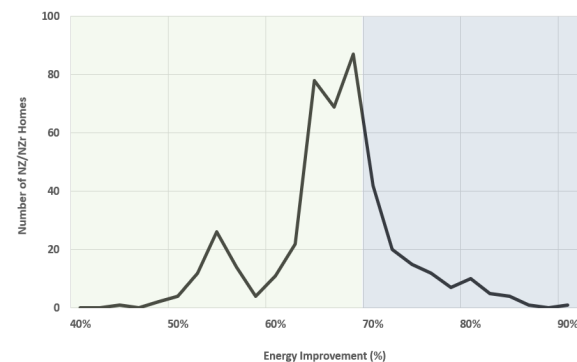
Envelope Target



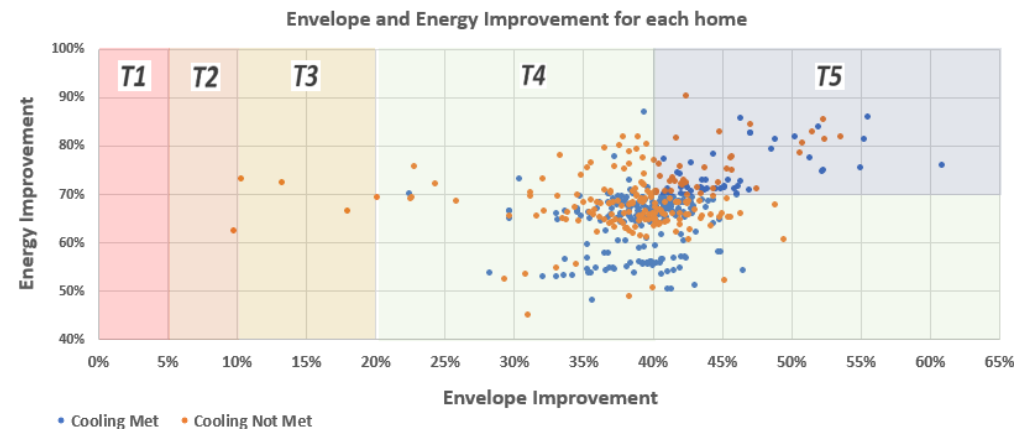
Cooling Criteria



Energy Target



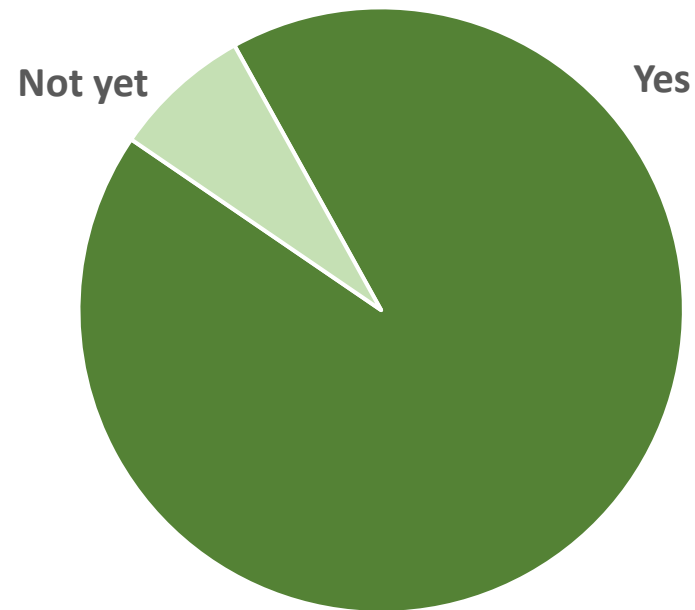
All Targets



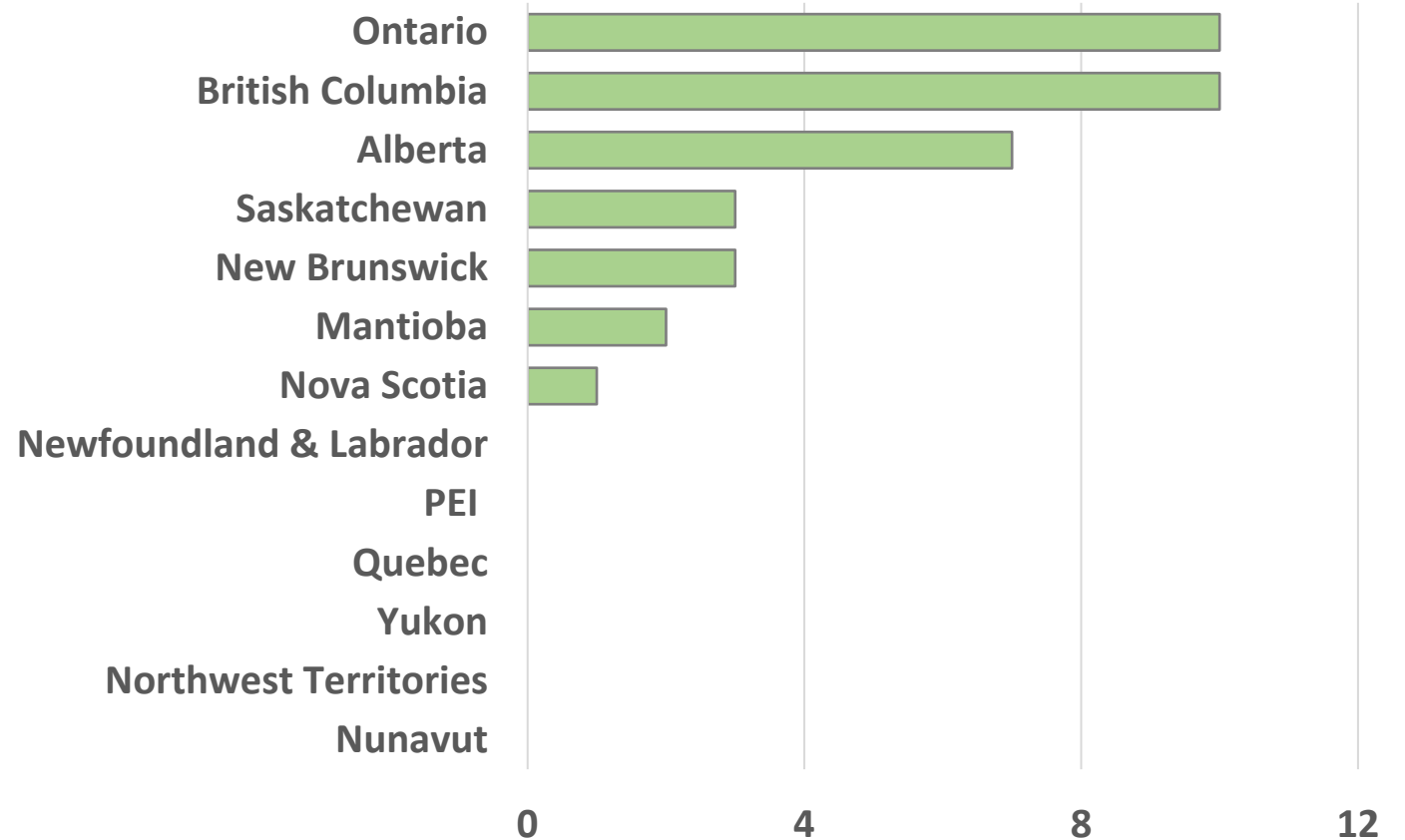


Qualitative Analysis: NZ Builder Survey

Are you a Qualified Net Zero
Builder/Renovator?

