PRICING METHODOLOGY FOR PRESCRIBED SHARED TRANSMISSION SERVICES

1 JULY 2022 TO 30 JUNE 2027

Important notice

PURPOSE

This pricing methodology has been prepared by AEMO for the purposes of Part J of the National Electricity Rules, as modified by clause S6A.4.2(k). [It has been approved by the AER in accordance with and for the purposes set out in the National Electricity Rules.][1] The National Electricity Rules and the National Electricity Law will prevail over this document to the extent of any inconsistency.

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Glossary

Unless the context otherwise requires, this document will be interpreted in accordance with Schedule 2 of the NEL.

Italicised terms used in this document have the same meanings given to those terms in the National Electricity Law (NEL and National Electricity Rules (NER) or the AER Guidelines unless otherwise specified.

Capitalised words, phrases and abbreviations have the meanings set out opposite them in the table below when used in this document.

TERM	MEANING
AARR	*aggregate annual revenue requirement* for *prescribed transmission services*
Additional assets	Transmission assets that provide *prescribed transmission services* but are not subject to *transmission determinations* under chapter 6A of the NER.
Adoptive Jurisdiction	The State of Victoria
AER Guidelines	The AER's pricing methodology guidelines made under rule 6A.25 of the NER, effective from 31 October 2007 as amended from time to time. Current version effective from 25 August 2022.
Auction Revenue	Receipts (if any) resulting from the *auction* of the rights to *inter-regional settlements residue.*
ASRR	*annual service revenue requirement*
CAMD	Contract agreed maximum demand as agreed between AEMO and a *Transmission Network User*
CNSP	*Co-ordinating Network Service Provider*
CRNP	Cost reflective network pricing
DTS	The *transmission system*, or a part of a *transmission system*, situated wholly or substantially in Victoria declared by the Minister as the *declared transmission system* pursuant to section 30 of the NEVA.
DTSO	A person who owns, controls or operates the DTS, or a part of the DTS, declared by the Minister to be a *declared transmission system operator* pursuant to section 31 of the NEVA.
Financial year	The period from 1 July to the next 30 June
Financial year t	The Financial year in which transmission prices being calculated are to apply
Financial year t+1	The Financial year following Financial year t
Financial year t-1	The Financial year prior to Financial year t
Financial year t-2	The Financial year prior to Financial year t-1, which represents the most recent Financial year where full historical data is available for pricing purposes
MAR	*maximum allowed revenue.*

TERM	MEANING
MLEC	*modified load export charge.*
NEL	National Electricity Law
NER	National Electricity Rules (version 188)
NEVA	National Electricity (Victoria) Act 2005 (Vic)
ORC	Optimised replacement cost
Revenue Methodology	AEMO's Revenue Methodology for Victoria's Electricity Transmission System dated 11 July 2011, published under clause S6A.4.2(c) of the NER, effective from 1 July 2011 as amended from time to time.
System strength charge	The charge determined by a System Strength Service Provider in accordance with clause 6A.23.5 of the NER.
System strength connection point	A connection point for a connection or an alteration to a generating system or other connected plant in respect of which an election is made under clause 5.3.4B(b1) of the NER to pay the system strength charge.
System strength node	A location on a transmission network that AEMO as the System Planner declares is a system strength node.
System Strength Service Provider	The System Strength Service Provider for a region as specified under clause 5.20C.3(a) of the NER.
System strength transmission service	The provision of facilities and services to meet the standard in clause S5.1.14 of the NER at system strength nodes.
System Strength Transmission Service User	(a) Transmission Network User in respect of its system strength connection points; and (b) Network Service Provider whose network is connected to the transmission network of a System Strength Service Provider and whose network includes any system strength connection points.
System strength unit price	The price determined by a System Strength Service Provider for a system strength node in accordance with its pricing methodology.
AusNet Services	**AusNet Transmission Group Pty Ltd**, which is the DTSO for the major part of the DTS.
Transmission Customer	*Transmission Customers* that receive *prescribed shared transmission services* pursuant to the NER
TNSP	A *Transmission Network Service Provider*

1 Overview

1.1 Introduction

As part of its functions AEMO provides *shared transmission services* to users of the DTS. These services include the planning of future requirements and the procuring of augmentations in the DTS. In addition, AEMO is also the *System Strength Service Provider* responsible for the provision of *system strength transmission services* in Victoria.

The costs which AEMO incurs in performing these functions (known as the Maximum Allowed Revenue (MAR)) are recovered by AEMO through charges to Transmission Customer and relevant *System Strength Transmission Service Users*. Most transmission charges are paid by distribution businesses, with some paid by large Transmission Customers directly connected to the DTS. AEMO's MAR is calculated as detailed in AEMO's Revenue Methodology, which is published on AEMO's website.

The majority of AEMO's MAR is made up of:

- Revenue relating to transmission assets owned, operated or controlled by DTSOs that is regulated under the NER and which provide transmission services to AEMO.[2]
- The costs under contracts between AEMO and service providers that provide transmission network services, equivalent services by the use of other alternative networks or non-network alternatives.
- MLEC
- Net intra-regional settlements residues
- Auction revenue
- AEMO's planning and procurement costs for the Victorian DTS.

This pricing methodology sets out how AEMO will recover its MAR for the 5-year regulatory period from 1 July 2022 to 30 June 2027. It has been developed in line with the requirements of the NER and the AER Guidelines.

1.2 Allocation

The allocation of costs permitted to be recovered (MAR) are set out in sections 3.3 and 3.4.

1.3 Pricing Structure

At the date of this Pricing Methodology, there were 37 Transmission Customer Connection Points (each a "Connection Point") in the DTS.

Every year, for each of the Connection Points, AEMO sets a:

- Locational Price.
- Non-locational Price.
- Common transmission services Price.

AEMO as System Strength Provider also sets prices for system strength transmission services at each system strength node on the Victorian DTS.

The price setting process and pricing structure is set out in section 3.5.

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[2] At the date of this Pricing Methodology, the only DTSOs whose assets are subject to revenue regulation under the NER are AusNet Services and Murraylink.

1.3.1 Locational prices and charges

The Locational Price is based on a *cost reflective network pricing* (CRNP) methodology and demand at times of greatest DTS utilisation for which network investment is likely to be contemplated.

1.3.2 Non-locational prices and charges

Non-locational Prices are calculated on a *postage stamp basis* which applies a uniform price per MW for all Transmission Customers regardless of their system use.

1.3.3 Common services prices and charges

Prescribed common transmission services prices are calculated on a *postage stamp basis* which applies a uniform price per MW for all Transmission Customers regardless of their system use. These services include *system strength transmission services*, which are the provision of facilities or services to meet the standard in clause S5.1.14 at *system strength nodes*.

1.3.4 System strength unit prices and charges

System Strength Unit Prices (SSUP) are set for each system strength node on the transmission network and are based on the 'forward-looking' long run average cost of providing the system strength capacity at each system strength node.

System strength charges come into effect from 1 July 2023.

1.3.5 Duration of methodology

This methodology is effective for a 5-year period from 1 July 2022 to 30 June 2027.

1.3.6 Publication of transmission prices

Clause S6A.4.2(k) of NER requires AEMO to publish the prices for each of the categories of *prescribed transmission services* to apply for the following financial year by 15 May annually. AEMO will use its best endeavours to publish the prices calculated using this pricing methodology for each of the categories of *prescribed transmission services* to apply for the following financial year by 15 March annually.

Clause 6A.24.2(d) of the NER requires AEMO to publish system strength unit prices for each system strength node at the same time it publishes prices for each of the categories of *prescribed transmission services*.

2 AEMO's responsibilities in the DTS

AEMO provides shared transmission services via the DTS in Victoria and allocates the MAR for shared transmission services to Connection Points in the DTS. AEMO is also the System Strength Service Provider responsible for the provision of system strength transmission services in Victoria.

Multiple TNSPs provide shared network capability services to AEMO in Victoria.

These TNSPs, to the extent that their revenue is regulated by the AER, must advise AEMO annually of the aggregate annual revenue requirement for their part of the transmission system that is used to provide shared network capability services to AEMO.

Other sources of costs allocated by AEMO include payments made to service providers under service contracts awarded to augment the DTS. More information on the revenue recoverable by AEMO under these contracts can be found in the Revenue Methodology.

AEMO then allocates (in accordance with this pricing methodology) the total aggregate annual revenue requirement of all TNSPs for each Connection Point.

3 Pricing methodology

3.1 Background

This pricing methodology sets out how AEMO will allocate its MAR for provision of *prescribed shared transmission services* over the 5-year regulatory period from 1 July 2022 to 30 June 2027. AEMO's MAR is calculated in accordance with AEMO's Revenue Methodology, which is published on AEMO's website[3].

3.2 Overview of the Pricing Methodology

Determining *prescribed shared transmission service* prices involves the following key steps:

1. Allocating the MAR:

   - allocating the MAR to prescribed TUOS services and pre-adjusted prescribed common transmission services.

   - allocating *prescribed TUOS services* into *pre-adjusted locational component* and *pre-adjusted non-locational component*.

   - adjusting the *pre-adjusted locational component* to account for any Auction Revenue, MLEC and other adjustments including those allowed under clause 6A.23.3(b) of the NER.

   - adjusting the *pre-adjusted non-locational component* to account for *intra-regional settlements residue*, over or under recovery, any prudent discounts, and other adjustments including those allowed under clause 6A.23.3(e) of the NER.

