AusNet Transmission Group Pty Ltd

Transmission Revenue Review 2023-2027

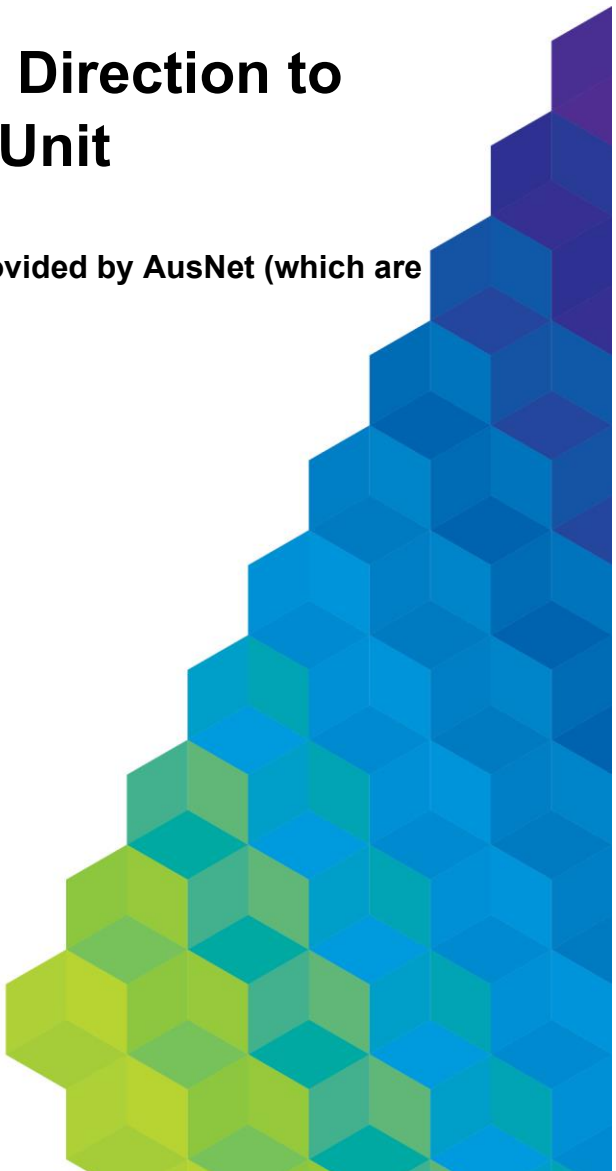
Revised Revenue Proposal

Appendix 3C: Draft AEMO Direction to install Phasor Monitoring Unit

All track changes accepted, including those provided by AusNet (which are not necessarily agreed by AEMO

PUBLIC

Submitted: 1 September 2021



NATIONAL ELECTRICITY RULES (Rules)
Notice under clause 4.11.1(d)

Remote monitoring equipment

1. This notice is given to **AusNet Transmission Group Pty Ltd** ABN 78 079 798 173 (**AusNet Services**), a *Network Service Provider*, under clause 4.11.1(d) of the Rules, in order to allow *AEMO* to discharge its *market* and *power system security* functions.

2. *AEMO* requires AusNet Services to:

   2.1. upgrade, modify or replace *remote monitoring equipment*, being the existing AEMO SEL 451 phasor measurement unit at Rowville Terminal Station, so that it complies with the specifications set out in Attachment 1, to remotely monitor the performance of AusNet Services' *transmission system* at that location; and

   2.2. install *remote monitoring equipment*, being phasor measurement units complying with the specifications set out in Attachment 1, to remotely monitor the performance of AusNet Services' *transmission system* at the following locations (more specifically described in section 3.1 of Attachment 1):

   Location (terminal station and voltage)

   Horsham 220 kV

   Moorabool 500 kV

   Red Cliffs 220 kV

   Kerang 220 kV

   Shepparton 220 kV

   Ballarat 220 kV

   Heywood 500 kV

   Loy Yang 500 kV

   Dederang 330 kV

   South Morang 500 kV

   Mortlake 500 kV

   2.3. install *remote monitoring equipment*, being phasor measurement units complying with the specifications set out in Attachment 1, to remotely monitor the performance of AusNet Services' *transmission system* at the following locations (more specifically described in section 3.2 of Attachment 1):