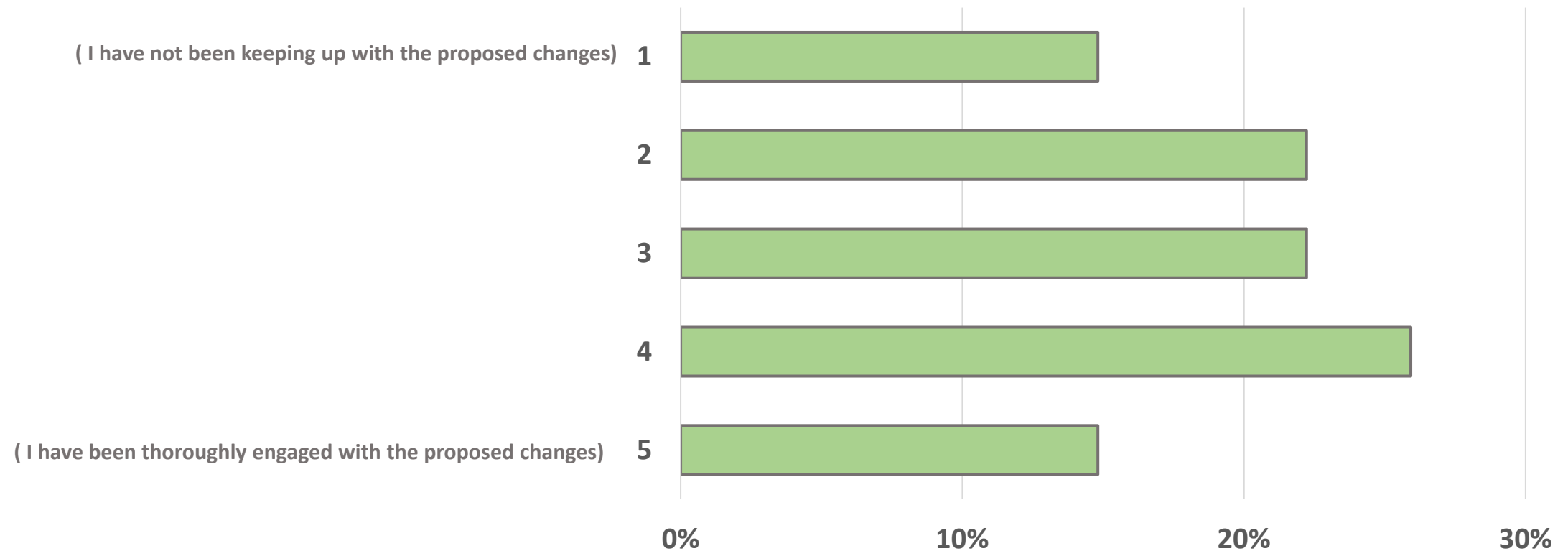


Region of Builders Surveyed

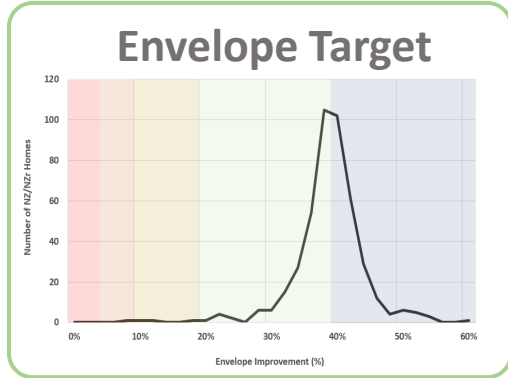


Qualitative Analysis: NZ Builder Survey

On a scale of 1-5, how closely have you been following the development of the proposed changes for energy efficiency in the upcoming 2020 National Building Code (NBC)?