   - adjusting the pre-adjusted *prescribed common transmission services* to account for forecast *annual system strength revenue*, over or under recovery, and other adjustments including those allowed under clause 6A.23.3A of the NER

2. Allocating the *adjusted locational component* to individual Connection Points based on *CRNP methodology*.

3. Calculating prices for the following categories of *prescribed transmission services*[4]:

   - *prescribed TUOS services - adjusted locational component*.

   - *prescribed TUOS services - adjusted non-locational component*.

   - *prescribed common transmission services* – other than *system strength transmission services*[5]

   - *system strength transmission services*

4. Calculating charges for the following categories of *prescribed transmission services*:

   - *prescribed TUOS services - adjusted locational component*.

   - *prescribed TUOS services - adjusted non-locational component*.

   - *prescribed common transmission services* – other than *system strength transmission services*

   - *system strength transmission services*

Appendix A provides an overview of the pricing process in a flowchart format.

Section 3.3-3.5 below describes each of the steps in further detail.

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[3] https://aemo.com.au/-/media/files/pdf/revenue-methodology-for-vic.pdf

[4] Note: AEMO does not set a price or levy charges for *prescribed entry services* or *prescribed exit services.* Those prices are set by AusNet Services and charges are levied directly against relevant Customers by AusNet Services.

[5] For avoidance of doubt, prescribed common transmission service price and charges includes cost associated with the system strength transmission service after the adjustment as per clause 6A.23.3A .

3.3 Allocating the MAR

3.3.1 Cost allocation to service categories

The first stage in calculating *prescribed shared transmission service* prices is to allocate *prescribed TUOS services* and *prescribed common transmission services* with the costs that are directly attributable to providing the relevant category of *prescribed transmission service* as applicable in the Adoptive Jurisdiction.

AusNet Services and Murraylink, as DTSOs that are revenue regulated under the NER in respect of the Adoptive Jurisdiction, provide sufficient information to AEMO so that AEMO can allocate the MAR for *prescribed TUOS services* and *prescribed common transmission services*.

AEMO also recovers costs of providing *prescribed shared transmission services* arising from service contracts entered into with service providers but are not revenue regulated as described above. These costs are charged according to a service agreement between AEMO and the service provider. AEMO allocates these assets to the relevant service category in accordance with clauses 2.4(a)(3) and (4) of the AER Guidelines.

AEMO's planning and procurement and other costs for the Victorian DTS[6] are allocated to *prescribed common transmission services*.[7]

3.3.2 Allocation of the prescribed *TUOS service* category

The NER sets out particular requirements for the allocation of MAR for *prescribed TUOS services*. The NER requires that the share of the MAR for *prescribed TUOS services* be allocated to Transmission Customers' Connection Points in the form of both a locational and non-locational component.

In accordance with the NER, AEMO will allocate the MAR for *prescribed TUOS services* as follows:

- 50% to *pre-adjusted locational component*; and
- 50% to *pre-adjusted non-locational component*.

3.3.3 Adjustment of the locational component and the non-locational component

AEMO will adjust the *pre-adjusted locational component* by:

- accounting for the estimated Auction Revenue receipts;
- subtracting or adding any further adjustments to Auction Revenue consistent with 6A.23.3(f);
- subtracting or adding the net MLEC receivable or payable by AEMO, where the MLEC is calculated consistent with the methodology in 6A.29A (see Appendix C);
- subtracting or adding any adjustments to the MLEC consistent with 6A.23.3(f).

In accordance with clause 6A.23.3(d), if the result of this adjustment yields a negative number, the *adjusted locational component* will be deemed to be zero and the absolute value of the negative amount will be subtracted from the *pre-adjusted non-locational component*.

AEMO will adjust the *pre-adjusted non-locational component* by:

- accounting for any estimated net *intra-regional settlement residue* receipts;
- subtracting or adding any over/under recovery of AEMO's MAR from a previous *year*;
- accounting for any adjustments consistent with 6A.23.3(f);
- accounting for any over/under recovery of AEMO's MAR as a result of applying the 2% price cap explained in section 3.5.1 below;

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[6] Planning costs include costs resulting from connections that cannot be allocated to a defined user

[7] The portion of AEMO's MAR that constitute AEMO costs incurred under Ministerial Orders made under section 16Y of the NEVA, are allocated to *prescribed common transmission services*.

- accounting for any under recovery as a result of applying any prudent discounts explained in section 5 below;

- accounting for any over/under recovery of AEMO's MAR as a result of the *adjusted locational component* being set to zero (explained above); and

- accounting for the amount of *NTP function* fees applicable to AEMO as a *Co-ordinating Network Service Provider* under clause 2.11.3(ba) of the NER.

3.3.4 Adjustment of the prescribed common transmission services

AEMO will adjust the *pre-adjusted common transmission service* component by:

- accounting for any forecast *annual system strength revenue* for the *regulatory year;*

- subtracting or adding any over/under recovery of *annual system strength revenue* from a previous *year;* and

- subtracting or adding any adjustments to *annual system strength revenue* consistent with 6A.23.3A(b).

In accordance with clause 6A.23.3(h1), the ASRR for prescribed common transmission services must be adjusted by subtracting the forecast annual system strength revenue for the regulatory year and any adjustment for under or over recovery from previous years, calculated in accordance with clause 6A.23.3A(b). These adjustments enable:

- Revenue from system strength charges to be recovered from System Strength Transmission Service Users in accordance with section 3.5.4 of this pricing methodology;

- Any residual annual costs in providing system strength services that are not forecast to be recovered from system strength charges to be recovered from all Transmission Customers through common service charges. These services provide equivalent benefits to all Transmission Customers without any differentiation based on their location; and

- Any under- or over-recovery in relation to annual system strength revenue for years t -1 and t-2 to be corrected by adjusting the annual service revenue requirement for prescribed common transmission services for year t.

To give effect to clauses 6A.23.3(h1) and 6A.23.3A(a)(1) and (2), the *annual system strength revenue* will be forecasted for year t and actual *annual system strength revenue* estimated for year t-1. While the forecasting methodology for *annual system strength revenue* will change in light of new information and experience, it will comply with the following principles specified in paragraphs 2.1(k)(7), 2.1(k)(8) and 2.8 of the AER's pricing methodology guidelines:

- the methodologies will be reasonable and appropriate for their purpose;

- the cost of implementing the methodologies will be proportionate to the expected level of materiality of the impact of any inaccuracy in estimates or forecasts;

- the methodologies will utilise relevant existing information to the extent possible, including information from connection agreements and, where relevant, applications to connect;

- the methodologies will be consistent with any relevant parts of the system strength requirements methodology and system strength impact assessment guidelines;

- the methodologies will be consistent with other relevant parts of the pricing methodology and approach to other relevant forecasts or estimates; and

- estimated actual annual system strength revenue will be based on actual data for part of the regulatory year where actual data is available and updated forecasts for the remainder of the regulatory year.

For the purpose of this pricing methodology, which covers the first system strength charging period, it is noted that:

- There is limited historical data that could inform the forecast revenue from system strength charges; and

- There is no information available regarding the likelihood that connection applicants will elect to pay the system strength charge in relation to the proposed connection or alteration.

Given the limited historical data, the methodology for forecasting the annual revenue from system strength charges will have regard to the following information:

- actual contracts for the provision of system strength services for the relevant year;

- forecast new connections for the relevant year having regard to known connection enquiries and connection applications;

- forecast of the new connections that will elect to pay the system strength charge, having regard to the facility seeking or likely to seek connection and an estimate of the costs of self-remediation; and

- the estimated applicable system strength unit prices; system strength locational factors; and system strength quantity applicable to each actual and forecast contract for the provision of system strength services.

The forecasting method will be reviewed and updated as historical data becomes available. Over time, an increasing proportion of system strength charges will be obtained from existing connections, rather than new connections. As a result, the accuracy of the revenue forecasts will improve in future regulatory periods.

3.4 Allocating the *adjusted locational component* to individual Connection Points

In accordance with the NER, prices for the recovery of the MAR allocated to the *adjusted locational component* of *prescribed TUOS services* will be based on demand at times of greatest DTS utilisation for which network investment is most likely to be contemplated.

AEMO will use the *CRNP methodology* to allocate the *adjusted locational component* to Connection Points[8]. The methodology estimates the proportionate use of relevant transmission system assets by each Transmission Customer based on loadflows and the optimised replacement cost (ORC) of those assets as described below.

To allocate the *adjusted locational component* to Connection Points, the following input data will be used:

- An electrical load flow model of the Victorian network that includes all committed augmentations in Financial year t.

- A cost model detailing the optimised replacement cost (ORC) for each network element in the static model of the Victorian DTS in Financial Year t-2.

- Load and generation data for each half hour during Financial year t-2.

- Where agreed, the CAMD agreed with Transmission Customers, or historical average monthly *maximum demand* data.

For modelling loads at Connection Points, if historical average monthly *maximum demand* data is unavailable or only partially available AEMO will use a forecast average monthly *maximum demand* instead. This is discussed in detail in section 3.5.1 below.

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[8] AEMO uses the software package TPRICE which implements the CRNP methodology.

3.5 Calculating locational, non-locational and common service prices and charges

3.5.1 Locational prices and charges for each Connection Point

Using the *CRNP methodology* in section 3.4 results in a lump sum dollar amount being recovered at each Connection Point representing the *adjusted locational component* of *prescribed TUOS services*.

