Airtightness trends in New Zealand homes and apartments, what are we achieving, and how can we balance the ventilation needs

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Why worry about airtightness?

One component to providing warm, dry and healthy buildings is a reduction of energy use

By increasing insulation, and reducing air leaks, we can make significant progress from current code settings

It also allows better control of ventilation

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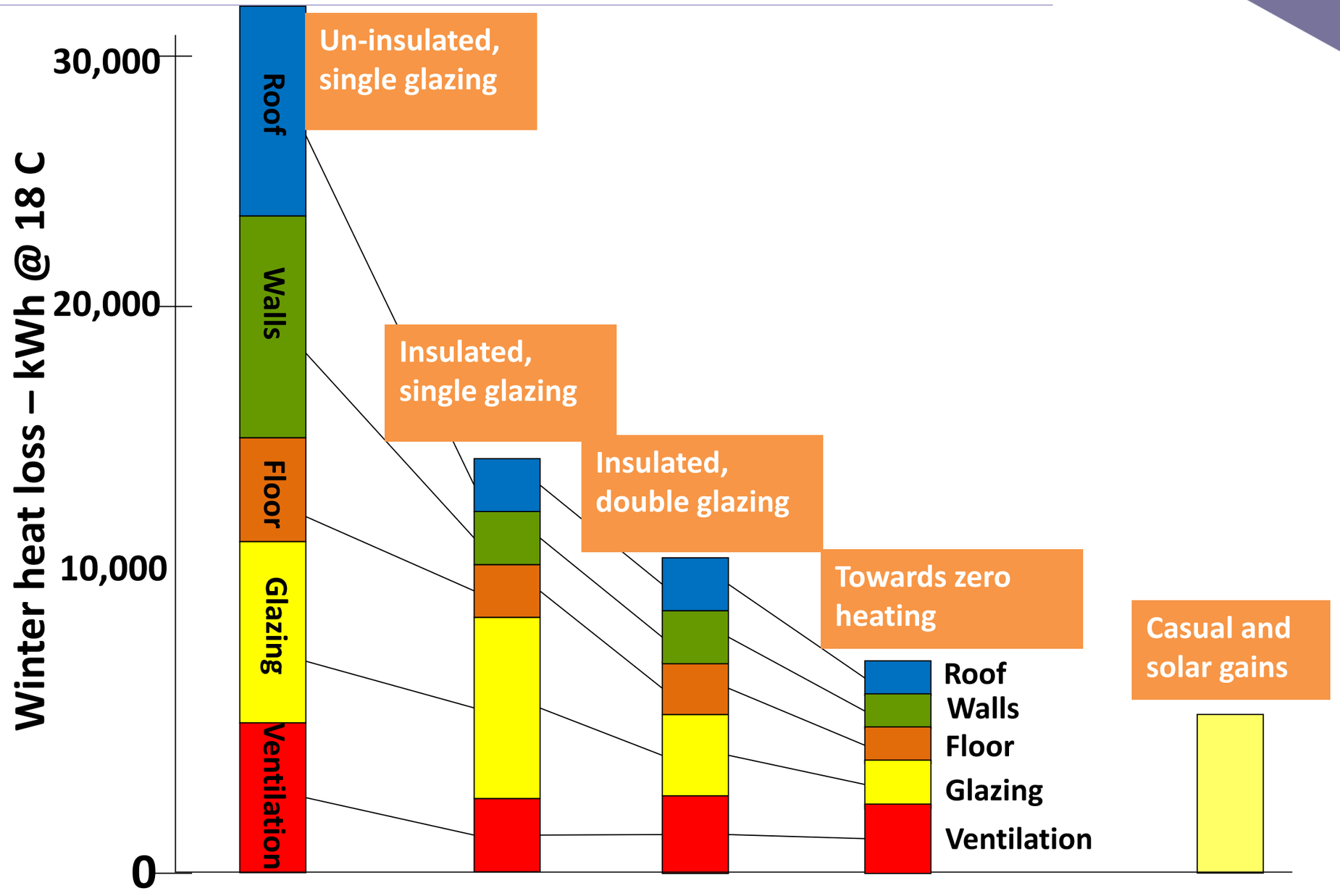
NZ Building Code and energy performance