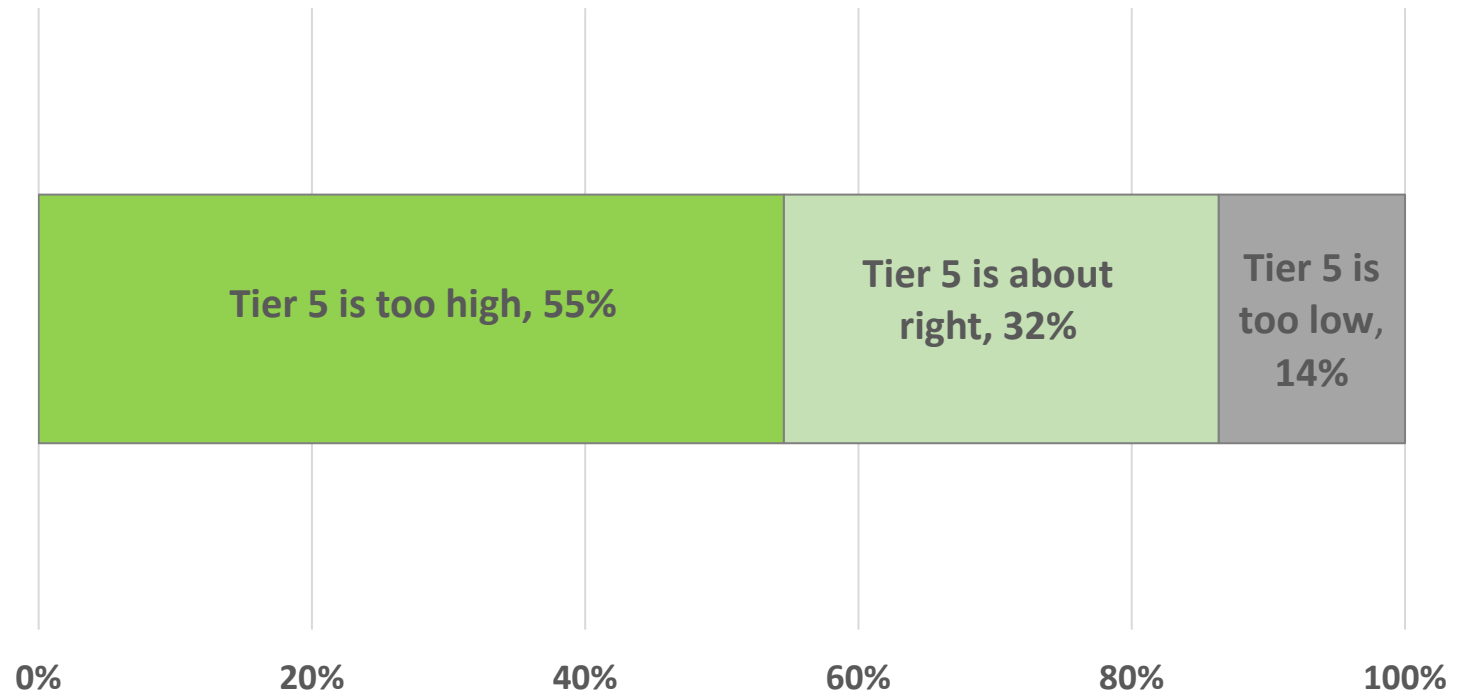


Qualitative Analysis: NZ Builder Survey



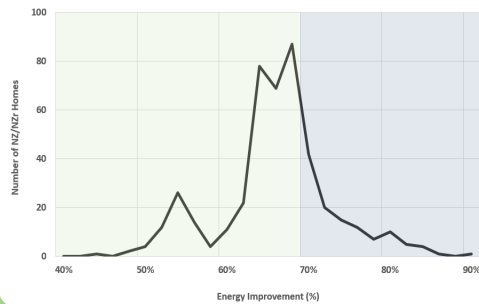
Only half of CHBA NZ/NZr labelled homes met or exceeded the envelope improvement target proposed for Tier 5 (>40%). In your opinion, which envelope improvement target would adequately represent 'Net Zero Energy Ready'?

