# Pole replacements: forecast method overview

UE BUS 4.02

Regulatory proposal 2021–2026

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# 1 Overview

The aim of this document is to provide an overview of how we developed forecasts for pole replacements over the 2021–2026 regulatory period. The key focus is our wood population, given these reflect around 85% of our total poles.

This document demonstrates that our proposed pole replacement program is prudent and efficient in accordance with the National Electricity Rules (**the Rules**), noting that it:[1]

- addresses the concerns of electricity consumers
- complies with our regulatory obligations, including the Electricity Safety Act 1998, our Electricity Safety Management Scheme (**ESMS**) and our Fire Prevention Plan (**FPP**)
- considers offsetting adjustments to other capital expenditure categories.

Our proposed program seeks to meet our safety obligations, as well as community expectations of a sustainable asset management program over the longer-term.

Our existing asset management approach for poles reflects a condition-based replacement program. To date, this approach has resulted in our network having amongst the lowest wood pole failure rates in Australia.

Notwithstanding our historical low failure rates, recent industry experience demonstrates heightened probabilities and consequences of failures focused on lower durability pole types. This includes ESV's recent review of Powercor's wood pole management practices, in which the regulator supported changes to assumptions regarding the fibre-strength of wood poles (e.g. it has been long-standing industry practice to assume the fibre-strength of a wood pole would be the same in year one as it would be in year 100).

Condition-based replacements alone also mean our wood pole population is ageing, and without intervention, this is forecast to result in an upward trend in the number of pole failures.

As a prudent network operator, the above factors have driven further consideration of our own pole management practices. We propose to supplement our condition-based replacement and reinforcement program with age-based factors to recognise that the fibre-strength of a wood pole will deteriorate over time. The focus of this incremental program is on our lower durability poles located in higher consequence areas.

A summary of our forecast capital expenditure requirements is shown in table 1.1.

1 See, for example: NER, clause 6.5.7(e)(5A) and clause 6.5.7(a)(2).

Table 1.1 Capital expenditure forecasts: pole replacement program ($ million, 2021)

| Description | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | Total |
|---|---|---|---|---|---|---|
| Condition-based replacements | 11.5 | 12.1 | 12.8 | 13.4 | 14.1 | 63.8 |
| Condition-based reinforcements | 2.0 | 2.1 | 2.2 | 2.4 | 2.5 | 11.2 |
| Risk-based pole replacement program | 2.5 | 2.5 | 2.6 | 1.8 | 1.8 | 11.2 |
| Concrete poles | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 3.9 |
| **Total** | **16.7** | **17.6** | **18.4** | **18.4** | **19.2** | **90.2** |

Source: United Energy

# 2 Background

Poles are essential to an overhead electricity distribution network. Their basic function is to support overhead electrical conductors and other pole mounted assets, and to provide safe clearance from the ground and other adjacent objects (including vegetation).

This section provides a snapshot of the population, age profile and historic performance of poles in our network.

## 2.1 Compliance obligations

We are committed to providing customers with a safe, reliable and affordable electricity supply through the application of an effective asset management framework. We are required to manage our network assets in accordance with the Electricity Safety Act 1998 and the Electricity Safety (Management) Regulations 2010. The key instruments that govern the management of our network assets, including poles, are:

- our Electricity Safety Management Scheme (**ESMS**) and Fire Prevention Plan (**FPP**), which are subject to approval by Energy Safety Victoria (**ESV**)[2]
- our asset management plan and asset class strategies, which provide information about the types of poles used, and their applications, failure rates and modes
- our network asset maintenance policy for inspection of poles, which describes the inspection frequency and scope, depending on pole condition
- our asset inspection manual, which describes how inspections should be conducted and sets out criteria for categorising the urgency of remedial maintenance actions and reporting, and information recording requirements.

ESV's role includes monitoring each electricity company's compliance with its obligations under the Electricity Safety Act 1998 to minimise risk 'as low as reasonably practicable' as articulated in our ESMS and FPP.

Further information on our compliance obligations is provided in Appendix A.

## 2.2 Asset population

Our population of poles includes both low voltage (**LV**), high voltage (**HV**) and sub-transmission assets.[3]

The material types used include wood, concrete and steel. Our wood pole population is further disaggregated into whether the pole has been staked (i.e. staking involves installing additional supports to reinforce the pole and extend its life).

Table 2.1 lists the types and volumes of poles installed in our network, as of 2018.

