Settlement Residual Allocation Methodology: principles, options and pass-through

Consultation paper

Submissions close: **5pm 1 March 2022**

18 January 2022

Executive summary

The wholesale electricity market (WEM) generates a surplus, called loss and constraint excess (LCE),[1] as consumers pay more for electricity than generators receive. Some LCE is used in the financial transmission rights (FTR) market. Remaining funds (the remainder of the LCE and FTR auction revenue after FTR payments have been made) are paid to Transpower and then distributed to transmission customers. In this paper we adopt the following terminology:

- "Settlement residue":[2] the balance of funds received by Transpower.
- "Settlement residual allocation methodology" (SRAM): the method used to allocate the above funds amongst transmission customers.
- "Settlement residual rebate":[3] the payment received by a transmission customer.

Settlement residual rebates are currently distributed to transmission customers (including distributors) according to a method developed by Transpower. That method depends on charges defined in the current transmission pricing methodology (TPM) and so becomes obsolete if a new TPM is incorporated into the Code and implemented (which could occur on 1 April 2023 under the Authority's indicative timeline). The Authority is considering replacing the current method with a new SRAM prescribed in the Code.

The simplest form of a new SRAM would be one that allocates settlement residual rebates in proportion to a customer's total transmission charges under the new TPM. However, the settlement residue is a substantial sum, and the SRAM can potentially promote the Authority's statutory objective more than a pro rata allocation would by supporting other incentives for efficient grid use and investment. So in our view it is worthwhile testing whether we are able to develop a SRAM that specifically promotes the statutory objective.

We propose to create principles to guide the development of a new SRAM and to guide any future updates as required. The proposed principles discussed in this paper are as follows:

> *Integrity of the WEM nodal transport charge* – promoting more efficient grid use.
>
> *Integrity of the (proposed) TPM benefit-based charge* – promoting more efficient investment.
>
> *Mitigation of volatility* – providing a partial offset against nodal transport charge volatility.
>
> *Full cost recovery* – avoiding over-payment for grid use.
>
> *Cost and practical considerations* – considering the cost and difficulty of developing, implementing and operating the SRAM.

To provide context and test our early thinking, in addition to a simple allocation in line with total transmission charges we also set out in this paper a potential option for a SRAM that supports the incentives arising from WEM nodal pricing and the proposed new TPM. That option is for a SRAM based on regional allocators from the TPM's benefit-based charge (BBC) simple method.

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1 LCE is otherwise known as transmission rentals, monthly settlement or congestion revenue.

2 Also known as "rentals received".

3 The rebate is also known as an "LCE payment".

The purpose of this consultation is to:

- seek stakeholders' views on the proposed SRAM principles
- seek initial feedback on our early thinking on options to be considered for the SRAM
- test our thinking on the related issue of whether distributors should be required to pass through settlement residual rebates to their own customers.

Relationship with other workstreams

The SRAM consultation is closely linked to two other Authority workstreams. First, it is relevant to the recent consultation on the Authority's proposed new TPM, because the SRAM affects how the proposed BBC allocations would be determined – and influences the incentives for efficient grid use and investment that the TPM is intended to achieve.

Second, it is linked to work on the FTR market, because some of the LCE is currently used to support the FTR market, which therefore determines the size of the settlement residue to be allocated via the SRAM.[4] This includes work underway to review the FTR market and operational enhancements such as the removing of the FTR rentals calculation and addition of new FTR hubs.

Next steps

Following consideration of submissions, the Authority will consider whether to develop a draft Code amendment for a new SRAM (and potentially on pass-through of settlement residual rebates by distributors to their customers) and consult on it around the September quarter. If the Authority decides to incorporate a new TPM and new SRAM-related provisions into the Code, Transpower would then calculate new settlement residual rebates based on the new SRAM alongside its first application of the new TPM.

