Annual ENSMS Performance Report

01-July-2021 to 30-June-2022

Endeavour Energy

Contents

Executive Summary

The Annual ENSMS Performance Report has been prepared in accordance with the Electricity networks reporting manual- Safety management system performance measurement – (September 2022) issued by IPART to fulfil this statutory obligation.

The report provides information regarding the performance of Endeavour Energy's Network System Management Systems (ENSMS) which has been prepared in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 (ESSNM).
Section A is the response to the reporting requirements and includes the previous financial year reporting performance measurement data for the period 1 July 2021 to 30 June 2022. Data has been provided for the previous periods where it has been possible to do so, and this will continue to be populated in future reports.

The following report data has been collated in line with the updated IPART reporting manual (2022). The report period is for 1 October 2021 to 30 September 2022.
Where reported figures are shown as "-" this denotes no report data is available. Where "0" is shown this indicates a reported figure, for other scenarios an explanatory note or footnote will be added.

Tier 1 – Major incidents

A.1 Major incidents

ESSNM Objective		Description of each major incident reported under the Reporting Manual - Incident Reporting requirements
Safety of members of the public		6th July 2021 - A concrete placing boom pump was pouring concrete in the construction site and have made contact with 11kV power line.
		2nd March 2022 - Human interference - Member of public (71-year-old neighbour assisting with flood assistance) made contact with energised LV cable with a screwdriver attempting to break open a hole in conduit under the house to allow water to escape
Safety of persons working on the network		Nil reported
Protection of property	Third party property	Nil reported
	Network property[a]	Nil reported
Safety risks arising from loss of electricity supply[b]		3rd March 2022 - Rain and flooding continue along the Nepean, Hawkesbury, Georges, Colo, and Macdonald Rivers. Customers in low-lying areas had power cut off ahead of rising floodwater levels. This event is classified as a major event day.
		8th March 2022 - Heavy rain and flooding along the Nepean, Hawkesbury, Georges, Colo, and Macdonald Rivers. This event is classified as a major event day. Disaster declaration was issued from the NSW Government ARGN 1012 related to the severe weather and floods.

a. Network property losses are not reportable under IPART's Reporting Manual - Incident Reporting requirements. For the purpose of this Reporting Manual, a network operator is to report each event in which losses exceed $500,000 in relation to damage caused to electricity works as defined in the Electricity Supply Act 1995.

b. As defined for major reliability incidents in IPART's Reporting Manual – Incident Reporting.

Tier 2 - Incidents

A.2 Incidents

ESSNM Objective	Description of each major incident reported under the Reporting Manual - Incident Reporting requirements
Safety of members of the public	Nil reported
Safety of persons working on the network	14th October 2021 – Accredited Service Provider struck 11kV cable with reciprocating saw resulting in arc flash burns to face and arms to worker.
	10th January 2022 - During commissioning of new Padmount substation the low voltage CB failed catastrophically. The operator sustained burns to the face.
Protection of third party property	Nil reported
Safety risks arising from loss of electricity supply[a]	15th January 2022 – Outage impacting 1,813 customers were affected in Glossodia and 126 in Warrawong. Primary causes were mains down by trees, and a probable lightning strike on a pole.

a. As defined for reliability incidents in IPART's Reporting Manual – Incident Reporting.

Tier 3 Control failure near miss

A.3 Network assets failures

Performance measure	Population	5-year average annual functional failures	Annual functional failures (for reporting period)					
			Unassisted			Assisted		
			No fire	Fire		No fire	Fire	
				Contained	Escaped		Contained	Escaped
Towers	844	0.2	0	0	0	0	0	0
Poles (including street lighting columns/poles & stay poles)	570,312	163.2	0	0	0	0	0	0
Pole-top structures[b]	444,914	385.6	0	7	0	0	0	1
Conductor – Transmission OH[c]	3,181	18.2	0	0	0	2	0	0
Conductor – Transmission UG[c]	421	4.2	0	0	0	0	0	0
Conductor – HV[d] (including sub-transmission) OH	11,073	735.6	18	5	4	37	1	5
Conductor – HV (including sub-transmission) UG	5,728	87.6	1	2	0	0	1	1
Conductor – LV[d] OH	13,682	359.4	14	0	2	156	0	0
Conductor – LV UG	15,703	151.8	27	6	0	35	1	0

Performance measure	Population	5-year average annual functional failures	Annual functional failures (for reporting period)					
			Unassisted			Assisted		
			No fire	Fire		No fire	Fire	
				Contained	Escaped		Contained	Escaped
Service line[e] OH	8,290	1433.6	8	0	0	117	0	0
Service line[e] UG	4,941	30.2	6	0	0	80	0	0
Power transformers[f]	434	10.6	0	0	0	0	0	0
Distribution transformers	31,203	197.8	1	2	2	0	0	1
Reactive plant[g]	161	0.8	0	0	0	0	0	0
Switchgear – zone / subtranmission/transmission substation	4,328	15.2	0	0	0	0	0	0
Switchgear – distribution (OH)	45,777	767.4	232	2	0	1904	0	0
Switchgear – distribution (ground based)	25,530	102.4	2	1	0	62	0	0
Protection relays or systems	20,472	33	16	0	0	0	0	0
Zone / subtransmission/ transmission substation SCADA system	207	13.8	0	0	0	0	0	0

Electricity Network Safety Management System – performance report

Performance measure	Population	5-year average annual functional failures	Annual functional failures (for reporting period)					
			Unassisted			Assisted		
			No fire	Fire		No fire	Fire	
				Contained	Escaped		Contained	Escaped
Zone / subtransmission/transmission substation Protection Batteries	284	14.4	0	0	0	0	0	0
Network SAPS[h]	0	0	0	0	0	0	0	0

a. See Glossary for definitions of unassisted failures and assisted failures.
b. Pole-top structures/components are any structure that is attached to a pole to support electricity mains and apparatus.
c. OH means ‘overhead’; and UG means ’underground’. Transmission and sub-transmission voltages are generally 33kV AC nominal and above. Transmission conductors form part of a transmission network. Sub-transmission conductors form part of a distribution network.
d. HV means ‘high voltage’, and LV means ‘low voltage’. High voltage are voltages 1kV AC nominal and above. Low voltage are voltages below 1kV AC nominal.
e. Overhead service and underground service as defined in the NSW Service and Installation Rules.
f. Power Transformers are transformers where the secondary/output voltage is 5kV nominal or above.
g. Reactive plants are reactors and capacitors.
h. This may include temporary, emergency or permanent SAPS. See Glossary for definition of Network SAPS.

A.4 Vegetation contact with conductors

Performance measure[a]	Event count – Current reporting period	Event count – Last reporting period	Event count – Two periods ago	Event count – Three periods ago	Event count – Four periods ago	Comments
Fire starts – grow-in	0	0	1	0	0	
Fire start – fall-in and blow-in	14	15	47	24	19	
Interruption[b] – grow-in	3065	0	0	0	-	Since system upgrade to ADMS we can now differentiate grow-in to fall-in and blow-in from FY22.
Interruption – fall-in and blow-in	1316	3583	4985	4972	-	

a. Vegetation hazard definitions as per the Industry Safety Steering Committee Guide for the Management of Vegetation in the Vicinity of Electricity Assets (ISSC3).
b. Includes momentary interruptions.

