TRANSPOWER

Guide to the TPM

On 12 April 2022, the Electricity Authority announced its decision to adopt a new transmission pricing methodology (TPM). The TPM applies to transmission charges payable by Transpower's transmission customers from 1 April 2023.

The TPM determines how Transpower recovers its maximum allowable revenue from its transmission customers through transmission charges. Transpower's maximum allowable revenue is set by the Commerce Commission to reflect the annual cost of owning and operating the national electricity transmission network (the grid).

Legal disclaimer

This document provides a high-level overview of the relevant subject matter only.

Transpower recommends you review the TPM itself and seek independent expert advice before relying on anything in this guide.

Transpower cannot, and does not, accept any liability for the accuracy or completeness of this guide or the consequences of your or others' reliance on it.

If you provide this guide or an extract from it to any other person you must include this disclaimer.

Further information

This guide provides an overview of the TPM. The TPM is in Schedule 12.4 of the Electricity Industry Participation Code. Readers are encouraged to also consult information on the Authority's website.

Transpower's website has information on grid pricing and implementation of the TPM, including a series of information sheets to assist stakeholders to understand each of the main components of the TPM.

Version history for this guide

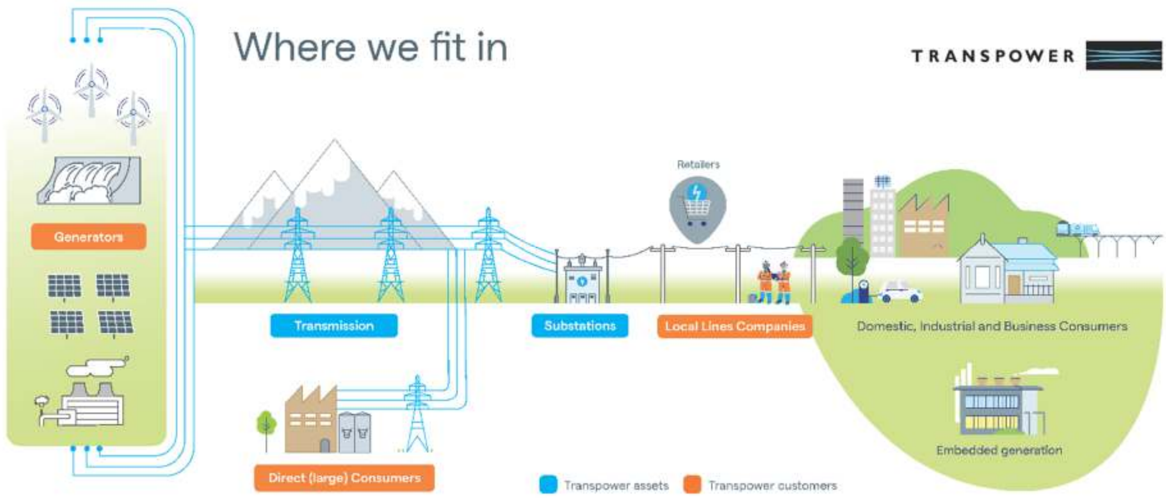
Version	Published	Key amendments compared to previous version
1	31 August 2022	n/a
2	26 January 2023	General updates including to align with information sheets published during 2022

1 Overview of the TPM

1.1 The Commission sets Transpower's revenue and the Authority determines the TPM

Under Part 4 of the Commerce Act, the Commerce Commission (**Commission**) sets the total revenue Transpower, as the owner and operator of the grid, can recover each year (Transpower's maximum allowable revenue).

Transpower recovers this revenue through transmission charges payable by anyone directly connected to the grid: generators, distributors (local lines companies) and some large consumers. These are Transpower's transmission customers - referred to as just "customers" from here on.



The Electricity Authority (**Authority**)'s transmission pricing methodology (**TPM**) specifies how Transpower must calculate transmission charges.