On Authority's current indicative timeline, if a new TPM and a new SRAM are both incorporated into the Code, Transpower would publish new transmission charges by 30 November 2022 which would take effect on 1 April 2023, the start of the following pricing year. The SRAM would be applied for the first time after the first month of new TPM charges, meaning settlement residual rebates under the new SRAM could be paid from May 2023.[5]

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4 The Authority is reviewing the policy settings for the FTR market and the use of LCE that supports it. We intend to release a discussion paper on this subject later this calendar year. Whilst any potential changes to the FTR market may change the amount of settlement residue available to be allocated, such changes would not mean the SRAM needs to be reconsidered. That's because the SRAM will determine only the *proportions* used to allocate the settlement residue – regardless of its size.

5 Refer to the document Proposed Transmission Pricing Methodology: Consultation Paper for detail on TPM implementation timeframes and processes. Available at https://www.ea.govt.nz/development/work-programme/pricing-cost-allocation/transmission-pricing-review/consultations/#c18989

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1 Introduction

Making a submission

1.1 Please see Appendix B for details on how and by when you can make a submission on this proposal. Appendix C collates all the consultation questions set out in this document. Submissions are due by **5pm, 1 March 2022**.

1.2 Please direct any further questions related to this consultation by email to network.pricing@ea.govt.nz.

Supporting information

1.3 The following table provides links to key information that may be helpful to stakeholders in their consideration of this consultation paper.

Table 1 Key sources of information relevant to this proposal

ITEM	REFERENCE
Transpower's explanation of its loss and constraint excess payment method, 2017	https://www.transpower.co.nz/sites/default/files/uncontrolled_docs/Loss%20and%20Constraint%20Excess%20Booklet.pdf
The Authority's 2019 TPM issues paper	https://www.ea.govt.nz/assets/dms-assets/25/25466TPM-Issues-Paper-30-July-2019-full-document.pdf
Transpower's TPM development website	https://www.transpower.co.nz/industry/transmission-pricing-methodology-tpm
The Authority's consultation paper on the proposed new TPM - September 2021	https://www.ea.govt.nz/development/work-programme/pricing-cost-allocation/transmission-pricing-review/consultations/#c18989

Remainder of this paper

1.4 In the remainder of this paper we discuss:

(a) How settlement residue is currently rebated and why this needs to change.

(b) Proposed SRAM principles.

(c) Early thinking on SRAM options (with indicative impact on aggregate rebates).

(d) Whether pass-through of settlement residual rebates should be mandated.

2 Background and problem definition

The need for a new SRAM

2.1 The wholesale electricity market (WEM) produces surplus funds. The WEM is settled each month using half-hourly nodal prices. Downstream nodal prices are generally higher than upstream nodal prices, due to transmission losses and congestion. These price differences mean consumers pay more for electricity than generators receive.[6] As a result, after WEM settlement, surplus funds are left over: the loss and constraint excess (LCE). Some, but not all, of the LCE is used in the FTR market.[7] The remaining funds – the remainder of the LCE and FTR auction revenue after FTR payments have been made (which we call the settlement residue) are transferred to Transpower for distribution to transmission customers.[8]

2.2 The settlement residue must be distributed to market participants. If Transpower retained these funds then it would over-recover its costs, ie, customer payments in aggregate would exceed Transpower's transmission network costs. So Transpower currently distributes the settlement residue amongst its customers. The term used for such a payment in this paper is a settlement residual rebate.[9]

2.3 Transpower's current approach to allocation of these rebates relies on components of the current transmission pricing methodology (TPM). In particular, it involves:[10]

(a) dividing the settlement residue into portions related to each connection asset, the interconnection assets (collectively), and the High Voltage Direct Current (HVDC) link

(b) allocating to connection customers the portion of the settlement residue related to their connection assets

(c) allocating to each offtake customer part of the interconnection portion of the settlement residue in proportion to its contribution to interconnection charges[11]

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6 Transpower's website (https://www.transpower.co.nz/industry/revenue-and-pricing/pricing#Key%20Terms) explains this as follows: *Nodal pricing is used to calculate wholesale electricity prices based on marginal costs at injection and off-take points. Surpluses arise because:*

- *losses are priced at the marginal loss rate while loss quantities are determined by the average loss rate (which is lower than the marginal rate)*
- *when a constraint occurs, consumers pay for all the energy consumed at nodes "downstream" of the constraint at the (higher) marginal prices set at those nodes, but some of the energy consumed at the "downstream" nodes is generated at "upstream" nodes where the prices are lower, and generators injecting at those nodes receive those lower prices*.

