EcoStruxure™
Innovation At Every Level

INNOVATION

Microgrid solution provides energy reliability and cost savings

South Australian Produce Market Ltd – Pooraka, South Australia

How EcoStruxure™ is enabling a world-leading, environmentally-friendly and cost-effective microgrid at SA Produce Market.

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Overview

With over 250,000 tonnes of fresh produce traded every year, the South Australian Produce Market Limited (SAPML) is South Australia's primary produce wholesale market. Forty-five wholesalers, 60 growers and hundreds of retail operators come together at the market spanning 20 hectares, with transactions valued at around $550 million each year.

Key to their productivity is a reliable and efficient electrical network. Previously, the market's electricity had been externally supplied, leaving the operators with little control of their own requirements. Now, in an innovative solution not seen on this scale in South Australia, the market has installed a microgrid featuring 6,412 solar panels, 25 Tesla Powerpack batteries and solar PV inverters. The solution provides autonomy to the SAPM and is expected to cut power bills by $4.3M over the next 10 years.

A microgrid is a local electrical distribution system with controlled loads and distributed energy resources, operating in parallel with the grid, off-grid or in an islanded mode. When a microgrid is operated in a coordinated system, it increases reliability in the case of a power outage and can be integrated with cost-effective renewable energy sources energy sources. Site energy consumption and demand can also be managed.

The Challenge

At the end of 2016, a state-wide power failure in South Australia brought businesses, workplaces and homes to a standstill. Many people were adversely affected at both practical and financial levels, and at SAPML the result was $2.5 million in lost produce.

A decision was made to bring power production onto the SAPML site so that if this scenario occurred again, they would remain in control of their own electricity supply.

The majority of power usage at SAPML is from refrigeration and air conditioning units, which together are a significant draw of power. Rather than contracting electricity, as most individuals and businesses do, SAPML is exposed to the National Electricity Market (NEM). AEMO decides which generators will be deployed to produce energy for the National Energy Market (NEM) so that energy demand can be met in the most cost-effective way.

Goal

Provide energy reliability and significantly reduce energy bills for South Australia's largest primary produce market.

Story

SAPML required a microgrid solution which would put them directly in control of their energy generation and costs.

Solution

An advanced microgrid of unprecedented scale with EcoStruxure Microgrid Advisor, PowerSCADA Operation, Power Monitoring Expert, Modicon PLCs, protection relays, power meters, circuit breakers, switchgear and kiosks.

Results

The microgrid solution will:

- Lower energy costs by $4.3M over 10 years
- Improve energy reliability and security
- Reduce annual greenhouse gas emissions by 30%

Electricity production is matched to electricity consumption, and spare generating capacity is always kept in reserve in case it's needed. Prices are calculated in 5-minute slots, and charged at 30-minute intervals. While this results in lower energy prices overall, it also exposes customers to large spikes when demand is very high.

SAPML wanted a solution that would allow them to be both on-grid and off-grid – switching power sources for the most cost-effective option, as well as ensuring reliability. They also needed a solution that would allow them to continue to charge their tenants on the power that they used. Both these objectives required intelligent metering and monitoring as well as an overarching control system that could ensure reliability while reducing costs.

Autonomous Energy was awarded the contract to build the microgrid and Schneider Electric EcoXperts, AZZO, were brought in to develop the operational strategy and controls.

The Solution

Autonomous Energy developed a microgrid solution for SAPML including 4.3MWh lithium-ion batteries, 2.5MW solar PV system and a 2.4MW on-site diesel generator, all connected electrically, with fiber optic cable and controlled by a custom designed smart control and switching system.

The control system utilizes both a Microgrid Control and SCADA system. Schneider Electric's EcoStruxure Power SCADA Operation and EcoStruxure Microgrid Advisor monitor and control the power supply system at the landlord's level. Remote and local monitoring capabilities allow the measuring, recording and outputting of the system performance and parameters. Inputs are collected from Schneider Electric M580 PLCs, Micrologic MTZ LV breakers, ION and Power Logic meters and Easergy P3 protection relays, all of which have enabled connectivity.