Location (terminal station and voltage)

Tarrone 500 kV

Wodonga 330 kV

Thomastown 66 kV

Richmond 66 kV

Brunswick 22 kV

Ringwood 66 kV

Springvale 66 kV

West Melbourne 66 kV

2.4. Under clause 4.11.1(e) of the Rules, AusNet Services is required to comply with this notice within 120 *business days* or such further period that *AEMO* requires. For these purposes, *AEMO* requires compliance with:

(a) paragraphs 2.1 and 2.2 of this notice by 31 March 2022;

(b) paragraph 2.3 of this notice by 30 June 2022.

3. *AEMO* acknowledges that it is a requirement of the Rules that AusNet Services comply with this notice and it therefore constitutes a "regulatory obligation or requirement" for the purposes of the National Electricity Law.

4. *AEMO* requests that AusNet Services promptly notify *AEMO*:

(a) if it becomes aware that the phasor measurement unit referred to in paragraph 2.1 cannot be upgraded, modified or replaced within the period specified in paragraph 2.4.1, with reasons for the delay and an estimated commissioning date;

(b) if it becomes aware that a phasor measurement unit referred to in paragraph 2.2 cannot be installed within the period allowed under paragraph 2.4 (a) or 2.4 (b) (as appropriate), with reasons for the delay and an estimated installation date;

(c) when a phasor measurement unit upgraded, modified, replaced or installed in response this notice is commissioned; and

(d) if AusNet Services becomes aware that a phasor measurement unit upgraded, modified, replaced or installed under this request will be or is undergoing maintenance or will be or is otherwise out of service for any reason.

5. In this notice, unless the contrary intention appears, a word or expression *in this style* has the meaning given in the Rules.

For and on behalf of Australian Energy Market Operator Limited

Attachment 1
Victorian Phasor Measurement Unit Specification

August 2021

VERSION CONTROL

Version	Release date	Changes
0.13	06/08/2021	At HYTS, (i) measure the 275 kV lines (for the Vic/SA interconnector) instead of the transformers, and (ii) measure the lines to APD instead of MOPS/TRTS.
0.12	02/08/2021	Revised the nominated current measurements in the Table 2 list of Medium Priority locations of monitors. Various minor changes to the entries in Table 1 and Table 2.
0.11	12/07/2021	After each reference to SEL Axion (or another specific system), insert the words “or another system approved by AEMO”.
0.10	02/07/2021	Revised to address AusNet’s comments
0.9	15/06/2021	Consolidation of attachments to draft notices 1, 2 and 3
0.8	28/05/2021	Revised version. Updated to relate to Request No. 1.
0.7	17/05/2021	Changed the document title and included more detailed references to the requirements in the data communication standard
0.6	10/05/2021	Retain Brunswick 22 kV points and exclude 22 kV at other sites
0.5	14/04/2021	Table of PMU locations Stage 2 – populated with sub-transmission feeder details
0.4	08/04/2021	Based on internal feedback, sub-transmission current measurements now prioritise feeder currents instead of transformer current.
0.3	30/03/2021	Added details for the medium priority PMU locations, focussing on currents through transformers rather than feeders
0.2	12/11/2020	Clarify the use of metering CTs and Protection CTs for obtaining current measurements. The term PSU meaning Power Supply Unit is added to the Glossary. Substitute SMTS 500 kV for ROTS 500 kV as a PMU location. Amend measuring points to align with current network topology – as advised by AusNet Services.
0.1	01/10/2020	

Contents

Tables

Functional requirements

1. PMU data measurement requirements

1.1. Measurement quantities

A Phasor Measurement Unit (PMU) must measure the quantities specified in section 3. Each quantity must be provided as 3 x single phase rms phasors as defined in IEEE standard c37.118. Voltages must be provided in kV as phase-to-ground measurements. Currents must be provided in amps. All phasors must be provided in polar format with the angle specified in radians.