NZ Builders Views on Tier 5 Envelope Target



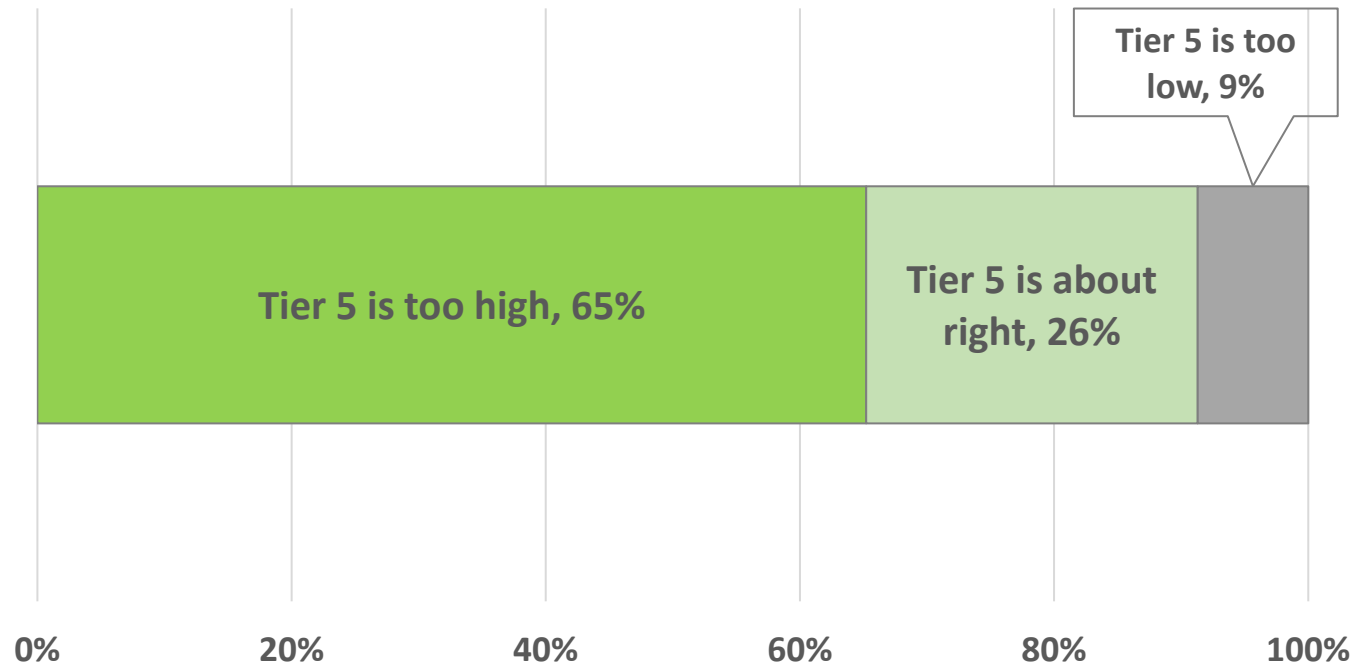
Qualitative Analysis: NZ Builder Survey

Energy Target



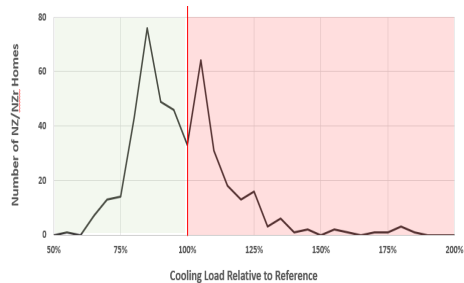
Just over one in four CHBA NZ/NZr labelled homes met or exceeded the energy improvement target proposed for Tier 5 (>70%). In your opinion, which energy improvement target would adequately represent 'Net Zero Energy Ready'?

NZ Builders Views on Tier 5 Energy Target



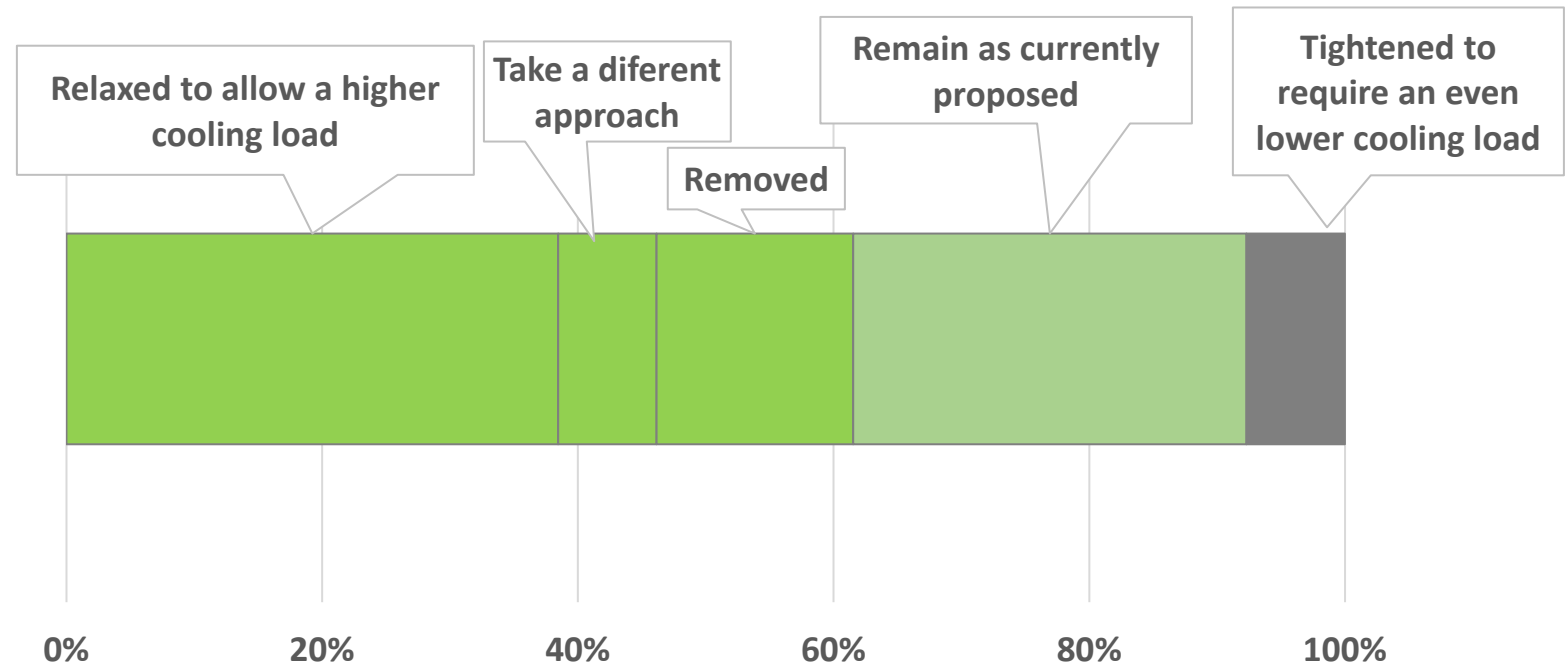
Qualitative Analysis: NZ Builder Survey

Cooling Criteria



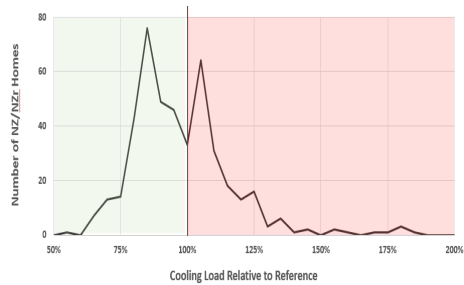
It is possible for a home with a large absolute peak cooling load to pass because it is slightly less than its reference house, and a home with a low absolute peak cooling load to fail because it is slightly higher than its reference house. Many CHBA NZ/NZr labelled homes do not meet this criteria. Do you feel the cooling requirement should be:

