

VOXELL

ENERGY MODELLING, EXPLAINED

What it is, when you need it, and why it's about to matter more.



What energy modelling actually is

An energy model is a thermal simulation of a home before it's built. It takes the real design, the construction R-values, the glazing and its solar gain, the orientation, the airtightness, and the local climate, and predicts how the building will perform: how much heating it needs, what it will cost to run, whether it will overheat in summer, and what its carbon footprint looks like.

That's the difference between modelling and a compliance checklist. A checklist tells you the parts meet minimums. A model tells you how the building behaves.

Why it's about to matter more

The Building Code's energy efficiency clause, H1, is in the middle of its biggest procedural change in years. The simplest compliance route, the schedule method, where you looked up minimum insulation values in a table, has been removed from the new sixth edition of H1/AS1. The old edition can still be used for consent applications until 26 November 2026. After that, every new home demonstrates compliance one of two ways: the calculation method, or the modelling method.

In short: the lookup-table era ends this year. Compliance is becoming performance-based, and modelling is the most capable tool for showing performance.

The three jobs a model does

1 Code compliance (H1)

The modelling method is the most flexible compliance route. It captures what the simpler methods ignore, orientation and solar gain, and it allows trade-offs across the whole building. A design with generous glazing that fails the standard limits can often demonstrate compliance through modelling, because the model accounts for what the glazing gives back.

2 Homestar certification

Homestar v5 sets compulsory targets for heating demand, energy use, and summertime overheating, demonstrated through NZGBC's modelling tool, ECCHO. Usefully, ECCHO is also accepted for H1 compliance and is internationally accredited (ASHRAE 140), so the same model can serve both the Homestar rating and the building consent.

3 Better decisions, earlier

This is the quiet one, and the most valuable. BRANZ modelling found an average house can need two to three times the heating energy of a similarly priced house designed with passive solar principles. The decisions that drive that gap, orientation, form, glazing, are made in the first weeks of design, when changing them costs nothing. A model at concept stage turns those decisions from opinion into data.

Overheating: the new problem

New Zealand's housing conversation has been about warmth for decades, but the emerging issue in new medium-density housing is summer overheating. BRANZ monitoring has found widespread overheating in bedrooms of newer homes. The Building Code currently has no explicit overheating requirement; Homestar v5 is the main scheme that formally caps it. A model is the only way to see overheating risk before the home is built, and small design moves, shading, ventilation, glazing selection, usually fix on paper what's expensive to fix on site.



What developers should know

For multi-unit projects, Homestar assesses repeated designs by typology, but the number of energy models is driven by variation: a different orientation, glazing spec, or cladding means a separate model, because the R-values change. The worst-performing unit sets the result for its whole typology. Two practical consequences:

Model early. Townhouse schemes typically sit close to their target rating with little margin. An early model, around resource consent, tells you whether the scheme holds before the design locks in.

Keep the model current. Small changes, a window resize, a cladding substitution, can move the result. Checking the model as the design evolves is far cheaper than re-engineering a failed scheme at consent.

Modelling can also answer conditions on a resource consent. Where a consent requires cooling or specified comfort levels, a model can demonstrate the design achieves them without adding plant, which is often the difference between a clean scheme and one carrying equipment it never needed.

How Voxell does it

We run our energy modelling in-house, in ECCHO, the NZGBC tool described above. That means the same model that tests your options at design stage can carry through to Homestar certification and H1 compliance, and decisions get made on data, not guesswork, without waiting on an external consultant's programme. For developers and consultants who need modelling as a standalone service, we offer that too.

**LET'S TEST IT BEFORE IT'S
BUILT**

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Sources: MBIE, building.govt.nz, H1 acceptable solutions and verification methods (edition status and transition dates); NZ Green Building Council, ECCHO, Energy and Carbon Calculator for Homes, nzgbc.org.nz (PHPP basis, ASHRAE 140 accreditation, H1/VM1 acceptance); BRANZ, housing performance research (heating energy comparison); MBIE, consultation on insulation requirements in housing (overheating risks).

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