FUTURE READY®

Case Study

FUTURE PROOFING RESIDENTIAL DEVELOPMENT TO CLIMATE CHANGE REPORT

Project Overview

Engaged by Waverley Council, WSP worked with the NSW Department of Planning, Industry and Environment; three Eastern Sydney Councils (Randwick, Woollahra and Waverley); the Commonwealth Department of Industry; and the CSIRO, to deliver the Future Proofing Residential Development to Climate Change project.

The project looked at residential dwellings compliant with the current building code, and modelled their performance using future climate projections for the Eastern Sydney region. The aim was to determine the effects of climate change on building thermal performance, energy consumption, Greenhouse Gas Emissions (GHG) and water demand.

Released in January 2021, the first project report found that the outdated climate data being used to assess code compliance did not account for the impacts of a changing climate, making residential dwellings non-compliant in the future. A subsequent project report by WSP identified design solutions to make buildings compliant, creating more comfortable living for occupants.

Funded by a 'Increasing Resilience to Climate Change Grant' from the NSW Government, the outcomes of the project will support the application of additional funding for research in this area as well as inform policy development to improve residential design with increased resilience to climate change.

In June 2021, the Greater Sydney Commission awarded Waverley Council the 2021 Planner Disruptor Award for the project, highlighting the importance of forward thinking planning for innovative city-shaping and resilience.

What Future Trends Did We Consider?

Climate	Society	Resources
More Extreme Weather	Densification	Water Scarcity
Hotter & Drier		Renewables Reign

How Did We Consider These Trends?

Climate

More extreme weather – The project investigated the potential performance of residential dwellings in Eastern Sydney under future climate scenarios. WSP applied our Future Ready thinking to show current typical designs mostly fail regulatory requirements in a 2030 climate scenario, with more serious failure rates in 2070.

Hotter & dryer – As the climate warms, houses will use significantly more energy for cooling than heating. Research indicated that in 2030, cooling loads increased by 70% on average and by 308% on

average in 2070. Dwellings curently approved under the Building Sustainability Index (BASIX) will be unsuitable for occupation by 2070 without extremely high levels of mechanical cooling. These impacts will also require governments to consider peak electricity demand challenges as the climate warms.

Society

Densification – This research project highlighted the need to change the way we both design and assess the performance of our buildings to improve resilience to climate change. The outcomes developed were based on practical, feasible and logical solutions like ceiling fans and better shading, and the development of community education materials on how to cool your home.

Resources

Water scarcity and renewables reign – Changes to rainfall patterns will reduce reliability of rainwater tanks and cause greater stress on conventional water supplies. Renewable energy will have a greater role to play to provide resilience to blackouts and meet energy demand via low-carbon sources.

How Was Our Approach Better?

WSP used future climate scenarios to test the ability of the current building code requirements to adapt to climate change. Modelling of BASIX buildings was undertaken in the Eastern Beaches region to determine the effects of future climate change on the buildings, including thermal comfort; energy and water use; and GHG emissions.

Three climate scenarios were modelled – 2020, 2030 and 2070. Modelling and analysis were undertaken for five different building types – detached, attached, low-rise, mid-rise and high-rise. The five building types comprised 217 dwellings to give a representative indication of current building design performance.

The Outcomes

Three climate adaptation opportunity areas were identified from the project:

1. Improve existing regulatory tools:
   - Improve BASIX and NatHERS regulatory tools with future climate data
   - Review building controls in consideration of net zero carbon emissions target
   - Review BASIX building control targets; strengthen BASIX energy target for multi-unit buildings in low carbon precincts
   - Establish a monitoring and evaluation protocol that ensures that BASIX is reviewed and adapted every three years
   - Ensure that revenue from the BASIX State Environmental Planning Policy is utilised for tool maintenance and enhancement
2. Strengthen Local government capability to respond:
   - Prepare planning controls to strengthen non-BASIX sustainability initiatives
   - Improve Basix and NatHERS plan marking through BASIX training videos for building professionals
   - Provide education to homeowners and tenants – how to shade your home; which plant where; how to maintain your rainwater tanks
3. Ensure effective Government response to emerging challenges:
   - Peak electricity demand challenges for existing housing stock as the climate warms
   - Impacts of increased use of air conditioning for all homes
   - Greater water demand from the residential sector in a warmer climate, and the need for alternative water supply
   - Use of vegetation for cooling as well as drought resistant plants for water conservation

Overall, our work helped Waverley Council and the other project partners gain a better understanding of the effects of climate change on building thermal performance, energy consumption, Greenhouse Gas Emissions (GHG) and water demand in relation to existing regulatory tools.

For More Information

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