Pricing Methodology

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1 Introduction

This document sets out TransGrid's revised proposed pricing methodology. It will be submitted to the Australian Energy Regulator (AER) by 13 Jan 2015 for approval and will apply from 1 July 2015. The revised proposed pricing methodology complies with the relevant provisions of Chapter 6A of the National Electricity Rules (the Rules) and the AER's pricing methodology guidelines. It replaces the proposed pricing methodology submitted to the AER on 31 May 2014 and takes into account the changes outlined in the AER's draft determination of TransGrid's Revenue Proposal 2014/15 – 2018/19.

TransGrid is the "Co-ordinating Network Service Provider" for the New South Wales market region. This means that TransGrid applies its pricing methodology to determine the transmission prices that are to be charged in the New South Wales market region to recover the regulated transmission revenues of Ausgrid, Directlink, ActewAGL, and TransGrid in accordance with Rule 6A.29.

TransGrid's proposed pricing methodology submitted on 31 May 2014 was developed following consultation with customers and other stakeholders. An explanation of the rationale for the proposed pricing methodology is set out in the accompanying paper, *Transmission Pricing Methodology – Better Outcomes for Customers*. To maintain our responsiveness to customers and stakeholders, the revised proposed pricing methodology still draws on the following common themes identified from the consultation:

1. prices are not sufficiently cost reflective;
2. a 50% proportion of transmission use of system costs (TUOS) recovered on a postage stamp basis is too high; and
3. postage stamp charges based on energy rates is inappropriate, as transmission costs as driven by peak demands.

While the pricing methodology is complex, this document is drafted in 'plain English' to assist stakeholders in understanding the methodology.

2 Duration

This pricing methodology will apply from 1 July 2015 of the 2015/16 to 2017/18 regulatory control period. The revised proposed pricing methodology includes an attachment for the recent Rule changes enabling inter-regional transmission pricing,[1] as outlined in Rule 6A.29A.

[1] AEMC, *National Electricity Amendment (Inter-regional Transmission Charging) Rule 2013*, 28 February 2013.

3 Which services are subject to this pricing methodology?

TransGrid's pricing methodology applies to transmission services that are subject to revenue cap regulation. The four service categories are:

- Shared transmission services or "TUOS services", which are provided to large customers and distribution companies;
- Connection services or "exit services", which are also provided to large customers and distributors;
- Connection services or "entry services", which are provided to generators; and
- Common services, which are services that provide the same benefit to all load customers irrespective of their location.

Full definitions of the transmission service categories are set out in the Chapter 6A of the Rules.

In addition to these regulated or "prescribed" transmission services, TransGrid also provides negotiated transmission services. Some connection services are negotiated services, for example as provided for in clause 11.6.11 of the Rules. Negotiated transmission services are not priced in accordance with this pricing methodology. For further information on negotiated transmission services, please refer to our negotiating framework.

4 Overview of the pricing methodology

The pricing methodology is concerned with:

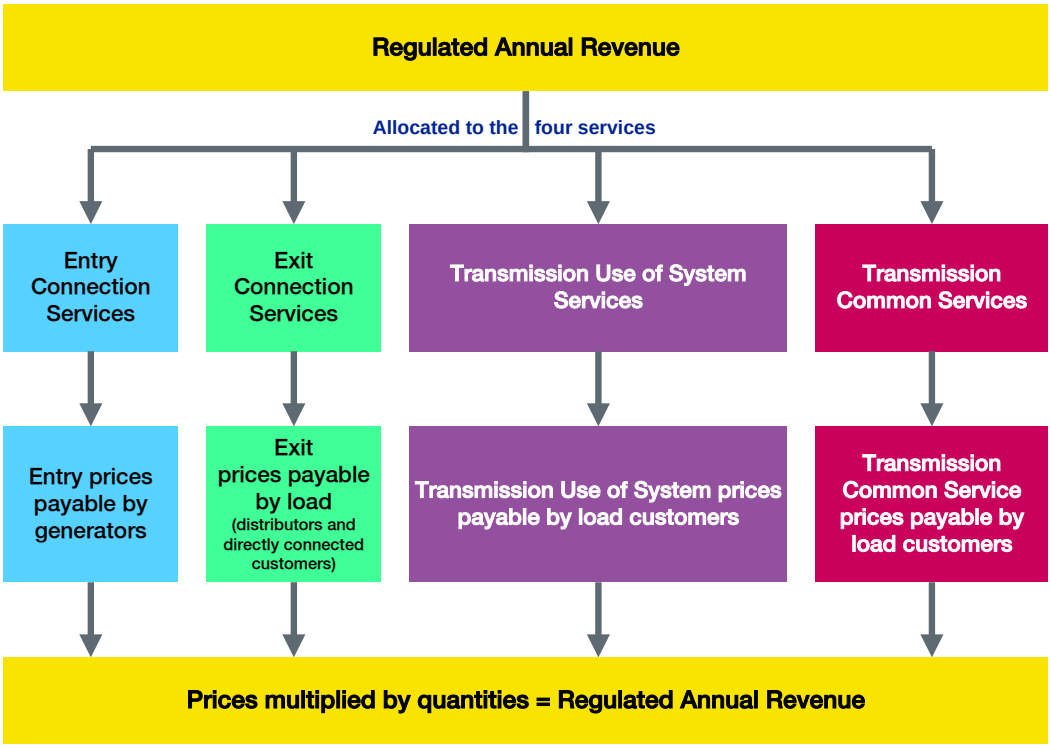
(1) recovering the regulated transmission revenue from customers and generators;

(2) allocating the appropriate amount of revenue to be recovered to each of the four transmission service categories;

(3) determining the amount of revenue to each of the TNSP's connection points; and

(4) setting prices at each of those connection points to recover the required revenue.

This is illustrated in the diagram below.



A more detailed presentation of the pricing methodology is provided in Appendix A.

5 Aggregate Annual Revenue Requirement

The Rules define the revenue to be recovered from transmission prices as the "Aggregate Annual Revenue Requirement" or AARR. This is different to the maximum allowed revenue (MAR) set by the AER because it may include a number of adjustments, such as:

- reopening of revenue determination for capital expenditure (Rule 6A.7.1)
- reopening or revocation of the revenue determination (Rule 6A.15);
- network support pass through (Rule 6A.7.2);
- cost pass through (Rule 6A.7.3);
- small scale incentive scheme (Rule 6A.7.5);
- payments under the service target performance incentive scheme (Rule 6A.7.4); and
- contingent projects (Rule 6A.8.2).

In addition to these adjustments, the Rules require the operating and maintenance costs expected to be incurred in the provision of prescribed common services to be allocated directly to common services, and recovered through common service prices (Rule 6A.22.1(2)). The operating expenditure that we attribute to common services is derived forecasts of 'actuals to date' and budget projections, and includes:

- network switching and operations;
- administration and management of the business;

- network planning and development; and
- general overheads.

Clause 6A.22.1(3) also allows the AARR to be adjusted should the allocation of AARR over more than one region be agreed with other TNSPs in agreement with Clause 6A.29.3 of the Rules. TransGrid does not have any such agreements in place.

6 Revenue recovery from transmission service categories

6.1 Overview

The first step in calculating transmission prices is to determine how much revenue should be recovered from each of the four transmission service categories.

We begin this task by allocating transmission assets to each service category. The revenue requirement (net of the operating and maintenance costs allocated directly to common services) is then allocated to each service category to reflect the percentage of the total asset costs that is attributed to that service.

Clause 2.4 of the AER's pricing methodology guidelines explains how assets should be attributed to the different prescribed transmission service categories. For example, the AER's guidelines state that the types of transmission system assets that are directly attributable to entry services are limited to:

A. substation buildings, substation land and associated infrastructure (such as fences, earthing equipment etc);

B. switchgear and plant associated with generators' generating systems connection and generator transformers;

C. secondary systems associated with primary systems providing prescribed entry services;

D. transmission lines owned by TNSPs connecting generators' generating systems to the TNSP's transmission network; and

E. meters associated with prescribed entry services and owned by the TNSP.

The AER provides similar guidance in relation to exit services, TUOS services and common services. TransGrid's pricing methodology adopts an allocation approach which is consistent with the AER's guidelines.

In cases where assets could be attributable to more than one category of transmission service, the Rules provide a mechanism for determining the appropriate allocation. Further information on this priority ordering process is provided in Appendix C (Rule 6A.23.2(d)).

6.2 Worked example

The following table provides an illustrative example of how the revenue requirements are allocated to particular service categories. The asset values are expressed in terms of optimised replacement cost (ORC).

Table 1
Asset allocations to service categories

Category	Asset Value ($)	Cost Share
Exit service	6,972,222	16.2%
Entry service	1,761,111	4.1%
TUOS service	33,566,667	78.0%
Common service	750,000	1.7%
Total	**43,050,000**	**100.0%**

Table 2 below shows the derivation of the revenue to be allocated amongst the four different services. It assumes that the maximum allowed revenue is $2,604,434.

Table 2
Derivation of AARR to be allocated to the four services

Derivation	Amount ($)
Maximum allowed revenue	2,604,434
Total adjustments for: • network support pass through; • cost pass through; • payments or penalties under the service target performance incentive scheme; and • contingent projects.	-45,000
Deduct operating and maintenance expenditure (incurred in the provision of prescribed common services)	-55,000
AARR to be allocated	**2,504,434**

The cost share percentages shown in Table 1 are used to allocate the revenue to be recovered from each service category. In accordance with the adjustments set out in Table 2, Table 3 shows that the revenue to be allocated (the AARR) is $2,504,434.

Table 3
Revenue allocations to service categories

Category	Cost Share	Revenue (AARR) to be recovered from each service ($)
Exit service	16.2%	405,609
Entry service	4.1%	102,453
TUOS service	78.0%	1,952,741
Common service	1.7%	43,631
Total	100.0%	2,504,434

7 Revenue to be recovered from each connection point

7.1 Overview

The second step is to determine the revenue to be recovered from each connection point.

For connection points that only provide entry services, the allocation is relatively straightforward. The revenue to be recovered from entry services is allocated to each connection point in proportion to the value of the entry assets employed at that connection point. As in the previous example, the allocation process is based on the ORC.

