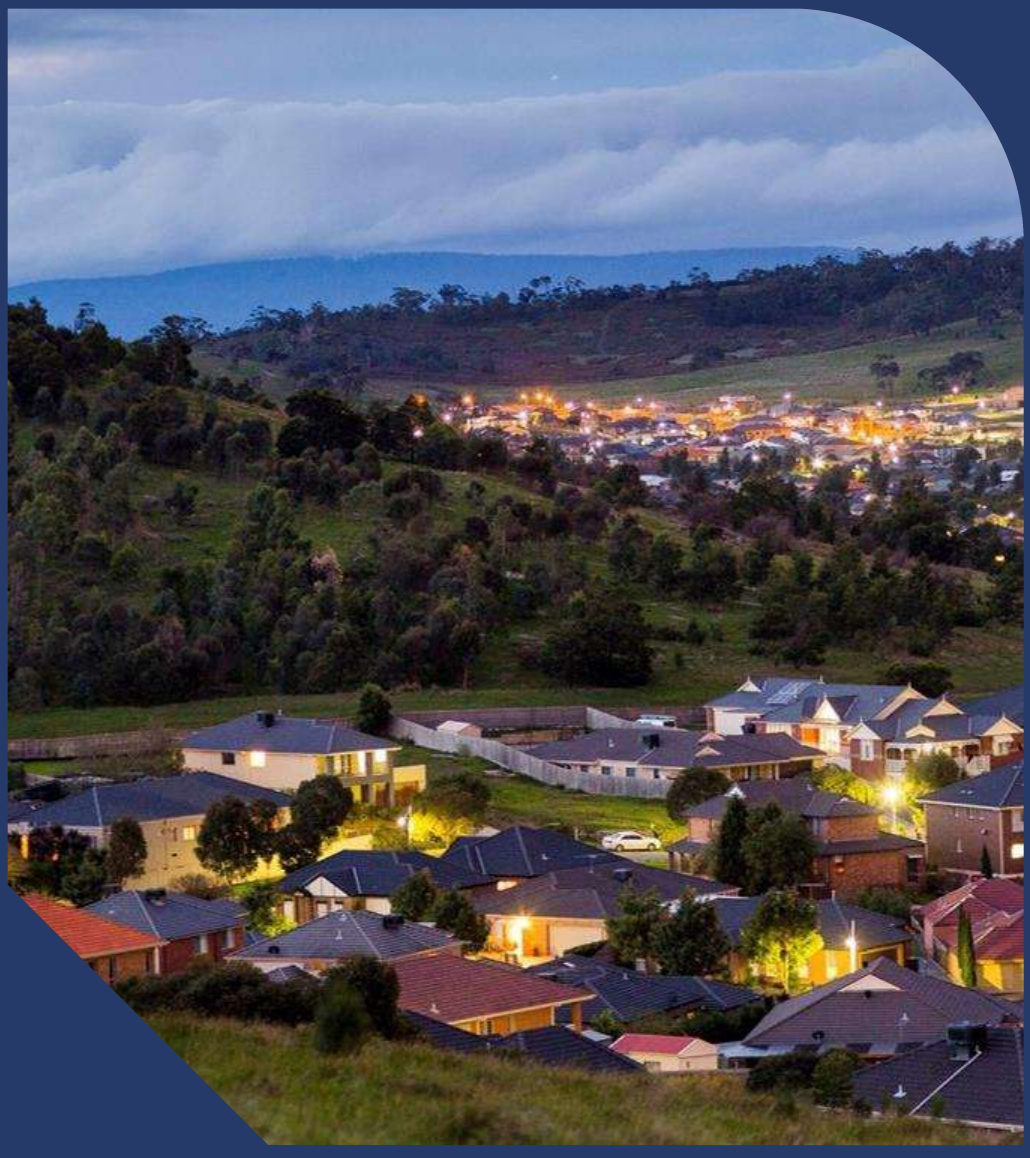
AusNet

EDPR Resilience (network hardening and hazard trees) Explanation document

1 December 2025



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1. Introduction

1.1. Purpose of this document

The purpose of this document is to accompany AusNet's revised regulatory submission, to give an overview of the updates and refinements made to the resilience network hardening model since our Regulatory Proposal submission in January 2025.

2. Overview of Changes

2.1. Approach to addressing feedback

Following the draft determination, AusNet applied the following changes to its approach to network hardening investments:

- **Updating unit rates.** Re-evaluated the unit rate of multiple interventions.
- **Considering alternative lower cost options.** Considered alternate options to pole replacement such as pole wraps.
- **Hazard trees.** Incorporated hazard trees as an option to network hardening.
- **Update VCR.** For residential outages less than 12 hours, we have adopted the AER's 2024 Victorian average residential VCR. For residential outages greater than 12 hours, we have adopted the 6-12 hour VCR multiplied by the VNR multiple where we have implemented the AER's VNR upper bound by adopting a $0 VCR for outages greater than 7 days. We adopted a similar approach for business customers.

