# The need for high resolution geospatial information to tackle urban climate

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**SUMMARY**

According to the Australian Bureau of Statistics (2024), cities host 90% of the Australian population and generate 80% of our GDP. A recent report from Infrastructure Australia (2024) estimates that the built environment (infrastructure and buildings) contributes directly to 31% of annual carbon emissions in Australia through embodied (54 Mt CO2e) and operational (112 Mt CO2e) components. Thus, it is commendable for all levels of government to develop evidence-based urban planning aiming at creating more resilient and sustainable cities in the face of climate change. However, here comes the uncomfortable truth: we don't have yet the evidence to support climate-proof urban planning at precinct, suburb or even city level. Why? Will you ask; simply because the regional climate models we use to establish climate projections include over-simplistic representations of Australian cities, often down to a mosaic of flat slabs of bare soil. The direct effect of urban footprint and its complex geometry, construction materials and their embodied carbon, or human activities – from transport to energy consumption – are still largely ignored in regional climate modelling. The absence of proper urban representation creates a two-way problem for our understanding of the intricate interactions between atmospheric and urban dynamics. On one side, even the most granular regional climate models, processing information at a 2.5 km resolution, cannot inform long-term urban policies and interventions at suburb or precinct levels. In other words, current climate projections are unable to inform or assess the actual effect of, let's say, an urban greening policy aiming to significantly reduce urban heat by 2050. On the other side, concrete and asphalt absorb heat at higher rates than natural environments, creating heat island effects; buildings alter wind flows creating updrafts that can affect cloud formation and sometimes alter rainfall patterns; in some cases, cities can even experience higher frequencies of hailstorms. Put it simply, large cities don't behave like flat tiles of bare soil, their influence on regional climate and its evolution is more complex, probably more significant and, unfortunately, more dramatic. Thus, it is urgent to harness high resolution geospatial data and technology to better understand and predict future urban climate patterns.