Explanatory statement

Draft decision

Pricing methodology guidelines: System strength pricing

2 June 2022

AUSTRALIAN ENERGY REGULATOR

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Overview

We, the Australian Energy Regulator (AER), work to make all Australian energy consumers better off, now and in the future. We regulate energy networks in all jurisdictions except Western Australia. Our work is guided by the National Electricity Objective which promotes efficient investment in, and operation and use of, electricity services in the long term interests of consumers.[1]

On 21 October 2021, the Australian Energy Market Commission (AEMC) made a final rule for the "Efficient management of system strength on the power system" rule change (system strength rule change).[2,3]

The AEMC's final rule requires us to modify the pricing methodology guidelines for two new requirements.[4] Specifically, the pricing methodology guidelines must specify or clarify:

- the permitted methodologies for determining the system strength unit price (SSUP**;** unit price) component of the system strength charge
- principles for determining forecast annual system strength revenue and estimated actual annual system strength revenue.

The pricing methodology guidelines set out the information a Transmission Network Service Provider (TNSP**;** transmission network) must provide to demonstrate that its proposed pricing methodology complies with the National Electricity Rules (NER**;** Rules).[5]

The amendments to our guidelines will be most relevant to transmission networks who are System Strength Service Providers (SSSP**;** system strength providers) under the new rule requirements. These are Transgrid, ElectraNet, Powerlink, TasNetworks and the Australian Energy Market Operator (AEMO).[6] However, the amendments will apply to all transmission networks and include some provisions that are relevant to transmission networks who are not system strength providers but who may have system strength connection points on their networks.

In accordance with the system strength rule change, we have made the following amendments to the draft pricing methodology guidelines.

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1 NEL, s. 7.

2 AEMC, *Rule determination: Efficient management of system strength*, 21 October 2021.

3 System strength is a quality of the power system reflecting a combination of fault current provision and the overall stability of the voltage waveform.

4 NER clause 6A.25.2(h). Note, clause 6A.25.2 sets out the required contents of the pricing methodology guidelines.

5 The current pricing methodology guidelines are available on our website: https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/pricing-methodology-guidelines-2014/final-decision

6 As part of its functions, AEMO is a Victorian electricity transmission network service provider.

- A system strength provider's proposed methodology for setting the unit price must be based on the long run average cost of providing system strength services at each system strength node (discussed in section 3.2).[7]
- system strength providers must use a period of at least 10 years when forecasting long run costs (discussed in section 3.1).[8]
- 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 (discussed in section 4).[9]
- The pricing methodology sets out high-level principles that system strength providers must be consistent with when determining forecast and estimated annual system strength revenues. The principles include that the methodologies used to forecast or estimate annual system strength revenues are reasonable and appropriate for their purpose. Further, these methodologies should utilise relevant existing information, such as connection agreements and applications to connect (discussed in section 5).[10]

The draft pricing methodology guidelines also set out the information to be included in or with a proposed pricing methodology to demonstrate compliance with the Rules and the pricing methodology guidelines.[11]

As we detail in this explanatory statement, we welcome stakeholder feedback on the amendments to the draft pricing methodology guidelines. We will take stakeholder feedback into consideration when we make our final pricing methodology guidelines by **31 August 2022**.[12]

Note on acronyms and short forms

In this explanatory statement, we include both an acronym and a short form in parenthesis after the first use of certain terms. We include the acronym to indicate consistency with terms defined in the Rules and associated determination documents. However, we generally use the short form in the text for readability.

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7 AER, *Draft pricing methodology guidelines*, 6 April 2022, paragraph 2.7(a)(1).
8 AER, *Draft pricing methodology guidelines*, 6 April 2022, paragraph 2.7(a)(2).
9 AER, *Draft pricing methodology guidelines*, 6 April 2022, paragraph 2.7(a)(1).
10 AER, *Draft pricing methodology guidelines*, 6 April 2022, paragraph 2.8.
11 AER, *Draft pricing methodology guidelines*, 6 April 2022, paragraph 2.1.
12 NER clause 11.143.4.

1 Introduction

1.1 Objective and scope of this explanatory statement

Our approach to amending the guideline must advance the National Electricity Objective,[13] deliver on the new guidance requirements in Rules clauses 6A.25.2(h) and 6A.25.2(i), and meet the requirements of the transmission consultation procedures.[14] The new guideline must also give effect to and be consistent with the Pricing Principles for Prescribed Transmission Services,[15] including the new principles applicable to system strength services which have been inserted by the system strength rule change.

This explanatory statement accompanies our draft amendments to the pricing methodology guidelines for the new system strength requirements. It explains our approach to consulting on these amendments, how we have taken into account the relevant Rules requirements, our approach to incorporating the amendments into the pricing methodology guidelines, and outcomes of our analysis and engagement on key issues relating to these amendments.

This explanatory statement should be read in conjunction with the draft pricing methodology guidelines (draft guidelines). To assist stakeholders, we have published a marked-up version of the draft guidelines to show the changes from the current guidelines. As part of this process, we have also amended the pricing methodology guidelines for minor consequential changes, corrections and cross-referencing updates.

1.2 How can you get involved?

Stakeholder engagement is not only something we must have regard to when performing our regulatory obligations. It is a valuable input, which we encourage.

When we receive submissions that articulate stakeholder preferences, address relevant issues, and provide evidence and analysis, our decision-making process is strengthened. It also provides greater transparency, predictability and builds trust and confidence in the regulatory framework.

We invite stakeholder submissions on the draft pricing methodology guidelines amendments by **15 July 2022**. We will consider all submissions received by that date.

Submissions should be in Microsoft Word or another machine-readable document format. Please address submissions to:

AERPricing@aer.gov.au

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13 NEL, s. 7.

14 NER, cl. 6A.20

15 NER, cl. 6A.25.1(b)

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We prefer that all submissions are publicly available to facilitate an informed and transparent consultative process. Submissions will be treated as public documents unless otherwise requested. All non-confidential submissions will be placed on our website. Parties wishing to submit confidential information should:

- clearly identify the information that is the subject of the confidentiality claim
- provide a non-confidential version of the submission in a form suitable for publication.

1.3 Consultation process

To meet the 31 August 2022 due date[16] for amending the pricing methodology guidelines, we are working through the following milestones for this project.

Table 1.1 Indicative milestones

Date	Milestone
Completed milestones	
22 March 2022	AER publishes Consultation Paper
8 April 2022	AER stakeholder forum
26 April 2022	Submissions to Consultation Paper due
2 June 2022	AER publishes Draft Pricing Methodology Guidelines
Future milestones	
15 July 2022	Submissions to Draft Pricing Methodology Guidelines due
By 31 August 2022	**AER publishes Final Pricing Methodology Guidelines**
By 30 November 2022	*Applicable transmission networks and AEMO submit amended proposed pricing methodologies*[17]
By 31 January 2023	*AER publishes final decision on proposed pricing methodologies*

1.3.1 Outcomes of our consultation to date

To initiate this review, we published a consultation paper in March 2022 seeking stakeholder comment on key areas of consideration in making amendments to the

16 NER clause 11.143.4.

17 Note, NER clause 11.143.5 requires each 'applicable transmission network' and AEMO to submit a proposed amended pricing methodology by this date. The applicable transmission networks are defined as Ausgrid, AusNet Services, ElectraNet, Powerlink, TasNetworks and Transgrid.

pricing methodology guidelines. We also held a public forum in April 2022 to provide stakeholders opportunity to engage, ask questions and provide verbal input into this process. The forum was attended by 21 stakeholders and our advisors farrierswier.