For connection points that provide exit services, the calculation is more complex because an allocation needs to be provided that reflects exit services, TUOS services and common services. The approach to allocation of revenue to these three services is as follows:

- For exit services, the approach is the same as the approach adopted for entry services. In particular, the revenue to be recovered from exit services is allocated to each connection point in proportion to the value (expressed in ORC terms) of the exit assets employed at that connection point.
- Common services are also straightforward; however an adjustment is first required. The TUOS revenue (ASRR) for prescribed common services is adjusted by adding back the operating and maintenance costs incurred in providing non-asset related common services. These non-asset related costs were removed from the AARR as described in Section 6.1 of this Pricing Methodology and in accordance with Clause 6A.22.1(2) of the Rules. This adjustment is made so that the calculation of the ASRR for each transmission service (described above) could be allocated on an asset basis. The common service revenue must then be recovered from load connection points on a postage stamp basis, which means that the prices do not vary by location. We examine the issue of pricing structures in section 8.
- TUOS services are more complex. Following stakeholder consultation, two common themes are that:
    1. prices are not sufficiently cost reflective, and;
    2. a 50% proportion of transmission use of system costs (TUOS) recovered on a postage stamp basis is too high.

In response, TransGrid has decided to implement a modified Cost Reflective Pricing Methodology (CRNP) which uses utilisation adjusted replacement costs to adjust the amounts recovered from locational and non-locational charges, and to provide utilisation adjusted cost reflective price signals.

We discuss TUOS in further detail in section 7.3. However, we first provide some numerical examples for the allocation of entry, exit and common service costs to each connection point.

7.2 Worked examples for entry, exit and common services

The following examples show how the allocation of revenue is applied to entry and exit services.

For entry services, this illustrative example assumes that there are two generators, Gen 1 and Gen 2. The asset values at each connection point and the corresponding percentage of the total is shown in the table below.

Table 4
Asset values employed at each entry point

Entry Connection Point	Asset Value ($)	Percentage of Total
Gen 1	1,033,333	58.7%
Gen 2	727,778	41.3%
Total	**1,761,111**	**100.0%**

As shown in Table 3 in section 6.2, the total revenue to be recovered from entry services is $102,453. Table 5 below shows that the revenue amount to be recovered from each generator is proportional to the asset values employed at each connection point.

Table 5
Entry service revenue to be recovered at each entry point

Entry Connection Point	Cost Share	Revenue Allocation ($)
Gen 1	58.7%	60,114
Gen 2	41.3%	42,338
Total	**100.0%**	**102,453**

Table 6 below shows a similar allocation process in relation to exit services. From Table 3, the revenue to be recovered in relation to exit services is $405,609. The revenue allocation to each connection point reflects the proportionate value of the exit assets employed at each connection point.

Table 6
Revenue allocation to each exit point

Exit Connection Point	Asset Value ($)	Percentage of Total	Revenue Allocation ($)
Load 1	2,083,333	29.9%	121,198
Load 2	1,405,556	20.2%	81,768
Load 3	2,633,333	37.8%	153,194
Load 4	850,000	12.2%	49,449
Total	**6,972,222**	**100.0%**	**405,609**

Table 3 in section 6.2 shows that $43,631 of the AARR is to be allocated to common services. Table 2 shows that a further $55,000 (being the operating expenditure attributable to common services) is to be allocated directly to common services, so the total revenue to be recovered is $98,631. As shown in Table 7 below, this is attributed to each connection point according to the maximum demand at that connection point.

Table 7
Common service revenue allocation to each exit point

Exit Connection Point	Maximum Demand (MW)	Percentage of Total Maximum Demand	Revenue Allocation ($)
Load 1	160	16.7%	16,439
Load 2	300	31.3%	30,822
Load 3	100	10.4%	10,274
Load 4	400	41.7%	41,096
Total	**960**	**100.0%**	**98,631**

7.3 Transmission Use of System (TUOS) services

7.3.1 Adjustments to the TUOS revenue to be recovered

The revenue attributed to prescribed TUOS services ASRR is divided between:

- a locational component, which is allocated to connection points using modified CRNP; and
- an adjusted non-locational component, which is recovered on a postage stamp basis.

This is allowed for in Clause 6A.23.3(a)(2) of the Rules:

(a) The *annual service revenue requirement* for *prescribed TUOS services* is to be allocated between a locational component (*pre-adjusted locational component*) and a non-locational component (*pre-adjusted non-locational component*) either:

1. as to 50% to each component; or

2. an alternative allocation to each component, that is based on a reasonable estimate of future *network* utilisation and the likely need for future *transmission* investment, and that has the objective of providing more efficient locational signals to *Market Participants*, *Intending Participants* and end users.

The following adjustments are made to the revenue to be recovered from the locational and non-locational components of TUOS:

- The TUOS revenue (ASRR) to be recovered on a locational basis is adjusted by:
  - subtracting estimated inter-regional settlements residue auction proceeds which is not subject to a settlement residue distribution (SRD) agreement (This adjustment is calculated in accordance with 6A.23.3(f)[2]). The estimated proceeds are converted to an equivalent asset replacement cost, which is offset against the asset replacement cost of the relevant interconnector network assets. If the equivalent asset replacement cost is greater than the interconnector asset costs, then the interconnector asset costs are set to zero and the outstanding portion of the estimated proceeds is offset against the non-locational TUoS component. The reduced network costs are used as an input to the CRNP methodology;
  - adding or subtracting the estimated modified load export charge (MLEC) determined in accordance with clause 6A.29A of the Rules. This adjustment is calculated in accordance with 6A.23.3(f)[2]; and
  - If the adjusted locational component is a positive amount, then it is to be allocated to connection points of transmission customers using the modified CRNP methodology in accordance with clause 6A.23.3(c). If the adjusted locational component is a negative amount, then the adjusted locational amount is deemed to be zero and the non-locational component adjusted to recover this amount in accordance with clause 6A.23.3(d) of the Rules.
- The TUOS revenue (ASRR) to be recovered on a non-locational component is adjusted in accordance with clause 6A.23.3(e) of the Rules by:
  - subtracting the absolute value of any negative adjusted locational component (referred to above);
  - by subtracting settlements residue due to intra-regional loss factors;
  - for any over-recovery amount or under-recovery amount from previous years including an adjustment in accordance with 6A.23.3(f);[2]
  - for any shortfall or over-recovery that arises from limiting the change in locational prices at a connection point (Clauses 6A.23.4(c) & (d));
  - for any amount arising as a result of the application of prudent discounts; and
  - subtracting any portion of the SRA proceeds that could not be offset against inter-connection assets (referred to above) when calculating the equivalent asset replacement cost.

[2] The difference between budget estimates and actual amounts in the settlement residue auction proceeds (Clause 6A.23.3(b)(1)), the modified load export charge (MLEC) (Clause 6A.23.3(b)(2)), and the under and over recovery amounts (Clause 6A.23.3(e)(5)) are to be adjusted.in accordance Clause 6A.23.3(f) of the Rules.

7.3.2 Application of the CRNP methodology

The CRNP methodology allocates a proportion (the locational component) of shared network costs to individual customer connection points. TransGrid applies the CRNP methodology using the T-PRICE cost reflective network pricing software used by most TNSPs in the NEM.

The CRNP methodology requires three sets of input data:

- an electrical (load flow) model of the network;
- a cost model of the network; and
- a set of load/generation patterns.

Appendix B describes the CRNP methodology in more detail.

As noted in Appendix B the choice of operating conditions is important in developing prices using the CRNP methodology. The use made of the network by particular loads and generators will vary considerably depending on the load and generation conditions on the network. For this reason a number of operating scenarios are examined with different load and generation patterns.

The Rules provide TransGrid with flexibility in the choice of operating conditions. The key requirements are that:

- the allocation of dispatched generation and loads be over a range of actual operating conditions from the last full financial year; and
- the range of operating scenarios is chosen so as to include the conditions that result in most stress on the transmission network and for which network investment may be contemplated.

TransGrid's primary objective is to ensure that the application of the CRNP methodology provides stable prices that reflect, to the extent possible, the long run marginal costs of serving load. With this objective in mind, TransGrid will apply the modified CRNP methodology for a full year of half hourly operating data.

Where actual operating conditions from the previous complete financial year are unavailable for a connection point, as would be the case for a new connection point, or where there are material changes in customer requirements at a connection point, an estimate of demand will be used instead. TransGrid will engage with the relevant network customer to determine the estimated demand.

7.3.3 Modified Cost Reflective Network Pricing Methodology

The essential difference between standard CRNP methodology and modified CRNP methodology is that in calculating the network costs to be recovered on a locational basis (i.e. prescribed TUOS services – locational component):

- The standard CRNP methodology allocates shared network costs to connection points on the basis of optimised replacement costs and assumes a 50-50 split between the locational and non-locational components of network charges;

- The modified CRNP methodology uses utilisation adjusted replacement costs. An average rate of return[3] is applied to the resulting costs allocated to each connection point to determine its share of the locational component of shared network charges (i.e. the arbitrary 50 - 50 split used with the standard CRNP methodology is removed). Prescribed TUOS services – non-locational charges recover the balance of network costs (the costs not recovered by prescribed TUOS services – locational charges).

The modified CRNP methodology is intended to encourage better utilisation of existing assets by discounting the costs allocated to under-utilised elements relative to those that are more heavily utilised.

TPRICE calculates utilisation factors based on the maximum loading of each network pricing branch over the range of operating conditions analysed and pricing branch ratings provided as input to TPRICE.

In determining the utilisation factors required by Schedule 6A.23.3(a)(2) of the Rules the modified CRNP methodology ensures that asset utilisation is based on the maximum flow allowed on network elements within the normal operating constraints of the network to prevent inefficient discounting of costs in the meshed network.

As TPRICE performs its calculations based on system normal operating conditions (i.e. with all elements in service) and does not carry out contingency analysis that is representative of the normal operating constraints of the network, it is necessary to apply an adjustment factor reducing branch ratings for input to TPRICE to ensure that utilisation factors appropriately take into account network contingencies.

Appendix C describes the ratings adjustment for calculation of utilisation factors in more detail.

