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## The benefits of insulation have been blown by big houses



**Cameron Jewell | 8 May 2017**

Increased house sizes have cancelled out the energy saving benefits of improved insulation, new research out of New Zealand published in the journal *Energy Policy* has found, with the authors arguing that building codes must account for growing house size.

The [paper](#) – *Increased house size can cancel out the effect of improved insulation on overall heating energy requirements* – looked at house size trends across Australia, New Zealand, England and the US, finding that for detached dwellings there has been a “dramatic” increase in house size since the '60s. In Australia, houses have gone from 100 square metres in 1950 to about 240 sq m today.

While there has been a shift towards apartments in new construction, the authors argue that the strong tradition of detached dwellings means that this sector is going to remain an important factor that needs to be tackled.

The question the NZ researchers asked was: “What effect has the increase in dwelling size, in Western countries, over the last 40 or 50 years, despite the improvement in building code and energy efficiency standards, had on the overall energy required to heat homes?”

For New Zealand, they said increases in dwelling size had been “sufficient to largely nullify the potential energy gains from increased insulation requirements of the last decades”. The same was likely true for Australia, England, the US and Canada.

The authors also said larger dwellings analysed in their case study were designed in less efficient ways than smaller homes.

“Larger dwellings can be designed to be aspirational, for example with double-height spaces or inefficient but decorative design features that increase the surface area to volume ratio.”

The authors said current measures of thermal efficiency – as energy use per square metre – “may have the unintended consequence of inadvertently encouraging dwellings with more energy use”, because energy use increases at a slower rate than house size, making larger dwellings appear more efficient.

Other issues included the risk of occupants of larger dwellings not being able to afford to heat their homes properly.

“This could lead to either under-heating and under-ventilating the dwelling, which might lead to mould growth; or reduced maintenance, which could result in the faster degradation of the dwelling.”

### How to fix it?

Having stricter energy efficiency regulations for larger dwellings was one solution sometimes put forward, the authors noted, however this was problematic.

“A potential problem with requiring more energy efficiency in larger dwellings, to take account of their greater heat transfer area, is that it implies that smaller dwellings (often lived in by single people or less wealthy people) will be less energy efficient on the same metric.

“It is these people who have the greatest need for cost savings provided by energy efficiency.”

The authors said energy efficiency regulation needed to be made with changing trends in house size in mind.

“The current situation where thermal regulation in building codes is only balancing the explosion in dwelling size is not one which leads to a comfortable future,” they said.

When building codes were being planned, “the likely size of the dwellings to be built should be considered fully, and accounted for in the cost-benefit analysis”.

“At the very least, based on current trends, this should include the worst-case scenario that separate dwelling sizes continue to increase.”

Other possibilities were an overall restriction on dwelling size or “absolute predicted dwelling energy requirements”, though the authors said this was “less likely” to happen.

They did, however, point out there was a precedent, with New Zealand dictating a maximum house size following World War II, due to material shortages.

In Australia, researchers Dr Robert Crawford and Dr André Stephan have found that the embodied energy in larger houses is a bigger factor than increased operational energy needed to run the house.

They argue that energy efficiency regulation needs to take into account embedded energy.

“We need to revise current energy efficiency regulations to include embodied energy and other measures of energy if we are to reduce the total energy and broader resource demands associated with buildings,” they said.

Tags: [energy use](#), [housing](#), [insulation](#)

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**One Response to “The benefits of insulation have been blown by big houses”**

*John Caley* says:  
10 May 2017 at 9:02 am

“ In thermal assessment of dwellings in Australia, the NatHERS software tools apply an “area-adjustment” correction factor which is designed to counter the tendency for larger dwellings to get better ratings. In NSW, the BASIX tool which sets the minimum energy efficiency for dwellings uses the total conditioned floor area in it’s calculations, making it harder for larger dwellings to pass.

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