7 For information on the flow of funds, including into and out of the FTRs market, see Appendix A.

8 Clause 14.16(7) of the Code requires the clearing manager to return these funds to the grid owner. The clearing manager is responsible for ensuring that industry participants pay or are paid the correct amount for the electricity they generated or consumed and for market-related costs. NZX is contracted to the Electricity Authority to provide the clearing manager market services.

9 The term that is often currently used for the rebate is the LCE payment, but that label fails to recognise that part of the LCE is used elsewhere before any settlement residue is allocated.

10 https://www.transpower.co.nz/sites/default/files/uncontrolled_docs/Loss%20and%20Constraint%20Excess%20Booklet.pdf

11 The interconnection charge is also known as the Regional Coincident Peak Demand (RCPD) charge.

(d) allocating to each South Island generator part of the HVDC portion of the settlement residue in proportion to its contribution to HVDC charges.

2.4 Due to its reliance on the current TPM, Transpower's current allocation approach is expected to become obsolete after April 2023. The current TPM is not consistent with the new (2020) TPM Guidelines and is in the process of being replaced by a proposed new TPM (which the Authority's indicative timeline has coming into operation on 1 April 2023).[12] This is the immediate reason why the Authority is considering a new SRAM, ie, the basic problem.

The SRAM must be consistent with the Authority's statutory objective

2.5 The simplest form of a new SRAM would be one that allocates settlement residual rebates in proportion to a customer's total transmission charges under the proposed new TPM. That remains an option that the Authority is considering.

2.6 However, the settlement residue is a substantial sum: in recent years it has ranged between 5% of transmission charges (in 2014-15) and 10% (in 2020-21).[13] The allocation of a large sum could have material effects on grid users' incentives. So, in our view it is worthwhile testing whether we are able to develop a SRAM that will specifically promote the Authority's statutory objective,[14] rather than defaulting to the simplest pro rata solution.

2.7 The SRAM can promote the statutory objective by influencing incentives for grid use and investment. These incentives are also affected by nodal prices in the wholesale market and by the TPM. A well-designed SRAM should work in concert with wholesale electricity prices and with the TPM to encourage efficient grid use and investment. These efficient incentives are created when grid users face the following efficient two-part charging arrangement for use of the grid (which is supported by a well-designed SRAM):

(a) Variable charges – the transport component of nodal prices, which coordinates grid usage efficiently by providing a granular signal of the cost of grid use at each location (node) and in each half-hourly time period.[15]

(b) Fixed charges – capital contributions, connection charges and benefit-based charges in the proposed TPM,[16] which create signals for efficient long-term investment decisions, as allocation is based on the parts of the grid each user

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12 The Authority concluded consultation on a proposed new TPM in December 2021, and has previously indicated that it is targeting a final decision on any new TPM by 31 March 2022. We expect to be able to firm up the timeline for this decision in early 2022.

13 For more details on the relative size of the settlement residue, see Appendix A.

14 The Authority's statutory objective is to promote competition in, reliable supply by, and the efficient operation of, the New Zealand electricity industry for the long-term benefit of consumers.

15 The transport component of nodal prices (the "nodal transport charge" or "loss and congestion charge") is the difference in nodal price between two nodes. It is equivalent to an additional transmission charge for transporting energy (see figure 1). The marginal cost of grid use at a given time and location is the resulting additional losses and congestion. It does not include the cost of energy (a separate component of nodal prices). In aggregate, nodal transport charges add up to the LCE.