A.5 Unintended contact, unauthorised access and electric shocks

Detail	Event count – Current reporting period	Event count – Last reporting period	Event count – Two periods ago	Event count – Three periods ago	Event count – Four periods ago	Comments
Electric shock[a] and arc flash incidents[b] originating from network assets including those received in customer premises						
Public	85	107	100	125	-	
Public worker	9	1	1	2	-	
Network employee / network contractor[d]	2	4	1	1	-	
Accredited Service Provider	1	2	1	0	-	See Section A.2
Livestock or domestic pet	1	0	0	0	-	Fallen conductor resulted in 8 dead cows.
Contact with energised overhead network asset (eg conductor strike)						
Public road vehicle[f] (Total)	268	248	224	295	-	Includes Agricultural, Network Vehicles & Other this reporting period.
Plant & equipment (subset of Total)	206	112	26	0	-	

Detail	Event count – Current reporting period	Event count – Last reporting period	Event count – Two periods ago	Event count – Three periods ago	Event count – Four periods ago	Comments
Agricultural and other[h]	N/A	57	14	0	-	Due to an ongoing implementation of SAP & ADMS Upgrades, we cannot differentiate Agricultural & Network Vehicles this reporting period. These have been included in the total (Public Road Vehicle).
Network vehicle	N/A	0	1	0	-	
Contact with energised underground network asset[e] (e.g. conductor strike)						
Plant & equipment	57	71	52	0	-	
Person with handheld tool	0	0	1	2	-	
Unauthorised network access (intentional)						
Zone / BSP / Transmission substation / switching station	3	2	3	7	-	Upgrade to ADMS (Advanced Distribution Management System) has enabled enhanced capture, hence the spike in reported instances for Distribution Substations and Towers / poles.
Distribution substation	30	8	2	3	-	

Electricity Network Safety Management System – performance report

Detail	Event count – Current reporting period	Event count – Last reporting period	Event count – Two periods ago	Event count – Three periods ago	Event count – Four periods ago	Comments
Towers / poles	82	0	1	1	-	See basis of preparation for more detail.
Other (e.g. communications sites)	0	0	0	-	-	
Safe Approach Distance[i]						
Network employee / network contractor	0	0	1	0	-	
Accredited Service Provider	0	0	0	1	-	
Public	0	0	0	0	-	
Public worker	0	2	3	6	-	

a. All electric shocks are to be reported except those resulting from static discharge, defibrillators, where the system is nominally extra low voltage or involving the DC rail traction system.
b. Incidents that result in a burn or other injury requiring medical treatment and result from exposure to an arc.
c. Events caused by network assets, network asset defects or network activities, including shocks received inside customer installations, are to be reported. Customer installation events not associated with network assets are not to be reported.
d. Includes all classes of authorised persons (network employee and network contractor). Accredited Service Provider employees are not included.

e. Would not normally include contact with a pole, pillar, distribution substation etc, unless the contact results in subsequent contact with an energised asset.
f. Including plant and equipment packed up for travel (i.e. plant and equipment travelling on a public road to or from worksite).
g. Cranes, elevated work platforms, cherry pickers, excavators, handheld tools, etc.
h. Examples include agricultural equipment, aircraft and watercraft.
i. Encroachment into the applicable Safe Approach Distance for the type of individual involved.

A.6 Reliability and Quality of Supply[a]

Performance measure	Event count – Current reporting period	Event count – Last reporting period	Event count – Two periods ago	Event count – Three periods ago	Event count – Four periods ago	Comments
High voltage into Low voltage[b]	51	55	62	13	-	
Sustained voltage excursions outside emergency range[c]	80,758	1936	1	3	-	The increase in this category is the result of enhanced data sources including accessing smart meter information. Increased data access has led to an increase in visibility of incidents. These 80,758 events were detected over 484 meters.
Reverse polarity	0	1	1	1	-	
Neutral integrity due to poor workmanship or incorrect procedure	0	0	0	0	-	Neutral integrity issues are ordinarily identified when a voltage is present within a customer's premises causing a shock. Consequently, these are captured in Table A5, specifically “Electric shock and arc flash incidents originating from network assets including those received in customer premises”.
Neutral integrity due to asset defect or failure	0	0	0	0	-	As above.

a. Reporting is required by distribution network operators only.
b. May also be referred to as HV LV intermix or HV injection.
c. As defined by network operator with reference to the measurement methodologies used in Australian Standard AS61000.3.100.

A.7 Reliability and Quality of Supply – Critical infrastructure incidents

Sustained (3+ minutes outage)

Type of critical infrastructure[a] (e.g. hospital)	Minutes of supply lost[b]	Cause	Consequential safety impacts associated with supply issue
Hospital - Public A1	163	Adverse weather	Wind (Growing or falling tree or branches not felled or lopped - bark, grass)
Hospital - Private A1	56	Defective equipment	Electrical Failure
Hospital - Public A1	244	Defective equipment	Wear & Tear
Hospital - Private A1	50	Defective equipment	Wear & Tear
Hospital - Private B	48	Adverse weather	Wind (Growing or falling tree or branches not felled or lopped - bark, grass)
Hospital - Public B	151	Defective equipment	Electrical Failure
Hospital - Public B	83	Defective equipment	Electrical Failure
Hospital - Private B	40	Foreign interference	Animals, Birds, Insects and Vermin
Hospital - Public B	31	Foreign interference	Probable Animals, Birds, Insects and Vermin
Hospital - Public B	99	Foreign interference	Vandalism
Hospital - Public B	74	Human element	Switching Error
Hospital - Public C	97	Adverse weather	Lightning/Electrical Storm
Hospital - Public C	6	Adverse weather	Probable Storm

Type of critical infrastructure[a] (e.g. hospital)	Minutes of supply lost[b]	Cause	Consequential safety impacts associated with supply issue
Hospital - Public C	191	Adverse weather	Wind (Growing or falling tree or branches not felled or lopped - bark, grass)
Hospital - Public C	204	Adverse weather	Wind (Growing or falling tree or branches not felled or lopped - bark, grass)
Hospital - Public, Private C	73	Adverse weather	Wind (Growing or falling tree or branches not felled or lopped - bark, grass)
Hospital - Public C	585	Adverse weather	Wind (Growing or falling tree or branches not felled or lopped - bark, grass)
Hospital - Public, Private C	5	Defective equipment	Electrical Failure
Hospital - Public C	68	Defective equipment	Electrical Failure
Hospital - Private C	55	Defective equipment	Electrical Failure
Hospital - Private C	63	Defective equipment	Electrical Failure
Hospital - Private C	62	Defective equipment	Electrical Failure
Hospital - Private C	15	Defective equipment	Electrical Failure
Hospital - Public, Private C	39	Defective equipment	Wear & Tear
Hospital - Private C	65	Defective equipment	Wear & Tear
Hospital - Public C	50	Defective equipment	Wear & Tear
Hospital - Public C	244	Defective equipment	Wear & Tear