2 The Electricity Safety (Bushfire Mitigation) Regulations 2015 require us to submit a Bushfire Mitigation Plan (which we refer to as a FPP) for a five-year period to ESV for review and approval.

3 Our pole population also includes dedicated public lighting poles, but these are excluded for the purpose of this report.

Table 2.1 Network poles population (2018)

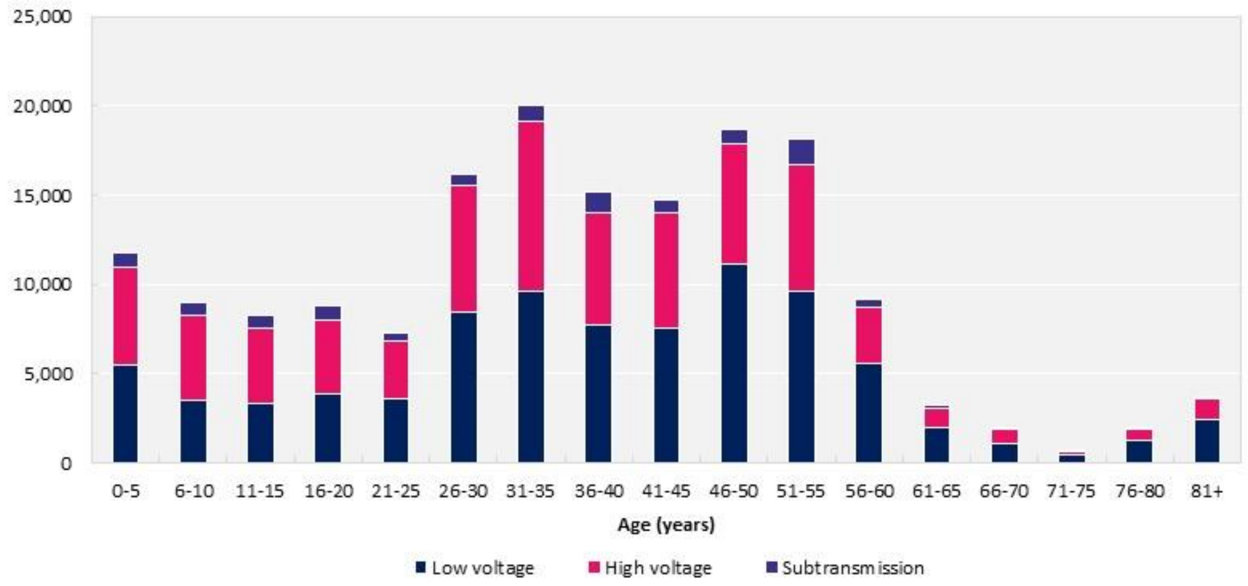
| Pole category | Wood (not-staked) | Wood (staked) | Concrete | Steel |
|---|---|---|---|---|
| LV | 60,760 | 10,650 | 14,985 | 398 |
| 11kV | 14,920 | 2,047 | 633 | 4 |
| 22kV | 41,297 | 4,342 | 8,748 | 12 |
| 66kV | 8,411 | 523 | 1,089 | 15 |
| **Total** | **125,388** | **17,562** | **25,455** | **429** |

Source: United Energy

## 2.3 Asset age profile

As shown in figure 2.1 the age of our poles varies from recent installations to assets installed over 80 years ago. Of this population, over 60% were commissioned more than 30 years ago, and almost 25% are older than 50 years.