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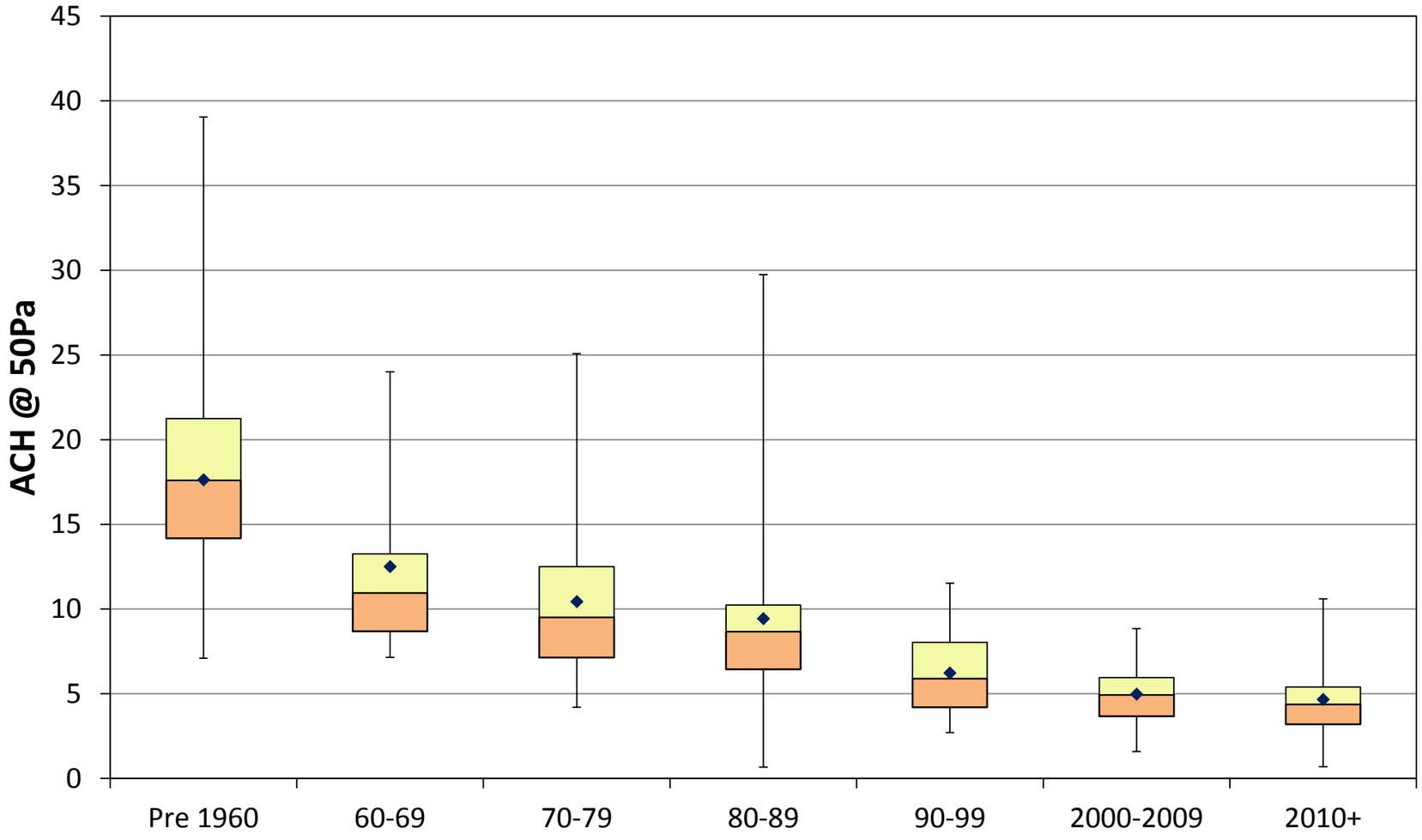
Airtightness trends - Residential



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What about apartments?

- Airtightness of apartments project aiming to find this out.