Data from these sources can be viewed and acted upon by operators individually, but Schneider Electric's EcoStruxure Microgrid Advisor software brings data sources together for a more effective and efficient solution.

Now embedded into the existing solution, EcoStruxure Microgrid Advisor is a predictive control system which uses real inputs to automatically forecast and optimize how and when to consume, produce and store energy. Relying on artificial intelligence (AI), the software applies multiple objectives and constraints, and then evaluates multiple scenarios before carrying out the best one. Past and actual data such as the immediate, daily and weekly solar power generation, weather information and current usage of power, are all fed into the system via the metering and monitoring solution.

In addition to this, EcoStruxure Microgrid Advisor draws input from the NEM, able to adjust power sources and generation to ensure the lowest prices are maintained and the system remains reliable.

Featuring a web-based user interface, the microgrid control system presents easy to understand real-time savings, earnings and CO2 emissions data. From an energy security perspective, the interface also permits the entire site to be automatically isolated from the microgrid system to supply the entire site's electrical load with no interruptions. Working with the existing on-site metering, Power Monitoring Expert also separates out billing so that SAPML can charge their tenants for the power usage at the site – at a rate which is much more competitive than through a traditional retailer. This has come to fruition after the first year, with the total electricity charged to tenants down 25% on the previous financial year, a saving of $434,000.

The Outcome

Completed in November 2019, the microgrid project at SAPML is having significant community and environmental benefits by cutting annual greenhouse gas emissions by 1,440 tonnes or 30% and reducing the maximum demand on the South Australian electricity grid.

The solution generated 3,273,579 kWh of solar power in its first year, and is projected to save $4.3M in energy costs over the next 10 years and allows SAPML to be completely self-sufficient in its energy supply. The $10.5M microgrid also received a $2.5M South Australian Government Energy Productivity Implementation grant.

This project will hedge against future electricity price increases and enable SAPML to avoid periods of high spot market pricing from the National Electricity Market.

"We want to ensure we can continue to provide affordable fresh produce on a local and global platform. This initiative means we can do it in an environmentally-friendly and cost-effective manner using an innovative solution," Chief Executive Officer of SAPML, Mr Angelo Demasi said.

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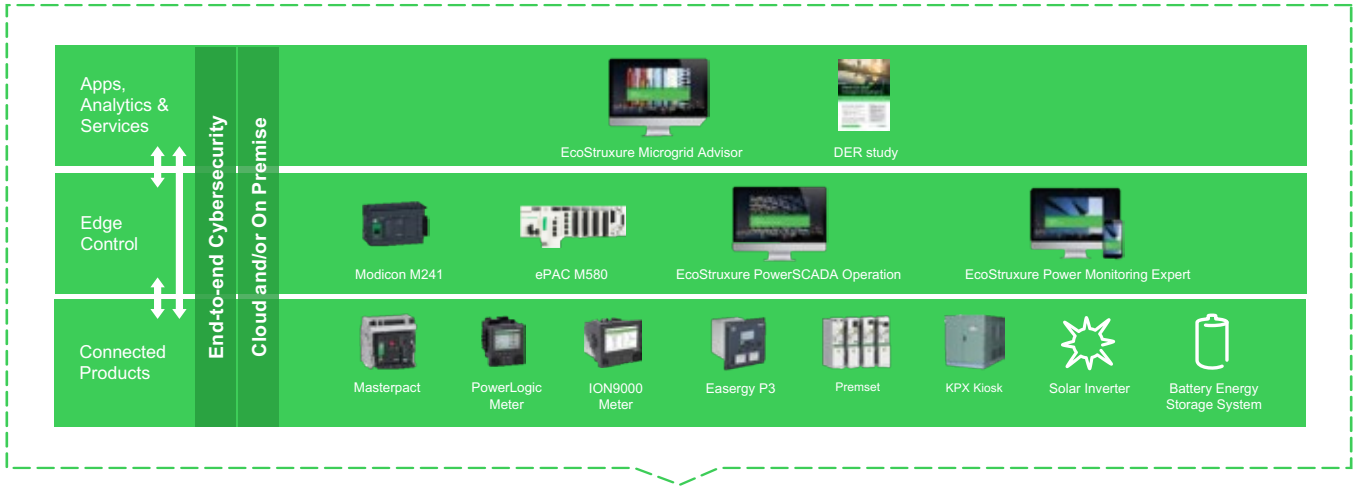
— Angelo Demasi, Chief Executive Officer SAPML

