THE NZ COMFORT CODE:

Designing for Better Indoor Air Quality and Overheating Prevention

A guide for architects, builders and home owners embarking on new builds.

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INTRODUCTION

New Zealand's quest for energy-efficient, winter-ready homes has led to higher insulation standards and increasingly airtight construction. But as homes become better at retaining heat, they can also become vulnerable to poor indoor air quality and excessive indoor temperatures in summer - threatening occupant comfort, health, and budgets.

This guide weaves together insights from updated H1 Building Code compliance pathways for insulation requirements, pivotal BRANZ research, and leading industry reports on overheating.

By merging airtightness and robust insulation with effective shading, ventilation, and occupant education, architects, builders, and homeowners can create homes that are simultaneously cosy in winter without overheating in summer.

The result? A new generation of Kiwi residences designed to thrive year-round, no matter the season or climate challenges ahead.

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1.1 BALANCING WINTER AND SUMMER PERFORMANCE

New Zealand's revised H1 Code sets stricter insulation and glazing standards to reduce winter heating demands and greenhouse gas emissions. However, as airtightness and R-values rise, the risk of summertime overheating also increases unless ventilation, shading, and occupant behaviour are carefully addressed.

Overheating Concerns

BRANZ Bulletin 656 (Dec 2022) and Study Report SR089 (2024) show New Zealand's new-build and renovated homes can easily hit 25–30°C+ indoors on hot days.

The latest BRANZ HEEP2 findings (2025) reveal that ~70% of Kiwi households experience warmer-than-desired indoor conditions at least occasionally in summer, with 36% of bedrooms exceeding overheating thresholds. Auckland bedrooms were the worst affected (58% of monitored rooms), while Wellington remained cooler (3%).

Indoor bedrooms often stay above 24°C at 2am in heat events, impacting sleep quality and health. Large unshaded windows, dark roofs, and inadequate ventilation can trap heat, exacerbated by airtight designs.

Consequences of Ignoring Overheating

- Health risks for children, the elderly, and vulnerable groups.
- High electricity bills in summer occur if occupants rely on air conditioning to compensate.
- Negative occupant satisfaction, numerous media reports (2024–25) highlight Auckland terrace owners calling their units "saunas."

1.2 HI CODE OVERVIEW

The Revised H1 Clauses (2022 onward) Introduce:

Increased Minimum R-values

This is especially true for roofs/ceilings, windows, and floors, which vary by six new climate zones across New Zealand.

Focus on Reducing Energy Demand

Encourages designers to minimise heating energy consumption in winter, but does not explicitly address overheating or specify summer comfort criteria.

Synergy with Ventilation (G4)

Tighter thermal envelopes make compliance with G4 ventilation requirements (and beyond) more critical, to ensure indoor air quality and mitigate heat build-up.

The Takeaway

Meeting or exceeding H1 is crucial for energy efficiency, but must be paired with overheating mitigation measures such as; shading, orientation, and ventilation to achieve genuinely year-round comfort.

I.3 INCORPORATING BRANZ 2024–2025 FINDINGS

Key insights from the latest BRANZ research underline why early planning for overheating prevention is vital:

1. Overheating Is a Growing Concern

Indoor summer temperatures have risen 6–10% over 20 years, outpacing outdoor rises of 4–8%.

2. Insulation Alone Isn't the Cause

BRANZ found no clear correlation between higher insulation levels and occupant reports of overheating. Design choices drive heat gains more than R-values.

3. Design Must Address Room-by-Room Risks

Overheating varies by orientation, glazing and shading. Early-stage modelling identifies problem zones (e.g. west-facing bedrooms) for targeted solutions.

4. Ventilation and Shading Are Front-Line Defences

Effective MVHR/ERV systems and external shading show the greatest impact on limiting peak temperatures.

Ventilation has the additional benefit of improving indoor air quality. Integrating these findings ensures projects meet both H1 energy goals and occupant comfort expectations.

BEST PRACTICES FOR ARCHITECTS

Architects shape the envelope and play a pivotal role in preventing overheating. Combine H1 compliance with proactive design as follows:

2.1 EARLY CONCEPTUAL COORDINATION

Engage HVAC Specialists from Day 1:

Ensure space reservations for heat pumps, VRF plant, and HRV units.

Model Summer Performance Early:

Use EnergyPlus or similar to test glazing ratios, overhang depths, and ventilation strategies.

Apply BRANZ Zone-Specific Data:

Tailor shading and ventilation based on local findings (e.g., Auckland bedrooms at high risk).

