

Urban Heat Island Challenge

2022 NSW Small Business Innovation & Research Program

Background

The NSW Small Business Innovation and Research (SBIR) program is NSW Government initiative that provides competitive grants to small and medium-sized enterprises (SMEs) to find and commercialise innovative solutions to well-defined problems for NSW Government agencies.

This document sets out the Urban Heat Island Challenge for the 2022 SBIR Program.

Challenge summary

The Greater Cities Commission (GCC) are seeking innovative solutions that could be trialled at the Westmead Health and Innovation District (WHID) to mitigate urban heat island effects and/or improve the resilience of our systems in response to extreme heat events. Urban heat island effects are a known problem across Western Sydney, and especially acute at the WHID.

Technology solutions might include, but are not limited to:

- Novel materials that could be incorporated onto existing buildings or new builds at the WHID that mitigate urban heat island effects by deflecting or reducing heat
- Built form solutions or green infrastructure that deflect or reduce heat, harness or direct wind or water to reduce urban heat island effects
- Digital technologies such as smart sensors, Internet of Things or mobile applications to track, measure, manage and/or mitigate urban heat island effects for local residents, reducing the burden on the local health system.

Challenge details

Urban heat is a common challenge faced by many economies with increased urbanisation. The average temperature in large cities is normally 1-3°C higher than rural regions, as urban areas tend to trap more heat than natural environments.

Urban heat islands are areas that have hard, sealed surfaces with less tree canopy, vegetation, waterways, and other green infrastructure. Urban heat effects and urban heat islands result in negative effects on human health and wellbeing, economic productivity, the environment, and infrastructure and services.

Urban heat and the urban heat island effect are increasing the heat-related effects of climate change in urban areas globally, making increased temperatures and extreme hot weather events more severe and difficult to manage. For example, in the construction industry, climate control and ensuring that the space is comfortable for the user is a major concern.

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According to various studies, Westmead is among the hottest suburbs in Western Sydney. A 2019 study by Western Sydney University identified the area around the Westmead Health Precinct, Parramatta North and Northmead as among the hottest areas in the Parramatta local government area.

While climate change is increasing average temperatures across NSW and globally, the western suburbs of Greater Sydney are particularly vulnerable to the urban heat island effect. Temperatures can be up to 6-10 °C higher in Western Sydney than in the east, and three times as many heat-related deaths occur in Western Sydney during heatwaves.

As Sydney experiences more frequent and prolonged heatwaves, it becomes increasingly important to look for new and advanced technologies to help make Western Sydney a more comfortable place to live.

Viable solutions to urban heat island effects would lower the ambient temperature of urban areas, reducing the cost of additional cooling methods that would require a higher burden in terms of energy and cost. A comprehensive literature review by the Greater Cities Commission (GCC) identified a range of interventions to mitigate urban heat island effects. Roughly, these have fallen into:

- **planning solutions** (for example, climate-resilient urban planning and design, and regulation of built form)
- **material/technology solutions** (greenery, water and cooling materials)
- **placemaking solutions** (for example, enhanced green canopies and more green public spaces; use of water-sensitive urban design).

Solution requirements

The solutions should:

- Deliver cost-effective technologies or methodologies to deflect, reduce or harness heat
- Establish reliable measurement to capture urban heat island impacts, as well as the measurement of mitigation efforts
- Improve the resilience of the systems that are impacted by extreme heat events. Examples of systems include water, energy, transport, and community (healthcare emergency response)
- Be deployed at suitable parts of the WHID, for example, along Hawkesbury Road or at the Westmead Health Precinct.

Proposals must:

- Demonstrate the scientific basis of the technology to address the problem
- Demonstrate that the technology:
 - Consistently and reliably quantify the impacts the solution has on the urban heat island effect in the WHID
 - Cost effectively mitigates or manages the urban heat island within the WHID or a certain section of the district
 - Delivers a solution that is robust, practical, scalable across different land types or physical assets
 - Reduces the impact of urban heat increases across the WHID community
 - Improves resilience in our responses to the urban heat island effect

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This challenge is agnostic to the type of technology used and seeks the most effective and efficient ways to mitigate urban heat island effects and/or improve the resilience of systems to extreme heat.

Applicants may propose a single technology or device, or an integrated suite of technologies and devices.

Proposed solutions that can be scaled for deployment across NSW will be highly regarded.

Benefits of the solution

A 2012 study based in Melbourne estimated that urban heat island effects cost \$300 million annually, impacting health, transport operation and infrastructure, energy demand and infrastructure, flora and fauna health, and crime rates. While many of these are difficult to quantify, a reduction in urban heat presents a major benefit to users of the urban environment.

There is an imperative to trial solutions to reduce the urban heat island effect in the WHID. The WHID is a leader in clinical services, research and education, providing a diverse range of public healthcare to more than 946,000 residents in Sydney's west. The concentration of people, including a significant proportion of children and other vulnerable patients, means there is a pressing need to minimise the urban heat island effects on their wellbeing, and facilitate mitigation and response measures during heatwaves.

The NSW Government views the WHID (and its other innovation districts) as catalysts for innovation, and a good location for solutions to manage urban heat island effects to be trialled for proof of value and adoption readiness. Successful solutions will be presented to NSW Government agencies active in the WHID with interest in the urban heat island problem space.

How to apply

Applications to the NSW 2022 SBIR Program will be made through the smartygrants platform, online applications forms can be found at <https://chiefscientist.smartygrants.com.au/SBIR2022Round>.

For more information, please visit chiefscientist.nsw.gov.au/sbir