Asset Management in the Changing SA Power Supply Industry

A summary taken from Doug Schmidt, General Manager Networks SA Power Networks key note presentation to AMPEAK16 Conference held in Adelaide April 2016.

Introduction

Twenty years ago, the internet took a century-old telephone network and turned it into an information superhighway. Today, something similar is happening in the power supply industry.

The power grid has already become an ‘internet for electricity’ where suppliers and consumers trade and regulate commodities in a two-way relationship.

Doug Schmidt is General Manager Networks at SA Power Networks, the 70-year-old electricity distributor that services virtually all residential and commercial customers in South Australia. He calls his part of the power supply chain “the poles and wires.”

Privatised in 2000, 80% of SA Power Networks’ value lies in the poles, power lines and substations it maintains, assets totalling $4 billion.

After 70 years, the company performs well on quality and reliability. But like every other player in the industry, it’s facing disruption fuelled by wind power, solar, and electric vehicles.

SA Power Networks is modifying its existing asset management (AM) framework in response.

This case study outlines how the problem is being assessed, the challenges, and the solutions for a new AM approach.

It’s an ongoing process in an era of unprecedented rapid change.

A wake-up call for traditional grid asset management

Most of SA Power Networks’ assets were installed between the 1950s and 1980s, with a current average age of about 40 years. Its focus has been on the continuous supply of electricity – repairing fallen lines, monitoring poles and maintaining substations.

This paradigm could have continued indefinitely, except for recent consumer-led changes. The electricity industry must now accept that the grid is a two-way street. A model where one generator supplied power to all homes is now obsolete, due to a number of industry disruptions.

Wind power blows everyone away

According to the Australian Energy Council, South Australia is second only to the US state of Iowa in its per capita use of wind power, a phenomenon that caught the industry napping.

“When they connected the first one we thought, ‘these things will never take off,’” Doug Schmidt says.

“But they did. In 2014, there was 1,200 megawatts (MW) of installed capacity in SA, and wind supplies about 40% of the state’s energy across the year. On some parts of some days, wind supplies 100% of the state’s energy. That directly impacts the operations of coal-powered power stations.”

Schmidt says that in the 1980s, no one would have expected wind power to develop in such a short period.

“It’s a classical disruption cycle – you never expect something’s going to happen, then all of a sudden, bang!”

However, he says there are serious problems with power stability when the wind drops, and some unintended consequences of this disruption that need to be managed.

Solar power and electric cars

With homes taking up solar power and feeding surplus energy back into the grid, solar is the game-changer when it comes to definitions of ‘supplier’ and ‘consumer’.

“One-in-four of our residential customers have solar on their roofs,” Schmidt says. “During the day, houses feed power back into the substation, so there are reverse flows on the network. Five years ago if you’d said we would have that situation, we would have said you’re crazy.”

The uptake of electric vehicles also disrupts the traditional view of asset management. Future electricity use will put further strain on the grid when consumers charge their cars at night during peak power consumption.

A first response to the disruption

In 2011, SA Power Networks started thinking about what the organisation was going to look like in future. It produced a document and a story that stakeholders could buy into.

“We tried to predict what a future customer would look like,” Schmidt explains. “How we’d service them and what our roles would look like in our internal processes.”

Future Option 1 saw customers going off-grid completely. But problems of high capacity and poor reliability made this untenable.

In Option 2, customers remain on the grid, but buy and sell their own generated solar electricity as it suits them. “I think that’s where we’re heading,” Schmidt confirms.

Future asset management strategies

SA Power Networks then looked at how to change its decades-old AM model.

“Every industry, no matter how successful, is experiencing some form of disruption,” Schmidt says.

“We need to be agile in designing and embedding new processes and procedures into the AM system. Ongoing engagement with customers and key stakeholders is critical to ensure services meet future needs and expectations.”

The company is on a two-year cycle for updating its AM model, but it’s still not keeping pace with industry changes. “I think it might need to get even quicker,” Schmidt admits.

Strategies being developed include:

1. Battery installation (grid and customer sides) to avoid costly infrastructure upgrades and replacement.
2. Micro-grids to avoid building new powerlines to service new residential developments.
3. Using localised generation to supply a new customer development.
4. Replacing aged infrastructure with shorter design life equipment.
5. Automating the network through digital technologies.

New opportunities for an AM model

AM strategies must include new technologies – video drones to identify where power lines are affected by trees and phone apps that show real-time progress on line repair jobs.

In a forecast of technology take-up published on Reneweconomy, it’s predicted 40% of customers will have batteries at home within the next 20 years.

“So now we have a two-way network, where customers connect to and use our network how it suits them,” Schmidt observes. “Customers can buy *and* sell electricity as it suits them.”

But he says that doesn’t go far enough.

“We have other disruptors, working in what we call ‘behind the meter’. They provide batteries, solar, in-home energy systems, all sorts of things behind the meter to provide better services to customers. That’s the positioning for new markets.”

SA Power Networks is getting in on the installation of solar panels and batteries behind the meter. “We’re doing things we wouldn’t have thought about doing five years ago, like home energy management systems. That’s how quickly the industry’s moving.”

Key points for AM in a competitive industry

“Just about every industry’s undergoing disruption,” Schmidt says. “No matter how successful you are or how long you’ve been around, there’s somebody nipping at your heels trying to get a slice of your action.”

A case in point is battery use at home to store solar generated electricity. By 2020, Australia is expected to have installed more than 800 MW of battery storage, worth more than $2.5 billion.

“You need to revisit your external environment, your customers and stakeholders, and update your strategy regularly,” Schmidt advises.

“Having done that, you need to be agile in implementing those new procedures and systems within your asset management system, so you can determine what product and service you’re going to provide.

“And you need to keep customers and stakeholders engaged on the journey. You can’t lose track of that and get struck in your theory or your excellence in engineering. It’s all about delivering improved outcomes to customers and stakeholders.”