NZ Builder Views on The Cooling Criterion

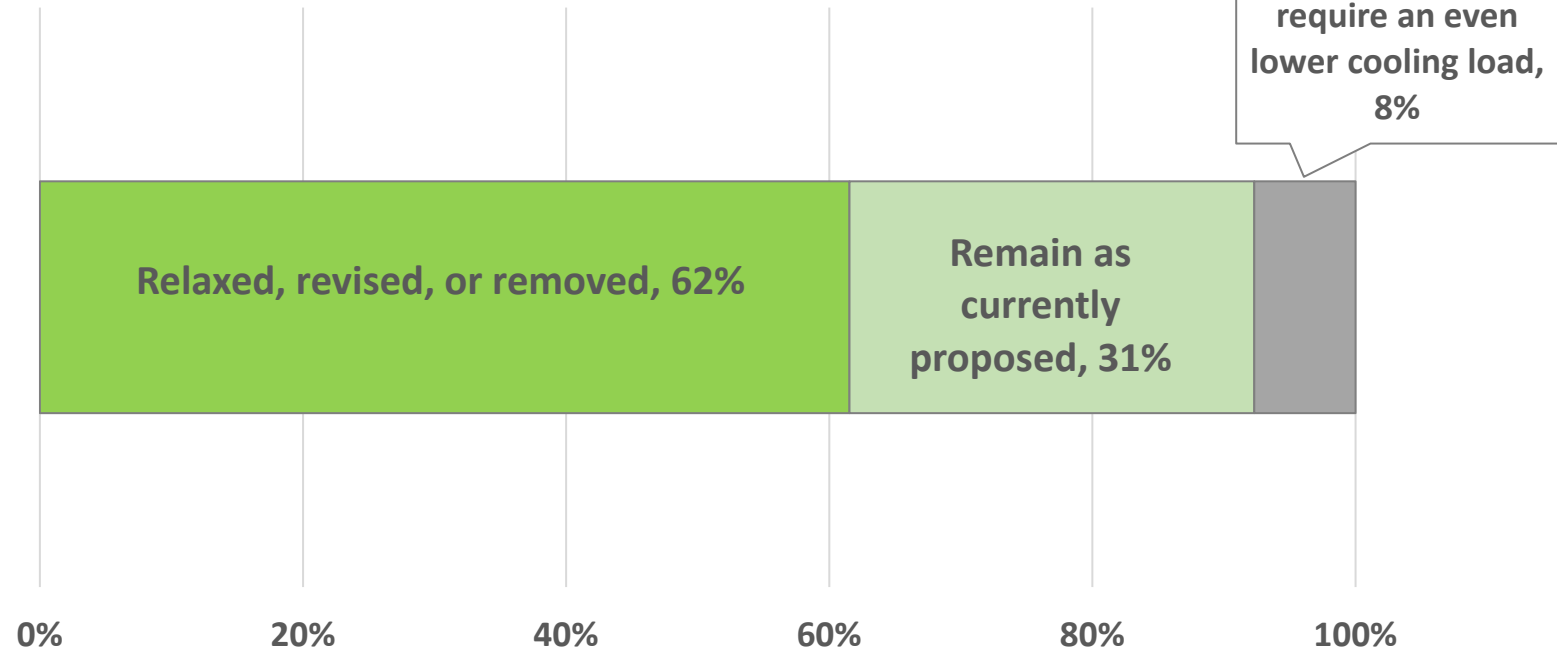


Qualitative Analysis: NZ Builder Survey

Cooling Criteria



NZ Builders Views on The Cooling Criterion





Survey Findings

- 55% feel the Envelope requirement is too stringent.
- 65% feel the Energy requirements is too stringent.
- 62% feel the cooling criteria goes too far or takes the wrong approach.



Improvement Considerations



What We Found :

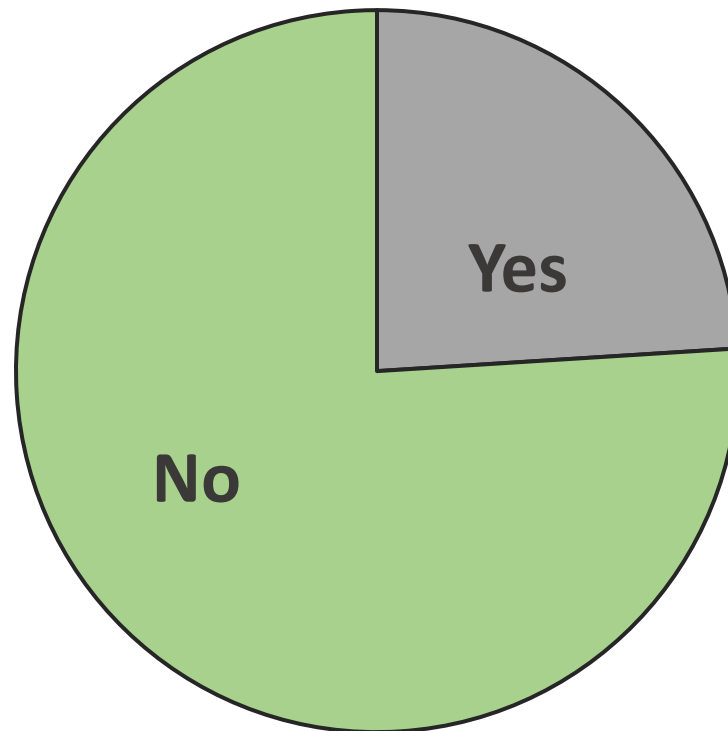
- Tier 5 is higher than what's needed for Net Zero Ready
- Cost-effective “sweet spot” for envelope and energy improvement
- Relax Tier 5?

	Envelope target	Energy Target	Cooling limit	% of NZr homes compliant
Tier 5 as proposed	40%	70%	100%	9%
Option 1	35%	65%	105%	41%
Option 2	30%	60%	110%	63%
Option 3	30%	55%	115%	77%