We received four written submissions from the Australian Energy Council (AEC), Energy Networks Australia (ENA), CS Energy and EnergyAustralia. These submission are available on our website.[18]

We address stakeholder feedback throughout this explanatory statement for each relevant issue in our draft decision.

1.4 Structure of this explanatory statement

The rest of this explanatory statement is structured as follows:

- Section 2 outlines key elements of the AEMC's final rule and summarises the scope of the amendments to our guidelines required by the final rule.
- Section 3 explains our draft decision on pricing based on long run costs.
- Section 4 explains our draft decision on annual inflation indexation.
- Section 5 explains our draft decision on the principles for revenue forecasting.
- Section 6 explains our draft decision on the information required to be included in a proposed pricing methodology to demonstrate compliance with the relevant regulatory requirements.
- Section 7 discusses other issues that were raised in our consultation paper or submissions but are not addressed in our draft decision.

1.5 Key terms used in this explanatory statement

Table 1.2 sets out the key terms we use in this explanatory statement.

Table 1.2 Key terms used in this paper

Term	Explanation
Long-run average cost (LRAC**;** average cost)	See section 3.2.2.
Long-run marginal cost (LRMC**;** marginal cost)	See section 3.2.2.
System strength charge	The system strength charge is the charge payable by system strength transmission service users to a system strength service provider for system strength services. It is calculated as explained in section 2.1.4 and has three components: the

[18] https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/system-strength-pricing/initiation

Term	Explanation
	system strength unit price (SSUP**;** unit price), system strength locational factor (SSL**;** locational factor) and system strength quantity (SSQ).
System strength service provider (SSSP**;** system strength provider)	System strength providers are defined in the Rules clause 5.20C.3 as either the transmission network for the region, or where there is more than one transmission network for a region, they are the jurisdictional planning body for that region. In the instance that the jurisdictional planning body is not a transmission network, then the coordinating transmission network service providers for that region will be the system strength provider for the region. The transmission networks that are currently system strength providers are ElectraNet in South Australia, Powerlink in Queensland, TasNetworks in Tasmania, Transgrid in NSW and AEMO in Victoria.
System strength unit price (SSUP**;** unit price)	The unit price is a key component of the system strength charge. It is the unit price (in $/MVA per year) for system strength services provided by a system strength provider at a system strength node. It is fixed for the system strength charging period, which is usually five years.

2 Background: Implementing system strength pricing

This section outlines key elements of the AEMC's final rule and summarises the scope of the amendments to the pricing methodology guidelines as required by the final rule.

Appendix B describes the rule change and the required amendments to the pricing methodology guidelines in more detail.

2.1 The system strength rule change

2.1.1 Background to the system strength rule change

AEMO currently defines system strength as:[19]

> *"the ability of the power system to maintain and control the voltage waveform at any given location in the power system, both during steady state operation and following a disturbance."*

A decline in system strength in the National Electricity Market (NEM) has been noticed over the last several years as inverter-based generation replaces synchronous generation output.

2.1.2 Key elements of the AEMC's final rule

On 21 October 2021, the AEMC made a final rule establishing a new framework to facilitate the proactive provision of system strength where it is needed in the network.[20]

The final rule implemented an approach that coordinates the supply and demand of efficient levels of system strength. Implementing the above reforms involves key actions by participants and market bodies including the AER, AEMO, system strength providers and other electricity networks.

A key finding of the rule making process was that transmission networks were best placed to identify options for system strength provision and to leverage economies of scale for efficient delivery of those options. One transmission network in each NEM region is designated as the system strength provider for that region.

The final rule implemented a three-part approach to providing efficient levels of system strength as summarised in the following illustration.

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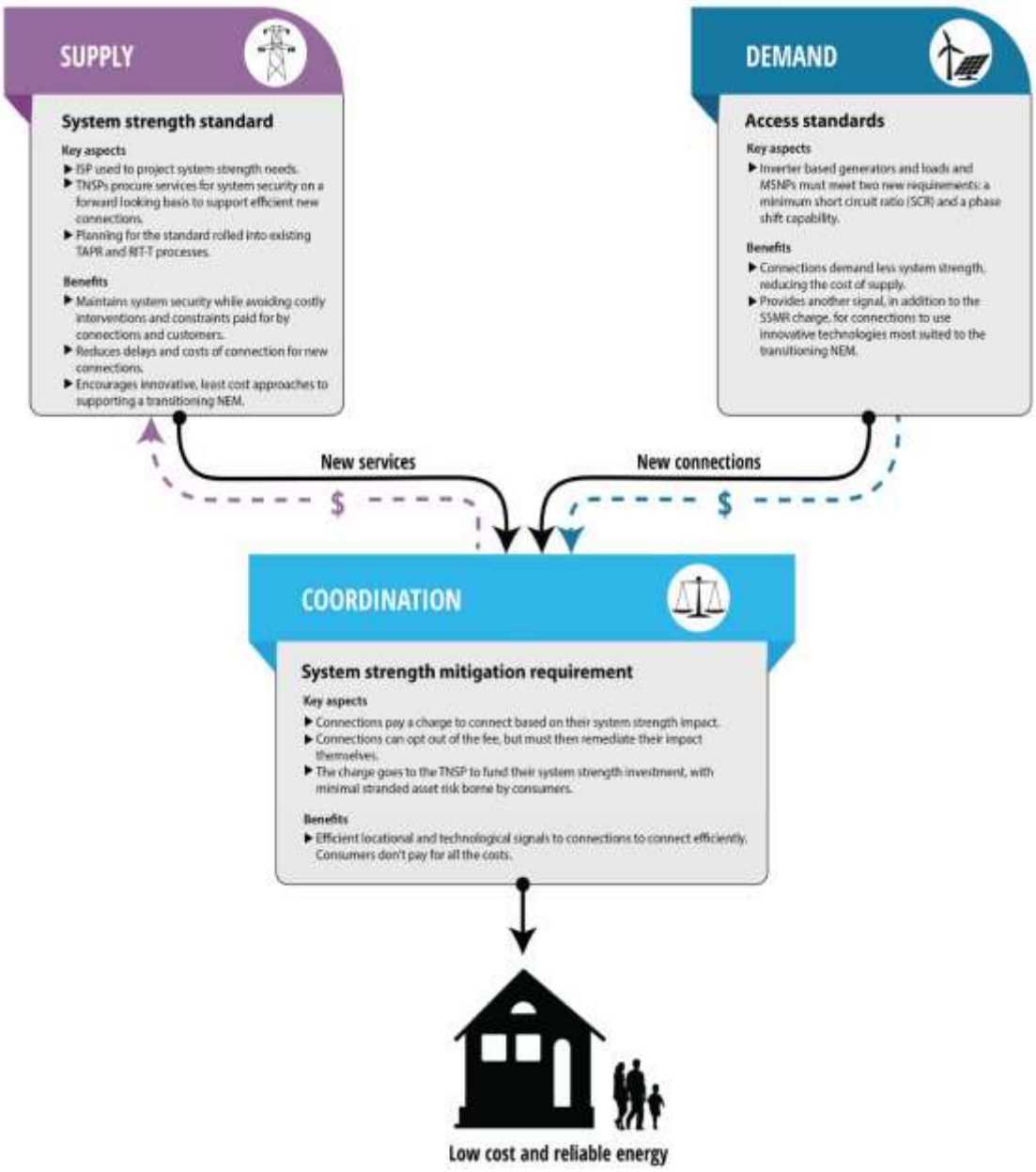
19 AEMO, *Amendments to AEMO instruments for Efficient Management of System Strength Rule, Issues Paper,* April 2022, p. 8.

