senzemo

Smart City
Solutions

Empowering society with cutting-edge IoT solutions for a resource-efficient and sustainable world.

Senzemo mission

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Smart park irrigation in Sydney, Australia

With the introduction of AI-controlled watering the park authority **saves about 5 million AUD** each year on irrigation.

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Climate sensors guide citizens to cooler spots and **assist urban planners** in designing better green spaces.

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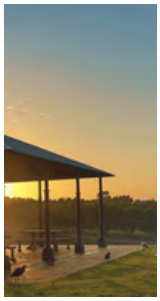
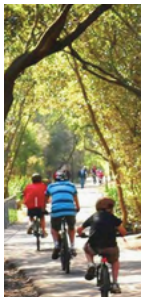
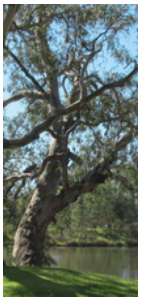
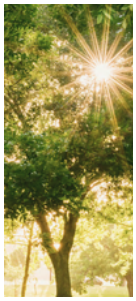
Sydney Olympic Park Irrigation

SMART PARK IRRIGATION IN SYDNEY, AUSTRALIA

20% SAVED ON IRRIGATION BILLS!

One of the largest irrigation systems in Australia

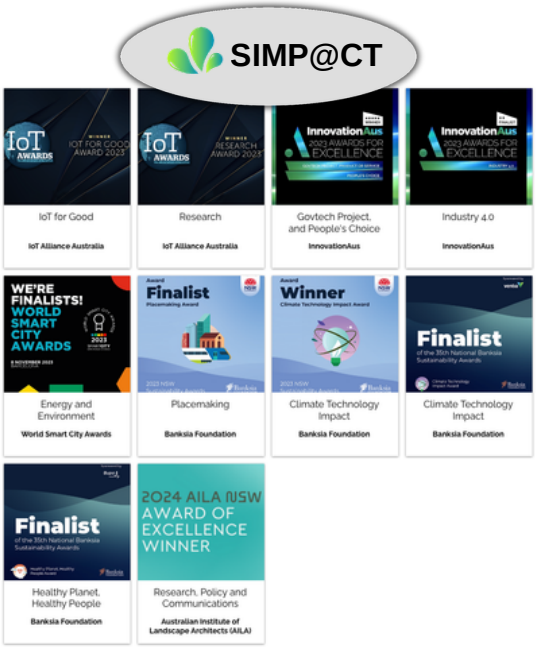
Bicentennial Park at Sydney's Olympic Park, a suburb of the city, has some unique urban heat and irrigation challenges. Spreading over 42 hectares, it's actually got one of the largest irrigation systems in Australia, but because its land is spread on an uncapped landfill, the soil is really thin so the plants are quite susceptible to drought. With heat waves of up to 50°C becoming more common, and irrigation getting more costly, the use of cutting-edge science is needed in order to monitor water use and temperatures, allowing Sydney Olympic Park Authority to optimize its water management and irrigation system.

The project

The climate is getting hotter.
Authorities need to find ways to cool cities down that are practical and that are actually efficient. Called the Park Cool Island Effect, the Sydney Olympic Park Authority (SOPA) is trying to maximize the effect by optimally hydrating every plant throughout the whole park.

The project is called SIMPaCT, which stands for Smart Irrigation Management for Cool Parks and Towns. This project is making the irrigation system more effective and modifying irrigation to give the greatest cooling. Deployed in the park, is a network of cost-efficient smart city sensors measuring meteorological variables like wind, rain, and sunlight so that the authorities can understand how the built environment and plants and different kinds of management approaches alter urban heat on a really fine scale at the scale that people live and work and play.



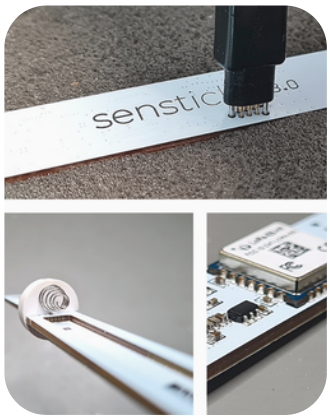
This project puts forward the knowledge and expertise of Smart City technologies that Professor Sebastian Pfautsch from the Institute for Sustainable Futures at Western Sydney University advised during his research on heat and its control around the Sydney area.