Type of critical infrastructure[a] (e.g. hospital)	Minutes of supply lost[b]	Cause	Consequential safety impacts associated with supply issue
Hospital - Public, Private C	663	Foreign interference	Animals, Birds, Insects and Vermin
Hospital - Public C	87	Foreign interference	Vehicle Impact
Hospital - Private C	32	Tree contact	Growing or falling tree or branches not felled or lopped (bark, grass)
Hospital - Public, Private C	193	Tree contact	Growing or falling tree or branches not felled or lopped (bark, grass)
Hospital - Public C	19	Unknown	Cause Unknown
Hospital - Public C2	91	Defective equipment	Electrical Failure
Hospital - Public D	134	Adverse weather	Wind (Growing or falling tree or branches not felled or lopped - bark, grass)
Hospital - Public D	86	Adverse weather	Wind (Growing or falling tree or branches not felled or lopped - bark, grass)
Hospital - Public D	247	Unknown	Cause Unknown
Hospital - Private D1a	94	Adverse weather	Wind (Growing or falling tree or branches not felled or lopped - bark, grass)
Hospital - Private D1a	102	Adverse weather	Wind (Growing or falling tree or branches not felled or lopped - bark, grass)
Hospital - Public D1b	106	Foreign interference	Vandalism
Hospital - Private	60	Tree contact	Growing or falling tree or branches not felled or lopped (bark, grass)

a. Critical infrastructure as identified in the network operator's formal safety assessment in relation to the safety risks associated with loss of supply.
b. Number of minutes that the critical infrastructure was without a network supply.

A.7 Comments:

Incidents include outages and supply quality events that adversely impact critical infrastructure. Momentary outages (less than 180 seconds) have been excluded. The maximum outage for any of these momentary outages was 21 seconds.

A.8 Network- initiated Property damage events

Performance measure	Event count – Current reporting period	Event count – Last reporting period	Event count – Two periods ago	Event count – Three periods ago	Event count – Four periods ago	Comments
Third party property (assets including vehicles, buildings, crops, livestock)						
Damage (e.g. Fire, Physical impact or Electrical)	1	0	1	0	1	
Network property (including non-electrical assets including vehicles, buildings)						
Damage (e.g. Fire, Physical impact or Electrical)	0	0	1	0	0	

Note: Event counts should include any event where there is a reasonable likelihood that damage was caused by electricity works.

Tier 4 Control implementation

A.9 Amendments and improvements to Formal Safety Assessments (FSA) or Associated Risk Treatments

Endeavour Energy's ENSMS consists of five Formal Safety Assessments that address the following risks:

- Worker injury – electrical. This includes the risk of injury through both electric shock and arc flash.
- Worker injury – non-electrical
- Bushfire
- Public safety. This FSA also addresses the risk of harm to third party property apart from damage due to network-initiated bushfires.
- Safety risks due to loss of supply

The risks of harm to the environment are managed through the implementation of Endeavour Energy's ISO14001-certified Environmental Management System.

During the reporting period the following amendments were made to these FSAs and the documented risk treatments.

FSA	Amendments / improvements
Worker injury – non-electrical	Complete review of the structure and form of the FSA and the introduction of a Risk Register.
Bushfire	Complete review of the structure and form of the FSA. Introduction of the Bushfire Risk Register. A more detailed discussion on bushfire threat categories and the control effectiveness assessment.
Worker Injury Electrical	Complete review of the structure and form of the FSA and the introduction of a Risk Register.
Environmental Management System	Endeavour Energy is certified to AS/NZS ISO 14001:2015, the November 2021 surveillance audit identified zero non-conformances. Endeavour Energy participated in the 2021 Global Real Estate Sustainability Benchmark (GRESB) Assessment and scored a 5-star rating with an improved score from the previous year.

FSA	Amendments / improvements
	A Sustainability Strategy was developed and publicly launched during 2022. This was based on a materiality assessment which informed environmental, social and governance aspects of the strategy.
Public Safety	Endeavour Energy has updated the Public Safety FSA based on our latest understanding of the risks our network poses to the public. Complete review of the structure and form of the FSA and the introduction of a Risk Register
Loss of Supply	Review of the FSA structure. Introduction of the Loss of Supply Risk Register. Amendments post stakeholder engagement.

A.10 Design, Construction and Commissioning

Performance measure[a]	Event count – Current reporting period	Event count – Last reporting period	Event count – Two periods ago	Event count – Three periods ago	Event count – Four periods ago	Comments
Designs for which Safety in Design (SiD) Reports have been completed	843	1121	886	144	-	
Designs for which Safety in Design (SiD) Reports have been audited	0	5	0	0	-	
Contestable designs certified[b]	1394	1490	1487	1618	1744	
Contestable level 1 project safety reviews performed[c]	865	1410	1559	1358	1295	Figure is lower than previous years due to reclassification
Contestable level 2 project safety reviews performed[c]	210	303	409	422	362	
Non-contestable project safety reviews performed[c]	2469	2769	2351	-	-	
Project closeout reports completed for contestable projects	1204	1045	1119	1152	1307	

Electricity Network Safety Management System – performance report

Performance measure[a]	Event count – Current reporting period	Event count – Last reporting period	Event count – Two periods ago	Event count – Three periods ago	Event count – Four periods ago	Comments
Project closeout reports completed for non-contestable projects	217	23	98	63	-	
Project closeout reports audited for contestable projects	1204	1045	1119	1152	1307	All Projects are Audited*
Project closeout reports audited for non-contestable projects	217	0	98	60	-	

a. The unit of measure is the number of designs/projects.
b. The network operator is to advise where no contestable designs have been performed.
c. A safety review would include checking that work on or near the network is being performed safely.

A.11 Inspections (assets)

Performance measure[a]	Inspection tasks				Corrective action tasks				Comments
	Planned inspection tasks[b]	Achieved[c]	Open[d]	Outstanding[d]	Tasks identified (all categories)[c]	Achieved	Open	Outstanding[e]	
Transmission Substations	53	29	9	15	2603	447	636	1519	
Zone Substations	16,641	5,913	2,153	8,575	32,091	14,084	4,686	13,320	Increase due to additional corrective actions tracking being systemised. Fire extinguisher, wet blanket checks, and a range of other tasks were previously tracked outside of corporate systems.
Distribution Substations	2,851	256	74	2,521	6,597	1,095	787	4,715	
Transmission OH	14,298	8,610	2,196	3,492	1,634	316	425	893	
Transmission UG	2,723	2,061	70	592	18	9	5	4	
Distribution OH	78,753	64,821	13,899	33	41,080	16,088	6,277	18,715	
Distribution UG	28,234	4,108	349	23,777	1,559	752	399	405	
Network SAPS[f]	0	0	0	0	0	0	0	0	

Note: The network operator may provide more detailed information when reporting tasks. These can be added under the headline metrics. Field captured inspection data may require additional processing to identify the appropriate corrective action tasks.

a. Table A.11 should not include activities reported in Table B.3 (Vegetation tasks) and Table B.4 (Asset tasks).
b. Includes all 'Open' and 'Outstanding' tasks from the previous reporting period.
c. Inspection tasks must only be reported as 'Achieved' when all associated corrective action tasks to address the faults of a particular asset have been identified.
d. 'Open' and 'Outstanding' tasks are those tasks categorised as such at the end of the reporting period. The outstanding category includes both open and closed tasks that were completed after the initial set due date
e. The network operator must provide commentary to explain how it is managing risk associated with outstanding tasks and when the outstanding tasks are expected to be completed.
f. This may include temporary, emergency or permanent SAPS. See Glossary for definition of Network SAPS.