20 AEMC, *Rule determination: Efficient management of system strength*, 21 October 2021.

Figure 2.1 Overview of the system strength framework in the final rule



Source: AEMC, *Rule determination: Efficient management of system strength*, 21 October 2021, p.14.

2.1.3 Final rule requirements for the pricing methodology guidelines

The final rule requires connecting plants to pay for the costs of 'consuming' the system strength service from system strength providers. Connecting plants would pay a charge based on the long run costs of providing system strength services. This charge is made up of several components including a unit price.

The final rule requires us to update our pricing methodology guidelines and set out the permitted methodologies for determining the unit price. The system strength providers

will then set the unit price in accordance with their pricing methodology, which in turn must comply with our pricing methodology guidelines and the National Electricity Rules (NER**;** Rules).

We discuss this issue further in section 3.

The final rule also requires us to include in our pricing methodology guidelines the principles for determining forecast and estimated annual system strength revenue. These are inputs to the true-up process to account for differences between forecast, estimated and actual annual system strength revenues.

We discuss this issue further in section 5.

Our pricing methodology guidelines must also give effect to and be consistent with the Pricing Principles for Prescribed Transmission Services (pricing principles).[21] The final rule made a number of amendments to the pricing principles in relation to system strength services.

Generally, the amendments made to the pricing principles reflected that system strength transmission services are a prescribed common transmission service, and that system strength service payments are to be treated in the same way as operating and maintenance costs expected to be incurred in the provision of prescribed common transmission services.

The relevant pricing principles which were inserted by the final rule include that:

- The annual service revenue requirement for prescribed common transmission services is to be adjusted by adding system strength service payments (to the extent that those costs or payments were subtracted from the maximum allowed revenue in accordance with clause 6A.22.1);[22]
- In addition to this adjustment, for a transmission network who is a system strength provider, the annual service revenue requirement for prescribed common transmission services for a regulatory year must be adjusted by subtracting the transmission network's forecast of its annual system strength revenue for that year, and adding or subtracting any adjustment arising from the application of clause 6A.23.3A(b);[23]
- A transmission network who is a system strength provider must determine a forecast of its annual system strength revenue for a year, as well as an estimate of its actual annual system strength revenue for the previous year and its actual annual system strength revenue for year t–2 (applying the principles in the pricing methodology guidelines). The calculation of the annual service revenue

[21] NER, cl. 6A.25.1(b)

[22] NER, cl. 6A.23.3(h)

[23] NER, cl. 6A.23.3A(b)

requirement for prescribed common transmission services for the year is to be in accordance with clause 6A.23.3A(b); [24]

- The transmission network must have separate prices for system strength transmission services; [25] and
- Prices for or in respect of system strength transmission services must be determined in accordance with the system strength charge structure set out in clause 6A.23.5 or clause 6A.23.6 (pass through charge), as applicable. [26]

We consider our draft guidelines give effect to and are consistent with the pricing principles.

[24] NER, cl. 6A.23.3A

[25] NER, cl. 6A.23.4(a)(6)

[26] NER, cl. 6A.23.4(h), 6A.23.25, 6A.23.26

3 Pricing based on long run costs

This section explains areas we have consulted on and reflected in the draft guidelines that relate to estimating long run costs.

3.1 Guidance on what constitutes long run

3.1.1 Draft decision

We have reflected a 10 year minimum period for forecasting "long run" costs in our guidance (see section 2.7(a)(2) of the draft guideline).

3.1.2 Reasons for draft decision

We consider specifying a minimum of 10 years is appropriate. As we noted for distribution pricing, there is no ideal or correct timescale that defines "long run". However, the timescale must be long enough to allow a significant number of factors of production to change. We consider a minimum of 10 years captures the essence of "long run".[27]

Stakeholders supported using a minimum forecast horizon of 10 years when calculating the unit price.

Our consultation paper[28] explained how long run cost pricing is different to existing transmission pricing methodologies which allocate transmission networks' AER-approved revenue requirements within a given 5 year regulatory control period (i.e. allocate the annual maximum allowed revenues). It outlined:

- issues associated with forecasting long run costs beyond the 5 year regulatory control period
- potential issues in the system strength provider context specifically
- other relevant and available information sources and their forecast periods, and
- that we have adopted a 10 year minimum period[29] for assessing long run under existing Rules for distribution pricing.

Stakeholder feedback in both our public forum and in written submissions all supported guidance specifying a minimum period for "long run" of 10 years.

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27 AER, *Draft Decision: SA Power Networks Distribution Determination 2020 to 2025: Attachment 18: Tariff structure statement*, October 2019, pp. 34–35.

28 At section 4.1.

29 AER, *Draft decision - Jemena distribution determination 2021-26 - Attachment 19 - Tariff structure statement*, September 2020, pp. 19–44.

In the stakeholder forum, a minimum period of 10 years was supported by several stakeholders including retailers, industry representative bodies and a transmission network. No stakeholders supported a minimum period of longer than 10 years. Another transmission network suggested the period should be flexible and 10 years be the maximum.

Submissions favoured a minimum period of 10 years for a range of reasons, including because it:

- aligns with the forecast periods in AEMO's System Strength report and with transmission networks' transmission annual planning reports[30]
- aligns with the AER's minimum long run definition in distribution network service providers' (DNSP**;** distribution network) tariff structure statements.[31]

3.2 Guidance on permissible long run cost concepts

3.2.1 Draft decision

Our draft decision establishes that long run average cost will be the permitted long run pricing methodology determining unit prices (section 2.7(a)(1) of the draft guidelines).

3.2.2 Reasons for draft decision

Our consultation paper[32] identified that our guidelines may need to adopt either or both of the long run economic cost concepts (marginal cost and/or average cost) commonly used in regulated infrastructure pricing.