Frequency and rate-of-change of frequency must also be provided in accordance with IEEE standard c37.118. Calculation of these Frequency and Rate-of-change of frequency quantities must be automatically performed by the PMU.

For each substation, two independent voltage measurements must be located so as to provide coverage in the event of bus reconfiguration.

All quantities must have a 50Hz sample rate.

It is preferred to obtain current measurements from metering current transformers (CTs) to maximise overall accuracy of measurements. In the event that the requested current measurements are not available from metering CT cores then current measurements may be obtained from protection CT cores, subject to a demonstration that confirms this meets requirements and with AEMO's written agreement.

1.2. Accuracy range

A PMU must achieve the following accuracies:

- Voltage: ±0.2%
- Current: ±0.2%
- Angle: ±0.5 degrees
- Frequency accuracy: ±0.002 Hz
- Frequency range: 45-55Hz

Note: This is accuracy of the monitor.

1.3. Time measurement

The PMU's internal clock must be synchronised with a GPS sourced IRIG-B input such as the SEL 2407 satellite clock, or another system approved by AEMO, with an accuracy of at least ±500 nanoseconds.

2. System requirements

2.1. Monitor hardware

At each location, a SEL Axion 2240 system, or another system approved by AEMO, must be installed. The existing SEL 451 PMU at Rowville terminal station will be replaced with a SEL Axion 2240 system, or another system approved by AEMO. This system consists of the SEL 2241 controller, SEL 2242 chassis, SEL 2243 power coupler, and

up to 16 SEL 2245-4 AC metering modules with each module providing 3 single-phase voltages and 3 single-phase currents each.

For locations with between 9 and 16 metering modules, an extra chassis and power coupler is required which is then bridged to the first by an ethernet cable. The required hardware per location is listed in section 3.

As the devices must be located in electrical substations, they must be capable of operating in a wide range of environmental conditions and meet TNSP substation equipment standards.

2.2. Monitor software

A dual-redundant pair of phasor data concentrators (PDC) must be installed behind the AusNet Services firewall and both PDCs are to receive data from each PMU. Each PDC must be capable of communicating over separate IP WAN links using either the C37.118.2011 (preferred) or C37.118.2005 protocol.

Each PDC must hold at minimum a rolling 2-week window of storage, in case of data transfer loss between AEMO and AusNet Services. AusNet Services must be able to provide AEMO with the data on request.

Each PMU must transmit to both of the relevant PDCs on separate channels. PDC and PMU IDs shall be provided by AEMO.

2.3. Data transfer requirements

Data transfer from each PMU to the AusNet/AEMO interface shall be in accordance with AEMO's Power System Data Communication Standard[1] section 5: Interfacing.

Transfer of data will occur across AEMO's encrypted RTNET IP WAN system, or other system approved by AEMO. Communications protocol will be over TCP/IP using either IEEE c37.118.2011 (preferred) or IEEE c37.118.2005.

The IEEE c37.118 specification covers aspects of requests, configuration and message format. All modern PDC software will natively support at least one version. Likely required bandwidth has been provided as a reference.

In the Victoria region, AEMO proposes the following data transfer arrangement between AusNet and AEMO:

- An Optus link between Rowville (AusNet) and Brisbane (AEMO)
- A Telstra link between Richmond (AusNet) and Norwest (AEMO).

2.4. Performance

Performance of a PMU and associated equipment including communications equipment to the AusNet/AEMO interface must be in accordance with AEMO's Power System Data Communication Standard section 2: Performance.

2.5. Reliability

Reliability of a PMU and associated equipment including communications equipment to the AusNet/AEMO interface must be in accordance with AEMO's Power System Data Communication Standard section 3: Reliability and section 6: Maintenance.