A.11 commentary on the number of Open and Outstanding items:

Across all performance measures in A.11 there is a significant percentage of inspection tasks and corrective actions in the Open and Outstanding columns.

This is primarily due to two factors detailed below:

- Inspection tasks were impacted during the reporting period by unplanned events including the restriction of staff across LGA boundaries during COVID which impacted on workforce mobility and major flooding events requiring reallocation of staff over a prolonged restoration time.
- IT system changes to the main operational system (ADMS) and our corporate system (SAP) have impacted on the maintenance program by:
    - Delays in raising of inspection tasks due to system delays and changes
    - Technical issues with the closure of inspection and corrective actions resulting in reporting showing as Outstanding even if the work is physically completed on time
    - Restrictions in raising outages impacting on the rectification of corrective actions that require system outages
    - Lower priority inspection tasks raised are done by scheduling and bundling for workforce efficiency

A.12 Inspections (vegetation) Aerial/Ground based

Bush fire risk category	Population (spans / poles)	Target	Achieved	Outstanding	Comments
Aerial	0	0	0	0	LiDAR is not currently used for scoping the routine maintenance program
Ground-based	570,312	153,491	153,383	108	Inclement weather impacted the PSBI Program this year.

Note: Table A.12 does not include activities reported in Table B.3 (Vegetation tasks) and Table B.4 (Asset tasks).

Hazard Tree Management

Trees that are considered as presenting a risk of falling, dropping, and contacting the electricity network are primarily identified by the vegetation contractor during the scoping phase of the vegetation management process however customers or other members of the public may also advise Endeavour Energy of potentially hazardous trees.

Tree Management Officer will undertake a visual tree assessment of such identified trees. If deemed to be a Hazard Tree the tree will be removed, trimmed, or otherwise managed to obviate the risk to the electricity network. It should be noted that trees which are identified as presenting an immediate risk to the electricity network are reported to Endeavour Energy's contact centre and are actioned through the respective local depot's fault and emergency process.

A.13 Public electrical safety plans and activities[a]

Network operator public safety programs / campaigns	Details
Public Safety Plan	In June 2021 Electrical & Public Safety presented Public Safety Plan to the Executive HSE Committee that detailed a plan to managing public safety risks associated with Endeavour Energy's network that included a number of activities grouped across four enablers: • **Asset Management** - activities across the network asset lifecycle that ensure the network is safe; • **Technology**- Initiatives based on Smart Meters and their capability to function as both a preventive and mitigative risk control for network neutral issues; • **Worker Competency** - activities that address the training, competency management and skill retention of our workers; and • **Public Awareness** - activities to raise our customer and stakeholder awareness of the hazards associated with our network. Since July 2021 significant progress with this plan has been achieved with all activities and initiatives being on track for delivery including effective industry engagement, promotion of awareness campaigns and collaboration with other stakeholders both internal and external to the business. Asset Management projects and programs continue to be delivered following a risk-based approach in line with our corporate investment plan.
Public Safety Awareness Campaigns	The Public Safety Team have been working closely with Corporate Affairs and a creative content agency to develop effective traditional and social media content to lift engagement and promote community education and awareness. In addition, the company website has been updated and includes a range of educational content regarding electrical safety at home and in the construction industry. The FY22 Public Safety Awareness Campaign was successfully delivered across a range of social media platforms with significantly improved engagement and page interaction.

Network operator public safety programs / campaigns	Details
Collaboration with other DNSPs and industry stakeholders	Endeavour Energy's Public Safety team continue to proactively engage with numerous industry stakeholders to explore opportunities for collaboration and sharing of safety education and awareness including Safe Work NSW, Transport for NSW, Before You Dig Australia, Sydney Trains, local council forums, large corporations and private enterprise. Endeavour Energy are also exploring opportunities to collaborate with other DNSPs from NSW, Tasmania, ACT and QLD with plans in place to co-brand and deliver awareness campaigns and public safety educational material.

a. Network operator to provide details on the plans and other activities that the network operator undertook to provide safety information to the public. Examples may include a publication of a Public Electrical Safety Awareness Plan, advertisements associated with electrical safety and awareness, publication of a bush fire risk management plan, shocks and tingles awareness program, etc.

A.14 Internal audits performed on any aspect of the ENSMS

Audit scope	Identified non-compliances	Actions taken or proposed by network operator
Loss of Upstream Electricity Supply	In line with the existing practice of installing UFLS on large loads which are connected at 33 kV or above, the adequacy of these loads to provide the required load reduction for UFLS should be periodically monitored.	Agreed, the required load reduction for UFLS will be periodically monitored.
	A review be undertaken to identify 11 kV feeders and zone substations experiencing reverse power flows and the associated time interval of these reverse flows. The identified feeders should be prioritised for implementing a reverse power flow monitoring and UFLS blocking scheme.	A review will be undertaken to identify 11 kV feeders and zone substations experiencing reverse power flows and the associated time interval of these reverse flows, and a case for investment will be submitted where it is cost justified to implement a reverse power flow monitoring and UFLS blocking scheme.
	We recommend that the zero time delay UFLS mandate be reviewed in consultation with TransGrid and AEMO. Once assessed and agreed with all parties, appropriate time delays should be implemented to ensure network security against plausible spurious trappings caused as a result of transient events like switching and faults.	The zero time delay UFLS mandate will be reviewed, and appropriate time delays implemented to ensure network security against plausible spurious trippings.
	In the event where a transformer is replaced for any reason, as per the current planning practice by Endeavour Energy, a wider tap changer range be selected so that participation in RERT is possible for more zone substations, improving the effectiveness and capability of Endeavour Energy to participate in the RERT scheme.	Review power transformer tapping range specification in consultation with System Control and implement as variation on the existing contract/s for all orders placed from May 2022 onwards. Update the transformer ETS (Equipment Technical Specification) prior to next tender.
	Consideration be given to assessing and reducing higher voltages at the TransGrid side of the transmission network to achieve ideal tap positions on the Endeavour Energy side, so	No action to be taken. RERT represents opportunistic market participation by Endeavour Energy. Other market participants can respond if Endeavour is not able to.

Audit scope	Identified non-compliances	Actions taken or proposed by network operator
	that more zone substations can be utilised to participate in the RERT scheme. This will require collaboration between Endeavour Energy and TransGrid.	
	Consideration be given to the provision of reactors / voltage control devices at appropriate voltage level and locations to address the high voltages caused due to HV cable capacitances.	A business case will be developed in consultation with TransGrid, with changes implemented if determined to be practical.

Note: Network operators are only required to report internal audit non-compliances that are related to ENSMS or safety issues.

a. AS 5577 is the Australian Standard Electricity network safety management systems, 2013, published by Standards Australia.

