

Cost pass through application 2019-20 Bushfire season

13 November 2020

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Contents

Exe	cutive	Summary1
1.	Intro	oduction5
	1.1	Purpose of this document5
	1.2	Our written statement5
	1.3	Timing of this Application5
	1.4	Structure of this Principal Application6
	1.5	Structure of our Supporting Materials6
2.	Impa	act of the 2019-20 bushfires on our network and our response9
	2.1	The 2019-20 NSW bushfire season9
	2.2	Overview of the impact of the 2019-20 NSW bushfires on our network and our response activities
	2.3	Network safety and restoration activities11
	2.4	Condition assessments14
	2.5	Network repairs
	2.6	Vegetation management and access
	2.7	Augmentation expenditure to provide supply to Essential Energy's network in Cabramurra and Mt Selwyn area5
3.	Natu	ure of the regulatory requirements6
	3.1	Positive change event
	3.2	Pass through event
	3.3	Positive Pass through amount7
	3.4	Framework for the AER's assessment7
4.	How	v we meet the regulatory requirements9
	4.1	Natural disaster pass through event9
	4.2	Material increase in providing prescribed transmission services11
	4.3	A single natural disaster event11
	4.4	Contingent project or trigger event12
5.	Our	incremental costs
	5.1	Overview of total costs
	5.2	Actual costs14
	5.3	Expenditure Forecast
	5.4	Costs are not included in the current determination17
6.	Our	proposed positive pass through amount18
	6.1	Pass through amount
	6.2	Materiality of costs



7.	Why	our costs are prudent and efficient	21				
	7.1	Governance procedures and practices – emergency response	21				
	7.2	Collaboration with emergency response agencies	23				
	7.3	Our control and asset monitoring centres	23				
	7.4	Governance procedures and practices - Identifying the required corrective work program	24				
	7.5	Electricity Network Safety Management System	25				
	7.6	Efficient costing of our forecast repair works	25				
	7.7	Vegetation Management Policies and Procedures	27				
	7.8	Insurance considerations	28				
8.	Demo	onstration of our compliance	29				
Glos	sary		30				
Арре	endice	S	32				
	Appe	ndix A – Impact of Major Bushfires in our network area	32				
	Appendix B – Contingent Projects						



Executive Summary

We are submitting this cost pass through application (Application), in accordance with clause 6A.7.3(a) of the National Electricity Rules (NER or Rules), to recover (i.e. pass through to customers) the additional costs for providing prescribed transmission services arising from the 2019-20 bushfire season in New South Wales (NSW). We are submitting this Application now, in accordance with the extended timeframe for making a pass through application approved by the Australian Energy Regulator (AER)¹.

Bushfires, State of Disaster and Government inquiries

The 2019-20 bushfire season was the worst bushfire season in NSW history and overlapped with fires in the Australian Capital Territory (ACT), Queensland and Victoria, while there were also fires burning simultaneously in South Australia (SA) and Western Australia². The 2019-20 Australian bushfires are known as the Black Summer bushfires³.

The 2019-20 NSW bushfires set a new benchmark for an extreme fire season in Australia's temperate forests⁴. There were 11,774 fires across NSW during the 2019-20 fire season,⁵ which ran for eight months between 1 July 2019 and 31 March 2020, including two mega-fires⁶. The last fires were extinguished on 2 March 2020 after 240 consecutive days of active bush or grass fires⁷.

The leading factor contributing to the frequency, intensity, timing and location of the 2019-20 NSW bushfires was the severe drought affecting NSW⁸. Most of NSW was into its third year of severe drought and in 2019, NSW experienced both its hottest and driest year on record⁹. Lightning was the suspected, immediate cause of ignition for the vast majority of the largest and most damaging fires across NSW in the 2019-20 season¹⁰.

Given the unprecedented scale and extreme nature of the 2019-20 bushfire season a number of inquiries to investigate the bushfires were initiated – these include:

- > the NSW Bushfire Inquiry (NSW Inquiry)¹¹
- the Senate Inquiry into lessons to be learned in relation to the preparation and planning for, response to and recovery efforts following the 2019-20 Australian bushfire season ¹² (Senate Inquiry), and
- > the Royal Commission into Natural Disaster Arrangements (Royal Commission)¹³

The catastrophic nature of the 2019-20 NSW bushfires resulted in the NSW Government declaring three states of emergency on 12 November 2019, the 19 December 2019 and 2 January 2020. Each declaration was in force for a week and it was the first time a State of Emergency had been made in NSW since October 2013.



¹ On 12 March 2020, the AER approved our request to extend the timeframe to submit our Application in relation to the 2019-20 bushfires until 13 November 2020

² Final Report of the NSW Bushfire Inquiry, 31 July 2020 p.2 (NSW Bushfire Inquiry). Found at Link

³ The Senate, Lessons Learned – Interim report, p.3. Found at Link

⁴ Royal Commission into National Natural Disaster Arrangement - Interim Observations – 31 August 2020, (Royal Commission Interim Observations) p. 5. Found at <u>Link</u>

⁵ NSW Bushfire Inquiry, p. 23

⁶ The Senate, Lessons Learned – Interim report, p. 9 found at <u>Link</u>

⁷ NSW Bushfire Inquiry, p. 29

⁸ GHD, Independent Verification 2019-20 Bushfire cost pass through application (GHD Independent Verification), 30 October 2020

⁹ NSW Bushfire Inquiry, p. 36

¹⁰ NSW Bushfire Inquiry, p. 28

¹¹ Found at Link

¹² Found at Link

¹³ Found at Link

The NSW Government also declared the 2019-20 bushfires a natural disaster in 51 Local Government Areas (LGAs) across the state.¹⁴ This declaration applied to the NSW bushfires after 31 August 2019 and included the Lithgow, Blue Mountains and Hawkesbury LGAs (Gospers Mountain fire), Wingecarribee and Wollondilly LGAs (Green Wattle Creek fire) and Shoalhaven LGA (Currowan fire).

Impact on our network

The 2019-20 bushfire season first impacted our network on 6 September 2019, and our assets were within the active fire zones until the fire season finished in March 2020. During the 2019-20 bushfire season, there were three distinct bushfire locations in our network:

- > Northern NSW from October 2019 to November 2019
- > Central NSW from mid-November 2019 to the end of January 2020, and
- > Southern NSW / Snowy Mountains from late December 2019 to January 2020.

The 2019-20 bushfires caused unprecedented damage to our network assets, in particular to our transmission line assets given their proximity and exposure to the fires and the intensity of the fires. Our transmission line assets within the active bushfire impacted zones included:

- > 999km of transmission line route length (comprising over 9,000km of conductors and earth wires), or 9 per cent of our transmission line route length and
- > 2,681 transmission line structures comprising 1,822 steel lattice tower and pole structures, 596 wood poles structures and 263 concrete structures.

Substations were also impacted, with three of our substations having fire up to the buffer zone and or fence, two of which lost auxiliary power supplies. Smoke and soot impacted 32 of our substations causing high levels of pollution-related discharge activity on equipment.

Our response efforts

The impact of the 2019-20 NSW bushfires and our response can be considered under four categories:

- Network safety and restoration activities emergency works to make assets safe and restore supply to our customers as quickly as possible where it was safe to do so. These costs have already been incurred.
- Condition assessments works to assess the damage caused to our equipment and surrounding areas and to identify priority repairs. These costs have also already been incurred.
- Network repairs works to repair the damaged parts of our network, to manage network safety risk to tolerance levels or As Low As Reasonably Practicable (ALARP), in accordance with our obligations. These proposed works are reflected in our forecast expenditure, and
- > Vegetation management and access works this comprises:
 - works required as a priority following the fire damage to provide and maintain access to our infrastructure. The cost of this work has also already been incurred.
 - further work to restore access and remove identified hazard trees, which has been scheduled following subsequent inspections. The cost of this proposed work is reflected in our forecast expenditure.

We plan for bushfires and take advice from the NSW Rural Fire Service (RFS) and other authorities about the upcoming season to prepare to enable continuing safe and efficient electricity transmission throughout NSW



¹⁴ See Link - Resilience NSW, Natural Disaster Declarations 2019-2020

and the ACT. When bushfires or other extreme weather events occur, our immediate and highest priority is protecting the community and our people including our staff, who work to repair the damage.

In the immediate aftermath of each bushfire, we undertook emergency works to make hazardous situations safe and restore assets which were rendered inoperable. We acted as quickly as possible to respond to the bushfires on our network, including by taking pre-emptive action in response to the heightened threat, where possible. This included:

- > keeping the community and our people updated with the latest information throughout the event, including through our website (see Link) and bushfire updates blog (see Link)
- > dispatching staff to critical interconnector sites to ensure that in the event of fire causing an interruption, we could respond immediately to faults, failures and outages to reduce any potential impacts and prevent loss of access to critical sites
- > working collaboratively with the NSW RFS, the Energy Utilities Services Functional Area Coordinator (EUSFAC) and other authorities as well as the NSW distribution network service providers (DNSPs) to restore supply as quickly as possible to customers and to reduce public safety risks
- > clearing vegetation and removing trees to allow crews to access network assets and impacted transmission lines to perform repair and replacement work. Extensive amounts of burnt out vegetation required removal for the ongoing safe operation of our network
- > using temporary generators to maintain supplies to our impacted switching stations and communications sites so they remained operational in the immediate aftermath of the bushfires, and
- > mobilising internal workforce and contracted service providers to make assets safe and remediate damage to substations and transmission lines in order to restore supply and transmission services.

All of these activities were undertaken consistent with our Corporate Response Emergency Management Framework (CREMF) and Power System Emergency Response Plan (PSERP).

Our emergency response has been followed by:

- > extensive condition assessment of bushfire damaged components of our network, and
- > ongoing remedial works to ensure the continued safe operation of the network, covering both priority repairs to assets (in particular transmission line conductors in the Snowy Mountains region) and further vegetation management to remove hazard trees.

These activities have been identified and scheduled in accordance with our corrective maintenance process. We have identified the network repair works necessary to continue to manage network safety risk to be below tolerance levels, or ALARP, consistent with our Electricity Network Safety Management System (ENSMS).

We have only included items for repair that are required to manage network safety risk to ALARP. For example, there are several transmission line spans which had minor damage but currently pose minimal risk. Remediating these to pre-bushfire condition would be considered disproportionate under ALARP. We will instead continue to monitor these issues during routine inspections and re-assess the condition and risk after each inspection.

Our costs arising from the bushfires

The response and restoration effort to address the 2019-20 bushfire season has materially impacted our costs of providing prescribed transmission services.

We have incurred \$10.6 million (Real 2017-18) and expect to incur a further \$39.2 million (Real 2017-18) in additional costs as a result of the 2019-20 NSW bushfires, which are not included in our 2018-23 Revenue Determination. These additional costs relate directly to the 2019-20 NSW bushfires and would not be incurred if the bushfires did not occur.



Our decisions and actions in relation to the risks presented by the 2019-20 NSW bushfires were prudent and efficient, and we took all reasonable action to reduce the magnitude of the costs we incurred. Our annual bushfire preparedness activities include mitigations for externally caused bushfires passing through or near our assets and we report our bushfire preparedness each year in our ENSMS – Annual Performance Report¹⁵ in accordance with the Independent Pricing and Regulatory Tribunal's (IPART) Electricity Networks Reporting Manual. However, the 2019-20 NSW bushfire season was unprecedented in its scale and intensity.

Our governance procedures and practices have determined our response, both in terms of our immediate emergency activities and identifying and prioritising our planned repair activities. We undertook a number of pre-emptive actions to minimise the impact on our network (and the potential disruptions to electricity supply) and our response costs. This included collaborating with emergency response bodies and applying our approved vegetation management policies.

The AER's approval of our prudent and efficient actual and forecast expenditure reflected in this Application will enable us to recover the expenditure needed to continue to manage and operate our network to a safety and risk mitigation level of ALARP in accordance with our obligations under:

- > the NSW Electricity Supply (Safety and Network Management) Regulation 2014, and
- > our ENSMS¹⁶.

The forecast expenditure for our transmission line remediation works are predominantly based on costs from similar recent works and existing contract rates (from our competitively sourced construction panel). Due to the bespoke and unique nature of the works, which are predominantly in the remote Snowy Mountains area, we have only sourced costs from our success estimating system where there was no actual costs or contract costs to draw from. The reasonableness of our cost forecasts has been confirmed by an independent assessment by GHD.

Positive cost pass through amount

Our 2018-23 Revenue Determination includes a pass through event for natural disasters, including bushfires, which materially increases the costs of providing prescribed transmission services.

This Application establishes the matters in clause 6A.7.3(c) of the NER and seeks the AER's approval to pass through to Transmission Network Users (customers) the positive pass through amount of \$53.2 million (Nominal), or \$55.5 million (Nominal) when smoothed over the last two years of the 2018–23 period. This revenue amount is directly attributed to the 2019-20 bushfire event and is derived from the additional costs in providing prescribed transmission services, which were not included in the AER's 2018-23 Revenue Determination.

The incremental costs arising from the 2019-20 bushfires amount to 1.2 per cent, 1.7 per cent and 3.7 per cent of our Maximum Allowed Revenue (MAR) for the 2019-20, 2020-21 and 2021-22 regulatory years, and therefore exceed the one per cent of MAR materiality threshold in the NER for the pass through event to be a positive change event.

We propose that the positive pass through amount be recovered in regulatory years 2021-22 and 2022-23, which are the two remaining years of the current regulatory period.

¹⁶ Our ENSMS follows the International Organization for Standardization's ISO31000 risk management framework which requires following a hierarchy of hazard mitigation approach



¹⁵ 2019 Report found at Link

1. Introduction

1.1 Purpose of this document

The purpose of this document is to detail our Application for a positive pass through amount for the 2019-20 NSW bushfire season, which we consider to be a single event eligible for a cost pass through under the Natural Disaster Event included in our 2018-23 Revenue Determination.

