



## Airtightness trends in New Zealand homes and apartments, what are we achieving and what barriers are there to doing better?

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## Why worry about airtightness?

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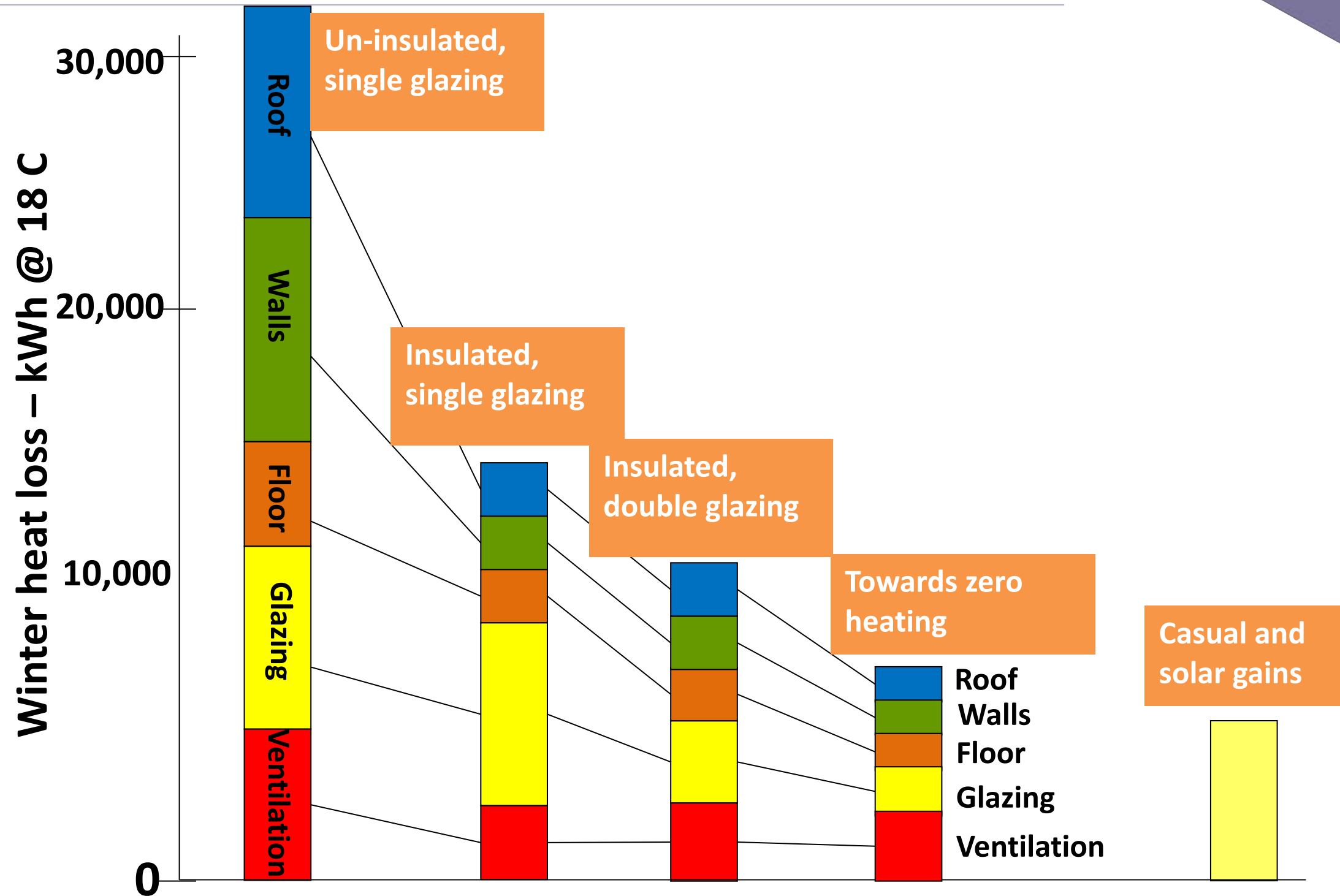
One component to providing warm, dry and healthy buildings is a reduction of energy use