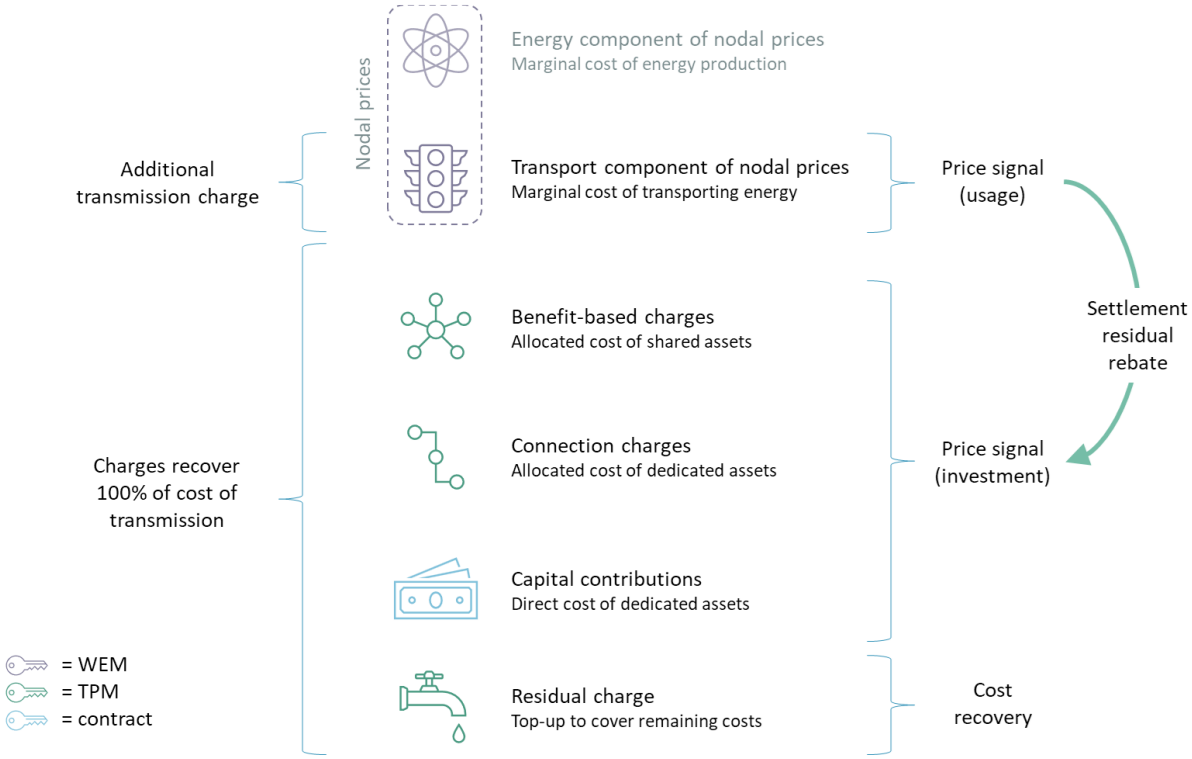
16 In addition to the fixed charge components above, there is a residual charge in the proposed TPM that works as a top-up to ensure full cost recovery. The residual charge is designed to minimise its effect on usage and investment price signals.

benefits from. These are fixed, to avoid distorting the efficient grid use signal sent by nodal prices.

2.8 To support the efficient two-part pricing arrangement, the SRAM must be designed in such a way that it does not work against nodal price signals. If a party's settlement residual rebate is correlated with its use of the grid, this would undermine the efficiency of nodal prices in coordinating grid usage (essentially dampening down the nodal price signal) and result in inefficient grid use and investment incentives.

2.9 The relationships between the transmission pricing components described above are illustrated in Figure 1 below.

Figure 1 Overview of pricing components



2.10 Finally, volatility in the transport component of nodal prices creates a risk for grid users. A well-designed SRAM (in conjunction with FTRs) would provide grid users with a partial offset against volatile congestion costs – without undermining the integrity of nodal price signals or of the proposed TPM benefit-based (BB) charge.[17]

2.11 So the more nuanced problem/opportunity the Authority is considering is whether, in allocating settlement residual rebates, it can more actively promote its statutory objective by creating a SRAM that works consistently with other pricing tools that are specifically designed to incentivise the efficient operation of, as well as competition in and reliable supply by, the electricity industry.

17 There is an interaction with the FTR market here because it aims to achieve a similar goal. Also, the FTR market transforms congestion revenue and can dampen the correlation between congestion costs and available (transformed) congestion revenue.

