



Metro Trains Sydney

Electricity networks annual safety performance report Reporting period July 2022- June 2023

A Annual safety performance reporting

A.1 Tier 1 – Major incidents

Tier 1 incidents are defined as a ‘Major Incident’ in accordance with the *Electricity networks reporting manual – Incident reporting* (Reporting Manual - Incident Reporting).⁸ Table A.1 provides a template for the minimum reporting requirements.

Table 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		Nil
Safety of persons working on network		Nil
Protection of property	Third party property	Nil
	Network property ^a	Nil
Safety risks arising from loss of electricity supply ^b		Nil

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.

A.2 Tier 2 – Incidents

Tier 2 incidents are defined as an ‘Incident’ in accordance with the Reporting Manual - Incident Reporting. Table A.2 provides a template for the minimum reporting requirements.

Table A.2 Incidents

ESSNM Objective	Description of each incident reported under the Reporting Manual - Incident Reporting requirements
Safety of members of the public	Nil
Safety of persons working on network	Nil
Protection of third party property	Nil
Safety risks arising from loss of electricity supply ^a	Nil

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

A.3 Tier 3 – control failure near miss

Table A.3 Network assets failures

Performance measure	Population	5-year average annual functional failures	Annual functional failures (for reporting period)					
			Unassisted ^a			Assisted ^a		
			No fire	Fire		No fire	Fire	
				Contained	Escaped		Contained	Escaped
Towers	-	-	-	-	-	-	-	-
Poles (including street lighting columns/poles & stay poles)	-	-	-	-	-	-	-	-
Pole-top structures ^b	-	-	-	-	-	-	-	-
Conductor – Transmission OH ^c	-	-	-	-	-	-	-	-
Conductor – Transmission UG ^c	1km	-	-	-	-	-	-	-
Conductor – HV ^d (including sub-transmission) OH	-	-	-	-	-	-	-	-
Conductor – HV (including sub-transmission) UG	276km	1.4	6	-	-	-	-	-
Conductor – LV ^d OH	-	-	-	-	-	-	-	-
Conductor – LV UG	-	-	-	-	-	-	-	-
Service line ^e OH	-	-	-	-	-	-	-	-
Service line ^e UG	-	-	-	-	-	-	-	-
Power transformers ^f	9	2.2	9 ^c	-	-	2	-	-
Distribution transformers	92	-	-	-	-	-	-	-
Reactive plant ^g	-	-	-	-	-	-	-	-
Switchgear – zone / sub-transmission/transmission substation	1	-	-	-	-	-	-	-

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
Switchgear – distribution (OH)	-	-	-	-	-	-	-	-
Switchgear – distribution (Ground based)	110	-	-	-	-	-	-	-
Protection relays or systems	322	0.6	3 ^B	-	-	-	-	-
Zone / sub transmission/transmission substation SCADA system	79	3.2	16 ^A	-	-	-	-	-
Zone / sub transmission/transmission substation Protection Batteries	76	1.2	6 ^C	-	-	-	-	-

Note: The network operator may provide more detailed information when reporting failures. These can be added under the headline metrics.

- ^A Initial Major Switchgear & Protection Maintenance highlighted a large number of operational defects in the HV Network,
- ^B Higher number of faults due to first round of major maintenance and testing on protection relays across the network.
- ^C Transformer and Battery faults are due commissioning works of significant number of new assets as the network triples in size.

