1. Paper / Proposal Title: Midlife Crisis: Retrofitting Australia’s ageing apartment buildings for the changing climate

2. Format:
Written paper

3. Author(s) Name:
Dr Paola Leardini
Paul Matthew

4. University or Company Affiliation:
University of Queensland, Australia

5. Abstract (300 words):
Between 1960 and 1980 the number of Australian multi-residential dwellings more than tripled in response to booming post WW2 immigration, growing local manufacturing industries and the new construction skills of migrants. Initially an expression of technological progress and economic prosperity, apartment buildings became a
distinctive feature of main east coast cities such as Brisbane, the Gold Coast, Sydney and Melbourne – and remain an integral part of their urban fabric today.

The multi-residential tower buildings in this cohort are typically concrete framed with cavity brickwork walls, little or no insulation, single glazed windows and minimal sun shading. As a result their energy consumption and per capita greenhouse gas emissions are well above current limits for new dwellings. At the time of their construction there were no energy or water efficiency requirements, so their poor performance is no surprise. Changes to the climate and more stringent requirements following Australia’s commitment to reduce greenhouse gas emissions will test the resilience of these buildings - and their residents. The durability and embodied energy of their brick and concrete shells makes them strong candidates for retention provided their energy efficiency is improved.

This paper examines the energy efficiency and thermal comfort of older residential towers against current Australian building standards, possible future energy use restrictions and the potential impact of climate change on energy performance.

Archival records and hygro-thermal modelling have been used to quantify the impact on energy performance of a series of retrofit packages applied to a case study building in Brisbane under three potential climate change scenarios. The modelling allows identification of retrofit interventions which provide greatest benefits in Brisbane’s subtropical climate: these are further discussed in light of ownership structure and construction market constraints. The results also draw out the implications of climate change for Australia’s building energy efficiency regime – particularly for the warmer regions in the North – building the case for energy retrofitting in a still resistant national context.

6. Author(s) Biography (200 words each):

Dr Paola Leardini:

Dr Leardini is a senior academic at the University of Queensland’s School of Architecture in the technology and environmental design field. She holds a PhD on energy efficiency and indoor environmental quality from the Politecnico di Milano (Italy); her doctorate work was undertaken under the guidance of Prof Fanger, one of the world’s leading experts in the field of thermal comfort. Dr Leardini has worked as an ESD designer and consultant, and taught in tertiary institutions in Italy, Switzerland, Germany, New Zealand and Australia. Her main research interest is energy efficiency and comfort of new and existing building stock; she has contributed to major urban regeneration and social housing retrofit programs in Italy and New Zealand, where also became founding member of the Passive House Institute New Zealand and actively contributed to the uptake of low energy standards. Currently she is involved in large
research projects funded by the Australian government, including the Cooperative Research Centre for Water Sensitive Cities and the Industry Transformation Research Hub for Tall Timber Buildings. Dr Leardini’s studies have been published internationally; she serves as a reviewer of scientific journals and has been invited to join judging panels of prestigious sustainable architecture competitions.

**Paul Matthew:**

Paul Matthew is a practicing architect in South East Queensland who has worked extensively on multi-residential buildings for a number of award winning practices including Bark Design, Elizabeth Watson Brown Architect, Gall & Medek and Bureau^Proberts. Paul has also tutored in Architectural Design and Architectural Technology at the University of Queensland and the Queensland University of Technology.

After dwelling in a series of 1960s brick apartment buildings and seeing first hand the deficiencies of this building cohort as well as with their beauty, durability, and accommodating natures Paul has commenced a PhD under Dr Leardini at the University of Queensland that examines the future prospects of 60s and 70s apartment buildings and their owners and residents. The PhD research aims to establish a history and taxonomy of Brisbane’s mid century high-density multi residential buildings and to recommend strategies to maintain and improve the longevity and environmental performance of these buildings.