Figure 2.1 Pole population: age profile

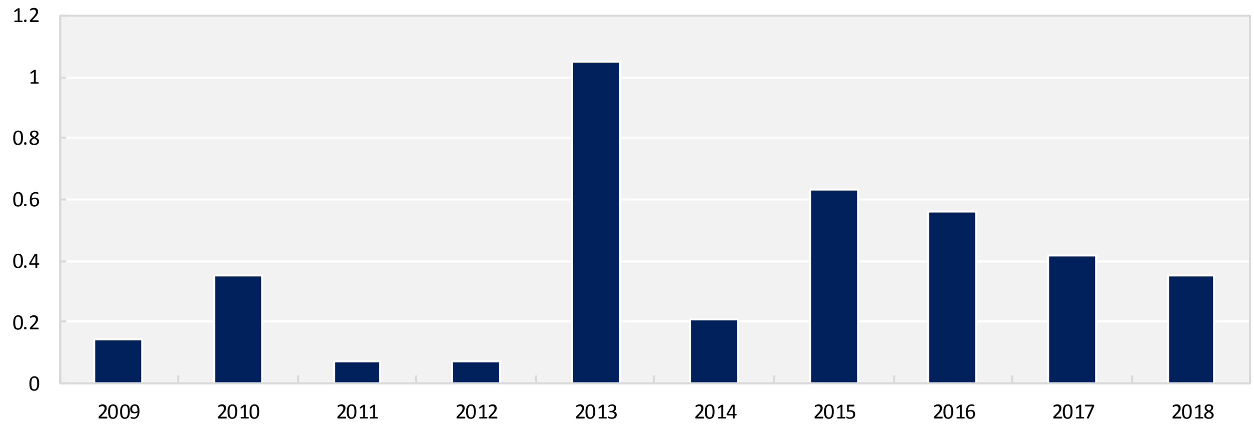



Source: United Energy

## 2.4 Asset performance

We have historically experienced low pole failure rates across our network. For example, our historical wood pole failure rates per 10,000 poles are shown in figure 2.2.

Figure 2.2 Historical wood pole failures (volume)




Source: Category analysis RINs

### 2.4.1 Staked wood poles

Poles were first staked on our network in 1985. The oldest staked poles are now exceeding 30 years old and are starting to exhibit signs of reaching the end of their serviceable lives (e.g. wood at or above the stakes is showing signs of deterioration).

The stakes themselves, however, have not exhibited any significant corrosion and are typically only showing some surface rust.

### 2.4.2 Concrete poles

Concrete poles were installed predominantly between 1972 and 1999 and have a long expected service life.

Some poles located near the coast have been exhibiting signs of deterioration of the steel reinforcing due to rust, and therefore deterioration of the concrete condition. However, this is predominately aesthetic and not affecting their strength.

We also have 2,780 legacy HV concrete poles that are not connected to a common-multiple earth neutral (**CMEN**). These concrete poles may become conductive during a phase to earth fault. This may pose a safety hazard, if a person is touching the concrete pole and the pole earthing is insufficient (i.e. earth grid resistance is insufficiently low to provide safe touch voltage).

### 2.4.3 Steel poles

We have a limited volume of steel poles installed in our network since the mid-1960s. These poles have long expected service life.

Some poles located near the coast have been exhibiting signs of deterioration of the steel structure, but this is limited to surface rust and therefore is not affecting their strength.

# 3 Asset management overview

In Victoria, the management of poles is heavily regulated. For example, if we make changes to any policy relating to the management of poles, we are required to notify ESV.

A summary of our asset management approach for wood poles is provided below.

## 3.1 Wood pole replacement drivers

Our inspection regime determines when wood poles need to be repaired or replaced, based primarily on an assessment of the level of 'sound' wood remaining. The main deterioration drivers for wood poles are set out in table 3.1.

Table 3.1 Wood pole deterioration drivers

| Deterioration drivers | Deterioration factors |
|---|---|
| Timber rot | The speed at which timber rot progresses is dictated by soil moisture, soil acidity, preventative treatments applied, and the natural resistance of the timber species:<br>• internal rot affects the heart wood at the base of the pole and results in the pole being hollowed out<br>• external rot affects the exterior of the pole and results in the girth (circumference) reducing<br>• above ground rot occurs at positions where moisture can enter the pole (e.g. cross arm attachments)<br>• pole tops are exposed as the cut is across the wood grain and water can pool on the flat surface. |
| Fungi | Various fungi can grow on a wooden pole. Certain types of rot fungi (white, brown or soft) can significantly reduce strength properties as they penetrate and break down the cell walls of wood. |
| Termites | Termite attack is typically dependent on the location of the pole and degrades its strength by hollowing it out. Other boring insects can similarly damage wood poles by reducing the thickness of sound wood. |
| Fire | Pole top fires, due to current leakage from insulators or failure of attached distribution equipment, can materially damage poles. |

Source: United Energy

## 3.2 Wood pole failure modes

The physical failure of a pole occurs when the pole has insufficient strength to support the loads applied to it. The pole may break and fall to the ground, or the conductors may provide enough support to keep the pole standing upright. Poles can also fail due to external impacts, such as vehicle collisions.

A functional failure is where a pole is classified as 'unserviceable' and must be either staked (i.e. reinforced) or replaced within specified time periods.

The consequences of a pole failure include damage to property or people from the impact of the pole or electrocution from live conductors. The risk is higher for lines workers if the pole failure occurs during the process of line construction on the pole or in the immediate vicinity.

