



SCIENCE AND  
INDUSTRY  
ENDOWMENT  
FUND



PENRITH  
CITY COUNCIL

# STEM Community Partnerships Program

## Penrith local scenario

### Heat Stress

The Penrith area is vulnerable to heat stress. Heat stress occurs when your body cannot maintain a healthy temperature (37°C). Babies, young children, the elderly and people with some health conditions or on some medications may be a higher risk. Heat stress results in more deaths in Australia than bush fires and is displayed with pale skins, excess or no sweating and dark urine. Heat stress may lead to a medical emergency such as heat stroke which is fatal in 80% of cases. The need for cooling leads to greater energy consumption.

Western Sydney typically experiences 6 – 10°C higher temperatures during extreme events in the summer period compared to Sydney's Eastern Suburbs. The area around Penrith is amongst the hottest parts of Western Sydney, with six locations in Penrith recording air temperatures above 50 °C for the first time during the summer of 2019/2020.

Strategies undertaken for the future management of heat stress includes urban wetlands, increasing urban green infrastructure and tree canopies, and the use of cool materials in community spaces (they have high reflectivity and emissivity value). Urban wetlands i.e. natural water bodies, evaporation technologies, pools, ponds and fountains can be used to decrease the ambient temperature. Urban greenery can not only assist in decreasing the ambient temperature but can mask urban noise, filter pollutants, prevent erosion and stabilise ground soils.

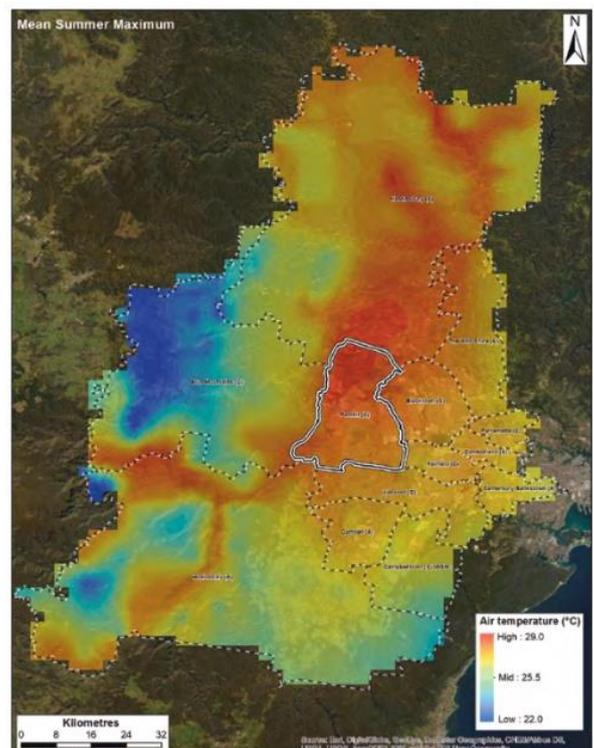
The design of buildings, construction and insulation and the use of skylights, glazing and shading also impacts the way temperature is experienced by locals and their use of energy consuming appliances. There are also technology advances in this area that Penrith City Council continues to consider.

How your Council tackles the complexity of this issue will impact you and your community, now and in the future.

### Your task

Your task is to use the information above, and resources provided below as a start to identify a local problem and design a STEM-focussed solution.

(Question, Design, Explore, Communicate)



Penrith temperatures compared with the rest of Greater Western Sydney, *Benchmarking Summer Heat Across Penrith*

## Resources

### CSIRO research

- Bushfire management, CSIRO <https://www.csiro.au/en/research/natural-disasters/bushfires>
- Smart Sensors to help Darwin residents manage smoke and heat, CSIRO <https://blog.csiro.au/darwin-smart-sensors/>
- Climate and Health cluster – article and website, CSIRO <https://research.csiro.au/climate/themes/clusters/csiro-climate-health-cluster/>

### Reports

- Benchmarking Summer Heat Across Penrith, Western Sydney University and Penrith City Council, August 2020  
[https://www.penrithcity.nsw.gov.au/images/penrith\\_city\\_council\\_benchmarking\\_summer\\_heat\\_across\\_penrith\\_web.pdf](https://www.penrithcity.nsw.gov.au/images/penrith_city_council_benchmarking_summer_heat_across_penrith_web.pdf)
- Sydney Water Cooling Western Sydney  
[https://www.sydneywater.com.au/web/groups/publicwebcontent/documents/document/zgrf/mtv4/~edisp/dd\\_168965.pdf](https://www.sydneywater.com.au/web/groups/publicwebcontent/documents/document/zgrf/mtv4/~edisp/dd_168965.pdf)
- Penrith City Council – Cooling the City strategy and masterclass  
<https://www.penrithcity.nsw.gov.au/waste-environment/cooling-the-city>

### Articles

- Heat stress and heat related illness, Better Health Channel  
<https://www.betterhealth.vic.gov.au/health/healthyliving/heat-stress-and-heat-related-illness>
- NSW Government Planning System – thermal comfort <https://basix.nsw.gov.au/iframe/thermal-help.html>
- How to survive a heatwave, ABC News, January 2020  
[https://www.westernsydney.edu.au/newscentre/news\\_centre/more\\_news\\_stories/6\\_tips\\_for\\_keeping\\_cool\\_this\\_summer](https://www.westernsydney.edu.au/newscentre/news_centre/more_news_stories/6_tips_for_keeping_cool_this_summer)
- Heatwaves may mean Sydney is too hot for people to live in ‘within decades’, ABC Science, 24 January 2021 <https://www.abc.net.au/news/science/2021-01-24/heatwaves-sydney-uninhabitable-climate-change-urban-planning/12993580>
- Pavement technology could cool cities from the ground up, AP News, October 2020  
<https://apnews.com/article/virus-outbreak-technology-arizona-bdd2b997ebdf976c22090eaf5b32bcb7>
- Natural ways of cooling cities, Science Daily, 4 September 2019  
<https://www.sciencedaily.com/releases/2019/09/190904165242.htm>
- City-cooling tech wins international award, Sustainability Matters, 24 September 2019  
<https://www.sciencedaily.com/releases/2019/09/190904165242.htm>