Enabling World-leading Rooftop Solar PV Uptake with SA Power Networks

OBJECTIVES

SA Power Networks (SAPN) is at the forefront of the global energy transition in South Australia, which boasts the highest uptake of residential solar PV worldwide, covering over 40% of homes. SAPN faced challenges with the permanent monitoring of its low voltage (LV) transformers, which is crucial for accurate forecasting and load growth prediction. Historically, SAPN had to rely on temporary monitoring methods, which proved inefficient and prone to inaccuracies, especially during the critical summer peak conditions when the network was most at risk of being overloaded. SAPN needed a solution that would provide continuous, accurate data monitoring to enhance predictions, reduce operating expenses (OpEx), and mitigate the risk of network failures.

APPROACH

- **Transition to Continuous Monitoring**: Moved from temporary data logging methods to robust, continuous monitoring systems for LV transformers.
- **Strategic Locations**: Partnered with Edge Zero to implement EdgeSensor monitoring solutions across 1,500 sites in suburban and regional areas.
- **Data Utilization for Network Planning**: Utilized the collected data to support long-term investment in network reliability and capacity planning.
- **Enhanced Forecasting Capabilities**: Leveraged real-time data, reducing the frequency of field crew dispatches.

RESULTS

The implementation of permanent monitoring systems resulted in significant operational and financial benefits for SAPN. They achieved Opex savings estimated at $5.3 million between 2020-2025 by eliminating the need for temporary surveys and equipment deployments. Additionally, this initiative delivered a Net Present Value (NPV) of $4.23 million over the asset life from 2020 to 2035. Beyond cost savings, SAPN also improved data accuracy and availability, which not only supported wider Distribution System Operator (DSO) functionalities but also led to more efficient network management. The enhanced data capabilities enabled SAPN to reduce long-term operating expenditures and respond more effectively to customer service inquiries, contributing to overall improved network reliability.

AT A GLANCE

Challenges

- High Solar PV Uptake
- Inaccurate Load Forecasting
- High OpEx
- Temporary Monitoring

Benefits

- Continuous Data
- Improved Prediction Accuracy
- $5M+ (AUD) OpEx Savings
- Enhanced Reliability

"One of the functions of network planning is to forecast, each year, which local LV transformers are reaching capacity so that transformer replacements or other augmentation works can be undertaken prior to the summer peak demand season."

LV Transformer Monitoring Business Case, Revised Regulatory Proposal, 2019