Unless otherwise specified, all expenditure forecasts are expressed in real terms (2017-18), and all revenue forecasts are expressed in nominal terms, consistent with our 2018-23 Revenue Determination.

1.2 Our written statement

This Application, and supporting documents, establish the matters in clause 6A.7.3(c) of the NER ('written statement'), being:

- > the details of the positive change event
- > the date on which the positive change event occurred
- > the eligible pass through amount in respect of the positive change event
- > the positive pass through amount proposed in relation to the positive change event
- > the value of the positive pass through amount proposed to be passed through to customers by regulatory year
- > evidence of the actual and likely increase in costs arising from the event
- > evidence that such costs occur solely as a consequence of the positive change event, and
- > any other information as may be required under any relevant regulatory information instrument.

Clause 6A.7.3(c)(7) of the NER requires us to provide any other information as may be required under any relevant regulatory information instrument. No such instrument has been issued by the AER at the time of submitting this Application. In accordance with clause 6A.7.3(e1) of the NER, we would welcome any necessary information request and consultation from the AER in the course of its consideration of our Application.

This Application also addresses the matters that the AER must take into account in deciding the approved pass through amount, being the matters listed in clause 6A.7.3(j) of the NER.

Chapter 8 details where in our Application we have provided this information.

1.3 Timing of this Application

The NER require us to submit a cost pass through application to the AER within 90 business days of the event occurring, to seek the AER's approval to increase in the costs of providing prescribed transmission services arising from the positive change event.

On 19 February 2020, we submitted a request to the AER under clause 6A.7.3(k) of the NER for an extension to submit our Application beyond the standard 90 business day limit. At that time the 2019-20 bushfires in NSW were not extinguished and the full extent of the damage to our network was not yet known. We advised the AER that we would not know, with a high degree of accuracy, the extent of the damage and cost to our network until we had safe access to complete the required condition inspections.

On 12 March 2020, the AER approved our request to extend the timeframe to submit our Application until 13 November 2020.



By lodging this Application on 13 November 2020, the timeframe requirement for submitting cost pass through applications has been met.

For the purposes of complying with 6.6.1(c)(2) of the NER, we consider it is reasonable to nominate 31 March 2020¹⁷ as the final day of the 2019-20 NSW bushfire season and therefore the date on which the positive change event occurred. This is the date that the NSW Inquiry Report declared the 2019-2020 bushfire season to have ended. We note, however, that on 2 March 2020 the NSW Rural Fires Service (RFS) declared that there were no longer any active fires in NSW.

1.4 Structure of this Principal Application

The remainder of this document is structured as follows:

- > Chapter 2 describes the impact of the 2019-20 NSW bushfire season on our network and our response activities
- > Chapter 3 sets out the regulatory requirements for cost pass through applications
- > Chapter 4 explains how we meet these regulatory requirements
- > Chapter 5 sets out the incremental costs incurred in providing prescribed transmission services as a result of the 2019-20 NSW bushfire season
- > Chapter 6 sets out the eligible pass through amount and our proposed positive pass through amount in relation to the 2019-20 NSW bushfire season
- > Chapter 7 substantiates the efficiency of our decisions and actions in response to the 2019-20 NSW bushfire season event, and explains why the incremental costs reflected in our proposed positive pass through amount are prudent and efficient, and
- > Chapter 8 summarises where the NER requirements have been addressed in this Application
- > Appendix A is a glossary of terms.

1.5 Structure of our Supporting Materials

Our Application comprises the attachments and models (illustrated in Figure 1 and detailed in Table 1-1) as well as other supporting documents. This Principal Application document references these attachments, models and other supporting documents and should be read in conjunction with them.





Figure 1 – 2019-20 Bushfire Application document structure



The attachments and models are summarised in Table 1-1.

Document / model number	Name	Content/ purpose
A.1	Principal Application document	Seeks the AER's approval to pass through to customers the incremental costs of providing prescribed transmission services incurred in response to the 2019-20 NSW bushfire season event, in accordance with the Natural Disaster pass through event approved for our 2018-23 Revenue Determination.
A.2	Overview of 2019-20 Bushfire Damage to TransGrid's Network	Describes the nature of the 2019-20 NSW bushfire season, our operational response and the damage and remediation required for our network.
A.3	Expenditure Forecasting Methodology	 Explains and justifies our: actual costs to 30 September 2020, relating to additional activities we undertook in response to the 2019-20 NSW bushfire season. These activities predominately related to network safety and restoration, condition assessment and vegetation management and access, and incremental expenditure forecast for repair works to assets damaged as a result of the 2019-20 NSW bushfire season, and presents the basis on which the works have been efficiently scheduled.
A.4	GHD, Independent Assessment of our 2019-20 Bushfire Expenditure	An independent engineering assessment of the reasonableness of our incremental actual expenditure and our forecast of expenditure for repair works arising from the 2019-20 NSW bushfire season.

Fable 1-1 - Documents and models	comprising this	Application	(excluding our	other supporting	documents)
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Document / model number	Name	Content/ purpose
A.5	Expenditure Forecast Model for the 2019-20 Bushfires	Calculates our incremental capex and opex forecasts arising from the 2019-20 NSW bushfire season.
A.6	Actual Cost Spreadsheets for the 2019-20 Bushfires	Sets out our actual incremental costs incurred to 30 September 2020 from responding to the 2019-20 NSW bushfire season.
A.7	Post-Tax Revenue Model	Demonstrates the calculations of our incremental revenue requirements and MAR, based on the incremental costs arising from the 2019-20 NSW bushfire season, in accordance with the NER.

In addition, we have provided the AER with other supporting documents that are referenced within the documents listed in Table 1-1.



2. Impact of the 2019-20 bushfires on our network and our response

The purpose of this chapter is to explain the impact of the 2019-20 NSW bushfires on our network and our response activities, including:

- > the immediate network safety and restoration activities that we undertook to make assets safe and restore supply to our customers as quickly as possible where it was safe to do so
- > our subsequent condition assessment works to assess the damage caused to our equipment and surrounding areas, to identify where priority repairs are required
- > our forecast network repairs to fix the damaged parts of our network, predominantly in the Snowy area where network safety risk is judged to be below tolerance levels, and
- > vegetation management and access works, both the emergency works that were undertaken immediately following each fire and our forecast work to manage the risks associated with hazard trees.

The efficiency of our actions in undertaking each of these response activities, and the efficiency of the associated incremental cost, is discussed in Chapter 7.

2.1 The 2019-20 NSW bushfire season

The 2019-20 bushfire season was the worst bushfire season in NSW history and overlapped with fires in the ACT, Queensland and Victoria, while there were also fires burning simultaneously in SA and Western Australia¹⁸. The 2019-20 Australian bushfires are known as the Black Summer bushfires¹⁹.

The 2019-20 NSW bushfires set a new benchmark for an extreme fire season in Australia's temperate forests²⁰. There were 11,774 fires across NSW during the 2019-20 fire season,²¹ including two mega-fires²², which ran for eight months between 1 July 2019 and 31 March 2020. The last fires were extinguished on 2 March 2020 after 240 consecutive days of active bush or grass fires²³.

2.2 Overview of the impact of the 2019-20 NSW bushfires on our network and our response activities

The 2019-20 bushfire season first impacted our network on 6 September 2019, when the first network fault outage occurred, and finished on 2 March 2020 when the NSW RFS declared that there were no longer any active fires²⁴. Our transmission line assets within the active bushfire impacted zones included:

- > 999km of transmission line route length (comprising over 9,000km of conductors and earth wires), or around 9 per cent of our transmission line route length, and
- > 2,681 transmission line structures comprising 1,822 steel lattice tower and pole structures, 596 wood poles structures and 263 concrete structures.

²⁴ NSW RFS Twitter Feed 02/03/2020 05:10PM, <u>https://twitter.com/nswrfs/status/1234360507919822849?lang=en</u>



¹⁸ NSW Bushfire Inquiry., p.2 Found at Link

¹⁹ The Senate, Lessons Learned – Interim report p. 3. Found at Link

 $^{^{\}rm 20}$ $\,$ Royal Commission Interim Observations, p. 5. Found at $\underline{\rm Link}$

²¹ NSW Bushfire Inquiry, p. 23

 $^{^{\}rm 22}$ $\,$ The Senate, Lessons Learned – Interim Report, p. 9 found at $\underline{\text{Link}}$

²³ NSW Bushfire Inquiry, p. 29

Appendix A lists the major fires in our network and shows that around 9.5 per cent of network area has been impacted by the bushfires.

There were three distinct 2019-20 bushfire locations in our network:

- Northern NSW from September 2019 to November 2019 the bushfires were mainly in the north of the state. These fires predominately affected our 132 kV wood pole assets.
- Central NSW from mid-November 2019 to the end of January 2020 there were a number of significant fires which impacted supplies from the Hunter and Central Coast power stations, and together with the Gospers Mountain fire near Lithgow, were causing outages on our 500 kV and 330 kV assets.
- Southern NSW from late December 2019 to March 2020, the Southern NSW and Snowy Mountains fires took hold and caused extensive damage to the conductors in that region.

The impact of these fires and our response is discussed below:

- > Network safety and restoration activities emergency works to make assets safe and restore supply to our customers as quickly as possible where it was safe to do so. This is discussed in section 2.3 and reflects costs already incurred.
- > Condition assessments works to assess the damage to our equipment and surrounding areas, to identify the need for priority repairs. This is discussed in section 2.4 and reflects costs already incurred.
- Network repairs works to repair the damaged parts of our network, where network safety risk is judged to be below tolerance levels or ALARP, in accordance with our obligations. These works are predominantly located in the Southern area of our network. This is discussed in section 2.5, and reflects our proposed works to address the damage to our network caused by the 2019-2020 bushfire event, and
- > Vegetation management and access works this is discussed in section 2.6, and comprises:
 - works required as a priority following the fire damage to provide and maintain access to our infrastructure. The cost of this work has also already been incurred.
 - further work to restore access and remove identified hazard trees, which has been scheduled following subsequent inspections. The cost of this proposed work is reflected in our forecast expenditure.

Further detail is provided in our 'Overview of 2019-20 Bushfire Damage to TransGrid's Network' provided at Attachment A.2.

The costs that we have and will incur as a result of these activities are detailed in:

- > Chapter 5 Incremental Costs Incurred
- > Expenditure Forecasting Methodology Attachment A.3 (which covers both our actual costs incurred and forecast costs for the remainder of the current regulatory period)
- > GHD, Independent Assessment of our 2019-20 Bushfire Expenditure Attachment A.4
- > Expenditure Forecast Model Attachment A.5
- > Actual Cost Spreadsheets for the 2019-2020 Bushfires Attachment A.6.

We also discuss below future augmentation works we anticipate being asked to undertake by Essential Energy to establish a new connection point from our Upper Tumut Switching Station. These works will restore permanent supply arrangements for Essential Energy's customers in the Cabramurra and Mt Selwyn area following the damage caused to their 33kV supply feeder (849) as a consequence of the 2019-20 NSW bushfire season. However we have elected not to incorporate this cost in our Application because the network planning process is still on-going.



2.3 Network safety and restoration activities

In the immediate aftermath of each bushfire, we undertook emergency works to make hazardous situations safe and restore assets which were rendered inoperable. This included establishing safe access to the transmission lines, replacing burnt out wood poles, restoring broken conductors, replacing damaged insulators and restoring auxiliary supplies to switching stations and communications sites.

Emergency works comprised a mix of temporary repairs to ensure safety in the short term, as well as restoration works undertaken over several weeks. These works were undertaken in close collaboration with the relevant emergency agencies, including the NSW EUSFAC and RFS.²⁵

All network safety and restoration activities have been completed and the associated costs are reflected in our actual costs discussed in Chapter 5.

The following section describes the emergency works that we have undertaken in each of the three bushfire impacted location in our network:

Northern NSW

The Northern NSW fires occurred from September to November 2019 and extended from Lismore down the east coast past Taree and inland as far as Armidale. During this period our network experienced approximately 30 bushfire-triggered outages, on 330 kV and 132 kV assets. The most significant damage occurred to line numbers 963, 965, and 966. During this period nine wood pole structures were destroyed and a significant portion of the north coast was being fed radially and with a constant risk of tripping whilst emergency repairs were being carried out.

A concurrent trip of lines 967 and 89 occurred on 8 October 2019. These lines run parallel to each other and were impacted by the same fire front. These outages led to an Energy Not Supplied (ENS) event at Lismore that lasted 22 minutes and has been calculated to be a total of 30.25 MWh of unsupplied energy, equating to 0.123 system minutes.

Network restoration works were required to prevent similar ENS events from occurring.

The following assets were damaged to an extent that they were inoperable or at imminent risk of failure requiring emergency works to maintain network safety and/or restore the network following asset failure:

- > 963 Tomago to Taree 132 kV Line impacted by the Hillville fire. One wood pole structure was burnt out and required emergency replacement.
- > 965 Armidale to Kempsey 132 kV Line impacted by the Warm Crossing, Carrai Creek and Carri East fires. One wood pole structure was burnt out and required urgent replacement.
- > 966 Armidale to Koolkhan 132 kV Line impacted by the Liberation Trail Fire. Six wood pole structures were destroyed or damaged rendering the transmission line inoperable and required emergency replacement.

These wood pole replacements were undertaken by TransGrid staff (internal labour).

Central NSW

The Central NSW Fires occurred from mid-November 2019 to the end of January 2020. These fires were interrupting supplies from the Hunter and Central Coast power stations, and together with the Gospers Mountain fire near Lithgow, were causing outages on our 500 kV and 330 kV assets. The northern parts of the Shoalhaven fires were also causing outages on our assets in and around Kangaroo Valley.