A.15 External audits performed on any aspect of the ENSMS (as per AS 5577 clause 4.5.4)

Audit scope	Identified non-compliances	Actions taken or proposed by network operator
ENSMS Bushfire Risk Audit March 2022	The Bushfire FSA should be updated to document or reference analysis at a lower asset granularity or provide documented justification where assets are grouped for analysis.	This will be incorporated in the ongoing update of the Bushfire FSA.
	It is recommended that the Bushfire Risk Register be updated to document the quantitative likelihood and consequence for each hazardous event (or threat).	Threat likelihood and a relative consequence will be calculated and reflected in the Bushfire Risk Register, in the ongoing update of the Bushfire FSA.
	The Bushfire FSA should be updated to document further practical safety controls that have been considered but not implemented. The justification for not implementing should be presented.	Work will be performed to document controls that have been considered and not pursued in a structured process. Currently internal documentation (GNV1119) is being updated, to better reflect this process and how it applies to all safety risks and this will be followed in the future.
	It is recommended that residual risks are calculated for each hazardous event (or threat) and documented in the Bushfire Risk Register. For each hazardous event (or threat) it should be stated whether ALARP has been achieved.	Work will be performed to document controls that have been considered and not pursued in a structured process. Currently internal documentation (GNV1119) is being updated, to better reflect this process and how it applies to all safety risks and this will be followed in the future.
	It is recommended that a review be undertaken of ENSMS controlled documentation to determine the full extent of procedures that have not been reviewed by the required review date. A plan should be implemented to review documents, on a risk assessed basis, and update all out of date documents as soon as practical. A review of Company Policy Information & Records Management 15.3.2 should also be undertaken to confirm that the procedure, with respect to this non-compliance, establishes an appropriate requirement.	a) Company Policy 15.3.2 Information & Records Management will be reviewed and updated b) A plan will be developed for the review of ENSMS documents

Bushfire preparedness

B.1 Bushfire risk profile across network operator's supply area

Year in review

The 2021-22 financial year saw a continuation of the above average rainfall seen in the previous year. La Niña conditions returned in late November 2021, peaked in mid-summer, and weakened over autumn 2022. As a result, rainfall deciles recorded by the Bureau of Meteorology were very much above average across the Endeavour Energy network area and bushfire risk for the fire season was below normal.

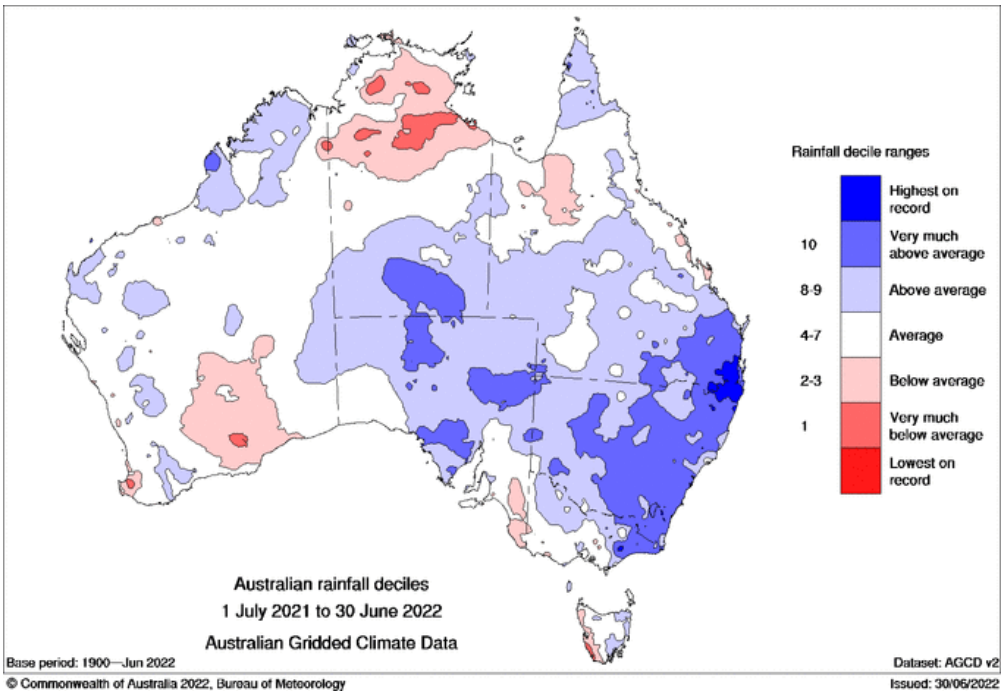

Figure 1 - Rainfall deciles for FY2022

Australia's wettest November on record saw flooding across large areas of New South Wales before an extreme multi-day rainfall event in late February and March produced major flooding in catchments within the Endeavour Energy network area. Heavy rain in early April caused renewed moderate flooding in the areas impacted in March.

Forecast

The Bureau of Meteorology climate outlook for the coming spring and summer notes the same climate drivers from 2021-22 are persisting, increasing the chance of above average rainfall across the Endeavour Energy network area and resulting in continuing benign bushfire conditions.

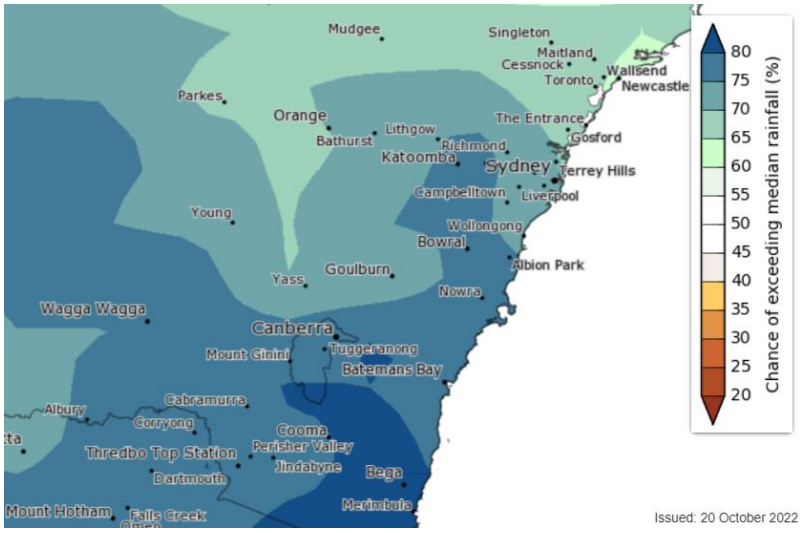

Figure 2 – Chance of above median rainfall – November 2022 to January 2023

The seasonal outlook for Spring 2022 issued by AFAC (the Australian and New Zealand National Council for fire and emergency services) indicates that due to the favourable climate forecast described above the bushfire outlook for the period ahead is normal or below normal for the Endeavour Energy network area.

Below normal fire potential is expected for areas burnt in the 2019-20 season due to reduced fuel loads and high fuel moisture. This results in below normal bushfire potential for 10,800 km^2 or 44% of the 24,800km^2 Endeavour Energy network area.