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

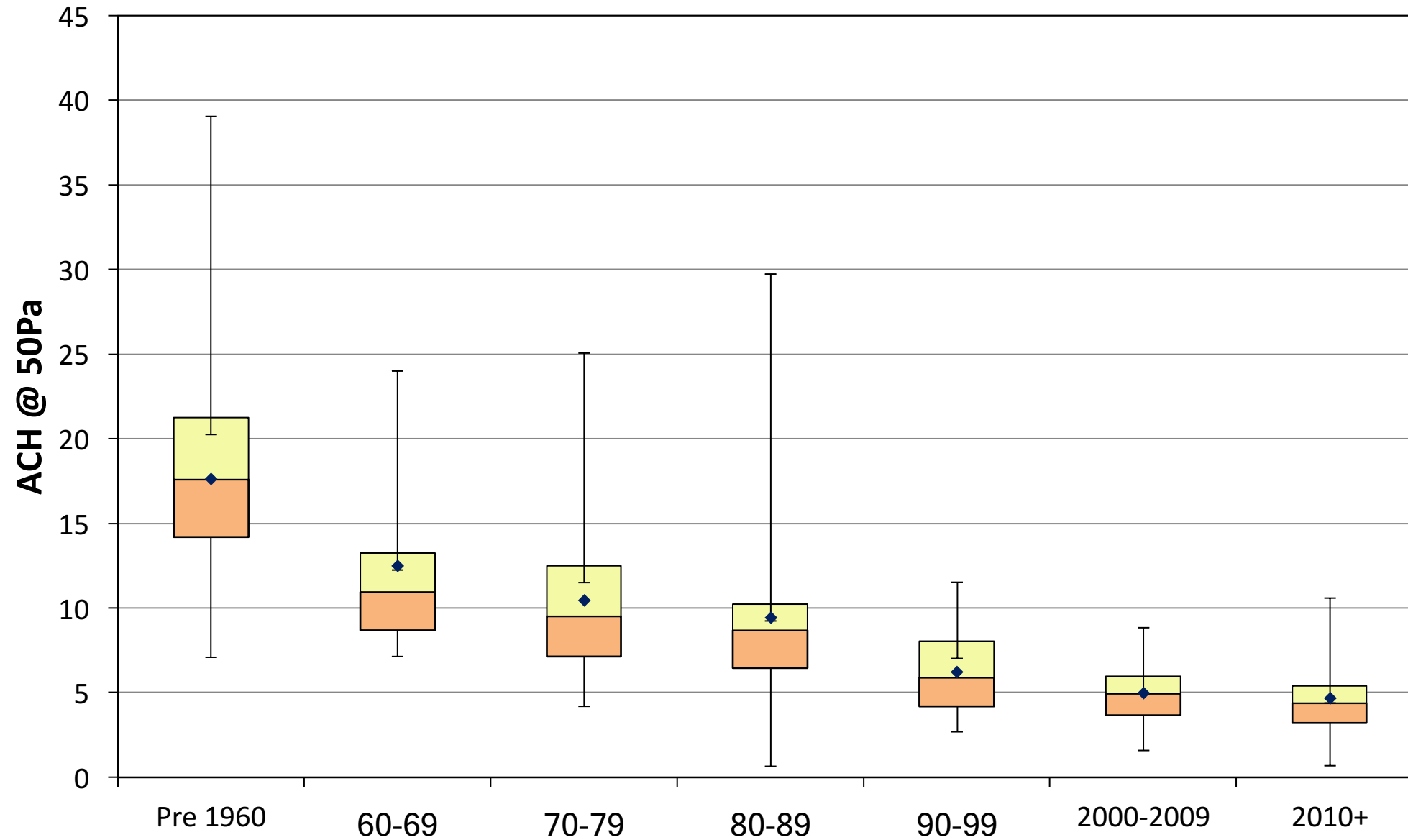
It also allows better control of ventilation