²⁵ This collaboration is discussed further in Chapter 7

In total there were 12 trips of 500 kV transmission lines. This is significant as these are not only part of the main backbone of our network but are also the tallest and largest structures in the network. The fact that so many trips occurred on these assets indicates the magnitude of the severity of the fires and the volume of smoke being produced at the time.

As well as trips of our 500 kV network there were also 129 outages caused by bushfires on the 330 kV network. This is significant again due to the size of the transmission line structures and shows how they were exposed to the fire and engulfed by the heavy smoke.

Network restoration activities in this region involved the urgent dispatch of staff and diesel generators to Kangaroo Valley Switching Station. The fires caused a loss of supply to the network communications services, preventing us from having SCADA system visibility to safely operate the network, which was restored using the diesel generators.

Southern NSW

The fires in Southern NSW, which occurred from late December 2019 to March 2020 (and included the Snowy Mountains in early January 2020), had the largest impact on our network, causing extensive asset damage.

The events resulted in a NEM regional separation between NSW and Victoria as well as an ENS event at Tumut, with Tumut town blacked out for approximately 2 hours. In the immediate aftermath AEMO placed constraints on the transmission lines and the Victoria – NSW interconnector due to the unknown condition of the assets potentially damaged by the bushfire events until network integrity condition assessments were completed (described in the next section).

We undertook the following emergency network safety and restoration works to restore the security of supply:

- > Tumut 1 to Upper Tumut 330kV Line (TL U3) impacted by the Dunns Road fire. Extensive damage to the aluminium conductor, with much of it melted and one phase with conductor separation rending the line inoperable. Emergency works were required to replace the damaged conductor and restore the transmission line. These works were performed by a construction contractor from our construction panel with our staff making the site safe and providing supervision and management.
- > Upper Tumut to Yass 330kV Line (TL 2) impacted by the Dunns Road and Adaminaby Complex fires. Six structures had insulators damaged and destroyed rendering the line inoperable. TransGrid staff (i.e. internal labour) replaced these insulators to restore the transmission line.
- > 993 Wagga to Gadara 132kV Line (TL 993) impacted by the Dunns Road fire. Five wood pole structures were destroyed and the conductor in this section damaged. TransGrid staff (i.e. internal labour) made the site safe and undertook emergency temporary repairs to facilitate safe use of the Snowy Mountains Highway being used by the RFS. A construction contractor from our construction panel then performed the replacement work of the structures with new steel poles.
- > Upper Tumut and Lower Tumut Switching Stations impacted by the Dunns Road fire. Both sites lost auxiliary power supply. Temporary diesel generators were arranged to restore power to the sites so that they could remain operational before battery backup systems discharged.

Figure 2 below shows the extent of damage in this region requiring emergency works to make safe and restore transmission services.





Figure 2: Bushfire damage rendering assets inoperable in the Snowy Mountains

Repairs on TL 2 and U3 took many weeks due to the extensive works required to make access to the sites safe, given the number of burnt out and hazardous trees. We undertook extensive work which involved clearing access tracks, providing safe access for crews and allow supply restoration and replacement work to take place. An example of the access works is shown in Figure 3 below.

Figure 3: - Access works and hazardous trees



We constantly considered the requirement and priority of restoration activities across the network throughout the 2019-20 bushfire season. For example, the network was extensively impacted by soot and ash from the bushfires, leading to faults on multiple transmission lines causing separation of the NSW and QLD NEM regions in early January 2020, as well as numerous substation sites experiencing elevated electrical discharge and 'tracking' on equipment. We carefully considered and evaluated undertaking washing of insulators to remove the pollutants, however deemed that this activity would not be prudent and that the high levels of electrical discharge could be tolerated in the short term until significant rainfall arrived, saving in excess of \$1 million.



Figure 4: Electrical discharge 'tracking' on insulators



2.4 Condition assessments

Following the immediate safety and restoration activities described above, we undertook condition assessments to ascertain the damage from the bushfires in two stages:

- > Stage one an immediate assessment of the integrity of the network, and
- > Stage two detailed inspections and assessment.

All condition assessment works have now been completed and the associated costs are reflected in our actual costs discussed in Chapter 5.

Each stage of the condition assessment is explained below.

Stage One - Network integrity assessment

Stage one involved us assessing the immediate integrity of our network in January 2020 to inform the extension or removal of market constraints imposed by AEMO. AEMO placed constraints on the transmission lines and the Victoria – NSW interconnector due to the unknown condition of the assets potentially damaged by the bushfire events during severe weather events²⁶.

We used a variety of different assessment techniques to assess the integrity of our network including:

- > helicopter patrols of transmission lines
- > metallurgical inspection and testing of transmission lines
- > inspection and testing of heat affected substation equipment
- > assessment of network property asset operability, e.g. fire systems and CCTV.
- > assessment of communication site equipment operability, and
- > testing of optical fibre communications links.

Stage Two - Detailed condition inspections

Stage two involved inspections and assessment to determine the extent of damage caused to the network. The scale of the bushfires across NSW and ACT meant that the stage two condition assessments have taken



²⁶ AEMO Electricity Market Notice 72574

a number of months to complete, although as noted above, we have now completed these activities and the associated costs are reflected in our actual costs discussed in Chapter 5.

The issues and defects identified in the stage two condition assessments were entered into our Asset Inspection Manager system where work orders for repairs were then issued in accordance with our Corrective Maintenance Process.

Stage two assessments included:

i. Light Detection and Ranging (LiDAR) inspections

We used LiDAR inspections to assess the condition of our transmission line conductors and to assess for material changes in ground clearances. We undertake LiDAR annually to assess vegetation clearances. This inspection was brought forward for the bushfire zones and additional analysis undertaken to assess the condition of the transmission line conductor and to assess for material changes in ground clearances. Only the incremental cost to bring forward the LiDAR bushfire zone inspections and perform the condition analysis has been included in this Application.

We added this to our existing annual LiDAR program which assesses vegetation clearances for efficiency. We have only included the incremental cost to perform the condition assessment work in this Application.

ii. Multi-spectral aerial inspections

We used multi-spectral aerial inspections which combine photographic, infrared (thermographic) and UV (corona) assessments. We undertook these inspections to identify issues caused by the bushfires which are outside of the visual spectrum. We sourced and utilised a technology which allowed for this to occur in a single flight rather than multiple flights for efficiency. Example results are shown in Figure 5 and Figure 6 below.

Figure 5: Example UV (corona) inspection results



Figure 6: Example IR (thermographic) inspection results





iii. Detailed conductor inspections

These inspections involve an enhanced condition assessment technique that uses high-resolution cameras to capture a continuous stream of digital images of overhead conductors, which are processed and analysed using machine learning to detect and map defects.

Detailed conductor inspections are an effective and efficient means of identifying defects, which are hard to see unless close-up and most processing is done through the machine learning algorithms which identify anomalies. This technique was only used in the Snowy Mountains region where the bushfires were most intense, and some conductor damage had already been reported. It was not used in other bushfire affected regions where there were no conductor issues. The application of detailed conductor inspections led to hundreds of conductor defects being identified which were not identified through normal aerial patrols.

Figure 7: Conductor damage example



iv. Other techniques

We applied a number of other inspections and assessment techniques including:

- > conductor sampling and testing we took samples of damaged conductor which could be recovered and sent them for detailed metallurgical analysis. This allowed us to assess the extent to which different conductor types still on the network had been damaged by the heat from the bushfires.
- > insulator testing we sent a sample of bushfire impacted insulators for lab testing to determine if the remaining impacted insulators on the network were fit for service.
- > wood poles we assessed wood poles that were charred, but not destroyed by the fires, to determine their remaining capacity.

2.5 Network repairs

Following the condition assessments described above, we have identified and begun to schedule the necessary corrective maintenance activities.

We manage network safety risk to be below tolerance levels or ALARP in accordance with our obligations under:

- > the NSW Electricity Supply (Safety and Network Management) Regulation 2014, and
- > our ENSMS²⁷

Our proposed remediation will enable us to continue to manage and operate our network to a safety and risk mitigation level of ALARP.



²⁷ TransGrid's ENSMS follows the International Organization for Standardization's ISO31000 risk management framework which requires following a hierarchy of hazard mitigation approach

Our corrective maintenance plans²⁸ identify the damage that is considered a defect requiring remediation, and establishing priorities to undertake the remediation. These maintenance plans have been audited by an independent third party under the direction of our technical regulator, IPART as part of the audits of our ENSMS, which confirm that we are managing network safety risk to ALARP. The damage caused by the 2019-20 bushfire season has been assessed against these maintenance plans and the appropriate priority assigned to each issue.

We have only included items for repair that are required to manage network safety risk to ALARP. For example, there are several transmission line spans which had minor damage but currently pose minimal risk. Remediating these to pre-bushfire condition would be considered disproportionate under ALARP. We will instead continue to monitor these issues during routine inspections and re-assess the condition and risk after each inspection.

We have planned the network repair work that must be carried out over the next couple of years and have commenced this work. Our actual costs and forecast expenditure associated with this work is discussed in Chapter 5.

These repair works must be performed in a staged and coordinated manner as the work generally requires network outages or is constrained by access (e.g. it not safe to access the Snowy Mountains region during snow season).

The category of network repairs that makes the most significant contribution to our forecast pass through expenditure is conductor repairs, which are focused on assets in the Snowy Mountains area.

Other required repairs include:

- > aerial ball marker repairs (in Kangaroo Valley and the Snowy Mountains area)
- > vibration damper repairs (which are required on assets all across our network)

Each of these repairs are explained in section 2.5.1 to 2.5.3 below.

2.5.1 Conductor repairs

Conductor repairs contribute the bulk of our expected network repair costs. In particular, extensive conductor damage has been identified in the Snowy Mountains region where the bushfires were most intense. There is evidence of conductor temperatures exceeding 645°C, with extensive conductor damage observed and what was molten aluminium on the ground below the conductor as shown in Figure 8.

²⁸ Maintenance Plan – Transmission Line Assets, Maintenance Plan – Easements & Access Tracks, and Corrective Maintenance Process



Figure 8: Conductor damage example



Heat from bushfires can impact conductors through various mechanisms including annealing of the aluminium strands, loss of conductor grease and the loss of the galvanizing layer from the inner steel strands of Aluminium Conductor Steel Reinforced/Galvanised (ACSR/GZ) type conductors. Annealing and melting of zinc galvanising (where that leads to Liquid Metal Embrittlement (LME)) have the potential to immediately impact conductor performance through a reduction in tensile strength.

The repair of conductor damage is focused only on repairing damage which has resulted in annealing and loss of conductor strength and therefore presents an urgent issue. We have not included repairing conductors which are only subject to longer term performance issues, for example through reduced corrosion performance from a loss of conductor grease or general loss of the galvanizing layer.

This focus has resulted in proposed repairs on only 49 per cent of the conductor length damaged by the bushfires. Figure 9 shows a count of each span with conductor damage and those which require urgent repairs (the cost of which is reflected in this Application) and those for which we are not currently proposing repairs.





The damaged conductors requiring urgent repair are those where their risk of failure is increased by:

- > significant loss of strength through the annealing of the aluminium, and in the case of conductors with a steel core potential loss of strength of the steel core through LME. While they are presently in service, a weather or operational event which exposes these conductors to higher mechanical loads than they have experienced to date since the 2019-20 bushfires may result in their failure, and
- > the deformation and 'un-wrapping' of the conductor adversely impacting the heat generation and dissipation characteristics, leading to overheating on the conductor in the damaged areas. The overheating under higher electrical loading conditions may be hot enough to reduce clearances below standards and further reduce the strength of the conductor and cause it to fail.

The consequence of a failure on the transmission lines with conductor damage is significant, as all of the impacted transmission lines support generation from the Snowy Hydro scheme as well as forming part of the NSW – VIC electricity transmission interconnection paths. A single transmission line conductor failure at a time of high electricity power transfer could then have a cascading effect, as loss of one transmission line will push more electrical load onto the other transmission lines which are also suffering damage and therefore placing them at greater risk of also failing in a cascading event.

The terrain in the Snowy Mountains area means that restoration of any conductor failure may take many weeks or even months. It is therefore imperative that we repair the urgent damage to maintain the integrity of the NEM.

We have made plans to undertake the repairs over the 2020-21 and 2021-22 financial years. It will take this long to undertake the repairs as the repairs can generally only be performed on one transmission line at a time due to the impact of taking outages on the NEM. It is also only possible for us to safely undertake the work outside of the winter months when much of this alpine area is under snow cover. We have also avoided undertaking the repair works in the summer period when electricity demand is higher (avoiding stressing damaged network elements) and the impact on the NEM is larger. The first conductor repair is planned and ready to commence in November 2020.



We are implementing operational controls to monitor and prevent failure of the conductors, however this may come with the need to de-rate transmission lines or take network elements out of service during high load periods until the damage is remediated. These will both impact the NEM adversely and increase the risk of load shedding. We are planning to undertake the repairs as soon as reasonably practical to minimise this risk.

2.5.2 Aerial marker ball repairs

We have had three transmission line spans where aerial marker balls have melted due to bushfire heat in locations shown in the figure below. Our aerial marker balls are installed in accordance with AS 3891.1-2008 and AS 3891.2-2018. The repairs involve replacing these marker balls. This is required to maintain aviation safety and compliance with the Australian standards.

Figure 10: Map of melted aerial marker ball locations



2.5.3 Vibration damper repairs

We experienced extensive damage to our spiral vibration dampers installed on earthwires and optical ground wire. Vibration dampers reduce Aeolian vibration, which can lead to fatigue wear on fittings and failure of the earthwire, as well as damage to optical fibres within the earth wires. These vibrations dampers are made of PVC and have a melting point of 100 °C to 150 °C, so were extensively damaged from the bushfire heat as shown in the figure below. Replacement is required to limit the period over which these earthwires and optical ground wires are exposed to vibration and avoid more substantial damage of the earthwires and optical ground wires. Replacement of these vibrations dampers has commenced, and has been scheduled to coincide with conductor replacement where relevant.