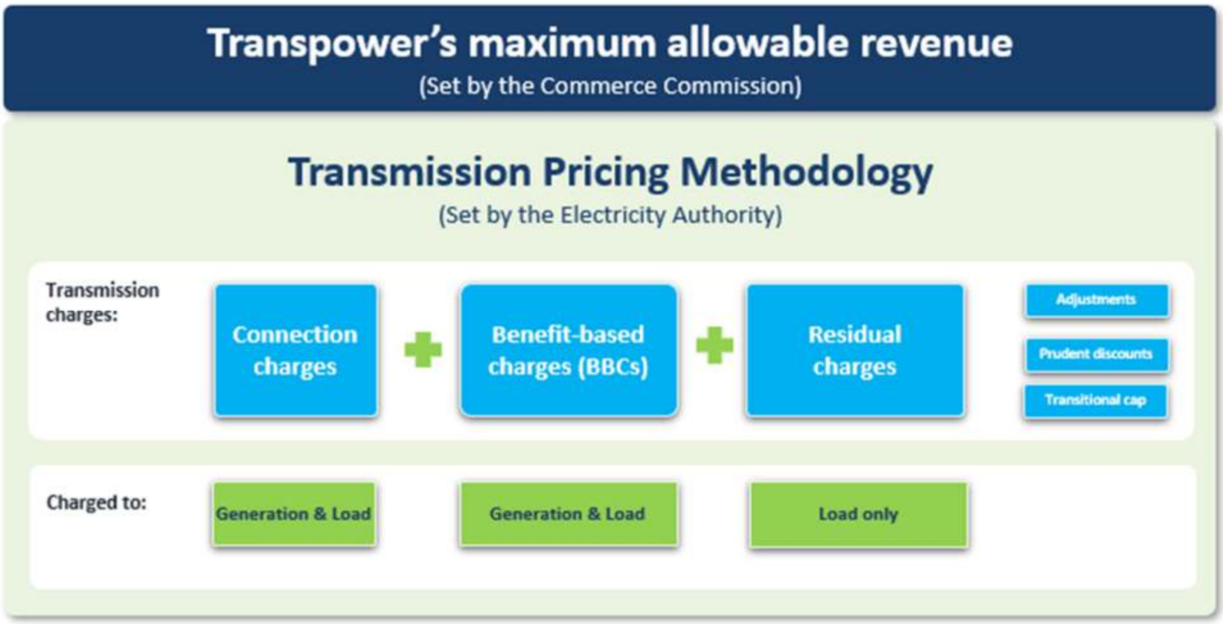
1.2 The TPM's main components

Figure 2 illustrates the main components of the TPM. These are:

- **Connection charges**, which recover the cost of assets that connect individual customer(s) to the interconnected grid and are paid by those customers.
- **Benefit-based charges (BBCs)** for new and some historic interconnection investments, paid by the customers who are expected to benefit from them. These investments are called benefit-based investments (**BBIs**). There are three broad categories of BBI: Appendix A BBIs (the seven historic interconnection investments specified in Appendix A of the TPM), high-value post-2019 BBIs (post July-2019 interconnection investments over $20 million) and low-value post-2019 BBIs (post July-2019 interconnection investments $20m or less).
- **Residual charges**, which recover residual revenue (maximum allowable revenue less all other transmission charges). Residual charges are allocated according to each customer's gross load, whether the load is supplied from the grid or from embedded generation and regardless of

season or time-of-use. The Authority intends this allocation method to minimise distortions to customer decisions on investment and grid use.

The TPM also includes provisions for amending transmission charges - adjustment events, reassignment and prudent discounts (in specific circumstances). There is also a transitional price cap.



1.3 Transpower's role is to implement the TPM

Transpower was required to develop a proposed new TPM in line with the Authority's 2020 TPM Guidelines[1] by 30 June 2021. The Authority accepted most of Transpower's TPM proposal, and made some specific, targeted changes.

The Authority's 2022 decision to adopt the new TPM triggered Transpower's obligation to implement it in transmission charges from 1 April 2023 (pricing year (**PY**) 2023/24).

Transpower has no role in how transmission charges are passed through by distributors (or other customers) to end-consumers:

- Distributors choose how to pass through transmission charges to their customers (electricity retailers mostly) by re-packaging them into distribution charges.
- Retailers then re-package distribution charges, along with wholesale energy and other costs, into the final retail pricing they offer consumers.

[1] Transmission pricing methodology: 2020 Guidelines, 10 June 2020.

2 Connection charges

Connection charges recover Transpower's costs of providing connection services. The connection charges for a particular connection asset are paid by the customer(s) connected to it.

Capital charges for connection asset investments agreed between Transpower and a customer under an investment agreement (e.g. a Transpower Works Agreement) are not recovered via connection charges under the TPM.

Connection charges under the new TPM are calculated in largely the same way as connection charges under the previous TPM. The main difference is the mechanisms introduced to deal with first mover disadvantage (**FMD**). These mechanisms apply to connection assets commissioned on or after 1 April 2023.