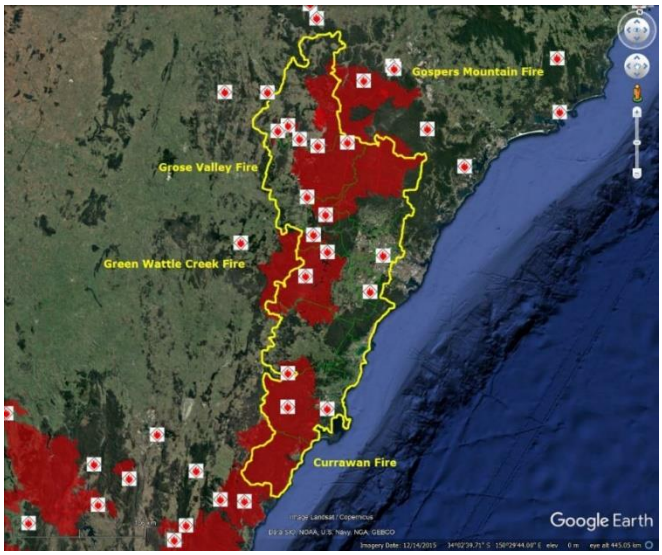

Figure 3 – Major fires impacting the Endeavour Energy operating area 2019-2020

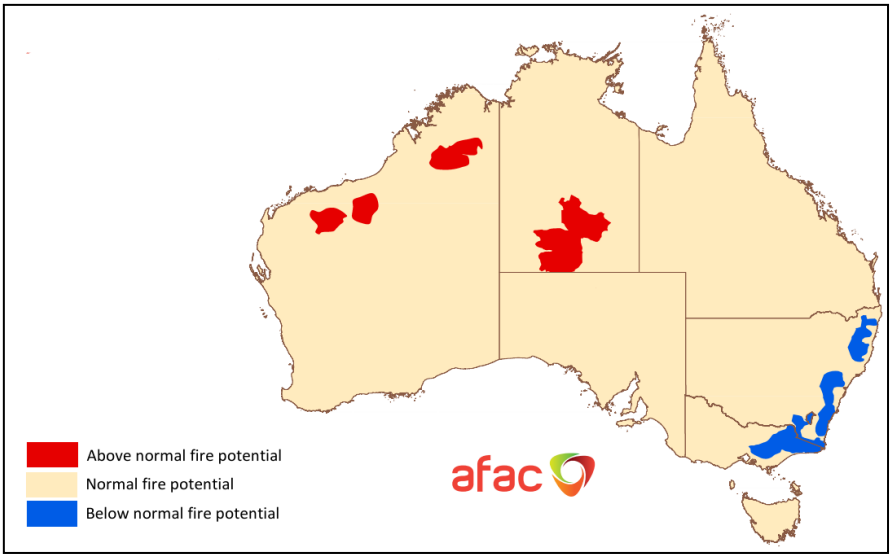

Figure 4 - Australian seasonal bushfire outlook August 2022

Endeavour Energy recognises that changes in weather conditions may contribute to an increased bushfire risk over the 2022/23 summer in some parts of the network area. As part of the company's normal operating practice Endeavour Energy will continue to monitor weather forecasts and liaise with the NSW Rural Fire Service and apply appropriate network risk mitigation strategies throughout the Bushfire Danger Period.

B.2 Permanent / temporary declaration of areas by RFS and network operator's actions

The NSW RFS has temporarily brought forward the commencement of the Bush Fire Danger Period in a number Local Government Areas in previous bushfire seasons, however no changes have been made within the Endeavour Energy network area this year. The table below details the LGAs within the Endeavour Energy operating area and their respective Bush Fire Danger Period commencement dates.

Region	LGA	Temporary	Permanent
Greater Sydney	Blacktown City	Nil	1 October
	Blue Mountains City	Nil	1 October
	Camden	Nil	1 October
	Campbelltown City	Nil	1 October
	Fairfield City	Nil	1 October
	Hawkesbury City	Nil	1 October
	Liverpool City	Nil	1 October
	Parramatta	Nil	1 October
	Penrith City	Nil	1 October
	The Hills Shire	Nil	1 October
Illawarra / Shoalhaven	Kiama	Nil	1 October
	Shellharbour City	Nil	1 October
	Shoalhaven City	Nil	1 September
	Wingecarribee Shire	Nil	1 October
	Wollondilly Shire	Nil	1 October
	Wollongong City	Nil	1 October
Central Ranges	Lithgow	Nil	1 October
	Mid-Western Regional	Nil	1 October

Endeavour Energy carries out a number of bushfire risk mitigation activities including both year-round and seasonal activities leading up to and within the bushfire season. During the reporting period Endeavour Energy undertook the following actions to mitigate bushfire risks.

Pre-bushfire danger period inspection and defect rectification

Each year Endeavour Energy undertakes patrols of network assets located in bushfire prone areas in the months prior to the Bushfire Danger Period. These patrols allow for the identification and rectification of defects that pose a genuine risk of initiating a bushfire. Rectification of significant defects found during this process is required prior to the start of the bushfire season.

Inspections of bushfire prone areas are typically a combination of aerial patrols where the area can be flown and ground patrols where it is not reasonably possible to conduct aerial patrols. These patrols include the use of LiDAR imagery for the determination of vegetation encroachments and high definition still photography for assessment of asset condition and defect identification.

Due to the permanent change to the Bushfire Danger Period in the Shoalhaven area to 1 September any defects identified during the Pre-Summer Bushfire Inspection (PSBI) program in the Shoalhaven area would be completed by 1 September. For all other bush fire prone areas defects were to be rectified no later than 1 October.

Refer to tables B.1, B.2, B.3 and B.4 for details of the status of the 2022 pre-summer bushfire inspection program.

Routine maintenance

In addition to the annual pre-summer bushfire inspections noted above, routine maintenance regimes and cyclic inspections also identify any faults or issues that need to be repaired. These are prioritised to ensure that the most significant issues are rectified ahead of the bushfire season.

Vegetation clearing

To help minimise safety and bushfire risks Endeavour Energy delivers annual vegetation programs to keep vegetation clear of power lines. Clearance requirements are based on the Industry Safety Steering Committee (ISSC) 3 - Guide for the Management of Vegetation in the Vicinity of Electricity Assets.

In heavily vegetated areas where clearing is problematic, alternatives such as line relocation, conversion to covered conductor or underground conversion may be considered where appropriate.

Covered Conductor Thick (CCT) project

Following a review of the 2019-20 bushfires Endeavour Energy fast-tracked a project to replace bare overhead conductor with Covered Conductor Thick (CCT) to further reduce the risk of bushfire ignition.

Recent development in bushfire risk modelling has provided clearer identification of locations on the network where a higher bushfire ignition risk exists. The modelling identified several locations that represent the highest bushfire ignition risk of all HV distribution spans in Endeavour Energy's network and as a result investment in additional bushfire ignition risk mitigation works has been approved for coming years.

Fire Mesh

Also following the 2019-20 bushfires a final case for investment was approved for the application of a product known as Fire Mesh to high risk timber poles in order to protect the poles from catching fire during a bushfire. The case for investment recommended the application of Fire Mesh to selected timber poles in a proactive manner based on risk assessment and for general application in a reactive manner when and overhead line is threatened by bushfire.

