2023-27
POWERLINK QUEENSLAND REVENUE PROPOSAL

Appendix 16.02 – PUBLIC

Transmission Pricing Consultation Paper

Transmission Pricing Consultation Paper

26 July 2019

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1. Executive Summary

As Queensland's provider of high voltage electricity transmission services, Powerlink is continually pursuing opportunities to improve in the delivery of safe, cost effective and reliable electricity services.

We recognise affordability remains a key concern for our customers - our large-scale directly-connected customers and more than four million Queenslanders. We consider it vital that all parts of the electricity system, including transmission, play their role in trying to address affordability concerns and put downward pressure on prices.

Feedback from customers directly connected to our network is that they generally support pricing signals that better reflect the costs of using the transmission network at different times and in different locations. We know our customers are changing the way they use Powerlink's network, as transformational changes take place throughout the electricity system. The challenge for Powerlink is to find ways to adapt to the changing environment and deliver our transmission services to meet customer expectations at the lowest long run cost.

In response to customer input and changing expectations, Powerlink is reviewing its transmission pricing arrangements. This Consultation Paper is a key mechanism for Powerlink to proactively engage with customers and stakeholders as part of this process and gain valuable input that will ensure any future pricing arrangements deliver optimal outcomes across our diverse customer base.

Specifically, this Consultation Paper outlines proposed pricing criteria and alternative pricing options for this review. The proposed criteria and options seek to enhance the role of transmission pricing arrangements by:

- providing stronger signals to customers to encourage more efficient use of the network and, therefore, lower future network costs; and
- enabling customers to reduce their costs by changing their network usage.

This Consultation Paper follows initial engagement with our Customer Panel, Energy Queensland (Energex and Ergon Energy), other Transmission Network Service Providers (TNSPs) and various other stakeholders through a webinar on pricing.

We are seeking input on this paper from customers and stakeholders by **6 September 2019**.

As a founding member of the Energy Charter, Powerlink is committed to acting in accordance with Charter Principles. This Consultation Paper and Powerlink's approach to reviewing its Pricing Methodology aligns with Principles 1 and 2 of the Charter regarding putting customers at the centre of our business and the energy system and improving energy affordability for customers.

2. Purpose

The purpose of this Consultation Paper is to:

- seek initial input and guidance on potential areas of transmission pricing arrangements to be examined;
- identify where we could deliver better value and outcomes for our customers through improved pricing arrangements that are transparent, fit-for-purpose, promote more effective use of our network assets and lower costs for customers in the future; and
- provide our customers and interested stakeholders with information about transmission pricing arrangements to support engagement during this first stage of consultation.

A key benefit of the review timing is that any alternative pricing arrangement requiring a Rule change can be considered, proposed and potentially determined by the National Electricity Rule maker, the Australian Energy Market Commission (AEMC), prior to the start of Powerlink's next regulatory period (starting 1 July 2022). This process will also help inform Powerlink's proposed Pricing Methodology for the next regulatory period. Any proposed change to Powerlink's Pricing Methodology must be assessed and approved by the Australian Energy Regulator (AER) and can only take effect from the start of Powerlink's next regulatory period.

Efficient pricing arrangements will signal efficient network reinvestment and investment with the objective of reducing overall costs and prices into the future. However, any change to the current prescribed pricing arrangements will result in a rebalancing of payments between customers. Pricing mechanisms which support customers remaining connected and contributing to the cost of the grid should benefit all customers over the long term.

Scope

The table below outlines the items within and outside the scope of this review, as well as the relevant regulatory instruments.

Within scope	1. Powerlink's prescribed transmission pricing arrangements, which are subject to regulation by the Australian Energy Regulator (AER). This includes: • shared transmission services; • entry services; • exit services; and • common services. 2. Potential changes within the existing regulatory arrangements, as well as whether there is a clear and demonstrated need to change the current Rules and/or Powerlink's approved Pricing Methodology.
Relevant regulatory instruments	1. The National Electricity Rules (the Rules); 2. The AER's Pricing Methodology Guidelines; and 3. Powerlink's approved Pricing Methodology which determines how Powerlink collects its prescribed revenue from customers.
Out of scope	Powerlink's total revenue for providing prescribed transmission services determined by the AER through the revenue determination process.

Background and context

We recognise the complexity of transmission pricing arrangements can make it difficult for interested parties to fully engage on these matters. In preparing this paper we aimed to strike a balance between discussing transmission pricing issues in a readily understandable way and providing sufficient detail to ensure engagement is meaningful. To assist in understanding transmission pricing arrangements, we have included:

- **Appendix 1** – which provides a glossary of common terms; and
- **Appendix 2** – which provides a detailed overview of the current pricing arrangements.

As we progress through this review, further information will be provided and there will be additional opportunities for stakeholders to provide input and feedback. This may include information on relevant external consultations, in particular any interaction between the Australian Energy Market Commission's (AEMC) Coordination of Generation and Transmission Investment (COGATI) implementation review and this consultation.