2.6. Cyber Security

Security of a PMU and associated equipment including communications equipment to the AusNet/AEMO interface must be in accordance with AEMO's Power System Data Communication Standard section 4: Security.

[1] https://www.aemo.com.au/-/media/Files/Electricity/NEM/Network_Connections/Transmission-and-Distribution/AEMO-Standard-for-Power-System-Data-Communications.pdf

2.7. Maintenance requirements

Maintenance of a PMU and associated equipment including communications equipment to the AusNet/AEMO interface including; response to failures, outage co-ordination, data management and co-ordination, and testing to confirm compliance must be in accordance with AEMO's Power System Data Communication Standard section 6: Maintenance or otherwise as approved in writing by AEMO.

Configuration of phasor data concentrators and commissioning of data transfer will be performed in association with AEMO.

3. Measurement quantities

3.1. High priority locations of monitors

The existing PMU at Rowville terminal station is also a high priority location.

Table 1. High Priority locations of monitors

Priority	Location (terminal station and voltage)	Voltage measurements	Current measurements	Hardware	Bandwidth (mbps)
1	Moorabool 500 kV	Ideally both 500 kV bus voltages. Otherwise any two of the Sydenham line, Haunted Gully line and Mortlake line 500 kV voltages	500 kV Line No. 1 to Haunted Gully	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 6x metering modules	0.10
			500 kV Line No. 2 to Mortlake Power Station		
			500 kV Line No. 1 to Sydenham		
			500 kV Line No. 2 to Sydenham		
			A1 500/220 kV transformer (HV side)		
			A2 500/220 kV transformer (HV side)		
2	Red Cliffs 220 kV	Ideally Red Cliffs No. 1 and No. 2 220 kV bus voltages. Otherwise any two of the Buronga line, Wemen line, Kiamal line, Murraylink and No. 1, No. 2 and No. 3 Transformer 220 kV voltages	220 kV line to Buronga	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 7x metering modules	0.11
			220 kV line to Wemen		
			220 kV line to Kiamal		
			220 kV line to Murraylink HVDC		
			No. 1 220/66 kV Transformer (HV side)		
			No. 2 220/66 kV Transformer (HV side)		
			No. 3 220/66 kV Transformer (HV side)		
3	Kerang 220 kV	Ideally Kerang No. 1 and No. 2 220 kV bus voltages.	220 kV line to Wemen		0.10
			220 kV line to Bendigo		

Priority	Location (terminal station and voltage)	Voltage measurements	Current measurements	Hardware	Bandwidth (mbps)
		Otherwise any two of Wemen line, Bendigo line, SVC and No. 1, No. 2 and No. 3 Transformer 220 kV voltages	No. 1 220/66 kV Transformer (HV side)	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 6x metering modules	
			No. 2 220/66 kV Transformer (HV side)		
			No. 3 220/66 kV Transformer (HV side)		
			SVC 220/4.5 kV transformer (HV side)		
4	Horsham 220 kV	Ideally Horsham No. 1 and No. 2 220 kV bus voltages. Otherwise any two of Murra Warra/Kiamal line, Bulgana line, static Var compensator and No. 2 and No. 3 Transformer 220 kV voltages	220 kV line to Bulgana	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 5x metering modules	0.09
			220 kV line to Murra Warra/Kiamal		
			SVC Transformer (HV side)		
			B2 220/66 kV Transformer (HV side)		
			B3 220/66 kV Transformer (HV side)		
5	Shepparton 220 kV	Ideally Shepparton No. 1 and No. 2 220 kV bus voltages. Otherwise any two of Bendigo/Fosterville line, Glenrowan 1 line, Glenrowan 3 line, Dederang line and No. 2, No. 3 and No. 4 Transformer 220 kV voltages	220 kV line to Bendigo/Fosterville	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 7x metering modules	0.11
			220 kV line No. 1 to Glenrowan		
			220 kV line No. 3 to Glenrowan		
			220 kV line to Dederang		
			B2 220/66 kV Transformer (HV side)		
			B3 220/66 kV Transformer (HV side)		
			B4 220/66 kV Transformer (HV side)		
6	Ballarat 220 kV	Ideally Ballarat No. 1 and No. 2 220 kV bus voltages.	220 kV line to Waubra	1x controller, 2x chassis, 2x PSUs, 1x GPS clock, 8x metering modules	0.12
			220 kV line to Bendigo		
			220 kV line to Elaine		