To calculate the price to recover this lump sum ("Locational Price"), AEMO will use:

- The CAMD, if the Transmission Customer has agreed to a CAMD, or
- the average of the half-hourly monthly *maximum demand* value recorded at the Connection Point over a period of 365[9] days in Financial year t-2.

    For Connection Points with Transmission Customers that have agreed to a CAMD, the lower of the actual half-hourly demand and the CAMD is used when calculating the Connection Point half-hourly monthly *maximum demand*.

    If the historical average of the Transmission Customer's Connection Point half-hourly monthly *maximum demand* data is unavailable for the period specified above or only partially available for a Connection Point, forecast average monthly maximum demand for the Financial year t in which the Locational Prices will apply may be used instead. This forecast will be determined by AEMO in consultation with the relevant Transmission Customer and may be either a forecast average monthly *maximum demand* for the Financial year t at the new Connection Point or may involve the use of the CAMD as a proxy and taking into account the likelihood of any negative half hourly intervals. This will be applicable for new Connection Points commissioned in the Financial year t in which the Locational Prices will apply, or for new Connection Points recently commissioned (within Financial year t-1) where historical average *maximum demands* in Financial year t-1 is only partially available.

    The lump sum dollar amount described above is divided by the Transmission Customer's CAMD or in the absence of a CAMD, by average of the Transmission Customer's Connection Point half-hourly monthly *maximum demand* value recorded at the Connection Point over a period of 365[10] days in Financial year t-2 and is expressed as $/MW.

For the calculations above, any half-hourly interval used to determine the average monthly *maximum demand* will set to zero any half-hourly interval which has a negative value and any negative monthly *maximum demand* will be set to zero and excluded from the averaging process. When a forecast of the average monthly *maximum demand* is used, any negative monthly *maximum demand* will be set to zero and excluded from the averaging process.

As provided in the NER, prices for recovering the *adjusted locational component* of *prescribed TUOS services* must not change by more than 2% per annum on a *load* weighted average basis for the Victorian *region* compared with the previous *regulatory year*. This is subject to exceptions under clause 6A.23.4(b)(3). Any under or over recovery resulting from this price constraint will be recovered or offset (as appropriate) by adjusting the *pre-adjusted non-locational component* of *prescribed TUOS services*.

Under the AER Guidelines, the Locational Price calculated must be applied to a measure of actual, forecast or contract demand to derive the locational charge.

AEMO will charge Transmission Customers for the *adjusted locational component* of *prescribed TUOS services* by multiplying the Locational Price by the lower of:

- the CAMD, if the Transmission Customer has agreed to a CAMD, and
- the Transmission Customer's actual average demand at the time of the monthly *maximum demand* for Financial year t-2) for their respective Connection Point.

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[9] AEMO will use 366 days in a leap year.

[10] AEMO will use 366 days in a leap year.

If historical average monthly *maximum demand* data for Financial year t-2 is unavailable or only partially available for a Connection Point, AEMO will charge Transmission Customers for the *adjusted locational component* of *prescribed TUOS services* by multiplying the Locational Price by the actual average monthly *maximum demand* for the Financial year t for their respective Connection Points. This will be done in two steps.

- Initially Transmission Customers will be charged for the *adjusted locational component* of *prescribed TUOS services* by an amount equal to the Locational Price multiplied by the forecast average monthly *maximum demand* for the Financial year t.

- After the end of the Financial year t, once the actual average monthly *maximum demands* for Financial year t are known, the charges paid during the year will be adjusted such that the total annual locational charge is equal to the Locational Price multiplied by the actual average monthly *maximum demand* for the Financial year t. Any over or under recovery in Financial year t as a result of this adjustment would be charged or reimbursed through an adjustment to *pre-adjusted non-locational component* of *prescribed TUOS services* in financial year t+1.

Under exceptional circumstances under section 4 below, the Transmission Customer may request that AEMO consider setting the Transmission Customer's locational charge on the basis of actual data for the remainder of Financial year t.

AEMO does not propose to recalculate Locational Prices for financial year t in circumstances where load at a Connection Point(s) changes significantly after the Locational Prices for Transmission Customers have been determined and published by AEMO for Financial year t.

For the calculations above, any half-hourly interval used to determine the average monthly *maximum demand* will set to zero any half-hourly interval which has a negative value and any negative monthly *maximum demand* will be set to zero and excluded from the averaging process. When a forecast of the average monthly *maximum demand* is used, any negative monthly *maximum demand* will be set to zero and excluded from the averaging process.

3.5.2 Non-locational prices and charges for each Connection Point

In accordance with the NER, prices for the recovery of the MAR allocated to the *adjusted non-locational component* of *prescribed TUOS services* will be set on a *postage-stamp basis*.

AEMO will calculate two prices for the recovery of the *adjusted non-locational component* of *prescribed TUOS services* ("Non-locational Price"), namely:

- An energy-based price based on historical metered energy offtake or current metered energy offtake ($/MWh); and

- A contract agreed maximum demand price (CAMD) price ($/MW)

unless a reduced charge for the Connection Point in accordance with clause 6A.26.1 of the NER has been negotiated.

These two prices will be calculated in such a way that a Transmission Customer with a load factor equal to the median load factor for Connection Points would be indifferent to which of the two prices applies. The load factor is calculated as the Transmission Customer's average demand at a connection point divided by their maximum demand at that connection point. The Non-locational Prices will be the same for each Connection Point on the Victorian DTS and will be determined so that the total amount AEMO expects to recover from charges for the adjusted non-locational component does not exceed the adjusted non-locational component of the MAR for *prescribed TUOS services*.

The CAMD price will only be available to Transmission Customers who are party to a Use-of System Agreement with AEMO which specifies a CAMD and penalties for exceeding the CAMD.

Transmission Customers with a CAMD are charged the lower of:

- the Non-locational Price multiplied by the CAMD, or

- the Non-locational Price multiplied by the historical metered energy offtake at the Connection Point for Financial year t-2.

The energy-based price will be available to Transmission Customers who do not have a Use of System Agreement with AEMO which specifies a CAMD and penalties for exceeding the CAMD.

Transmission Customers without a CAMD are charged the energy-based Non-locational Price multiplied by the metered positive half-hourly energy offtake at the Connection Point for Financial year t-2. However, if the Transmission Customer has elected to use energy the Transmission Customer will be charged the price multiplied by the energy.

If historical metered energy offtake for the most recent 12 months is unavailable or only partially available for a Connection Point, forecast energy offtake for the Financial year t may be used instead. This forecast will be determined by AEMO in consultation with the relevant Transmission Customer. This will be applicable for new Connection Points that will be commissioned in the Financial year t in which the Non-locational Prices will apply, or for new Connection Points recently commissioned where historical metered energy offtake for the Financial year t-1 is unavailable or partially available.

For the calculations above, any half-hourly interval used to determine the metered energy offtake will set to zero any half-hourly interval which has a negative value.

Under exceptional circumstances under section 4, the Transmission Customer may request that AEMO consider setting the Transmission Customer's non-locational charge on the basis of actual data for the remainder of the Financial year t.

3.5.3   Prescribed common transmission services prices and charges (other than system strength transmission service)

In accordance with the NER, prices for the recovery of the MAR allocated to the *adjusted prescribed common transmission services* will be set on a *postage-stamp basis*.

AEMO will develop prices and charges for *adjusted prescribed common transmission services* in a method similar to that used to develop prices for the *adjusted non-locational component* for *prescribed TUOS services*.

3.5.4   System strength transmission service prices and charges

In accordance with the NER, prices and charges for *system strength transmission services* will be set as below.

3.5.4.1   System strength transmission service prices

A System Strength Unit Price (SSUP) will be set for each *system strength node* on the transmission network. In accordance with the NER and the AER's pricing methodology guidelines, the methodology determines the SSUP according to the 'forward-looking' long run average cost of providing the system strength capacity at each *system strength node*.

SSUP will be calculated in real terms and indexed annually in accordance with this methodology. Appendix D: System Strength Charge provides worked examples to illustrate the application of the methodology, which is described below.

The SSUP is a price per MVA which reflects the forecast long run average costs of providing *System Strength Transmission Services* at the relevant *system strength node* calculated as follows:

$$SSUP = \frac{\textit{The total long run capital and operating costs of providing an efficient quantity of system strength at a system strength node, over a period of t years}}{\textit{The total system strength hosting capacity provided by that system strength node, over a period of t years}}$$

Where:

- Long run means the costs of providing system strength capacity at a *system strength node*, having regard to the actual and forward looking costs of providing the required capacity at that node. Specifically:

    - The long run costs include AEMO's actual costs[11] of providing system strength capacity where the forward looking costs are higher than AEMO's actual costs; and

    - The long run costs include the forward looking costs of providing system strength capacity where these costs are lower than AEMO's actual costs.

- Capital and operating costs of providing *System Strength Transmission Services* means:

    - The annualised capital costs of providing the required system strength capacity at a *system strength node* in each year for a period of t years;

    - The annual operating costs required to operate and maintain network assets employed to provide the required system strength capacity at a system strength node in each year for a period of t years; and

    - The annual costs of contracts with non-network service providers to provide the required system strength capacity at a system strength node in each year for a period of t years.

- Total system strength hosting capacity means the quantity of system strength provided by a *system strength node* to supply an efficient quantity of system strength to connection points in each year for a period of t years.

- t years is 10 years.