Timeframes

Powerlink intends to conduct its review over the next 12 to 18 months. The timeframes below are indicative only and may be extended based on the level of feedback provided at each stage, the level of subsequent analysis that may be required to prepare for the next stage and the types of engagement to be undertaken. We will consult with stakeholders and customers following the release of our paper.

Indicative Timeframe	Activity
26 July 2019	Consultation Paper published
6 September 2019	Submissions close on Consultation Paper
Q4 2019	Preliminary Positions Paper
Q1 2020	Submissions on Preliminary Positions
Q2 2020	Draft Positions Paper
Q2 2020	Submissions on Draft Positions
Q3 2020	Final Positions Paper

Input and Feedback

Powerlink is seeking input and feedback on the following questions:

Consultation aspect	Questions	Relevant section/s
Engagement	1. How would you like us to engage with you as part of this review?	Chapter 3
Proposed Pricing Criteria	2. Is the proposed criteria appropriate for this review? If not, what alternative or additional criteria do you propose and why? If you were to rank the criteria which would you rank highest and lowest?	Chapter 4
Proposed Pricing Options	3. Should Powerlink further investigate any or all of the proposed pricing options identified and, if so, what further work may be required? 4. Are there any other alternative transmission pricing arrangements that should be investigated and why?	Chapter 5

Submission process

Powerlink seeks feedback on matters raised and questions asked in this paper by close of business **6 September 2019**. Feedback can be provided via:

Email: pqpricing@powerlink.com.au

If you have any further questions please send them to the email address above or call Powerlink on (07) 3860 2111 and ask to speak with Ben Wu.

Powerlink is committed to an open and transparent engagement process. With this approach in mind, Powerlink intends to publish the submissions received on its website, unless the response is marked as 'confidential'.

3. Engagement

Powerlink sought early input to the preparation of this Consultation Paper via:

- our Customer Panel, which comprises customers directly connected to our network, consumer advocates and industry representatives;
- an open webinar, attended by approximately 14 customer representatives;
- discussions with network businesses to understand ways to better align the structure of transmission charges with distribution tariffs; and
- engagement with other TNSPs through our key national body Energy Networks Australia (ENA) to identify if other TNSPs had commenced similar work and whether they had any input on Powerlink's consultation.

Table 1 outlines key areas of feedback received from the above consultation.

Table 1 Feedback Summary

Theme	Summary of feedback	How feedback has/will be used
Powerlink Transmission Pricing Review	Supported the review but suggested that stakeholder expectations needed to be managed (e.g. real impacts of change)	This paper has clarified: - the scope of the review - that any change will impact different customers in different ways and - that further input will be sought at subsequent stages of the review.
Pricing Criteria	Some stakeholders believed fairness and equity must be considered. Others thought the proposed criteria were inconsistent.	We have proposed the same initial criteria for feedback and have acknowledged there may be potential trade-offs.
Existing Pricing Arrangements	Sought information on the problems/shortcomings of existing arrangements.	We have included information on current transmission pricing arrangements (see Appendix 2).
Rule Changes	Sought further clarity on which arrangements would require a Rule change.	Table 3 sets out our preliminary view on which options would require a Rule change.
Other Market Reviews	Asked how Powerlink's review would interact with other Rule changes/reviews currently underway (e.g. coordination of transmission and generation investment (COGATI) review).	Powerlink is providing input to the current COGATI consultation process. Powerlink will consider COGATI and other relevant reviews in progressing this consultation.
Engagement Approach	Stakeholders proposed that a variety of approaches could be used as required, e.g. broad engagement, face-to-face meetings, regular updates on progress and an educational piece on pricing arrangements.	We will engage in a fit-for-purpose and constructive way informed by our stakeholders and customers. Powerlink is currently working with our customers to develop an engagement approach for the upcoming regulatory determination process. We will develop and circulate further high-level customer material on transmission pricing in coming months.

4. Proposed Pricing Criteria

Key points

- Powerlink intends to utilise holistic pricing criteria to assist in understanding what our customers value and to ensure we are customer focussed in the assessment process.
- Powerlink has proposed three pricing criteria:
    - equity/fairness;
    - price stability and transparency; and
    - efficient price signals.

4.1 Introduction

Economic and regulatory principles indicate that transmission prices should be cost reflective. The challenge is to provide price signals that reflect the marginal costs of using the network, while also recovering the costs associated with past investments.

Powerlink acknowledges that any change to our current pricing arrangements will require some rebalancing of transmission charges between our customers.

However, it is important to recognise that changes which deliver more efficient transmission pricing arrangements will inform optimum investment and should result in all customers ultimately being better off in the long-term.

4.2 Proposed pricing criteria

To help guide our assessment and discussion of any alternative pricing arrangements, Powerlink has proposed the following pricing criteria:

- equity/fairness;
- price stability and transparency; and
- efficient price signals.

