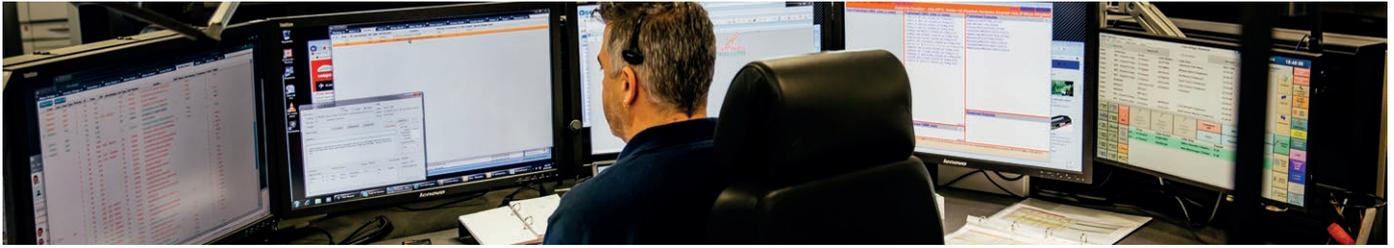


# RELIABLE

## Power through the storm

Keeping the electricity flowing no matter what the conditions

SA Power Networks depends on Schneider EcoStruxure™ Grid for reliable monitoring and management of their vast network, helping to keep the people of South Australia safe through extreme weather conditions.



## About SA Power Networks

SA Power Networks (SAPN) operates an electricity distribution network that stretches across the vast state of South Australia, comprising thousands of kilometers of powerlines and hundreds of substations.

### The challenge

SAPN operates in a highly weather-dependent environment, with challenges ranging from bushfires to storms. In doing-so they face many challenges:

**Power outages:** when a power outage occurs, finding the source can be a challenge at any time. In the extremely rural South Australian countryside, the reality of isolating the problem along hundreds of kilometers of line is formidable due to lack of full SCADA coverage and the distances to travel.

**Load flow:** the electrical landscape of South Australia is transforming in the wake of emerging technologies, creating new challenges for SAPN in terms of load flow. Customers would periodically experience loss of supply to their properties due to network outages. Such outages often continued for extended periods until the faults could be pinpointed and an alternative supply provided. This affected residential buildings as well as critical facilities and major customers such as hospitals, universities, shopping centers, factories, and airports.

**Safety issues:** South Australia is a high-risk state for bushfires because of the hot and dry climate, particularly during summer where the state is prone to heat waves. Faults on overhead lines may cause bushfires because they are considered a fire hazard, and thus must be identified, disconnected and isolated as quickly as possible. Given a large proportion of the network is via overhead conductors, during storm events this may lead to conductors being broken and falling to the ground which poses a public safety risk. It is vital that these situations are identified, and the faulted section isolated as soon as possible to lessen the possibility of harm to the public.

## Goal

Schneider Electric's goal was to create a robust power network that would improve monitoring and control; enhancing confidence in supply continuity during extreme weather events.

## Challenge

SAPN provides continuous residential and critical electricity supply to 1.7 million people across a vast region in South Australia. Geographically the state regularly faces extreme weather events from powerful Southern Ocean storms to desert heatwaves and lightning generated bushfires. The kind of conditions that create exceptional challenges for continuity of power supply.

## Solution

The installation of a new Advanced Distribution Management System (ADMS) system, together with Grid Automation Equipment and Pole-Mounted Switchgear, provides a holistic, 'smart utilities' solution, unique to Schneider Electric.

## Results

SA Power Networks is now able to use data like never before, gaining a spectacular improvement in network visibility for greater efficiency, while ensuring continuity of supply, safety of staff, and plant safety.



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## Facing the storm

Ensuring electrical supply in one of the world's harshest environments was never going to be easy. The power of nature can sometimes defeat even the most robust electrical engineering. This was the situation facing SAPN. They needed a partner to engineer a system that could handle these conditions and actively provide workaround solutions when outages were experienced.

According to SAPN Network Control Manager, Tasnim Abdel-Razaq, "We basically have two peak seasons, one is the summer season, which is when bushfire events creep up.

*The other component is around autumn. So that's storm events, lightning, rain, and wind activity. We have a lot of transient faults, which are basically due to vegetation or animals.*

*We have hundreds of kilometers of line, and over 1.7 million customers. So, when we do dispatch a crew they can spend hours travelling to the location and patrolling the lines."*

## Our smart solution

While not unique, SAPN's challenge was significant and required a highly capable grid management system that provided real time monitoring, pinpoint accuracy, and a high degree of automation.

We began discussions with SAPN on an ADMS solution back in 2011/12. It was developed as a two-stage project, with stage one involving like-for-like replacement of the infrastructure; and stage two involving the software implementation.

The installation of an advanced network management system, together with grid automation equipment and pole-mounted switchgear, provides a holistic 'smart utilities' solution, unique to Schneider Electric.