2.12 The Authority considers that, as a first step, it would be appropriate to develop SRAM principles to articulate how we see our statutory objective applying in this context, and allow stakeholders a clear opportunity to provide early feedback, and thereby guide the development of a new SRAM. We set out proposed principles in the next chapter of this paper.

Distributors not required to pass rebates to their customers

2.13 Creating the incentives described above likely requires that wholesale purchasers of electricity (retailers and industrial consumers) receive the settlement residual rebates.

2.14 Many distributors pass rebates through to their customers, either each month, or as a reduction in forecast transmission costs (with an annual wash up for differences). In most cases, this cost saving then flows through to the retail market where retail competition should tend to ensure that, over time, lower costs of supply are passed through to end users.

2.15 However, distributors are not required to pass on the rebates, and sometimes this does not occur. In such circumstances, wholesale purchasers of electricity (retailers and industrial consumers) would appear to be overpaying for use of the grid and do not receive any benefit from settlement residual rebates offsetting volatile congestion costs. This consultation therefore includes the question of whether it should be compulsory for distributors to pass through settlement residual rebates and, if so, how that should be implemented.[18]

2019 TPM issues paper

2.16 In the 2019 TPM issues paper, the Authority discussed a prospective change to the Code (which it was considering whether to propose in the near future) that would establish a SRAM. The SRAM under consideration was one that ensured that LCE attributable to specific grid assets is allocated to transmission customers that pay charges in relation to those assets in proportion to each customer's charges.[19] This was essentially a forerunner to the SRAM BB options we describe later in this paper.

2.17 Submissions on this issue were mixed. Some submitters broadly supported the Code amendment being considered by the Authority.[20] Some made alternative suggestions, including that LCE be retained by the grid owner,[21] or that it be determined for specific grid investments, but distributed to traders at each relevant node in proportion to the energy purchases or sales at that node.[22] Transpower recommended that the task of allocating residual LCE (settlement residue) should go to the clearing manager, who could allocate it to wholesale market purchasers in proportion to their payments as part of the normal monthly clearing process.[23]

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18 In its submission in response to the 2019 Issues paper (from page 29), Meridian submitted that in the Code amendment relating to LCE that the Authority was considering, it should set rules for distributors relating to the issue of whether and how to pass LCE back to end consumers.

19 See Appendix F of the 2019 Issues paper.

20 See Meridian (from page 29), Trustpower (Page 62 in response to Q61).

21 Electric Power Optimization Centre, University of Auckland, Page 2.

22 Nova Energy (in response to Q61).

23 Transpower has consistently recommended this proposed approach to LCE (eg, in June 2021).

2.18 These submissions have strengthened our view that it is useful to step back at this point from proposing a specific SRAM, and instead test our higher-level thinking, ie, the SRAM principles.

Consultation questions

Do you have any comments on the problem definition and background material in this chapter?

3 Proposed SRAM principles

3.1 The Authority's statutory objective at section 15 of the Electricity Industry Act 2010 is to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers. We have developed a proposed set of principles for the SRAM in accordance with that objective. The principles articulate how we see our statutory objective applying in the context of the SRAM.[24]

3.2 The SRAM principles will then guide the Authority's development of the SRAM in the next stage.[25] In developing or assessing any proposed SRAM or alternative option the Authority will seek to ensure that the proposed SRAM is consistent with the principles and promotes its statutory objective.

We have developed some proposed SRAM principles

3.3 We propose the following SRAM principles:

(a) **Integrity of the WEM nodal transport charge** – promoting more efficient grid use.

(b) **Integrity of (proposed) TPM benefit-based charge** – promoting more efficient investment.

(c) **Mitigation of volatility** – providing a partial offset against nodal transport charge volatility.

(d) **Full cost recovery** – avoiding over-payment for grid use.

(e) **Cost and practical considerations** – considering the cost and difficulty of developing, implementing and operating the SRAM.