Table 2 Proposed Pricing Criteria

Proposed Pricing Criteria	Description
Equity and fairness	Equity – transmission prices should apply to all network users based on the services provided to them Fairness – transmission prices should be fairly applied and allow for transitional arrangements where network users face significant price impacts resulting from changes to pricing arrangements
Price stability and transparency	Price stability – Transmission prices should be sufficiently stable to enable network users to make informed investment decisions with a level of confidence Transparency – Transmission prices should be sufficiently transparent to enable network users to understand how prices are derived
Efficient price signals	Transmission prices should provide efficient signals to inform network users about how their use of transmission services affects existing and future network investment and costs.

We recognise the proposed criteria are inter-related and that there are likely to be trade-offs between each. For example, certain pricing options may be more efficient in terms of reflecting peak usage of the network. However, this may result in less stability in the actual transmission charges borne by customers over time.

While some trade-offs between criteria is inevitable, we consider that it is still useful to have an identified set of criteria to provide a more objective basis for comparison. Ultimately, we will need to balance the 'pros and cons' of one option against the other.

5. Pricing options and issues for consultation

Key points

- Powerlink has identified a number of alternative pricing arrangements for consideration. These options have been grouped into four main areas:
  - alternatives to Cost Reflective Network Pricing (CRNP);
  - improving how transmission customers are charged;
  - peak and off-peak pricing; and
  - other initiatives to deliver customer benefits.
- This Paper discusses the alternative pricing approaches to inform the consultation at this stage.
- The options will be expanded in terms of detail as this consultation progresses.
- Powerlink must comply with the Rules in terms of its Pricing Methodology. Powerlink is willing to pursue changes to the Rules if there is a case for an alternative pricing arrangement that would deliver better customer value and outcomes.

5.1 Introduction

In 2015, Powerlink conducted a review of its prescribed transmission pricing arrangements for input to its proposed Pricing Methodology for the current (2017-22) regulatory period. This involved engagement with Powerlink's Customer Panel, additional customers directly connected to Powerlink's network and other key stakeholders, including some large customers connected to the Queensland distribution networks, and TNSPs. As customer and stakeholder feedback at that time was mixed, Powerlink decided not to propose any material changes at that time.

This chapter includes options previously presented in 2015 as well as a number of potential new arrangements for consideration. Before addressing each of these, it is important to note that any change in Powerlink's Pricing Methodology will impact customers differently and potentially require rebalancing of payments between customers.

For customers directly connected to the transmission network, the impact of changes to prescribed transmission charges will vary depending on the location of their connection, as well as the individual customer's demand profile and electricity usage. The impact of such changes on these customers is likely to be more material in terms of the delivered transmission cost of electricity compared to residential customers where transmission charges are about 7% of an average residential customer's electricity bill in Queensland.

This chapter discusses a number of potential options to enhance transmission pricing signals at a conceptual level only. No modelling of potential customer impacts has been performed at this stage.

5.2 Regulatory Requirements

The Rules essentially require an allocation of a TNSP's total allowed revenue to four different categories of transmission services. The pricing arrangements must comply with the Rules and the AER's Pricing Methodology Guidelines. Powerlink is open to proposing Rule changes if there is a case for an alternative pricing arrangement that would deliver better customer value and outcomes.

5.3 Summary of options

We have grouped the proposed transmission pricing options into four main areas, as identified below. These options are not necessarily mutually exclusive and we will need to consider interactions between alternatives as we progress through this consultation. A glossary of terms is provided in Appendix 1.

Table 3 Alternative Transmission Pricing Options

Pricing Area	Options	Impacted Prescribed Charges	Rule Change Required*
Alternatives to CRNP (Cost Reflective Network Pricing)	Modified CRNP	Locational charges, non-locational charges	No
	Long Run Marginal Cost	Locational charges, non-locational charges	Yes
	Rebalancing between locational and non-locational components	Locational charges, non-locational charges	No
Improving how Transmission customers are charged	Locational charges determined on a peak demand basis only (average demand component removed)	Locational charges	No
	Postage stamped charges all demand based	Non-locational charges, common charges	No
	kVA charging	Locational charges and/or non-locational charges, common charges	Yes
Peak and Off-Peak Pricing	Removing penalties for exceedance	Locational charges	No
	Applying specific operating periods for locational charging	Locational charges	No
Other initiatives	Timing of provision of pricing information	All charges	No
	Offering more predictable transmission prices	All charges	Will depend on implementation

**Preliminary Powerlink views on whether a Rule change would be required. Ultimately, this will depend on the precise nature of the proposed amendment to the Rules.*

5.4 Alternatives to Cost Reflective Network Pricing

5.4.1 Modified CRNP

The Rules currently allow for locational prices to be calculated using either the CRNP methodology or modified CRNP methodology to derive the proportionate use of the relevant transmission assets.

The CRNP methodology is an allocation process under the Rules[1]. This process allocates locational revenue to be collected from each location on the transmission network based on the use of shared transmission assets, such as substations, lines and transformers.