## Key objectives

- One of the world's most automated power management systems
- Ability to pinpoint power outages during extreme weather events
- Capability to reroute power to automatically restore power instantly
- Greater network reliability
- Improved operational efficiency
- Reduced operations costs
- Increased safety
- Enhanced security
- Support for regulatory compliance
- Better asset utilization
- Standards-based integration

## Greater levels of visibility

Our approach would give SAPN greater levels of visibility over their whole network, and considerably more automated control using our best-in-class suite of products, including industry-leading EcoStruxure™ ADMS, medium voltage switchgear and decentralized feeder automation systems. Our solution tackled the challenge from three integrated systems:

# 5th

largest distributor in Australia

# 743,918

residential connections

# 99,203

business connections

# 1%

average yearly growth

# 76,774

kilometers overhead lines

### Advanced Distribution Management System – ADMS

- Advanced monitoring, analysis, control, optimization, planning and training functions
- Integrated, secure system combining the industry’s most feature-rich distribution management system (DMS), an electrical distribution SCADA system and an outage management system (OMS)
- Self-healing (FLISR), Volt/VAR optimisation and more than 50 other advanced functions

### Pad-Mount Smart Pre-Fabricated Substation

- Underground feeder protection and automation
- Remote and local control of ring main unit
- Advanced fault passage indication
- Automatic sectionalising
- Metering

### Pole-Mount Smart Switchgear

- Overhead feeder protection
- Remote and local control of overhead feeder switchgear
- Automatic sectionalising
- Advanced fault passage indication
- Metering

### Efficiency through data analysis

With this, SAPN will be able to use data like never before, gaining a considerable improvement in network visibility for greater efficiency, while ensuring continuity of supply, safety of staff, and plant safety.

### Key products



### EcoStruxure™ ADMS

EcoStruxure ADMS (Advanced Distribution Management System) – a unified DMS, SCADA, OMS, and EMS solution

16,952

kilometers underground cables

25,923

MVA transformer capacity

74,679

transformers



EcoStruxure™ Architecture



## RMS

Medium Voltage Compact Switchboard  
(Ring Main Unit) up to 24kV



## MiCOM

Compact and modular substation and  
bay controller

### Performance requirements

- Very reliable fault passage indication, with strict performance requirements (protection-grade equipment and CT's)
- Precise fault type identification
- Additional discrimination points (i.e. switching points) for accurate fault isolation
- Limited fault re-energisation
- Consistent approach for underground, overhead and hybrid distribution systems

### Secondary requirement

- Remote engineering over secure communications



### One centralized source of truth

Our EcoStruxure ADMS and the feeder automation scheme would give SAPN better visibility of their network because it has smarter reporting capability, allowing them to capture a lot of their network structure for one centralized source of truth.

### Next level results

With the EcoStruxure™ ADMS and feeder automation functionality, SAPN now has far better monitoring and management of their vast network, and increased visibility of what is happening on the ground.

These solutions allow the utility to benefit from:

- Fault location, isolation and service restoration
- Network monitoring
- Load flow analysis
- Real-time control and optimization
- Operational planning
- Training and simulation

## ADMS offers many advantages

Firstly, it reduces the duration of power outages and the number of households the outage affects. It does this in a split second, by identifying where a line outage has occurred and rerouting the electricity grid to bypass this section. Secondly, the location of the outage is precisely pinpointed so maintenance crews can locate it more efficiently.

The network currently has many schematics and feeder plans that are recorded on paper. With the implementation of the new system, these will all be recorded electronically so they can be consolidated.

According to Tasnim, *“The project has been a good ‘nudge’ for us to improve our data capture processes and abilities. We hit a few hurdles around the data that we were capturing, and what we needed to be capturing.*

*The new system which we now have in place will reduce our current work processes from a four-step process to a two-step process, because the system will be able to complete some of these steps by itself.”*

## How is the system operating?

Network visibility and automation has made a considerable difference to operational efficiencies. As Tasnim explains, *“The Schneider Electric offering had a lot more going for it than the other offers that had been put on the table.*

*The ADMS offer brought everything together in the one system. It was one that really stuck in my mind as offering a complete solution for our network.*

*To be able to restore power to the majority of customers on a feeder in under a minute, is something that has never been done in SA Power Network’s history.*

*Without Schneider Electric we probably wouldn’t have been able to progress as fast as we have, and as quickly as we have.”*

We asked SAPN how our solution had improved their operation. According to Matthew Napolitano, Network Control Manager, *“With the ADMS and automation functionality, we have better monitoring and management of our network and increased visibility of what is actually happening out there. This means we can easily and confidently guide our field crews to the fault location rather than full patrols. This results in faster repair time and hence faster restoration times, increasing reliability to our customers.*

*Our priorities are always safety of personnel, safety of equipment, and continuity of supply. The ADMS and automation schemes provide us better visibility of the network which helps us make operational decisions faster and hence restore supply when it is safe to do so, ensuring safety to the public.”*

## An ongoing partnership

Schneider Electric has also offered SAPN ongoing training in the new system, which is appreciated by the power supplier network.