3.5.4.1.1 Cost allocation

In relation to the process of allocating capital and operating costs to *system strength nodes*, it should be noted that:

- The capital and operating costs of providing system strength capacity may be attributable to more than one *system strength node*. In such cases, the costs of providing that system strength capacity will be allocated to each of the relevant *system strength nodes* on a reasonable basis to reflect the percentage of that capacity used at each of those nodes.

- The *capital and operating costs* of providing system strength capacity at a *system strength node* may include an allocation from one or more sources of system strength capacity, whether that source is a network investment or a contract with a non-network service provider.

- The *capital and operating costs* of providing system strength capacity at a *system strength node* will have regard to the National Electricity Amendment (Operational Security Mechanism) Rule 2022.

3.5.4.1.2 Indexation

In accordance with clause 2.7(b) of the AER's *pricing methodology guidelines*, the SSUP will be indexed annually. The SSUP will be indexed annually by the same inflation series the AER uses to index the maximum allowed revenue under the revenue determination of AusNet Services from one year to the next, as it captures inflation conditions applicable to Victoria.

3.5.4.2   System strength transmission service charges

The *System Strength Transmission Service User* for a system strength connection point must pay an *annual system strength charge* for the *system strength connection point* calculated in accordance with this section. The *annual system strength charge* is payable in equal monthly instalments. *System strength charges* come into effect from 1 July 2023.

If the obligation to pay the *system strength charge* in relation to a *system strength connection point* commences part way through a *regulatory year*, the annual *system strength charge* will be calculated on a pro rata basis and charged for the remaining months of the regulatory year.

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[11] AEMO actual costs includes forecasted actual costs as highlighted in Table 2 in Appendix D: System Strength Charge.

The annual *system strength charge* for a *system strength connection point* for a *regulatory year* will be calculated in accordance with the following formula:

SSC = SSUP x SSL x SSQ

where:

SSC is the annual *system strength charge* for the regulatory year (in $).

SSUP is the *system strength unit price* for the *system strength node*. SSUP will be the same for each *regulatory year* in a *system strength charging period*, except to the extent the *pricing methodology guidelines* permit indexation, in accordance with clause 6A.23.5(f).

SSL is the *system strength locational factor* applicable to the *system strength connection point*, calculated in accordance with the *system strength impact assessment guidelines*. *SSL* will be the same for each *regulatory year* in a *system strength charging period*.

SSQ is the *system strength quantity* applicable to the relevant *system strength connection point* (in MVA). It should be noted that:

- SSQ is the product of (1) the short circuit ratio and (2) the rated active power, calculated in accordance with clause 6A.23.5(j).

- If a change to SSQ comes into effect part way through a regulatory year, the monthly instalments of the annual *system strength charge* for the remaining months of the *regulatory year* will be calculated using the new *system strength quantity*, in accordance with clause 6A.23.5(k).

The *system strength charging period* is from 1 July 2023 until 30 June 2028 and for each subsequent period of 5 years (except that, if a pricing methodology of the System Strength Service Provider commences at the start of any such period and is in effect for longer than 5 years, the subsequent period ends when that pricing methodology ends).

4 Exceptional circumstances

Under exceptional circumstances where a Transmission Customer's load is likely to differ significantly from what was previously expected, the Transmission Customer may request that AEMO consider charging the Transmission Customer on the basis of actual data for the remainder of the current period (t).

AEMO will consider requests on a case by case basis. Examples of situations where the use of forecast average monthly *maximum demand* may be appropriate include:

- The transfer of significant amounts of load to/from Connection Points.

- The commissioning/decommissioning of significant amounts of load.

- The highly variable nature of load, results in significant deviations between historical average monthly maximum demand and forecast average monthly maximum demand.

5 Prudent discounts

AEMO may, but is not required to, agree with a Transmission Customer to charge lower prices for *prescribed TUOS services* and *prescribed common transmission services* than the prices determined in accordance with this Pricing Methodology.

In the event that a Transmission Customer does receive prudent discounts in the future, AEMO will adjust the *pre-adjusted non-locational component* of the *prescribed TUOS services* and the *prescribed common services component* to allow for the amount of the estimated under recovery arising from that discount in Financial Year t.

6 Billing and financial transfers

6.1 Billing arrangements for inter-regional TUOS charging

In accordance with clause 6A.29A.4, AEMO will:

- issue invoices for *MLEC* to co-ordinating network service providers (CNSP) for each interconnected region, as equal monthly instalments; and

- Pay invoiced *MLEC* to *CNSPs* for each *interconnected region*.

6.2 Billing arrangements for Transmission Customers

AEMO will issue monthly invoices to Transmission Customers. These will contain at least the minimum information requirements specified in clause 6A.27.2 of the Rules.

Transmission Customers must pay charges for *prescribed transmission services* (other than *system strength transmission services*) properly charged and billed in accordance with this Pricing Methodology by the date specified on the invoice. Charges derived from Locational Prices will include adjustments for net *MLEC* either payable to or receivable by AEMO.

6.3 Billing arrangements for System Strength Transmission Service Users

AEMO will issue monthly invoices to *System Strength Transmission Service Users*. These will contain at least the minimum information requirements specified in clause 6A.27.2 of the Rules.

In addition to the minimum information requirements in clause 6A.27.2(a), a bill for a *connection point* issued directly to a *Distribution Network Service Provider* or *Transmission Network Service Provider* relating to *system strength charges* will separately identify the *system strength charge* by *connection point*.

6.4 Financial transfers

AEMO will pay to each relevant TNSP the revenue it collects for charges for the *prescribed transmission services* provided by assets owned by those TNSPs. This revenue will be inclusive of net MLEC receivable by AEMO from other CNSPs of interconnected regions.

These financial transfers will be paid in accordance with the Rules and as per agreements negotiated between the parties.

7 Prudential requirements

Under the NER, AEMO may require a Transmission Customer to establish prudential requirements for either or both connection services and TUOS. These prudential requirements may take the form of, but need not be limited to, capital contributions, prepayments or financial guarantees.

In the event that a capital contribution or prepayment is required, any contribution will be taken into account in determining *prescribed transmission service* prices (other than system strength transmission services) in a manner negotiated between the parties and in all cases in accordance with the relevant provisions of the Rules.

8 Derogations

Under clause 2.1(o) of the AER Guidelines, AEMO's pricing methodology must include details of any derogations in accordance with Chapter 9 of the NER.

Clause 9.8.4 of the NER requires that in determining *transmission service* pricing and revenues, the *AER* must ensure that each Distributor has the benefit or burden of an equalisation adjustment for each *financial year* as shown in Table 1, multiplied by the relevant factor as shown in Table 2:

Table 1:

Business	Equalisation Adjustment ($'000))
SPI Electricity	(4,939)
Powercor Australia Ltd	(19,011)
Jemena	5,171
CitiPower Pty Ltd	5,920
United Energy Ltd	12,859

Table 2

If the *financial year* falls within the period:	then the relevant factor is:
July 2011 - 30 June 2015	.40
July 2015 - 30 June 2020	.20
Thereafter	0

AEMO must, in allocating revenue to be recovered from each Distributor to which it provides *prescribed TUOS services* and *prescribed common transmission services* by means of, or in connection with a *declared shared network* in each *financial year* of a *relevant regulatory period*, adjust the allocation in accordance with the clause above.

9 Monitoring and compliance

In accordance with clause 6A.24.2 of the NER, AEMO will publish a current copy of its approved pricing methodology on its website. In addition, in accordance with clause 6A.16 as modified by clause S6A.4.2(f), AEMO will publish its *prescribed shared transmission service* prices for each regulatory year on AEMO's website in accordance with the NER.

10 Differences between current and final pricing methodology

AEMO's pricing methodology differs from its previous pricing methodology as set out below:

- Address the changes required by the introduction of System Strength Charging in accordance with the AEMC's Rule determination, Efficient Management of System Strength on the Power System Rule 2021, October 2021

- Accounting for the treatment of costs associated with Ministerial Orders pursuant to section 16Y of the NEVA.

This pricing methodology complies with the requirements of Chapter 6A of the National Electricity Rules (the Rules) and the AER's pricing methodology guidelines.