Figure 11: Map of melted vibration damper defects



Figure 12: Melted spiral vibration dampers



2.6 Vegetation management and access

In addition to the immediate network safety and restoration activities and the subsequent condition assessment and scheduling of repairs, the 2019-20 NSW bushfire season has also affected our activities relating to maintenance of access tracks and vegetation management.

Many access tracks were damaged or access cut-off due to changes to the landscape and debris as a result of the 2019-20 bushfires. The extensively changed environment continues to impact on access, as a result of significant soil erosion, tree failure, and in some instance exposing naturally occurring asbestos making the access tracks unsafe for operations.

We have been progressively undertaking work since the fires passed, clearing fallen trees debris across access tracks and removing hazard trees adjacent to access tracks, in order to provide safe access for crews and allowing for inspections, infrastructure repairs and replacement work to take place. Access track work on 830km



of track was required to restore standard four-wheel drive utility vehicle access to transmission lines following the fires. Much of this work is complete, and is reflected in our actual costs discussed in Chapter 5. The remaining access track restoration work is included in our opex forecast.

Once access was available, we were then able to inspect hazard trees. The bushfires burnt out many tall trees at the edges of transmission line corridors. We estimate that approximately 17,700 hazard trees have been impacted by the bushfires. These trees are now at risk of failure due to the fire damage and they could impact the transmission line if they fall. These trees are being inspected by qualified arborists and being identified for removal or management where their condition warrants this action, with approximately 80% of the hazard trees having been inspected to date.

These hazard trees were burnt beyond their capacity to remain structurally sound, with fire further hollowing major limbs, stems, structural roots, and live tissue, to the point that failure is likely. The intense fires incinerated soil-protecting leaf litter, vegetative debris, live understory and tree canopy all of which protect and provide essential nutrients to the trees and soil biota. This will continue to impact on tree stability and structural integrity well into the future.

The on-going weather conditions and changes in growing environment will result in trees continuing to fail. Inspections have identified that approximately 14 per cent of the impacted hazard trees are at risk of immediate failure and require management to manage the risk to the network, in addition to the quantity normally managed through our routine hazard trees maintenance program. These trees require management in the near term, as failure of a tree has the potential to result in it falling and impacting the transmission line, causing network faults and potentially damaging the transmission lines. In the medium term, once regrowth of vegetation occurs, these trees will also present an increasing bushfire ignition risk.

The remaining hazard trees do not currently pose a clear and present danger to the network, however the fire damage occasioned to these trees will significantly increase vectors for escalated damage in the future from wood boring insects, termites and fungal decay. It can therefore reasonably be expected that hazard tree detection rates in the fire-affected areas over future years will be significantly elevated above normal levels (that would otherwise have occurred in the absence of the severe fires) – allowance for this is not being sought through our Application.

Our forecast costs in this Application include the costs of vegetation management to address the affected hazard trees. These forecasts are based on detailed estimates of the volume of hazard trees that require removal in each area (based on the inspections that have been carried out), and current vegetation contractor rates.

2.6.1 Avoided routine vegetation management

With much of the landscape burnt, some routine vegetation maintenance planned in 2019-20 and 2020-21 for sections of transmission line in those fire affected areas is no longer needed. This is predominately in the Snowy Mountains region.

This has resulted in some avoided vegetation maintenance costs. These avoided vegetation management costs have been deducted in estimating the incremental increase in our vegetation management costs as a consequence of the 2019-20 NSW bushfire season.

Subsequent regrowth is unlikely to result in any further avoided costs.

In some areas routine maintenance has seen an increase in costs as a result of the bushfires. This increase is, however, not included in our Application.



2.7 Augmentation expenditure to provide supply to Essential Energy's network in Cabramurra and Mt Selwyn area

The 2019-20 NSW bushfire season resulted in extensive damage to the Essential Energy-owned and operated Cabramurra and Mt Selwyn 33kV supply feeder (849). A total of 65 per cent of the 24km line length has either been damaged or destroyed, directly as a result of the bushfires.

Supply to these areas is currently operating on a single contingency through Snowy Hydro's auxiliary supplies at Tumut and through diesel generators providing supply to critical services, including a local communications tower. The ski lodge in the area is currently burnt down and is being rebuilt. However, the Tumut auxiliary supplies will not have the capacity to meet the peak demand in winter 2022 when the ski lodge rebuild is expected to be complete. There are no other feeders in the area to be able to reconfigure the distribution network and restore grid supplies.

Essential Energy is currently evaluating a number of options to restore grid supply to the Cabramurra and Mt Selwyn area, including alternatives to rebuilding the 33kV feeder 849 from the Providence Portal zone substation. As part of this assessment, Essential Energy submitted a work request to us to undertake an option assessment for alternative supply arrangements from our nearby Upper Tumut substation.

Essential Energy's assessment is currently indicating that the option of supply via our Upper Tumut substation is the most cost effective option, once risk costs associated with the alternative options are considered.

Any requested augmentation works at our Upper Tumut substation would be a direct consequence of the 2019-20 NSW bushfire season and the damage it caused to Essential Energy's 22kV supply feeder. This would represent incremental expenditure as we were not previously expecting to undertake any transmission augmentation works at this substation.

Notwithstanding, we have elected not to incorporate the forecast cost of this augmentation in the positive pass through amount requested in this Application, given that Essential Energy's network planning process is ongoing.



3. Nature of the regulatory requirements

The regulatory requirements for the AER's review and acceptance of a cost pass through application are contained in section 6A.7.3 of the NER. The key regulatory requirements are:

- > identification that a positive change event has occurred
- > confirmation that the event is consistent with an approved pass through event for the TNSP
- > determination of an approved positive pass through amount.

The AER must take into account the factors listed in clause 6A.7.3(j) of the NER when making its decision on our Application.

Chapters 4, 7 and 8 of this Application shows how we satisfy the regulatory requirements.

3.1 Positive change event

A positive change event is defined in the NER as²⁹:

a pass through event which entails the Transmission Network Service Provider incurring materially higher costs in providing prescribed transmission services than it would have incurred but for that event, but does not include a contingent project or an associated trigger event. (Emphasis added).

The key requirements of a positive change event are:

- > it is an approved 'pass through event' for the TNSP
- > the occurrence of 'materially higher costs' in providing prescribed transmission services as a direct result of the event, and
- > the event is not a contingent project or associated trigger event.

3.2 Pass through event

Pass through events are defined in clause 6A.7.3(a1) of the NER, and include:

(5) any other event specified in a transmission determination as a pass through event for the determination;

Pursuant to clause 6A.7.3(a1)(5) of the NER, our 2018-23 Revenue Determination includes a 'natural disaster' pass through event³⁰, defined as follows:

Natural Disaster Event means any natural disaster including but not limited to fire, flood or earthquake that occurs during the 2018/19 – 2022/23 regulatory control period that increases the costs to TransGrid in providing prescribed transmission services, provided the fire, flood or other event was not a consequence of the acts or omissions of the service provider.

Note: In assessing a Natural Disaster Event pass through application, the AER will have regard to, amongst other things:

(i) whether TransGrid has insurance against the event; and

(ii) the level of insurance that an efficient and prudent NSP would obtain in respect of respect of the event

²⁹ Chapter 10 of the NER

³⁰ AER Final Decision - TransGrid transmission determination 2018 to 2023, May 2018, p. 37. Found at Link

3.3 Positive Pass through amount

A positive pass through amount is defined in the NER as³¹:

For a Transmission Network Service Provider, an amount (not exceeding the eligible pass through amount) proposed by the provider under clause 6A.7.3(c).

An eligible pass through amount is defined in the NER as³²:

In respect of a positive change event for a Transmission Network Service Provider, the increase in costs in the provision of prescribed transmission services that, as a result of that positive change event, the Transmission Network Service Provider has incurred and is likely to incur (as opposed to the revenue impact of that event) until:

- (a) unless paragraph(b) applies the end of the regulatory control period in which the positive change event occurred; or
- (b) if the transmission determination for the regulatory control period following that in which the positive change event occurred does not make any allowance for the recovery of that increase in costs (whether or not in the forecast operating expenditure or forecast capital expenditure accepted or substituted by the AER for that regulatory control period) the end of the regulatory control period following that in which the positive change event occurred.

3.4 Framework for the AER's assessment

If the AER determines that a positive change event has occurred, it must then make a determination on:

- > the approved pass through amount, and
- > the amount of that approved pass through amount that should be passed through to transmission network users in the regulatory year in which it occurs, and each regulatory year after that in which the positive change event occurred.

In making this decision, the AER must take into account the factors listed in clause 6A.7.3(j) of the NER. For a positive change event such as that covered in this Application, these include:

- > the matters and proposals set out in any statement given to the AER by the TNSP
- > the increase in costs in the provision of prescribed transmission services that, as a result of the positive change event, the TNSP has incurred and is likely to incur
- > the efficiency of the provider's decisions and actions in relation to the risk of the positive change event, including whether the provider has failed to take any action that could reasonably be taken to reduce the magnitude of the eligible pass through amount in respect of that positive change event and whether the provider has taken or omitted to take any action where such action or omission has increased the magnitude of the amount in respect of that positive change event
- > the time cost of money based on the allowed rate of return for the TNSP for the regulatory control period in which the pass through event occurred
- > the need to ensure that the TNSP only recovers any actual or likely increment in costs to the extent that such increment is solely as a consequence of a pass through event
- > whether the costs of the pass through event have already been factored into the calculation of the provider's maximum allowed revenues for the regulatory control period in which the pass through event

³¹ Chapter 10 of the NER

³² Chapter 10 of the NER

occurred or will be factored into the calculation of the provider's maximum allowed revenues for a subsequent regulatory control period

- > the extent to which the costs that the TNSP has incurred and is likely to incur are the subject of a previous cost pass through determination made by the AER, and
- > any other factors the AER considers relevant.

In addition, the National Electricity Law (NEL) requires the AER, in exercising its economic regulatory function and powers, to exercise its powers in a manner that will or is likely to contribute to the achievement of the National Electricity Objective (NEO).

The NEL also specifies revenue and pricing principles. Of relevance to this Application is the principle that a network service provider (NSP) should be provided with a reasonable opportunity to recover at least the efficient costs it incurs in providing prescribed transmission services and complying with a regulatory obligation or requirement or making a regulatory payment.



4. How we meet the regulatory requirements

Under the NER, a pass through of incremental costs not included in an AER Revenue Determination is based on the occurrence of a 'positive change event'. For the purposes of this Application, the positive change event is defined as the 2019-20 bushfire season from 1 July 2019 and 31 March 2020.

This chapter sets out why the 2019-20 bushfire season meets the requirements of a positive change event, being that:

- > it is a pass through event in particular, it satisfies the definition for a 'Natural Disaster Event' as provided for in our 2018-23 Revenue Determination. This is discussed in section 4.1
- > the event will result in us incurring 'materially higher costs' in providing prescribed transmission services. This is discussed in section 4.2
- > while the event consisted of multiple fires, impacting communities across NSW at the same time, it is considered to be a single event. This is discussed in section 4.3.
- > the event is not a contingent project or an associated trigger event. This is discussed in section 4.4.

4.1 Natural disaster pass through event

As set out in section 3.1 our 2018-23 Revenue Determination incudes a "natural disaster event" defined as³³:

...any **natural disaster** including but not limited to **fire**, flood or earthquake that occurs **during the 2018/19 – 2022/23 regulatory control period** that **increases the costs** to TransGrid in providing prescribed transmission services, provided the fire, flood or other event was **not a consequence of the acts or omissions of the service provider**. (Emphasis added)

The 2019-20 bushfire season is a natural disaster event because:

- > the fires materially increase our cost of providing prescribed transmission services. This is discussed in section 4.2, and
- > the fires were a 'natural disaster', in the normal meaning of the phrase, and not a consequence of acts or omissions by us. This is discussed in sections 4.1.1 and 4.1.2, and further in Chapter 7.

4.1.1 Cause of the 2019-20 bushfires

The bushfire event was an exogenous, uncontrollable event that was not a consequence of acts or omissions by us.

The 2019-20 NSW bushfires set a new benchmark for an extreme fire season in Australia's temperate forests³⁴. There were 11,774 fires across NSW during the 2019-20 fire season,³⁵ including two mega-fires³⁶, which ran for eight months between 1 July 2019 and 31 March 2020.



³³ AER Final Decision - TransGrid transmission determination 2018 to 2023, May 2018, p. 37. Found at Link

³⁴ Royal Commission Interim Observations, p. 5. Found at Link

³⁵ NSW Bushfire Inquiry, p. 23

³⁶ The Senate, Lessons Learned – Interim report p. 9 found at Link

Given the unprecedented scale and extreme nature of the 2019-20 bushfire season a number of inquiries to investigate the bushfires were initiated – these include:

- > the NSW Inquiry 37
- > the Senate Inquiry³⁸
- > the Royal Commission³⁹

The fires started in Australia's hottest and driest year on record⁴⁰. Most of NSW was into its third year of severe drought and in 2019, NSW experienced both its hottest and driest year on record⁴¹. Therefore, vegetation and soil were very dry across most of NSW.⁴² The Forest Fire Danger Index was the highest since national records began⁴³.

The Final Report of the NSW Bushfire Inquiry (Final Report), published on 31 July 2020, found that 'extreme dryness of forested regions over large continuous areas was the determining factor in the size of the fires'.⁴⁴

The various inquiries found that a combination of factors, including weather and vegetation, provided the catalyst for the unprecedented level of bushfire activity across NSW during the 2019-20 bushfire season.