8 Transmission pricing structures

The third and final step in setting transmission prices is to determine the pricing structure, which is the basis on which prices are calculated and applied for each service category. In a number of cases, the Rules provide no choice regarding the pricing structure. The remainder of this section addresses each service in turn.

8.1 Entry and exit services prices

The revenue to be recovered for entry and exit services at each connection point is recovered on the basis of a fixed $/day price.

It is possible that entry and exit services are shared between generators or customers at a common connection point. In these cases, the costs are allocated as follows:

- If there are multiple generators connected at a single connection point, then the entry cost would be allocated between the generators on the basis of the peak generation into the system by each generator. TransGrid does not currently have any connection points where this occurs.
- If there are multiple customers connected at the one connection point, then the exit asset cost is allocated between the customers on the basis of the peak load

[3] The rate of return is calculated so that *prescribed TUOS services* – locational charges would recover the full cost of the shared *network* when all *network elements* are assumed to be 100% utilised.

measured for each customer in the most recent completed financial year. This arrangement currently applies at some points where two distributors share a connection point.

8.2 TUOS pricing – locational component

The application of the CRNP methodology establishes a revenue amount that should be allocated to each connection point. As discussed in sections 7.3.2 and 7.3.3 of this pricing methodology, this calculation is based on the application of CRNP for a full year of half hour operating data.

To determine the locational TUOS price to be applied in the forthcoming year at each connection point, TransGrid will maintain its current approach. The calculation requires that the $ amount of locational TUOS costs allocated to a connection point is divided by the average of the monthly maximum demands in each month at that connection point in the previous financial year (adjusted for forecast system load growth from the historical period to the period during which the prices will apply) and expressed as a $/kW/month price. This pricing structure is unchanged from the current approved methodology. For the avoidance of doubt:

- The CRNP methodology is applied using historic data, to allocate locational costs to each connection point.
- A locational price is calculated for each connection point by dividing the allocated costs by the connection point maximum demand.
- The locational price for each connection point is applied to the monthly maximum demands in the next financial year.

Two specific complications are worth noting:

- Where there are both customer loads and generator auxiliary loads at a connection point, rates are set on the basis of the full load at the connection point, even though the generator does not pay usage charges.
- In some cases, there is a back up supply to a particular load (e.g. a town or large industrial customer) and simple application of the pricing calculation could give very different prices for the two connections. Where it is assessed that this may create incentives to the customer to switch supply points, and that this would not be consistent with efficient operation of the network, the variable rates at the two points may be set to the same level and a fixed charge used to obtain the balance of usage revenue allocated to the connection point.

The Rules require that the TUOS locational prices must not change by more than 2% per annum relative to the average increase (Clauses 6A.23.4(b)(2) and 6A.23.4(b)(3) of the Rules), unless:

(1) the load at the connection point has materially changed;

(2) in connection with that change, the customer requested a renegotiation of its connection agreement with the TNSP; and

(3) the AER has approved the change of more than 2 per cent per annum.

In addition, the locational prices are not subject to the 2% limitation to the extent that the change in prices relate to the adjusted modified load export change (MLEC) [Rule 6A.23.4(3)(i)].

TransGrid will apply these provisions. As already noted, the balance of any revenue shortfall or over-recovery that occurs as a result of applying the 2 per cent constraint is addressed by adjusting the non-locational TUOS prices.

8.3 TUOS pricing – non-locational component

TransGrid is required to recover the non-locational TUOS revenue on a postage stamp basis, which means that the price cannot vary by location. TransGrid will recover the non-locational TUOS revenue as twelve equal monthly payments on the basis of historical yearly maximum demand expressed as $/kW/month, which is a permissible pricing structure outlined in 2.3(b)(2) of the AER's pricing methodology guidelines.

The AER's pricing methodology guidelines (Section 2.3(b)) requires the non-locational TUOS price to be calculated by dividing the non-locational TUOS revenue by the sum of the maximum demand for all connection points. Adjustments are made to account for historic metering data not being available or significant differences between historic and current metered demand. The adjustments must be consistent with the charging arrangements, described below, to ensure that the application of the prices yields the required non-locational TUOS revenue.

The AER's pricing methodology guidelines require that maximum demand based charges must be calculated by:

A. multiplying the maximum demand based price by the maximum demand at that connection point in the corresponding billing period two years earlier (i.e. historical metered maximum demand off-take); or

B. multiplying the maximum demand based price by the maximum demand at that connection point in the same billing period (current metered maximum demand off-take) if the historical maximum demand off-take is not available; or

C. multiplying the maximum demand based price by the current metered maximum demand off-take if the historical metered maximum demand off-take is significantly different to the current metered maximum demand off-take.

In accordance with the AER's guidelines (Section 2.3), TransGrid will levy non-locational TUOS prices on the basis described above.

8.4 Prescribed common service prices and charges

Under the Rules, the revenue requirement attributed to common services must be recovered on a postage stamp basis. TransGrid will calculate common service prices, and recover common service costs on a maximum demand or nominated maximum demand basis, in the same manner as described in section 8.3 above.

8.5 Setting of TUOS locational prices between annual price publications

In the event that TransGrid is required to set a TUOS locational price at a new connection point or at a connection point where the load has changed significantly[4] after prescribed TUOS service locational prices have been determined and published, an interim price, not subject to the side constraints of clause 6A.23.4(b)(2) of the Rules, will be determined. This will be calculated using the prevailing pricing models and soundly based demand forecasts. Suitable adjustments to reflect actual outcomes that differ from forecasts will be negotiated with the customer for inclusion in the relevant connection agreement.

A price subject to the side constraints of clause 6A.23.4(b)(2) of the Rules will be determined and published at the next annual price determination.

9 Billing arrangements

9.1 Billing for prescribed transmission services

TransGrid will calculate the transmission service charges payable by Transmission Network Users for each connection point in accordance with the published transmission service prices. Where relevant, charges will reflect metering data managed by AEMO.

TransGrid will issue bills to Transmission Network Users for prescribed transmission services which satisfy or exceed the minimum information requirements specified in clause 6A.27.2 of the Rules on a monthly basis or as specified in the relevant transmission connection agreement.

Consistent with clause 6A.27.3 of the Rules a Transmission Network User must pay charges for prescribed transmission services properly charged to it and billed in accordance with this pricing methodology by the date specified on the bill.

9.2 Payments between Transmission Network Service Providers

As the appointed Co-ordinating Network Service Provider referred to in Clause 6A.29.1 of the Rules, TransGrid will pay to each relevant Transmission Network Service Provider the revenue which is estimated to be collected on their behalf during the following year. Such payments will be determined by TransGrid, consistent with clauses 6A.27.4 and 6A.27.5 of the Rules

Financial transfers' payable under clause 6A.27.4(b) of the Rules will be paid in equal monthly instalments or as documented in revenue collection agreements negotiated between the parties.

10 Prudential requirements

10.1 Prudential requirements for prescribed transmission services

Consistent with clause 6A.28.1 of the Rules, TransGrid may require a Transmission Network User to establish prudential requirements for either or both of connection services and

[4] For an existing connection point this would be subject to clause 6A.23.4(3)(ii)(A) of the Rules.

transmission use of system services. These prudential requirements may take the form of, but need not be limited to, capital contributions, pre-payments or financial guarantees.

The prudential requirements will be negotiated between the parties and specified in the applicable transmission connection agreement.

10.2 Capital contribution or prepayment for a specific asset

Consistent with clause 6A.28.2 of the Rules, where TransGrid is required to construct or acquire specific assets to provide prescribed connection services or prescribed TUOS services to a Transmission Network User, TransGrid may require that user to make a capital contribution or prepayment for all or part of the cost of the new assets installed.

TransGrid notes that no capital contributions or prepayments have been made in respect of prescribed transmission services assets as at the date of this proposed pricing methodology.

In the event that a capital contribution is required, any contribution made will be taken into account in the determination of prescribed transmission service prices applicable to that user by way of a proportionate reduction in the ORC of the asset(s) used for the allocation of prescribed charges or as negotiated between the parties.

In the event that a prepayment is required any prepayment made will be taken into account in the determination of prescribed transmission service prices applicable to that user in a manner to be negotiated between the parties.

The treatment of such capital contributions or prepayments will be in accordance with the relevant provisions of the Rules and the revenue determination.

11 Prudent discounts

TransGrid has a very small number of customers who currently receive prudent discounts pursuant to clause 6A.26.1 of the Rules. All transmission charges paid by those customers are in accordance with the prudent discount arrangements approved by the AER.

TransGrid will address any future request for prudent discounts in accordance with the Rules requirements.

12 Inter-regional transmission charging

As the appointed Co-ordinating Network Service Provider referred to in Clause 6A.29.1 of the Rules, TransGrid will calculate the AARR for the NSW region (Rule 6A.29.3) and modified load export charge (MLEC) payable to the NSW region by each interconnected region consistent with Clause 6A.29A.2 of the Rules.

As required by Clause 6A.29A.3 of the Rules, TransGrid will calculate adjustments to the modified load export charge in accordance with 6A.23.3(f). However, adjustments will not be made in regulatory year 1 and regulatory year 2 as allowed for in Savings and Transitional Rules, Clause 11.64.4.

TransGrid will publish details on the modified load export charge on its website by 15 March each year consistent with clause 6A.24.2(b) of the Rules. Details of inter-regional transmission charging and billing are included in Attachment 1.

13 Monitoring and compliance

As a regulated business TransGrid is required to maintain extensive compliance monitoring and reporting systems to ensure compliance with its obligations under the State Owned Corporations Act, National Electricity Law, and the Rules, together with numerous other regulatory instruments.

In order to monitor and maintain records of its compliance with its approved pricing methodology, the pricing principles for prescribed transmission services, and part J of the Rules, TransGrid:

- incorporates the specific obligations arising from part J of the Rules into its compliance management system;
- maintains electronic records of the annual calculation of prescribed transmission service prices and supporting information; and
- periodically subjects its transmission pricing models and processes to functional audit by suitably qualified persons.

14 Description of pricing methodology differences

The primary differences between the pricing methodology set out in this paper and TransGrid's current pricing methodology is:

(1) All postage stamp prices will be set according to maximum demand, and therefore will no longer apply on an energy basis.