All TNSPs use the AER-approved T-PRICE software to determine the CRNP locational amounts to be recovered at connection points. Both CRNP and Modified CRNP involve the TNSP running the T-PRICE software to allocate costs to connection points by modelling electricity flows in the network. The key difference between the two approaches is that when allocating revenue, CRNP does not adjust for utilisation at each connection point, whereas modified CRNP does.

Modified CRNP therefore recognises that transmission prices should be lower in locations where there is spare capacity, and higher in locations where there is less or no spare capacity[2]. As noted by the AEMC, this should encourage more efficient locational decisions as, all other things being equal, load will be encouraged to increase in areas where there is spare capacity, rather than areas where capacity is limited[3].

As a general observation, meshed networks are likely to exhibit higher rates of utilisation as a result of having multiple injection points in a given area to supply larger load centres. For these locations, the adoption of modified CRNP is likely to have minimal impact. Conversely, modified CRNP will tend to reduce locational charges for radial connections with lower levels of utilisation.

Modified CRNP is more complex to apply as it requires the TNSP to collect more data and inputs for measuring utilisation. A modified CRNP methodology is currently applied by TNSPs in Tasmania, South Australia and New South Wales.

5.4.2 Long-Run Marginal Cost (LMRC)

The Rules state that CRNP or Modified CRNP are two permitted methodologies for estimating the proportionate use of transmission assets for the purposes of setting locational charges. It is open to a TNSP to propose an alternative method, such as LRMC, for determining the proportionate usage of the network.

LRMC represents a forward estimate of how consumers' use of the network over time can influence future network costs. This requires prices to be determined in advance of costs actually being incurred. That is, prices would be based on estimates or assumptions about future demand, costs and the timing and location of new loads, rather than being based on actual investment costs, as would be the case with CRNP[4].

[1] NER, Schedule 6A.3.2.
[2] TransGrid (2013), Consultation Paper: Transmission Pricing, November, p17.
[3] AEMC (2013), National Electricity Amendment (Inter-regional transmission charging) Rule 2013, 28 February, pp24-25.
[4] AEMC, Ibid, pp121-122.

5.4.3 Rebalancing locational and non-locational costs

The costs of providing shared network services are currently split on a 50/50 basis between locational and non-locational charges. This allocation satisfies the Rules[5], which require that the allocation between locational and non-locational charges be on the basis of either:

- 50% to each component; or
- an alternative allocation based on a reasonable estimate of future network utilisation and the likely need for future transmission investment and has the objective of providing more efficient locational signals.

The Rules[6] also require that the prices for recovering the locational component of prescribed Transmission Use of Service (TUOS) services must be based on demand at times of greatest utilisation of the transmission network and for which network investment is most likely to be considered.

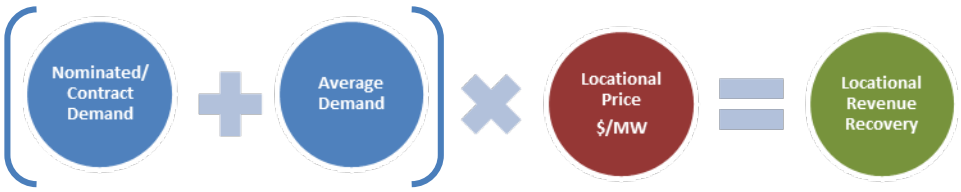
As locational charges are intended to reflect peak utilisation of the transmission network, a higher weighting (or revenue allocation) to locational charges would provide stronger locational price signals. This option would explore whether the split between locational and non-locational charges should be weighted differently, e.g. 70/30 or 60/40.

5.5 Improving how customers are charged

5.5.1 Basis for locational changes

Figure 1 below shows how Powerlink currently applies its locational prices to a combination of nominated demands and average demands.

Figure 1 Current Locational Revenue Calculation (Constrained)



The purpose of the locational charge structure above is to provide price signals about the costs of using the network at peak times. This structure is used for the purpose of locational revenue recovery. This concept is reflected in the CRNP methodology, which requires locational costs to be allocated using operating scenarios that result in most stress on the transmission network and for which network investment may be considered. Given this objective, it may be more appropriate to apply the locational price to the nominated or contract agreed maximum demand only, without the average demand component.

Charging based on contract maximum demand only would cause locational prices to change subject to the side constraint, i.e. by no more than 2% of the weighted average

[5] NER, 6A.23.3.
[6] NER, 6A.23.4(e).

Queensland price. The adoption of this approach may result in an increase in locational charges for some customers, while other customers will benefit from lower locational charges.

5.5.2 Postage Stamped Charges all based on demand

The Rules[7] require that non-locational and common service charges be postage stamped. That is, the cost of these services are recovered from all customers and the unit price is the same for all connection points. The charge to each individual customer is dependent on connection arrangements with the customer and can be calculated on either a contract demand or energy basis.

The majority of postage stamped revenue is currently recovered through energy-based charges. As discussed previously, demand on the transmission network is a key driver of investment.