- Preliminary results for new apartments are similar to modern homes 2-3 ACH@50Pa common

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Energy is only one part of the puzzle though

Insulation, heating and ventilation all need to be considered

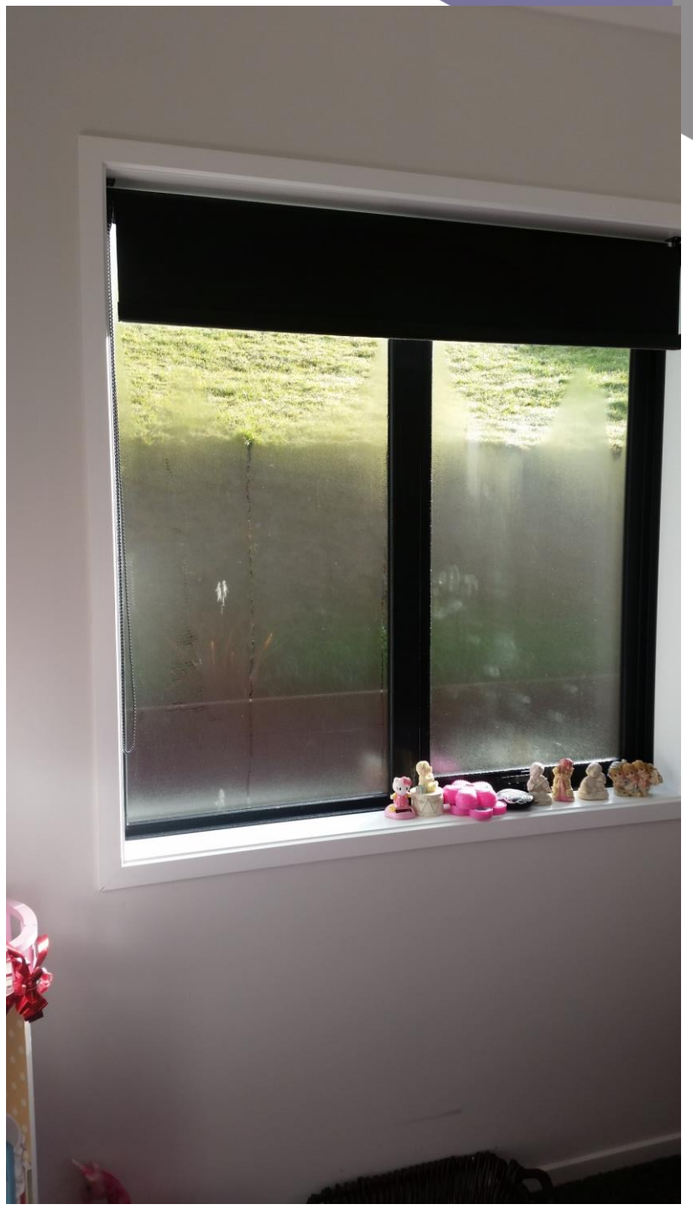
Good IAQ and comfort needs a balance between each of these three components

Source management particularly important for moisture

“Build tight – ventilate right”

Impact of increasing airtightness

- Energy outcome is good
- Ventilation (G4) has not moved with the trend though
- Reliance on occupants to open windows…