(2) TransGrid will adopt the modified CRNP methodology for the calculation of transmission prices from 1 July 2015. This will replace the approach currently adopted where transmission prices are determined using standard CRNP.

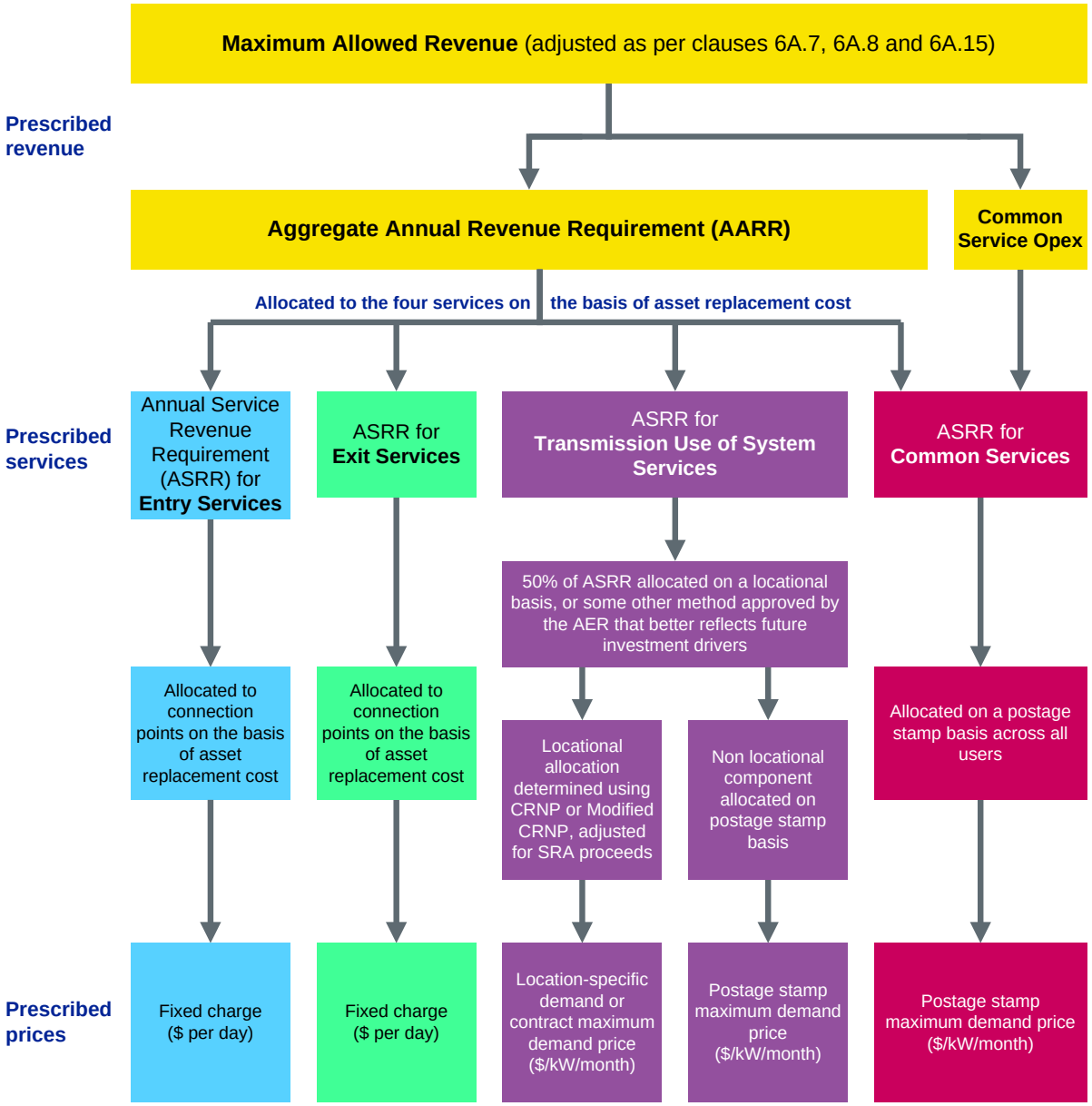
This change reflects the feedback provided by stakeholders during TransGrid's consultation process. TransGrid considers that this change will promote the achievement of the National Electricity Objective and deliver improved outcomes for customers.

15 Conclusion

TransGrid's proposed pricing methodology for the regulatory control period from 1 July 2015 to 30 June 2018 has been submitted to the AER in accordance with the requirements of Chapter 6A of the Rules and the pricing methodology guidelines. TransGrid is confident that its proposed pricing methodology fully satisfies the requirements of the Rules and the pricing methodology guidelines.

If approved by the AER, TransGrid's pricing methodology will address a number of concerns raised by stakeholders during TransGrid's consultation process, and deliver outcomes to customers that promote the achievement of the National Electricity Objective.

Appendix A – Structure of Transmission Pricing under Part J of Rules



Appendix B – Cost Reflective Network Pricing Methodology

The cost reflective network pricing (CRNP) methodology generally involves the following steps:

(1) Determining the annual costs of the individual transmission network assets in the optimised transmission network;

(2) For modified CRNP, adjusting each asset's cost according to its expected utilisation;

(3) Determining the proportion of each individual network element utilised in providing a transmission service to each point in the network for specified operating conditions;

(4) Determining the maximum flow imposed on each transmission element by load at each connection point over a set of operating conditions;

(5) Allocating the costs attributed to the individual transmission elements to loads based on the proportionate use of the elements;

(6) Determining the total cost (lump sum) allocated to each point by adding the share of the costs of each individual network element attributed to each point in the network.

Allocation of generation to load

A major assumption in the use of the CRNP methodology is the definition of the generation source and the point where load is taken. The approach is to use the "electrical distance" to pair generation to load, in which a greater proportion of load at a particular location is supplied by generators that are electrically closer than those that are electrically remote. In electrical engineering terminology the "electrical distance" is the impedance between the two locations, and this can readily be determined through a standard engineering calculation called the "fault level calculation".

Once the assumption has been made as to the generators that are supplying each load for a particular load and generation condition (time of day) it is possible to trace the flow through the network that results from supplying each load (or generator). The use made of any element by a particular load is then simply the ratio of the flow on the element resulting from the supply to this load to the total use of the element made by all loads and generators in the system.

Operating conditions for cost allocation

The choice of operating conditions is important in developing prices using the CRNP methodology or modified CRNP methodology. TransGrid has flexibility in the choice of operating conditions but notes that the Rules that existed prior to 2006 set out the principles that should apply in determining the sample of operating conditions considered. Of particular note is the requirement that the operating conditions to be used are to include at least 10 days with high system demand, to ensure that loading conditions, which impose peak flows on all transmission elements, are captured.

Schedule 6A.3.2(3) is more prescriptive, requiring that the allocation of dispatched generation to loads be over a range of actual operating conditions from the previous financial year and that the range of operating scenarios is chosen so as to include the

conditions that result in most stress on the transmission network and for which network investment may be contemplated.

The use made of the network by particular loads and generators will vary considerably depending on the load and generation conditions on the network. For this reason a number of operating scenarios are examined with different load and generation patterns.

In selecting those operating scenarios it is important to recognise that the operating conditions that impose most stress on particular elements may occur at times other than for system peak demand.

Appendix C – Ratings Adjustment for Calculating Utilisation Factors

When assigning a proportion of shared network costs to individual customer connection points the modified CRNP methodology reduces the ORC of each shared network pricing branch (line or transformer) by a utilisation factor that reflects the maximum loading of the branch with respect to its rating.

In determining the appropriate branch rating for entry into TPRICE (used to perform the CRNP calculations) it is important to understand that TPRICE only considers system normal operating conditions whereas the shared network must be able to withstand a single contingency outage without overloading any network element consistent with the requirements of the Rules and the Transmission Network Design and Reliability Standard published by the NSW Government.

This means that utilisation factors calculated with respect to equipment ratings (thermal line ratings and transformer nameplate ratings) under system normal conditions would result in artificially low utilisation factors.

This problem can be overcome by reducing the equipment ratings to reflect the maximum flow on a network branch under system normal conditions that would not result in its absolute rating being exceeded in the event of the worst contingency.

The reduced ratings are calculated by examining flows in network elements over a range of peak system operating conditions first for system normal conditions, and then with each meshed network element out of service one at a time. For each network element, the ratio of maximum system normal flow to maximum contingency flow is used to scale down the absolute equipment rating to obtain the reduced rating for input to TPRICE.

This process can best be illustrated by an example. A line has an absolute (thermal) rating of 200 MVA. Network analysis over a range of peak operating conditions shows that this line has a maximum system normal flow of 120 MV.A and a maximum single contingency flow of 160 MVA. The reduced rating of this line (as input to TPRICE) is (120/160) * 200 giving 150 MVA.

When TPRICE is run, analysis will consider flows on this line over a much wider range of operating conditions (than used in the contingency analysis) some of which may even exceed 120 MVA. If say the highest usage of this line over the operating conditions assessed by TPRICE is 123 MVA, then the utilisation factor used by TPRICE with modified CRNP will be 0.82 (123/150).

Appendix D – Priority Ordering Methodology

Rules Requirement

Clause 6A.23.2(d) of the Rules requires that:

Where, as a result of the application of the *attributable cost share*, a portion of the AARR would be attributable to more than one category of *prescribed transmission services*, that *attributable cost share* is to be adjusted and applied such that any costs of a *transmission system* asset that would otherwise be attributed to the provision of more than one category of *prescribed transmission services*, is allocated as follows:

(1) to the provision of *prescribed TUOS services*, but only to the extent of the *stand-alone amount* for that *category of prescribed transmission services*;

(2) if any portion of the costs of a *transmission system* asset is not allocated to *prescribed TUOS services*, under subparagraph (1), that portion is to be allocated to *prescribed common transmission services*, but only to the extent of the *stand-alone amount* for that *category of prescribed transmission services*;

(3) if any portion of the costs of a *transmission system* asset is not attributed to *prescribed transmission services* under subparagraphs (1) and (2), that portion is to be attributed to *prescribed entry services* and *prescribed exit services*.

Stand-alone amount is defined as:

For a *category of prescribed transmission services*, the costs of a *transmission system* asset that would have been incurred had that *transmission system* asset been developed, exclusively to provide that *category of prescribed transmission services*.