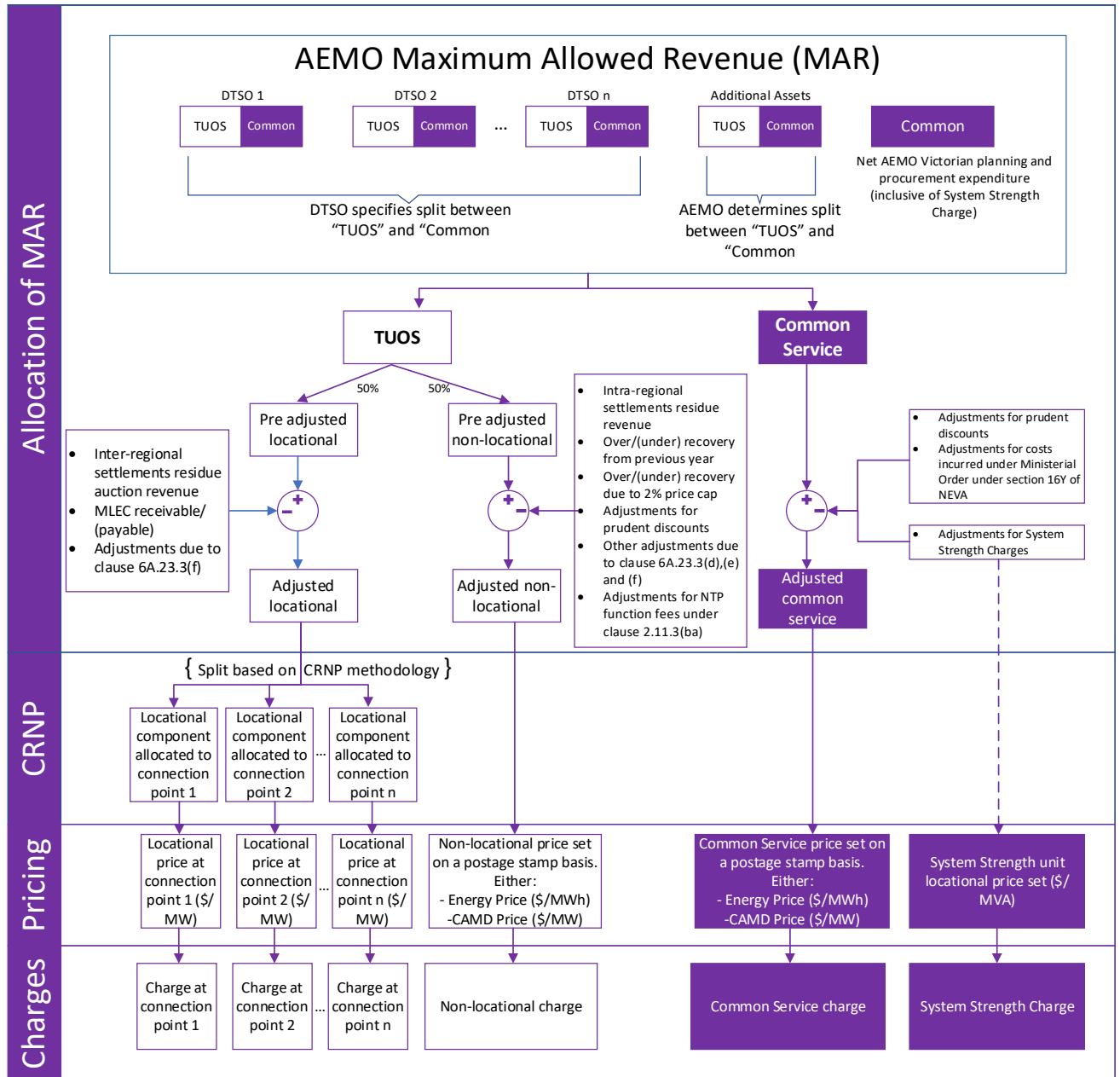# 11 Appendix A: Overview of AEMO's Pricing Methodology

Figure 1: Overview of TUOS Pricing Methodology

12 Appendix B: TUOS worked example

12.1 Calculation of total annual service revenue requirements (ASRR) for prescribed TUOS services and prescribed common transmission services

Assume a simple power system as depicted by figure Figure 2 below consisting of two generators and four Transmission Customer Connection Points with loads 1 to 4.
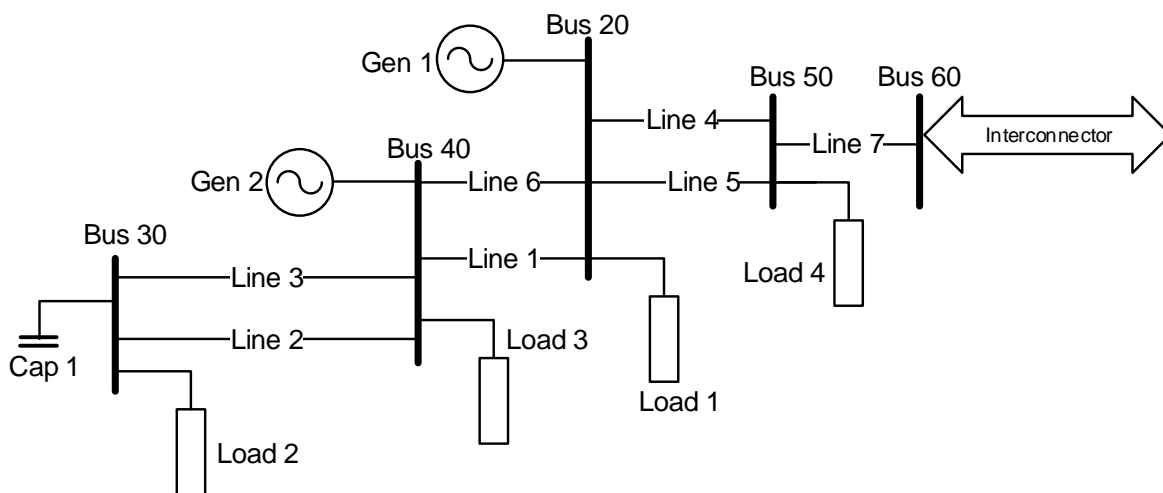
Figure 2: Simple power system

Also assume that at bus 60, the network is interconnected to a transmission network of another interconnected region.

12.1.1 DTSO component of ASRR

Assume a single DTSO in the region. The DTSO notifies AEMO of the DTSO's ASRRs and its operating and maintenance costs incurred in the provision of *prescribed common transmission services*. Assume the following:

- The DTSO's ASRR for *prescribed TUOS services* is $20m.
- The DTSO's ASRR for *prescribed common transmission services* is $10.7m.

12.1.2 Additional assets

In the sample power system depicted in Figure 1 above, the following network elements are additional assets; they provide shared network services that are operated and maintained by the DTSO or other service providers under service agreements with AEMO described in the Revenue Methodology, the costs of which are not included in the determination of the DTSO's AARR:

- Line 1, between Bus 20 and Bus 40.
- Line 3, between Bus 30 and Bus 40.
- Capacitor 1, at Bus 30.

As the costs of these network elements are not reflected in the DTSO's AARR, AEMO will allocate each of these additional assets to either the *prescribed TUOS services* or *prescribed common transmission services* categories of *prescribed transmission services*, with charges as per the service agreements ("additional assets"). Assume the charges are allocated as in Table 1 below.

Table 1: Annual service charges for additional assets

Additional assets	Allocation to category of prescribed transmission services	Annual service charge ($m)
Line 1	Prescribed TUOS services	8.7
Line 3	Prescribed TUOS services	10.045
Capacitor 1	Prescribed common transmission services	1.8

12.1.3 AEMO planning and procurement costs

Assume that AEMO's net annual Victorian planning and procurement cost is $1.5m.

12.1.4 Determine total ASRRs

AEMO then sums the *prescribed TUOS services* and *prescribed common transmission services* categories to arrive at the total Victorian ASRRs in Table 2:

Table 2: Total ASRRs for Victorian region

Category of prescribed transmission services	DTSO's ASRR ($m)	Additional assets ($m)	AEMO's Victorian planning and procurement ($m)	Total ASRRs for Victorian region ($m)
Prescribed TUOS services	20	18.745		38.745
Prescribed common transmission services	10.7	1.8	1.5	14

12.2 Adjustment of *pre-adjusted locational component* of *prescribed TUOS services* and allocation to Connection Points

12.2.1 Locational component and adjustments

AEMO then calculates the *pre-adjusted locational component* of the *prescribed TUOS service* as 50% of the ASRR for *prescribed TUOS services* ($38.745m from Table 2), and adjusts this with the inter-regional settlement residue auction revenue. Assume:

- Zero inter-regional settlement residue auction revenue;
- $1.5m of *MLEC* payable by AEMO to the *CNSP* of the *interconnected region*; and
- $0.5m of *MLEC* receivable by AEMO from the *CNSP* of the *interconnected region*. Further details of this calculation for this can be found in appendix C.

Therefore, the net *MLEC* is $1m payable by AEMO, and is added to calculate the *adjusted locational component*.

- *Adjusted locational component* = $20.373 ($38.745m x 50% + $1m due to net *MLEC* payable by AEMO)

12.2.2 Allocation to Connection Points

The *CRNP methodology* simultaneously allocates the *adjusted locational component* of the *ASRR* for *prescribed TUOS services* to Transmission Customer's Connection Points in the network.

An example result of how the locational component of the ASRR for prescribed TUOS services as determined by the *CRNP methodology* for year t is set out in Table 3 below.

Table 3: Locational cost allocation in year t

Load	Bus Name	Proportional split from CRNP	Allocation not considering MLEC ($m)	Allocation due to MLEC ($m)
1	Bus 20	34.69%	6.720	0.347
2	Bus 30	5.87%	1.138	0.059
3	Bus 40	9.41%	1.823	0.094
4	Bus 50	50.03%	9.692	0.500
Total			19.373	1.000
Adjusted location component			20.373	

That is, *CRNP methodology* produces a locational cost allocation for each Connection Point in the network in year t. The sum of all these locational cost allocations is the locational component of the ASRR for *prescribed TUOS services*, which is $20.373m for year t.

12.3 Determination of prices for *locational component* of *prescribed TUOS services*

12.3.1 Data requirements

The following data is required for calculating prices for recovery of the *adjusted locational component* for *prescribed TUOS services* in year t:

- The locational cost allocation for each Connection Point with a Transmission Customer in the DTS for year t as in Table 3; and

- The average monthly maximum demands and CAMD for each of those Connection Points in year t-2 set out in Table 4 below.