Priority	Location (terminal station and voltage)	Voltage measurements	Current measurements	Hardware	Bandwidth (mbps)
		Otherwise any two of Waubra line, Bendigo line, Elaine line, Moorabool No. 1 line, Moorabool No. 2 line, Berrybank line, Battery and No. 1 and No. 2 Transformer 220 kV voltages	220 kV line No. 1 to Moorabool		
			220 kV line No. 2 to Moorabool		
			220 kV line to Berrybank		
			B1 220/66 kV Transformer (HV side) to Ballarat Battery Energy Storage System		
			B2 220/66 kV Transformer (HV side)		
7	Heywood 500 kV and 275 kV	275 kV bus voltage and ideally both 500 kV bus voltages. Otherwise 275 kV bus voltage and both the APD/Tarrone No. 1 line and the APD/Mortlake No. 2 line 500 kV voltages	500 kV Line No. 1 to Tarrone	1x controller, 2x chassis, 2x PSU, 1x GPS clock, 9x metering modules	0.14
			500 kV line No. 1 to APD		
			500 kV Line No. 2 to Mortlake Power Station		
			500 kV line No. 2 to APD		
			275 kV line No. 1 to South East substation		
			275 kV line No. 2 to South East substation		
			M1 500/275 kV transformer (HV side)		
			M2 500/275 kV transformer (HV side)		
			M3 500/275 kV transformer (HV side)		
8	Loy Yang 500 kV	No. 1, No. 2, No. 3 and No. 4 500 kV bus voltages	Loy Yang A unit 1 No. 1 Gen 500/21 kV Transformer (HV side)	1x controller, 2x chassis, 2x PSU, 1x GPS clock, 11x metering modules	0.17
			Loy Yang A unit 2 No. 2 Gen 500/24 kV Transformer (HV side)		
			Loy Yang A unit 3 No. 3 Gen 500/21 kV Transformer (HV side)		

Priority	Location (terminal station and voltage)	Voltage measurements	Current measurements	Hardware	Bandwidth (mbps)
			Loy Yang A unit 4 No. 4 Gen 500/21 kV Transformer (HV side)		
			Loy Yang B unit 1 No. 1 Gen 500/20 kV Transformer (HV side)		
			Loy Yang B unit 2 No. 2 Gen 500/20 kV Transformer (HV side)		
			500 kV line to Basslink HVDC		
			500 kV Line No. 1 to Hazelwood		
			500 kV Line No. 2 to Hazelwood		
			500 kV Line No. 3 to Hazelwood		
			No. 1 500/220 kV transformer (HV side) to Valley Power Gas Station		
9	Dederang 330 kV	Ideally both No. 1 and No. 3 330 kV bus voltages. Otherwise any two of Murray line No. 1, Murray line No. 2, South Morang line No. 1, South Morang line No. 2, Wodonga line, Transformer No.1, No. 2 or No. 3 330 kV voltage	330 kV line No. 1 to Murray	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 8x metering modules	0.12
			330 kV line No. 2 to Murray		
			330 kV line 1 to South Morang		
			330 kV line 2 to South Morang		
			330 kV line to Wodonga		
			H1 330/220 kV Transformer (HV side)		
			H2 330/220 kV Transformer (HV side)		
			H3 330/220 kV Transformer (HV side)		
10	South Morang 500 kV	Ideally both South Morang No. 1 and No. 2 500 kV bus voltages. Otherwise any two of the Sydenham No. 1 line, Sydenham No. 2 line, Keilor line, Hazelwood	500 kV line No. 1 to Sydenham	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 7x metering modules	0.11
			500kV line No. 2 to Sydenham		

