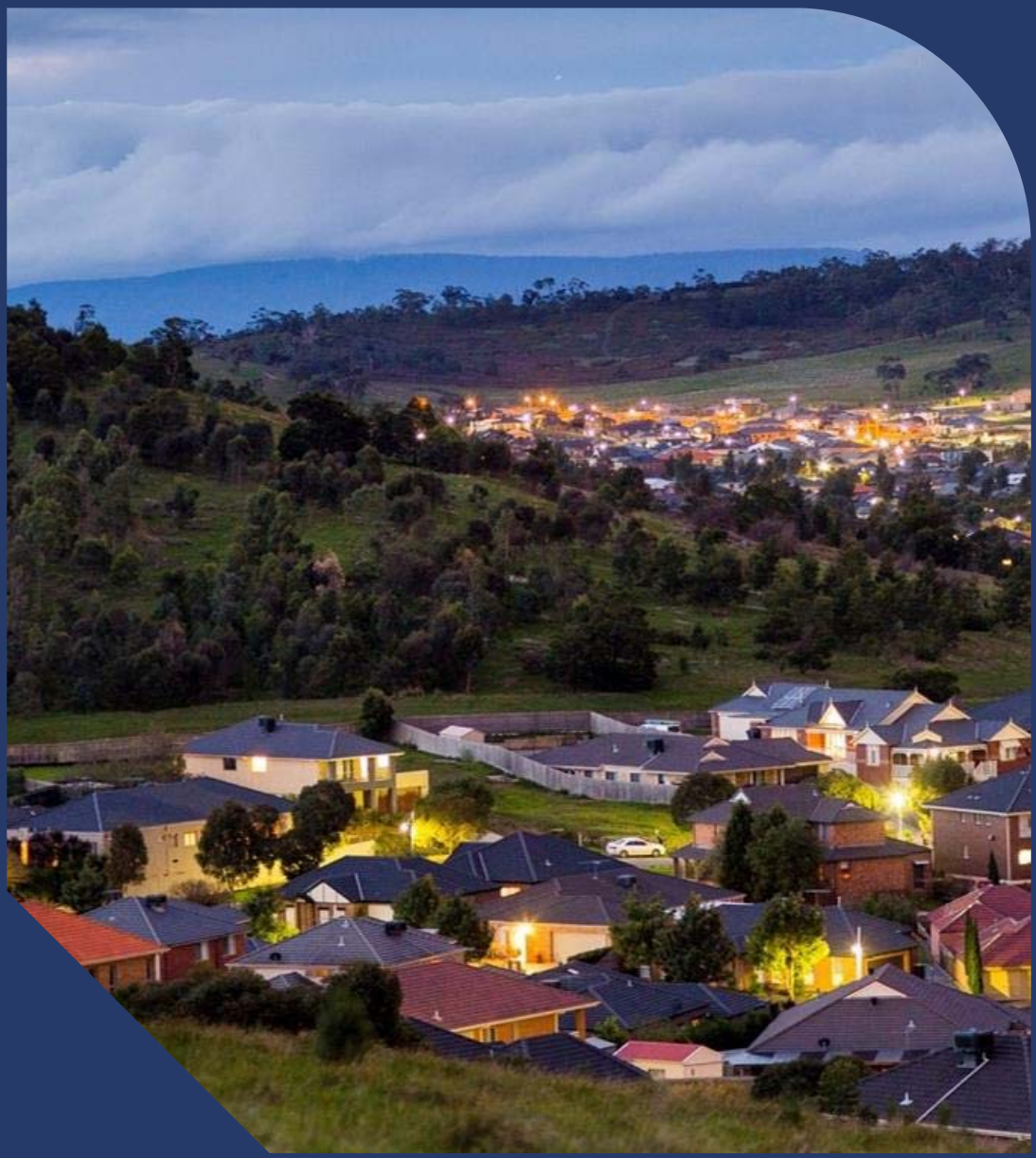
AusNet

Distribution Bare Conductor Replacement

Regulatory Investment Test for Distribution

Notice of Determination under clause 5.17.4(d) of the National Electricity Rule

Friday, 19 August 2022



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1. Introduction

AusNet Services is a regulated Victorian Distribution Network Service Provider (DNSP) that supplies electrical distribution services to more than 745,000 customers. Our electricity distribution network covers eastern rural Victoria and the fringe of the northern and eastern Melbourne metropolitan area.