The NSW Inquiry Report found that⁴⁵:

- lightning was the suspected, immediate cause of ignition for the vast majority of the largest and most damaging fires across NSW in the 2019-20 season, ⁴⁶ and
- > some new fires started as a result of other fires through ember spotting.

This is supported by the Interim Report from the Senate Inquiry⁴⁷, published on 7 October 2020, which found that ⁴⁸:

the fires were catastrophic from both an environmental and public health perspective, and the worst in history for some jurisdictions, such as New South Wales (NSW), due to:

"... unprecedented extreme weather and cascading events including drought, heatwaves, dry thunderstorms, multiple days of Severe, Extreme and Catastrophic fire danger, and pyroconvective fires'

Further, investigation by CSIRO concluded that⁴⁹ 'of the three factors that contribute to fire behaviour, two have played a major role in this bushfire season for the eastern and southern states of Australia: weather and vegetation'.

We consider no prudent risk management framework could have prevented the bushfire event from occurring, nor mitigate its impact on our transmission network.



³⁷ Found at Link

³⁸ Found at Link

³⁹ Found at Link

⁴⁰ Royal Commission, Interim Observations, 31 August 2020 p. 4 Found at Link

⁴¹ NSW Bushfire Inquiry, p. 28

⁴² NSW Bushfire Inquiry, p. 28

⁴³ Royal Commission into National Natural Disaster Arrangements Report, 28 October 2020. p. 5. Found at Link

⁴⁴ NSW Bushfire Inquiry p.iv.

⁴⁵ NSW Bushfire Inquiry, p. 28

⁴⁶ NSW Bushfire Inquiry, p. 28

⁴⁷ The Senate, Lessons Learned – Interim report p. 3 found at Link

⁴⁸ The Senate, Lessons Learned – Interim report, p. 3 found at Link

⁴⁹ CSIRO, The 2019-20 bushfires: a CSIRO explainer February 2020. Found at Link

Our vegetation and bushfire risk management processes reflect prudent and effective actions to limit both the customer impact of the 2019-20 bushfire event and the magnitude of the pass through amount. These are discussed in Chapter 7.

The conclusion that the bushfire event was an exogenous, uncontrollable event is further supported by:

- > Attachment A.2 Overview of 2019-20 Bushfire Damage to TransGrid's Network, and
- > Attachment A.4 GHD's independent assessment of our 2019-20 bushfire expenditure.

4.1.2 Natural disaster declaration

A State of Emergency and Disaster was declared by the NSW Government in relation to the 2019-20 bushfire season:

- > over the course of the bushfire season the NSW Government⁵⁰ declared a State of Emergency three times under Section 33 of the State of Emergency and Rescue Management Act. These declarations were valid for seven days commencing on 12 November 2019, 19 December 2019 and 2 January 2020. This was the first time a State of Emergency had been made in NSW since October 2013. and
- > the NSW Government also declared the 2019-20 bushfires a natural disaster in 51 LGAs across the state.⁵¹ This declaration applied to the NSW bushfires after 31 August 2019 and included the Lithgow, Blue Mountains and Hawkesbury LGAs (Gospers Mountain fire), Wingecarribee and Wollondilly LGAs (Green Wattle Creek fire) and Shoalhaven LGA (Currowan fire).

4.2 Material increase in providing prescribed transmission services

We expect to incur additional costs of \$49.8 million (Real 2017-18) in providing prescribed transmission services solely as a consequence of the 2019-20 bushfire season. A breakdown of these costs is provided in Chapter 5.

From a service classification perspective, the additional costs relate to activities which fall into the category of prescribed transmission services, including:

- > network safety and restoration
- > condition assessment
- > network repair, and
- > vegetation management and access.

The materiality of these costs is set out in section 6.2.

4.3 A single natural disaster event

The 2019-20 bushfires first impacted our transmission network on 6 September 2019, and the impact continued to develop through to 31 March 2020⁵². There were 11,774 fires across NSW during the 2019-20 fire season,⁵³ including two 'mega fires'⁵⁴:

> the Gospers Mountain fire, which started on 26 October 2019 and burned approximately 512,626 hectares, becoming one of the biggest forest fires in Australian history.



 $^{^{\}rm 50}$ $\,$ Acting on the recommendation of the NSW RFS Commissioner $\,$

⁵¹ See <u>Link</u> - Resilience NSW, Natural Disaster Declarations 2019-2020

⁵² On 2 March 2020 the NSW RFS declared that there were no longer any active fires in NSW

⁵³ NSW Bushfire Inquiry, p. 23

⁵⁴ The Senate, Lessons Learned – Interim report, p. 9 found at Link

> the fire which emerged by 11 January 2020, when three fires on the border of NSW and Victoria, the Dunns Road fire, the East Ournie Creek, and the Riverina's Green Valley, joined and burned through 895,744 hectares.

We propose that the 2019-20 bushfires and their associated impact be recognised as a single positive change event ('the 2019-20 NSW bushfire season'). From AusNet Services' Black Summer bushfire cost pass through application, we understand that to be considered a single event, the AER needs to be satisfied the bushfires which impacted our network were sufficiently related, such that they:

- > shared a similar underlying cause (such as extreme weather conditions), and
- > occurred in relatively close proximity and time, as part of the same generally characterised 'Black Summer' season.

The NSW Inquiry Report concluded that the fires that affected our transmission network were burning at the same time, over the same period as fires burning in other parts of Australia, and with common underlying causation. In particular, the NSW Inquiry Report found that:

- > the fires in NSW overlapped with fires in the ACT, Queensland and Victoria, while there were also fires burning simultaneously in South Australia and Western Australia,⁵⁵ and
- > lightning was the suspected, immediate cause of ignition for the vast majority of the largest and most damaging fires across NSW in the 2019-20 season.

It is evident that each inquiry regards the 2019-20 bushfires as a single catastrophic event rather than individual and discrete bushfire events. In all respects the bushfires that occurred in NSW and across the Australia during the 2019-20 bushfire season are being treated within the context of a single catastrophe.

As disused in section 4.1.2 above, the scale of the bushfire threat was reflected by the NSW Government declaring a State of Emergency across the entire state with the event obtaining formal natural disaster status in NSW.

4.4 Contingent project or trigger event

A pass through event must not be a contingent project or an associated trigger event. Contingent projects and trigger events are defined in the NER.

The contingent projects and associated trigger events included in our 2018-23 Revenue Determination are set out in Appendix A of this Application.

It is clear from the NER definitions and Appendix A, that the contingent projects and associated trigger events are unrelated to our response to, and the network restoration works arising from, the 2019-20 bushfires.



⁵⁵ NSW Bushfire Inquiry, p. 28

5. Our incremental costs

This chapter overviews our incremental actual and forecast costs for the provision of prescribed transmission services that we will incur as a direct result of the 2019-20 bushfire season.

5.1 Overview of total costs

We have incurred \$10.6 million (Real 2017-18) and expect to incur a further \$39.2 million (Real 2017-18) in additional costs as a result of the 2019-20 NSW bushfire seasons, which are not included in our 2018-23 Revenue Determination. These additional costs relate exclusively to the 2019-20 NSW bushfire season and would not be incurred in the absence of the 2019-20 NSW bushfires.

Our actual costs are discussed in section 5.2 below.

Table 5-1 sets out our total incremental opex and capex of \$49.8 million (Real 2017-18) by year.

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Opex	-	8.8	11.9	28.1	-	48.8
Сарех	-	1.0	-	-	-	1.0
Total	-	9.8	11.9	28.1	-	49.8

Table 5-1: Incremental cost increase from 2019-20 NSW bushfire season event (\$M, Real 2017-18)

Table 5-2 below shows the breakdown of our total incremental costs of \$49.8 million (Real 2017-18) by category and year. This shows that:

- > incremental opex is driven by a range of activities, with network safety and restoration, network repair and vegetation management and access activities being the most significant contributors – collectively they account for around 97 per cent of the total incremental costs, and
- > there are some avoided costs from avoided routine vegetation management, that have been deducted in calculating our incremental expenditure.

Table 5-2: 2019-20 NSW bushfire season event - Incremental expenditure by category (\$M, Real 2017-18)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total	% of Total
Орех							
Network safety and restoration	-	7.1	0.5	-	-	7.5	15.1%
Condition Assessment	-	0.9	0.1	-	-	0.9	1.8%
Network repair	-	0.1	6.5	28.0	-	34.6	69.4%
Vegetation management and access	-	1.2	5.0	0.1	-	6.2	12.5%
Avoided costs (vegetation management)	-	(0.4)	(0.1)	(0.0)	-	(0.5)	(1.1%)



	2018-19	2019-20	2020-21	2021-22	2022-23	Total	% of Total
Pass through application	-	-	0.1	-	-	0.1	0.2%
Сарех							
Network safety and restoration	-	1.0	-	-	-	1.0	2.1%
Total	-	9.8	11.9	28.1	-	49.8	100.0%

Our incremental costs are explained and justified in the following supporting documents:

- > Expenditure Forecasting Methodology Attachment A.3
- > GHD Independent Assessment of our 2019-20 Bushfire Expenditure Attachment A.4.

Our Expenditure Forecast Model and Actual Cost Spreadsheets are also provided at Attachment A.5 and Attachment A.6.

5.2 Actual costs

Table 5-3 sets out our actual incremental costs of \$10.6 million (Real 2017-18) to 30 September 2020 that were incurred solely as a result of the 2019-20 NSW bushfire season event.

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Actual Opex	-	8.8	0.8	-	-	9.6
Actual Capex	-	1.0	-	-	-	1.0
Total	-	9.8	0.8	-	-	10.6

Table 5-3: 2019-20 NSW bushfire season event - Actual expenditure by capex and opex (\$M, Real 2017-18)

Table 5-4 sets out our actual incremental costs by year and category of expenditure. This shows that more than 98 per cent of our actual costs relate to:

- > Network safety & restoration (emergency response work) As discussed in section 2.3 these activities involved establishing safe access to the transmission lines, replacing burnt out wood poles, restoring broken conductors, replacing damaged insulators and restoring auxiliary supplies to switching stations and communications sites. All network safety and restoration activities are complete and the associated costs are reflected in our actual costs. Attachment A.2 'Overview of 2019-20 Bushfire Damage to TransGrid's Network' provides further information on these activities.
- Condition assessment As discussed in section 2.4, we undertook two stages of condition assessment: stage one involved an immediate assessment of the integrity of the network and stage 2 involved detailed inspections and assessment. Both stages are now complete and the associated costs are reflected in our actual costs. In calculating our incremental costs for condition assessment we deducted the costs that would have been incurred as a result of our routine LiDAR inspections.
- > Vegetation management and access As discussed in section 2.6 these activities involved clearing fallen trees debris across, and removing hazard trees adjacent to, access tracks, providing safe access for crews and allowing for inspections, infrastructure repairs and replacement work to take place. Access track work on 830km of track was required to restore access to our transmission lines. We have



completed the majority of required work on our access tracks and the associated costs are reflected in our actual costs.

	2018-19	2019-20	2020-21	2021-22	2022-23	Total	% of total
Actual Opex							
Network safety & restoration ¹	-	7.1	0.5	-	-	7.5	70.9
Condition assessment	-	0.9	0.1	-	-	0.9	8.6
Network repairs	-	0.1	0.1	-	-	0.2	1.6
Vegetation management and access	-	1.2	0.2	-	-	1.4	13.1
Avoided vegetation management & access	-	(0.4)	-	-	-	(0.4)	(3.7)
Actual Capex							
Network safety and restoration ¹	-	1.0	-	-	-	1.0	9.6
Total	0.0	9.8	0.8	0.0	0.0	10.6	100.0

Table 5-4: 2019-20 bushfire event - Actual expenditure by category (\$M, Real 2017-18)

Note 1. This is emergency response work.

5.2.1 Capture of actual costs

Our actual costs have been captured in a manner consistent with our business as usual (BAU) accounting framework. This involves the relevant costs for the bushfire work activities being booked to work orders created specifically to record the costs resulting from the 2019-20 NSW bushfire season. These work orders were linked to opex account codes relating to 'cost pass through' for the provision of prescribed transmission network services in our General Ledger.

This process ensured all incurred bushfire response costs were appropriately captured at a detailed level during the bushfire period and are able to be easily separated and distinguished from BAU network expenditure.

The costs incurred in November and December 2019 relate to the remediation of network damage and are opex - 'corrective maintenance' - undertaken to restore the damaged assets as well as work relating to the inspection and removal of hazard trees⁵⁶. We have expensed these costs directly in the Statement of Profit or Loss.

The treatment of the costs for the bushfire work activities as opex and associated cost allocation in accordance with our Cost Allocation Methodology formed part of our independent assurance review of our FY2019-20 Regulatory Accounts⁵⁷.

⁵⁷ No issues were identified in PwC's assurance review report, and a signed unmodified review opinion has been provided for our FY2019-20 Regulatory Accounts



⁵⁶ These costs are not eligible for capitalisation as they do not meet the criteria in our Expenditure Capitalisation procedure being: 1. the remediation work does not involve any substantial replacement of our assets, and 2. there are no significant assets' enhancements that result in an effective and material increase in service capacity or extended useful life

5.3 Expenditure Forecast

Table 5-5 sets out our forecast expenditure of \$39.2 million (Real 2017-18) arising from the 2019-20 bushfire season by year.

Table 5-5 – 2019-20 bushfire event -	Forecast expenditure	e by capex and ope	x (\$M. Real 2017-18)
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Capex category	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Forecast opex	-	-	11.1	28.1	-	39.2
Total	-	-	11.1	28.1	-	39.2

Table 5-6 sets out our forecast incremental expenditure of \$39.2 million (Real 2017-18) by year and category of expenditure. This shows that:

- > \$34.4 (Real 2017-18) million or 87.8 per cent relates to network repair. As discussed in section 2.5, the majority of these repair costs relate to conductor repairs on transmission lines in the Snowy Mountain area, and
- > \$4.8 million (Real 2017-28) or 12.3 per cent relates to vegetation management and access. As noted above, most of these forecast costs relate to the removal of hazard trees.