A pole failure that results in conductors making contact with the ground or other structures will also cause an outage, and in high bushfire risk areas, there is a high probability of a fire start due to arcing/sparking of the conductor.

## 3.3 Wood pole inspection and treatments

There are a number of inspection techniques and processing treatments that can be applied to wood poles and each can affect the poles durability.

### 3.3.1 Wood pole inspection (sound wood)

Sound wood measurements are taken by physically drilling a hole into the pole and assessing the thickness of wood that is not rotten. This method is referred to as the 'dig and drill' method and has been (and continues to be) used in the industry for approximately 50 years.

Drilling a hole in the pole, however, provides an additional point for moisture ingress and weakens the pole. It can also provide false readings as poles do not rot uniformly and the measurement is based on where the pole is drilled.

Since 2018, we have also used 'Woodscan' technology as an additional level of assessment for poles that are deemed 'limited life' or 'unserviceable'.[4] Woodscan provides a more accurate measure of sound wood. Specifically, it uses 12 contact points around the pole to generate 66 scans across each pole section. An ultrasonic scanner measures pulses travelling between these points to detect any defects inside the pole.

The establishment of non-invasive inspection methods for wood poles is preferable to invasive inspection practices. We are committed to pursuing non-invasive inspection methods for all pole types to address these challenges.

### 3.3.2 Pole treatments

Our current standard pole treatment is copper-chrome-arsenate (**CCA**), which replaced creosote as the preferred treatment due to occupational health and safety considerations. However, many creosote treated poles remain in service. These will be replaced by CCA treated poles when they become unserviceable.

Treatments are applied to poles throughout their lives at specified time intervals.

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4 We classify the condition of our poles as either serviceable, limited life, or unserviceable. This classification is based on a decreasing scale of sound wood.

# 4 Identified need

The identified need is to ensure our pole replacement program complies with all our existing safety obligations, supports our commitment to maintaining our reliability performance, and meets community expectations of a sustainable asset management approach over the longer-term.

## 4.1 Complying with our safety and reliability obligations

We must manage network assets in accordance with a range of safety and regulatory obligations, as set out in appendix A. Broadly speaking, the focus of these obligations is to ensure we prudently and efficiently manage the network to maintain reliability, and to minimise safety risks as far as reasonably practicable.

### 4.1.1 Recent industry experience

As a prudent network operator, we closely monitor the experience of other electricity distributors to ensure we continue to manage our network consistent with best practice.

In 2019, a key focus was the two separate reviews undertaken by ESV into the condition and sustainability of Powercor's wood pole safety management approach. ESV has stated its intention to review the sustainability of all Victorian distributors pole replacement practices, and our wood pole replacement practices are like those historically undertaken by Powercor, subject to the following material differences:

- we require pole drilling below the ground line at every inspection, whereas Powercor require drilling every five years
- we use a minimum ‘sound wood’ requirement to determine a wood pole’s serviceability, whereas Powercor use minimum sound wood and a pole calculator tool
- we use Woodscan to assess poles classified as limited life or unserviceable and not suitable to reinforce, whereas Powercor only apply Woodscan to poles classified as unserviceable and not suitable to reinforce.[5]

ESV’s conclusion for Powercor found that its asset management approach for wood poles will not deliver a sustainable safety outcome.[6] ESV also supported Powercor's shift to incorporate age-based factors into its pole condition assessment process to recognise that the fibre-strength of a wood pole will deteriorate over time.[7]

ESV's conclusion has driven further consideration of the need to change our own pole management practices. As a result, we propose to supplement our condition-based replacement and reinforcement program with age-based factors. Consistent with Powercor's approach, we propose to recognise that the fibre-strength of a wood pole will deteriorate over time.

The target of our incremental risk-based program is lower durability poles located in higher consequence areas, reflecting the nature of our network terrain and asset population characteristics. This results in a modest uplift in our pole replacement forecasts.

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5 Woodscan is an ultrasonic scanner measuring pulses travelling between 12 contact points around the pole to detect if there are any defects inside the pole.

6 UE ATT153: ESV, *Powercor - wood pole management, Sustainable wood pole safety management approach, Detailed technical report*, December 2019, p. 14.

7 UE ATT153: ESV, *Powercor - wood pole management, Sustainable wood pole safety management approach, Detailed technical report*, December 2019, p. 84.