2.1 A funded asset component to address Type 1 FMD (free riders)

Type 1 FMD arises if the first connecting customer (the first mover) pays for a connection asset under an investment agreement (referred to as a "funded asset") and continues to bear the full capital cost under that agreement even after other customers connect to the asset. It is a type of free-rider problem which may cause customers to delay their connection to avoid being a first mover, potentially slowing investment in new renewable generation or the electrification of load.

The TPM addresses Type 1 FMD using a funded asset component (**FAC**) mechanism. The mechanism works by collecting, via connection charges, a financial contribution to the capital cost of a connection asset funded by a first mover under an investment agreement from later connecting customers (the FAC) and rebating it to the first mover.

The FAC mechanism uses connection charges to simulate a commercial outcome that might reasonably have been agreed between the first mover and subsequent connecting customer(s), had they been able to do so.

2.2 A mechanism to address Type 2 FMD (anticipatory connection assets)

Type 2 FMD arises if first movers carry the cost, or part of the cost, of anticipatory connection assets (including anticipatory additional capacity in connection assets) until later customers and load arrive. Again, this may cause customers to delay their connection to avoid being a first mover.

The Type 2 FMD mechanism in the TPM spreads the capital cost of an anticipatory connection asset investment over a larger set of customers than just the first movers by:

- recovering half of the capital cost by "pooling and sharing" it through the asset components of connection charges for other connection assets
- recovering the other half of the capital cost through BBCs for a notional asset (called an "anticipatory BBI"), the allocations for which are calculated using a modified form of the simple method for calculating BBC allocations under the TPM (see section 3 below).

Absent the Type 2 FMD mechanism, first movers would be charged for an anticipatory connection asset they do not need or use, and would not necessarily know how long they will continue to be charged for it.

3 Benefit-based charges

The costs of new and some historic interconnection investments (benefit-based investments or BBIs) are allocated to the expected customer beneficiaries of those investments through benefit-based charges (BBCs).

BBIs include new interconnection assets, investments in the replacement and refurbishment of existing interconnection assets, and transmission alternatives that avoid or defer the need to invest in interconnection assets.

A customer is expected to be a beneficiary of a BBI if the customer has expected positive net private benefit (**EPNPB**) from the BBI. A customer's starting BBC allocation for the BBI is the customer's share of total EPNPB.

The cost recovered through the BBCs for a BBI is referred to as the BBI's "covered cost". A BBI's covered cost includes capital components (return on and of investment) and an allocation of Transpower's total operating costs (including overheads). Covered cost is calculated annually, for each BBI.

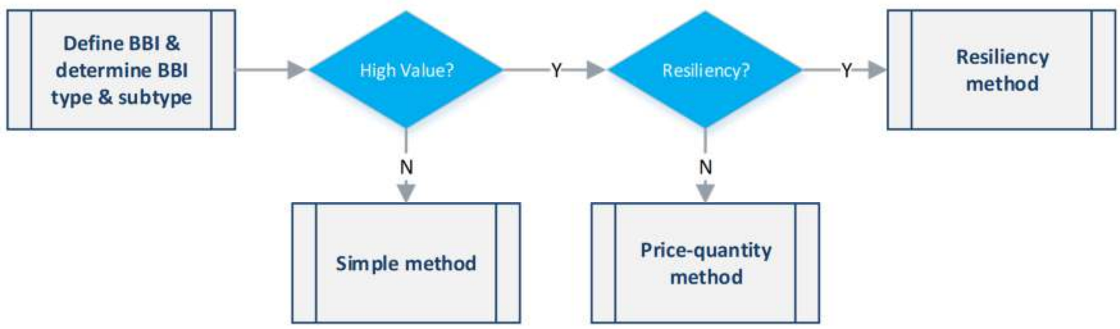
3.1 BBC allocations for historic BBIs – Appendix A of the TPM

The Authority calculated starting BBC allocations for seven historic (pre-July 2019) BBIs and specified these in Appendix A of the TPM. The Appendix A BBIs are:

- Bunnythorpe-Haywards Reconductoring Project
- Pre-July 2019 investments in the HVDC link
- Lower South Island Renewables Project (other than the recent CUWLP investment, which is treated as a separate post-July 2019 BBI)
- Lower South Island Reliability Project
- North Island Grid Upgrade Project
- Upper North Island Dynamic Reactive Support Project
- Wairakei Ring Project.