It should be noted that TransGrid has obtained legal advice in relation to clause 11.6.11(c)(2), which deals with grandfathering of connection assets. The legal advice is that clause 11.6.11(c)(2) effectively adds a fourth step to the priority ordering. The remainder of this appendix, however, is focused on the first three steps as required by clause 6A.23.2(d).

In its rule determination the AEMC provided the following guidance on the application of the priority ordering approach for the allocation of costs which can be attributed to more than one type of service:[5]

> "The Commission has maintained a priority ordering approach for the allocation of expenses or costs which can be attributed to more than one type of service. The cascading principle adopted by the Commission is based on the premise that users are seen to be the 'cause' of transmission investment. Therefore, costs should be first allocated to prescribed transmission use of system services on a stand-alone basis and then to *prescribed common transmission services*. Where a service/cost cannot justifiably be attributed to TUOS or common services it should be allocated to entry and exist services."

In developing this methodology TransGrid has had regard for the following example in the rule determination:[6]

Consider a substation costing $30 million that was developed:

- partly in order to provide *prescribed TUOS services*;

[5] AEMC, *Rule Determination for National Electricity Amendment (Pricing of Prescribed Transmission Services) Rule 2006*, p5.
[6] Ibid p37.

- partly in order to provide *prescribed common transmission services*; and
- partly in order to provide *prescribed exit services*.

Then assume that had the substation been developed solely to provide *prescribed TUOS services*, it could have been much smaller and would have cost only $10 million. Had the substation been developed solely in order to provide *prescribed common transmission services*, it would have cost $5 million. Finally, had the substation been developed solely in order to provide *prescribed exit services*, it would have cost $20 million.

The application of the principle would then lead to the $30 million cost of the substation being attributed to Prescribed Transmission Service categories as follows:

- $10m to the *prescribed TUOS services ASRR*;
- $5m to the *prescribed common services ASRR*; and
- the remaining $15 million to the prescribed exit service *ASRR*.

Objective and General Approach

The proposed allocation methodology relies on the assumption that substation infrastructure and establishment costs are proportionate to the number of high voltage circuit breakers in the substation.

Based on this assumption the appropriate allocator for substation infrastructure and establishment costs for a stand-alone arrangement is the ratio of the number of high voltage circuit breakers[7] in the stand-alone arrangement to the number of high voltage circuit breakers in the whole substation.

Proposed Methodology

Step 1: Branch Identification

Identify the branches,[8] being the lines, transformers, major reactive devices and exits/entries in the substation which provide prescribed TUOS, *prescribed common transmission services* and exit or entry services, in the substation.

Step 2: Allocation of Circuit Breakers to Branches

For each high voltage circuit breaker in the substation identify the branches directly connected to it. Any circuit breaker that does not directly connect to a branch is excluded from allocation and all costs associated with it are added to the substation infrastructure and establishment cost.

Count the total number of circuit breakers directly connected to branches.

As a general rule, Distribution Network Service Providers (DNSPs) are classified as a prescribed exit service while Generators are classified as a prescribed entry service. Negotiated services are not part of the regulated asset base and fall outside the priority ordering process detailed in clause 6A.23.2(d) of the Rules.

Step 3.1: Stand-alone arrangements for Prescribed TUOS

With reference to the number of lines providing *prescribed TUOS services* determine the number of circuit breakers required to provide TUOS services of an equivalent standard on a

[7] Low voltage circuit breakers are not considered in the standalone arrangements.
[8] "Branches" are defined below.

stand-alone basis.[9] The stand-alone configuration is the simplest substation configuration (in the absence of development) had it been developed to provide a prescribed TUOS service. This may be done by way of a look up of typical stand-alone configurations.

Step 3.2: Stand-alone arrangements for Prescribed common transmission services

With reference to the number of lines providing *prescribed TUOS services* and the devices providing *prescribed common service* determine the number of circuit breakers required to provide *prescribed common transmission services* of an equivalent standard on a stand-alone basis. The stand-alone configuration is the simplest substation configuration (in the absence of development) had it been developed to provide a *prescribed common service*. This may be done by way of a look up of typical stand-alone configurations.

Step 4: Allocation of substation infrastructure and establishment costs

Step 4.1: Allocation of Prescribed TUOS

Allocate a portion of substation infrastructure and establishment costs to prescribed TUOS according to the ratio of the high voltage circuit breakers identified in step 3.1 to the total number of high voltage circuit breakers connected to branches in the substation identified in step 2.

Step 4.2: Calculate the Unallocated Substation Infrastructure Costs after TUOS Allocation

Calculate the Unallocated substation infrastructure cost by subtracting the amount calculated in step 4.1 from the total substation infrastructure amount.

Step 4.3 Allocation of Prescribed Common Service

Allocate a portion of the substation infrastructure and establishment costs to *prescribed common service* based on to the ratio of the high voltage circuit breakers providing *prescribed common transmission services* identified in step 3.2 to the total number of high voltage circuit breakers connected to branches in the substation. If the common service portion of substation infrastructure is greater than the Unallocated costs, then the Unallocated portion only is attributed to *prescribed common service*. In this instance, nothing will be attributed to *prescribed entry and prescribed exit services*.

Step 4.4: Calculate the Unallocated Substation Infrastructure Costs after Common Service Allocation

Calculate the Unallocated substation infrastructure cost by subtracting the amount calculated in step 4.3 from the amount calculated in step 4.2.

Step 4.5: Allocation of Prescribed Entry and Exit Service

Allocate the remaining substation infrastructure and establishment costs (calculated in step 4.4) to each branch providing prescribed exit or entry services based on the ratio of the high voltage circuit breakers providing the entry or exit service to the branch to the total number of high voltage circuit breakers providing entry or exit services or in accordance with the cost allocation process.

Notes

Costs are only allocated in step 4 until fully allocated.

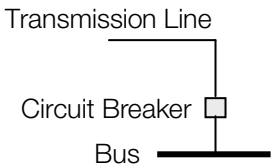
[9] Whilst an argument can be made that a substation would typically not exist to provide TUOS services alone it is believed that this is inconsistent with the intent of the rule. Accordingly standalone arrangements for prescribed TUOS are taken to require a level of switching consistent with the prevailing bus arrangements.

- Consistent with clause 6A.23.2(d)(3) of the Rules it is possible that no costs will be attributed to entry and exit services.
- New and existing negotiated service assets are excluded from the analysis as any incremental establishment costs associated with them are taken to be included in the negotiated services charges on a causation basis.
- The assessment of standalone arrangements only needs to be conducted once per substation except where changes to the configuration of the substation occur.

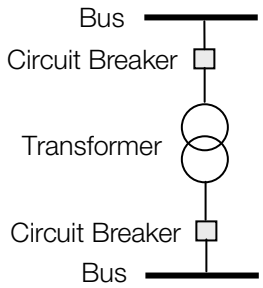
Definitions and examples are set out on the following pages.

Definition - Branches

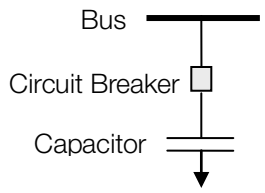
As illustrated by the diagrams below a "Branch" is a collection of assets (e.g. lines, circuit breakers, capacitors, buses and transformers) that provide a transmission service.



Branch with Transmission Line, Bus and Circuit Breaker



Branch with Transformer, Circuit Breaker and two Busses



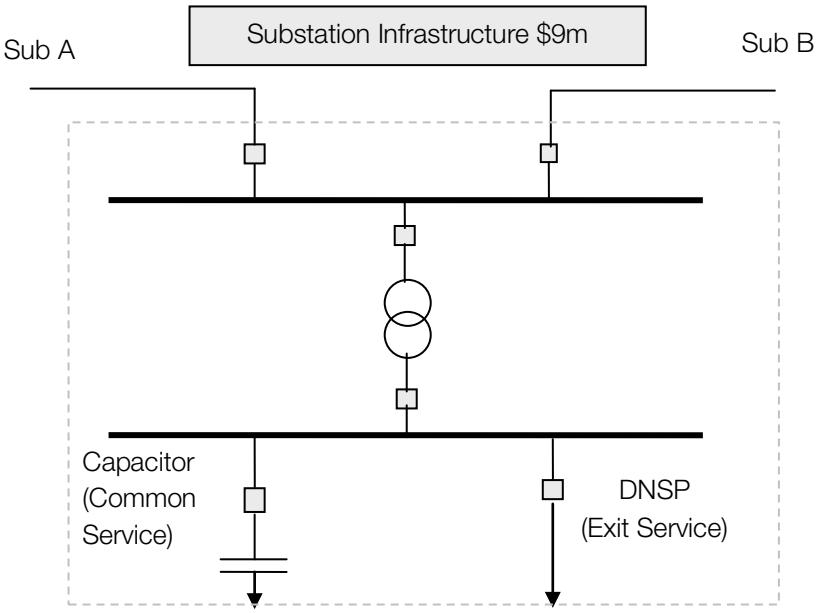
Branch with Capacitor, Circuit Breaker and Bus

Examples are set out on the following pages.

Examples

Example A

The substation configuration is shown in the diagram below.



Step 1: The branches are Sub A, Sub B, DNSP, Tie Transformer and PCS.

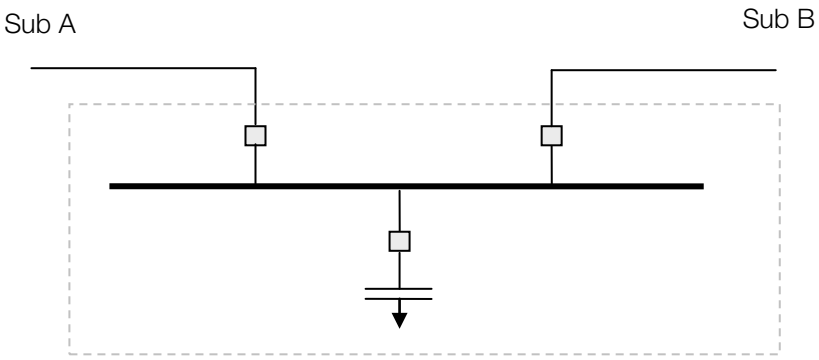
Step 2: The total number of circuit breakers directly connected to branches is 6.