2.2 PASSIVE SHADING AND SOLAR CONTROL

Optimised Window-Wall Ratios:

North-facing glazing for winter gain; limit east/west exposure or equip with low-SHGC glazing.

Deep Eaves and Adjustable Shading:

Calculate eave overhangs to block high summer sun; install external blinds/louvres on hot elevations.

2.3 MECHANICAL VENTILATION

Specify MVHR/ERV with Summer Bypass:

Choose systems that recover 85–92% of heat, yet allow free-cooling at night.

Duct Routing in Design:

Conceal ducts in bulkheads or ceiling voids - coordinate with structural beams early.

2.4 THERMAL MASS AND NIGHT FLUSH

Expose Mass for Heat Absorption:

Polished concrete or masonry floors can dampen daytime peaks.

Automated Night-Purge Vents:

Integrate clerestory or skylight vents with controls to flush heat overnight.

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2.5 DOCUMENTATION AND HANDOVER

Detailed Drawing Notes:

Call out shading device dimensions, insulation continuity, and ventilation schedules.

Client Briefing:

Educate on system operation and the health/comfort benefits of integrated HVAC.

BEST PRACTICES FOR BUILDERS

Builders are the stewards of design intent. Precision in installation makes all the difference.

3.1 AIRTIGHTNESS AND INSULATION QUALITY

Seal All Junctions and Penetrations:

Use tapes, gaskets, and membranes recommended by BRANZ guidelines.

Avoid Compression of Insulation:

Gaps at slab edges, roof-wall junctions, and around frames undermine both winter and summer performance.

3.2 HVAC INSTALLATION

Follow the Design Exactly:

Install MVHR ductwork, heat pump linesets, and outdoor units per consultant layouts.

Commission and Balance:

Test airflow rates, verify summer bypass operation, and provide filter-change guidance.

3.3 SHADING AND GLAZING

Build Shading to Spec:

Overhangs, pergolas, and external screens must match drawn dimensions within ±10 mm.

Frame Sealing and Flashing:

Ensure window installs meet H1 air-tightness and thermal-bridge requirements.

3.4 QUALITY COMMUNICATION

Site Coordination Meetings:

Resolve any shading, insulation, or ducting queries before enclosures close in.

Handover Walk-Through:

Demonstrate MVHR boost/bypass, heat pump controls, and shading operations to the owner.

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BEST PRACTICES FOR BUILDING COMPANIES

Building companies offering off-the-plan homes frequently aim to minimise upfront costs for their customers, but the outcome is often installing only a single heat pump in the living area. However, under tightened H1 standards, which demand higher insulation and airtightness, such minimal HVAC solutions risk creating uncomfortably hot interiors, poor air quality, and moisture issues under serviced areas in the home.

Below are practical strategies to future-proof your builds by prioritising heat recovery ventilation (HRV) and whole-home heating/cooling. This will ensure each residence meets or exceeds new H1 expectations while preventing summertime discomfort.

4.1 WHY HEAT RECOVERY VENTILATION (HRV) OVER POSITIVE PRESSURE?

Airtightness Demands Balanced Ventilation

Positive pressure setups rely on leaks or gaps to push stale air out, which conflicts with the very concept of airtight design. If the construction achieves good airtightness, positive pressure systems are very likely to perform poorly.

In a highly insulated, airtight home, a balanced HRV system (equal supply and extract) prevents pressurisation or depressurisation, maintaining a stable indoor environment.

Seasonal Adaptability

In cooler seasons, HRV systems reclaim warmth from outgoing air, reducing heating requirements.

Many units include a summer bypass mode, which brings cooler outdoor air in at night and helps mitigate overheating, particularly valuable for airtight homes that trap heat.

Improved Indoor Air Quality

Continuous, balanced ventilation removes stale air, moisture, and pollutants, replacing them with filtered fresh air.

This is especially important in airtight builds, where high humidity can quickly lead to

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condensation or mould problems if moisture cannot escape.

4.2 WHOLE-HOME HEATING AND COOLING

Beyond a Single Heat Pump

Limiting HVAC to one heat pump in the living space may leave bedrooms and other areas sweltering in summer and insufficiently warmed in winter.

A multi-room heat pump system gives independent temperature control across multiple zones, maintaining comfort throughout the entire home all year round.

Synergy with the Building Envelope

Even the best mechanical systems benefit from fundamental design features like shading, orientation, and cross-ventilation, which reduce overall heating/cooling loads.

Incorporating exposed thermal mass (e.g., concrete floors) further stabilises indoor temperatures by absorbing daytime heat and releasing it when cooler.