3.2 BBC allocations for new BBIs – standard and simple methods

The TPM contains different methods for calculating EPNPB, and therefore starting BBC allocations, for post- 2019 BBIs. There is one simple method and two standard methods (the resiliency and price-quantity methods), as shown below.



Determine BBC method for Interconnected Grid Investment

The simple method is used to calculate EPNPB and starting BBC allocations for post-2019 BBIs that, at the time of the investment decision, are expected to cost $20m or less (low-value post-2019 BBIs).[2]

The two standard methods are used to calculate EPNPB and starting BBC allocations for post-2019 BBIs that, at the time of the investment decision, are expected to cost over $20m (high-value post-2019 BBIs).

- The resiliency method must be used where the primary purpose of the high-value post-2019 BBI is to mitigate a risk of cascade failure or another high impact, low probability event resulting in unserved or unsupplied energy (referred to as a "resiliency BBI").
- The price-quantity method must be used for all high-value post-2019 BBIs that are not resiliency BBIs. The price-quantity method calculates EPNPB based on price and quantity changes (with and without the BBI) in the wholesale markets for electricity and ancillary services and changes in reliability (unserved or unsupplied energy). Subject to certain limits, under the price-quantity method Transpower may also take into account other costs and benefits that arise outside electricity markets, such as aesthetic or safety improvements.

Both standard methods involve determining regional customer groups of beneficiaries (and, under the price-quantity method, the regional net private benefit (**NPB**) for each regional customer group) and then calculating individual NPBs for the customers in those groups based on historical grid use, mostly grid offtake or injection. The individual NPBs with positive values (each beneficiary's EPNPB) are then used to calculate the starting BBC allocations for the relevant BBI.

Like the standard methods, the simple method uses modelled regions and regional customer groups with regional NPB. A key difference is the regional customer groups and regional NPBs are

2 The $20m threshold is set to match the base capex threshold in the Transpower Capex Input Methodology.

static - they apply to all low-value post-2019 BBIs commissioned during a (usually) five-year simple method period, after which the regions, regional customer groups and regional NPBs are reset. The starting BBC allocations for previously commissioned low-value post-2019 BBIs do not change.

The TPM requires that 67.5% of the covered cost of any low-value post-2019 BBI is allocated to offtake customers (load) and 32.5% to injection customers (generation).

4 Residual charges

Residual charges recover the part of Transpower's recoverable revenue not recovered through other transmission charges (residual revenue). Residual charges therefore ensure Transpower recovers its maximum allowable revenue every year.

Residual charges are paid by load customers only, based on their historic maximum gross demand at each connection location. For new and recent load customers, this will be estimated.

Gross load (demand (kW) and energy (kWh)) captures the contribution of non-grid supply to loads, including from non-battery embedded generation. As a result, there may be instances where a customer who does not take electricity off the grid will nevertheless be a load customer and be liable to pay a residual charge on a gross load basis. Gross load excludes contributions from batteries when charging or discharging other than their storage losses.

In summary:

- The initial (baseline) allocations of residual charges are in proportion to load customers' maximum gross demand (kW) averaged across the four financial years (**FYs**) from FY 2014/15 to FY 2017/18, i.e. the period 1 July 2014 to 30 June 2018. For a load customer that did not exist on 1 July 2014, including a new load customer, Transpower estimates maximum gross demand based on the customer's assets and the assets connected to them being fully operational.
- Maximum gross demand is calculated or estimated per-trading period and by reference to coincident gross demand across all points of connection at a connection location.
- Transpower may reduce a load customer's initial allocation if there has been a large (≥ 10MW) and sustained reduction in the customer's maximum gross demand after the end of FY 2014/15 due to an event or circumstance beyond the customer's control.
- Load customers' initial allocations are adjusted annually based on changes in their lagged average gross energy usage (kWh) over the period of four financial years commencing eight financial years ago (e.g. for PY 2023/24 the relevant period is from FY 2015/16 to FY 2018/19).
- A recent or new load customer will not pay a residual charge until it has been connected to the grid for at least four financial years. The load customer's residual charge will then ramp up over the next four years and the adjustments based on lagged average gross energy usage will start after that.

The revenue recovered through residual charges will decrease over time as the revenue recovered through BBCs increases.