# NZ Building Code and energy performance



# Airtightness trends - Residential



## What about apartments?

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- Airtightness of apartments project aiming to find this out.
- Preliminary results for new apartments are similar to modern homes 2-3 ACH@50Pa common

## Energy is only one part of the puzzle though

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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

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



# Perfluorocarbon Tracer Study

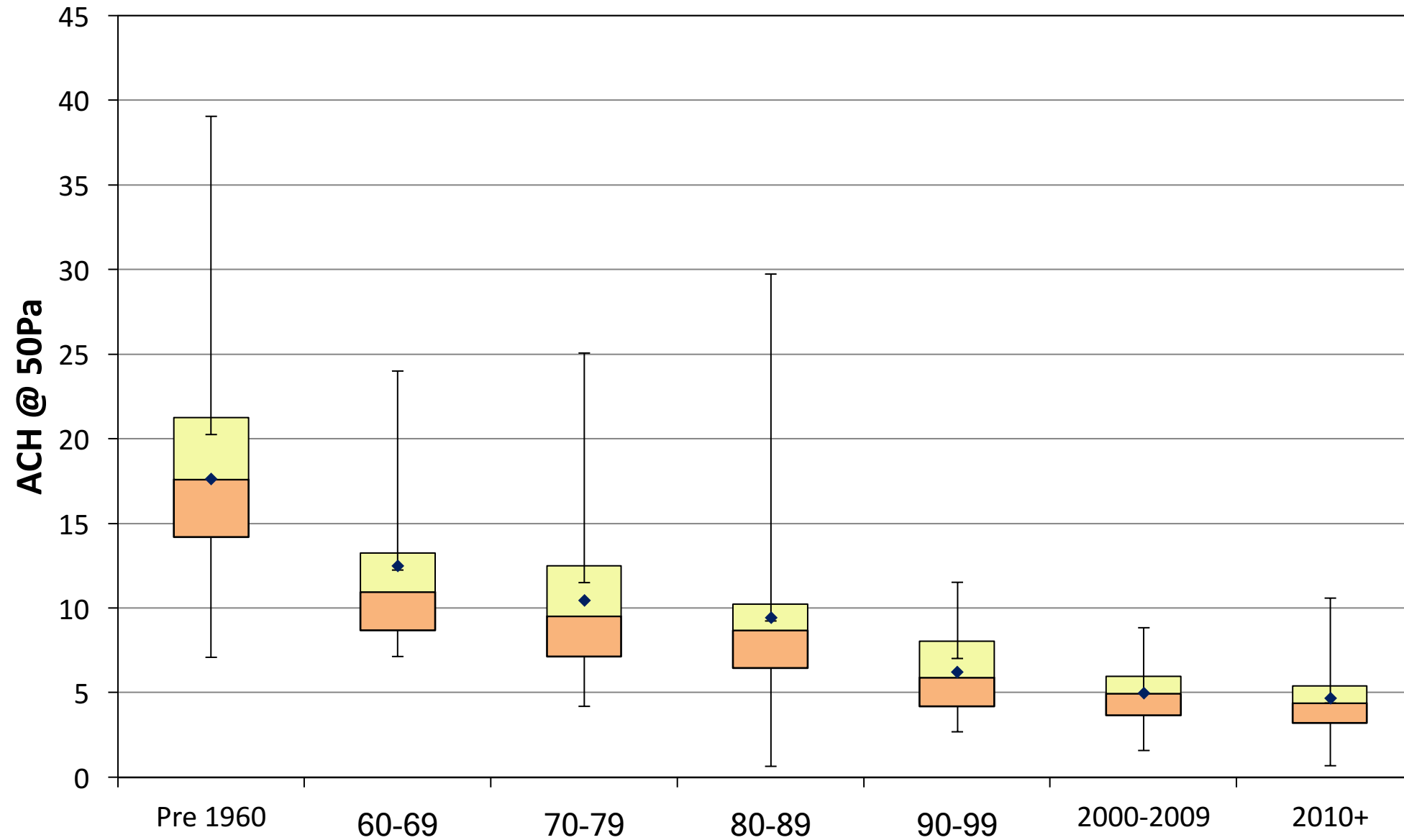
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- Activated carbon samplers
- 4 Rooms
- 3-4 week exposure