4.3 COMBINING WHOLE-HOME COMFORT WITH HEAT RECOVERY VENTILATION

Ducted Heat Pump + HRV

Occupants benefit from filtered, balanced ventilation plus consistent heating or cooling in all rooms, eliminating “hot” or “cold” spots.

Summer Bypass or Smart Controls

Where available, an HRV summer bypass function cools the house by drawing in evening air without recovering heat.

Integrated “smart” controllers coordinate ventilation and HVAC operation, automatically optimising energy use and indoor comfort.

Straightforward Maintenance and Operation

Homeowners often worry about complexity. Emphasise easy filter changes and intuitive controls.

Clear handover documentation and demonstrations reduce the risk of misuse or neglect, ensuring fewer post-occupancy complaints.

4.4 COMMUNICATING THE BENEFITS TO HOMEOWNERS

Year-Round Comfort

A balanced HRV system keeps air fresh and tempered in winter, while a bypass (or night purge mode) helps prevent overheating in summer.

Ducted heat pumps ensure uniform temperatures across all living areas and bedrooms, eliminating zones of discomfort.

Health and Air Quality

Filtered ventilation reduces allergens and humidity, supporting healthier indoor conditions. Numerous independent studies suggest that improved indoor air quality is likely to reduce health issues for occupants.

Occupants avoid the stale air or condensation issues that often plague airtight builds lacking proper ventilation.

Reduced Future Complaints

By proactively designing for balanced ventilation and whole-home climate control, homeowners are far less likely to seek costly retrofits or file complaints about hot bedrooms or stuffy air.

Satisfied customers become brand ambassadors, underscoring comfort as a core selling feature of your off-the-plan offerings.

4.5 ALIGNING WITH HI AND EXCEEDING EXPECTATIONS

Stay Ahead of Regulatory Changes

As H1 continues to evolve, mechanical ventilation solutions will likely become even more central to code compliance. Offering HRV now positions your company as forward-thinking.

Team Coordination

Collaboration with architects is key: ensure shading, window placement, and orientation support your chosen ventilation and HVAC strategies. A well-planned envelope can dramatically lower mechanical loads.

Protect Your Reputation

A home that remains comfortable year-round, thanks to HRV and whole-home heating/cooling, yields fewer callbacks and more positive word-of-mouth.

Early integration of ducted heat pumps with HRV cements your standing as a quality-focused, future-ready builder.

4.6 KEY TAKEAWAY

By installing balanced heat recovery ventilation and offering whole-home heating/cooling via a ducted heat pump, building companies can deliver high-performance homes that comply with H1 requirements and keep occupants satisfied all year. This approach not only reduces the risk of overheating complaints and poor air quality but also showcases a commitment to occupant health, energy efficiency, and top-tier craftsmanship. Ultimately fostering repeat business, glowing referrals, and a strong market reputation.

ADVICE FOR HOMEOWNERS

Ultimately, homeowners live with the design and construction outcomes. Meeting H1 ensures warmth in winter, but active occupant participation is essential to avoid overheating and high summer energy bills.

5.1 KEY QUESTIONS TO ASK EARLY

How Does the Design Meet H1?

Inquire about the insulation levels in the roof, walls, windows, and floor.

If possible, ensure the design surpasses minimum R-values, particularly for windows, as this often pays dividends in both comfort and energy savings.

What's the Overheating Strategy?

Ask the architect or builder how the home prevents excessive summer temperatures (shading, orientation, mechanical ventilation, etc).

Are There Secure, User-Friendly Ventilation Options?

If street noise or security is a concern, check for high louvre windows or mechanical systems that allow fresh air without wide-open windows.

Do I Need Air Conditioning?

A well-designed, well-shaded, and well-ventilated home can often avoid (or minimise) air conditioning. If included, ensure it's sized appropriately for an efficient envelope.

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5.2 OPERATIONS AND MAINTENANCE TIPS

Use Windows and Vents Wisely

On hot days, close windows and curtains before the sun hits. In the evening, open higher vents or skylights for night purge if the outside air is cooler.

BRANZ Bulletin 656 emphasises occupant behaviour as crucial - homes designed to stay cool still need active involvement (opening/closing windows, blinds).

Manage Shading

Deploy external blinds or louvres during peak afternoon sun.

Where possible, keep western windows shaded from around 2pm to prevent intense late-afternoon heat gains.

Ventilation System Care

Replace or clean filters per the manufacturer's guidelines.

If your system has a summer bypass or "boost mode," learn to switch it on when indoor temps rise above comfortable levels and the outside air is cooler.