We consider establishing average cost as the permitted methodology for determining the unit price is consistent with the requirements of the Rules.[33] We consider the average cost method:

- provides efficient investment and utilisation signals for system strength transmission services. This is because the average cost method:
    - results in stable pricing across system strength charging periods. This in turn would support investor confidence and more optimal location decisions.
    - allocates more of the costs of providing system strength transmission services to the parties that require those services. This in turn reduces the costs to be recovered from customers via prices for prescribed common transmission services (see chapter 5).

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30 AEC, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.1; ENA, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.4; CS Energy, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.2.

31 EnergyAustralia, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.3.

32 At section 4.2.

33 NER, cl. 6A.25.2(h).

- be simpler to administer than the marginal cost method because it uses information that is more readily available.

We discuss our reasons in greater detail below.

3.2.2.1 Consideration of long run cost concepts

Marginal cost pricing of system strength looks at the cost of the next unit of system strength. By contrast, average cost pricing takes the total cost of providing system strength and divides it by the units of system strength. In choosing between these concepts, we are comparing the cost of the next unit to the cost of all units for a given pricing node.

Our consultation paper[34] and public forum discussions compared the two cost concepts by considering:

- how these cost concepts are estimated and the likely relative complexity and effort involved in administering these concepts.
- the circumstances marginal cost and average cost may have different incentive effects, including the incentive implications of relative costs and the scenarios and probabilities.
    1. How different do we expect the outcome of the long run pricing methodologies to be: 1) from each other, and 2) from connecting parties' costs?
    2. What are the benefits of different long run cost methodologies in terms of investment and utilisation incentives, and are there any preconditions for these benefits to be realised?
    3. Which long run cost methodology would support consistent price structures over time?
    4. Implications for the incidence of cost recovery between connecting parties and load customers, and who may be best placed to manage risks associated with system strength services costs and utilisation.

Feedback from both our stakeholder forum and written submissions identified a common preference[35] for adopting the average cost method in our pricing methodology guidelines. No stakeholders in the forum or submissions supported using marginal cost.

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[34] At section 4.2.

[35] AEC, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.2; ENA, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, pp.1 and 4; CS Energy, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.2; EnergyAustralia, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.3.

We agree with EnergyAustralia's submission, which reflect the sentiments of most stakeholder submissions:[36]

> [average cost] pricing should be favoured over a [marginal cost] approach in most cases. This is because [an average cost] methodology would:
>
> - result in stabler pricing, greater investor confidence and more efficient locational investment decisions, especially in situations where…investment in system strength is expected to be lumpy;
> - allocate more of the risk of system strength costs to generators with fewer residual costs having to be borne by transmission customers;
> - avoid the complexities and uncertainties of marginal cost modelling making forecasts likely to be more accurate;
> - be simpler to calculate and apply, thereby being more administratively efficient; and
> - be more consistent with other current transmission pricing frameworks.'

The AEC noted other benefits of using average cost: [37]

- sharper pricing for generators who consume system strength, thus sending a better technological and locational investment signals;
- stronger financial recognition of generators that provide system strength; and
- allocating more system strength costs to causers of strength declines rather than load so fewer residual costs have to be recovered from transmission customers.

Submissions and workshop discussion corroborated our consultation paper scenario considerations.[38] Stakeholders identified that the expected economies of scale and scope available from centrally-procured system strength contemplated in the AEMC's rule making process are likely to hold in most cases. Hence self-provision will likely be higher than both average cost and marginal cost. EnergyAustralia therefore considered a marginal cost approach is not likely to have material efficiency or incentive benefits than an average cost approach.[39]

3.2.2.2 Consideration of consistency across system strength providers

[36] EnergyAustralia, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.3.

[37] AEC, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.2.

[38] See AER, *Consultation paper: Pricing methodology guidelines: System strength pricing*, 22 March 2022, pp. 30–32.

[39] EnergyAustralia, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.3.

Our consultation paper[40] and forum explored whether consistency of unit price pricing method and unit price pricing levels being stable over time were desirable. This covered:

- Consistency in the unit price over time
- Consistency in the long run cost method (average cost versus marginal cost) across system strength providers
- Consistency with other prescribed transmission service pricing
- Whether consistency could adversely affect innovation.

In the stakeholder forum, we asked stakeholders for their views on the relative importance of these consideration. Consistency in the unit price over time was the highest voted consideration. It was also cited in submissions as an important outcome for supporting generation investor confidence and efficient investment decisions.[41]

The ENA submitted that flexibility in pricing system strength services should be factored into the guidelines.[42] We consider our draft guidelines, being principles-based rather than prescriptive, affords flexibility in system strength pricing (as well as forecasting/estimating annual system strength revenues, which we discuss in section 5).

All other submissions stated that system strength providers should not be allowed to use different long run pricing methodologies and that average cost is the most appropriate method.

EnergyAustralia stated it did not consider that having a common long run cost concept prescribed in the guidelines would stymie innovation.[43]

3.2.2.3 Rule considerations

Clause 6A.25.2(h) requires that we have regard to the following matters when specifying or clarifying permitted methodologies for determining the unit price:

(1) the *system strength charge* structure in clause 6A.23.5;

(2) the desirability of providing efficient investment and *system strength transmission service* utilisation signals to actual and potential *System Strength Transmission Service Users* based on the long run cost of providing *system strength transmission services* at the relevant location;

(3) the desirability of consistent pricing structures across the NEM; and

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40 At sections 4.2.3.2 and 5.1.

41 EnergyAustralia, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, pp.1, 4 and 5.

42 ENA, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, , pp. 1 and 5.

43 EnergyAustralia, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.5.

(4) the costs and benefits associated with calculating, implementing and applying the methodology

Having regard to our analysis and stakeholder feedback, we consider these rule considerations are best met by requiring all system strength providers to use the average cost method and to adopt a minimum period of 10 years when forecasting long run costs.

This approach will promote efficient investment and utilisation signals and consistent pricing structures across the NEM.

The use of average cost instead of marginal cost will minimise the costs of calculating, implementing and applying the methodology, with little to no reduction in efficiency benefits. The average cost method can use information that is readily available such as the expenditure and demand forecasts included in regulatory proposals and transmission annual planning reports.

By comparison, the marginal cost method can be more complex to administer and may require the development of additional expenditure and demand forecasts.

For example, a well-known method for estimating marginal cost is the perturbation approach. This method involves estimating forward-looking total operating and capital costs for each year over the forecasting period as a first step. The method then re-estimates the optimised forward-looking operating and capital costs for each year of that period due to a permanent increment or "shock" in demand. The present value of the difference between these two forward-looking costs is then divided by the demand increment applied.[44]

That is, a system strength provider would need to estimate alternative cost scenarios for each system strength node under the perturbation approach.

A further complicating factor is choosing the size of the "shock" in demand. The resulting marginal cost estimates can differ significantly depending on the size of the demand increments or decrements in the calculation.[45] This would be compounded by the uncertainty in the costs of and demand for system strength services in the short to medium term.