As expected by our customers and required by the various regulatory instruments that we operate under, AusNet Services aims to maintain service levels at the lowest possible cost to our customers. To achieve this outcome, we develop forward looking plans that aim to maximise the present value of economic benefit to all those who produce, consume and transport electricity in the National Electricity Market (NEM).

Our approach is to consider network and non-network options on their merits, so that we meet our customers' needs and our compliance obligations at the lowest total cost. Where applicable, we also prepare, publish, and consult on a regulatory investment test for distribution (RIT-D), which further helps ensure all credible options are identified and considered, and the best option is selected.

In relation to the distribution bare conductor replacement project, we have concluded that there are no credible non-network options capable of addressing the identified need, which arises from the poor condition of these assets. In accordance with clause 5.17.4(d) of the National Electricity Rules (NER), therefore, this document is the notification of our determination that there are no credible non-network options. Consequently, AusNet Services will not publish a non-network options report as part of the RIT-D for the distribution bare conductor replacement project.

This notice provides background information which explains the identified need and outlines the reasons for AusNet Services making its determination, along with our methodologies and assumptions. The next stage of the RIT-D process will be the publication of the Draft Project Assessment Report (DPAR), which AusNet Services intends to publish in September 2022.

2. Background

AusNet has 38,208km of bare overhead conductor installed across the electricity distribution network, which comprises over 400,000 spans of low voltage (LV), medium voltage (MV) and high voltage (HV) circuits. Conductors in the electricity distribution network transport electricity between zone substations, consumers and embedded generators. Their main function is to connect zone substations to electricity users and generators.

Conductor systems involve a range of conductor fittings with various functions, as follows:

- Spacers mitigate the risk of conductor clashing on long spans;
- armour rods protect the conductor against abrasion;
- vibration dampers prevent damage due to laminar wind induced forces;
- repair rods and compression splices address broken strands and conductor breakage; and
- tie wires and helical terminations connect conductors to insulators.

2.1. Asset population

There are 38,2081 km of bare overhead conductor across the entire distribution line network, which is composed of a mix of steel, aluminium and copper. This conductor forms over 400,000 spans of low voltage (LV), medium voltage (MV) and high voltage (HV) circuits as shown in the figure below.

