Local Climate Management Through Urban Heat Mapping

NSW, Australia

Climate Change Response
Providing Sustainable Solutions

CASE STUDY – Urban Heat Mapping

Background

This historic city in New South Wales, Australia, lies northwest of Sydney. As one of the oldest inland settlements in the country, it currently boasts a population of 44,112 residents. The city's strong local economy, proximity to Sydney, and affordable living costs contribute to its status as a rapidly growing area, with projections estimating a population of 56,560 by 2041. Celebrated for its vibrant and diverse community, this city provides an ideal setting for living, working, and raising a family.

Aim

- Collect temperature data from various urban zones as a starting point for the implementation of effective smart city cooling strategies. Assess local climate conditions to understand urban heat islands and their impact on the city's environment and residents.
- Gather temperature data from various urban zones to initiate efficient smart city cooling strategies.
- Provide necessary hardware, connectivity solutions, and set up a real-time monitoring dashboard to support cooling strategies.
- Ensure scalability in connectivity, monitoring, data analytics, and automation for sustainable and adaptable smart city solutions.

Challenge

- No data on temperature across different city zones
- No climate regulatory policies
- Agility and Scalability

Solution

CCR Zhaga Based NEMA Sensor

Network

LoRaWAN

Climate Change Response

100 Sites	**5** LoRaWAN Gateways
220 V Powered	**150** Parameters types

The Smart Sensor Approach

The project's core objectives were to monitor temperatures in different city areas and provide accurate information for developing and implementing city cooling strategies. This aimed to enhance efficiency, lower utility expenses, reduce emissions, and implement smart city cooling strategies.

1. The project deployed 100 Zhaga-based NEMA sensors strategically across the city to monitor real-time temperatures. These sensors, integrated with existing streetlamps and powered by a 220V supply, ensure continuous operation without reliance on batteries. The network is supported by five scheduled LoRaWAN-based gateways.

2. The project's dashboard provides real-time access to temperature data collected by the sensors. This information is crucial for evaluating temperature differentials across city areas, enabling data-driven decisions in the formulation and execution of smart city cooling strategies.
3. The implementation of this system has catalyzed a burgeoning Smart City initiative marked by enhanced data transparency and immediate operational benefits. Beyond temperature monitoring, the system supports comprehensive environmental and asset management. Future expansion opportunities include environmental control, smart street solutions, video analytics, and facilitating precise city planning and responsive decision-making processes.
This integrated approach underscores the project's contribution to efficiency gains, reduced utility costs, emissions mitigation, and the advancement of smart city cooling strategies.

Result Delivered

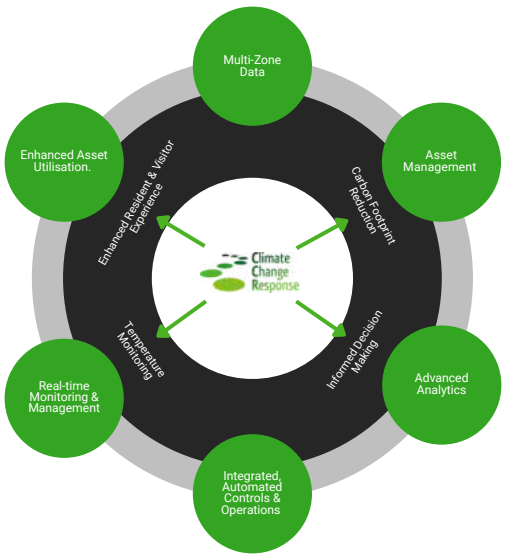
Reduced complexity, increased visibility. Automated Controls & Operations integrated in a centralised application & dashboard.

Savings

> AU $5,000,000 over 10yrs*

Scope for Expansion

- Comprehensive data analysis across a range of parameters.
- Monitoring and recording the mobility of citizens.
- Managing parks, open spaces, and irrigation systems.
- Efficient traffic control.
- Progressing towards a Net Zero Infrastructure through DER integration.
- Evaluating natural ecosystems and monitoring air quality.
- Leveraging Artificial Intelligence and Machine Learning for data analysis and valuable insights.



Success Criteria

- Achieved in advance of the established timeline.
- Expertly integrated a comprehensive system featuring monitoring, control, and analytical technologies.
- Delivered substantial value in accordance with the project's prescribed objectives.

*** Figures based on opportunities identified & captured to date**

Carbon: Decarbonising Council Operations

Merely tracking emissions isn't enough to address decarbonization. CCR incorporates Industry 4.0 technologies into a versatile platform, providing actionable insights to reach Net Zero.

IoT | AI | ML | Big Data Analytics | Edge- & Cloud Computing

- Tracked 45,000+ tCO2e emissions in 10 years.
- AI and ML identify carbon hotspots in real-time.
- Accurate Carbon Budget for Net Zero targets.
- Automated quarterly emissions reports for sustainability.