5 Amending transmission charges

5.1 Adjustment events

The TPM provides for some specific circumstances in which “step” adjustments to transmission charges must be made, such as when a customer enters or exits, a customer connects or disconnects large (≥ 10MW) plant (grid-connected or embedded), or there is a substantial and sustained change in grid use.

5.2 Reassignment

The TPM provides for a BBI to be “reassigned” if its forecast future loading is substantially less than the BBI’s capacity, i.e. the BBI is deemed to be over-sized ex post. Reassignment takes effect as a reduction in the BBI’s covered cost, so that all beneficiaries’ of the BBI will pay lower BBCs.

Reassignment shifts (reassigns) recovery of part of the BBI’s covered cost from BBCs to residual charges.

There are several conditions for reassignment, including that the BBI must have a current depreciated value of at least $5m (CPI-adjusted), the post-reassignment value of the BBI must be less than 80% of the BBI’s current depreciated value, and the circumstances justifying reassignment must be sustained. Reassignment is generally not available for BBIs that are less than 10 years old.

Reassignment is only available on application to Transpower.

5.3 Prudent discounts

The prudent discount policy in the TPM provides for two types of prudent discount. These are:

- **Inefficient bypass prudent discount (IBPD):** an IBPD is intended to help ensure the TPM does not incentivise a customer to invest in an alternative project (such as alternative lines or new generation) that would allow the customer to reduce its own transmission charges by bypassing the grid but would be inefficient overall in terms of total cost to consumers. An IBPD is granted if the alternative project:
    - would provide the same or substantially similar level of service as the bypassed part of the grid
    - is technically feasible (including from a consenting perspective)
    - is operationally feasible
    - is consistent with good electricity industry practice (GEIP)
    - is commercially viable for the customer
    - would be inefficient overall.

  If an IBPD is granted, the customer’s transmission charges are reduced to what they would be if the alternative project were built and the customer pays Transpower an annuity based on what the cost of the alternative project would be.
- **Stand-alone cost prudent discount (SACPD):** A SCAPD is intended to help ensure the TPM does not result in a customer paying transmission charges that exceed the efficient stand-alone cost

of the transmission services the individual customer receives. A SACPD is granted if there is an alternative project (such as alternative lines or new generation) that:

- is an efficient stand-alone investment that would provide the same or substantially similar level of service as the customer receives from the grid
- is technically feasible (but not necessarily from a consenting perspective)
- is operationally feasible
- is consistent with GEIP
- is commercially viable for the customer.

If a SACPD is granted, the customer's connection charges, BBCs and residual charge are reduced to zero and the customer pays Transpower an annuity based on what the cost of the alternative project would be.

The amount of a prudent discount (net of the annuity paid by the recipient) will be recovered from other customers in proportion to their residual charges and the BBCs they pay for the BBIs to which the prudent discount relates. This is done via prudent discount recovery charges.

A prudent discount is only available on application to Transpower.. Prudent discount applications received within six months of Transpower publishing the application requirements and fees will, if successful, be back-dated to 1 April 2023, even if approved at a later date.

6 Transitional price cap

The TPM contains a transitional price cap which applies to some components of transmission charges. The transitional price cap applies to distributors' and grid-connected consumers' BBCs for the Appendix A BBIs and their residual charges, and caps those charges relative to the distributor's or grid-connected consumer's interconnection and HVDC charges for PY2019/20. It is not a cap on total transmission charges.

The cap only applies to customers in their capacity as a direct consumer or distributor. The cap does not apply to customers in their capacity as a generator (even if the generator is a load customer and pays a residual charge).

Broadly, the cap is set at 3.5% (in real terms, i.e. adjusted for inflation) of the total cost of lines services and electricity paid by the grid-connected consumer or the distributor's customers during pricing year PY 2019/20. If the customer is a grid-connected consumer, the 3.5% cap increases by 2% each pricing year after PY 2024/25. The cap only applies to customers who existed during PY 2019/20 and at least two pricing years before that. The cap ceases to apply to all customers from PY 2038/39.

The cap is "use it or lose it" in nature. The cap does not apply to a customer after the first pricing year the customer does not receive any reduction in their transmission charges as a result of the cap. As a result, only those customers who receive a cap reduction for the first pricing year under the TPM (PY 2023/24) will ever receive one.

Total cap reductions for a pricing year are recovered from all customers (including generators) in proportion to each customer's total annual residual charge and BBCs for the Appendix A BBIs. This is done via cap recovery charges.

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