IT MADE SENSE TO TURN TO SMART TECHNOLOGY AND SENSOR TECHNOLOGY TO SEE IF THERE COULD BE IMPROVED WAYS OF RUNNING THE IRRIGATION SYSTEM.

42 hectares
Subtropical vegetation
Largest irrigation system

Bicentennial Park has some unique challenges with urban heat and irrigation. It has one of Australia's largest irrigation systems, but because it's on capped landfills, the soil is really thin, so the plants are susceptible to drought.

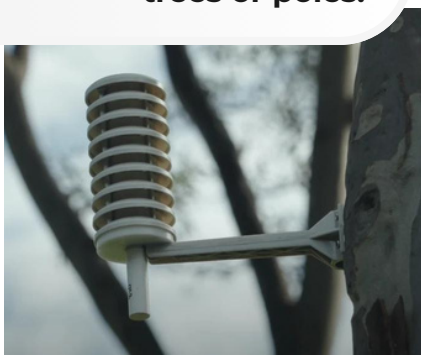
Wireless measurements in the ground and in the air



The project involved the deployment of a network of more than 200 Senstick (SSM30) soil sensors and 50 Senstick (SMC30) microclimate sensors to record soil moisture, air temperature, and humidity.

Microclimate Sensors were placed on trees or poles, 3 meters off the ground, while Soil Moisture Sensors were dug 15 cm into the ground. They were put into PVC casing and despite them being underground the transmission of data is sent through LoRaWAN connectivity every 15 minutes.

50 Microclimate Sensors were placed on trees or poles.



Senstick
Soil Moisture
SSM40

- Up to **10 years of** operational **life**
- Suitable for **harsh environments**
- Measures **soil moisture**

Customizable Settings

IP68 Water & Dust Resistant Rating

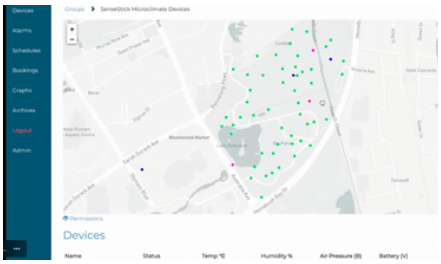
Easy Installation Integration

NFC or OTA Reconfigurable

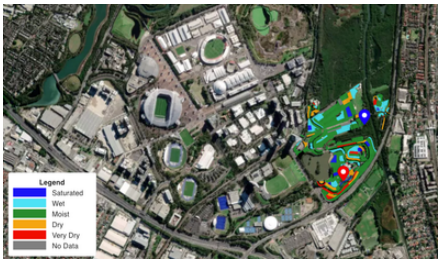
200 Soil Moisture Sensors were dug 15 cm into the ground. They were put into PVC casing and still the transmission of data went smoothly.

Dashboard control

In order to understand the current state of the park and then build a solution to apply the appropriate mitigation measures, various, disparate data sets are required to be interrogated together. This, along with assembling bespoke workflows and building fit-for-purpose machine learning models, the project required all of these components to be accessible in one platform in order to build the desired solution.



Together with weather forecasts, the microclimate data captured is used to fine-tune the park's active cooling management. This can make a substantial contribution to reducing urban heat and ensuring residents about the safety in accessing the outdoors.



AI Management of Water Pumps

Irrigation in Bicentennial Park can only occur at certain times of the day. Irrigation window is in place through the night, to avoid wetting park visitors and to ensure infiltration of water into the soil. The fixed irrigation infrastructure in Bicentennial Park is a large network of pipes connected to a pump room.

Water supply for irrigation during standard operation of the system is recycled, sourced from the 'brick pit' reservoir 1.3 km to the north. The reticulated pipe network is divided into five areas, each defined by a 'console' (a pumping booster station for maintaining water pressure).

Each console comprises 30 to 60 'stations', with a total of 200 stations in the park. A station is an operational area defined by a relatively uniform vegetation type, soil type, slope, and aspect.