*“It is a very powerful tool, a fantastic platform for us to develop in the future to be the leading edge in the distribution sector.”*

— Tasnim Abdel-Razaq  
SAPN Network  
Control Manager

*“Replacing a business-critical operational system brings with it a fair share of challenges and opportunities, but it was through the hard work, dedication and enthusiasm of a large number of business representatives, technical experts and the project team that we have delivered such a robust product.”*

— Doug Schmidt  
SAPN General Manager,  
Network Management

# EcoStruxure™

## Innovation At Every Level

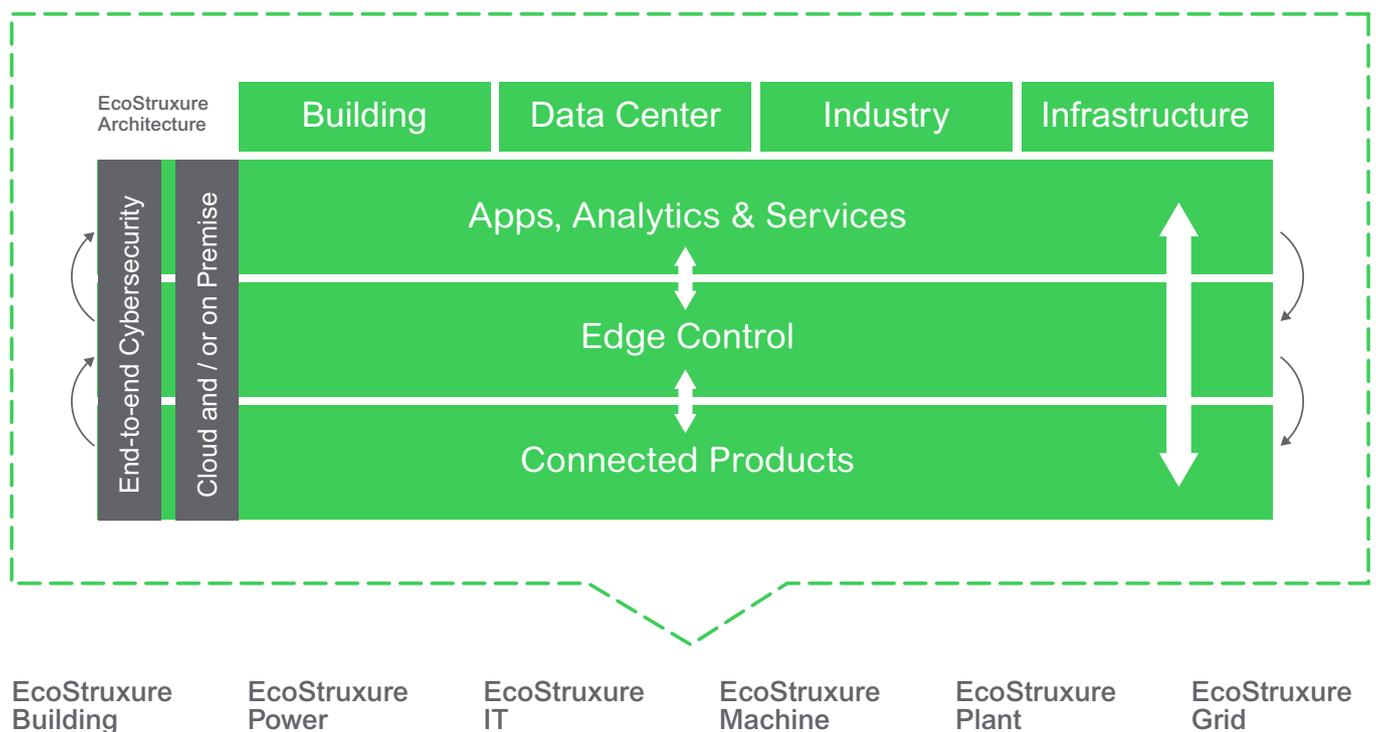
### IoT-enabled solutions that drive operational and energy efficiency

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 450,000+ installations, with the support of 9,000 system integrators, connecting over 1 billion devices.

### 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, & Services for seamless enterprise integration.

# Learn More



Watch how SA Power Networks keep the lights on through the storm.



Discover how Enel in Italy leverages EcoStruxure Grid™ for sustainable future.



See the potential of EcoStruxure™ ADMS unlock in adverse conditions.



How utilities can manage demand: peak shaving in action with EcoStruxure™ ADMS.



Learn how EcoStruxure™ Grid increases your grid's efficiency for sustainable networks.



Discover how EcoStruxure™ ADMS enables advanced monitoring, analysis, control, optimization, planning, and training functions allowing utility companies to provide more reliable, safe, and efficient power.

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