Perfluorocarbon Tracer Study

- Activated carbon samplers
- 4 Rooms
- 3-4 week exposure

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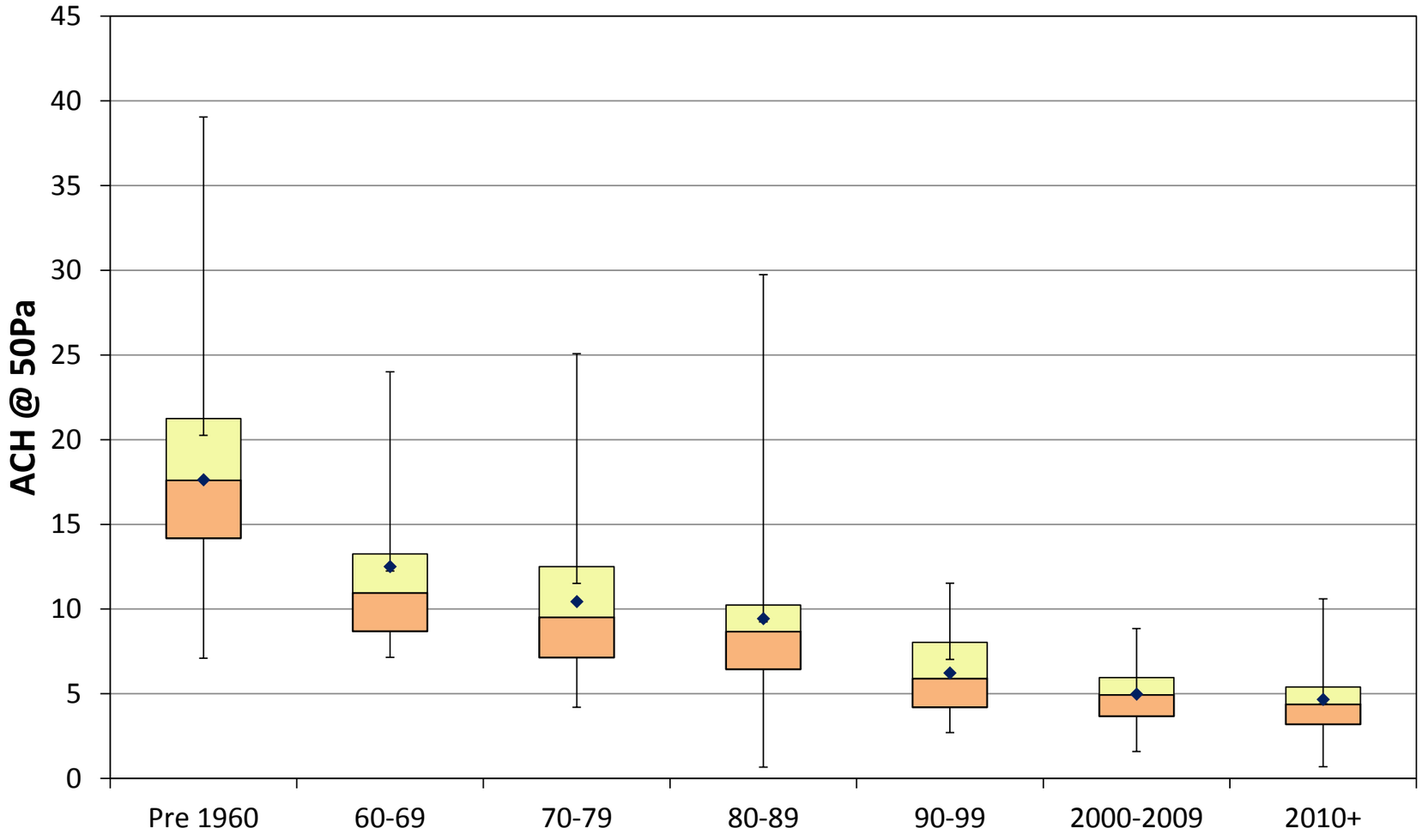
Airtightness trends - Residential