These mitigative measures are expected to provide significant enhancements in the networks resilience to bushfire as well as improving reliability of supply for customers.

Protection relays and settings

A program of works commenced in 2016-17 which involves replacing of non-microprocessor based protective devices that will reduce the time to isolate circuits in response to faults on the network. This will have the benefit, amongst other things, of a reduction of bushfire ignition risk. The program to replace relays was completed in 2021-22.

Fault Anticipation

Endeavour Energy is undertaking a pilot to evaluate the efficacy of Fault Anticipation technology. Early Fault Detection (EFD) units have been installed on selected distribution feeders and are being monitored. Based on initial success the trial is being expanded in 2022-23 ahead of a final decision regarding broader implementation on the Endeavour Energy network to help reduce bushfire risk.

Emergency Preparedness and Response

Endeavour Energy is committed to being adequately prepared for incidents to provide an effective response. Effective operational responses minimise danger to workers and the public, limit disruption to customer service, protect assets, and minimise harm to the environment.

The normal year-round emergency response and incident management systems are in place to coordinate a response to any incidents that are declared during summer. During incidents, communications plans are coordinated with the incident management process, to ensure that stakeholders and responders are notified of response progress.

At an organisational level, the company will implement the Incident Management Plan (IMP) once it becomes clear that managing the impact of an incident or event requires a coordinated response and significant re-prioritisation of the operational needs and resources as outlined in the procedure.

The IMP has a broad scope and has been designed to respond to a wide range of major network incidents. It provides a framework which defines the actions to be taken upon declaration of a major disruptive event by providing:

- guiding principles for response;
- the company's structure for management of an incident;
- roles and responsibilities for management of an incident;
- escalation and notification schedules;
- checklists for initial considerations upon activation of an incident;
- checklists to monitor that planning addresses all the relevant issues; and
- the type of documentation required to be retained.

Following each incident, the same communications processes will continue, to provide updates on

changes in network risk, and the actions taken to maintain network security. Where the Bureau of Meteorology announces a Fire Weather Warning Rating of Extreme or Catastrophic for a designated area, no planned electricity supply interruptions will occur that affect customers in that designated area.

Liaison with NSW Rural Fire Service and with Local Councils

Endeavour Energy maintains strong relationships with the NSW Rural Fire Service (RFS) and Fire and Rescue NSW as well as with local councils, National Parks and Wildlife Service and other stakeholders. Endeavour Energy has identified staff to perform the Liaison Officer role for each local government area. These Liaison Officers attend Local Emergency Management Committees and local Bushfire Management Committees in each local government area to keep in touch with events as they arise along with preparation for the upcoming season.

Additionally, Endeavour Energy field staff complete training in Bushfire Awareness conducted by the RFS which provides an outline of the safety requirements for working in and around bushfire areas.

Communications

Prior to the onset of the storm and bushfire season, Endeavour Energy pro-actively distributes safety media releases. Information is also available on the company's website and social media channels, including:

- Bushfire and storm safety tips;
- Dangers of trees near power lines; and
- Electrical safety for emergency services personnel.

Advertising campaigns are targeted to incorporate safety messages to align with seasonal issues. Where aerial patrols are conducted as part of pre-summer network inspections, radio and press notifications advising of the aerial patrols are also carried out.

Endeavour Energy's Contact Centre provides an important service of informing affected customers of supply restoration developments during incidents. Contact Centre team members are continually provided with updated information and key contacts in other nominated business sections to enable customer queries to be addressed promptly.

The contact centre also provides an important feedback function whereby new information received through calls is recorded in internal systems and relayed to Systems Operations where appropriate. This provides a greater level of situational awareness to System Operators and the Incident Management Team.

Information updates are also regularly communicated through Endeavour Energy's social media pages, namely Facebook and Twitter. The company also provides information via a range of conventional media outlets as appropriate during incidents.

Standards

In bushfire prone areas Endeavour Energy has adopted standards that require new power lines to be either underground cables or where overhead is permitted, to be predominantly of covered or insulated construction.

Endeavour Energy's vegetation management standard has recently been revised to incorporate consequence rating levels for cutting maps to better prioritise cutting activities before the bushfire season. This is based on outputs of the Phoenix RapidFire bushfire simulator and risk assessment decision support tool.

Total Fire Ban Days

Endeavour Energy has installed reclosing devices at most of its zone substations and many field locations. These devices are designed to isolate supply in the event of a fault, and then attempt to restore supply a brief period later. If the fault is persistent, supply is isolated until a repair is undertaken, and at this point the recloser is re-set. This type of protection is considered appropriate during most conditions as many faults are only of a temporary nature, such as tree branches on mains etc.

In line with ISSC 33 - Guideline for network configuration during high bushfire risk days, Endeavour Energy adopts a risk-based approach to determining which feeders should have auto-reclosing disabled on total fire ban days. Generally, the auto-reclose functionality would not be disabled on feeders or field reclosers during total fire bans, however, where extenuating circumstances or unusual conditions exist on a feeder, the auto-reclose function will be disabled until the unusual condition is removed.

B.3 Aerial consumer mains on bushfire prone private land (HV and LV)

Aerial consumers mains are the overhead conductors and support structures between the main switchboard of an electrical installation and a support structure that is the connection point with the distribution system.

Low and high voltage overhead lines

Endeavour Energy's routine overhead line inspection program incorporates the inspection of aerial low voltage consumer mains including poles, conductors, and fittings. High voltage lines are inspected up to and including the high voltage metering point or the first point of protection (for example, dropout fuses, circuit breaker or switch fuse), whichever is first. If there is no high voltage metering point, all poles are inspected for the entire line length.

Where a defect is identified the customer is advised of the defect in writing and a copy of the written defect is to be forwarded to the OLI/GLI Manager. It is the customer's responsibility to have the defect repaired. Any defect that could result in a loose neutral connection, burning, or live metallic structures are regarded as an emergency hazardous situation and reported to the Endeavour Energy's Overhead Line / Ground Line Inspection (OLI/GLI) group for further action.

In addition to the routine overhead line inspection program, prior to the commencement of the Bushfire Danger Period, Endeavour Energy conducts a pre-summer bushfire inspection (PSBI) program which includes the identification and rectification of electricity asset defects and vegetation encroachments which have the potential to initiate a bushfire.

The pre-summer bushfire inspection program also includes inspection of overhead aerial consumer's mains located in bush fire prone areas. In a similar manner to the routine overhead line inspection program, the customer is advised in writing of any defects identified on overhead aerial consumers mains and are given a period of time that the defect must be rectified. Should the defect not be rectified within the specified timeframe Endeavour Energy will, under the powers provided by the Electricity Supply Act, either undertake the required works to rectify the defect and recover the reasonable costs for the work or disconnect the installation from the electricity network.

High Voltage Customers

The maintenance of electrical assets owned by High Voltage Customers is the responsibility of the owner. These requirements are detailed in Endeavour Energy's High Voltage Operating Protocols, however in addition, Endeavour Energy writes to High Voltage Customers, annually, advising them of the need to undertake inspections of their equipment and their responsibility for rectifying any defects capable of initiating a fire prior to the start of the bush fire danger period.