Integrity of the WEM nodal transport charge

3.4 The SRAM should work in concert with wholesale electricity prices to encourage efficient grid use and investment. As noted in the previous chapter, the transport component of nodal prices coordinates grid usage efficiently by providing a signal of the cost of grid use at each node and in each time period. It is because of this nodal pricing signal that the Authority has not included a permanent congestion charge in the 2020 TPM guidelines and the proposed new TPM.

3.5 The SRAM must be designed in such a way that it does not work against these nodal price signals. If a party's settlement residual rebate is correlated with its use of the grid, this would undermine the efficiency of nodal prices in coordinating grid usage and result in inefficient grid use and investment incentives.[26] Specifically, if a

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24 To be clear though, the specific wording of our statutory objective will always remain our paramount consideration in making any decisions.

25 The principles may also guide Transpower in the future if it seeks to make changes to the SRAM, ie, if we include a mechanism for operational review of the SRAM by Transpower.

26 The LCE generated by users collectively from a transmission grid circuit is the same as the nodal transport charge for using the circuit. So an individual user of the circuit may increase the LCE generated by a circuit by increasing their use of the circuit. Because the FTR market transforms LCE in generating the settlement residue, there is a looser correlation between use of the grid and the settlement residue. Nevertheless, it can still be expected that over time there will be a correlation between the nodal transport charge for using a circuit and the settlement residue that is attributable to it. This means that the allocation of settlement residual rebates can provide a partial offset against nodal

customer knows that if it increases its use of the grid, the additional nodal price it pays for the additional energy use, in particular any increase in the transport component, will be offset by an increase in its settlement residual rebate, then it has an incentive to increase its use of the grid even when that is inefficient (as it is not then facing the full cost of the congestion it causes).

3.6 The Authority considers this principle to be critical – as nodal pricing is central to the efficient use of the grid. It is also relevant to reliability (dampening the nodal pricing signal would make congestion issues more likely) and competition (which could be affected if the SRAM allowed parties with market power to use it to extract larger rebates).[27] Accordingly, any SRAM option which allowed a user's own use of the grid to significantly affect the size of its settlement residual rebate is likely to be rejected due to this principle.

Integrity of benefit-based charges

3.7 The SRAM should also work with the TPM to encourage efficient grid use and investment. As noted in the previous chapter, benefit-based charges in the proposed new TPM (together with connection charges and capital contributions) will create signals for efficient long-term grid use and investment decisions. This is because charge allocation is based on the cost of those parts of the grid each user benefits from, which means grid users take into account the cost of new investments in the grid in their own decision making.

3.8 The SRAM can affect the allocation of benefit-based charges. If a new grid investment reduces the settlement residual rebate a customer would receive,[28] this dis-benefit could be taken into account when the allocation of benefit-based charges for the investment is set.[29] This can influence incentives (and so, efficiency).

3.9 The SRAM should be designed in such a way that it supports the long-term signal for efficient grid use and investment decisions. For example, consider a grid user whose expected use of the grid is – and so its benefit-based charges are – low, but whose use of the grid increases rapidly and unexpectedly, and as a result, the grid must be upgraded. For efficiency, such a user should expect to pay higher transmission charges relating to that grid upgrade – since then it will take into account the cost of the upgrade in its own decision making on grid use and investment – and so make more efficient decisions. This would be the case if the user's settlement residual rebate is based on its (low) transmission charges, so its loss of rebate as a result of the grid expansion is small. In this scenario, the user whose usage had grown rapidly would bear a higher share of the cost of congestion before the investment (due to their proportionately small rebate) and after the investment (due to their proportionately higher BB allocation). This continuity would help enhance the integrity of BB charges. By contrast, if the SRAM resulted in the user in this scenario

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transport charge volatility – and that it could potentially therefore undermine the incentives created by nodal prices.

27 For example, a generator could structure its offers to cause or worsen price separation across a congested line, with its loss of sales revenue outweighed by an increase in settlement residual rebate.

28 A new grid investment would reduce settlement residual rebates if it reduces congestion on the grid, as this would reduce price separation between nodes and so result in a smaller LCE.