Table A.4 Vegetation contact with conductors

Performance measure ^a	Event count Current reporting period 2022 – 23	Event count Last reporting period 2021 – 22	Event count Two periods ago 2020 – 21	Event count Three periods ago 2019 – 20	Event count Four periods ago 2018-19	Comments
Fire starts – grow-in	0	0	0	0	0	
Fire start – fall-in and blow-in	0	0	0	0	0	
Interruption ^b – grow-in	0	0	0	0	0	
Interruption – fall-in and blow-in	0	0	0	0	0	

Table A.5 Unintended contact, unauthorised access, and electric shocks

Detail	Event count Current reporting period 2022 – 23	Event count Last reporting period 2021 – 22	Event count Two periods ago 2020 – 21	Event count Three periods ago 2019 – 20	Event count Four periods ago 2018-19	Comments
Electric shock^a and arc flash incidents^b originating from network assets^c including those received in customer premises						
Public	0	0	0	0	0	
Public worker	0	0	0	0	0	
Network employee / network contractor ^d	0	0	0	0	0	
Accredited Service Provider	0	0	0	0	0	
Livestock or domestic pet	0	0	0	0	0	
Contact with energised overhead network asset^e (e.g. conductor strike)						
Public road vehicle ^f	0	0	0	0	0	
Plant and equipment ^g	0	0	0	0	0	
Agricultural and other ^h	0	0	0	0	0	
Network vehicle	0	0	0	0	0	

Detail	Event count	Event count	Event count	Event count	Event count	Comments
	Current reporting period	Last reporting period	Two periods ago	Three periods ago	Four periods ago	
	2022 – 23	2021 – 22	2020 – 21	2019 – 20	2018-19	
Contact with energised underground network asset^e (e.g. conductor strike)						
Plant and equipment	0	0	0	0	0	
Person with handheld tool	0	0	0	0	0	
Unauthorised network access (intentional)						
Zone / BSP / Transmission substation / switching station	0	0	0	0	0	
Distribution substation	0	0	0	0	0	
Towers / poles	0	0	0	0	0	
Other (e.g. communication sites)	0	0	0	0	0	
Safe Approach Distance (SAD)ⁱ						
Network employee / network contractor	0	0	0	0	0	
Accredited Service Provider	0	0	0	0	0	
Public	0	0	0	0	0	
Public Worker	0	0	0	0	0	

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 (ie, plant and equipment travelling on a public road to or from worksite).

g Cranes, elevated work platforms, cherry pickers, excavators, hand held tools, etc.

h Examples include agricultural equipment, aircraft and watercraft.

i Encroachment into the applicable Safe Approach Distance for the type of individual involved.

Table A.6 Reliability and Quality of Supply^a

Detail	Event count	Event count	Event count	Event count	Event count	Comments
	Current reporting period	Last reporting period	Two periods ago	Three periods ago	Four periods ago	
	2022 – 23	2021 – 22	2020 – 21	2019 – 20	2018-19	
High voltage into Low voltage ^b	0	0	0	0	0	
Sustained voltage excursions outside emergency range ^c	0	0	0	0	0	
Reverse polarity	0	0	0	0	0	
Neutral integrity due to poor workmanship or incorrect procedure	0	0	0	0	0	
Neutral integrity due to asset defect or failure	0	0	0	0	0	

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.

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

Type of critical infrastructure ^a (e.g. hospital, tunnel)	Minutes of supply lost ^b	Cause	Consequential safety impacts associated with supply issue
n/a	n/a	n/a	n/a

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.

Note: Incidents include outages and supply quality events that adversely impact critical infrastructure.

Table A.8 Network-initiated Property damage events

Performance measure	Event count	Event count	Event count	Event count	Event count	Comments
	Current reporting period	Last reporting period	Two periods ago	Three periods ago	Four periods ago	
	2022 – 23	2021 – 22	2020 – 21	2019 – 20	2018-19	
Performance measure						
Damage (e.g. Fire, Physical impact or Electrical)	0	0	0	0	0	
Network property (including non-electrical assets including vehicles, buildings)						
Damage (e.g. Fire, Physical impact or Electrical)	0	0	0	0	1 ²	2 – Voltage transformer failure at BSP 2019

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

A.4 Tier 4 Control implementation

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

FSA	Amendments / improvements
Electrical Safety Rules	Formal review of Electrical Safety Rules being undertaken with respect to the network expansion currently occurring
Electrical Safety Training	Revision of the Electrical Safety Training package, ensuring training aligns with risks experienced on the MTS Electrical Network.