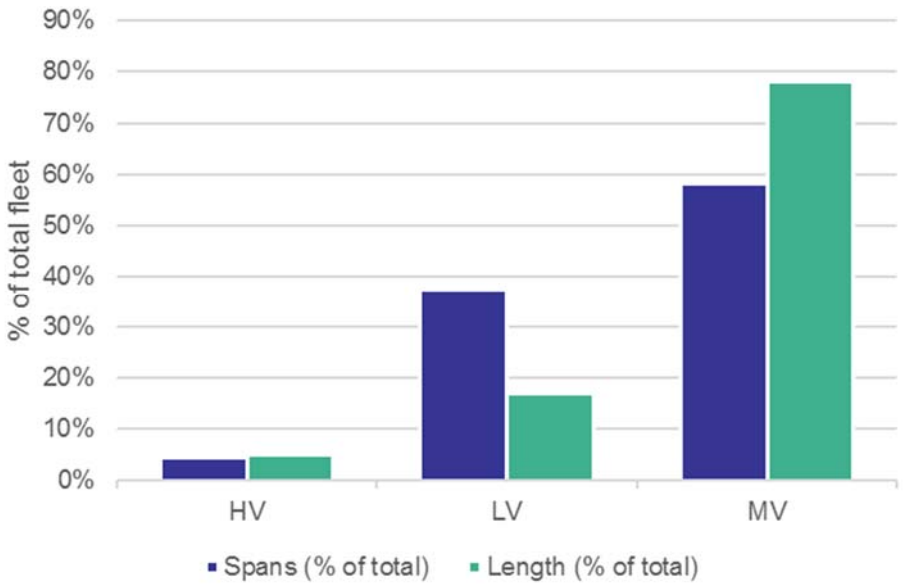

Figure 1: Bare conductor population by operating voltage

The figures below show the mix of conductor materials for high volage (HV) and medium voltage (MV) below, and then for low voltage (LV). The materials are:

- All Aluminium Conductor (AAC);
- Aluminium Clad Steel Reinforced (ACSR);
- Copper (Cu);
- Steel; and