Priority	Location (terminal station and voltage)	Voltage measurements	Current measurements	Hardware	Bandwidth (mbps)
		No. 1 line, Hazelwood No. 2 line, Rowville line and F2 transformer 500 kV voltages	500 kV Line to Keilor		
			500 kV line No. 1 to Hazelwood		
			500 kV line No. 2 to Hazelwood		
			500 kV Line No. 3 to Rowville		
			F2 500/330 kV Transformer (HV side)		
11	Mortlake 500 kV	Ideally both 500 kV bus voltages. Otherwise any two of Moorabool No. 2 line, Heywood No. 2 line, Blue Gum line, Mortlake unit 11 generator transformer and Mortlake unit 12 generator transformer 500 kV voltages	Mortlake Power Station unit 11 generator 510/20 kV transformer (HV side)	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 5x metering modules	0.09
			Mortlake Power Station unit 12 generator 510/20 kV transformer (HV side)		
			500 kV Line to Blue Gum		
			500 kV Line No. 2 to Moorabool		
			500 kV Line No. 2 to Heywood		

3.2. Medium priority locations of monitors

Table 2. Medium Priority locations of monitors

Priority	Location (terminal station and voltage)	Voltage measurements	Current measurements	Hardware	Bandwidth (mbps)
1	Tarrone 500 kV	Ideally Tarrone No. 1 and No. 2 500 kV bus voltages. Otherwise any two of the Heywood No 1. Line, Haunted Gully No. 1 line and K1 transformer 500 kV voltages	500 kV Line No. 1 to Haunted Gully 500 kV Line No. 1 to Heywood K1 500/132 kV transformer (HV side)	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 3x metering modules	0.07
2	Wodonga 330 kV	Ideally Wodonga No. 1 and No. 2 330 kV bus voltages. Otherwise any two of the Dederang line, Jindera line, No. 1, and No. 2 Transformer 330 kV voltages	330 kV line to Dederang 330 kV line to Jindera No. 1 330/66/22 kV Transformer (HV side) No. 2 330/66/22 kV Transformer (HV side)	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 4x metering modules	0.08
3	Thomastown 220 kV (monitoring sub-transmission)	Thomastown No. 1, No. 2 and No. 3 220 kV bus voltages	220 kV line No. 1 to Brunswick 220 kV line No. 3 to Brunswick 220 kV line to Eildon Power Station 220 kV line No. 1 to Keilor 220 kV line No. 2 to Keilor 220 kV line to Rowville 220 kV line to Ringwood 220 kV line No. 1 to South Morang 220 kV line No. 2 to South Morang 220 kV line to Templestowe B1 220/66 kV transformer (HV side) B2 220/66 kV transformer (HV side) B3 220/66 kV transformer (HV side) B4 220/66 kV transformer (HV side)	1x controller, 2x chassis, 2x PSU, 1x GPS clock, 15x metering modules	0.19