29 Rebates are to be taken into account if benefit-based charges are set under the alternative s.53 method in the proposed TPM, but not under the default s.52 method.

facing a substantial loss of rebate as a result of the grid upgrade, it is likely to result in less efficient long-term grid use and investment decisions.

Mitigation of volatility

3.10 The SRAM can benefit grid users by providing a partial offset against nodal transport charge volatility. The transport component of nodal prices is volatile and not very predictable. This exposes grid users to financial risk. Likewise, the magnitude of the settlement residue – and so the cash flow from settlement residual rebates – is also volatile, so the unpredictability of rebates also contributes to this financial uncertainty.

3.11 The SRAM can be designed so that it provides a partial offset against these risks. The higher the nodal transport charges on a grid asset, the higher is the aggregate LCE (and settlement residue) generated by that grid asset. So, if ways can be found to return the settlement residue to those who pay the nodal transport charge for the investment – without undermining nodal prices – that could substantially mitigate the financial risk due to the nodal transport charge and the settlement residual rebate. This could improve predictability of cash-flows for users and support retail competition (promoting the competition limb of the statutory objective).

3.12 Under this principle we therefore assume that the settlement residual rebate cashflows can provide a partial offset to the regional (congestion-driven) volatility of nodal prices. In practice, this will depend on the FTR market – FTRs provide a targeted hedge and the FTR market transforms the cashflow profile of LCE. Depending on the outcome of the forthcoming consultation on the FTR market, the partial offset provided by the settlement residual rebate should be complementary to the more targeted hedge provided by FTRs: it will be available to all customers without the customer taking any action, and it will be available for the whole grid, not just for a subset of the transmission grid/system.

Full cost recovery

3.13 Total transmission charges (including the transport component of wholesale electricity prices) paid by grid users should not exceed grid costs. As discussed in the previous chapter, unless settlement residue is returned to grid users, they will collectively pay more for use of and access to the grid than it costs to provide. This can distort investment decisions (favouring decisions that use the grid less than is optimal). The SRAM should return settlement residue, in aggregate, to those who bear the cost of congestion.

3.14 The scope of the task is to allocate the settlement residue (that is, the funds available after settlement of the FTRs market): no more and no less. All SRAM options to be considered will allocate the same amount in aggregate. It would, of course, be possible to reconsider whether (and how much) LCE should be used in the FTRs market, but that question is outside the scope of the current consultation.[30]

3.15 However, this principle applies not just in aggregate, but also to classes of customers (eg, load as opposed to generators). If a particular class of customers overpays for its use of the grid, there is a risk that investment decisions for that customer class may be distorted. A well-designed SRAM would seek to avoid this outcome.

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30 The proposals in this paper take as given the current FTR market settings and their influence on settlement residue.

Cost and practical considerations

3.16 Different options will have different costs involved in developing, implementing, and operating the SRAM. These costs and other practical considerations should be taken into account when considering the SRAM options. In developing the SRAM, the Authority will balance the economic benefits and costs of precision of the SRAM with the economic benefits and costs of practical considerations including robustness; simplicity; certainty and predictability, including through limiting the need for Transpower to exercise discretion; and costs associated with developing, administering and complying with the SRAM.[31]

Consultation questions

Do you have comments on the proposed SRAM principles, or on anything else in this chapter?

[31] This is equivalent to the principle set out at clause 1(b) of the 2020 TPM Guidelines.

4 SRAM options: early thinking

4.1 In this chapter we set out our initial thinking about options that could be considered for the SRAM, and also indicative estimates of the aggregate impact. Options will be assessed against the SRAM principles that we settle on through this consultation.

4.2 We have not yet decided which SRAM options we will consider in depth. We have given preliminary consideration to four options and lay out our early thinking on these below for the purpose of getting initial feedback. We also invite stakeholders' views on any other options we should consider.

4.3 The options we have considered are:

Option A: TPM charges – allocates in proportion to total TPM charges.

Option B: Simple BB – uses regional allocators (BBC simple method in the proposed new TPM).

Option C: Full BB – uses proposed new TPM allocators based on all applicable methods.

Option D: WEM purchasers – based on wholesale energy purchase volumes.