WESTERN SYDNEY UNIVERSITY

Sebastian Pfautsch

Professor of Urban Management and Planning
at Western Sydney University

For the first time, AI will be able to control when and how much water is distributed across an entire park to cool its microclimate.

Each station contains a series of sprinkler heads connected to a 'solenoid' (a controllable open/close valve), with all solenoids connected back to a console. A station can be managed based on the specific needs of the soil and plants within it. The irrigation infrastructure is controlled through wired communication between each solenoid and the Irrinet local control system.

Optimal irrigation scheduling is based on advanced analytics modeling. Commands are issued to the irrigation management platform in the form of scaling factors (expressed as a %) which indicate required changes to the existing irrigation schedule.

This project uses only recycled water and represents a large-scale prototype of how smart water management can ease the pressure on our most valuable natural resource.

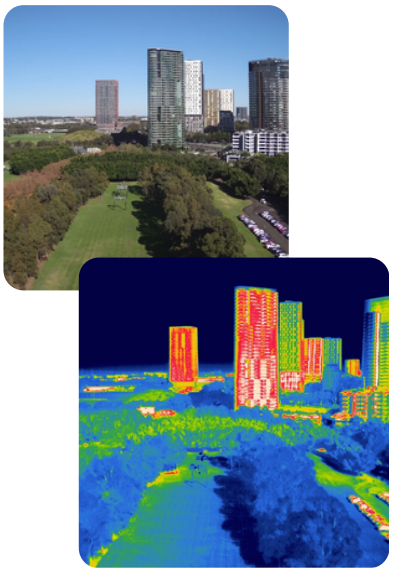
One of the main sponsors of SIMPaCT is Sydney Water, who came on board with a specific request that the project can be upscaled or downscaled inside the AI module for any irrigation system.

SIMPACT MANAGES THE IRRIGATION SCHEDULE BASED ON SOIL MOISTURE LEVELS, VEGETATION/LANDSCAPE, AND WEATHER FORECASTING.

Urban Heat Island Mitigation

The Urban Heat Island Effect doesn't just make things uncomfortable; it leaves communities living in urban centres exposed to health risks and at higher risk of dying, reduces work hours and can have detrimental impacts on urban flora and fauna. It also drives up power use and increases the carbon intensity of our cities and towns – exacerbating the root cause of increasing urban heat.

The absorption, storage, and radiation of heat by grey infrastructure leads to urban warming. Plants and water bodies help cooling our cities. Increasing the area in cities covered by parks, forests and gardens is the most effective way to tackle the issue of the Urban Heat Island (UHI) effect and urban overheating.



PARK VISITORS ARE ALSO BE ABLE TO CHECK ON THEIR MOBILE PHONES WHERE THE COOLEST SPOT FOR A PICNIC IS OR WHERE THEY SHOULD EXERCISE.

Multiple award winning IoT research project

SIMPaCT stands as Australia's largest project focused on smart green infrastructure and represents a significant stride in advancing heat-responsive urban design. It is an incredible example of cutting-edge technology being used to improve sustainability. As a result of this, it's won several awards focused on sustainability.

These include winning the Climate Technology Impact category in the Banksia Foundation NSW Sustainability awards, the Research and also the IoT For Good categories at the IOTAA Awards, the Gov Tech and People's Choice Awards at InnovationAUS, and being a finalist in the World Smart City Awards 2023 in the Energy and Environment category.

The IoT Impact Awards are the most high-profile awards in the Australian IoT sector. The project won two of them in the 'IoT for Good' category.

It has garnered widespread national recognition, which will hopefully translate into ongoing support for this exciting and innovative project.

See Video:

SIMPaCT Project

IRRIGATION IS NOW MUCH CHEAPER.

WITH THE INTRODUCTION OF AI-CONTROLLED WATERING THE PARK AUTHORITY SAVES ABOUT 5 MILLION AUD EACH YEAR ON IRRIGATION!

THIS PROJECT CAN BE TAKEN INTO OTHER ENVIRONMENTS WHERE THE COMPLEXITY IS LOWER.

How it started	How it ended
Costly irrigation	20% decrease in irrigation costs
Dangerous heat waves	4°C reduction in temperature
Public needs info about safe areas	Possibility to expand safe zones

Coburg Microclimate Monitoring

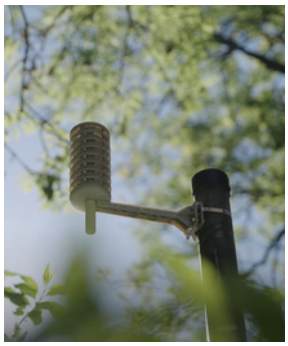
URBAN THERMAL COMFORT, SMART CITIES

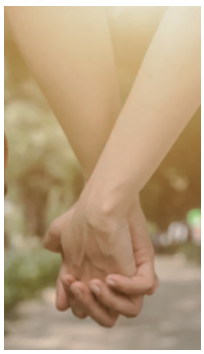
CLIMATE CHANGE MANAGEMENT!

Combating City Heat

Given the accelerated climate change, the placement of microclimate sensors in urban areas is becoming increasingly important. With rising temperatures and more frequent heatwaves, these sensors provide critical real-time data to guide citizens to cooler zones and enhance public safety. They help mitigate the increasing heat threats in cities. Urban planners can use this information to make informed decisions about green spaces and infrastructure, ensuring cities adapt to changing climatic conditions. The integration of IoT technology for monitoring microclimatic conditions makes cities more resilient, livable, and sustainable.

This proactive approach protects citizens and promotes climate-resilient urban environments.





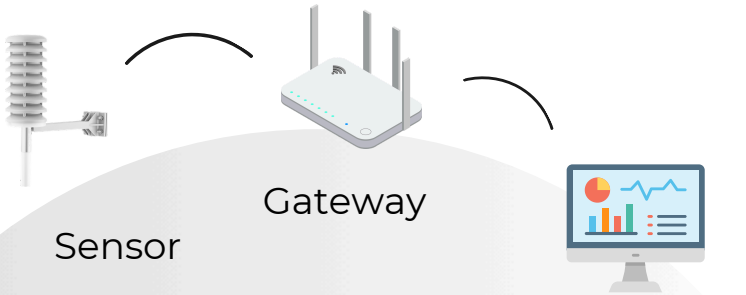
Technology behind

The sensors are of high quality and are distinguished not only by their design but also by the fact that they are manufactured and assembled in the European Union (Slovenia). They are made from premium materials, making them significantly more reliable and accurate.

They are designed for durability, and apart from the batteries, the sensors can last for decades. On LoRaWAN, they can operate up to 50 km from the gateway and are easy to install, providing a high-quality experience for both integrators and end customers.

Senstick
Microclimate
SMC30 with Shield

- Up to **10 years of** operational **life**
- Suitable for **harsh environments**
- Measures **temperature, humidity**, and **air pressure**



LoRa™

OR
Platform of
your choice

DATACAKE

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ThingsBoard

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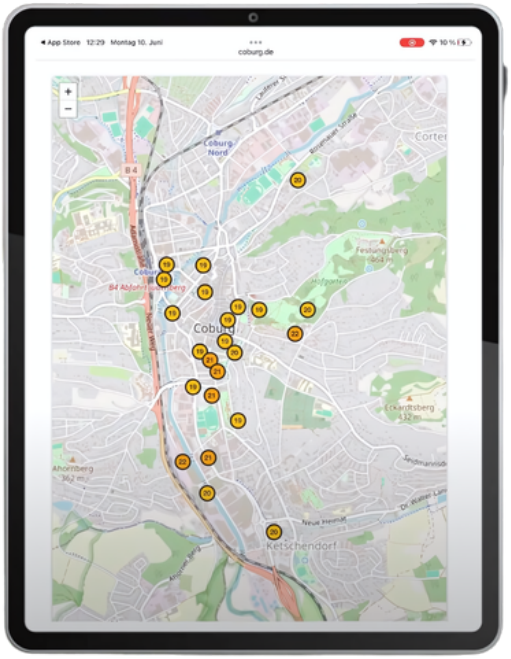