Step 3.1: The stand-alone arrangement for the provision of *prescribed TUOS services* to an equivalent standard is shown below and consists of 2 circuit breakers.

Stand Alone Prescribed TUOS Service

Step 3.2: The stand-alone arrangement for the provision of *prescribed common transmission services* to an equivalent standard is shown below and consists of 3 circuit breakers.

Stand Alone Prescribed Common Service



Step 4:

Assume total Infrastructure cost is $9m.

Costs are allocated to prescribed TUOS in the ratio of the circuit breakers in the stand-alone arrangement to the total circuit breakers.

Infrastructure Cost Allocated to TUOS = (2/6) x $9m = $3m

Unallocated = $9m - $3m = $6m

Costs are allocated to *prescribed common service* in the ratio of the circuit breakers in the stand-alone arrangement to the total circuit breakers.

Infrastructure Cost allocated to Common Service = (3/6) x $9m = $4.5m

Unallocated = $6m - $4.5m = $1.5m

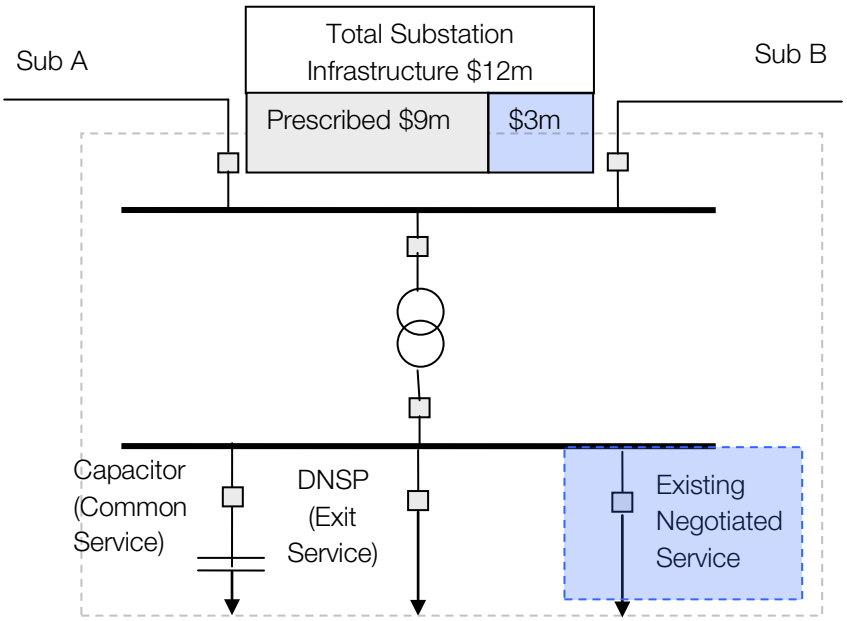
Remainder of Unallocated (calculated above) to be allocated to *prescribed entry and prescribed exit services*.

Infrastructure Cost allocated to Exit = $1.5m

Item	Number	Allocation	Unallocated
Substation infrastructure costs		9,000,000	9,000,000
Total breakers	6		
TUOS stand-alone breakers	2		
Share to TUOS	0.333	3,000,000	6,000,000
Common Service stand-alone breakers	3		
Share to Common Service	0.500	4,500,000	1,500,000
Share to Entry and Exit services		1,500,000	

Example B

The substation configuration is shown in the diagram below.



Step 1: The branches are Sub A, Sub B, DNSP, Tie Transformer, PCS and an existing negotiated service.

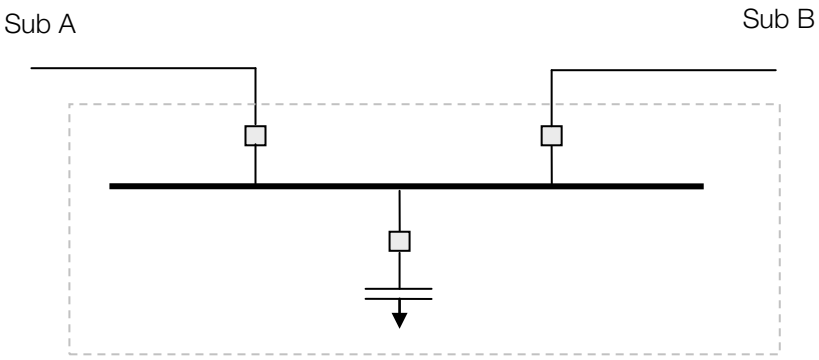
Step 2: The total number of circuit breakers directly connected to branches is 6 (no prescribed costs are allocated to the existing negotiated service).

Step 3.1: The stand-alone arrangement for the provision of *prescribed TUOS services* to an equivalent standard is shown below and consists of 2 circuit breakers.

Stand Alone Prescribed TUOS Service

Step 3.2: The stand-alone arrangement for the provision of *prescribed common transmission services* to an equivalent standard is shown below and consists of 3 circuit breakers.

Stand Alone *Prescribed Common Service*



Step 4:

Assume total Infrastructure cost is $12m, however $3m is for the existing negotiated service, which does not form part of the regulated asset base and is not governed by 6A.23.2(d).

Costs are allocated to prescribed TUOS in the ratio of the circuit breakers in the stand-alone arrangement to the total circuit breakers.

Infrastructure Cost Allocated to TUOS = (2/6) x $9m = $3m

Unallocated = $9m - $3m = $6m

Costs are allocated to *prescribed common service* in the ratio of the circuit breakers in the stand-alone arrangement to the total circuit breakers.

Infrastructure Cost allocated to Common Service = (3/6) x $9m = $4.5m

Unallocated = $6m - $4.5m = $1.5m

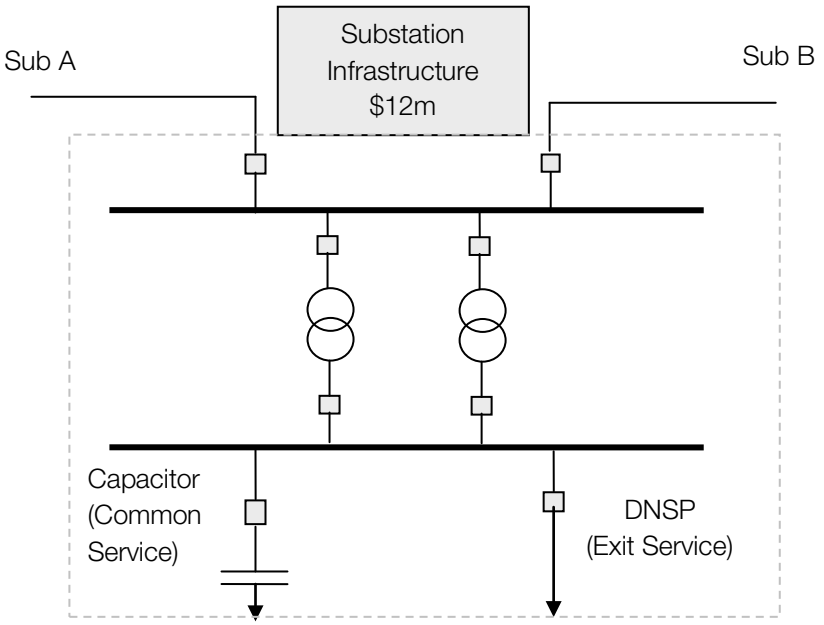
Remainder of Unallocated (calculated above) to be allocated to *prescribed entry and prescribed exit services*.

Infrastructure Cost allocated to Exit = $1.5m

Item	Number	Allocation	Unallocated
Substation infrastructure costs		9,000,000	9,000,000
Total breakers	6		
TUOS stand-alone breakers	2		
Share to TUOS	0.333	3,000,000	6,000,000
Common Service stand-alone breakers	3		
Share to Common Service	0.500	4,500,000	1,500,000
Share to Entry and Exit services		1,500,000	

Example C

The substation configuration is shown in the diagram below.



Step 1: The branches are Sub A, Sub B, DNSP, Tie Transformer 1, Tie Transformer 2 and PCS.

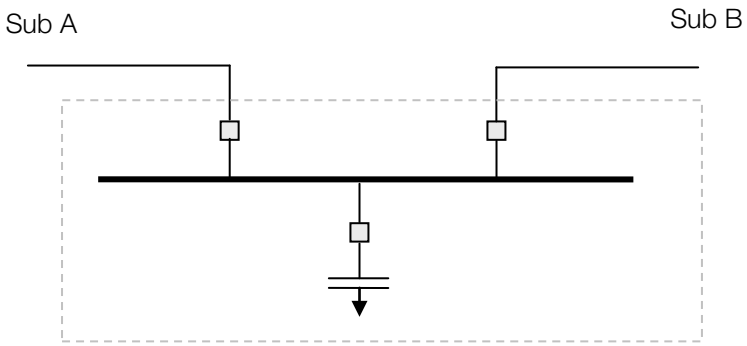
Step 2: The total number of circuit breakers directly connected to branches is 8.

Step 3.1: The stand-alone arrangement for the provision of *prescribed TUOS services* to an equivalent standard is shown below and consists of 2 circuit breakers.

Stand Alone Prescribed TUOS

Step 3.2: The stand-alone arrangement for the provision of *prescribed common transmission services* to an equivalent standard is shown below and consists of 3 circuit breakers.

Stand Alone *Prescribed Common Service*



Step 4:

Assume total Infrastructure cost is $12m.

Costs are allocated to prescribed TUOS in the ratio of the circuit breakers in the stand-alone arrangement to the total circuit breakers.

Infrastructure Cost Allocated to TUOS = (2/8) x $12m = $3m

Unallocated = $12m - $3m = $9m

Costs are allocated to *prescribed common service* in the ratio of the circuit breakers in the stand-alone arrangement to the total circuit breakers.