This option would involve a shift from energy-based postage stamped rates to demand based rates. This shift will strengthen the pricing signal that demand is a key driver of network investment. In the longer term, reductions in a customer's demand should reduce the need for new investment in the network and have a flow-on effect to postage stamped charges, i.e. this should also reduce the overall size of the charges to be recovered in following years on a postage stamped basis.

5.5.3 KVA charging

A number of respondents to our 2015 pricing consultation supported a move to kVA (kilo Volt Amperes) charging for locational prices. Currently, Queensland DNSPs charge some of their larger customers on a kVA basis. For consistency with distribution, the non-locational and common service component of transmission charges could also be expressed on the same basis.

Explained briefly, kVA is a measurement of network usage known as apparent power. This measurement includes two components, real power (kW) and reactive power (kVAR). Both of these components are required to transport electricity around the transmission network to customers. kVA is a key determinant of network investment as it represents the full measurement of power flow through electricity assets.

As a result, two separate loads can have the same real (kW) demand requirement but one that requires less reactive power (kVAR) transfer will require less proportional overall network usage and can be seen as more efficient than the other which requires more reactive power (kVAR) transfer. Through a range of mechanisms, customers can improve their reactive power components of their load thereby reducing overall network usage (kVA).

KVA charging enhances cost reflective principles by factoring in reactive power efficiencies of loads. Ultimately more efficient loads will reduce additional demand on the network and the subsequent need for investment which could include additional power quality assets in Powerlink's network.

[7] NER, 6A.23.4(e)(f).

5.6 Peak and off-peak pricing

5.6.1 Penalties for exceeding nominated contract demand

The AER's Pricing Methodology Guidelines specify the conditions under which a contracted maximum demand pricing arrangement may be used[8]. In short, where a customer is subject to a Contract Agreed Maximum Demand (CAMD) arrangement, penalties apply when the nominated contract demand (in any half-hour interval) is exceeded. Currently the nominated demand can be exceeded at any time during the year.

One potential option is to amend the definition of CAMD under Connection and Access Agreements, so that customers are not penalised for exceeding the agreed amount in circumstances where the increase has no impact on the transmission network. For example, the definition of CAMD could apply for the period between 8am and 8pm daily, provided that we are confident that demand outside this period will not drive network investment. This approach could encourage increased usage of the network during off-peak periods and thereby increase overall network utilisation.

5.6.2 Operating conditions used to calculate locational revenue requirements

Locational charges for transmission connection points are forecast to recover overall locational revenue requirements each year. These charges are currently calculated using one year (most recent historic) of half-hourly network load data.

The Rules[9] require that locational charges must reflect periods of utilisation of the network for which network investment is most likely. Generally, peak utilisation of the transmission network occurs during summer peak periods. Network usage outside peak times may not necessarily drive network investment. Hence, if customers are incentivised to use the network at times when the network is less utilised (instead of during peak times) this should ultimately reduce the overall need for transmission investment.

This option would involve Powerlink adopting different operating conditions (i.e. uses operational data only at specific times, which could be between certain months of the year, days of the week or hours of the day) for the purposes of calculating locational revenue requirements for the forthcoming year. These operating conditions would more closely align with use of the transmission network at peak times, which could be different for different parts of the network. The outcome of this approach would be to apply greater weight in allocating costs to connection points that utilise assets at peak periods.

5.7 Other initiatives to deliver customer value

5.7.1 Timing of provision of pricing information

Another option that may be considered valuable by customers relates to the timing for provision of transmission prices for the coming year. At present, the Rules[10] require prices for each of the categories of prescribed transmission services to be applied from 1 July in the next financial year be published by 15 March each year.

While these timeframes are mandated in the Rules, Powerlink is interested to understand whether customers would benefit from being notified of such prices in draft form. While there would necessarily be some caveats around the provision of such information, this arrangement could result in customers being notified some months prior to final prices

[8] Clause 2.2(g)
[9] NER, 6A.23.4(b)(1).
[10] NER, 6A.24.2(c)(1).

being published. This could potentially assist with future planning and business decision-making for customers.

5.7.2 Offering more predictable transmission prices

Transmission prices vary from year to year as a result of various revenue adjustments relative to the allowed MAR in a TNSP's final revenue determination from the AER. This could be due to, for example, differences in the assumed CPI, the rate of return, network performance scheme amounts, and/or actual under/over-collections of revenues from the previous year. Powerlink's directly connected customers are particularly affected by these variations as electricity typically comprises a significant portion of their total input costs.

While prescribed transmission prices will inevitably vary from year to year for the reasons outlined above, we are open to exploring the possibility of offering customers fixed prices for a given period of time if customers considered this would provide additional value. However, such an option would need to be worked through to ensure that other customers would not be adversely impacted by such an arrangement. For example, we may need to establish a 'true-up' mechanism to address any differences between fixed and actual prices.