^a Adjustment or modifications made by the network operator to formal safety assessments, or risk treatment action plans, including those changes informed by consideration of the results of the investigation and analysis of incidents, near misses or asset failures, where the network operator has assessed that existing assessments or risk treatments do not eliminate or reduce risk so far as is reasonably practicable.

Table A.10 Design, construction and commissioning

Performance measure	Event count	Event count	Event count	Event count	Event count
	Current reporting period	Last reporting period	Two periods ago	Three periods ago	Four periods ago
	2022 – 23	2021 – 22	2020 – 21	2019 – 20	2018-19
Designs for which Safety in Design (SiD) Reports have been completed	0	0	0	1	0
Designs for which Safety in Design (SiD) Reports have been audited	0	0	0	1	0
Contestable designs certified ^b	0	0	0	0	0
Contestable level 1 project safety reviews performed ^c	0	0	0	0	0
Contestable level 2 project safety reviews performed ^c	0	0	0	0	0
Non-contestable project safety reviews performed ^c	0	0	0	0	0
Project closeout reports completed for contestable projects	0	0	0	0	0
Project closeout reports completed for non-contestable projects	0	0	0	0	0
Project closeout reports audited for contestable projects	0	0	0	0	0
Project closeout reports audited for non-contestable projects	0	0	0	0	0

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.

Table A.11 Inspections (assets)

Performance measure	Inspection tasks				Corrective action tasks				Comments
	Planned inspection tasks	Achieved	Open	Outstanding	Tasks identified (all categories)	Achieved	Open	Outstanding	
Transmission Substations	-	-	-	-	-	-	-	-	
Zone Substations	21	15		6	6	5	0	1	Outstanding inspections have been managed via general substation inspections and a switching operator available on the network 24/7. Outstanding Inspection Priority is reviewed weekly
Distribution Substations	957	866		91	53	26	0	27	
Transmission OH	MTS does not operate transmission OH assets								
Transmission UG	-	-	-	-	-	-	-	-	
Distribution OH	MTS does not operate distribution OH assets								
Distribution UG	-	-	-	-	2	2	0	0	2 x HV Cable failures

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.

Table A.12 Inspections (vegetation) Aerial/Ground based

Bushfire risk category	Population (spans / poles)	Target	Achieved	Outstanding	Comments
Aerial					
Total	0	0	0	0	MTS electricity network consists of underground cable and substations wholly contained within buildings mitigating aerial vegetation risks
Ground-based					
Total	0	0	0	0	MTS electricity network consists of underground cable and substations wholly contained within buildings mitigating ground-based vegetation risks

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

Table A.13 Public electrical safety plans and activities^a

Network operator public safety programs / campaigns	Details
Rail Safety Week	An information campaign that informs the public who interact with rails networks of the risks associated with operation of railway networks.
Electrical Safety Awareness	Operational safety training program for operational and engineering staff providing them with increased awareness and competency around electrical assets. This program facilitates communication to the general public of inherent electrical risks by public facing staff.

^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 bushfire risk management plan, shocks and tingles awareness program, etc.

Table A.14 Internal audits performed on any aspect of the ENSMS (as per AS 5577^a clause 4.5.4)

Audit scope	Identified non-compliances	Actions
Internal Audit- Element 32 ENSMS – Contractor management	<ol style="list-style-type: none"> It was not evident that the copies of completed and signed permits were uploaded on the MTS SharePoint along with the associated documentation of Completed Switching program. The Engineering and Maintenance Delivery representatives were not able to demonstrate the establishment of a process for recertification /authorisation of Switching operator after 2 years. The HV &1500 V operation plan refers to information which is no longer valid and requires a review. 	<ol style="list-style-type: none"> Permits are now uploaded weekly to SharePoint. Provide email from EnerMech confirming this requirement as evidence. Improve and implement Switching Operator Training including an annual recertification assessment. Establish a review panel consisting of relevant stakeholders and review referenced documentation. Publish amended version of plan.