We therefore consider there is greater scope for uncertainty and variability in unit prices in the short to medium term under marginal cost approaches. We do not consider this would support efficient investment and location decisions.

The use of a 10 year minimum period for forecasting average cost will minimise the costs of calculating unit prices by allowing system strength providers to draw on a range of existing sources of information.

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44 AER, *Consultation paper: Pricing methodology guidelines: System strength pricing*, 22 March 2022, p. 30.

45 AEMC, *Distribution Network Pricing Arrangements, Rule Determination*, 27 November 2014, p. 129.

This approach will also support consistency in system strength pricing over time, which will be important for efficient investment and utilisation. After connection, generators and inverter-based loads will have limited ability to respond to ongoing pricing signals, whereas expectation of future volatility could distort their upfront connection location and investment decisions. Having a minimum period to represent the long-term and specifying average cost as the permitted long run pricing method will aid consistency in the unit price over time.

4 Annual indexation

4.1 Draft decision

Our draft decision makes provision for the unit price to be updated for indexation for each regulatory year in the system strength charging period (see section 2.7(b) of the draft guidelines). It requires that the basis for indexation is consistent with the approach used for annual inflation indexation of the transmission network's maximum allowed revenue under its revenue determination.

4.2 Reasons for draft decision

The unit price is fixed for the system strength charging period (usually five years) unless the pricing methodology guidelines allow annual indexation for inflation.

Our consultation paper identified that there may be merit in:

- permitting annual inflation indexation of unit prices, and
- adopting the same inflation series the AER uses to index the maximum allowed revenue under the revenue determination from one year to the next.

By maintaining unit prices in real terms, this would prevent the relative real share of system strength provider's revenues coming from system strength charges declining compared to other prescribed transmission services for reasons that are not related to system strength demand.

Stakeholder submissions that responded to this issue supported annual indexation. Further, indexation should be consistent with the annual inflation indexation of the maximum allowed revenue determined in a transmission network's revenue determination.[46]

[46] AEC, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.2; EnergyAustralia, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.5.

5 Revenue forecasting

This section explains areas we have consulted on and reflected in the draft guidelines relating to forecasting/estimating system strength revenues.

5.1 Guidance on annual system strength revenue inputs

Draft decision

Our draft decision requires that the system strength provider's proposed methodologies for determining forecast annual system strength revenue and estimated actual annual system strength revenue must give effect to, and be consistent with, the following principles (see section 2.8 of the draft guidelines):

(1) the methodologies should be reasonable and appropriate for their purpose.

(2) the cost of implementing the methodologies should be proportionate to the expected level of materiality of the impact of any inaccuracy in estimates or forecasts.

(3) the methodologies should utilise relevant existing information to the extent possible, including information from connection agreements and, where relevant, applications to connect.

(4) the methodologies should be consistent with any relevant parts of the system strength requirements methodology and system strength impact assessment guidelines. For example, the system strength provider will need to estimate the locational factor and system strength quantity components of the system strength charge for future connections. We would expect the system strength provider to do so in a manner is consistent with AEMO's guidance on those components.

(5) the methodologies should be consistent with other relevant parts of the transmission network's proposed pricing methodology and the transmission network's approach to other relevant forecasts or estimates. For example, transmission networks already undertake similar estimates and forecasts for the true-up of settlement residue auctions and modified load export charges under clause 6A.23.3 of the Rules.

(6) estimated actual annual system strength revenue should 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.

5.2 Reasons for draft decision

Each year the system strength providers' pricing methodologies will rely upon system strength revenue inputs to apply a true-up process to account for differences between forecast, estimated and actual annual system strength under rule 6A.23.3A. This involves revenues inputs for three years:

- Forecast system strength revenues for the relevant transmission pricing year (year t)
- Estimated system strength revenues for the year before the relevant transmission pricing year (year t–1)
- Actual system strength revenues for the year 2 years prior to the relevant transmission pricing year (year t–2).

The role of these revenue inputs is to determine how much system strength revenue adjustments must occur to the allocated revenues system strength providers will recover from prescribed common transmission services in a given pricing year.

System strength providers will recover—via the system strength charge—some of the costs of providing system strength services from users of those services (such as generators and large inverted based loads).

System strength providers will recover the remainder of system strength costs through charges to transmission customers for prescribed common transmission services. An annual true-up mechanism adjusts this allocation to account for any differences between actual and forecast/estimated system strength revenues. This mechanism ensures the total amount of revenue recovered by the system strength provider does not exceed its maximum allowed revenue.

Our consultation paper and public forum:

- explored the purpose and consequences of accuracy in these revenue inputs under a transmission networks' revenue cap
- outlined for feedback relevant principles for guidance on these inputs.

Stakeholders in the public forum supported a principled rather than prescriptive approach to revenue input guidance.

The only stakeholder who submitted on this issue supported the principles articulated in our consultation paper.[47]

We agree that the guidelines should contain relatively high-level principles on this issue rather than prescriptive requirements. Any difference between estimated or forecast system strength revenue and actual system strength revenue is unlikely to have a material impact on overall transmission prices for customers given the small size of system strength revenue relative to the transmission network's total maximum allowed revenue.

[47] EnergyAustralia, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.5.

6 Information requirements

6.1 Guidance on information required to be included in a proposed pricing methodology

6.1.1 Draft decision

Our draft decision provides guidance on the information a transmission network must include in its proposed pricing methodology to demonstrate that it complies with the Rules and guidelines (see section 2.1(j) to (l) of the draft guidelines). We also made a number of minor consequential changes to section 2.1 of the guidelines.

6.1.2 Reasons for draft decision

Section 2.1 of our current guidelines sets out a comprehensive list of the information a transmission network must include in its proposed pricing methodology.

We updated this section of the guidelines to include the information a transmission network must include in its proposed pricing methodology to demonstrate compliance with the rules and our draft guidelines. This approach will make it easier for transmission networks and us to check that a proposed pricing methodology complies with all of the relevant regulatory requirements.

This guidance is relevant to system strength providers and also to transmission networks who are not system strength providers.

The proposed information requirements applying to system strength providers are based on the various new requirements applying to them under the Rules as well as the long run costs, indexation and revenue forecasting aspects of our guidelines discussed above.

The proposed information requirements applying to transmission networks who are not system strength providers relate to the new Rules requirement that their pricing methodology must provide for a charge for each system strength connection point on their transmission network. These charges would recover on a pass through basis the annual system strength charge determined by the relevant system strength provider.[48]

Stakeholder submissions did not address the issue of what amendments should be made to this part of the guideline.

In a separate process prior to submission, we will request system strength providers to include in their proposals additional information that support their proposed pricing methodology. Such information may include

- sources for cost and demand forecasts for system strength services.

[48] NER clause 6A.23.6(b).

- the model(s) utilised to determine the system strength unit price for each system strength node on its transmission network for the system strength charging period.
- reports, including consultant reports.

