National Cool Cities Initiative (NCCI)

Improving Heat Resilience in Australian Settlements

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Empirical benchmark study into the generation and mitigation of urban heat islands at sub-precinct level across Australia’s major cities;

First stage commenced in Sydney supported by 10 local councils and the State Government of New South Wales.

Strong nationwide interest with over 60 councils to date – First stage in Sydney (approx. 587 km²).
New extremes: Cities now experience 45ºC during prolonged heat waves;

Urban temperatures at street scale vary greatly due to urban form;

Positive relationship between urban density and Urban Heat Island Effect;

Climate change further amplifies Urban Heat Island Effect;

Current policy disregards urban microclimate and heat vulnerability;

Lack of understanding, information and tools.

Canopy Layer Urban Heat Islands: The hottest neighbourhoods in Australia have low urban densities.
NCCI - AIMS AND OBJECTIVES

► **Creating the evidence-base** for heat resilient urban design, planning and policy;
► **Quantifying how the design of neighbourhoods influences urban temperatures at precinct and street scales** and thus the liveability and carbon footprint of our cities;
► **Addressing the vital need for a risk assessment and mitigation framework** to extreme heat events across the study area and other cities globally.

How can urban heat be mitigated while creating healthy, low carbon cities with higher urban densities?
NCCI - METHODOLOGY

► **Airborne remote sensing plus car transects** | High-resolution thermal, multispectral and lidar plus air temperature at day and night;

► **Quantifying variables at sub-precinct and street scales** | Vegetation content and structure, imperviousness, volumetric building density, H/W-ratio, albedo, altitude, distance to ocean, street orientation, air and surface temperatures;

► **Spatial Analysis** | Automated Local Climate Zone classification at 100x100m;

► **Statistical Analysis** | Multiple Linear Regression with spatial dependency.

Quantifying urban parameter across a city at very high resolution.
Providing easily accessible information and tools to assess and avoid embedded vulnerability to extreme heat events;

Identifying high risk areas to prioritize localized urban design interventions and educate the community;

Nationwide best practice design and planning guidelines for urban heat resilience.

Urban Heat Island intensity at pedestrian level depends on urban form and varies greatly across a city.
NCCI - IMPACT

- Improving comfort, health and productivity of the community;
- Reducing the carbon footprint of the built environment;
- Raising community awareness;
- Enabling a review of local design and planning regulations;
- Providing an easy to use tool for urban heat vulnerability assessment;
- Facilitating cost-benefit analysis of targeted urban interventions for long-term risk reduction and immediate adaptation actions.

Local Climate Zone classification and thermal analysis at precinct scale (100x100m).
Thank you!

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