Resilience Augex – Portable Switchboards and Transformers Investment Case

Background

The Portable Zone Substation Equipment Resiliency program is proposed to address outcomes of the Royal Commission into National Natural Disaster Arrangements and the NSW Bushfire Inquiry. The major flood events that have devastated NSW over recent years were also considered when compiling our 6.02 Resilience Plan.

Zone substations are critical infrastructure to Essential Energy's network. There are 37 sites across the footprint which are classed as single transformer sites. Which means there is no back up if the equipment fails. There are also a number of radial subtransmission lines throughout the footprint. Damage to a zone substation with a radial spur means several townships would lose power, resulting in significant numbers of customers affected. This makes the criticality of the mobile equipment a necessity for providing a resilient and reliable power supply to our customers following major weather events.

The recent flood event in Lismore NSW highlighted the importance of having portable zone substation equipment, that can be deployed and commissioned quickly enabling restoration of power to customers. While some spare equipment is currently available, it was being used for fault and emergency works in the south of the state where a switchboard was faulty and could not be moved as it was keeping Marulan substation operating.

With only having a small portion of zone substation equipment that is portable and available to be interchanged around the state, restoration to the flood damaged Lismore zone substation took considerable time. Sections of the zone substation had to be built on site, which would have been avoided with the availability of sufficient portable equipment improving restoration times for customers.

It takes between 4-6 hours to commission portable zone substation spares (not including travel time). As shown at Lismore, it can take days to months if sourcing spares (or ordering new) and building on site. More than one natural disaster occurring simultaneously across the state would see significant outage times for customers if portable zone substation equipment is not available. Important to note, restoration to the distribution network from the zone substation is not included within the 4-6 hour restoration window.

Our current fleet of portable equipment has been used for contingency planning at Edrom, Providence Portal and Rappville during the catastrophic bushfires that swept through NSW in 2019. The fires came extremely close to the fence of these zone substation sites. We currently have some portable zone substation equipment standing by for the devastating flooding which is occurring throughout the Central West of the state (November 2022).

The most recent report from the Intergovernmental Panel on Climate Change ("**IPCC**") stated that climate change has impacted many weather and climate extremes in every region across the globe with evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones. On current projections, the IPCC estimate 3°C of warming by the end of the century, increasing the risks of more uncertainty and extreme events. Australia is recognised as having a higher level of susceptibility to climate impacts which influences heat extremes, rainfall (more time in drought, but more intense heavy rainfall events), number of dangerous fire weather days and a longer fire season.

Our Climate Impact Assessment (Attachment 6.01) forecasts natural disasters are likely to increase not only in frequency but also severity. Using representative pathway concentration (RPC) of 4.5, predicts increases in the following natural disasters up to 2050 in our region:

- Network average increase in probability of Bushfire up 10%.
- Network average increase in flood likelihood up 8% (where flooding is likely to reach a depth of 4m).
- Network average increase in 90km/h windstorm events by 60%

Forecasting Approach

- The forecast was developed by SME input into identifying suitable portable equipment to make our network more resilient.
- Equipment unit rate costs are based on current period contracts and SME estimation.
- Potential list of equipment was reduced following internal discussion and challenge.
- The spend phased across the 5-year period to allow monitoring and evaluation of effectiveness of the chosen equipment.

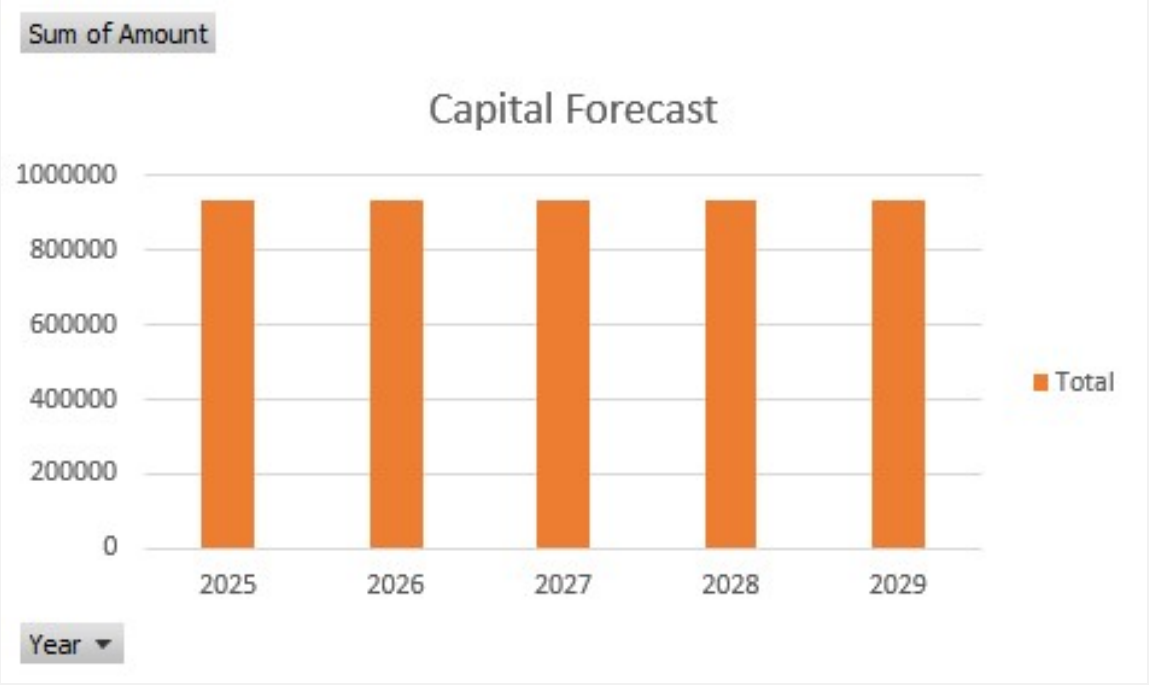
Investment Options

Options considered include:

1. Continue with current minimal allocation of portable zone substation equipment (will not deliver to customer expectations in relation to resilience and reliability outcomes)
2. Spare zone substation and protection equipment up to $14.4m (not economically feasible)
3. Portable zone substation equipment totalling $4.7m (2 x 66-33/33-11KV, 5/8MVA Tapchanging Transformer, 2 x 66KV DT CB on a skid with onboard protection, 145KV DT CB on a skid with onboard protection, 2 x 33KV, 4 Recloser switch room rated at 800Amps and a Prefabricated Control Room 6 panel transportable) - NPV benefit $7.8m (discount rate of 3.54%).

5 Year Capex Forecast

Forecast augmentation capital expenditure across the 24-29 period is $4.7M.



Note: All values are in middle of the year 2023-24 real dollar terms

Justification

We are confident that our approach delivers an efficient and prudent level of investment because:

- **Clear, prudent drivers from Royal Commission into National Natural Disaster arrangements and the NSW Bushfire Inquiry:** Meets Essential Energy's responsibilities for building critical infrastructure resilience. This resilience supports Essential Energy's management of response to emergencies and maintains operational coordination capabilities in these events.
- **Alignment with Asset Management Objectives (detailed in Attachment 10.01 SAMP) and 6.02 Resilience Plan**: Demonstrate network safety risk is managed SFAIRP and achieve corporate network safety targets by removing high risk activities occurring simultaneously with natural disaster events.
- **Customer needs:** Through customer engagement, refer Chapter 4 of our Regulatory Proposal, customers indicated a desire to maintain current levels of safety and reliability, and increase expenditure for resilience based projects. The investment will contribute to improving resilience and maintaining reliability, within the wider capital portfolio. Refer to **4.02 How Engagement Informed our Proposal**.

The major benefits expected from these investments are:

- **Increased reliability:** By strengthening the portable zone substation fleet it will allow faster restoration times to multiple natural disaster events.
- **Improved service to customers:** Shorter outage times for customers during natural disasters
- **Additional benefits:** Not further increasing costs by having spare transformers and equipment available all across the state (rather then portable).

Forecast expenditure for the 2024-29 period is $4.7m with an NPV of $7.8m.