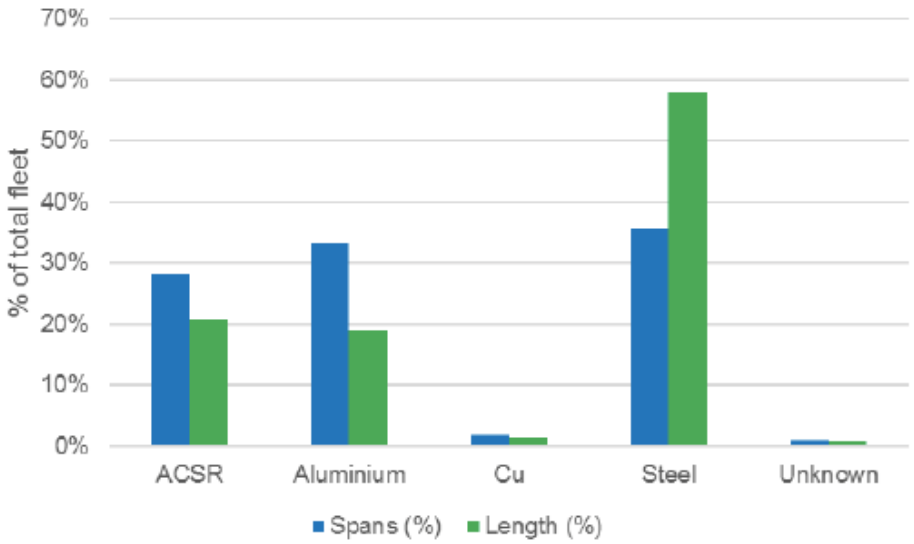

Figure 2: MV & HV bare conductor population by material

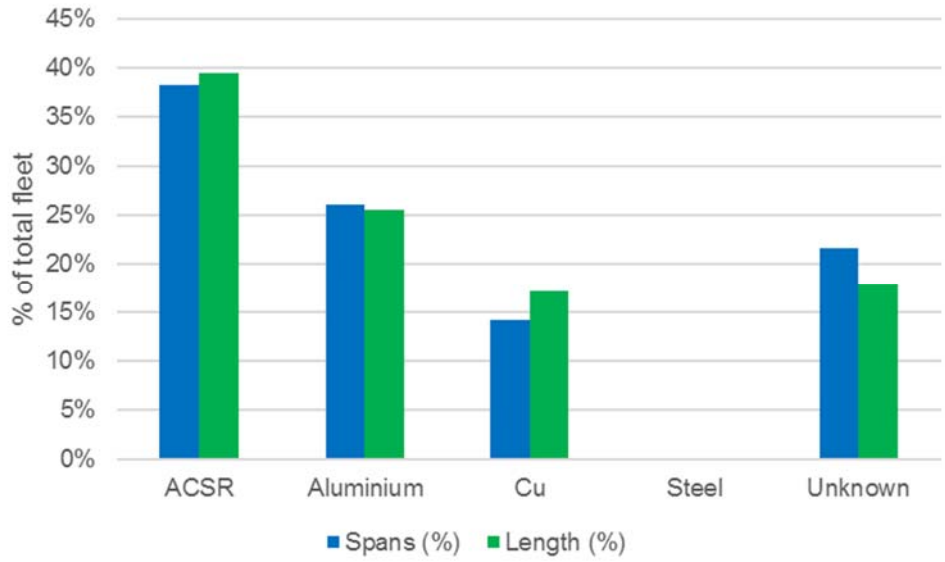

Figure 3: LV bare conductor population by material

2.2. Asset age and condition

The age profile for bare conductors is shown in the figure below, which is based on the known and derived installation dates of the fleet of bare conductors. The peak population in the 50-55 age category is a key driver for future replacement programs.

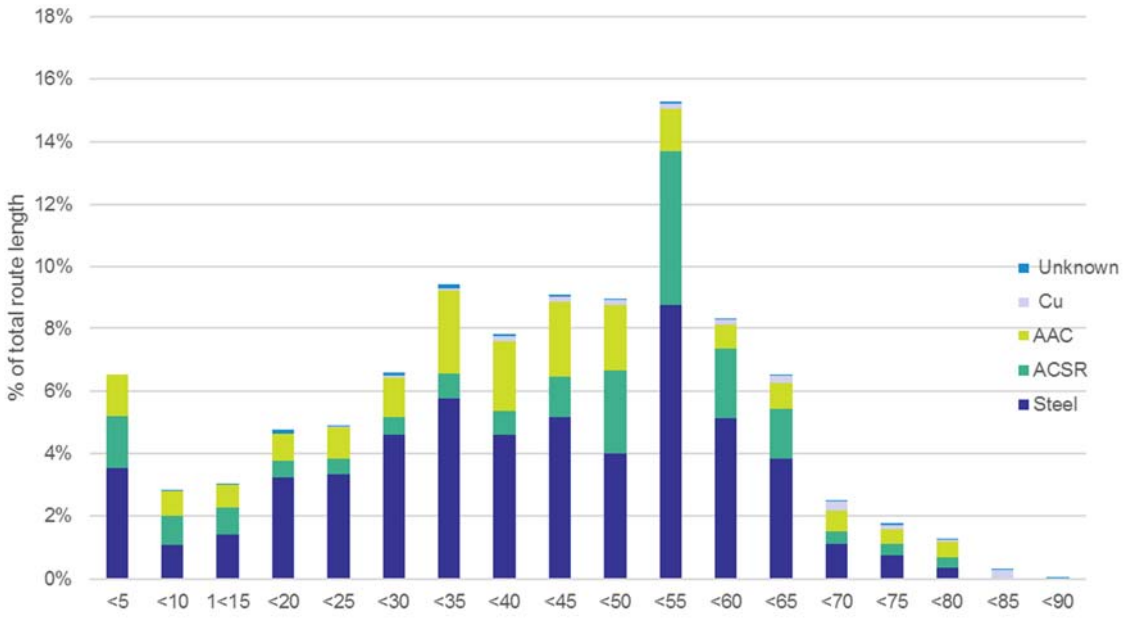

Figure 4: LV bare conductor population by material

There are five different condition scores that have been applied to bare conductors, ranging from "Very good" (C1) to "Very poor" (C5).

