CRC for
Water Sensitive Cities

# Water Sensitive Cities Scenario Tool – TARGET Module Beta Release

The WSC Scenario Tool is a planning tool developed by the Cooperative Research Centre for Water Sensitive Cities (CRCWSC) to assess the multiple benefits of green infrastructure solutions. It now integrates TARGET – a new microclimate model that can produce a time series of land surface and air temperatures and human thermal comfort indicators for a given site.

## About the Scenario Tool

The Scenario Tool comprises four rigorously tested analytical modules integrated within a powerful online geospatial modelling environment:

- *Urban Development Module* (BETA Release May 2019). Users can define urban development scenarios for a given site.
- *Simple "Extreme Heat Day" Land Surface Temperature Module* (BETA Release May 2019). Users can assess the spatial distribution of "Extreme Heat Day" land surface temperature for a given site.
- *The Air-temperature Response to Green/Blue infrastructure Evaluation Tool (TARGET) Module* (BETA Release April 2020). Users can assess land surface temperature, air temperature and human thermal comfort for a given site.
- *Urban Water Cycle Module* (due for BETA release June 2020). Users can assess the stocks and flows of urban water streams (potable water, rainwater, stormwater, greywater and blackwater) for a given area based on user defined integrated water management strategies.

## About TARGET

Developed by Monash University, Arizona State University and Ghent University, TARGET uses a simplified set of modelling algorithms to minimise computational complexity required for scientifically robust time series of land surface temperature and air temperature for a specified urban context. TARGET harnesses inputs of land cover information and meteorological data for the location of interest.

| Use cases | |
|---|---|
| ✓ | Urban heat responses to different urban development and green/blue infrastructure scenarios |
| ✓ | Urban heat responses to converting surface types (e.g. converting hard surfaces to natural ones or unirrigated to irrigated surfaces). |

| Key features | |
|---|---|
| ✓ | Includes a base level of meteorological data for all of Australia |
| ✓ | Includes capacity to upload custom data sets for land cover and buildings |
| ✓ | Simulates real life scenarios at the street, precinct, or city scale |
| ✓ | Produces heat mapping outputs for the subject site area including a gridded map denoting the spatial variation of the average air temperature illustrated using a colour gradient |
| ✓ | Models street level air temperature (˚C) at fine spatial scales |
| ✓ | Supported by step-by-step user guide and tutorials |




Australian Government
Department of Industry, Science, Energy and Resources
Business Cooperative Research Centres Program

## Release information

The TARGET module was launched on 29 April 2020 and is integrated into the updated BETA Scenario Tool.

REQUEST ACCESS

## User training

The CRCWSC regularly offers training on the different modules of the Scenario Tool. All past trainings are uploaded to TAP 4 website.

TRAINING ON TARGET

## User feedback

We invite industry feedback on the functionality and usefulness of the Scenario Tool and modules, particularly applications of TARGET, and how the results helped in planning, decision-making and business case development. To provide feedback, please submit an enquiry form.

SUBMIT AN ENQUIRY FORM

## CASE STUDY – TEST APPLICATION

The CRCWSC applied TARGET to estimate the economic benefits of urban heat island mitigation due to greening. Using a test site on Melbourne's outskirts, we developed four scenarios, which specified requirements for urban form and green infrastructure. The scenarios represented different levels of WSUD intensity, with associated levels of vegetation, perviousness and water availability that ultimately affect the surface energy balance and drive the near-surface climate.

We used the tool to simulate trees and residential properties according to these scenarios. TARGET simulated air temperature from a standard height of 2 m (from the surface) with a resolution of 30 m for three types of summer conditions (cool, mild, and hot). TARGET also provided the UTCI (Universal Thermal Climate Index) outputs to measure thermal comfort. Using this data, we produced daily average minimum (overnight) and maximum (midday) temperatures for each type of summer climate for each scenario.

Under the maximum WSUD scenario, the WSUD technologies appear to be effective at mitigating heat impacts during moderate conditions and across the hot days making up the bulk of the summer, but like most strategies, it is not as effective on the extreme days.

For further details on the scenario development and TARGET modelling work for this application, see the Biophysical Aspects Report. To find out about the economic value generated by these WSUD interventions in this case study, see the associated Economic Analysis Report.

## CASE STUDY – TEST APPLICATION

The CRCWSC applied TARGET to evaluate the biophysical impact of an urban greening strategy for an urban streetscape in Dubbo.

A GIS-based grid was created, with land surface and air temperature assigned to each cell. The contrasting grid-base maps can be seen in Figure 1 & 2 below, with the future tree canopies providing significant cooling in the context of the road reserve and surrounding landscape. The results helped the investors to better understand the urban heat island effect benefits of a proposed tree planting program.

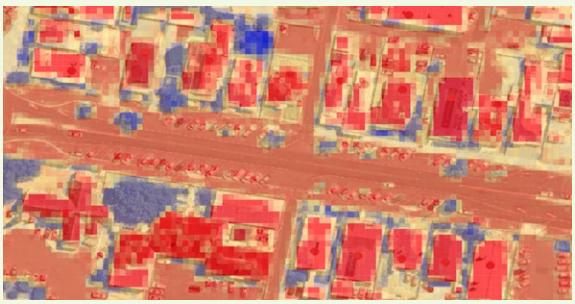


Figure 1. Bultje St – land surface temperatures before tree planting

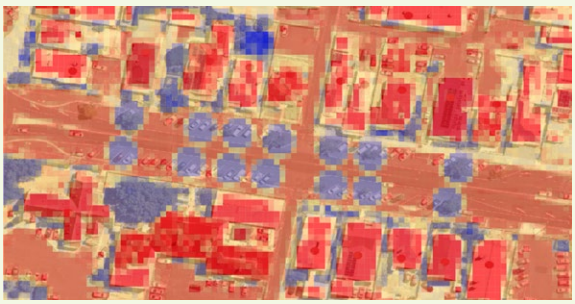

Figure 2. Bultje St – land surface temperatures after tree planting

## Further information

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https://watersensitivecities.org.au
/solutions/water-sensitive-cities-scenario-tool/

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