2.2. Summary of Key Updates

2.2.1. Changes to VCR and VNR

The following table outlines the values used for the calculation of the expected unserved energy risk associated with the investments and how AusNet has applied the VNR methodology.

Table 1 – VCR and VNR values adopted in resilience modelling

		Base VCR type	Base VCR ($ per kWh)	VNR multiple	Resulting VNR ($ per kWh)
Residential customers	<12h	Vic average residential	$49.23	1	$49.23
	12-24h	6-12h VCR	$24.20	2	$48.40
	24h to 7 days	6-12h VCR	$24.20	1.5	$36.30
	>7days	6-12h VCR	$24.20	0	Nil
Commercial customers	<12h	Commercial overall VCR	$34.39	1	$34.39
	12-24h	6-12h VCR	$12.30	1.5	$18.45
	24-72h	6-12h VCR	$12.30	1	$12.30
	>72h	6-12h VCR	$12.30	0.5	$6.15
Industrial customers	<12h	Industrial overall VCR	$33.49	1	$33.49
	12-24h	6-12h VCR	$11.70	1.5	$17.55
	24-72h	6-12h VCR	$11.70	1	$11.70
	>72h	6-12h VCR	$11.70	0.5	$5.85
Agriculture customers	<12h	Agriculture overall VCR	$22.25	1	$22.25
	12-24h	6-12h VCR	$9.70	1.5	$14.55
	24-72h	6-12h VCR	$9.70	1	$9.70
	>72h	6-12h VCR	$9.70	0.5	$4.85

2.2.2. Considering pole wraps

In considering the cost and effectiveness of pole wraps, AusNet engaged with other Australian DNSPs to get their experience of the product. From these discussions we came to the following conclusions:

Effectiveness

- Pole wraps will be installed 2m up a timber pole. This means any unwrapped portion of the timber pole is still prone to ember attack or large-flame height front fires;

- Pole wraps serve no purpose on non-combustible poles;
- Where poles are >50 years of age, it would be more prudent to replace the pole rather than wrapping a pole;
- The effectiveness of the wrap to a low flame-height fire is assumed to be **75%**
- The effectiveness of the wrap to a high flame-height fire is assumed to be **0%.** Fire Mesh has a rated heat flux of ~50kW/m^2, however, the heat flux from a bushfire, according to the CSIRO, can exceed 100kW/m^2.
- For the effectiveness to be realised, enough penetration of the pole population is required (i.e., a single pole wrapped on a feeder will not prevent an outage of a feeder, but multiple can)

Vegetation Density

- Based on the above, analysis was conducted assessing the locations of where poles of a feeder are in vicinity to dense vegetation.[1]
- From this analysis it was found that only 9.3% of Ausnet's pole population was located near dense vegetation.

Unit Cost

- Direct unit cost for the installation of a pole wrap, per pole was $CIC, inclusive of labour.

'Wrap-able' Poles

- Based on the above, the criteria used to determine poles which could be wrapped had to meet all three of these criteria:
    1. Pole was a timber pole;
    2. Pole was <50 years of age;
    3. Pole was NOT located near dense vegetation
- Based on the above criteria, it was found at a network level, 21% of Ausnet's pole population were candidates for pole wrapping.

2.2.3. Re-evaluating hazard trees

In considering the cost and effectiveness of hazard trees, AusNet came to the following conclusions:

- The ability for a trained arborist to detect all hazard trees is 90%.[2]
- The ability to be able to detect a hazard tree which could impact the network was taken as 50% (for example, there are trees which look perfectly healthy and can still become structurally unsound and come into contact with a powerline).
- Based on Ausnet's historical hazard tree treatments, on average at a network level, the split between treatment options are:
    - CIC% are removed
    - CIC% are trimmed.
- The removal and trimming costs vary depending on tree. These prices can vary greatly, and as such, AusNet assumed a weighted average cost for the trees based on historical spends. This resulted in the following costs:
    - Tree removal cost: $CIC each
    - Tree trimming cost: $CIC each
- The weighted average hazard tree cost for removal / trimming is therefore $CIC

[1] Density of trees and the definition of, was found utilising the Victorian government dataset located at: https://www.land.vic.gov.au/maps-and-spatial/spatial-data/vicmap-catalogue/vicmap-vegetation

[2] This is an assumed figure. Trained arborists are highly skilled and are assumed to be able to detect all hazard trees, however, based on industry incidents where a hazard tree has impacted a network and resulted in a fire, a nominal figure was taken as 90% to be conservative.

- Based on historical failure data information, the number of tree impacts per year was estimated to be 255.8 out of a population of 1269 i.e., 20.1%
- To calculate the effectiveness, we translated the vegetation impacts, with the hazard tree find rate, i.e.: 90% x 50% x 20.1%
- The final effectiveness is therefore 9.1%

2.2.4. Re-evaluating unit prices

AusNet has re-evaluated the unit rates for many of its interventions, but in relation to the network hardening business case, the following unit rates were applied.