6.2 Guidance on confidential information

6.2.1 Draft decision

Our draft decision does not amend the existing section 2.5 for treatment of confidential and commercially sensitive information.

6.2.2 Reasons for our draft decision

Our consultation paper sought feedback on potential circumstances where revenue inputs may be commercially sensitive to parties who are liable to pay system strength charges. It explained that section 2.5 of our existing pricing methodology guidelines sets out guidance on information disclosure, including the treatment of confidential or commercially sensitive information. This includes treatment of information that may be commercially sensitive to a transmission customer.

The only stakeholder who submitted on the issue of adequacy of existing confidential information guidance considered the existing provisions were sufficient.[49] No other concerns with the treatment of confidential or commercially sensitive information were raised.

[49] EnergyAustralia, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.5.

7 Issues not addressed in the guidelines

This section explains matters we consulted on but where our assessment and/or stakeholder feedback has not required any further guidance in the draft guideline.

7.1 AEMO as Victoria's system strength provider

In Victoria, responsibility for providing prescribed transmission services is split between AEMO and declared transmission system operators such as AusNet Services.

Under the Rules, AEMO is the system strength provider for Victoria. AEMO is therefore responsible for meeting the new system strength standard, planning for and providing system strength services and setting the unit price in Victoria.

Our consultation paper and public forum set out:

- How AEMO is expected to provide system strength services by contracting with declared transmission system operators or providers of non-network solutions
- Differences between AEMO and other system strength providers, and asked whether those differences warranted specific amendments to our pricing methodology guidelines for AEMO.

At the public forum, stakeholders considered guidelines which are principles-based and are not too prescriptive should adequately cover differences between Victoria and other jurisdictions.

Written submissions also did not consider AEMO should be treated differently to other system strength providers.[50]

We have also met with AEMO to discuss this issue. To date, AEMO has not indicated the pricing methodology guidelines requires provisions that account for their particular arrangements.

Accordingly, our draft guidelines do not contain any provisions that modify their application in Victoria. This is consistent with the approach to other issues in the current guidelines.

7.2 Matters affecting system strength provider's revenue determinations for system strength cost recovery

[50] AEC, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, pp.2-3, EnergyAustralia, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.6; CS Energy, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p.3.

The pricing methodology guidelines must specify or clarify principles for determining forecast annual system strength revenue for the relevant pricing year (year t) and forecast and estimated actual annual system strength revenue for prior years for the purpose of administering the annual true-up mechanism.

These are forecasts of the revenues earned from the system strength charge. They are used to administer the system strength provider's annual tariff setting and demonstrate compliance with the transmission pricing requirements of the Rules. Section 5 contains our detailed consideration of this issue.

This is not the same as forecasting required revenues for the purpose of determining allowed cost recovery. The existing prescribed transmission services regulatory framework—including the AER revenue determination, RIT-T and contingent project processes—will be used to regulate the system strength provider's maximum regulated revenues.

In the public forum and some submissions, some stakeholder raised matters that are considerations for revenue determinations and not the pricing methodology guidelines. For example, CS Energy suggested we explore the potential impact of over-procurement of system strength services on consumers in order to minimise this risk.[51] We will consider these matters when making the relevant transmission network's revenue determinations.

7.3 Other issues raised in submissions

In its submission, ENA noted:[52]

> This tight timeframe and the paucity of cost data that will be available when initial prices are set further highlights the need to provide flexibility in the pricing arrangements to the extent permissible by the Rules... It is highly likely, therefore, that significant revisions to prices will be required at the end of the first 5 year period.
>
> ENA therefore considers that the AER's guidelines should recognise the likely improvement in cost information that will emerge during the first regulatory period, rather than expecting prices to be 'locked in' for an extended period

CS Energy noted:[53]

> CS Energy suggests there be provision for a review within a five-year regulatory period in the event of a material divergence between expected and actual uptake of system strength services to reduce the potential costs on consumers. The outcome of
>
> the review may result in changes to the forecast for the next period or pricing methodology improvements, resulting in a reduction of system strength costs allocated

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51 CS Energy, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p. 3.

52 ENA, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, pp. 5-6.

53 CE Energy, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p. 3.

> to consumers and minimising the volume of underutilised or stranded system strength services.

These submissions are consistent with the comments in our consultation paper where we noted a range of reasons that may require the approach to system strength charging to evolve over time. Recognising these considerations, the draft guidelines do not take a highly prescriptive approach. Rather, the draft guidelines provide system strength providers flexibility to adjust their approach between five year system strength charging periods. This would enable them to adapt as more information becomes available about the costs and demand for system strength services and as technology for system strength services evolves. We may also review our guidelines in future if needed.

However, the Rules do not allow unit prices to be adjusted within a system strength charging period other than for indexation.

ENA also submitted that:[54]

> the AER's guidelines should provide sufficient flexibility for [transmission networks] to 'meet the market' by discounting published prices if there is an economic case for doing so. ENA acknowledges that the Rules may not permit a discounting approach, in which case the AER's guidelines should provide flexibility to the extent permissible by the Rules. For example, this may include adopting a pricing approach that has regard to the connecting parties' likely costs in self-sourcing SSS, rather than focusing narrowly only on the [transmission network's] costs.

We have not permitted such discounts in the draft guideline as it would not be consistent with the Rules. The Rules provide that the unit price be based on the long run costs of providing system strength services at the relevant location. The AEMC also determined that system strength charges should be excluded from the prudent discount arrangements in clause 6A.26 of the Rules.

The AEC's submission raised inter-regional issues related to system strength, noting:[55]

> Where system strength nodes may be impacted by investments in neighbouring regions, the obligation should be jointly shared between the relevant SSS Providers rather than relying on joint planning to ensure costs are appropriately attributed to the parties consuming system strength.

We have not addressed this issue in our guidance. The Rules set out system strength providers' obligations and the approach to planning, including joint planning arrangements, and are not within the scope of our guidelines. AEMO's recent issues

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54 ENA, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, p. 6.

55 AEC, *Submission on pricing methodology guidelines 2022 consultation paper*, 26 April 2022, pp. 2–3.

paper on amendments to its instruments related to system strength addresses some inter-regional issues.[56]

[56] AEMO, *Amendments to AEMO instruments for Efficient Management of System Strength Rule, Issues Paper,* April 2022.

A Acronyms and shortened forms

Shortened form	Extended form
AEC	Australian Energy Council
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
DNSP	Distribution network service provider
ENA	Energy Networks Australia
IBR	Inverter based resources
LRAC; average cost	Long-run average cost
LRMC; marginal cost	Long-run marginal cost
MAR	Maximum allowed revenue
MVA	Megavolt amperes
MW	Megawatt
NEM	National electricity market
NER	National electricity rules
TNSP; transmission network	Transmission network service provider
SSIAG	System strength impact assessment guidelines
SSL; locational factor	System strength locational factor
SSSP; system strength provider	System strength service provider
SSQ	System strength quantity
SSUP; unit price	System strength unit price

B Background

This section:

- Outlines key elements of the AEMC's final rule and how it interacts with existing transmission pricing, and describes key terms used in this paper.
- Explains the scope of the amendments to our guidelines that are required by the system strength rule change.
- Identifies interdependencies with tasks being done by AEMO and tasks required of affected transmission networks.