The High Voltage Customers are requested to formally advise Endeavour Energy that the inspection and rectification of defects have been completed.

Electricity Network Safety Management System – performance report

Table B.1 Aerial consumer mains on bush fire prone private land (HV and LV)

Performance measure	Current reporting period		Last reporting period		Two periods ago		Three periods ago		Four periods ago	
	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Private LV lines[b] checked by the network operator	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of directions for bushfire risk mitigation issued to LV customers by the network operator	N/A	73	N/A	52	N/A	411	N/A	30	N/A	46
Number of directions for bushfire risk mitigation issued to LV customers by the network operator that are outstanding by more than 60 days	N/A	0	N/A	0	N/A	0	N/A	1	N/A	1
HV customers (metering point count) advised to undertake pre-season bushfire checks in accordance with ISSC 31[c]	84	84	90	90	89	89	84	84	84	84
HV customers (metering point count) providing statements of compliance in accordance with ISSC 31	84	47	90	79	89	83	-	78	84	84
HV customers (metering point count) requiring additional risk mitigation prior to start of the reporting year[d]	0	1	0	11	0	6	-	5	-	-
HV customers (metering point count) where additional risk mitigation has been completed prior to start of the reporting year	1	0	11	0	6	0	-	1	-	-

a. Table B.1 is not applicable to Sydney Trains.
b. Private lines means aerial consumers mains on bush fire prone private land. Network operators may report in terms of numbers of LV installations or the numbers or percentage of areas targeted and checked.
c. Industry Safety Steering Committee Guideline for the Management of Private Overhead Lines (ISSC 31).
d. Includes the number of high voltage customers who did not provide a statement of compliance or had identified defects requiring mitigation, where the network operator is ensuring appropriate risk mitigation (eg, inspection by the network operator).

Table B.2 Pre-Summer bushfire inspections

Pre-Summer bushfire inspections	Population (spans / poles)	Target	Achieved	Outstanding	Comments
Aerial Inspection	172,855	172,855	146,528	458	Inclement weather impacted the PSBI Program this year.
Ground-based Inspection	0	0	25,869	0	Typically, the target is for all inspections to be carried out by Aerial Inspection, therefore the population in the ground inspection program is 0. In cases where adequate photographs and inspections could not be carried out by air, these are sent to the ground teams.

Comments

In cases where inspections have been carried out on a pole by aerial inspection and ground inspection, whichever was carried out last will be the Inspection Type.

Table B.3 Vegetation task

Bushfire risk category	Status	Encroachment Classification A1[a]	Encroachment Classification A2[b]	Encroachment Classification A3[c]	Encroachment Classification A4[d]	Hazard Trees[e]
Bushfire Prone Network (31st August Target)	Identified	170	320	264	38	Refer Note 1.
	Completed	169	311	258	38	
	Open	0	0	0	0	
	Outstanding	1	9	6	0	
Bushfire Prone Network (30th September Target)	Identified	1148	2638	2386	379	
	Completed	1090	2466	2201	258	
	Open	0	0	0	0	
	Outstanding	58	172	185	121	
Bushfire Prone Network (15th October Target)	Identified	0	0	756	257	
	Completed	0	0	380	141	
	Open	0	0	376	116	
	Outstanding	0	0	0	0	
Bushfire Prone Network (15th November Target)	Identified	0	0	1187	484	
	Completed	0	0	565	140	
	Open	0	0	622	344	
	Outstanding	0	0	0	0	
Bushfire Prone Network (15th December Target)	Identified	0	0	1466	1618	
	Completed	0	0	566	642	
	Open	0	0	900	976	
	Outstanding	0	0	0	0	

Electricity Network Safety Management System – performance report

Bushfire Prone Network (15th January Target)	Identified	0	0	719	3211
	Completed	0	0	329	982
	Open	0	0	390	2229
	Outstanding	0	0	0	0
Bushfire Prone Network (15th February Target)	Identified	0	0	349	3567
	Completed	0	0	110	1071
	Open	0	0	239	2496
	Outstanding	0	0	0	0
Bushfire Prone Network (15th March Target)	Identified	0	0	90	1539
	Completed	0	0	26	299
	Open	0	0	64	1240
	Outstanding	0	0	0	0
Bushfire Prone Customer (31st August Target)	Identified	1580	1956	0	0
	Completed	1580	1952	0	0
	Open	0	0	0	0
	Outstanding	0	4	0	0
Bushfire Prone Customer (31st December Target)	Identified	0	0	1624	2333
	Completed	0	0	1553	2288
	Open	0	0	71	45
	Outstanding	0	0	0	0

1. Hazard trees are described in notes under A.12 earlier in this document.
2. Asset tasks identified is the quantity of defects requiring attention following Endeavour Energy's review of the defects received from the PSBI contractor's defect identification process. An experienced pole inspector/auditor undertook a detailed review of each defect identified by the PSBI contractor to assess for consistency with the Defect Handbook (MMI 0002). Findings from this review process will be used to refine the PSBI contractor's defect identification processes in future programs.
3. Defect Categorisation (source: SMI 124 - Maintenance data entry and defect prioritisation)

   Category 1: Defects that pose a direct and immediate risk to safety of the public/staff, and/or to the network availability, requiring diversion of resources to isolate supply if required and control/repair the defect.

   Category 2: Defects that pose risks to safety of the public/staff, and/or the network availability, where the asset condition is such that a response in a period materially less than the business as usual processes for arrangement of isolations, materials ordering, and resource allocation is required.

   Category 3: Defects that pose a non-immediate risk to the safe and/or reliable operation of the network over the short term and would be prioritised for action during this period using the business as usual processes.

   Category 4: These defects do not impose a level of risk that warrants an escalated priority response but do represent a risk which needs to be managed and resolved in the medium term.

a. A1 – vegetation has encroached as far as 75-100% into the minimum vegetation clearance.
b. A2 – vegetation has encroached as far as 50-75% into the minimum vegetation clearance.
c. A3 – vegetation has encroached as far as 25-50% into the minimum vegetation clearance.
d. A4 – vegetation has encroached as far as 0-25% into the minimum vegetation clearance.
e. Hazard trees are blow-in/fall-in vegetation hazards as defined in ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets.
f. See Glossary for definitions of open and outstanding.

Table B.4 Asset tasks

Bushfire risk category	Status	Category 1[a]	Category 2[a]	Category 3[a]	Category 4[a]	Totals
Network	Identified	107	203	472	237	1019
	Completed	50	119	149	33	351
	Open	57	84	323	204	668
	Outstanding	0	0	0	0	0
Customer	Identified	9	18	71	19	117
	Completed	6	14	50	12	82
	Open	3	4	21	7	35
	Outstanding	0	0	0	0	0
Totals	Identified	116	221	543	256	**1136**
	Completed	56	133	199	45	**433**
	Open	60	88	344	211	**703**
	Outstanding	0	0	0	0	**0**

a. Network operator to define task priority (Categories 1-4).
b. See Glossary for definitions of open and outstanding.

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W Endeavourenergy.com.au
E news@endeavourenergy.com.au
T 131 081

ABN 11 247 365 823

Endeavour Energy