Infrastructure Cost allocated to Common Service = (3/8) x $12m = $4.5m

Unallocated = $9m - $4.5m = $4.5m

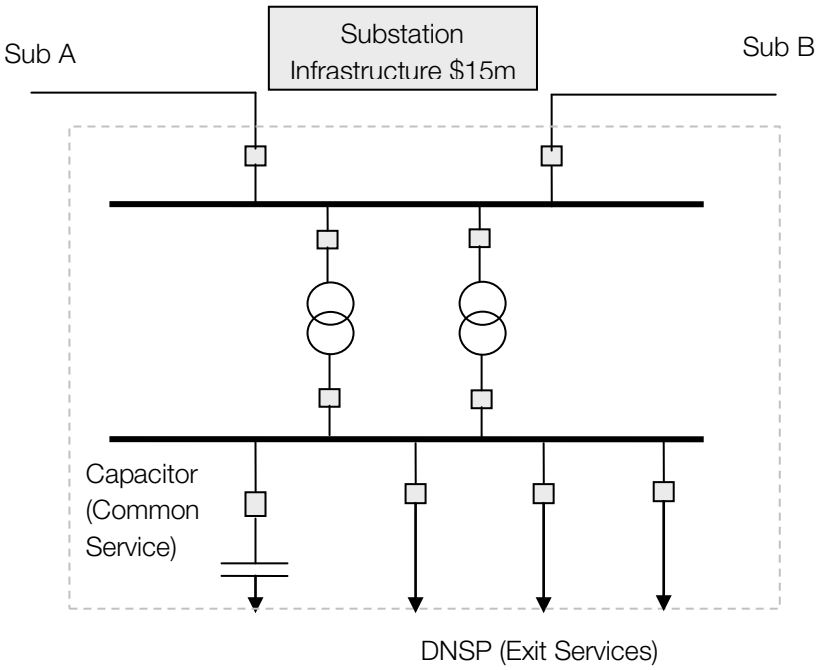
Remainder of Unallocated (calculated above) to be allocated to *prescribed entry and prescribed exit services*.

Infrastructure Cost allocated to Exit = $4.5m

Item	Number	Allocation	Unallocated
Substation infrastructure costs		12,000,000	12,000,000
Total breakers	8		
TUOS stand-alone breakers	2		
Share to TUOS	0.250	3,000,000	9,000,000
Common Service stand-alone breakers	3		
Share to Common Service	0.375	4,500,000	4,500,000
Exit service		4,500,000	

Example D

The substation configuration is shown in the diagram below.



Step 1: The branches are Sub A, Sub B, DNSP1, DNSP2, DNSP3, Tie Transformer 1, Tie Transformer 2 and PCS.

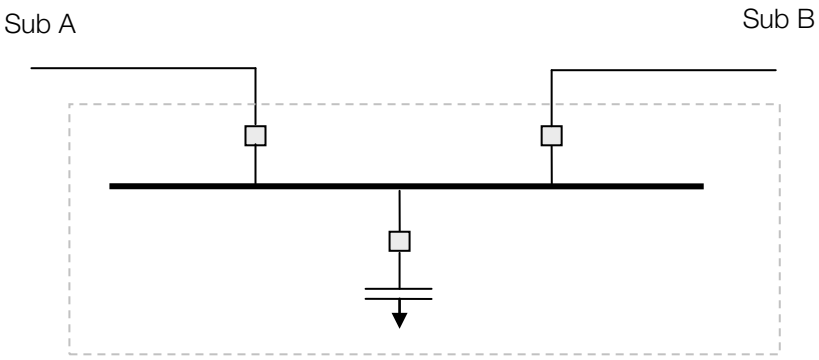
Step 2: The total number of circuit breakers directly connected to branches is 10.

Step 3.1: The stand-alone arrangement for the provision of *prescribed TUOS services* to an equivalent standard is shown below and consists of 2 circuit breakers.

Stand Alone Prescribed TUOS

Step 3.2: The stand-alone arrangement for the provision of *prescribed common transmission services* to an equivalent standard is shown below and consists of 3 circuit breakers.

Stand Alone *Prescribed Common Service*



Step 4:

Assume total Infrastructure cost is $15m.

Costs are allocated to prescribed TUOS in the ratio of the circuit breakers in the stand-alone arrangement to the total circuit breakers.

Infrastructure Cost Allocated to TUOS = (2/10) x $15m = $3m

Unallocated = $15m - $3m = $12m

Costs are allocated to *prescribed common service* in the ratio of the circuit breakers in the stand-alone arrangement to the total circuit breakers.

Infrastructure Cost allocated to Common Service = (3/10) x $15m = $4.5m

Unallocated = $12m - $4.5m = $7.5m

Remainder of Unallocated (calculated above) to be allocated to *prescribed entry and prescribed exit services*.

Infrastructure Cost allocated to Exit = $7.5m

Item	Number	Allocation	Unallocated
Substation infrastructure costs		15,000,000	15,000,000
Total breakers	10		
TUOS stand-alone breakers	2		
Share to TUOS	0.200	3,000,000	12,000,000
Common Service stand-alone breakers	3		
Share to Common Service	0.300	4,500,000	7,500,000
Exit service		7,500,000	

Attachment 1 – Inter-regional Transmission Charging

1. Introduction

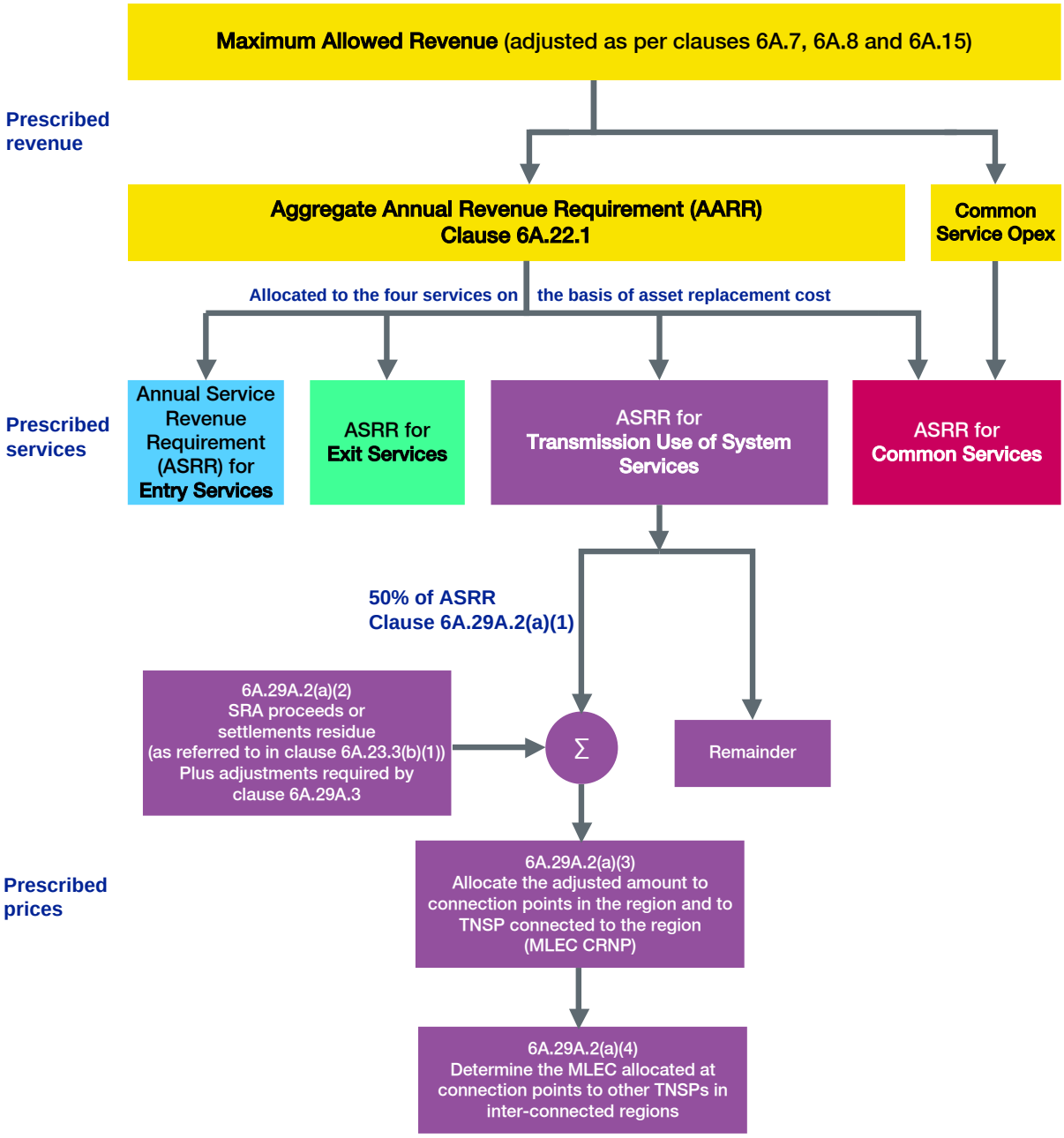
As the appointed Co-ordinating Network Service Provider referred to in Clause 6A.29.1 of the Rules, TransGrid will calculate the AARR for the NSW region; and will calculate, bill and arrange for the payment of the modified load export charge (MLEC) in accordance with 6A.29A of the Rules and the Section 2.6 of the AER's guidelines.

TransGrid will publish details of all modified load export charges to apply in the following financial year on its website by 15 March each year consistent with clause 6A.24.2(b) of the Rules.

The inter-regional transmission charging arrangement allows transmission businesses to levy a modified load export change on transmission businesses in neighbouring regions. Transmission load customers would subsequently pay a share of the costs of transmission used to import electricity into their region from neighbouring regions.

2. Overview of the process

An overview of the process to calculate MLEC is shown in the diagram below.



The steps involved to calculate MLEC are:

Step 1:

The AARR will be calculated as described in section 5 of TransGrid's proposed pricing methodology.

The allocation of the AARR to each of the transmission service categories will be calculated as described in Section 6 of TransGrid's proposed pricing methodology. This will determine the ASRR to be recovered from prescribed TUOS services. The calculations in Step 1 are the same as for calculating transmission prices.

Step 2:

As required by Clause 6A.29A.2(a)(1) of the Rules, the modified load export charge is to be calculated from 50% of the ASRR for prescribed TUOS services.

Step 3:

The amount determined in Step 2 is the TUOS revenue to be recovered on a locational basis and is adjusted in accordance with Clause 6A.29A.2(a)(2) of the Rules by:

- subtracting estimated inter-regional settlements residue auction proceeds;
- subtracting a portion of the settlements residue as referred to in clause 6A.23.3(b)(1);
- including any adjustments as required by 6A.29A.3.