Appendix 1- Glossary of Key Terms

Annual Aggregate Revenue Requirement (AARR) – the maximum allowable revenue determined by the Australian Energy Regulatory (AER) adjusted by the X-factor, CPI and performance incentive schemes.

Australian Energy Market Commission (AEMC) – is the expert energy policy adviser to Australian governments and is responsible for making and revising the energy rules and provide advice.

Australian Energy Regulator (AER) – is the energy regulator responsible for regulating electricity networks and covered gas pipelines, in all jurisdictions except Western Australia. The AER sets the amount of revenue that network businesses can recover from customers for using these networks. The AER is also responsible for enforcing the laws for the National Electricity Market and monitoring and reporting on the conduct of market participants and the effectiveness of competition.

Avoided TUOS payments – these are payments made by distributors to generators embedded in the distribution network to reduce the demand taken by the DNSP from the transmission system at times of peak demand. The Rules require that this benefit be passed onto the embedded generator as the distributor effectively avoids paying more TUOS at these times (or reduces its liability).

Contract Agreed Maximum Demand (CAMD) – maximum demand for any half-hour period interval for a connection point as agreed under connection and access agreement. Penalties apply when the CAMD is exceeded.

Common Services - provide common benefits to all customers irrespective of location (for example, voltage support).

Cost Reflective Network Pricing (CRNP) – a method for calculating locational prices under the Rules, based on peak utilisation of backward-looking (or sunk) asset costs.

Distributed Energy Resources (DER) – on-site distributed generation (e.g. solar photovoltaic (PV) facilities) and low cost battery storage.

Entry/Exit Services – services provided for connection to the shared transmission network. Entry services apply to generators. Exit services apply to distribution network service providers (DNSPs) and directly connected customers supplied by the transmission network.

Locational charges - costs of providing shared transmission services for a particular connection point. Under the Rules, locational prices must not change by more than 2% per annum relative to the load weighted average price for the region.

Long Run Marginal Cost (LRMC) – a forward-looking method for allocating network costs, where charges are based on the cost of future investments. DNSPs are required to calculate distribution charges/prices using LRMC.

Maximum Allowed Revenue (MAR) – the amount calculated for a regulatory year of a regulatory control period in accordance with rule 6A.3.

National Electricity Market (NEM) – is an Australian electricity sector arrangement for connection of electricity transmission grids of the eastern and southern Australian states and territories to create a cross-state wholesale electricity market.

Non-Locational charges – the balance of shared network costs that are not location specific, which are recovered on a postage stamp basis.

Regulatory Asset Base (RAB) – the value of assets involved in the delivery of prescribed transmission services.

Postage Stamped – where the unit price is the same for all connection points and customers.

TNSPs – Transmission Network Service Providers, such as Powerlink.

TUOS – Transmission Use of System or shared network services that are not prescribed common transmission services, prescribed entry services or prescribed exit services, and that provide specific benefits to:

a) Transmission Customers who have a connection point with the relevant transmission network, based on the location of that connection point within the transmission system; and

b) Transmission Network Service Providers who have a direct or indirect connection or an interconnection with the relevant transmission network, based on the location of that connection or interconnection within the relevant transmission system.

X-factor – used by the AER to smooth revenues across a regulatory period as part of a regulatory determination.

Appendix 2: Current Transmission Pricing Arrangements

2.1 Revenue and price setting processes

For a regulated TNSP like Powerlink, the prices charged to customers for its regulated (prescribed) services does not drive its revenue. Instead, the revenue Powerlink is allowed to recover from its customers for these services is the outcome of a separate revenue setting process determined by the AER.

Revenue setting

Like other regulated TNSPs, Powerlink's annual revenue requirement or the maximum allowed revenue (MAR) it is permitted to recover each year is set by the AER as part of a regulatory determination process.

Typically every five years, a TNSP makes a Revenue Proposal to the AER which sets out the various types of expenditure and allowances (or building-blocks including a return on capital, depreciation, operating expenditure and tax allowance) it considers will be required to deliver prescribed services over the coming five-year regulatory period in a prudent and efficient way. The AER undertakes a detailed assessment and determines an appropriate MAR.

The annual MAR determined by the AER through the revenue determination process then becomes an input to the annual transmission price setting process. The annual prices charged by a TNSP for its prescribed transmission services are determined so that it recovers its MAR.

Where actual revenues collected by the TNSP for prescribed services in any given year are higher (or lower) than the MAR, these revenues are returned to (or recovered from) customers in the following year. Actual revenues collected in any given year may differ due to variations in key input assumptions such as the energy flows within regions and between regions (i.e. inter-regional and intra-regional settlements), consumer price index, energy and demand.

This Consultation Paper considers only the price setting process. As such, the options proposed in this paper do not have any direct impact on the total revenue that Powerlink is able to recover from its customers in the current regulatory period.

However, in the longer term, if transmission pricing arrangements lead to increased utilisation of the network by reducing peak network usage, this can reduce the need for capital expenditure in the future. In the longer-term, this will feed into lower revenue requirements, all other things being equal.