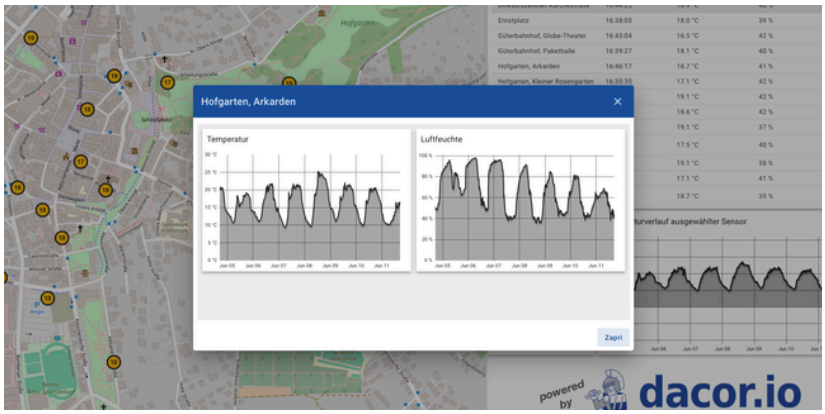
Live-Data on Dashboard

The live microclimate data is available at any time on the City of Coburg's website for all devices. The dashboard displays each sensor and the measurements for current and past data. This allows citizens or city employees to view the data whenever needed.

Currently, 25 locations are already active, and the network will be expanded to cover the entire city area (including districts) in the coming weeks and months. A total of nearly 50 measuring stations will initially be established.

You can find data on Temperature and Humidity on the Coburg Climate page at the following link:

https://www.coburg.de/boersen/kuehle-orte-in-coburg/Klima-in-Coburg.php



See Video:

Coburg Microclimate Management

SENSORS PROVIDE INSIGHTS

TO HELP CITIZENS FIND A COOL SPOT IN THE SUMMER, THE CITY OF COBURG HAS INSTALLED CLIMATE SENSORS AT SELECTED LOCATIONS THROUGHOUT THE CITY.

Stefan Fey

Department of Digitalization, City of Coburg

*It is about **generating value in urban planning**, identifying hotspots, such as areas that become extremely hot in the summer, and determining where improvements can be made in the future.*

42,000 inhabitants
50 microclimate sensors
42.5 hectares, Coburg city center

Andreas Kücker

Digital Manager at süc//dacor GmbH

Solutions like these with LoRaWAN connectivity are a cost-effective way to make cities smart.

CITIES REDUCE RISKS

GUIDING CITIZENS TO A SAFE LIVING ENVIRONMENT AND ENABLE URBAN PLANNERS TO BETTER DESIGN GREEN SPACES.

How it began

Dangerous heat hazards

No data available

No network

Unoptimized green spaces

How it ended

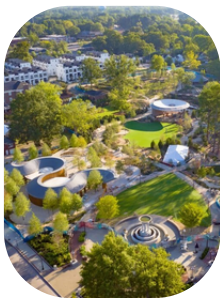
Public safety on hot days

Guidance to cooler zones

Information for urban planning

Possibility to expand the sensor network

Other Examples



Smart Park
Town of Cary, USA

Downtown Cary Park installed 30 x SMC30 temperature sensors that provide insights into how the various parts of the park feel at different times of day, in all seasons, and in various weather conditions, which can be used to make future decisions about the evolution of the park's features.

Pilot Site
Leuven, Belgium

Pilot area for VARCITIES is a former hospital site in the medieval centre of the city Sensors measure local climatic conditions, with various climate parameters such as air quality, air humidity, temperature and amount of precipitation.

Heat Control
Parramatta, Australia

The city of Parramatta measures microclimate data, so that they can control the evaporation cooling devices and turn them on based on the actual air temperature and humidity.

Other Products for Smart Cities

SRM10

Senstick Rain Meter

- Measures rainfall
- Stormwater management

STP40

Senstick Temperature Probe

- Measures temperature
- Road, Railroad Management

Smart City Deployments

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Europe:

BERLIN

STADT COBURG

leuven

Skellefteå kommun

Il-Gżira

CITTÀ DI CASTELFRANCO EMILIA

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NOVO MESTO

Mestna občina Ljubljana

VARCITIES

Elsewhere:

CITY OF SYDNEY

Town of Cary North Carolina

CITY OF PARRAMATTA

Our partners

Have questions about how your city can become smart?

Ask me.

BLAŽ KASTELIC,
SMART CITY IOT PROJECT MANAGER

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