B.1 The system strength rule change

B.1.1 Background to the rule change

Historically, fault level (measured in MVA) in the electricity power system has been used as the proxy unit of measurement for system strength. However, this only captures one aspect of system strength. AEMO currently defines system strength as:[57]

> *"the ability of the power system to maintain and control the voltage waveform at any given location in the power system, both during steady state operation and following a disturbance."*

A decline in system strength in the National Electricity Market (NEM) has been noticed over the last several years as inverter-based generation replaces synchronous generation output.

B.1.2 Key elements of the AEMC's final rule

On 21 October 2021, the AEMC made a final rule establishing a new framework to facilitate the proactive provision of system strength where it is needed in the network.[58] A key finding of the rule making process was that transmission networks were best placed to identify options for system strength provision and to leverage economies of scale for efficient delivery of those options. One transmission network in each NEM region is designated as the system strength provider for that region.

The final rule implemented a three-part approach to providing efficient levels of system strength (summarised earlier in Figure 2.1).

Implementing the above reforms involves the following key actions by participants and market bodies:

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[57] AEMO, *Amendments to AEMO instruments for Efficient Management of System Strength Rule, Issues Paper,* April 2022, p. 8.

[58] AEMC, *Rule determination: Efficient management of system strength*, 21 October 2021.

- **AER:** will update the transmission pricing methodology guidelines, and review and assess cost recovery applications via the existing processes (including revenue determinations, contingent projects and pass throughs).
- **AEMO:** will update its system strength impact assessment guidelines (SSIAG**;** impact assessment guidelines) and its system strength requirements methodology and publish an annual system strength report. In accordance with these documents, AEMO will:
    - specify the number and location of system strength nodes
    - forecast the future IBR connections for each system strength node
    - set the three-phase fault level required for a secure system at each node.
- **System strength providers:** will need to update their transmission annual planning reports for their plans to meet the system strength standard, seek AER cost recovery for their planned activities to meet the standard, and update their pricing methodologies to include system strength pricing.
- **Transmission networks and distribution networks who are not system strength providers:** must implement the system strength charges from the system strength provider for their region to connections on their networks who face the system strength charge, including:
    - Transmission networks who are not system strength provider but who have system strength connection points on their network (i.e. Ausgrid and AusNet Services) will need to submit updated pricing methodologies to the AER by 30 November 2022.
    - Distribution networks' pricing proposals from 2023 onwards must explain how they will pass through system strength charges in a manner that replicates the amount, structure and timing of the relevant system strength provider's system strength charge as far as is reasonably practicable.[59]

B.1.3 Final rule requirements for the pricing methodology guidelines

The final rule requires connecting plants to pay for the costs of 'consuming' the system strength service that system strength providers provide. Connecting plants would do this by paying a charge based on the long run costs of providing system strength services. This charge is intended to better coordinate the supply and demand of system strength by efficiently charging the parties for their use of centrally supplied system strength. This charge is made up of several components as explained below including the unit price.

[59] NER clause 6.18.2(b)(6C).

The final rule requires us to update our pricing methodology guidelines and set out the permitted methodologies for determining the unit price. The system strength providers will then set the unit price in accordance with their pricing methodology, which in turn must comply with our pricing methodology guidelines.

The final rule also requires us to include in our pricing methodology guidelines the principles for determining forecast annual system strength revenue and estimated actual annual system strength revenue. These are inputs to the true-up process to account for differences between forecast, estimated and actual annual system strength revenues.

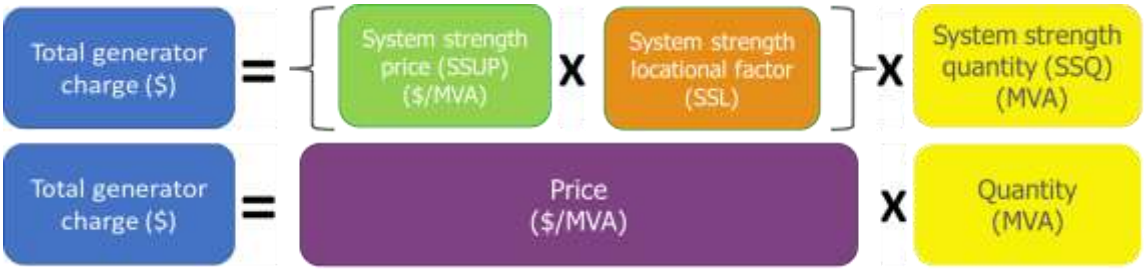
There are also several other issues that the final rule allows us to address in our pricing methodology guidelines, including the method for indexation of the unit price.

B.1.4 Prescribed structure of the system strength charge

The final rule prescribed both the structure of the new system strength charge and who would be responsible for determining the guidance, calculations and key input forecasts required to administer it.

Figure B.7.1 shows the system strength charge structure prescribed in the rules.

Figure B.7.1 Prescribed components of the system strength charge



Source: AEMC, *Rule determination: Efficient management of system strength*, 21 October 2021, p.25.

The prescribed component parts of the system strength charge are:

System strength unit price (SSUP; unit price) in $/MVA for the relevant system strength node is the unit price for system strength procured from a given system strength provider.

The AER's pricing methodology guidelines will specify permitted methodologies for determining the unit price component of the charge following the principles set out in Rules clause 6A.25.2(h).

The unit price must be included in a system strength provider's transmission pricing methodology and must be shown to comply with the permitted pricing methodologies and any information requirements set out in the AER's pricing methodology guidelines.

The unit price is fixed for the duration of each system strength charging period, which is usually five years, subject to annual indexation (see section 4).[60] Although the unit price is fixed, the total generator charge is variable as it is impacted by the relative system strength quantities (MVA).

System strength locational factor (SSL; locational factor) is the relative electrical distance from the closest system strength node for a newly connecting generator or load, calculated as the ratio of the:

- additional fault level needed at the nearest system strength node to restore the available fault level at the connection point to the pre-connection level, and
- system strength quantity requirement of the connecting party plant.

The relevant network service provider will calculate the locational factor for each connection, drawing on AEMO guidance in its impact assessment guidelines. The relevant network service provider will update the locational factor at the start of each system strength charging period to account for any changes to the network.

System strength quantity (SSQ) is the expected consumption of the service (calculated as MVA/MW x MW) by the party connecting to the grid, which will be estimated from:

- the size of the connecting plant in MW, and
- its short circuit ratio (SCR) as determined by the relevant SCR access standard.

AEMO will provide guidance through its impact assessment guidelines, and the relevant network service provider would use this guidance to calculate this component for each connection. The system strength quantity is fixed at the time of connection unless alterations to the connected plant require an update to the agreed performance standards.