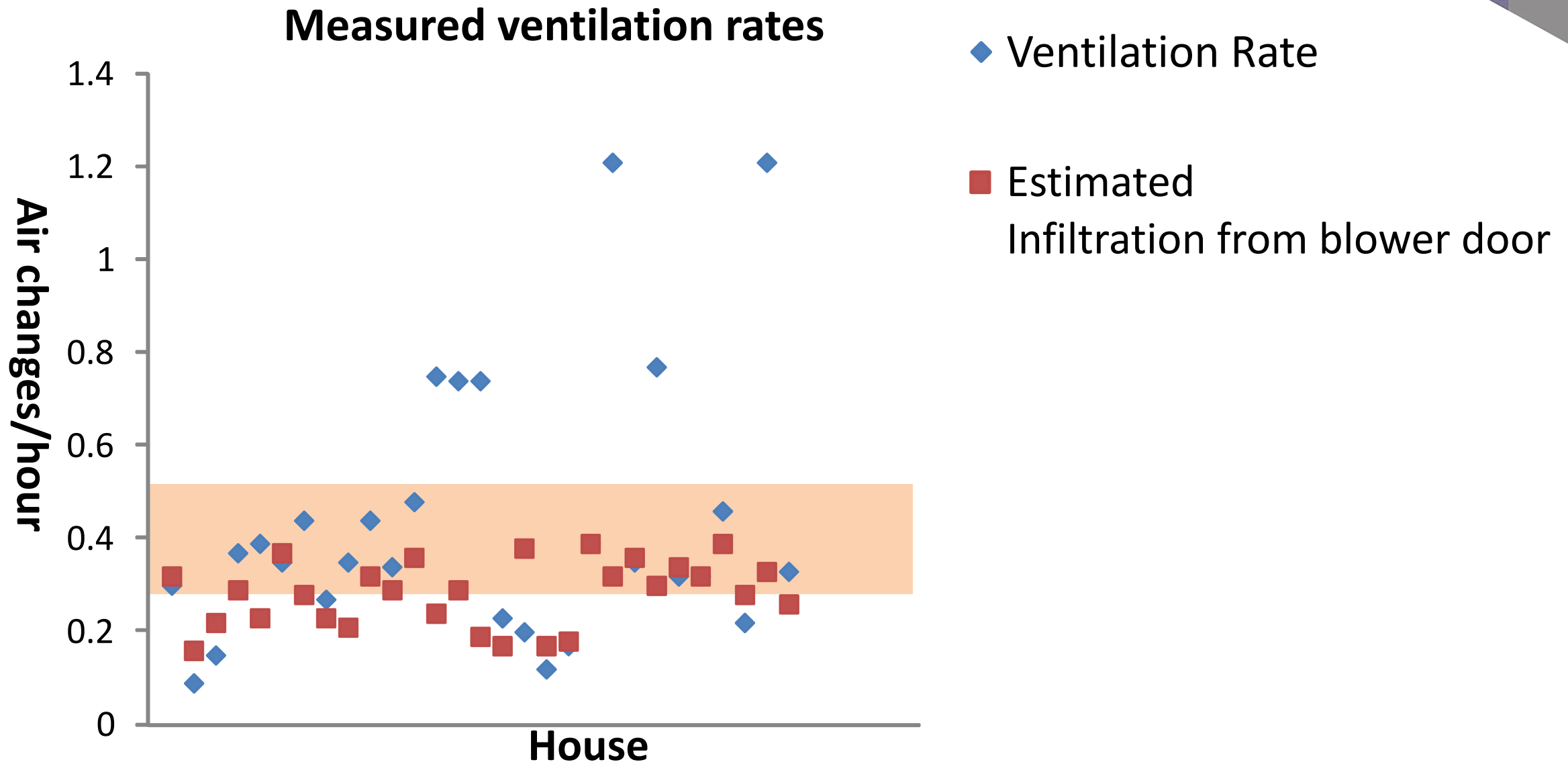




# Airtightness trends - Residential



# Survey Results, with calculated infiltration (from WAVE)