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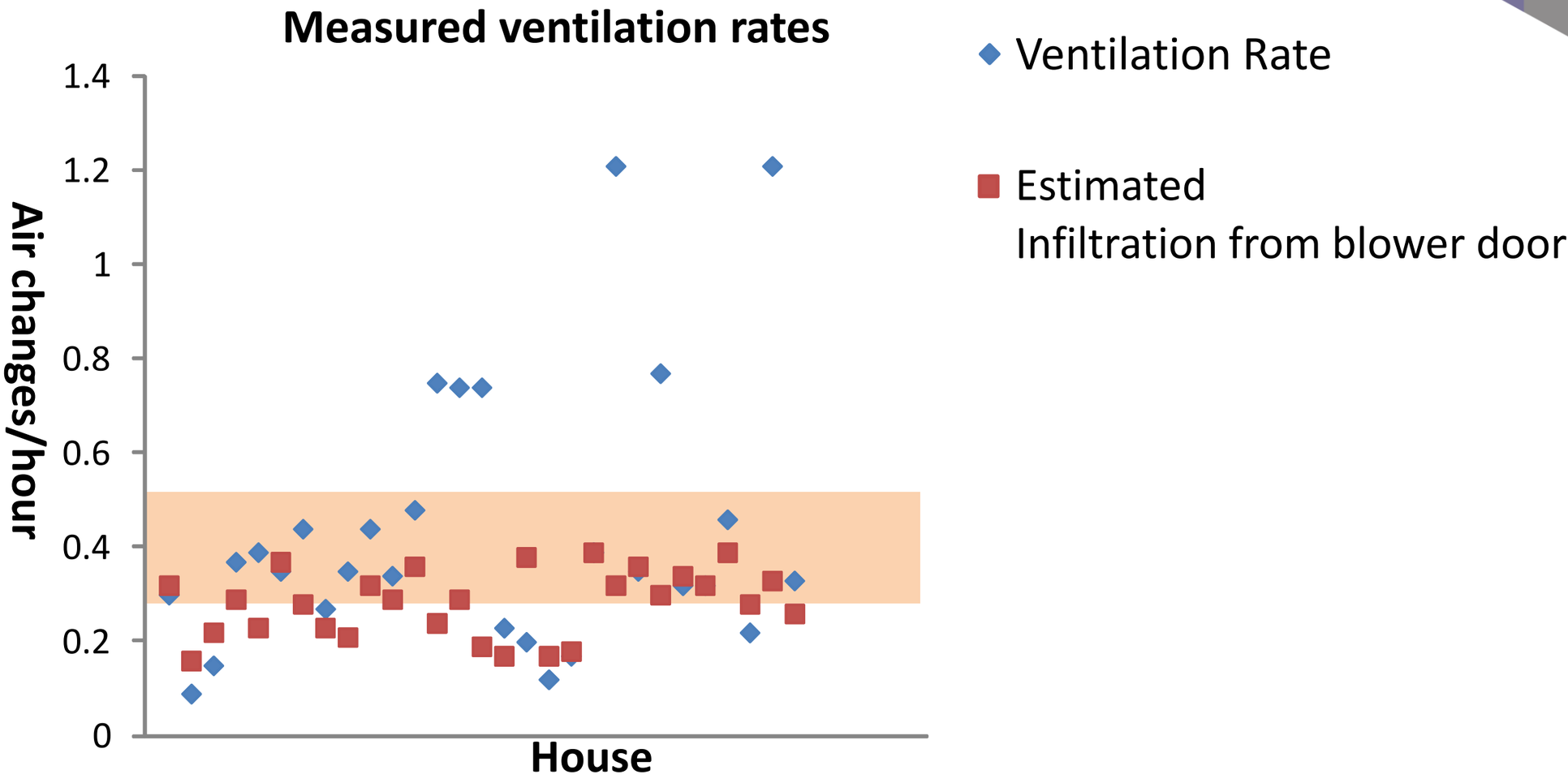
Survey Results, with calculated infiltration (from WAVE)



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A different metric?