### 4.1.2 Long-term sustainability of our pole replacement program

Condition-based replacements alone mean our wood pole population is ageing. In the absence of an increase in intervention volumes, this continued ageing is expected to result in an upward trend in the number of failures of both our LV and HV poles. To the extent that increased failures will drive declining safety and/or reliability performance, this is not consistent with our obligations under the Rules.[8]

### 4.1.3 Compliance obligations

As outlined in section 2.4.2, we have 2,780 legacy HV concrete poles that are not connected to CMEN across our network. A CMEN system of earthing is where the LV neutral conductor is used as the low resistance return path for fault currents, and where its potential rise is kept low by having it connected to earth at a number of locations along its length.

Concrete poles not connected to our CMEN may become conductive during a phase-to-earth fault, and therefore may pose a safety hazard if a person is touching the concrete pole and the pole earthing is insufficient (i.e. earth grid resistance is insufficiently low to provide safe touch voltage). We need to ensure these poles comply with our earthing standards, which are aligned with Australian Standards (AS 2067:2016) for substations and high voltage installations exceeding 1kV, and our obligations to minimise safety risks as far as reasonably practicable.

## 4.2 Meeting customer expectations

We have been talking to our customers and stakeholders about the development of our 2021–2026 regulatory proposal since 2017. This included multiple engagement 'phases', the full details of which are set out in our regulatory proposal.

Our engagement process found that customers viewed maintaining the safety of the network as our core business. It is too important to be traded off and it must be maintained and improved where possible across the network.[9]

We also recognise the clear directive provided to the Victorian electricity distributors by members of parliament. Although these comments were focussed on communities in western Victoria, they have parallels to our network and culminated in ESV's announcement that it will review the sustainability of our pole replacement program in 2020.

For example, the Member for Polwarth, Richard Riordan MP highlighted the safety concerns of Western Victorians, drawing attention to the findings of the Victorian Bushfire Royal Commission:

> *"We know from the findings of the Bushfire Royal Commission, and subsequent Grimes Review that compromised power poles can, and have started devastating bushfires in our community."*

Mr Riordan also highlighted the small percentage of the pole population that has been replaced in recent years. In his view, there is a 'tsunami of replacements' that will be required because many of the poles are 60 or 70 years old.

In March 2019, a bushfire safety forum in Terang was attended by the Federal Energy Minister, Angus Taylor, and the Federal cabinet minister and Member for Wannon, Dan Tehan, alongside state politicians Richard Riordan and Bev McArthur. The forum was attended by 60 members of the community. The key message from the Energy Minister was that current inspection and replacement programs needed to improve. In addition, Mr

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8 NER, clause 6.5.7(a)(3).

9 UE ATT084: Woolcott Research and Engagement, *United Energy integrated summary report*, August 2019, p. 4.

Tehan emphasised the need for ESV's regulatory requirements to be enforced and strengthened, calling on ESV to protect the community.

# 5 Replacement forecast

Our pole replacement forecasts comprise our condition-based pole replacement program (including staking), additional risk-based replacements to recognise the deterioration of fibre-strength of wood poles over time, and a targeted program to address concrete poles in areas not connected to CMEN. We consider that collectively, this program will address the identified need outlined in section 4.

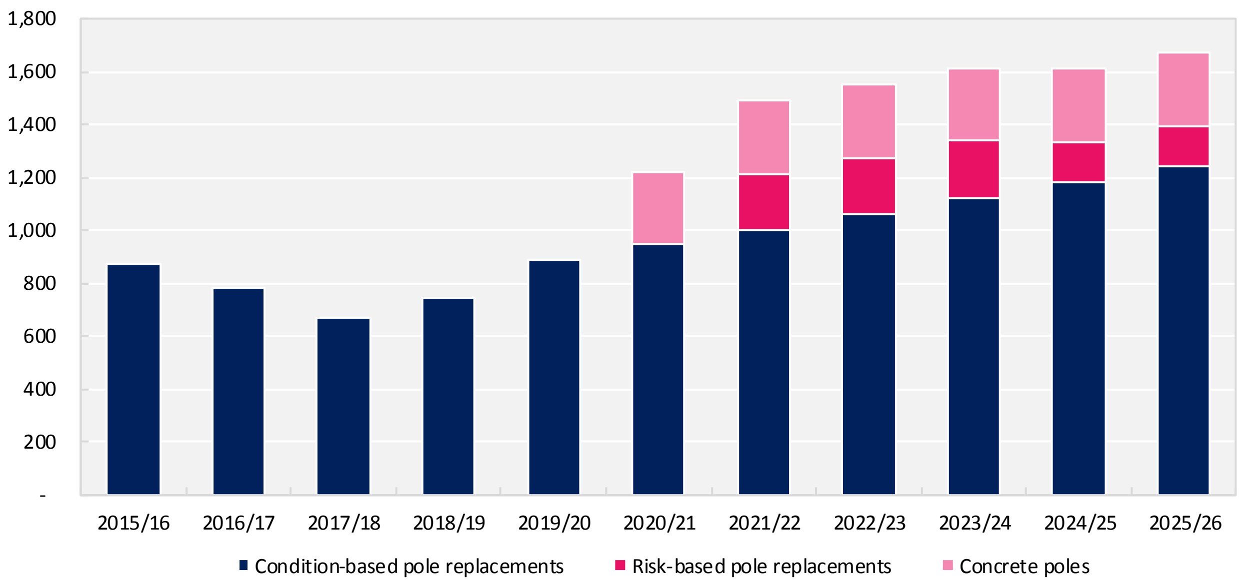
Our additional risk-based replacement program also impacts our service line and pole-top structure replacement forecasts. As outlined below, we have forecast adjustments to these programs to avoid double-counting replacement volumes.