## A different metric?

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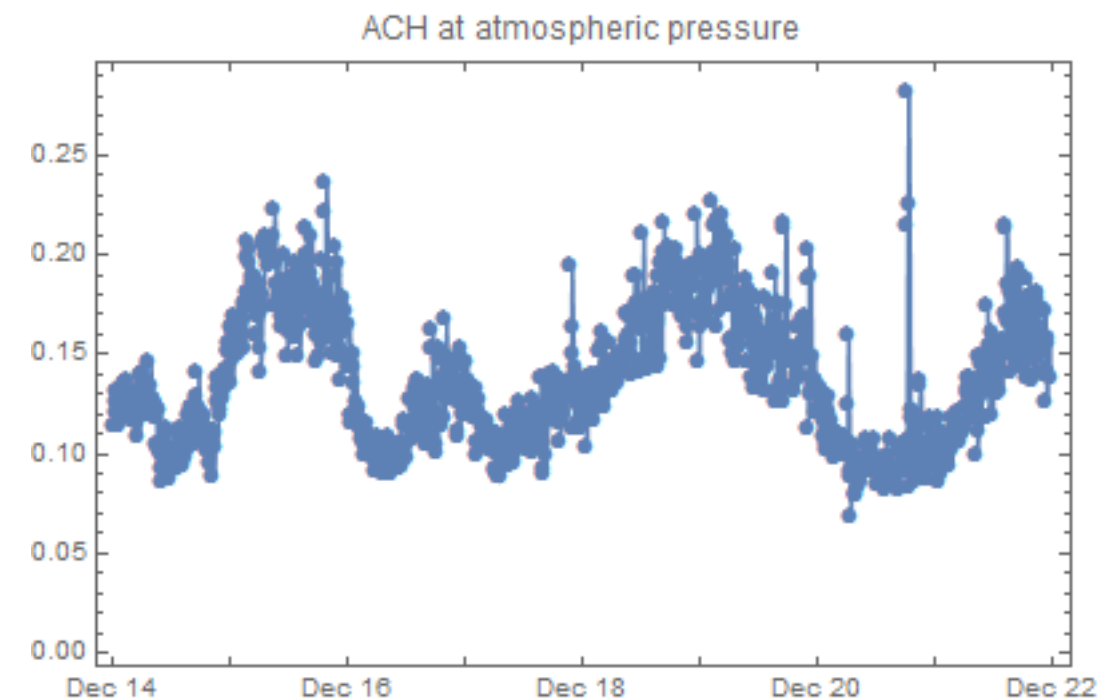
- Plenty of confusion