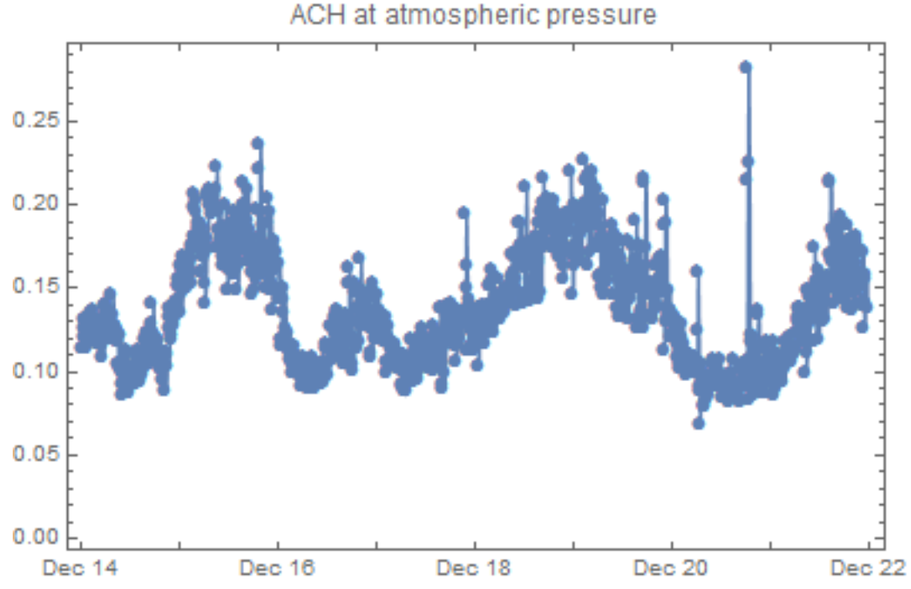
- Plenty of confusion

N50 result is NOT the average infiltration for a building

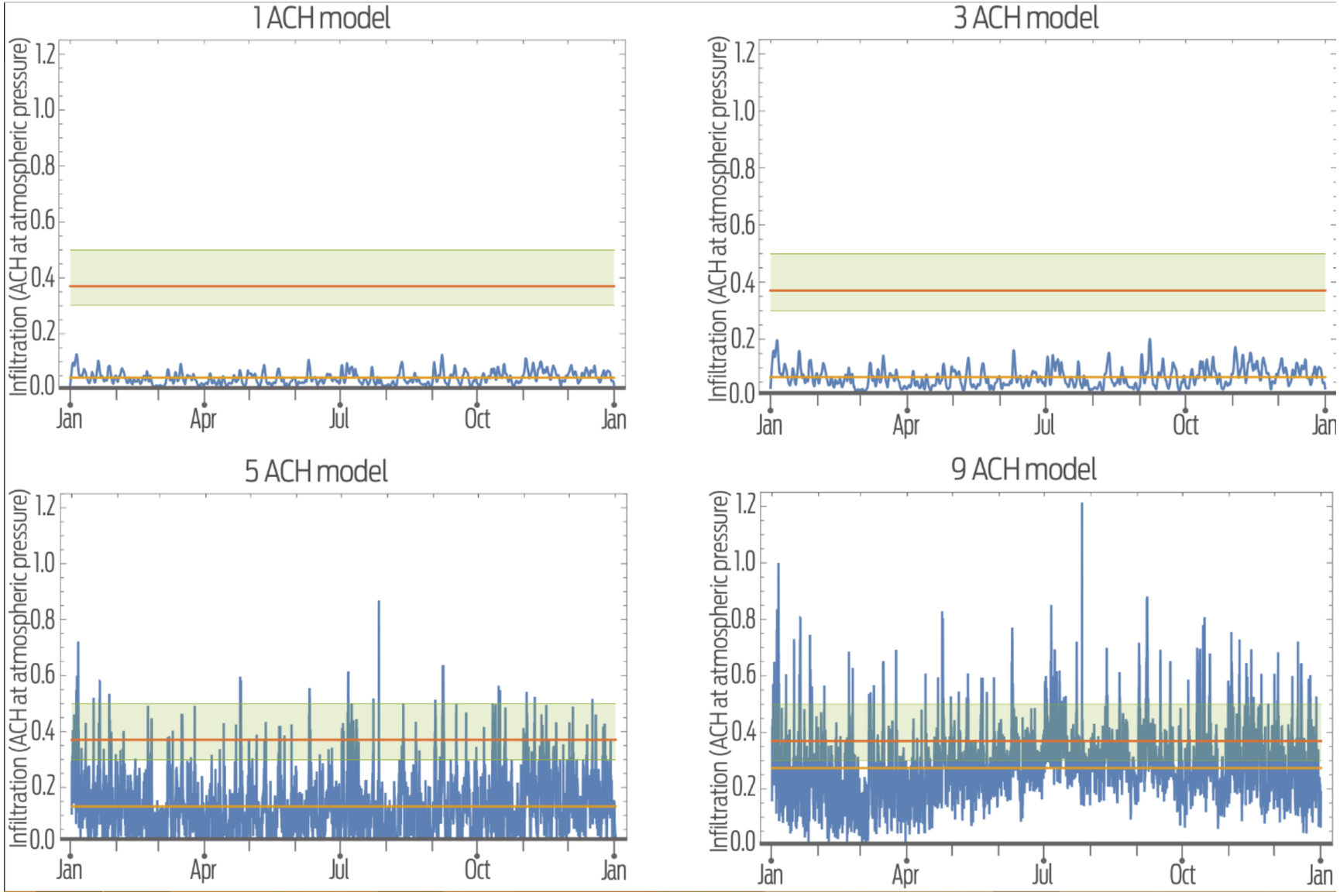
/20 ‘rule of thumb’ to convert

But…

Closer to /40 for airtightness of 4ach@50Pa



Infiltration rates with airtightness – benchmarked



Envelope permeability instead?