Priority	Location (terminal station and voltage)	Voltage measurements	Current measurements	Hardware	Bandwidth (mbps)
			B5 220/66 kV transformer (HV side)		
4	Richmond 220 kV (monitoring sub-transmission)	Richmond No. 1, No. 2A, No. 2B, No. 3 and No. 4 220 kV bus voltages.	220 kV line to Brunswick	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 8x metering modules	0.15
			220 kV line No. 1 to Rowville		
			220 kV line No. 4 to Rowville		
			B1 220/66 kV transformer (HV side)		
			B2 220/66 kV transformer (HV side)		
			B5 220/66 kV transformer (HV side)		
			L1 220/22 kV transformer (HV side)		
			L2 220/22 kV transformer (HV side)		
5	Brunswick 220 kV (monitoring sub-transmission)	Brunswick No. 1, No. 2 and No. 3 220 kV bus voltages	220 kV line to Richmond	1x controller, 2x chassis, 2x PSU, 1x GPS clock, 9x metering modules	0.14
			220 kV line No. 1 to Thomastown		
			220 kV line No. 3 to Thomastown		
			B1 220/66 kV transformer (HV side)		
			B2 220/66 kV transformer (HV side)		
			B3 220/66 kV transformer (HV side)		
			L1 220/22 kV transformer (HV side)		
			L2 220/22 kV transformer (HV side)		
			L3 220/22 kV transformer (HV side)		
6	Ringwood 220 kV (monitoring sub-transmission)	Ringwood No. 1 and No. 220 kV bus voltages.	220 kV line to Rowville	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 8x metering modules	0.12
			220 kV line to Thomastown		
			B1 220/66 kV transformer (HV side)		
			B2 220/66 kV transformer (HV side)		
			B3 220/66 kV transformer (HV side)		
			B4 220/66 kV transformer (HV side)		
			L2 220/22 kV transformer (HV side)		
			L3 220/22 kV transformer (HV side)		
7			220 kV line No. 1 to Heatherton		0.11

Priority	Location (terminal station and voltage)	Voltage measurements	Current measurements	Hardware	Bandwidth (mbps)
	Springvale 220 kV (monitoring sub-transmission)	Springvale No. 1 and No. 2 220 kV bus voltages.	220 kV line No. 2 to Heatherton	1x controller, 1x chassis, 1x PSU, 1x GPS clock, 7x metering modules	
			220 kV line No. 1 to Rowville		
			220 kV line No. 2 to Rowville		
			B1 220/66 kV transformer (HV side)		
			B3 220/66 kV transformer (HV side)		
			B4 220/66 kV transformer (HV side)		
8	West Melbourne 220 kV (monitoring sub-transmission)	West Melbourne No. 1, No. 2, No. 3 and No. 4 and No. 1 220 kV transformer 220 kV bus voltages.	220 kV line No. 1 to Fishermans Bend	1x controller, 2x chassis, 2x PSU, 1x GPS clock, 10x metering modules	0.17
			220 kV line No. 2 to Fishermans Bend		
			220 kV No. 1 line to Keilor		
			220 kV No. 2 line to Keilor		
			B1 220/66 kV transformer (HV side)		
			B2 220/66 kV transformer (HV side)		
			B3 220/66 kV transformer (HV side)		
			B4 220/66 kV transformer (HV side)		
			L1 220/22 kV transformer (HV side)		
			L3 220/22 kV transformer (HV side)		

Glossary

Term	Definition
AusNet/AEMO interface	A point where AusNet Service's PDC system connects to AEMO's PDC system
IEEE c37.118	A standard covering many aspects relating to high-speed streaming devices including the calculation of synchrophasor, accuracy standards, communication protocols and message formats. Defines the raw binary message data structure emitted and consumed by PMUs and PDCs.
IRIG-B	A method of synchronising power system measurements with a global positioning satellite clock. Usually provided to the monitoring hardware via a co-axial cable.
PDC	Phasor Data Concentrator. A piece of software that communicates and coordinates a network of many PMUs, concentrates the data into a single stream and sends the data to a PDC located at another organisation.
PMU	Phasor Measurement Unit. A piece of hardware located at an electrical substation that converts an analog power system quantity to a digital signal, converts the waveform to a synchrophasor and then transmits the data at a typical rate of 50Hz over TCP/IP using the IEEE C37.118 protocol. Can also transmit analog non-phasor data and digital (boolean) data.
Power System Data Communication Standard	Means AEMO's Power System Data Communication Standard as amended, supplemented or replaced from time to time
PSU	Means Power Supply Unit
Synchrophasor	A representation of a current or voltage waveform using two numerical values. Consists of a magnitude that specifies the amplitude of the waveform, and an angle which specifies the phase shift of the waveform.
WAMS	Wide Area Monitoring System. A piece of software that analyses synchrophasor data in real-time to provide insights to power system operators. It also stores the raw synchrophasor data to a database for offline analysis.