Table 4: Allocated locational cost and average monthly maximum demand

Load	Bus name	Allocation not considering MLEC ($m) in year t	Allocation due to MLEC ($m) in year t	Average maximum monthly demand (MW) in year t-2	CAMD (MW)
1	Bus 20	6.720	0.347	686.27	n/a
2	Bus 30	1.138	0.059	245.10	n/a
3	Bus 40	1.823	0.094	245.10	n/a
4	Bus 50	9.692	0.500	294.12	300.0

12.3.2 Calculation of price

Locational prices are capped as specified in clause 6A.23.4(b)(2). However, clause 6A.23.4(b)(3)(i) specifies that price capping is not applicable to the extent that the change in prices relates to the MLEC. In order to fulfil both requirements, the price component with and without the influence of MLEC is calculated, and only the price component that is not influenced by MLEC is capped.

The uncapped price for each Connection Point for recovery of the *adjusted locational component* of *prescribed transmission services* can now be calculated. This is done by dividing the allocated cost in year t for each Connection Point by the average maximum monthly demand in Financial year t-2 for that Connection

Point. Note that for load 4 at bus 50, since the Financial t-2 average monthly maximum demand is less than the CAMD, the Financial t-2 average monthly maximum demand is used to calculate the locational component.

The resulting uncapped prices in Financial year t for recovery of the locational component of the ASRR for prescribed TUOS services are set out in Table 5 below.

Table 5: Uncapped prices for locational component in year t

Load	Bus name	Average maximum monthly demand (MW) in year t-1	Allocation not considering MLEC ($m) in year t	Allocation due to MLEC ($m) in year t	Uncapped price	
					Price component not considering MLEC ($/MW) in year t	Price component due to MLEC ($/MW) in year t
1	Bus 20	686.27	6.720	0.347	9,792	506
2	Bus 30	245.10	1.138	0.059	4,643	241
3	Bus 40	245.10	1.823	0.094	7,438	384
4	Bus 50	294.12	9.692	0.500	32,953	1700

12.3.3 Price capping

It is necessary to limit the annual changes in prices for the locational component established by clause 6A.23.4(b)(2) of the NER (cap), excluding the price changes due to the influence of MLEC. The cap requires that the load weighted average price for the locational component in year t does not change by more than 2% per annum on a *load* weighted average basis for the Victorian *region* compared with the previous year. This calculation for the prices derived in Table 5 is listed in Table 6 below.

Table 6: Uncapped price change calculation.

Load	Financial year t-1		Financial year t		Price change (%)
	Average maximum monthly demand (MW) in year prior year t-2	Locational price ($/MW)	Average maximum monthly demand (MW) in year t-2	Uncapped price component not considering MLEC ($/MW)	
1	676	7,751	686.27	9,792	26.3
2	245	4,400	245.10	4,643	5.5
3	245	5,962	245.10	7,438	24.8
4	300	27,500	294.12	32,953	19.8

- Annual load weighted average for Financial year t-1 = $10,932.

- Annual load weighted average for Financial year t = $13,174.

- Therefore, the annual load weighted change = 20.5%.

- By applying clause 6A.23.4(b)(2), the locational price change (excluding the price changes due to the influence of MLEC) should be constrained to 20.5% ± 2% i.e. 18.5% to 22.5%. From the last column of Table 6, it can be observed that Loads 1, 2 and 3 have breached these limits and need to be capped

at 22.5%, 18.5% and 22.5% respectively. Load 4 is within the cap and would remain unchanged. Final prices are calculated by adding the capped locational price component with the uncapped price component due to MLEC. The results are shown in Table 7 below.

Table 7: Capped price change calculation

Load	Year t-1		Year t				
	Average maximum monthly demand (MW) in year t-3	Final Capped Locational price ($/MW)	Average maximum monthly demand (MW) in year t-2	Capped locational price component		Uncapped price component due to MLEC ($/MW)	Final capped locational price ($/MW)
				($/MW)	Change (%)		
1	676	7,751	686.27	9,493	22.5	506	9,999
2	245	4,400	245.1	5,215	18.5	241	5,456
3	245	5,962	245.1	7,305	22.5	384	7,689
4	300	27,500	294.12	32,953	19.8	1700	34,653

12.4 Determination of charges for *adjusted locational component* of *prescribed TUOS services*

The charge for each Connection Point for recovery of the locational component can now be calculated. This is done by multiplying the capped price in year t (calculated in Table 7) for each Connection Point by the average maximum monthly demand in Financial year t-2 for that Connection Point. This is shown in Table 8 below.

Table 8: Locational charge

Load	Year t		Locational charge ($m)
	Average maximum monthly demand (MW) in Financial year t-2	Final capped locational price ($/MW)	
1	686.27	9,999	6.862
2	245.1	5,456	1.337
3	245.1	7,689	1.885
4	294.12	34,653	10.192

The total charge for the locational component of the prescribed TUOS services is $20.276m. This differs from $20.373m, which is the total locational charge after adjustments (calculated in section 13.2 above). This difference is due to the price capping process, and the shortfall will be recovered in the *adjusted non-locational component* of *prescribed TUOS services* as explained in section 13.5 below.

12.5 Determination of adjusted non-locational component of prescribed TUOS services and prices

12.5.1 Determine *adjusted non-locational component*

AEMO then calculates the *pre-adjusted non-locational component* of the *prescribed TUOS service* as 50% of the ASRR for *prescribed TUOS services* ($38.745m from Table 2). Therefore:

- Prescribed TUOS services (pre-adjusted non-locational component) = $19.373m

To calculate the *adjusted non-locational component*, AEMO must make adjustments for:

- The amount of any over or under-recovery of the ASRRs for prescribed *TUOS services* and *prescribed common transmission services* in previous years.

- Intra-regional settlement residue revenue.

- Any prudent discount.

- The amount of any anticipated under-recovery by reason of the cap on the annual change in prices for the recovery of the locational component.

- NTP costs.

- Costs under Ministerial orders pursuant to section 16Y of the National Electricity (Victoria) Act 2005 (Vic).

- Adjustments due to clause 6A.23.3(f).

Assume that after these adjustments are applied, the resultant *adjusted non-locational component* for *prescribed TUOS services* is $15.373m.

12.5.2 Calculation of non-locational prices

To calculate the two prices for *adjusted non-locational component* of *prescribed TUOS services* in year t, namely the energy-based price and the CAMD price, the historical metered energy offtake data for each Transmission Customer's Connection Point set out in Table 9 below is required.

Table 9: Individual Connection Point CAMD and historical metered energy offtake

Load	Bus name	CAMD (MW)	Average monthly maximum demand (MW) in Financial year t-2	Historical metered energy offtake (GWh) in Financial year t-2
1	Bus 20	n/a	686.27	3250.0
2	Bus 30	n/a	245.10	1100.0
3	Bus 40	n/a	245.10	900.0
4	Bus 50	300.0	294.12	1500.0
			Total	6750.0

Note that only a few Transmission Customers have entered into an agreement with AEMO which specifies the level of CAMD. To calculate the energy-based price and the CAMD price for *prescribed common transmission services*, it is necessary to identify the median load factor Transmission Customer and its CAMD. Since the majority of Transmission Customers do not have CAMDs, average monthly maximum demands in year t-2 are used for Transmission Customers for the purpose of determining the median load factor Transmission Customer where there is no defined CAMD for the Transmission Customer.

The energy-based price and the CAMD price for the recovery of the *adjusted non-locational component* for *prescribed TUOS services* are then calculated by solving the following representative simultaneous equations:

$$(AB_{t-1} \times PNLe_t) + (CCMD_t \times PNLc_t) = NLC_t \,(1)$$

and

$$(ME_{t-1} \times PNLe_t) = (MMD_t \times PNLc_t) \qquad (2)$$

where:

AB_{t-1}	= total annual billable energy (MWh) in year t-2 for all Connection Points in which the energy based price for recovery of the *adjusted non-locational component* for *prescribed TUOS service* applies in year t
$PNLe_t$	= adjusted non-locational component energy based price in year t
$CCMD_t$	= sum of CAMDs for all Connection Points at which the CAMD price for recovery of the adjusted non-locational component applies in year t
$PNLc_t$	= adjusted non-locational component CAMD price in year t
NLC_t	= adjusted non-locational component in year t
ME_{t-1}	= median load factor Transmission Customer's historical metered energy offtake in year t-1
MMD_t	= median load factor Transmission Customer's average monthly maximum demands in year t-1

Using the known values of AB_{t-1}, NLC_t, ME_{t-1}, $CCMD_t$ and MMD_t, the equations (1) and (2) above are solved simultaneously to determine the unknowns:

- Energy based price, i.e. $PNLe_t$; and
- CAMD Price, i.e. $PNLc_t$.

In this example, the median load factor Transmission Customer is Load 1. Therefore the solution of the following two simultaneous equations leads to the energy-based price and the CAMD Price for the adjusted non-locational component of prescribed TUOS services in year t.

$$(3250 + 1100 + 900) \times 10^3 \times PNLe_t + 300 \times PNLc_t = \$15.373m$$

$$3250 \times 10^3 \times PNLe_t = 686.27 \times PNLc_t$$

The result is:

$$PNLc_t = \$10,914/MW$$

$$PNLe_t = \$2.30/MWh$$

12.6 Determination of charges for *adjusted non-locational component* of *prescribed TUOS services*

The charge for each Connection Point for recovery of the *adjusted non-locational component* can now be calculated. This is done by multiplying the prices in year t calculated above for each Connection Point by the historical metered energy offtake in [Financial] year t-1 or the CAMD for that Connection Point (if it results in a lower charge). This is shown in Table 10 below.