In addition to recovering the MAR, the Pricing Methodology is concerned with providing the right signals to customers.

2.2 Powerlink's current Pricing Methodology

TNSPs are required to prepare a Pricing Methodology[11] which is approved by the AER as part of the regulatory determination process.

Powerlink's Pricing Methodology sets out the structure of transmission charges in Queensland which reflects the allocation of annual prescribed revenue to be recovered from the various categories of prescribed services. Revenue is allocated to prescribed transmission services based on the costs of providing these services (as determined by the value of assets involved in and operating costs incurred in delivering these services). Prescribed transmission services comprise:

- **Shared transmission services**, which are provided to customers directly connected to the transmission network and connected network service providers. These services are recovered from load customers through a combination of locational and non-locational charges. Currently, Powerlink adopts a 50/50 split between locational and non-locational charges. Locational costs are attributed to each load connection point, based on relative use of network assets using the CRNP methodology. This methodology attributes locational revenue to connection points based on the relative proportion of the use of shared assets at times when the network is under stress. This Pricing Methodology considers the values of existing assets or sunk costs and is often referred to as a backward-looking approach. Non-locational costs are recovered on a 'postage stamp' basis, which means that the price does not vary according to location.

- **Entry services**, which are provided to generators that were directly connected to the transmission network by 9 February 2006. These services are location specific.

- **Exit services**, which are provided to connect the distribution networks to the transmission network and large customers that were connected on 9 February 2006. These services are location-specific.

- **Common services**, which benefit all transmission customers or TNSPs in interconnected regions. These services are required under the Rules or under jurisdictional legislation and are necessary to ensure the integrity of the transmission network. As such, these services cannot be attributed to particular connection points and therefore are non-locational.

In addition to prescribed transmission services, Powerlink also provides negotiated and non-regulated transmission services. These include connections services for generators and load customers that connected after 9 February 2006. This Consultation Paper only considers prescribed transmission services.

[11] National Electricity Rules Clauses 6A10.1and 6A.13

Table 4 summarises this information and Powerlink's current charging arrangements.

Table 4: Overview of prescribed transmission services and charging arrangements

Service type	Recovered from	Allocation to Service Sub-Components	Current charges
Shared transmission services (TUOS services*)	Directly connected customers and connected networks	Locational (50% based on CRNP)	$/kW/month applies to the sum of average half hourly demand and the nominated demand
		Non-locational (50% based on CRNP)	$/MWh applies to historic average usage or $/MW/month applies to contract maximum demand
Entry services (grandfathered)	Generators	Connection - based on value of specific connection assets	$/month
Exit services	Directly connected customers and distribution networks	Connection - based on value of specific connection assets	$/month
Common Services	Directly connected customers and distribution networks	Common Service – based on value of common assets	$/MWh applies to historic average usage or $/MW/month applies to contract maximum demand

*TUOS services comprise prescribed locational and prescribed non-locational services.

The Rules[12] define a Pricing Methodology as a methodology, formula, process or approach that:

(1) allocates the aggregate annual revenue requirement (AARR) for prescribed transmission services to each category of prescribed transmission services;

(2) makes a number of adjustments to the annual service revenue requirement to account for modified load export charges (charges to adjacent transmission networks); settlements residue auction proceeds; under/over recovery of revenues from previous years; and intra-regional settlements;

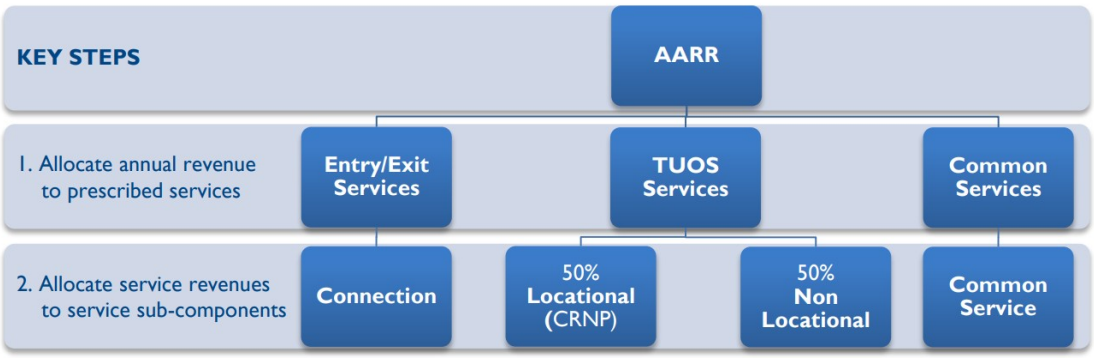
(3) allocates the annual service revenue requirement to transmission network connection points (other than connection points of any Market Network Service Provider); and

(4) determines the structure and recovery of prices for each category of prescribed transmission services.

[12] NER, 6A.24.