- m3/hr/m2@50Pa
- Becomes a property of the surface of the building, so we can treat it like R-value, U-value
- Takes away the confusion converting n50
- Has a positive impact for larger buildings – surface area to volume ratios in these buildings makes n50 targets easier to meet

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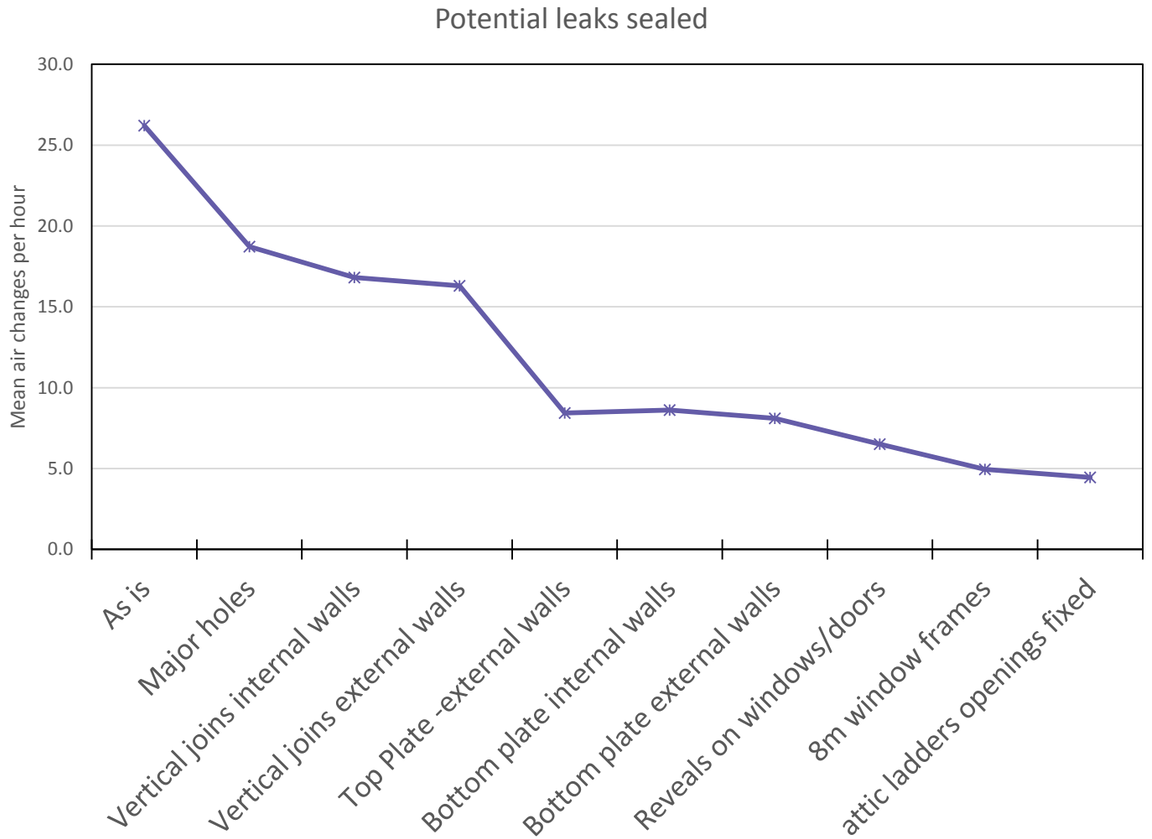
Regardless of the metric…

- More guidance needed for ventilation
- We cant leave it to be an afterthought
- Industry practice needs to improve…

Where to now?