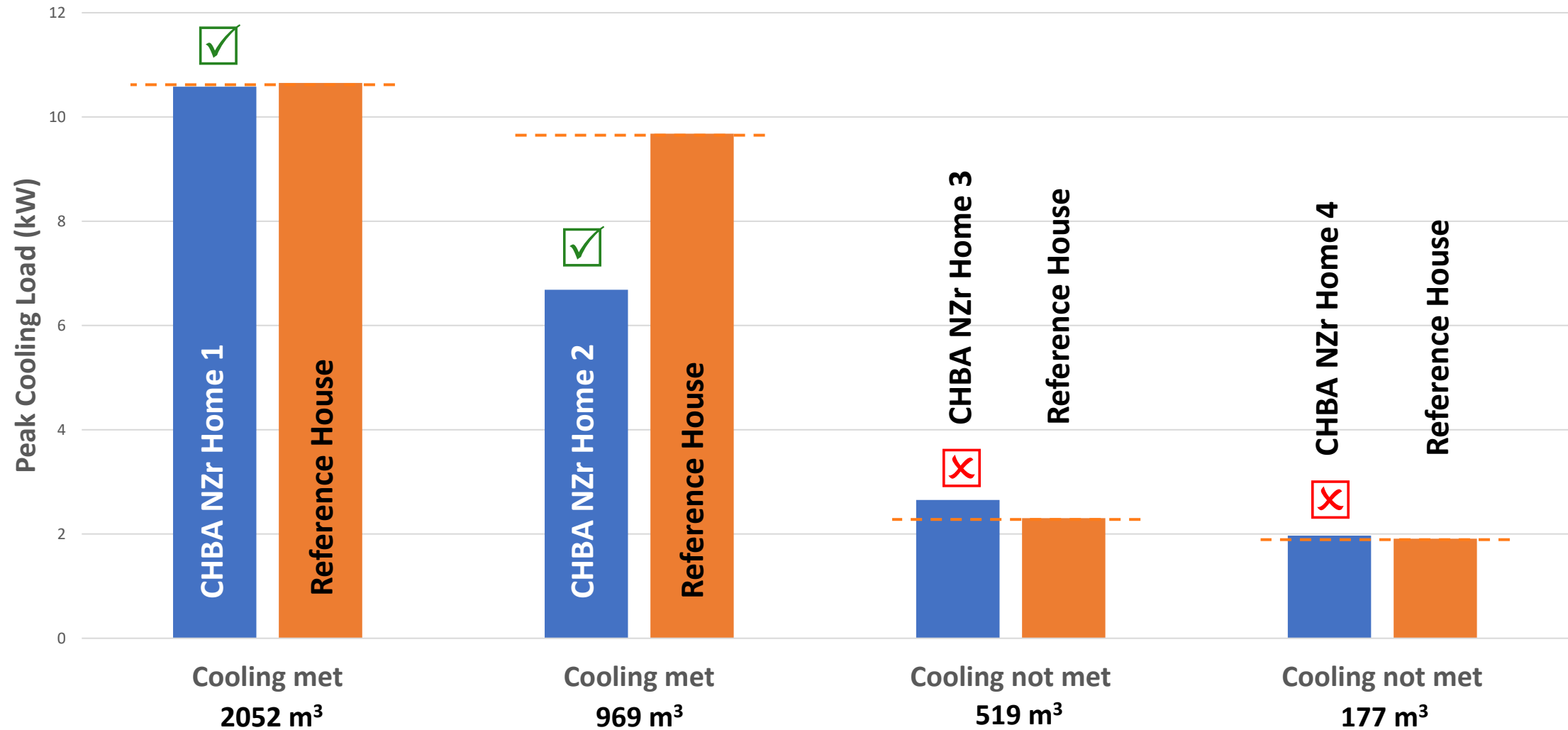


Overheating

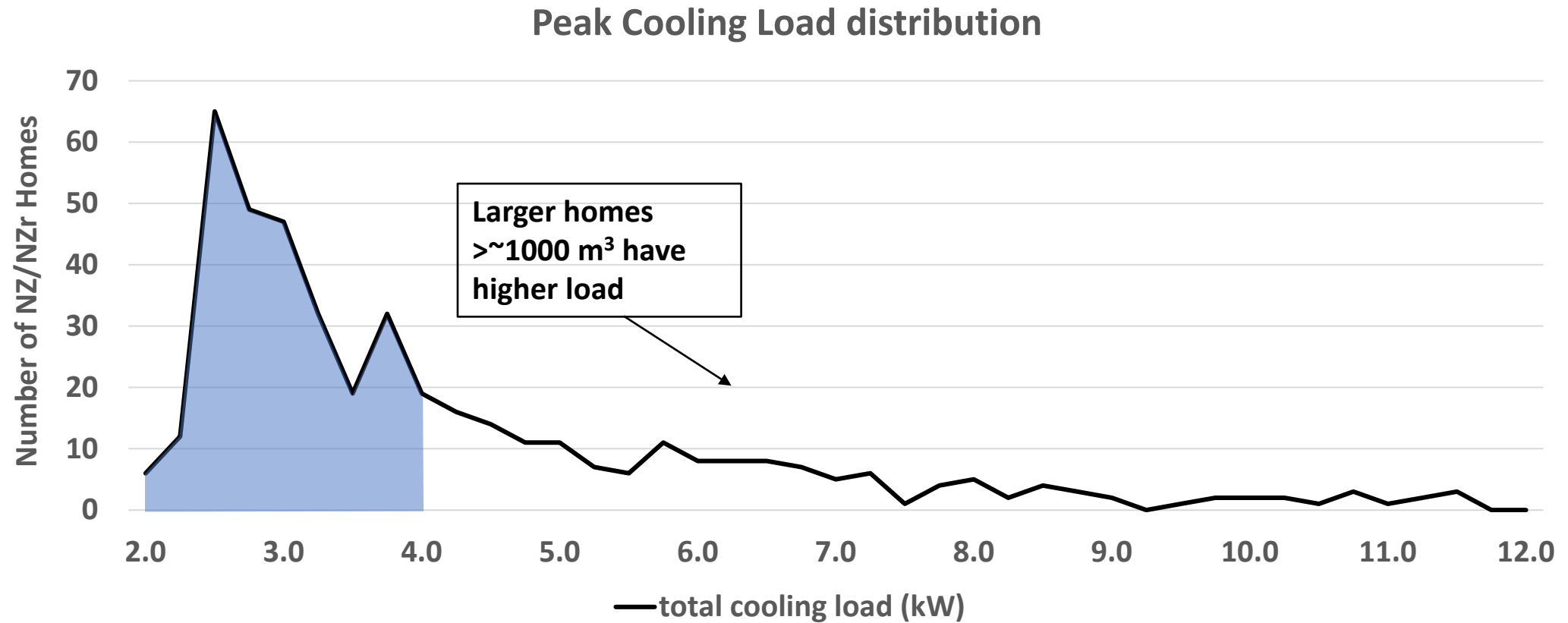
Have you experienced overheating issues in the NZ/NZr homes that you have built/renovated?