Table 5-6: 2019-20 NSW bushfire season event - Forecast incremental expenditure by category (\$M, Real 2017-18)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total	% of Total
Opex							
Network safety and restoration	-	-	-	-	-	-	-
Condition Assessment	-	-	-	-	-	-	-
Network repair	-	-	6.4	28.0	-	34.4	87.7
Vegetation management and access	-	-	4.7	0.1	-	4.8	12.3
Avoided costs (vegetation management)	-	-	(0.1)	(0.0)	-	(0.1)	(0.4)
Pass through application	-	-	0.1	-	-	0.1	0.2
Total	-	-	11.0	28.1	-	39.2	100.0

Our Expenditure Forecasting Methodology – Attachment A.3, explains how we have determined these costs.



5.4 Costs are not included in the current determination

The NER⁵⁸ requires the AER to take into account whether the costs of the pass through event have already been factored into the calculation of our maximum allowed revenues (MAR) for this regulatory control period, or will be factored into the calculation of our MAR for a subsequent regulatory control period.

The 2019-20 NSW bushfire season was not anticipated at the time of our 2018-23 Revenue Determination and therefore the costs of this event were not included in that determination.

The AER used a 'base, step, trend' approach to determine the efficient level of opex for our 2018-23 regulatory period. The AER applies this forecasting method, in conjunction with benchmarking techniques, because opex is largely recurrent in nature – that is, what is spent in one year generally provides a good indication of future costs.

In developing the base level of opex for our 2018-23 Revenue Determination, the AER had regard to our actual opex in 2016-17 (among other things). In this regulatory year, we incurred only a small amount (\$38,000) of bushfire related expenditure.

In trending forward our base level of opex the AER did not apply any step changes for an anticipated major bushfire event during the 2019-20 NSW bushfire season. Nor did the AER approve a capital works program for such activities. This is consistent with the AER's approval in our 2018-23 Revenue Determination of a cost pass through for a Natural Disaster Event, which covers events such as the 2019-2020 NSW bushfire season. This approach was appropriate as at the time of our 2018-23 Revenue Determination the severity of the 2019-20 NSW bushfires was an unforeseeable event that could not have been anticipated.



⁵⁸ NER clause 6A.7.3 (j)(6A).

6. Our proposed positive pass through amount

This chapter sets out our proposed positive pass through amount in relation to the 2019-20 NSW bushfire season event. This proposed positive pass through amount is equal to the eligible pass through amount, as defined in the NER.

We are seeking the AER's approval to recover a positive pass through amount totalling \$53.2 million (Nominal) (which is equivalent to \$55.5 million (Nominal) when smoothed over in the last year two years of our current regulatory period). This revenue amount is directly attributed to the 2019-20 NSW bushfire season and is derived from the incremental costs we have and will incur in providing prescribed transmission services, which were not included in the AER's 2018-23 Revenue Determination.

6.1 Pass through amount

We have calculated an eligible pass through amount of \$55.5 million (Nominal) based on the total incremental costs (capex and opex) of \$49.8 million (Real 2017-18) that are a consequence of the 2019-20 bushfire event (as discussed in chapter 5).

These opex and capex amounts, and the year in which they have been incurred or are expected to be incurred, is presented in Table 5-1 (of Chapter 5). These actual and forecast incremental costs have been inputted into our Final decision PTRM for the 2018-19 to 2022-23 regulatory period (updated to reflect the additional revenues approved in the AER's determination on our QNI Upgrade contingent project application) to derive the eligible pass through amount. Table 6-1 sets out the build-up of the eligible pass through amount by each building block category.

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Return on capital	-	-	0.1	0.1	0.1	0.2
Return of capital	-	-	(0.0)	(0.1)	(0.0)	(0.0)
Opex	-	9.2	12.8	31.0	0.0	53.0
Tax allowance	-	-	0.0	0.0	0.0	0.0
MAR (unsmoothed)	-	9.2	12.9	31.0	0.1	53.2
MAR (smoothed)	-	-	-	50.2	5.3	55.5

Table 6-1: Building block costs for eligible pass through amount (\$M, Nominal)

As revenue for the first three years of our regulatory period cannot be adjusted, the revenue impacts of the eligible pass through amount have been smoothed over the final two years of the regulatory period, as shown in Table 6-2.

Our Application seeks to pass through the positive pass through amount of \$53.2 million (Nominal) in costs we have (and will) incur in responding to the 2019-20 NSW bushfire season. This equates to \$55.5 million (Nominal) when smoothed over in the last year two years of our current regulatory period.



Table 6-2: Eligible pass through amount - smoothed revenue impacts (\$M, Nominal)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
AER 2018-23 determination (updated for the QNI CPA)	734.3	759.5	779.5	828.2	865.2	3,966.7
Impact of 2019-20 bushfire event (Smoothed MAR)	-	-	-	50.2	5.3	55.5
Updated MAR	734.3	759.5	779.5	878.3	870.5	4,022.2

6.2 Materiality of costs

We can only pass through the costs of the 2019-20 NSW bushfire season if the event has led to us incurring materially higher costs in providing prescribed transmission services.

The NER defines the term 'materially' as a 'change in costs (as opposed to the revenue impact)' that 'exceeds 1% of the maximum allowed revenue for the Transmission Network Service Provider for that regulatory year'. In past decisions, the AER has used either the change in building block costs or total capex and opex to assess the materiality of the change in costs.⁵⁹

Table 6-3 sets out this calculation using the change in building block costs. It shows that the 2019-20 NSW bushfire season led to a change in our costs of \$53.2 million (Nominal) and that, when measured against our MAR, the one per cent materiality threshold is satisfied in the 2019-20, 2020-21 and 2021-22 regulatory years.

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
MAR	734.3	759.5	779.5	828.2	865.2	3,966.7
Incremental costs – 2019-20 bushfires plus MAR	734.3	768.8	792.4	859.2	865.3	4,019.9
Difference	-	9.2	12.9	31.0	0.1	53.2
Materiality of bushfire event (%)	0.0%	1.2%	1.7%	3.7%	0.0%	1.3%

Table 6-3: Pass through application thresholds - incremental building block costs (\$M, Nominal)

Table 6-4 sets out this calculation using the change in total capex and opex instead. It too shows that the one per cent materiality threshold is exceeded in the 2019-20, 2020-21 and 2021-22 regulatory years.

Table 6-4: Pass through application thresholds - incremental capex and opex (\$M, Nominal)

	2018-19	2019-20	2020-21	2021-22	2022-23	Total
MAR	734.3	759.5	779.5	828.2	865.2	3,966.7
Incremental costs – capex and opex	-	10.3	12.8	31.0	-	54.1

⁵⁹ For instance, in its recent decision on AusNet Services pass-through application for a 500 kV transmission line tower collapse, the AER used total capex and opex. Prior decisions have used the change in building block costs, which are calculated based on changes to actual and projected capex and opex.

See: AER, September 2020, Determination – 500kV Transmission Line Tower Collapse cost pass through – AusNet Services, p. 9.



	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Materiality of bushfire event (%)	0.0%	1.4%	1.6%	3.7%	0.0%	1.4%

Note: 1. Incremental costs exclude debt and equity raising costs. 2. The incremental capex and opex shown here in nominal dollars (\$54.1 million) matches the real 2017-18 dollars (\$49.8 million) shown in chapter 5. The only difference is the dollar basis.



7. Why our costs are prudent and efficient

In assessing our proposed positive pass through amount, the NER requires⁶⁰ the AER to consider:

- > the efficiency of our decisions and actions in relation to the risk of the positive change event, including whether we failed to take any action that could reasonably be taken to reduce the magnitude of the eligible pass through amount, and
- > whether we took, or omitted to take, any action which increased the eligible pass through amount.

Chapter 2 described the actions that we took, and will need to take, to address the impact of the 2019-20 NSW bushfire season on our network.

This Chapter sets out the governance procedures and practices that have determined those actions, both in terms of our immediate emergency response and in identifying and prioritising our planned repair activities. It also describes the pre-emptive actions we took in light of the risks posed by the 2019-20 NSW bushfire season to minimise both the impact on our network (and the potential disruptions to electricity supply) and our response costs, including our collaboration with emergency response bodies and our vegetation management policies. We also explain that it would not have been prudent for us to have taken out insurance policies to cover the risks associates with a natural disaster of the magnitude of the 2019-20 NSW bushfire season.

This Chapter therefore demonstrates that our 'decisions and actions' in relation to the risks presented by the 2019-20 NSW bushfires were prudent and efficient, and that we took all reasonable action to 'reduce the magnitude of the eligible pass through amount.' Our annual bushfire preparedness activities include mitigations for externally caused bushfires passing through or near our assets. However the 2019-20 NSW bushfire season was unprecedented in its scale and intensity.

We also summarise the basis on which our forecast expenditure has been developed, in order to demonstrate that it is prudent and efficient. Further detail on our expenditure forecasting methodology is provided in:

- > Attachment A.3 Expenditure Forecasting Methodology, and
- > Attachment A.4 GHD, Independent Assessment of our 2019-20 Bushfire Expenditure.

7.1 Governance procedures and practices – emergency response

In the immediate aftermath of each bushfire, we undertook emergency works to make hazardous situations safe and restore supply to our customers as quickly as possible where it was safe to do so.

These emergency network safety and restoration activities are described in section 2.3 and comprised a mix of temporary repairs to ensure safety in the short term, as well as restoration works undertaken over several weeks. These costs are reflected in our actual incremental costs associated with the 2019-20 NSW bushfire season.

Our corporate emergency response to the 2019-20 NSW bushfire season was governed by our internal policies relating to events that present a threat to our business as usual activities, and have the potential to impact the safety and reliability of our High Voltage Network and the environment, in order to address these threats as quickly and safely as possible.

These policies include our Corporate Response and Emergency Management Plans (CREMP) and PSERP. The objectives of our CREMP are to:

> Protect human life



⁶⁰ NER clause 6A.7.2

- > Protect the environment
- > Ensure security of supply
- > Protect TransGrid's interests, including physical and non-physical assets, and
- > Manage stakeholder interests

Figure 13 provides an overview of our CREMF, which is focused on limiting both the likelihood and impact of Business Disruption Events.

Figure 13 Corporate Response Emergency Management Framework



The PSERP is the practical application of the requirements within the CREMP, and sets out the processes to manage Power System Network incidents and emergencies and provides check-sheets for the various roles required to manage the incident and the response.

On two occasions during the 2019-20 NSW bushfire season we also implemented our Incident Management Processes (IMP). These actions ensured that electricity transfer paths across the NEM regions were secured and response times to any faults could be minimised.

- > The first occasion was for the North Coast Fires in November 2019. We dispatched staff across the fire zones, primarily around the Queensland to NSW Interconnector (QNI) and down to the Snowy region Victorian Interconnector, to ensure supply could be restored in a timely manner for the cross-NSW flow from QLD to VIC. We ensured that we had staff on the far side of a fire zone that was likely to prevent access due to road closures, in the event of needing prompt response to a fault.
- > The second occasion was 4 January 2020, where fires in the Snowy region were threatening our assets. We dispatched staff to Tumut and the Victorian Interconnection locations so that response times could be minimised. The initiation of the dispatch of staff to nominated sites was triggered by Lack of Reserve (LoR) predictions by AEMO that existed or were forecast in the NEM. This included LoR conditions in other jurisdictions and not just NSW, but due to the criticality of our network in joining generation to loads across the NEM, we dispatched staff to these critical interconnection backbone sites.

On both of the above occasions the Incident Management Team (IMT) was stood up in line with the PSERP. This comprised the Jurisdictional Responsible Officer (JRO), our Executive Manager of Works Delivery and our Executive Manager of Network Planning and Operations, who attended weekly, daily, and sometimes hourly meetings with AEMO.

We did not enact our Crisis Response Team on either of the above occasions because we did not reach the Emergency Level.



7.2 Collaboration with emergency response agencies

Throughout the 2019-20 NSW bushfire season, we worked collaboratively with the relevant emergency agencies, including the NSW EUSFAC and RFS, to ensure that emergency services were aware of our assets and to assist in firefighting operations which helped protect the community. This collaboration provided critical information on forecast fire behaviour and informed our firefighting strategy.

Effective engagement and communication with these agencies were critical to responding to the 2019-20 NSW bushfires as explained below.

7.2.1.1 Energy Utilities Services Functional Area Coordinator

Throughout the 2019-20 NSW bushfire season we worked closely with the EUSFAC who set themselves up to operate 24/7 in the State Emergency Operations Centre (SEOC) from November 2019 to the end of January 2020.

The EUSFAC coordinated meetings between us, the NSW DNSPs and emergency response agencies to increase situational awareness of all parties in areas such as:

- > increases to Asset Protection Zones (APZs) (where possible)
- > strategic back-burning
- > retardant drops (where possible)
- > location of coal stockpiles (Mt Piper generator), and
- > coordinated protection of critical infrastructure.

The EUSFAC provided critical information on forecast fire behaviour, which informed our firefighting strategy. This considerably reduced the impact of fire damage to the Upper Tumut Switching Station, Mt Piper and Murray power stations, and our switching stations and other power assets.

The EUSFAC provided access to additional response and recovery resources, for example by organising a Defence Forces Helicopter to undertake the after-fire asset inspections following the destructive fires on 4 January 2020.

7.2.1.2 NSW Rural Fire Service

We worked collaboratively with the NSW RFS who was involved in critical decisions relating to sensitive electricity loads that required a reliable electricity transmission supply throughout the 2019-20 NSW bushfire season.