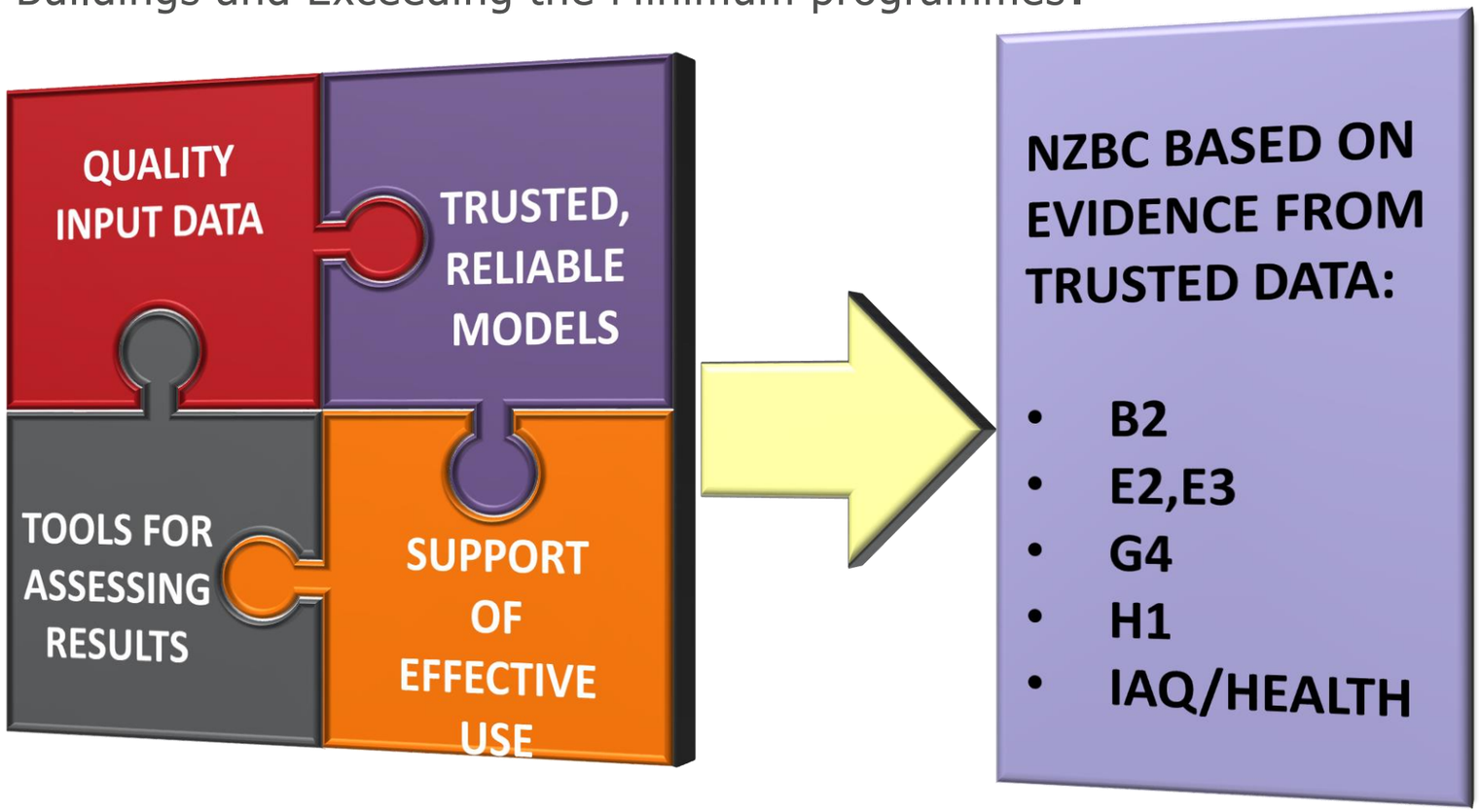
- New builds, not much more effort needed, just education about continuity.. (particularly for more interesting buildings)
- “Build tight – ventilate righ
- Older building retrofit?



Model Buildings

What is the project?

- The project comprises experimental and simulation activities to support the next generation of the building code. The work packages address a number of questions in the Warmer, Drier, Healthier Buildings and Exceeding the Minimum programmes.



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