Table 10: Adjusted non-locational charge

Load	Year t				Non-locational charge ($m)
	Historical metered energy offtake (GWh) in year t-1	Energy based price ($/MWh)	CAMD (MW)	CAMD price ($/MW)	
1	3250.0	2.30	n/a		7.475

Load	Year t				Non-locational charge ($m)
	Historical metered energy offtake (GWh) in year t-1	Energy based price ($/MWh)	CAMD (MW)	CAMD price ($/MW)	
2	1100.0	2.30			2.530
3	900.0	2.30			2.070
4	n/a since a lower charge is obtained with the use of CAMD		300.0	10,914	3.274

The total charge for the *adjusted non-locational component* of the *prescribed TUOS services* is $15.349m. This is different from $15.373m in section 12.5.1 above due to the effect of rounding prices.

12.7 Prices for adjusted prescribed common transmission services

The prices for *adjusted prescribed common transmission services* are derived in a substantively similar method to that set out above in respect of charges for the *adjusted non-locational component* of *prescribed TUOS services*, the only difference being that in this example, NLC_t should be substituted with the value $14m which is the ASRR for *adjusted prescribed common transmission services* as calculated in Table 4 above. The prices $PNLe_t$ and $PNLc_t$ will then be the *adjusted prescribed common transmission services* energy based price in year t, and *adjusted prescribed common transmission services* CAMD price in year t respectively.

13 Appendix C: Inter-regional TUOS Charge

Inter-regional transmission charging arrangements provide a mechanism for exporting regions in an inter-connected system to charge importing regions a *MLEC* for facilitating the transport of electricity.

AEMO is the *CNSP* in Victoria, and is responsible for calculation, allocation and billing of *MLEC* to or from *CNSPs* in *interconnected regions* to each TNSP within Victoria. This is done is accordance with clause 6A.29A.

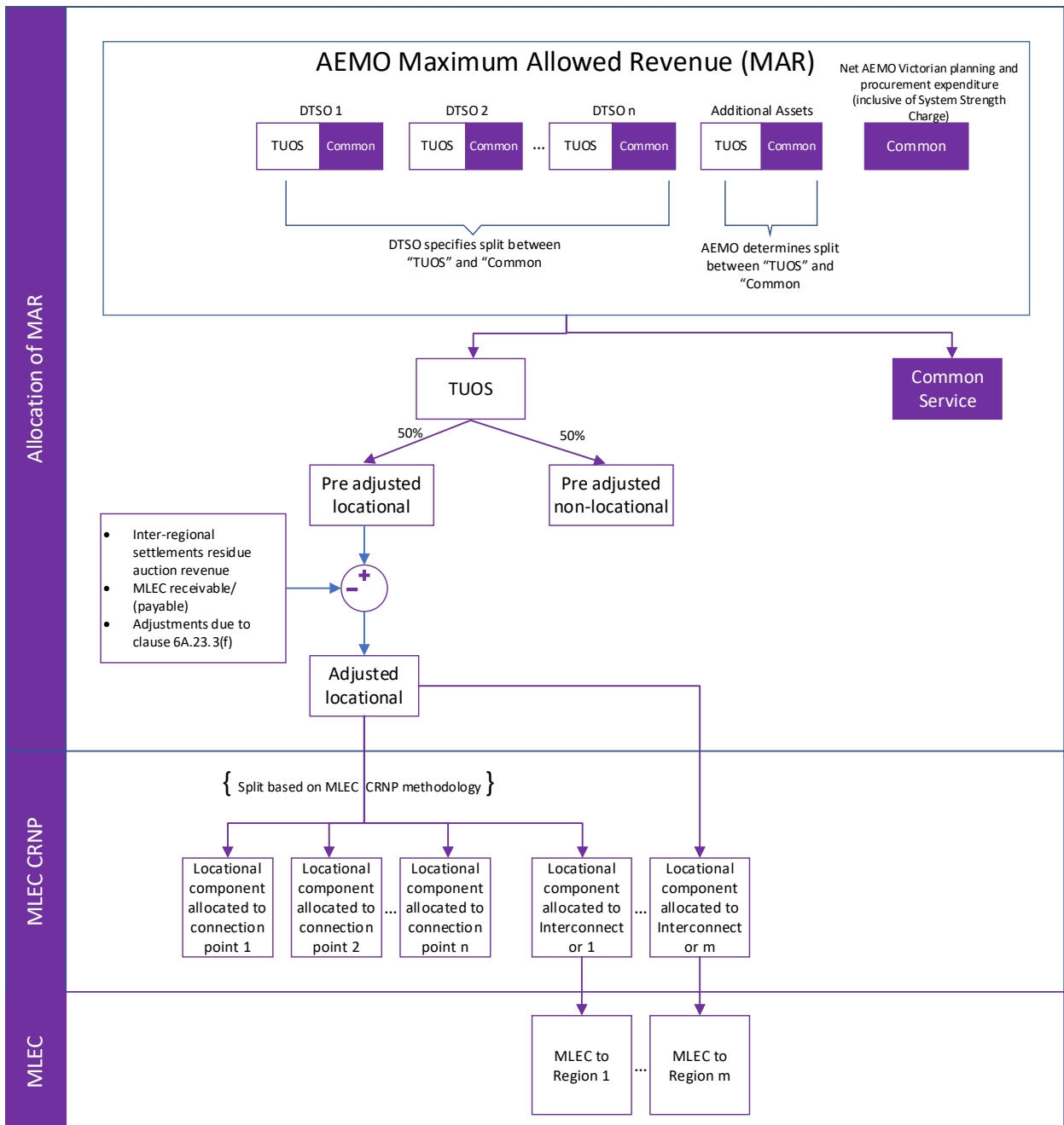An overview of the calculation of *MLEC* is shown figure 3 below.

Figure 3: Overview of Inter-regional TUOS Charge

13.1 Allocating the MAR

The MAR is allocated to *prescribed TUOS services* as described in section 3.3.1. In accordance with 6A.29A.2, 50% of *prescribed TUOS services* is allocated to the *pre-adjusted locational component*.

13.2 Adjustment of locational component

In line with clause 6A.29A.2(a)(2), AEMO will calculate the *adjusted locational component* by adjusting the *pre-adjusted locational component*:

- By subtracting the estimated inter-regional settlement residue auction revenue;
- For any adjustments to the inter-regional settlement residue auction revenue consistent with 6A.23.3(b)(1);
- For any adjustments consistent with 6A.23.3(f).

13.3 MLEC

As required by clause 6A.29A.2(b)(3), AEMO will use the *MLEC CRNP methodology* to allocate the adjusted locational component to Connection Points of Transmission Customers and interconnected regions on the basis of their proportional use of the transmission system assets. The *MLEC CRNP methodology* is applied to data sourced from the previous completed financial year.

The *MLEC* for an *interconnected region* is determined to be the amount allocated to each *interconnected region*.

13.4 Billing arrangements with TNSPs within Victoria

In accordance with clause 6A.29A.5, AEMO as the *CNSP* in Victoria will allocate net receivable or payable *MLEC* to Victorian TNSPs on the basis of intra-regional network utilisation by applying the MLEC *CRNP methodology*. AEMO will also issue a bill to each TNSP for the net MLEC payable or receivable.

On behalf of Victorian TNSPs, AEMO is responsible for charging Transmission Customers with TUOS charges that include adjustments for net *MLEC*. AEMO will also pay or receive *MLEC* from *CNSPs* of *interconnected regions*.

In practice, TNSPs will receive their aggregate annual costs, and there is no separate net MLEC amount to be transferred between AEMO and the TNSPs. The allocation and billing of net MLEC to TNSPs is solely for information purposes and to satisfy clause 6A.29A.5.

13.5 Worked example of inter-regional TUOS charges

This example is based on the same scenario described in section 13. In terms of the chronological order of performing calculations, the calculations in appendix C is done prior to appendix B since the MLEC is required to be published by 15 March.

- As in section 13.1.4, the ASRR for prescribed services is $38.745m.
- Assuming *inter-regional settlement residue auction revenue* and other adjustments are zero, the adjusted locational component is 50% of $38.745m, which is $19.373m.
- Based on the *MLEC CRNP methodology*, assume that the *adjusted locational component* is split according to the proportions in column 3 of table 13. Then the allocated amounts to the Connection Points and the interconnector is listed in column 4.

Table 14: MLEC CRNP results

Load/Interconnector	Bus Name	Proportional split from CRNP	Allocation ($m)
1	Bus 20	33.79%	6.547
2	Bus 30	5.72%	1.108
3	Bus 40	9.17%	1.776
4	Bus 50	48.74%	9.442
Interconnector	Bus 60	2.58%	0.500
Adjusted location component			19.373

- *MLEC* charged to the *CNSP* of the interconnected region is $0.5m.