Further detail on our pole replacement volumes and expenditure is set out in our plant, station and lines replacement model.[10]

## 5.1 Forecast volumes

This section outlines how we have developed our replacement volume forecasts for each component of our pole replacement program. Our historical and forecast pole replacement volumes are summarised in figure 5.1.

Figure 5.1 Forecast wood pole replacement volumes




Source: United Energy

### 5.1.1 Condition-based pole interventions

Our business-as-usual condition-based pole intervention volumes have been forecast using a linear trend of intervention volumes since 2010. These trends are forecast separately for LV, HV and sub-transmission poles in our unitised replacement volume model, and the split of interventions between pole staking and replacement is based on observed historical percentages.[11]

10 UE MOD 4.03 - Plant, stations and lines replacement - Jan2020 - Public

11 UE MOD 4.02 - Unitised volume model - Jan2020 - Public

Our forecast of condition-based intervention volumes for the 2021–2026 regulatory period is summarised in table 5.1. The upward trend in condition-based interventions is consistent with the continued ageing of our wood population.

Table 5.1 Condition-based pole interventions (volumes)

| Description | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| Condition-based replacements | 1,004 | 1,063 | 1,122 | 1,180 | 1,239 |
| Condition-based reinforcements | 1,639 | 1,737 | 1,834 | 1,931 | 2,029 |
| **Total** | **2,644** | **2,800** | **2,956** | **3,112** | **3,268** |

Source: United Energy

### 5.1.2 Risk-based pole replacement program

Our incremental risk-based pole replacement program has been forecast using our existing pole condition data and our serviceability index assessment method. Our serviceability index method is consistent with that supported by ESV.[12]

Specifically, our assessment method determines serviceability based on equation 1 below.

Equation 1 Serviceability index

$$SI = \frac{\text{Residual capacity}}{\text{Design load}}$$

This serviceability index is a measure of the limit state design (**LSD**) residual structural capacity ('residual capacity') of the pole divided by the ultimate LSD load ('design load'). The residual capacity (**$F_{rs}$**), is determined from equation 2.

Equation 2 Residual capacity

$$F_{rs} = \frac{\emptyset f_{bs} Z_s}{h} \times 10^{-6}$$

where:

- $\emptyset$ is the strength reduction factor for wood poles, derived from AS 7000
- $f_{bs}$ is the residual fibre strength of the pole, and includes the fibre strength degradation factor for the age of the pole which is derived from ENA research[13]
- $Z_s$ is the residual section modulus of the pole at the section 'h' distance from the tip of the pole to the ground.

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12 For example, recommendation seven in ESV's review of Powercor's wood pole asset management practices stated that the development and implementation of its serviceability index-based assessment methodology will lead to a more accurate representation of the likelihood of pole failure over time. UE ATT200: ESV, *Powercor - wood pole management, Sustainable wood pole safety management approach, Detailed technical report*, December 2019, p. 16.

13 ESV concluded that this ENA research provides a reasonable basis for enhanced serviceability algorithms to incorporate strength degradation more explicitly. UE ATT200: ESV, *Powercor - wood pole management, Sustainable wood pole safety management approach, Detailed technical report*, December 2019, p. 82.

