A Smart Grid Project

Perth, Western Australia

Climate Change Response
Providing Sustainable Solutions

CASE STUDY – City Smart Grid

Introduction

A suburban area in Perth, Western Australia, is home to over 90,000 people and ranks among the region's fastest-growing communities. It features a blend of retail and business districts set within a beautiful natural landscape. Serving as a major economic hub in southeastern Perth, the area is committed to sustainability, community engagement, thoughtful planning, and a wide range of services.

Aim

- Providing essential hardware, connectivity, and an analytical foundation.
- Ensuring scalability for connectivity, monitoring, analytics, and automation.
- Initial focus on enhancing the energy efficiency of the city's assets and public areas.
- Delivering insights into the city's Scope 1,2 and 3 emissions.
- Future expansion into real-time water and environmental monitoring, asset health tracking, space optimization, remote control, and automation.
- The analytical layer delivers valuable insights to the city, incorporating advanced analytics, tailored reporting, automated billing, Artificial Intelligence, and seamless integration with third-party applications as needed.

Challenge

- Stronger monitoring, reporting and verification system
- Community engagement
- Partnership establishment
- Agility and Scalability

Solution

CCR Smart Grid

Network

Modbus, Bacnet, 4GLte, LoRa, LoRaWAN, Ble

Climate Change Response

420kW Distributed Renewable Energy System	**15** Sites
210 Meters	**150** Parameters types

The City Smart Grid

The project's objectives were to enhance efficiency, lower utility expenses, reduce emissions, optimize renewable energy production, and provide an educational platform for the local community.

1. Eleven representative sites were strategically chosen across the city, featuring a network of 100 electrical meters and sub-meters (approximately 70 meters). These meters deliver real-time data on 30 parameters per minute, including 10 power quality indicators. Additionally, a LoRa network was employed to incorporate water metering and various sensors, enriching facility monitoring.
2. Local government facilities serve as central hubs for engaging the community in discussions about Smart City initiatives. The system ensures seamless data and analytics display through web-based platforms and on-site screens, in compliance with ISO monitoring standards.

3. CCR's system has ignited a burgeoning Smart City movement, driven by enhanced data transparency and immediate benefits. Beyond utility management, the infrastructure now extends to various data points, simplifying environmental and asset management. Future expansion possibilities include services like waste management, parking, and lighting controls. Community engagement is on the rise, enabling precise planning, prediction, and responsive decision-making for the city.

Results Delivered

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

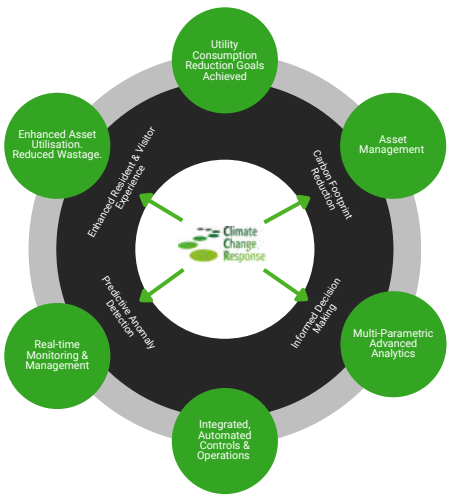
Savings

> AU $3,000,000 over 10yrs*

Scope for Expansion

Anticipated throughout 2025

- In-depth analysis of data across various parameters.
- Counting and tracking people's movements.
- Observing and managing atmosphere, lighting, and temperature.
- Overseeing parks, open spaces, including irrigation and pumping systems.
- Advancing towards a Net Zero Infrastructure with further DER integration.
- Analyzing natural ecosystems, such as lakes, and monitoring air quality.
- Utilizing Artificial Intelligence and Machine Learning for data analysis and insights.



Success Criteria

- Achieved ahead of schedule.
- Successfully integrated a comprehensive system with smart monitoring, control, and analytics technology.
- Delivered value in alignment with project objectives.

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

Smart Grid for a Smarter City

The City through CCR is preparing for a Smart City future by implementing an end-to-end Smart Grid system. This system goes beyond traditional utilities like power and water to wirelessly monitor connect- ed meters and sensors, enabling data analytics and AI-driven modeling. It seamlessly integrates data from various sources, including indoor and outdoor conditions, people counting, solar irradiation, air quality, and lighting levels. By correlating this diverse data, it provides targeted insights to achieve specific Smart City Goals. This Smart Grid system streamlines data collection for analytics, offering correlation models, alarms, automation, and reporting to greatly enhance management and decision-making processes.

- Fighting scope 3 emissions
- Support COP 21 Climate Action initiatives
- Manage utilities efficiently
- Efficiently integrate renewables into existing networks
- Facilitate green energy financing compliance
- Reduce Carbon Emissions
- Align with the United Nations 7 Sustainable Development Goals
- Comply with Smart City initiatives

Integrating through Agility – A Scalable City Grid

An end-to-end and dynamic Smart Grid system goes beyond mere data collection and dashboard display. It harnesses the power of Big Data analytics in tandem with advanced Artificial Intelligence and Machine Learning capabilities. These Big Data models proactively initiate preventive measures, rather than reactive responses. A Smart Grid system stands as a pivotal driver in the ongoing journey towards a Smart City.

The City aimed to better manage energy and water use, leading to improved planning and smarter decisions. By detecting issues, monitoring emissions, and reporting in real-time, they saved costs and moved closer to a Net Zero goal.

Within the CCR Ecosystem, we employ cutting-edge edge computing and multi-protocol connectivity to seamlessly integrate data from a wide array of sensors, meters, and hardware—beyond the scope of just utilities. This stands in stark contrast to traditional, siloed technology applications that yield limited data diversi ty and introduce operational constraints.

Indeed, integration serves as the linchpin in involving our communities in the exciting journey towards a Smart City future.

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.