- Clause 6A.29A.5 requires AEMO as the *CNSP* to allocate and bill Victorian TNSPs with net *MLEC* charges.

  o Assume that there are two TNSP in the region, A and B, and:

    ▪ Loads 1 and 2 are in the network of TNSP A:

    ▪ Loads 3 and 4 are in the network or TNSP B; and,

    ▪ $1.5m of MLEC is payable by AEMO to CNSPs of interconnected regions (see section 12.2.1).

  o Net MLEC payable by AEMO is $1m ($1.5 - $0.5m)

  o From table 14,

    ▪ Allocation to TNSP A as a percentage of all loads is 40.56%

    ▪ Allocation to TNSP B as a percentage of all loads is 59.44%

  o MLEC allocated and billed is

    ▪ $0.4056m payable by TNSP A ($1m x 40.56%)

    ▪ $0.5944m payable by TNSP B ($1m x 59.44%)

14 Appendix D: System Strength Charge

The AER's explanatory statement explained that:[12]

- A system strength provider's proposed methodology for setting the System Strength Unit Price (SSUP) must be based on the long run average cost (LRAC) of providing *system strength services* at each *system strength node*;

- *System strength providers* must use a period of at least 10 years when forecasting long run costs; and

- If the unit price is updated for indexation each year, the basis for indexation must be consistent with the approach for inflation indexation of the transmission network's maximum allowed revenue under its revenue determination.

As explained in this pricing methodology, our proposed approach to setting System Strength Charges complies with these requirements.

The purpose of this appendix is to provide illustrative numerical examples to show how the pricing methodology may apply in the following cases:

- Case 1: LRAC set for 10 year period, using a combination of network and non-network solutions; and

- Case 2: As per Case 1, with SSUP reset for years 6-15 with existing network solutions no longer reflecting the forward-looking costs.

In both cases, the SSUP calculates the LRAC over a 10 year period. The examples illustrate how the SSUP may change depending on whether the actual costs of the network solution are higher or lower than the forward-looking costs.

It should be noted that while the focus is on network solutions in these examples, the same approach may apply to non-network solutions where 'locked in' contracts for non-network services no longer reflect the forward-looking costs of providing system strength services.

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[12] AER, Explanatory statement, Final decision - Pricing methodology guidelines: System strength pricing 25 August 2022, page 5.

Table 1   Case 1 LRAC set based on 10 year forecasts, using combination of network and non-network solutions (All dollar amounts are stated in real terms)

	Year	1	2	3	4	5	6	7	8	9	10	Total
Row 1	Total System Strength requirement (MVA)	1000	1000	1200	1200	1500	1500	1600	1600	1800	1800	14200
Row 2	Requirement met by network solutions (MVA)	500	500	500	500	1000	1000	1000	1000	1000	1000	
Row 3	Annual unit cost of network solutions ($/MVA)	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	
Row 4	Annual total cost of network solutions ($M)	$3.7	$3.7	$3.7	$3.7	$7.4	$7.4	$7.4	$7.4	$7.4	$7.4	$59.2
Row 5	Requirement met by non-network solutions (MVA)	500	500	700	700	500	500	600	600	800	800	
Row 6	Annual unit cost of non-network solutions ($/MVA)	$8,400	$8,200	$8,286	$8,214	$8,000	$7,900	$7,833	$7,667	$7,625	$7,500	
Row 7	Annual total cost of non-network solutions ($M)	$4.2	$4.1	$5.8	$5.8	$4.0	$4.0	$4.7	$4.6	$6.1	$6.0	$49.2
Row 8	Total annual cost of meeting requirement ($M)	$7.9	$7.8	$9.5	$9.5	$11.4	$11.4	$12.1	$12.0	$13.5	$13.4	$108.4

SSUP is the 10-year LRAC, which is $7,634 per MVA. This price applies for years 1-5 and will be revisited for year 6 onwards

Row 1 shows the total system strength requirement in MVA for each year, as specified by AEMO as the System Operator. To simplify the exposition, this example assumes that the total system strength requirement at the node is the same as the total system strength hosting capacity (SSQ x SSL) at each of the connection points served by that node. In practice, however, the sum of the total system strength hosting capacity at the connection points may exceed the total system strength requirement at the node.

In this example, the TNSP has determined that the most economic mix of resources that will meet the requirement consists of a combination of network and non-network solutions. Row 2 shows the total system strength requirement that will be met by network solutions for each year. This information is provided to illustrate the implied $/MVA cost for the network and non-network solutions, noting that the System Strength Service Provider will plan to meet the system strength standard at the lowest total life cycle cost.

Row 3 shows the real annual cost per MVA of the network solutions for each year. The annual cost will reflect the expected economic life of the network solution.

Row 4 shows the total annual cost (in real terms) of the network solutions. It is calculated by multiplying the values in Row 2 (MVA provided by network solutions) and Row 3 (real annual cost of network solutions per MVA) for each year.

Row 5 shows the total system strength requirement in MVA to be met by non-network solutions. In each year, the amount of system strength service provided by non-network solutions is the difference between the total requirement and the amount provide by the network solutions.

Row 6 shows the forecast real cost of non-network solutions per unit of MVA provided in each year.

Row 7 shows the total annual cost (in real dollars) of the non-network solutions. It is calculated by multiplying the values in Row 5 (MVA provided by non-network solutions) and Row 6 (real annual cost of non-network solutions per MVA) for each year.

Row 8 shows the total annual cost of meeting the specified system strength requirement. It is calculated by summing the values in Row 4 and Row 7.

The long run average cost of meeting the specified system strength requirements is $7,634 per MVA. It is calculated by summing the total annual cost over 10 years shown in Row 8 ($108.4 million) and dividing that number by the sum of the total MVA of system strength services provided over the period (14,200 MVA, as shown in Row 1). As noted above, to simplify the exposition, it is assumed that the total system strength hosting capacity is the same as the system strength capacity provided at the node. In practice, the long run average cost would divide the total cost over 10 years by the total system strength hosting capacity.

The table below (Case 2) illustrates the pricing methodology at the first re-set at the end of year 5, where the forward-looking costs are lower than the actual network costs. The greyed out data does not feature in this SSUP calculation in this case.

Table 2   Case 2 As per Case 1, with SSUP reset for years 6-15 with existing network solutions no longer reflecting the forward-looking costs (All dollar amounts are stated in real terms)

Row	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total years 6-15
Row 1	Total System Strength requirement (MVA)	1000	1000	1200	1200	1500	1500	1600	1600	1800	1800	1800	2000	2300	2300	2300	19000
Row 2	Requirement met by network solutions (MVA)	500	500	500	500	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
Row 3	Annual unit cost of network solutions ($/MVA)	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	$7,400	
Row 4	Annual total cost of network solutions ($M)	$3.7	$3.7	$3.7	$3.7	$7.4	$7.4	$7.4	$7.4	$7.4	$7.4	$7.4	$7.4	$7.4	$7.4	$7.4	
Row 5	Forward-looking annual unit cost of network solutions ($/MVA)						$7,400	$7,400	$7,400	$7,400	$7,400	$7,250	$7,250	$7,250	$7,250	$7,250	
Row 6	Forward-looking annual total cost of network solution ($M)						$7.4	$7.4	$7.4	$7.4	$7.4	$7.3	$7.3	$7.3	$7.3	$7.3	$73.3
Row 7	Requirement met by non-network solution (MVA)	500	500	700	700	500	500	600	600	800	800	800	1000	1300	1300	1300	
Row 8	Annual unit cost of non-network solution ($/MVA)	$8,400	$8,200	$8,286	$8,214	$8,000	$7,900	$7,833	$7,667	$7,625	$7,500	$7,300	$7,200	$7,000	$6,750	$6,700	
Row 9	Annual total cost of non-network solution ($M)	$4.2	$4.1	$5.8	$5.8	$4.0	$4.0	$4.7	$4.6	$6.1	$6.0	$5.8	$7.2	$9.1	$8.8	$8.7	$65.0
Row 10	Total annual cost of meeting requirement ($M)	$7.9	$7.8	$9.5	$9.5	$11.4	$11.4	$12.1	$12.0	$13.5	$13.4	$13.1	$14.5	$16.4	$16.0	$16.0	$138.2

As per case 1, the annual SSUP is set at $7,634 per MVA for years 1-5 based on LRAC for years 1-10. SSUP is reset in year 6 at $7,275 per MVA based on the LRAC for years 6-15

In this example, at the end of year 5, the forecast costs of meeting the specified system strength requirements for the next 10 years are assessed. In this example, the costs of the network and non-network solutions for years 6 to 10 are unchanged from the initial assessment (shown in Case 1). Over years 11 to 15, the forecast unit costs of non-network solutions (shown in Row 8) are expected to fall.

It is estimated that the most cost-effective system strength resource that would be available to meet the remaining requirement (which will be met by network solutions) has a cost of $7,250/MVA/year. Accordingly, the annual unit cost of the network solutions is adjusted down from $7,400/MVA (Row 3) to $7,250/MVA (Row 5). For the purpose of calculating the 10 year LRAC for years 6 to 15, the reduced forward-looking cost of the network solutions is adopted. Accordingly, the values in Rows 3 and 4 for years 11 to 15 are shaded grey and excluded from the calculations, while the values in Rows 5 and 6 are used in the calculations instead.

The long run average cost of meeting the specified system strength requirements over years 6 to 15 is $7,275 per MVA. It is calculated as the sum of the total annual costs over the period from years 6 to 15 (Row 10, $138.2 million) divided by the sum of the system strength requirements over the same period (Row 1, 19,000). This cost is lower than the $7,634/MVA/year calculated for the initial 10 year period, reflecting:

- the forecast reduction in the unit cost of non-network solutions over years 11 to 15; and

- the reduction in the forward-looking cost of network solutions for years 11 to 15.

As noted in relation to case 1, the above exposition has been simplified by assuming that the total system strength hosting capacity is the same as the system strength capacity provided at the node.