Step 4:

Clause 6A.29A.2(b)(3) requires the adjusted amount from Step 3 to be allocated to connection points of transmission customers in the NSW region and to CNSPs interconnected to the NSW region as if they were connected as transmission customers. This allocation will be made on a proportionate use of transmission system assets. Consistent with the requirements of Clause 6A.29A.2(b)(3), TransGrid will only use the MLEC CRNP methodology for estimating the proportionate use of the relevant transmission system assets.

TransGrid applies the CRNP methodology using the T-PRICE cost reflective network pricing software used by all TNSPs in the NEM.

The CRNP methodology requires three sets of input data:

- an electrical (load flow) model of the network;
- a cost model of the network; and
- a set of load/generation patterns.

Appendix B of TransGrid's Pricing Methodology describes the CRNP methodology in more detail.

The network model differs slightly from the network model used for price determination as described in the proposed pricing methodology. The network model in the MLEC CRNP methodology does not require SRA proceeds to be converted into an equivalent asset as described in Section 7.3.1 of the proposed pricing methodology.

The key requirements for MLEC CRNP are:

- The modified load export charge to be determined using standard CRNP approach.
- All transmission elements are to be included.
- All half hour periods in the previous full financial year are to be used.
- Peak usage of assets must be used.

For each regulatory year TransGrid will calculate the modified load export charge using the MLEC CRNP approach. The calculation will use generation and load data from the previous financial year completed at the time the MLEC CRNP is being calculated.

Step 5:

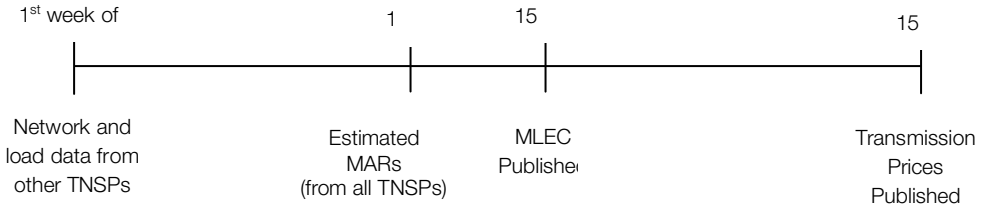
Clause 6A.29A.2(b)(4) requires the modified load export charge to be recovered from Co-ordinating Network Service Providers in interconnected regions to be the amount allocated to connection points to neighbouring regions as determined in Step 4.

3. Timetable for the provision of data

As required by 6A.29A.4(e), each TNSPs located in the NSW region is required to provide TransGrid with all information reasonably required for the calculation of the MLEC estimate.

To facilitate this information transfer, the Section 2.6 of the AER guidelines require a CNSP to specify a timetable for the provision of all necessary data for the calculation of the inter-regional and intra-regional transmission charges.

The following timetable for the provision of data will facilitate the calculation of all modified load export charges to apply in the NSW region by 15 March each year.



4. Billing the modified load export charge

TransGrid will issue a monthly bill to the CNSP in each interconnected region for the MLEC amount payable to TransGrid in accordance with Clause 6A.29A.4(a) of the Rules. The monthly bills will include any adjustments made to it in accordance with the Rules (Clause 6A.29A.3 of the Rules).

In accordance with Clause 6A.29A.4(b) of the Rules, the monthly bill will include:

- The total annual estimate of MLEC payable by the CNSP.
- Details of the MLEC CRNP allocation and the adjustments as specified in Clauses 6A.29A.3 and 6A.23.3(f)
- The monthly instalment amount

5. Billing arrangements between multiple TNSPs in a region

5.1 Allocation of amounts to each TNSPs in the same region

In accordance with clause 6A.29A.5(a) of the NER, where there is more than one TNSP in a region, the CNSP must allocate any amounts receivable or payable to it for MLEC to each TNSP.

As the appointed Co-ordinating Network Service Provider referred to in Clause 6A.29.1 of the Rules, TransGrid will allocate any amounts receivable or payable for MLEC to each relevant Transmission Network Service Provider in the NSW region for the following year as required by clause 6A.29A.5 of the Rules.

This allocation will be based on the MLEC CRNP methodology for estimating the proportionate use of the relevant transmission system assets. The allocation of amounts will be calculated according to intra-regional, rather than inter-regional, network utilisation. For the avoidance of doubt, these amounts will be incorporated in the connection point prices determined by TransGrid for each TNSP in the NSW market region.

5.2 Billing each TNSP in the same region

TransGrid will issue a bill to each TNSP in the NSW region for the net amount of MLEC as required in clause 6A.29A.5(b) of the Rules to be paid in equal monthly instalments or as documented in revenue collection agreements negotiated between the parties. Such payments will be calculated by TransGrid. TransGrid will also provide reasonable details on the calculation of these amounts.

6. Worked example – modified load export charge

The worked example uses the same amounts referred to in the examples of the proposed pricing methodology.

Step 1 – Aggregate annual revenue requirement (AARR)

In accordance with Clause 6A.22.1, the maximum allowed revenue is adjusted:

1) in accordance with clause 6A.3.2, and
2) by subtracting the operating and maintenance costs expected to be incurred in the provision of prescribed common transmission services; and
3) by any allocation as agreed between Transmission Network Service Providers in accordance with clause 6A.29.3.

This example assumes that the maximum allowed revenue is $2,604,434.

Table A1.1
Derivation of AARR to be allocated to the four services

Derivation	Amount ($)
Maximum allowed revenue	2,604,434
Total adjustments for: • network support pass through; • cost pass through; • payments or penalties under the service target performance incentive scheme; and • contingent projects.	-45,000
Deduct operating and maintenance expenditure (incurred in the provision of prescribed common services)	-55,000
AARR to be allocated	2,504,434

Step 2 – Annual service revenue requirement

Similar to the calculation example in section 6.2 of the proposed pricing methodology, the ASRR for each category of service is calculated as shown in Table A1.2.

Table A1.2
Asset allocations to service categories

Category	Asset Value ($)	Cost Share
Exit service	6,972,222	16.2%
Entry service	1,761,111	4.1%
TUOS service	33,566,667	78.0%
Common service	750,000	1.7%
Total	**43,050,000**	**100.0%**

The cost share percentages shown in Table A1.2 are used to allocate the revenue to be recovered from each service category. In accordance with the adjustments set out in Table A1.1, Table A1.3 shows that the revenue to be allocated (the AARR) is $2,504,434.

Table A1.3
Calculation of Annual Service Revenue Requirements (ASRR)

Category	Cost Share	Revenue (AARR) to be recovered from each service ($)
Exit service	16.2%	405,609
Entry service	4.1%	102,453
TUOS service	78.0%	1,952,741
Common service	1.7%	43,631
Total	**100.0%**	**2,504,434**

Clause 6A.29A.2(a)(1) then requires 50% of the ASRR for prescribed TUOS services to be calculated.

Category	Asset Value ($)
50% of TUOS service	976,371

Step 3 – Adjustment for settlement residue auction proceeds

For this example the SRA proceeds and other adjustments are assumed to be zero.

Step 4 – Standard CRNP Calculation

An electrical model of the NSW transmission network is set up including all transmission elements. The TPRICE software is used to calculate the allocation of costs based on a proportionate use of transmission system assets.

For the NSW network, TPRICE is used to determine the cost allocation for each TNSP separately within the market region. The total allocation to each connection point to another region is then determined.

Table A1.5
Standard CRNP allocation and I/C cost share

Connection Point	CRNP ORC Allocation ($k)	Cost Share
Dederang	1,000	3%
Red Cliffs	300	1%
Wodonga	500	1%
Queensland via Directlink	600	2%
QNI	400	1%
Total for I/C connection points	**2,800**	**8%**
Total for all connection points	**33,566,667**	

Step 5 – Modified load export charge to be recovered

The revenue to be recovered is pro-rated using the adjusted AARR from Step 2.

Table A1.6
Modified load export charge

Connection Point	Cost Share	Revenue to be recovered from each connection point ($)
Dederang	3%	29,087
Red Cliffs	1%	8,726
Wodonga	1%	14,543
Modified load export charge for the Victorian region		**52,356**
Queensland via Directlink	2%	17,452
QNI	1%	11,635
Modified load export charge for the Queensland region		**29,089**

7. Worked example – allocation and billing to other TNSPs in NSW region

The allocation of net MLEC to each TNSP in the NSW region is based on the CRNP cost allocations to connection points. This allocation broken up on a TNSP basis is shown in Table A1.7.

This allocation of net MLEC is performed in accordance with the rule requirement 6A.29A.5(b) that requires a CNSP to issue a bill to each TNSP within the region of the net MLEC payable or receivable. In actual fact, the net MLEC amount is already included in the calculated prices for each TNSP, so there is no net MLEC amount to be transferred to or

from the CNSP. This calculation is solely for information purposes and to satisfy rule 6A.29A.5.

Table A1.7
CRNP allocation on a TNSP basis

TNSPs in NSW	CRNP ORC Allocation ($k) Victoria	CRNP ORC Allocation ($k) Queensland	Total CRNP ORC Allocation ($k) to each TNSP
TransGrid	1,780	880	2,660
Ausgrid	8	4	12
Essential Energy	3	22	25
Directlink	9	94	103
ActewAGL	0	0	0
Total for I/C connection points	**1,800**	**1,000**	**2,800**

The net MLEC amount allocated to each TNSP is then obtained by pro-rating the total MLEC amounts from Table A1.6 by the CRNP allocation in Table A1.7 as shown in Table A1.8.

Table A1.8
Calculation of MLEC attributed to each TNSP in the NSW region

TNSPs in NSW	Net MLEC for the Victorian region ($k)	Net MLEC for the Queensland region ($k)	Net MLEC for each TNSP ($k)
TransGrid	51,774.27	25,598.32	77,373
Ausgrid	232.69	116.35	349
Essential Energy	87.26	639.96	727
Directlink	261.78	2,734.37	2,996
ActewAGL	0	0	0
Total net MLEC for each interconnecting region	**52,356**	**29,089**	**81,445**