5.3 SIGNS OF POTENTIAL OVERHEATING

Rooms Consistently Above 25-27°C in Summer

Check if shading or ventilation features are being used properly.

Persistent Humidity >60%

High moisture can compound discomfort. Confirm that the mechanical or natural ventilation is adequate.

HI COMPLIANCE AND FUTURE REGULATION

6.1 CURRENT HI REQUIREMENTS (2022+)

Higher Minimum R-values

Roof R-values are often 6.6 or higher in colder zones; windows range from about R0.37–0.46 (U-values ~2.15–2.7) or better. Some regions push for triple glazing.

Emphasis on Overall Envelope

Minimising thermal bridging, sealing infiltration paths, and matching the correct climate zone.

6.2 POTENTIAL OVERHEATING CODE INCLUSIONS

Industry discussions and documents (e.g. Submission Form – Insulation Requirements…) suggest that future H1 or supplementary code clauses could include:

- Limits on glazing area (especially west-facing) or mandatory shading elements.
- Maximum hours over 25°C or a specific summertime thermal comfort metric.
- Compulsory balanced mechanical ventilation with heat recovery for very airtight envelopes.

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CONCLUSION

Combining H1 compliance for winter efficiency with robust overheating mitigation is now the standard of care for New Zealand residential design.

1. Architects must integrate advanced insulation (per H1) with shading, orientation, ventilation, and thermal mass to keep homes comfortable year-round.

2. Builders ensure precise construction to meet higher R-values, maintain airtightness, and install shading/ventilation systems exactly as designed.

3. Homeowners can enjoy a warm, dry home in winter that also remains cool in summer, provided they deploy shading, operate ventilation features (mechanical or natural), and maintain the building systems properly.

By addressing both winter and summer thermal requirements from the start, we future-proof New Zealand's housing stock against rising climate pressures, ensure occupant health and well-being, and maintain alignment with the country's energy efficiency and sustainability goals.

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7.1 FUTURE-PROOFING WITH MITSUBISHI ELECTRIC SOLUTIONS

Leverage proven technologies to embed comfort into every project:

Heat Pumps / Air Conditioning

From single-room high wall units, floor consoles, and ceiling cassettes to discreet whole-home ducted systems and flexible OmniCore Multi Room setups, the Mitsubishi Electric range is designed to meet the heating and cooling demands of any residential project - ensuring optimal performance, design flexibility, and long-term value in living spaces and bedrooms.

Lossnay HRV/ERV

Recover up to 92% of heat energy from outgoing extract air to pre-warm or pre-cool incoming fresh filtered air. Free Cooling Modes* allow incoming air to bypass the core for cooling when outdoor air is cooler, which is helpful for spaces that may have overheated during the day.

*Compared to using a dedicated cooling device.

The unit will continue to use a small amount of power to bring colder, fresh air from outside.