B.1.5 Interaction with existing transmission network pricing methodologies

The AEMC's final rule also set out arrangements for how the costs of system strength service provision would be recovered from both system strength charges and existing prescribed transmission services.

At a high level, these arrangements specified that:

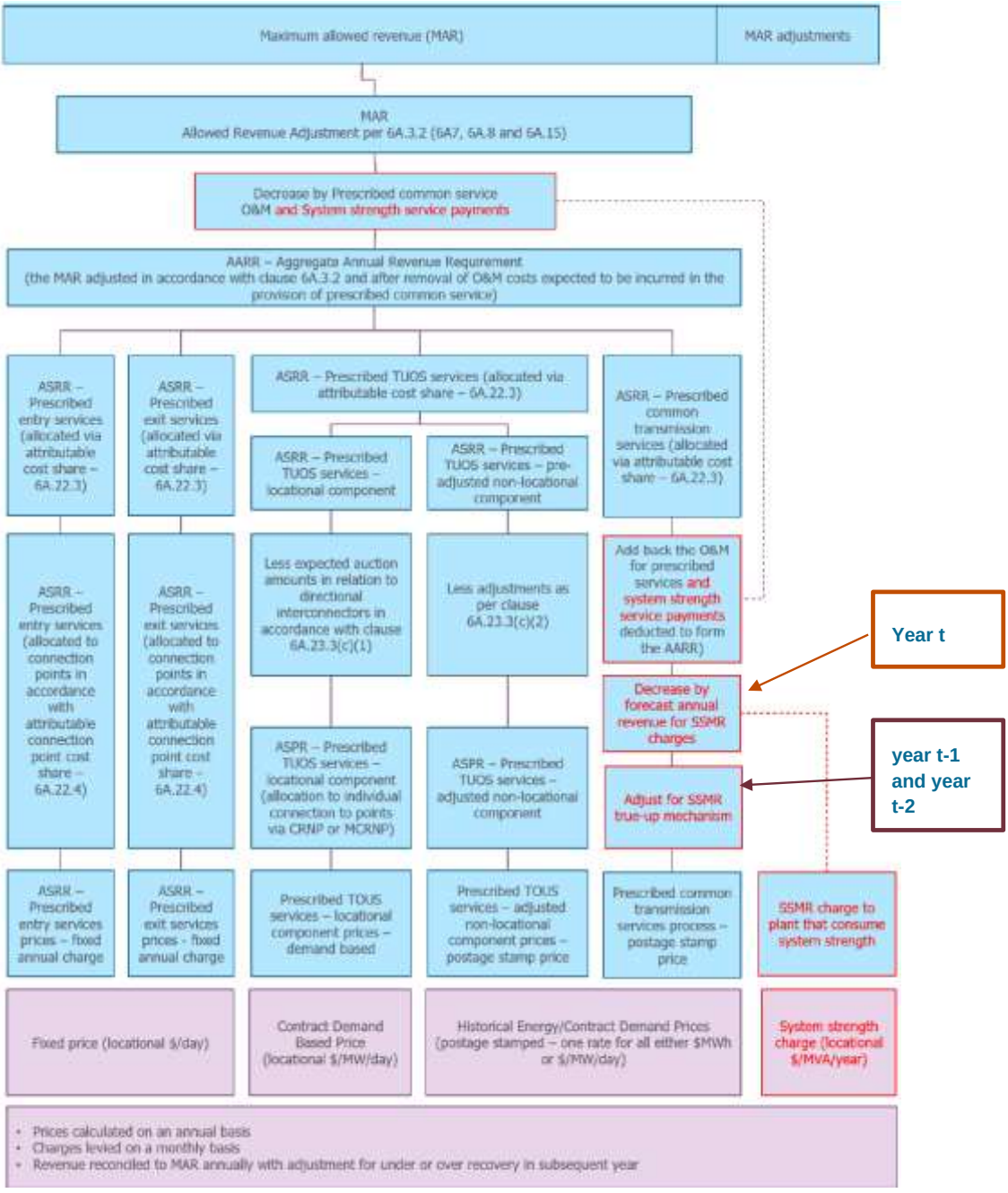
- system strength charges would reflect the system strength provider's estimated long run costs of service provision

[60] Each system strength charging period runs from the start of the second regulatory year in a regulatory control period of the system strength provider to the end of the first regulatory year in its next regulatory control period – see clause 6A.23.5(b).

- the costs of providing system strength, after deducting forecast revenues earned from system strength services and any true-up thereof, will be allocated to prescribed common transmission services and recovered from transmission customers on a postage stamp basis.

The AEMC illustrated this via the following figure.

Figure B.7.2 How system strength pricing interacts with existing transmission pricing



Source: AEMC, *Rule determination: Efficient management of system strength*, 21 October 2021, p. 181.

Note: Figure B.7.2 shows that system strength providers must forecast system strength revenues for year t, and true-up estimated and actual revenues from years t–1 and t–2, respectively. We discuss these issues in section 5.

B.2 Scope of the AER's guidance task

The AEMC's final rule requires the AER to modify the transmission pricing methodology guidelines for two new requirements:[61]

> The *pricing methodology guidelines* must specify or clarify:
>
> (h) permitted methodologies for determining the *system strength unit price* component of the *system strength charge*, having regard to the following:
>
> (1) the *system strength charge* structure in clause 6A.23.5;
>
> (2) the desirability of providing efficient investment and *system strength transmission service* utilisation signals to actual and potential *System Strength Transmission Service Users* based on the long run cost of providing *system strength transmission services* at the relevant location;
>
> (3) the desirability of consistent pricing structures across the NEM; and
>
> (4) the costs and benefits associated with calculating, implementing and applying the methodology; and
>
> (i) principles for determining forecast *annual system strength revenue* and estimated actual *annual system strength revenue*.

B.2.1 What the pricing guidance must cover

B.2.1.1 Permitted pricing methodologies for system strength

The pricing methodology guidelines must specify or clarify the permitted methodologies for determining the unit price component of the system strength charge.

These methodologies may differ from transmission networks' existing methodologies because those methodologies are required to allocate the maximum allowed revenue based on full cost recovery to the various types of prescribed transmission services.

[61] NER clauses 6A.25.2(h) and 6A.25.2(i). Note, clause 6A.25.2 sets out the required contents of the pricing methodology guidelines.

In contrast, provide for the permitted pricing methodologies for system strength to be based on the long run cost of providing system strength transmission services at the relevant location. They are not based on transmission networks' regulated maximum allowed revenues and, as such, will not be based on the same fully allocated cost approach currently used for other services.

We discussed this issue further in section 3.

B.2.1.2 Forecasting system strength revenue

The pricing methodology guidelines must specify or clarify principles for determining forecast annual system strength revenue for the relevant pricing year (year t) and estimated and actual annual system strength revenue for prior years for the purpose of administering the annual true-up mechanism.

These are forecasts of the revenues earned from the system strength charge. They are used to administer the system strength providers' annual tariff setting and maximum allowed revenue compliance. We discussed this issue in section 5.