SA Produce Market
Ecostruxure™ Grid & Ecostruxure™ Power



Ecostruxure™
Architecture

EcoStruxure™
Innovation At Every Level

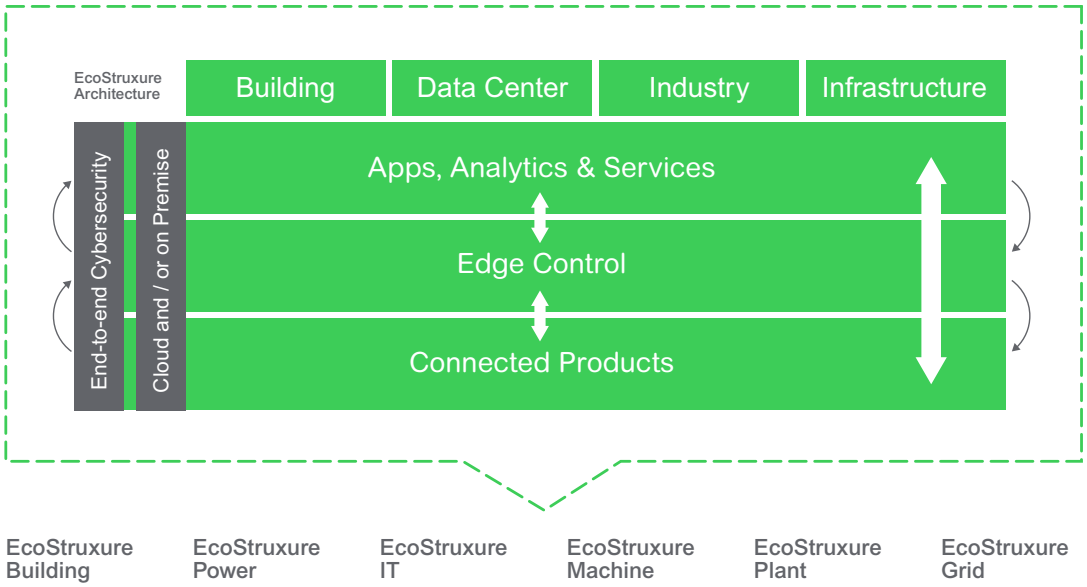
IoT-enabled solutions that drive operational and energy efficiency

EcoStruxure is Schneider Electric's open, interoperable, IoT-enabled system architecture and platform.

EcoStruxure delivers enhanced value around safety, reliability, efficiency, sustainability, and connectivity for our customers.

EcoStruxure leverages advancements in IoT, mobility, sensing, cloud, analytics, and cybersecurity to deliver Innovation at Every Level including Connected Products, Edge Control, and Apps, Analytics & Services. EcoStruxure™ has been deployed in 480,000+ sites, with the support of 20,000+ system integrators and developers, connecting over 1.6 million assets under management through 40+ digital services.

One EcoStruxure architecture, serving 4 End Markets with 6 Domains of Expertise



Connected Products

The Internet of Things starts with the best things. Our IoT-enabled best-in-class connected products include breakers, drives, UPSs, relays, sensors, and more. Devices with embedded intelligence drive better decision-making throughout operations.

Edge Control

Mission-critical scenarios can be unpredictable, so control of devices at the edge of the IoT network is a must. This essential capability provides real-time solutions that enable local control at the edge, protecting safety and uptime.

Apps, Analytics & Services

Interoperability is imperative to supporting the diverse hardware and systems in building, data center, industry, and grid environments. EcoStruxure enables a breadth of agnostic applications, analytics and services for seamless enterprise integration.

Find out more about EcoStruxure

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Schneider Electric (Australia) Pty. Ltd.
33-37 Port Wakefield Road,
Gepps Cross,
South Australia, 5094

se.com/au

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