Smart Wi-Fi Control

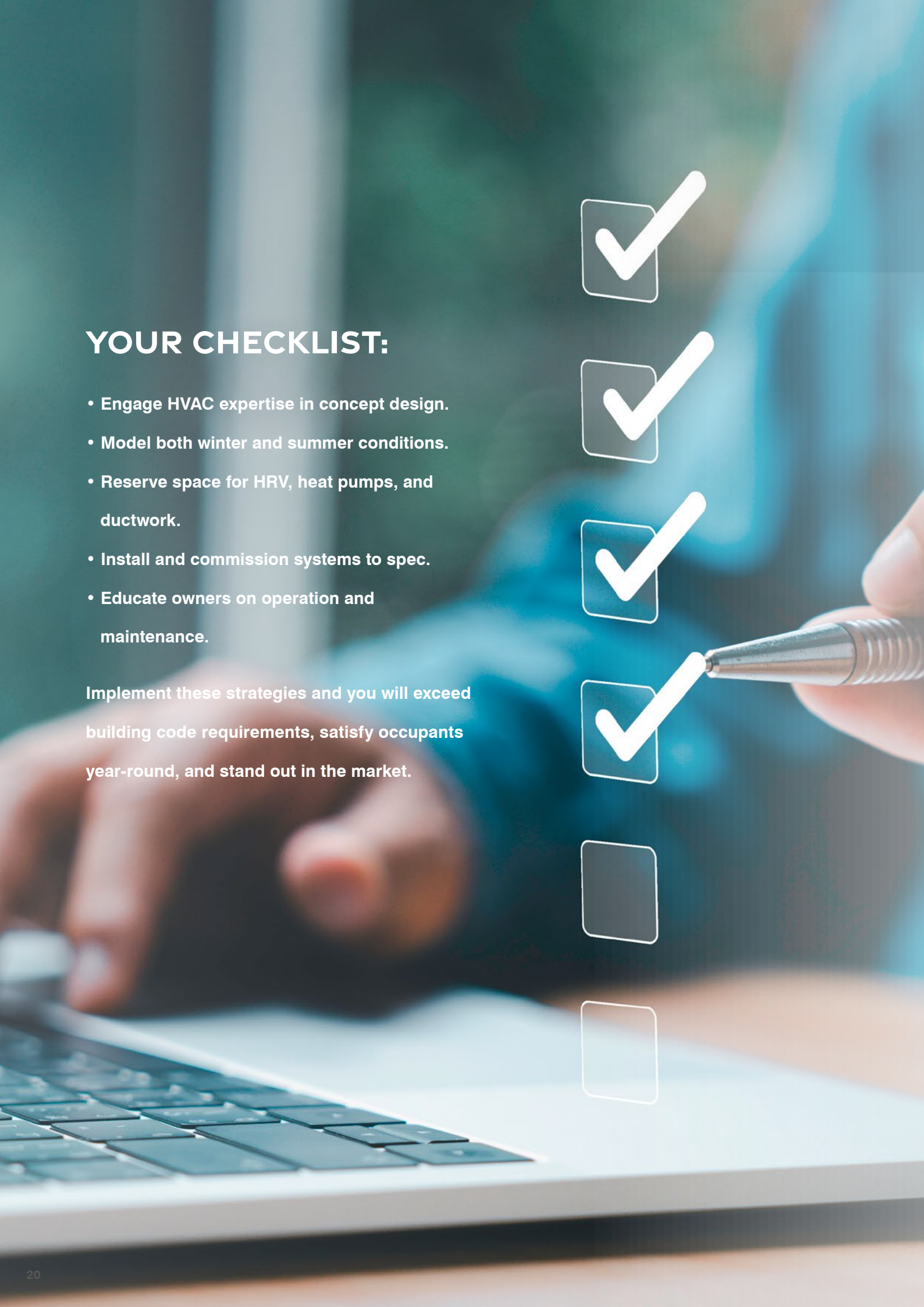
The Mitsubishi Electric Wi-Fi Heat Pump and Lossnay Ventilation Control App visualises real-time temperature, energy use, and system status, bridging the information gap buyers face about comfort.

Action:

Specify Mitsubishi Electric systems early, partner with certified installers, and highlight these features in marketing to demonstrate comfort credentials.

7.2 NEXT STEPS

New Zealand's climate imperatives and the latest BRANZ research make it clear: overheating prevention is as critical as insulation. By integrating shading, ventilation, and HVAC systems from concept to completion, stakeholders can deliver homes and buildings that meet H1, avoid summer discomfort, and provide healthy indoor environments.



YOUR CHECKLIST:

- Engage HVAC expertise in concept design.
- Model both winter and summer conditions.
- Reserve space for HRV, heat pumps, and ductwork.
- Install and commission systems to spec.
- Educate owners on operation and maintenance.

Implement these strategies and you will exceed building code requirements, satisfy occupants year-round, and stand out in the market.

REFERENCES AND FURTHER READING

8

- H1 Building Code (MBIE) – Information on current H1 energy efficiency requirements and guidance.
- BRANZ Bulletin 656: Minimising Overheating in Housing (Dec 2022).
- BRANZ Study Report SR089: Summertime Overheating in New Zealand Houses – Influences, Risks, and Mitigation Strategies (2024).
- BRANZ Study Report SR502: Household Energy End-Use Project 2 (HEEP2) Preliminary Findings on Summer Indoor Temperatures (March 2025). BRANZ, Study Report SR502. BRANZ Annual Review 2024: Safe & Resilient Built Environment (2024). Section on Overheating in Buildings. BRANZ.
- Life in Medium Density Housing in Tāmaki Makaurau Auckland – Chapter 10: Discussion and Recommendations (2024).

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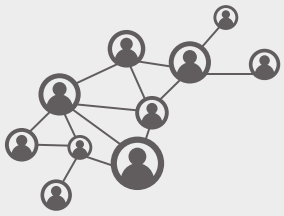

Our Vision – Creating New Zealand's Sustainable Future

Black Diamond Technologies Limited in partnership with Mitsubishi Electric, strives to develop and introduce new technologies for New Zealanders that will make our lives more comfortable while also creating a greener tomorrow.

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PLEASE LOOK AFTER THE ENVIRONMENT AND RECYCLE