The application of our enhanced serviceability index assessment method uses our underlying pole condition data for class three poles only.[14]

The serviceability outputs for our class three population are used as a proxy for the probability of pole failure, with high bushfire risk areas targeted to reflect the greater consequence of failure (relative to low bushfire risk areas).

Whilst data limitations currently prevent us from quantifying the asset risk cost in accordance with the AER's risk monetisation approach, we regard it as prudent and efficient to undertake additional risk-based replacement volumes, consistent with our safety obligation to ensure that safety risk is as low as reasonably practicable. We also consider our conceptual approach is consistent with the AER's risk framework.

Our forecast of risk-based replacement volumes for the 2021–2026 regulatory period is shown in table 5.2.

Table 5.2 Risk-based pole replacements (volumes)

| Description | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| Risk-based replacements | 209 | 212 | 216 | 152 | 152 |

Source: United Energy

### 5.1.3 Concrete poles

Our forecast for addressing the 2,780 legacy HV concrete poles that are not connected to our CMEN is based on implementing a 10-year remediation program (in line with our 10-yearly earth integrity testing obligations). This program will address concrete poles by a combination of replacing existing insulators or connecting to the nearest CMEN network.

An alternative solution of replacing these concrete poles with wood poles was not considered to be economic.

Our forecast of concrete pole replacement volumes in non-CMEN areas for the 2021–2026 regulatory period is shown in table 5.3.

Table 5.3 Concrete pole replacements in non-CMEN areas (volumes)

| Description | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| Concrete pole replacements in non-CMEN area | 278 | 278 | 278 | 278 | 278 |

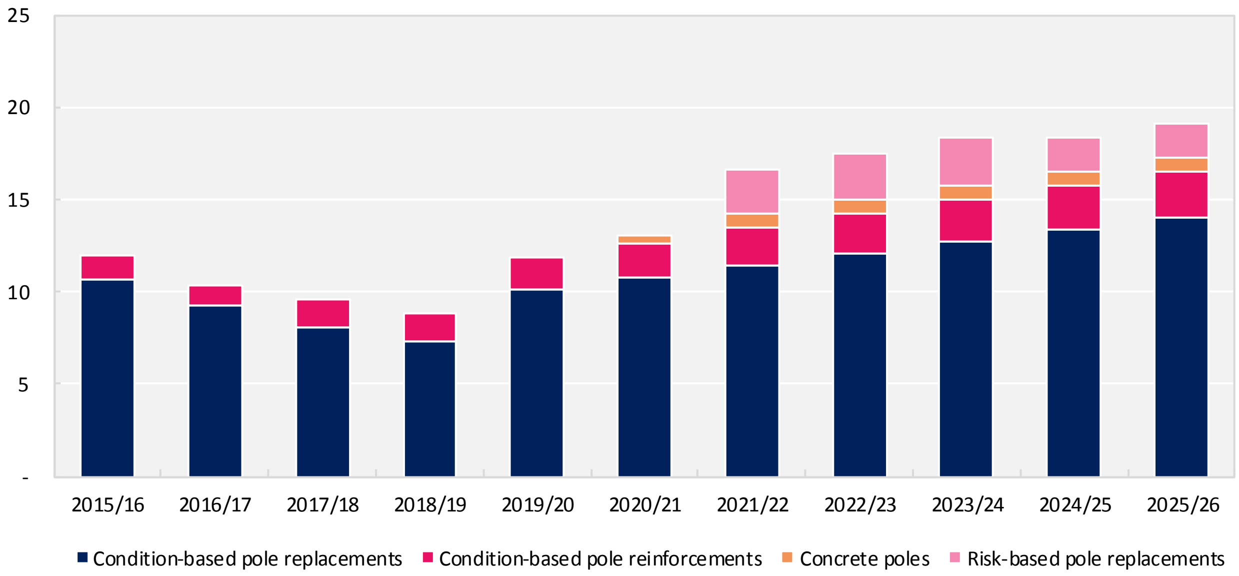
Source: United Energy

## 5.2 Forecast expenditure

We have forecast replacement expenditure for poles based on the volumes set out in section 5.1, and historical unit costs over the period 2015–2018. A summary of our total historical and forecast expenditure for poles is shown in figure 5.2 and table 5.4.

14 Australian Standards divide timbers into four durability classes, which relate to only the non-preservative treated heartwood or true-wood, with class one being the most durable.