Table 2 – Intervention unit rates

Intervention	Unit rates applied in SCS capex model, direct cost only	Units rate applied in Resilience Network Hardening Model, inclusive of overhead cost and finance charges so that solutions are based on total cost
Pole wraps	CIC	CIC
Pole hardening	CIC	CIC
Covered conductors	CIC	CIC
Undergrounding	CIC	CIC
Reclosers	CIC	CIC
Hazard trees	CIC	CIC

3. Resultant Outcome

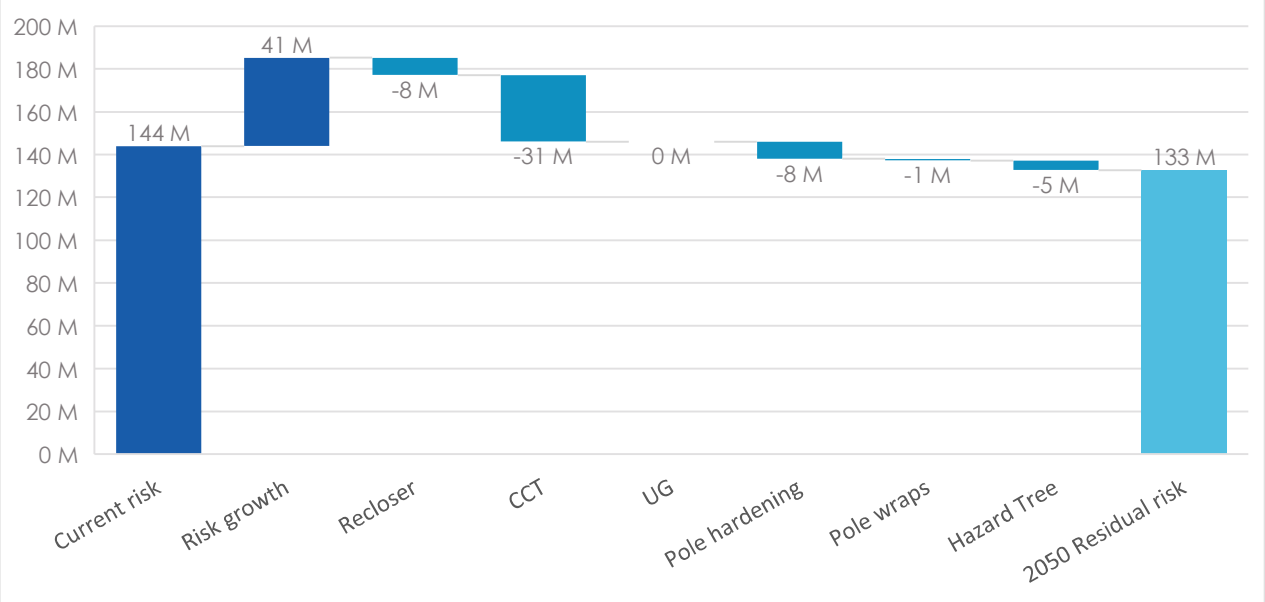
The following table outlines the result of the economic model.

Table 3 – Economic Model re-evaluation outcome

Intervention	Units Rate Applied	Resultant units (full program)	Halving the covered conductors program (units)	Post removing overlaps with repex (units)	Revised reg proposal for 2026-31 period (units)
Pole Wraps	CIC	2,626	2,626	2,626	2,626
Pole Hardening	CIC	1,646	1,646	1,580	1,580
Covered Conductors	CIC	821km	409km[3]	382km	382km
Undergrounding	CIC	0.01km	0.01km	0.01km	0[4]
Reclosers	CIC	99	99	99	99
Hazard trees for 2026-31 period	CIC	2,317	2,317	2,317	2,317

The chart below shows the risk reduction by intervention in year 2050.

Figure 1 – Resultant Risk Profile Managed



[3] Our rounding method led to a volume that is close to half, but not exactly half.
[4] The model showed 10m of undergrounding being economic to undertake. We have instead proposed zero units of undergrounding.

4. Sensitivity testing

We undertook some sensitivity testing – see tables below

Table 4 – Economic Model re-evaluation outcome

Intervention	Main model run with central assumptions	Lower VCR Use 6-12h VCR for outages less than 12h and outages greater than 12h	Higher VCR Vic average residential VCR for residential customers & business overall VCR for business customers	Reducing hazard tree effectiveness to zero
Pole Wraps (units)	2,626	2,626	2,031	4,119
Pole Hardening (units)	1,646	1,657	1,376	1,740
Covered Conductors	821km	756km	1,320km	968km
Undergrounding	0.01km	0.01km	40km	0.01km
Reclosers (units)	99	105	90	138
Hazard trees (units) 2026-31	2,317	2,200	2,267	0

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