Figure 2 provides a simplified depiction of the Pricing Methodology[13].

Figure 2 Overview allocation of prescribed transmission pricing process



The Rules[14] place a side constraint or limit on locational charges so that locational prices must not change by more than 2% per annum relative to the load weighted average price for the region, i.e. Queensland[15]. The side constraint helps to manage price impacts on customers. One effect of the side constraint is that it may take a number of years for the locational prices to reflect the unconstrained price (or the true calculated price associated with supplying a particular location). The side constraint also means that any revenues associated with variations in locational prices above or below the 2% constraint each year are reallocated to non-locational TUOS and are collected from all Queensland electricity customers in the following year.

2.3 Other TNSPs' Pricing Methodology

There is a reasonable level of alignment of pricing arrangements across TNSPs, as set out in Table 5 below. However, it should be noted that the Rules[16] permit either the CRNP or modified CRNP approach to allocating the annual service revenue requirement for locational shared transmission services to connection points.

Table 5 Comparison of Shared Transmission Service methodologies

TNSP	CRNP	Modified CRNP	50/50 or other	Maximum Demand /Average Demand
Powerlink (Qld)	√		50/50	100% Demand (Maximum Demand and Average Demand)
AEMO (Vic)	√		50/50	100% Demand (Contract Demand or Average Maximum Demand on top 10 weekdays)
ElectraNet (SA)		√	50/50*	100% Demand (Maximum Demand)
TasNetworks (Tas)		√	50/50*	100% Demand (Maximum Demand)
Transgrid (NSW)		√	50/50*	100% Demand (Average of Monthly Maximum Demands)

*Modified CRNP adjusts TUOS revenue allocations

[13] https://www.powerlink.com.au/Network/Connection_and_pricing/Pricing.aspx
[14] NER, 6A.23.4(b)(2).
[15] National Electricity Rules Clause 6A.23.4(b)
[16] NER, Schedule 6A.3.

2.4 Current Rules and scope for change

The Rules[17] require each TNSP to submit its proposed Pricing Methodology to the AER as part of the five yearly revenue determination process. In accordance with the Rules, a TNSP's proposed Pricing Methodology must:

- give effect to and be consistent with the pricing principles specified in the Rules; and
- comply with the AER's Pricing Methodology Guidelines (the Guidelines).

With the exception of changes in relation to inter-regional transmission charges, the Rules and Guidelines have been in place since December 2006. The aim of the Rules and Guidelines is to specify the boundaries for pricing arrangements that a TNSP can propose in its Pricing Methodology.

While the current Rules have limitations, Powerlink is open to proposing changes to the Rules if there is a strong case and customer support for doing so. However, given that such a Rule change proposal would directly impact other TNSPs in the NEM, Powerlink would seek to involve and consult wider before lodging such a proposal.

It is also important to note that Powerlink's pricing arrangements include matters that are broader than the Pricing Methodology as defined in the Rules. For example, it may include the earlier provision of information on our future prices or our terms and conditions for payment. In this paper, Powerlink is focused on all prescribed aspects of its pricing arrangements, some of which may not be governed by the Rules.

2.5 Distribution and transmission pricing relationship

The AEMC amended the Rules for distribution network pricing in November 2014. The Rules require distributors to comply with new pricing principles when developing and setting distribution network tariffs. Generally, the new principles focused on how pricing signals should be incorporated into tariffs, with a view to increasing cost reflectivity.

Historically, distribution tariffs have typically been focused on energy throughput, rather than demand. Under this tariff structure, the new Distributed Energy Resource (DER) technologies such as on-site distributed generation (e.g. solar PV facilities) and, in future, low cost storage – allow customers to reduce their electricity costs, while continuing to make use of the network at peak times. This situation creates an inequity with other users, who pick up a larger portion of the network costs. This is now common in many countries[18].

In addressing the Rules' requirements, and in response to these challenges, distributors are making changes to their network tariffs. In particular, more cost-reflective network tariffs are being introduced to:

- ensure that all customers pay a fair contribution to use the network;
- provide price signals to encourage customers to shift their peak load, reduce their network costs and, in the longer term, avoid costs for the distributor and other customers;

[17] NER, 6A.10.1(a).

[18] Cambridge Economic Policy Associates, International Review of Cost Recovery Issues, Office of Gas and Electricity Markets, Final Report, February 2017.

- reduce the impact of air conditioners, pool pumps and hot water systems, which are the main contributors to summer peak demand; and

- in the longer term, promote the use of the distribution network as a platform for two-way flows of electricity, demand side management and the provision of network support services by customers.

In reviewing its transmission pricing arrangements, Powerlink is also conscious of the types of changes underway in distribution tariffs, noting that:

- where relevant transmission charging arrangements should work together with distribution signals, opportunities for alignment may exist;

- transmission charges are recovered from small business and residential customers through distribution tariffs; and

- new distribution tariffs may promote changes in customer behaviour that have consequential impacts on the transmission network.