Figure 5.2 Forecast wood pole replacement and reinforcement expenditure ($ million, 2021)




Source: United Energy

Table 5.4 Forecast wood pole replacement and reinforcement expenditure ($ million, 2021)

| Description | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | Total |
|---|---|---|---|---|---|---|
| Condition-based replacements | 11.5 | 12.1 | 12.8 | 13.4 | 14.1 | 63.8 |
| Condition-based reinforcements | 2.0 | 2.1 | 2.2 | 2.4 | 2.5 | 11.2 |
| Risk-based pole replacement program | 2.5 | 2.5 | 2.6 | 1.8 | 1.8 | 11.2 |
| Concrete poles | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 3.9 |
| **Total** | **16.7** | **17.6** | **18.4** | **18.4** | **19.2** | **90.2** |

Source: United Energy
Note: Totals may not add due to rounding

When we replace a pole, we may also replace any wood cross-arms on the pole (as these no longer meet our technical standards, and are typically older assets). Accordingly, we have reduced our pole-top structure forecast to ensure that cross-arms replaced as part of our incremental pole replacement program are not double-counted.

In contrast, we have increased our service line replacement volumes (i.e. as we replace more poles, we will find more non-preferred service line types). These service line replacements represent a small percentage of our total service line expenditure, and unlike cross-arms, are not reflected in our pole replacement expenditure forecasts.

These adjustments are itemised in our plant, station and lines replacement model, and are summarised below in table 5.5.[15]

Table 5.5 Other asset replacement adjustments due to incremental pole replacements ($ million, 2021)

| Description | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| Pole-top structures | -0.2 | -0.2 | -0.3 | -0.2 | -0.2 |
| Service lines | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 |
| **Total** | **-0.2** | **-0.2** | **-0.2** | **-0.1** | **-0.1** |

Source: United Energy

15 UE MOD 4.03 - Plant, stations and lines replacement - Jan2020 - Public

# A Compliance obligations

An overview of the relevant compliance obligations for our pole asset category is provided below.

## A.1 National Electricity Rules

The Rules set out the capital and operational expenditure objectives, factors and criteria.[16] The key requirements are to prudently and efficiently manage the network to maintain safety, maintain reliability and comply with all applicable regulatory obligations.

## A.2 Victorian Electricity Distribution Code

Clause 3.1 of the Victorian Electricity Distribution Code (**the Code**) requires us to manage our assets in accordance with principles of good asset management. Under this provision, we must, among other things, develop and implement plans for the acquisition, creation, maintenance, operation, refurbishment, repair and disposal of its distribution system assets:

- to comply with the laws and other performance obligations which apply to the provision of distribution services including those contained in the Code
- to minimise the risks associated with the failure or reduced performance of assets
- in a way which minimises costs to customers taking into account distribution losses.

## A.3 Electricity Safety Act 1998

The Electricity Safety Act 1998 (**the Act**) makes provisions relating to:

- the safety of electricity supply and use
- the reliability and security of electricity supply
- the efficiency of electrical equipment.

Under section 98 of the Act, we (as a major electricity company) must design, construct, operate, maintain and decommission its supply network to minimise as far as practicable:

- the hazards and risks to the safety of any person arising from the supply network
- the hazards and risks of damage to the property of any person arising from the supply network
- the bushfire danger arising from the supply network.

Section 99 of the Act requires that we prepare and implement an electricity safety management scheme, which specifies our safety management system for complying with obligations under section 98.

## A.4 Electricity Safety (Management) Regulations 2009

Electricity Safety (Management) Regulations 2009 (made under section 150 of the Act) set out the requirements for an Electricity Safety Management Scheme (**ESMS**), including an electrical safety management system. An ESMS is compulsory, and effectively covers all documentation, procedures, accreditation, monitoring and reporting of work on or for designing, installing, operating, maintaining and decommissioning network assets. The ESMS must be submitted to Energy Safe Victoria (**ESV**) every five years for acceptance, and is audited by ESV.

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16 NER, clauses 6.5.6 and 6.5.7.

The Safety Management System incorporates all network asset policies, procedures, systems, standards and controls in place to manage network safety.

## A.5 Electricity Safety (Bushfire) Regulations 2013

Clause 7(1)(i) requires major electricity companies to inspect electricity assets located in hazardous bushfire risk areas at intervals not exceeding 37 months and inspect electricity assets located in other areas at intervals not exceeding 61 months.

Clause 7(2) clarifies that the assets that must be inspected under the schedule specified in clause 7(1)(i) do not include assets located in a terminal station, a zone substation or any part of the major electricity company's underground supply network that is below the surface of the land.