For the North Coast Fires in 2019 we had staff with a business hours presence in the RFS Local Command centre. We also had direct communications with the RFS Fire Controller to coordinate transmission line outages for overnight back burning operations.

In early 2020 we had staff working in the RFS Tumut Local Command Centre for approximately 2 weeks. This was done on a 24 hour shift roster to ensure the RFS were aware of our assets and could fight fires from our easements within the Snowy Mountains National Park. We also used this resource to coordinate outages of our network (via our Control Room, discussed further below), to undertake pre-emptive fire fighting around our substations and to gain access to our assets once deemed safe to be escorted into the fire zones.

7.3 Our control and asset monitoring centres

Our Control Room and asset monitoring centres monitored asset outages cause by the bushfires and monitored fire forecasts using online systems coupled with information from the RFS. We also liaised continually with the EUSFAC, as described above.



Our Control Room added two additional staff to the rosters during the major incident fires to ensure the capability to respond to Network Incidents. The coordination of switching and outages was managed by the Control Room, with the management of the field staff response coordinated through our response team. The Control Room was responsible for advising the response team of the network restoration priorities, based on operational requirements, so that the response to the emergencies and any repair works could be coordinated in a prioritised manner.

The repairs were also prioritised on the basis of the potential of the damaged assets to start new fires and network operational requirements, and so temporary repairs to damaged assets were prioritised over damaged but serviceable assets and over longer-term strategic repairs. This was coordinated through our asset monitoring centres and took into account risks to the community and environment, risks to the network, risks to assets and asset requirements, resource availabilities and costs.

7.4 Governance procedures and practices - Identifying the required corrective work program

In addition to our emergency network safety and restoration activities, we have also undertaken condition assessments for our assets subject to bushfire activity during the 2019-20 NSW bushfire season and identified the required network repair works necessary to continue to manage network safety risk to be below tolerance levels, or ALARP, consistent with our ENSMS (discussed in section 7.5 below). These activities are discussed in sections 2.4 and 2.5.

The governance process used for identifying the required repair works resulting from the 2019-20 NSW bushfire season is the same as our business-as-usual governance processes applied to our Prescribed Expenditure. Our key supporting documents detailing this governance framework are our:

- > Corrective Maintenance Process Document No. D2017/01717
- > Maintenance Plan Transmission Line Assets Document No. D2014/16598, and
- > Maintenance Plan Easement and Access Tracks Document No. D2003/2398

Our Corrective Maintenance Process defines the governance arrangements and processes in place to identify, assess, review, scope and approve corrective actions to address a defect issue. This process is summarised below and has been applied to identifying and costing the scope of works for the 2019-20 NSW bushfires repairs.







7.5 Electricity Network Safety Management System

We comply with the *NSW Electricity Supply (Safety and Network Management) Regulation 2014* that requires us to have an ENSMS. Our ENSMS complies with the requirements of AS5577 ENSMS.

The primary objective of the ENSMS is to ensure that design, construction, commissioning, operation and decommissioning of our network (or any part of our network) is safe, and in particular, to support the:

- > safety of members of the public
- > safety of persons working on networks
- > protection of property (whether or not belonging to a network operator)
- > management of safety risks arising from the protection of the environment (for example, preventing bush fires that may be ignited by network assets), and
- > management of safety risks arising from loss of electricity supply.

Our ENSMS defines the risk controls, processes and procedures that are required to manage network safety risk being eliminated so far as is reasonably practicable and if this is not practicable, being reduced ALARP. The ENSMS identifies hazards, assesses risks, and identifies controls in line with the principles of ISO31000 'Risk Management' and articulates through Formal Safety Assessments (FSA) risks related to:

- > bushfire
- > public safety
- > worker safety
- > reliability
- > property and environment.

The Bushfire FSA identifies the hazards, threats and potential risk created by three main hazards:

- > maintaining control of electricity within our network
- > ensuring resilience to external bushfire threat on our assets, and
- > managing risks created by construction, maintenance, and operations of the network such as hot work.

Assessment of these threats allows us to identify effective preventive and mitigative controls that are implemented through policies, procedures and management plans. The delivery of the policies, procedures and plans are managed through our certified ISO55001 Asset Management System.

Our compliance obligations in relation to the ENSMS, the Act and the Regulation provides confidence that network risks are being managed in accordance with good industry practice. The performance of these systems is assured through regular internal and external auditing of both the ENSMS and our Asset Management System.

Public information on our network safety management, including bushfires, can be found on our website at <u>TransGrid Network Safety Management</u>.

7.6 Efficient costing of our forecast repair works

The forecast costs for transmission line remediation works are predominantly based on costs from similar recent works and existing contract rates (from our competitively sourced construction panel). Due to the bespoke and unique nature of the works, which are predominantly in the remote Snowy Mountains area, we have only sourced costs from our Success estimating system where there was no actual costs or contract costs to draw from.

The basis for our forecast costs are described in detail and substantiated as prudent and efficient in:

> Attachment A.3 Expenditure Forecasting Methodology



> Attachment A.4 GHD, Independent Assessment of our 2019-20 Bushfire Expenditure.

Key matters to note with respect to our forecast costs include:

- > Contracted labour and equipment for delivery of the work and site establishment costs for transmission line repairs are based on the recent actual costs for the TL-U3 bushfire remediation works, sourced from one of our panel contractors, who completed TL-U3 Stage 1 repairs earlier in 2020. These rates reflect recent works completed in the Snowy Mountains area and are representative of the terrain, outage and ground/access conditions expected on the transmission lines requiring further works. These rates are considered by the estimation team as more reflective than utilising indicative database rates, as these were not derived from works in this remote site geography.
- > All of the transmission line conductor works are located in the Snowy Mountains area. Access to these sites are limited to times outside of the snow season and requires travel to remote areas. As a consequence there is a substantive labour over-time element associated with these works, which is prudent given the priority given to addressing defects on these lines to avoid safety issues and the risk of potential loss of supply. Utilising labour over-time is also efficient as it improves site productivity by allowing longer work days to take place which reduces the duration of the works and the associated costs, such as site establishment costs. GHD have independently assessed the build-up of internal and outsourced labour hours and its basis such as the scope of work, type of activities, project team set-up, need for multiple site work fronts, and our construction risk and HSE system requirements. GHD concluded that 'we are satisfied that the volumetric or quantity estimate and their underlying basis used in forecasting the expenditure are reasonable.'
- > Transmission line materials including fittings, insulators and conductor costs have been derived from recent overhead/earth-wire upgrade projects, TL-U3 Stage 1 contract rates, and our Stores Inventory pricing from our Ellipse inventory management system (reflecting the average cost for each of the items over recent time).
- > Access and track work allowances are based on a lump sum allowance per kilometre of remediation work with the applicable unit rate from our Success system based on Tier 1 contractor rates, depending on the nature and difficulty of the terrain. This access work is required to facilitate heavy machinery access to the work sites.
- Stone (gravel) costs for track repair was informed by the costs incurred for TL-U3 Stage 1 works based on the stone prices per tonne from the local quarry.
- > Pad costs were derived utilising recent competitively sourced market rates on other outsourced Schedule of Rates contracts for similar terrain types, in conjunction with the Engineering assessment for the elevating work platform (EWP), crane, and winch sites nominated.
- > We have used panel contract rates (competitively market tested) for contract labour based on our panel contractors that have the capability and availability to be able to deliver the works.

In terms of works scheduling:

- > We have considered safety and environmental and access constraints (terrain, slopes, etc), terminations and optimal pulling locations (premised on tension and termination structures), to optimise delivery of works in the safest manner with minimal impact to earth works, and the shortest duration of outages.
- > Climate considerations were also factored into the program, as the worksites are highly affected by winter weather, inclusive of snow loading.
- Consideration was given to the likely outage restrictions, as the affected lines are tied to Snowy Hydro generators, and are heavily market constraining transmission lines. Therefore, work needs to be scheduled with daily outages to appropriately manage the complexity around the delivery of the works.



7.7 Vegetation Management Policies and Procedures

As discussed in section 4.1, the 2019-20 NSW bushfires season event was an exogenous, uncontrollable event that was not a consequence of acts or omissions by us.

The various inquiries found that a combination of factors, including weather and vegetation, provided the catalyst for the unprecedented level of bushfire activity across NSW during the 2019-20 bushfire season.

The NSW Inquiry Report found that⁶¹:

- > lightning was the suspected, immediate cause of ignition for the vast majority of the largest and most damaging fires across NSW in the 2019-20 season, ⁶² and
- > some new fires started as a result of other fires through ember spotting.

There was no suggestion in any of the inquiries that vegetation management in our easements was a contributing factor to the 2019-20 NSW bushfires season event.

Further, the 2019-20 bushfire season was found to be of an unprecedented magnitude for NSW. The Interim Report from the Senate Inquiry⁶³, published on 7 October 2020, found that '⁶⁴:

the fires were catastrophic from both an environmental and public health perspective, and the worst in history for some jurisdictions, such as New South Wales (NSW), due to:

"... unprecedented extreme weather and cascading events including drought, heatwaves, dry thunderstorms, multiple days of Severe, Extreme and Catastrophic fire danger, and pyroconvective fires'

Our vegetation management policies and procedures assure that we manage our easements to reduce risks consistent with ALARP. We develop our vegetation management practices by considering all relevant standards (including the Industry Safety Steering Committee's (ISSC) Guide for the Management of Vegetation near Electricity Supply Infrastructure – ISSC3) and other inputs (industry forums, engagement of peers and continual improvement) to ensure our processes follow good industry practice, or, where we deviate, provide an equal or better safety outcome.

Our Bushfire FSA identifies the following principal policies and procedures that specifically relate to vegetation management:

- > Bushfire Risk Management Plan
 - This details the specific actions required to ensure that asset defects are identified and rectified in accordance with the risks that they represent. The plan has a focus of removing critical defects for the network, prior to the commencement of the bushfire season.
- Maintenance Plan Easements and Access Tracks, and Maintenance Plan Transmission Lines and Cables
 - Our maintenance plans contain activities that we perform to reduce bushfire risk. These two plans specifically look at activities that control vegetation and line integrity that present the greatest bushfire risk.
- > Corrective Maintenance Procedure



⁶¹ NSW Bushfire Inquiry, p. 28

⁶² NSW Bushfire Inquiry, p. 28

 $^{^{\}rm 63}$ $\,$ The Senate, Lessons Learned – Interim report p. 3 found at $\underline{\text{Link}}$

⁶⁴ The Senate, Lessons Learned – Interim report p. 3 found at Link

- This procedure ensures that all defects identified on the network are evaluated on a risk basis and given the appropriate timeframe for rectification from immediate action to continued monitoring of the defect over a longer period of time.
- Our Corrective Maintenance Procedure is discussed in section 7.4.
- > Easement Guidelines for Third Parties
 - This is an externally published guideline that provides guidance to third parties on what they can and can't do around our easements. These can be found on our Internet site at <u>Living and working with</u> <u>transmission lines</u>.

The application of these policies and procedures is audited to ensure that they remain effective.

Given the above, we are confident that our decision and actions in relation to vegetation management did not contribute either to the cause of the 2019-20 NSW bushfire season or to the magnitude of the positive pass through amount associated with that event, and that our policies and procedures remain consistent with good business practice and prudent risk management.

7.8 Insurance considerations

The definition of "natural disaster event" included in our Revenue Determination⁶⁵ includes a note that in assessing a pass through application for a natural disaster event, the AER will have regard to, amongst other things, whether we have insurance against the event and the level of insurance that an efficient and prudent NSP would obtain in respect of the event.

We do not hold insurance cover for loss, damage or destruction of above ground transmission lines, poles, towers and pylons of our network during a natural disaster. This is because external insurance is unavailable on commercial terms. The key reasons for this include that:

- > the insurance market, both domestically and internationally, is very limited and does not provide us with access to coverage on commercial terms, particularly for assets in high bushfire risk locations. The increasing frequency and severity of bushfire events worldwide has contributed to the tightening of insurance markets for bushfire coverage for electricity networks in recent years.
- > where coverage is available, large premiums combined with a large policy excess have shown this class of business not to meet the risk for reward level

We note that the AER's rationale for approving our Natural Disaster Event reflected that the cost of obtaining insurance for such events was likely to mean that it is not efficient and in the long term interests of customers to seek to eliminate this risk through insurance:⁶⁶

While a prudent service provider could take steps to reduce the likelihood and cost impacts of these events, and could insure or self-insure against them, expenditure beyond a certain level aimed at completely eliminating the risk is likely to be imprudent or inefficient. In such circumstances we consider a sharing of risk between the TNSP and its customers is appropriate and more likely to be in the long term interest of consumers with respect to price.

Because we do not hold insurance cover, this means no insurance premium is being funded by customers as part of the operating costs reflected in our 2018-23 Revenue Determination.

We routinely review our insurance needs and can confirm that insurance cover for poles and wires in respect of a natural disaster remains unavailable on commercial terms, and therefore continues not to be an efficient approach to managing the risk of damage to or loss of these assets.

AER Draft Decision - TransGrid transmission determination 2018 to 2023, Attachment 13 – Pass through events, September 2017, pp. 11 12. Found at Link



⁶⁵ AER Final Decision - TransGrid transmission determination 2018 to 2023, May 2018, p. 37. Found at Link

8. Demonstration of our compliance

Table 8-1 details how this Application complies with the NER requirements.