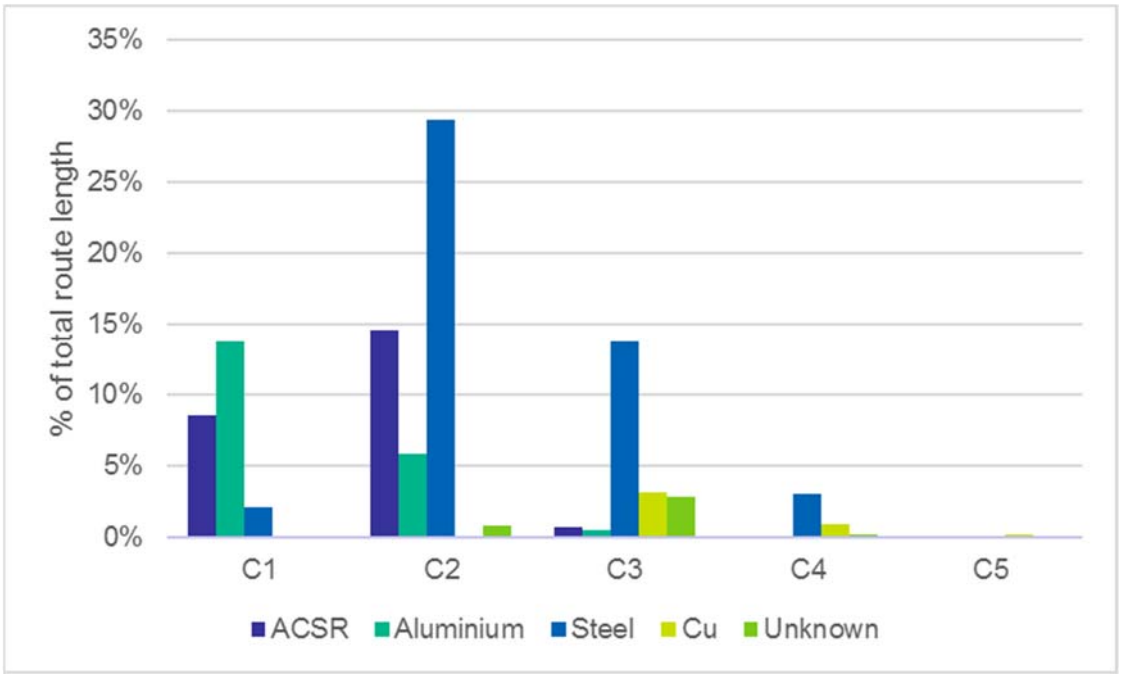

Figure 5: Asset condition by material type

2.3. Risk assessment methodology

A conductor failure is defined as a loss of any of the electrical or mechanical functions of the conductor systems and can result from several different failure mechanisms. Our risk assessment considers the following main failure mechanisms: corrosion, fatigue and vibration.

Machine Learning techniques have been applied to model asset health and assess the risk relating to the failure of bare distribution conductors. Machine Learning allows for a more granular evaluation of the probability of failure of

assets and hence a more granular evaluation of asset risk, which facilitates more effective prioritisation of works. It also improves the predictability of defects, resulting in a smaller proportion of assets being identified as highest risk.

Our risk assessment has also been enhanced by destructive testing of bare steel conductor samples. It uses a Weibull probabilistic approach to update the residual life in medium corrosivity areas of the network.

Our risk assessment methodology considers the following for each conductor span:

- Probability of failure:
  - expected life of the asset in different corrosivity zones
  - calculate remaining service potential based on current conductor condition score
  - calculate probability of failure.
- Consequence of failure:
  - bushfire risk cost
  - value of unserved energy - product of VCR (value of customer reliability), EAR (energy at risk) and the MTTR (mean time to repair)
  - safety risk cost.
- Cost of replacement:
  - cost of replacement in today's $ value
  - cost of replacement NPV for each option considered
  - cumulated consequence and cost of replacement NPV for each option.
- Benefit of replacement:
  - calculated benefit NPV as a difference between the consequence NPV and cost of replacement NPV
  - calculated preferred option as a maximum NPV benefit across all considered options.

3. Identified need

The condition of some distribution bare conductors may expose customers and the broader community to an increased risk of asset failure, potentially resulting in significant costs in terms of bushfire, adverse safety outcomes and unserved energy. The extent of these costs will depend on the risk and consequence of conductor failure, which in turn depends on the location of the conductors. The identified need is to mitigate these risks efficiently in accordance with our regulatory obligations and good industry practice.

4. Regulatory obligations

In addressing the identified need, we must satisfy our regulatory obligations, which we summarise below.

