SA Power Networks Ensuring reliable electricity supply for Adelaide's CBD



The Adelaide CBD is our key business and entertainment precinct.

The more than 140,000 people who work or live in the Adelaide Central Business District (CBD) experience outages consistent with the 15 minute per annum average target established by the Essential Services Commission of SA (ESCOSA).

There's about 200 kilometres of underground cable of various voltages in the CBD. Cables (generally of 11,000 Volts) are laid underground in a network of underground conduits and manholes. The age of the cables varies. Some are new and some were installed as far back as the 1950s, though they continue to reliably supply businesses and residential properties.

While the CBD has the most reliable electricity supply of any region in South Australia, in 2017, there was a spike in outages affecting parts of the CBD. These power outages were mainly due to faults in individual sections of cables serving the city centre and understandably caused some frustration and inconvenience for customers.

The chart (right) shows the varied location of cable sections that failed, all in different locations except for the three cable faults near Victoria Square. Two of these were due to a cable joint failure and the other a cable insulation failure. This section of cable has been replaced.







CBD HV Cables fault by half year (no. and USAIDI)

This graph (above) shows the spike in the number of cable faults in the second half of 2017. The average minutes (USAIDI) customers were without supply was unusual and has not been repeated in 2018.

How have we responded?

SA Power Networks has identified both short term and longer-term responses to the unusually high number of cable faults.

Short term actions

Our response included:

- Establishing a Taskforce to investigate possible causes, identify if there was any clearly reoccurring pattern to the faults and improve response times when faults occurred.
- Establishing a depot within the CBD and temporarily relocating crews to the Adelaide CBD during peak times (eg Christmas shopping period and 'Mad March') reducing travel time to site.
- Installing more remote sensing within the network serving the CBD. This permits faster identification of the location of a fault and consequently faster switching of customers to other sources of supply.
- Commissioning an engineering assessment.

Developing a long term approach

An independent engineering consultancy was appointed to assist in identifying if there was a clear pattern to the faults and developing a model to replace cables based on the risk associated with failure and their current condition.

The report has suggested faults in 2017 may have been exacerbated by weather conditions (a significant dry period followed by good rains), but there was no specific pattern in terms of the type of fault, or that they were concentrated within a specific cable segment. Rather, while there were more faults among older lead-covered and paper-insulated (PILC) cables, the faults have been in random sections located across the CBD.

So, while the study has identified a higher rate of failure in older cables, it has not identified a specific pattern that would suggest the need for their immediate and complete replacement (to fully replace the PILC cables in the CBD would cost about \$80m). This means it is neither feasible or necessary to replace all the CBD's older underground cables. In many cases they are continuing to operate reliably. Instead, we are developing a targeted program based on engineering and science.

Our engineers have been working with the consultancy to develop a predictive model that will inform the targeted and cost-effective replacement of cables. The modelling should assist in identifying cables that may be more vulnerable to failure and replacing them in a timely and orderly fashion that ensures reliability of supply and minimises the cost of cable replacement for customers.

To assist in calibrating the model, some cable segments will be proactively replaced to confirm the condition of cables across the CBD and target segments that the model suggests are more likely to fail.