Internal Audit- Element 32 ENSMS – Risk management	<ol style="list-style-type: none"> 1. On review of the FSA, it was noted that the validity date of the Bow-tie unwanted events had past the due date of March 2023 and are due for review. The controls and causes in few cases were incoherent. 2. The Engineering Controller handbook review was found to be pending. 3. The Engineering and Maintenance Delivery representatives were not able to demonstrate that a procedure for the protection of Underground cables has been established. 	<ol style="list-style-type: none"> 1. The electrical network Formal Safety Assessment is to be reviewed by an appropriate panel. 2. The Engineering Controller handbook review is to be finalised. 3. Develop and implement a procedure for protection of MTS underground cables - A SharePoint Folder for DBYD Referrals has been implemented
Internal Audit- Element 32 ENSMS – Asset management	<ol style="list-style-type: none"> 1. The Engineering and Maintenance Delivery representatives were not able to demonstrate that 'safety critical' spares for electrical asset discipline, which fall under the General spares category are identified and inventory levels are maintained accordingly. 	<ol style="list-style-type: none"> 1. Develop and implement register of electrical asset discipline safety critical spares including minimum inventory levels.

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.

Table 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
Systems Connect-JV(SC) Emergency and Incident management	NIL	NIL

Glossary

Assisted failure	Any functional failure of a piece of equipment (component of an asset or asset) where the equipment was subject to an external force or energy source against which the network operator's standards for design and maintenance do not attempt to control.
Fire	<p>A state, process, or instance of combustion in which fuel or other material is ignited and combined with oxygen, giving off light, heat and flame. This includes 'smouldering' or 'smoke' events, and LV wires down events resulting in burning around the point of contact on a combustible surface. Excludes LV wires down arcing events on non-combustible surfaces.</p> <p>Network Scope: Applicable to any fire caused by, or impacting, a network asset.</p>
Functional failure	<p>Performance of a piece of equipment (or component of an asset or asset) that represents a reduction below acceptable limits of the specification for a piece of equipment resulting in reduced capability required for service. In general, a functional failure is represented by a defect condition where the equipment that is required for service can no longer perform its expected function and which results in an unplanned maintenance action to restore condition to an acceptable limit.</p> <p>Note: operation of protection equipment (e.g. fuse) within its design characteristics is not a functional failure.</p>
Incident	Defined in accordance with IPART's <i>Electricity networks reporting manual - Incident reporting</i> , available on the IPART website.
Major incident	Defined in accordance with IPART's <i>Electricity networks reporting manual - Incident reporting</i> , available on the IPART website.
Network worker	A person who has been authorised by the network operator to plan or conduct work on or near the network. Includes persons employed by the network, persons engaged under a contract by the network operator, and persons authorised by the network operator and working for an Accredited Service Provider.
Open (with respect to defects / tasks)	A defect / task that has not been rectified by the network operator but where the time that has elapsed since being identified has not exceeded the standard time that the network operator has set for having the defect rectified.
Outstanding (with respect to defects / tasks)	A defect / task that has not been rectified by the network operator where the time that has elapsed since being identified has exceeded the standard time that the network operator has set for having the defect rectified.
Public worker	A party or parties that are conducting work that is not directly associated with the electricity network such as building work, landscaping, landfill work, excavations, road works and includes the construction, maintenance, adjustment or dismantling of mobile plant and scaffolding.
Unassisted failure	Any functional failure of a piece of equipment (component of an asset or asset) where the cause of the failure is of a type for which the network operator's design and maintenance standards include specific controls to mitigate against the risk of failure and which is neither an assisted failure nor a maintenance induced failure. These failures are generally caused by a deterioration of the condition of the equipment and also include overhead connection failures and vegetation within the mandatory vegetation clearance window.