N50 result is NOT the average infiltration for a building

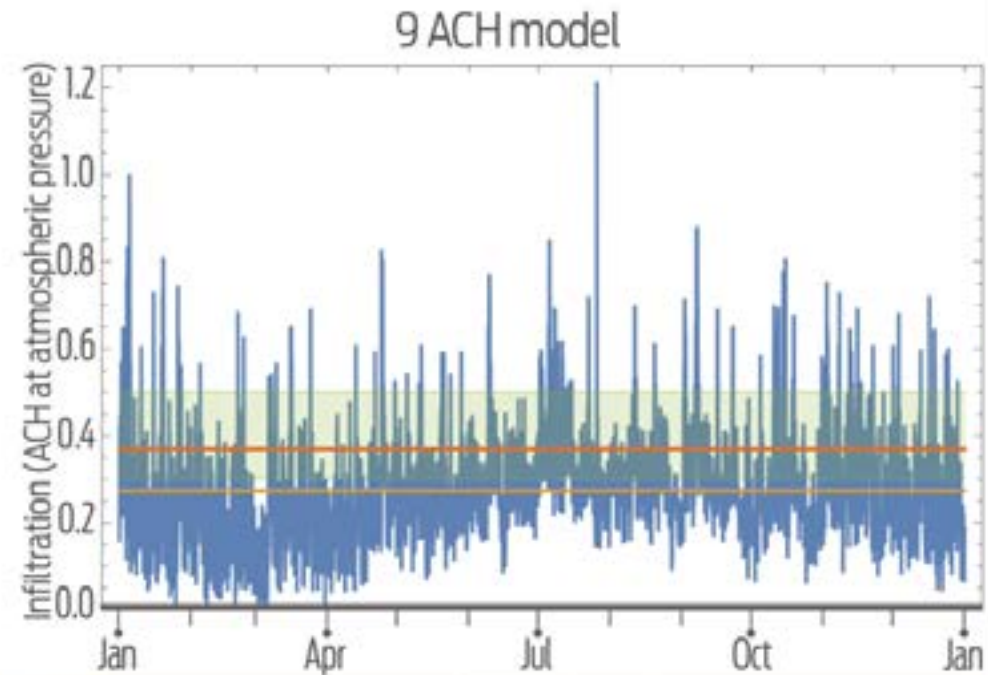
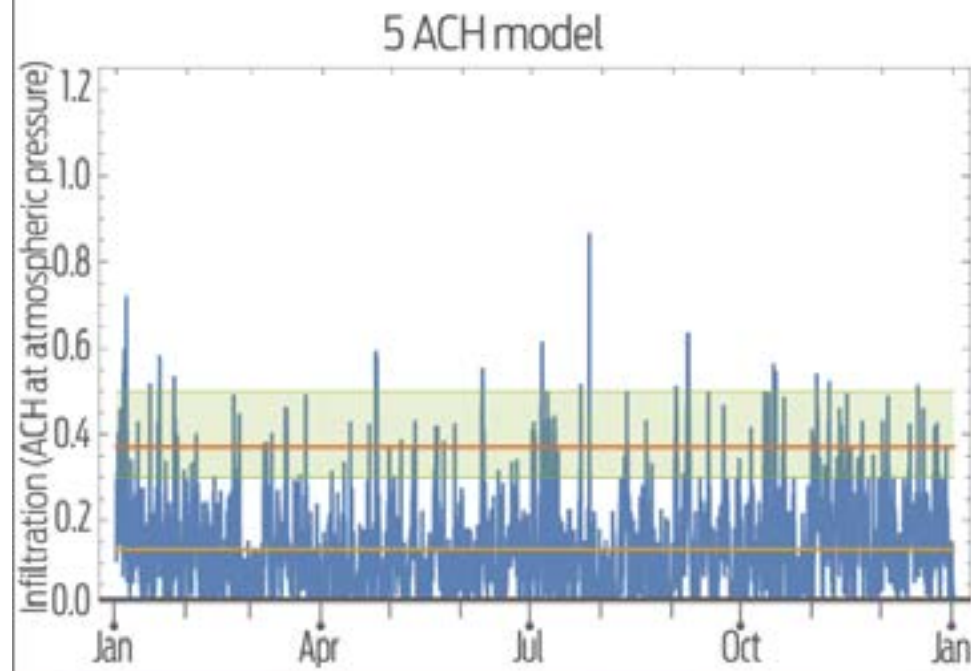
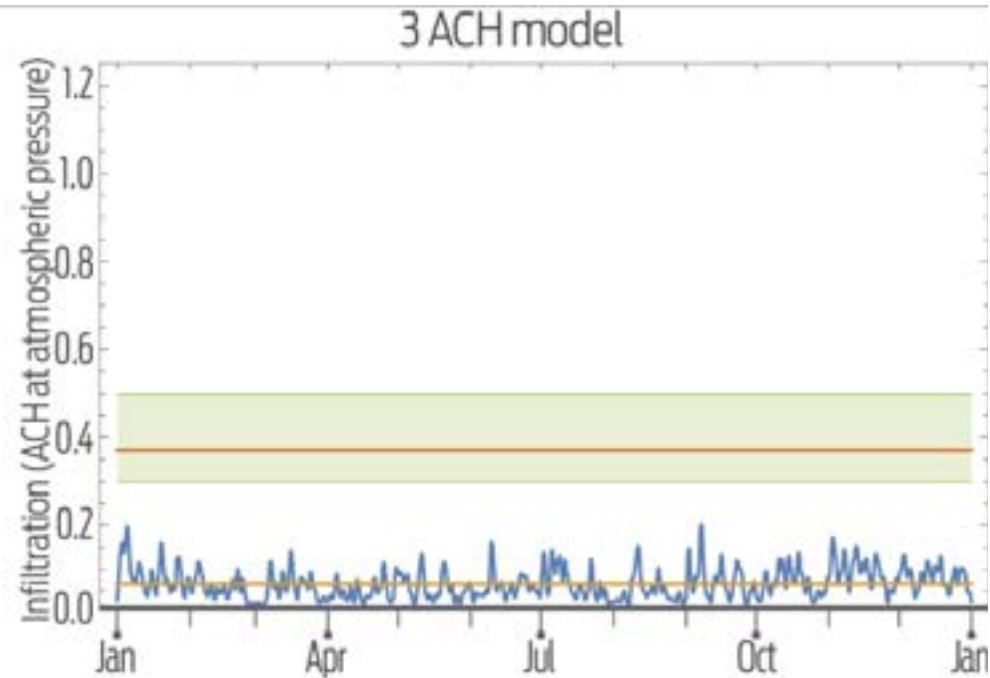
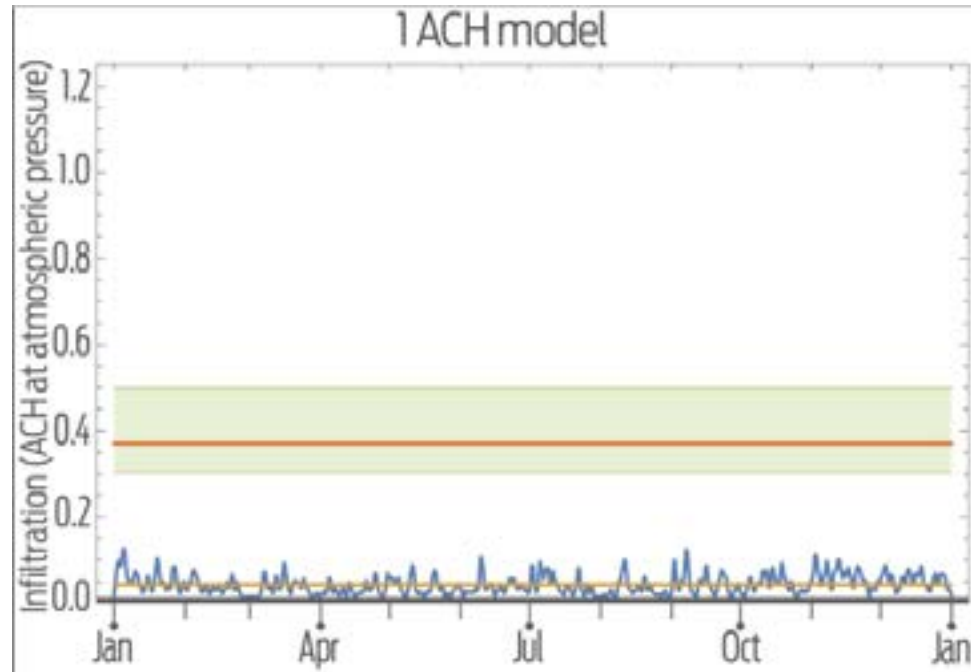
/20 'rule of thumb' to convert

But...

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



# Infiltration rates with airtightness – benchmarked



## Envelope permeability instead?

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- $\text{m}^3/\text{hr}/\text{m}^2@50\text{Pa}$
- 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

## Regardless of the metric...

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- 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 right
- Older building retrofit?



Potential leaks sealed