Cooling Approach

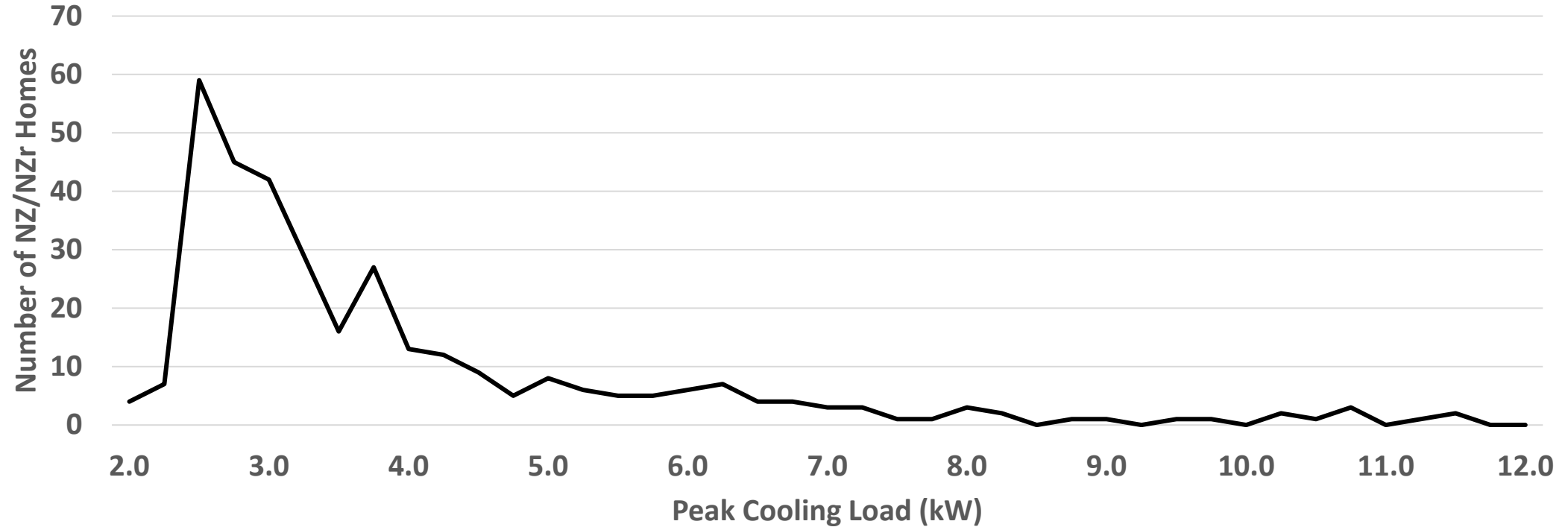


Cooling Approach: Absolute Cooling Load

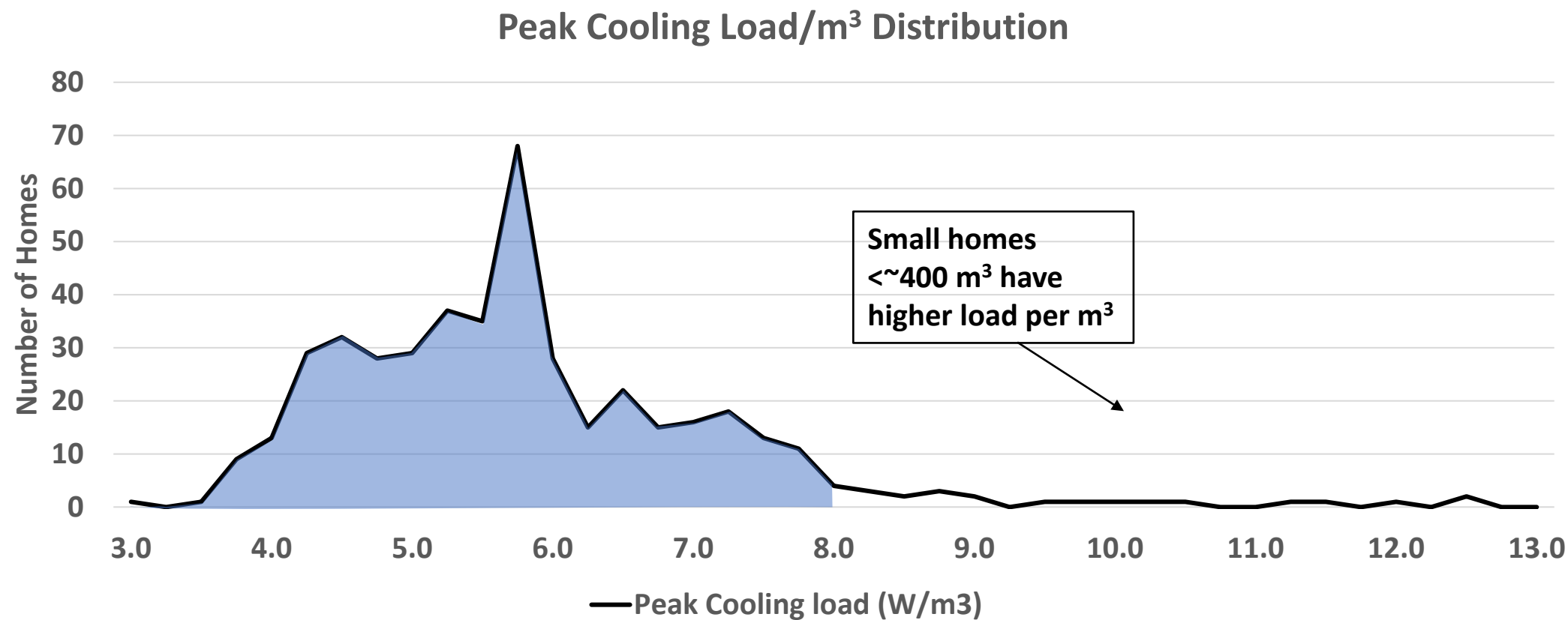


Cooling Approach: Absolute Cooling Load

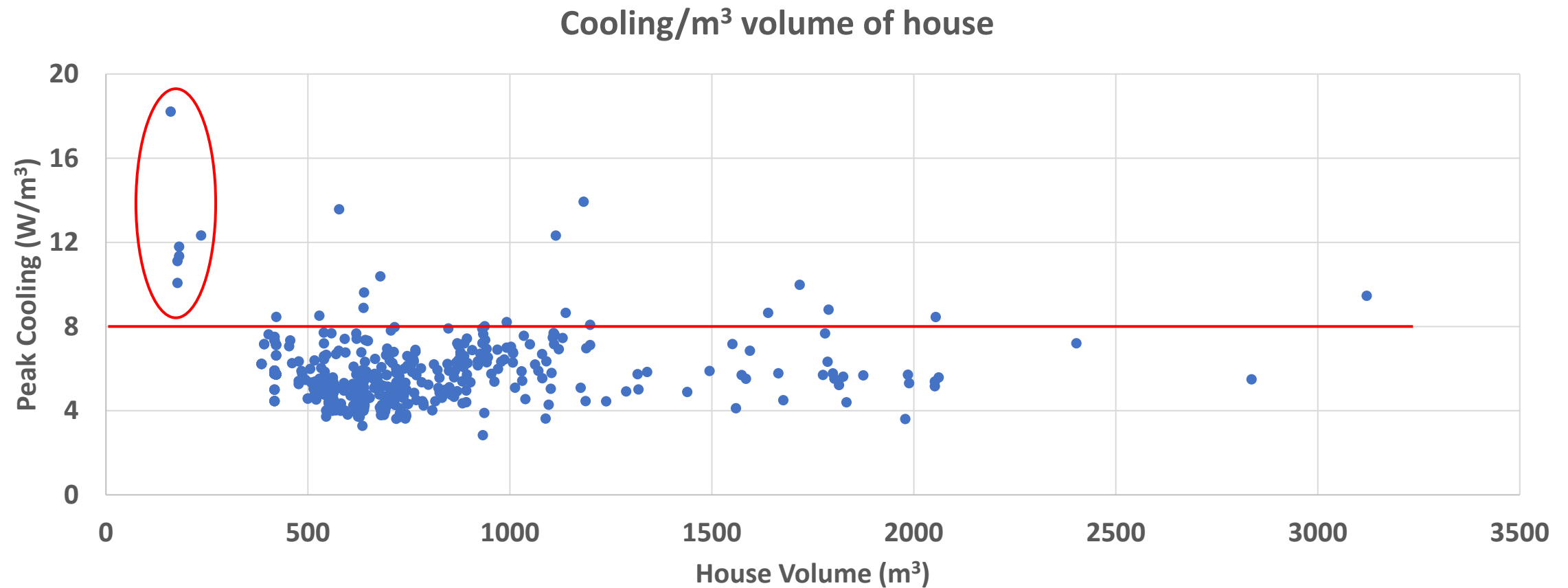
>10 Homes Builder Cooling Load Distribution



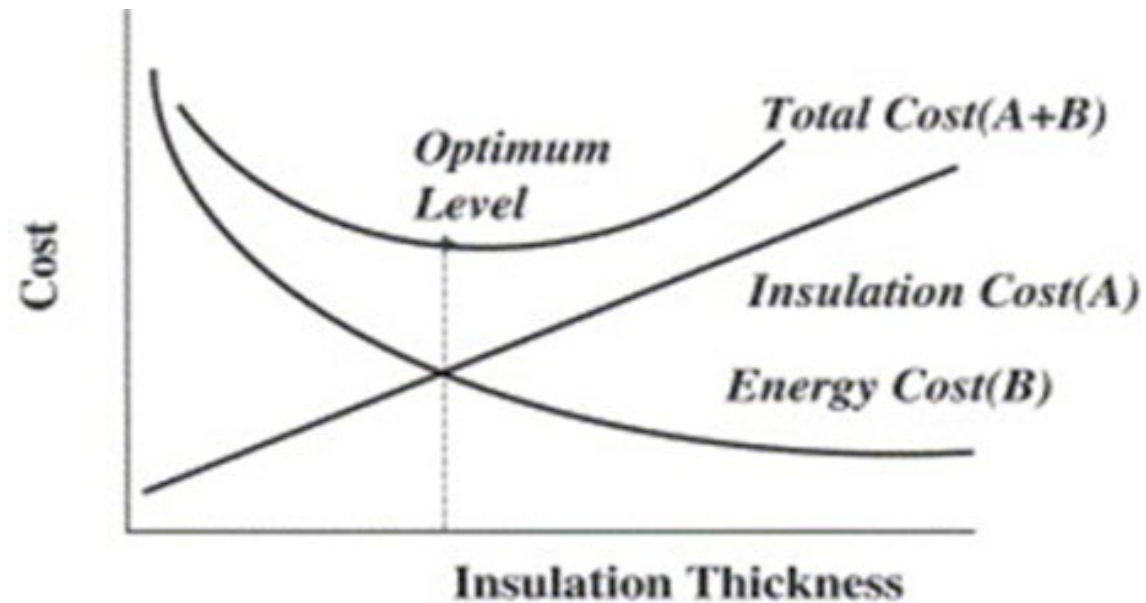
Cooling Approach: By House Volume



Cooling Approach: By House Volume



Conclusion: Additional Cost to Tier 5





Conclusions

- Tier 5 appears to overshoot Net Zero Ready
- More effective solutions were found with slightly relaxed targets
- Cooling criteria may be too stringent at low cooling loads
- Net Zero Builders believe that Tier 5 should align with the CHBA Net Zero Home Labelling Program

Questions



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