Table 8-1 – Compliance with NER requirements

	NER, clause 6A.7.3 (c)(1) to (7) requirements	Reference in Application	
(1)	Details of the positive change event	Chapter 4	
(2)	The date on which the positive change event occurred	Chapter 1	
(3)	The eligible pass through amount we propose in relation to the positive change event	Chapter 6	
(4)	The positive pass through amount we proposes in relation to the positive change event	Chapter 6	
(5)	The positive pass through amount that we propose should be passed through to customers in the regulatory year in which, and each regulatory year after that in which, the positive change event occurred	Chapter 6	
(6)	Evidence of:	Chapter 5	
	 the actual and likely increase in costs, and that such costs occur solely as a consequence of the positive change event 	Attachment A.1 Overview of 2019-20 Bushfire Damage to TransGrid's Network	
		Attachment A.3 Expenditure Forecasting Methodology	
		Attachment A.4 GHD, Independent Assessment of our 2019-20 Bushfire Expenditure	
(7)	Other such other information as may be required pursuant to any relevant regulatory information instrument	No such instrument has been issued by the AER at the time of submitting this Application.	
		In accordance with clause 6A.7.3 (e1) we will provide further information, as requested by the AER, to assist it assess our Application and make its determination.	



Glossary

Abbreviations/acronyms	Definition
ACSR/GZ	Aluminium Conductor Steel Reinforced/Galvanised
ACT	Australian Capital Territory
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ALARP	As Low As Reasonably Practicable
Application	Cost pass through application
APZ	Asset Protection Zones
BAU	Business as usual
CREMP	Corporate Response and Emergency Management Plans
DNSPs	Distribution Network Service Providers
ENS	Energy Not Supplied
ENSMS	Electricity Network Safety Management System
EUSFAC	Energy Utilities Services Functional Area Coordinator
EWP	Elevating work platform
FSA	Formal Safety Assessments
IMT	Incident Management Team
IPART	Independent Pricing and Regulatory Tribunal
ISSC	Industry Safety Steering Committee
JRO	Jurisdictional Responsible Officer
km	kilometres
kV	kilovolt
LGA	Local Government Areas
LME	Liquid Metal Embrittlement
LoR	Lack Of Reserve
Μ	Millions



MAR	Maximum Allowed Revenue
NEL	National Electricity Law
NEM	National Energy Market
NEO	National Electricity Objective
NER or Rules	National Electricity Rules
NSW	New South Wales
NSW Inquiry	NSW Bushfire Inquiry
Opex	Operating expenditure
PSERP	Power System Emergency Response Plan
PTRM	Post-Tax Revenue Model
QNI	Queensland – New South Wales Interconnector
RAB	Regulatory Asset Base
RFS	Rural Fire Service
RIT-T	Regulatory Investment Test for Transmission
Royal Commission	Royal Commission into Natural Disaster Arrangements
SA	South Australia
SEOC	State Emergency Operations Centre



Appendices

Appendix A – Impact of Major Bushfires in our network area

Table 0-1 lists the major fires in our network and shows that 8.9 per cent of network route length and 9.5 per cent of network area has been impacted by the bushfires

Table 0	-1: Mai	or Bus	hfires in	our	network	area
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Bushfire	Region	Network Length burnt (km)	Network area burnt (km²)
3476 Orara Way, Kremnos	Northern NSW	0.20	0.01
Adaminaby Complex	Southern NSW/ Snowy Mountains	26.80	1.61
Andersons Creek	Northern NSW	3.21	0.14
Arizona Rd, Charmhaven	Central NSW	1.69	0.10
Bees Nest	Northern NSW	9.95	0.52
Busbys Flat Rd	Northern NSW	17.86	0.94
Calabash	Southern NSW/ Snowy Mountains	1.70	0.08
Carrai Creek	Northern NSW	24.47	1.10
Carrai East	Northern NSW	28.14	1.27
Charcoal Rd	Central NSW	1.38	0.10
Charleys Forest	Central NSW	4.44	0.27
Clear Range	Southern NSW/ Snowy Mountains	10.32	0.46
Clearfield Rd, Rappville	Northern NSW	10.30	0.54
Currowan 2	Central NSW	66.43	3.99
Dunns Road	Southern NSW/ Snowy Mountains	283.50	16.76
Erskine Creek Fire	Central NSW	18.86	1.13
Eve Creek Rd, Brooklana	Northern NSW	0.91	0.05
Gospers Mountain	Central NSW	69.43	4.30
Green Wattle Creek	Central NSW	30.60	1.86
Guyra Road	Northern NSW	49.08	2.53



Bushfire	Region	Network Length burnt (km)	Network area burnt (km²)
Hawkmount - Wilton Rd, Awaba	Northern NSW	2.06	0.12
Hillville fire	Northern NSW	12.89	0.58
Jersey Bull Rd, Upper Orara	Northern NSW	0.92	0.06
Kangaroo Creek Rd	Northern NSW	3.76	0.17
Kerry Ridge	Central NSW	17.29	1.04
Lemington Rd, Jerrys Plains	Northern NSW	1.64	0.10
Liberation Trail	Northern NSW	71.07	3.50
Lindfield Park Road	Northern NSW	2.6	0.12
Little L Complex	Central NSW	26.2	1.57
Long Gully Rd, Drake	Northern NSW	25.09	1.13
Meads Creek West	Northern NSW	11.05	0.77
Mount Mckenzie Rd	Northern NSW	10.00	0.45
Mt Solitary	Central NSW	0.77	0.05
Myall Creek Road	Northern NSW	43.48	2.27
Pacific Mtwy (Northbound), Killingworth	Northern NSW	3.17	0.19
Quarry Rd, Ben Bullen	Central NSW	1.37	0.10
Rocky Creek Road 2	Northern NSW	0.42	0.03
Ruined Castle	Central NSW	19.25	1.16
South St, Marsden Park	Southern NSW/ Snowy Mountains	0.79	0.05
Sydney St, Wereboldera	Southern NSW/ Snowy Mountains	0.46	0.02
Three Mile	Central NSW	61.19	3.90
Upper Turon Rd, Palmers Oaky	Central NSW	11.86	0.69
Walang Dr, Walang	Central NSW	0.94	0.04
Warm Crossing	Northern NSW	2.23	0.10
Watagan RD	Central NSW	3.14	0.22



Bushfire	Region	Network Length burnt (km)	Network area burnt (km²)
Waterfall Way, Wollomombi	Northern NSW	3.82	0.17
Unnamed	Central NSW Southern NSW/ Snowy Mountains	2.53	0.15
TransGrid network length (Prescribed) – as per 2020 RIN		11,262 km	
Approximate easement area ¹			592.86 km ²
Impact		8.9% of network route impacted	9.5% of network area impacted

Notes 1. This is calculated based on the sum of standard easement width miltiplied by the span length for each span



Appendix B – Contingent Projects

Our Final 2018-23 Revenue Determination includes the following contingent projects⁶⁷ with the associated trigger events.

Table 0-2 - 2018-23	Revenue Determination	- Contingent	Projects and	l associated trigger	[.] events

Contingent Project	Trigger
New South Wales to South Australia Interconnector (\$276m to \$1074m)	 Successful completion of a RIT-T demonstrating an overall network investment by all parties involved in the interconnector construction that maximises the positive net economic benefits from establishing a new high voltage interconnection from South Australia, and/or that addresses a reliability corrective action.
	Determination by the AER that the proposed investment satisfies the RIT-T.
	TransGrid Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.
	 Clauses 1 and 2 do not apply if a change in the law occurs that allows the inclusion of the proposed investment in TransGrid's maximum allowed revenue under this revenue determination even if a RIT-T is not carried out.
Reinforcement of Southern Network (\$60m to \$393m)	 New generation of more than 350 MW is committed in southern NSW at any current or future connection point(s) south of Bannaby and Marulan, or NSW import capacity from Southern Interconnectors is determined to be increased by more than 350 MW due to committed expansion of southern interconnections.
	 Successful completion of the RIT-T demonstrating a network investment by TransGrid maximises the positive net economic benefits from increasing the capacity of the network south of Bannaby and Marulan at 132/330kV or other voltages.
	Determination by the AER that the proposed investment satisfies the RIT-T.
	 TransGrid Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.
	 Clauses 2 and 3 do not apply if a change in the law occurs that allows the inclusion of the proposed investment in TransGrid's maximum allowed revenue under this revenue determination even if a RIT-T is not carried out
Reinforcement of Northern Network (QNI	1. Either:
upgrade) (\$63m to \$141m)	 Committed retirement of more than 1100 MW of generation in the Hunter or Central Coast area; and/or
	 ii. AEMO classification of generation developments as being at the 'committed' stage of development on the 'Generator Information'

⁶⁷ AER p. 6-137-140. Found at Link



Contingent Project	Trigger	
	webpage, exceeding 1100 MW at any current or future connection point(s) north of Armidale; and/or	
	iii. AEMO classification of generation developments as being at the 'committed' stage of development on the 'Generator Information' webpage, exceeding 350 MW at any current or future connection point(s) south of Liddell and Bayswater.	
	 Successful completion of the RIT-T demonstrating a network investment by TransGrid that maximises the positive net economic benefits from increasing the capacity of the network between Bulli Creek and Liddell at 132/330kV or other voltages. 	
	Determination by the AER that the proposed investment satisfies the RIT-T.	
	TransGrid Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.	
	 Clauses 2 and 3 do not apply if a change in the law occurs that allows the inclusion of the proposed investment in TransGrid's maximum allowed revenue under this revenue determination even if a RIT-T is not carried out 	
Support South Western	1. Either:	
NSW for Renewables (\$89m to \$477m)	 New generation of more than 400 MW is committed in South Western NSW (west of Wagga); and/or 	
	ii. New generation in North West Victoria	
	 (a) exceeding 800 MW for connection to the Ballarat - Waubra - Ararat - Horsham 220 kV Lines or connection point(s); and/or 	
	 (b) exceeding 200 MW for connection to the Redcliffs – Weman – Kerang 220 kV Lines or connection point(s); and/or 	
	 (c) exceeding 500 MW for connection to the Ballarat – Terang – Moorabool 220 kV Lines or connection point(s); and/or 	
	(d) exceeding 1,500 MW in the North West Victoria zone	
	2. Where the optimal solution involves works in NSW and Victoria, successful completion of the RIT-T demonstrating an overall network investment by all parties of their respective works maximises the positive net economic benefits from strengthening the high voltage interconnection between New South Wales and Victoria.	
	Determination by the AER that the proposed investment satisfies the RIT-T.	
	TransGrid Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.	
	 Clauses 2 and 3 do not apply if a change in the law occurs that allows the inclusion of the proposed investment in TransGrid's maximum allowed revenue under this revenue determination even if a RIT-T is not carried out 	

Contingent Project	Trigger
Supply to Broken Hill (\$52m to \$177m)	 Notification from Essential Energy of available capacity of backup generation at Broken Hill that would result in expected unserved energy exceeding 10 minutes at average demand.
	 Successful completion of the RIT-T, including a comprehensive assessment of the credible options, that demonstrates a network investment by TransGrid maximises the economic benefits while meeting reliability of supply obligations to the Broken Hill area.
	Determination by the AER that the proposed investment satisfies the RIT-T.
	TransGrid Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.
	 Clauses 2 and 3 do not apply if a change in the law occurs that allows the inclusion of the proposed investment in TransGrid's maximum allowed revenue under this revenue determination even if a RIT-T is not carried out.
Reinforcement of Southern Network in response to Snowy 2.0 (\$831m to \$1,228m)	 New generation of 2000 MW is committed in southern NSW at any current or future connection point(s) south of Bannaby and Marulan.
	2. Where the optimal solution involves related works across other TNSPs, successful completion of the RIT-T demonstrating an overall network investment by all parties involved in the construction of their respective works that maximises the positive net economic benefits from strengthening their transmission networks in response to the Snowy 2.0 project.
	 Determination by the AER that the proposed investment satisfies the RIT-T.
	4. TransGrid Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.
	 Clauses 2 and 3 do not apply if a change in the law occurs that allows the inclusion of the proposed investment in TransGrid's maximum allowed revenue under this revenue determination even if a RIT-T is not carried out.
Support Central Western NSW for Renewables (\$120m to \$455m)	 New generation of more than 900 MW is committed in central western NSW (west of Wollar and Mt Piper).
	 Successful completion of the RIT-T demonstrating a network investment by TransGrid maximises the positive net economic benefits from increasing the capacity of the network west of Wollar and Mt Piper at 132/330kV or other voltages.
	Determination by the AER that the proposed investment satisfies the RIT-T.
	 TransGrid Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.



Contingent Project	Trigger
	 Clauses 2 and 3 do not apply if a change in the law occurs that allows the inclusion of the proposed investment in TransGrid's maximum allowed revenue under this revenue determination even if a RIT-T is not carried out
Support North Western NSW for Renewables (\$500m to \$945m)	 New generation of more than 800 MW is committed in North Western NSW (north of Bayswater and Liddell).
	 Successful completion of the RIT-T demonstrating a network investment by TransGrid maximises the positive net economic benefits from increasing the capacity of the network north of Bayswater and Liddell at 132/330kV or other voltages.
	Determination by the AER that the proposed investment satisfies the RIT-T.
	TransGrid Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.
	 Clauses 2 and 3 do not apply if a change in the law occurs that allows the inclusion of the proposed investment in TransGrid's maximum allowed revenue under this revenue determination even if a RIT-T is not carried out
Renewables development in the Mt Piper to Wellington area (\$36.8m)	 New generation of more than 150 MW is committed in the Mt Piper to Wellington area.
	 Successful completion of the RIT-T demonstrating a network investment by TransGrid maximises the positive net economic benefits from increasing the capacity of the network between Mt Piper and Wellington at 132/330kV or other voltages.
	Determination by the AER that the proposed investment satisfies the RIT-T.
	 TransGrid Board commitment to proceed with the project subject to the AER amending the revenue determination pursuant to the Rules.
	 Clauses 2 and 3 do not apply if a change in the law occurs that allows the inclusion of the proposed investment in TransGrid's maximum allowed revenue under this revenue determination even if a RIT-T is not carried out