Clause 6.5.7 of the National Electricity Rules requires AusNet Services to only propose capital expenditure required to achieve each of the following:

(1) meet or manage the expected demand for standard control services over that period;

(2) comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;

(3) to the extent that there is no applicable regulatory obligation or requirement in relation to:

(i) quality, reliability or security of supply of standard control services; or

(ii) the reliability or security of the distribution system through the supply of standard control services

to the relevant extent:

(iii) maintain the quality, reliability and security of supply of standard control services, and

(iv) maintain the reliability and security of the distribution system through the supply of standard control services; and

(4) maintain the safety of the distribution system through the supply of standard control services.

Section 98(a) of the Electricity Safety Act requires AusNet Services to design, construct, operate, maintain and decommission its supply network to minimise as far as practicable:

(a) the hazards and risks to the safety of any person arising from the supply network; and

(b) the hazards and risks of damage to the property of any person arising from the supply network; and

(c) the bushfire danger arising from the supply network.

The Electricity Safety act defines 'practicable' to mean having regard to –

(a) severity of the hazard or risk in question; and

(b) state of knowledge about the hazard or risk and any ways of removing or mitigating the hazard or risk; and

(c) availability and suitability of ways to remove or mitigate the hazard or risk; and

(d) cost of removing or mitigating the hazard or risk.

Clause 3.1 of the Electricity Distribution Code requires AusNet Services to:

develop and implement plans for the acquisition, creation, maintenance, operation, refurbishment, repair and disposal of its distribution system assets and plans for the establishment and augmentation of transmission connections:

(i) to comply with the laws and other performance obligations which apply to the provision of distribution services including those contained in this Code;

(ii) to minimise the risks associated with the failure or reduced performance of assets; and

(iii) in a way which minimises costs to customers taking into account distribution losses.

Under clause 5.2 of the Electricity Distribution Code, AusNet Services:

must use best endeavours to meet targets required by the Price Determination and targets published under clause 5.1 and otherwise meet reasonable customer expectations of reliability of supply.

5. Screening for Non-network Options

As detailed in section 4, the identified need in relation to bare conductors exposes customers and the community to increase risk in relation to:

- Bushfire start;
- Health and safety impact; and
- Unserved energy.

We undertook desktop analysis to consider whether it would be feasible to adopt a non-network option in relation to the conductors that may need to be replaced. Our analysis indicated that the costs of non-network options that enabled the conductors to be decommissioned rather than replaced were prohibitive, being in the order of 16 times the replacement cost. Accordingly, we have concluded that there are no credible non-network options to address the identified need in relation to distribution bare conductors. In accordance with the NER requirements, we note that our conclusion reflects our assessment of the costs of non-network options, which are orders of magnitude greater than the cost of replacing the conductors.

6. Next steps

For the reasons set out in Section 5, AusNet Services has determined that there will not be a non-network option that is a credible option, or a non-network component that forms a significant part of a potential credible option in relation to the replacement of bare conductors. In accordance with clause 5.17.4(c) of the NER, therefore, AusNet Services will not be publishing a non-network options report as part of the RIT-D for the bare conductor replacement project.

Any questions on the matters of this determination notice should be submitted by email to ritdconsultations@ausnetservices.com.au

The next stage of the RIT-D process is the publication of the DPAR, which is required to provide the information set out in clause 5.17.4(j) of the National Electricity Rules, including:

- A description of the identified need for investment.
- The assumptions used in identifying the need for investment, including the reasons why AusNet Services considers the subject of this RIT D requires reliability corrective action.
- A description of each credible option assessed, and their costs, that AusNet Services considers could potentially address the identified need.
- The results of our net present value analysis and accompanying explanatory statements regarding the results.
- Identification of the proposed preferred option that meets the identified need and the RIT-D requirements.
- The contact details for a suitably qualified staff member to whom queries on the draft report may be directed.

AusNet Services intends to publish the DPAR in September 2022

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