Option A: TPM charges

4.4 Under this option, each month[32] Transpower would allocate settlement residual rebates in proportion to its customers' total TPM charges.[33] This option is similar to the current methodology.[34]

4.5 Option A would almost entirely decouple rebates from usage, so the risk of undermining the integrity of nodal pricing signals is very low. It is also the simplest to implement and operate – simpler even than the current methodology because it does not require matching the settlement residue to the HVDC link or to connection assets.

4.6 However, our initial view is that it wouldn't perform very well compared to the potential benefits that a more targeted SRAM could provide in offsetting volatility. It would also appear likely to perform poorly at returning revenue to the class of customers who bear the cost of congestion – noting that it would be weighted heavily towards those who pay TPM residual charges – especially in the early years of the new TPM.[35] And it could provide an inefficient marginal incentive to a customer that incurs a large TPM residual charge to oppose a grid upgrade which, by relieving congestion, would reduce its settlement residual rebate.

32 We assume every option continues to operate on a monthly cycle, consistent with WEM settlement.

33 TPM charges are only reset annually or with new or removed connections.

34 This option could be made even closer to the current methodology by making slight variations (involving a broad split of the settlement residue according to connection vs interconnection assets or to connection vs interconnection vs HVDC assets).

35 Transpower's impact modelling projects residual charges falling from 63% of total TPM charges in 2023 to 20% by 2035.

Option B: Simple BB

4.7 Under this option Transpower would match the settlement residue to grid assets (lines and transformers) and allocate it to its customers using TPM allocators for:

(a) Connection assets – Transpower already maps the settlement residue to connection lines and transformers and allocates it to the user(s) of each asset

(b) Benefit-based charge simple method – every interconnection line and transformer would be mapped to one of the regions used for the simple method, then the settlement residue from that region would be allocated using the simple method allocation factors for that region.

4.8 Option B would perform better than a pro rata type allocation like Option A at preventing over-payment by returning settlement residual rebates broadly to the parties who bear the cost of congestion in the long term, ie, the parties who benefit from, and therefore pay for, the assets under the proposed new TPM. This broad matching of the settlement residue to the parties paying for the asset where the congestion occurs also means that it would be more effective at providing a partial offset against nodal transport charge volatility. Also, it would better support the long-term signal for efficient grid use and investment decisions provided by the benefit-based charge – as a grid user whose use of the grid turns out to increase rapidly would pay higher transmission charges relating to a subsequent grid upgrade.[36]

4.9 Compared to a pro rata type allocation, Option B carries slightly more risk to nodal pricing signals, as a grid user's actions could affect the amount of the settlement residual rebates for a simple method region in aggregate. However, the risk would appear to be low. That's because settlement residue generated by any grid link would be allocated across a broad set of beneficiaries, meaning the ability of any one party to influence the size of its own rebate would be limited. The scope for strategic behaviour is limited because all settlement residue within a region is pooled together then allocated. However, a risk could arise to the extent there were situations where a party both can influence the amount of settlement residue produced within a region (eg, through their usage downstream of a constraint, or the generation offers either side of a constraint), and is allocated a large share of regional settlement residue.

4.10 Option B would also be somewhat more complex to implement and operate. That's because it would require many lines and transformers to be mapped to the simple method regions. However, once that mapping was complete, all lines and transformers in a region would be treated the same and the existing simple method allocators could be applied. It follows that this methodology would result in predictable allocations. Under Option B the SRAM would also need rules for dealing with occasional updates to the simple method regions and allocators.

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36 This is because the user's benefit-based charge and so settlement residual rebate is based on its expected use of the grid. If its actual use of the grid is higher than expected, its benefit from a grid upgrade (in terms of reduced nodal prices, for example) is likely to be high relative to the dis-benefit from lost settlement residual rebate. Also, prior to the grid upgrades its nodal prices will be high relative to its rebate.

Option C: Full BB

4.11 Under this option Transpower would match LCE to the lines and transformers where it was produced, then allocate rebates to customers using applicable TPM allocators:

(a) Connection assets – rebates matched to connection lines and transformers would be allocated to the users of each asset (Transpower does this currently).

(b) