

# Resilience – Radio Sites Solar and Batteries Investment Case

## Background

The Radio Site Resiliency program is proposed to address outcomes of the Royal Commission into National Natural Disaster Arrangements and the NSW Bushfire Inquiry. The forecasts were developed using input from subject matter experts and consequence of failure models developed as part of the asset class strategy for Electrical Network Telecommunications Systems.

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%

Customer support of proactive resilience projects is covered in **4.02 How engagement informed our Proposal**.

## Forecasting Approach

Approximately 50 radio sites have been deemed as critical communication hubs (out of the 71 assessed) for the operation and restoration of Essential Energy electrical network assets. Company procedures **6.03.02 Network Risk Management Manual** and **6.03.03 Appraisal Value Framework** were used to assess and identify the consequence of each of the 71 sites becoming unavailable, then determining if access can be limited during fire or flood events or if the site is critical to black start events. In conjunction, estimating the likelihood of floods, bushfires and black start events, the annual risk that can be mitigated through better power resilience was determined. This risk was used in NPV calculations that showed 45 radio sites are NPV positive in 10 years or less with a further 5 sites NPV positive over the 20 year life of the asset. A discount rate of 3.54% was used for this analysis.

During natural disasters these sites may require temporary installation of petrol generators, and therefore frequent refuelling to maintain power supply to support critical communications for Essential Energy staff and systems. This can become problematic when access is limited by a disaster event, dramatically raising the criticality of the sites.

A single unit rate cost of \$33.45k has been used pending further analysis of individual site specific physical conditions for installation of assets.

## Investment Options

There are two solutions that will be implemented to improve the resilience of 50 radio sites this Regulatory period:

1. Solar installation with 48 hours of battery backup. This will provide off grid support should mains power be lost which would likely result in no site visits to deliver generators and fuel through areas actively impacted by natural disasters and other significant events.
2. 72 hour battery backup solution (no solar). This will provide extended protection for sites against loss of mains providing more time to allow dangers to subside and or mains power to be restored.

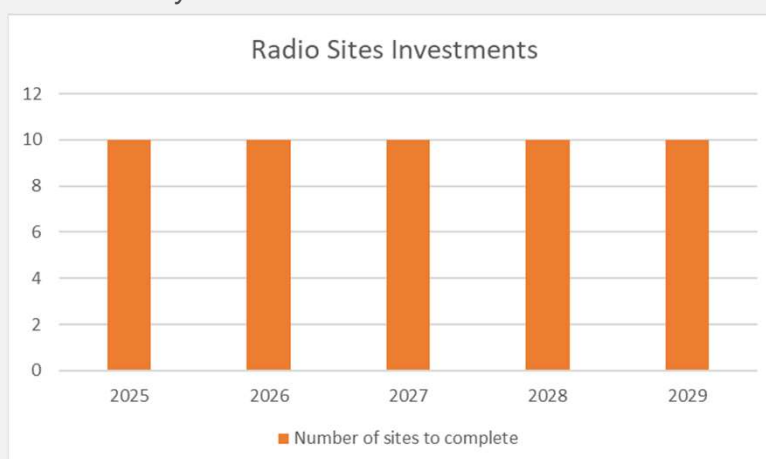
As not all radio sites are the same, there are a number of site specific factors such as available space or impacts of shading from vegetation that will determine the solution that is the most suitable for the site.

A solar solution with 48 hours backup is the preferred resilience option as it presents benefits that exceed the second solution. Specifically, the second option would likely still require staff to transport generators and fuel through areas that are being actively impacted by natural disasters and other significant events which presents a risk that we can substantially lower by installing solar with battery backup. Detailed analysis will be conducted through the project development stage to determine the most appropriate solution to implement at the individual site level.

Forecast augmentation capital expenditure across the 24-29 period is \$1.67M with a staged deployment as shown below.



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



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 their response to emergencies and maintains their 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. Improving communications to field staff while they operate in heightened risk scenarios.
- **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 influenced our Proposal**.

The major benefits expected from these investments are:

- **Reduced staff risk:** Investment will reduce the requirement for staff to attend sites during natural disasters for refuelling generators. Reliable communications will improve safety outcomes for staff operating during and after natural disasters.
- **Improved sustainability:** Installing solar power at critical sites will provide a renewable energy source for critical assets and return savings through avoided consumption charges.
- **Improved service to customers:** Effective and reliable communications will assist in the restoration of electrical network after a major natural disaster.

Forecast augmentation capital expenditure across the 24-29 period is \$1.67M with an NPV of \$15.1M.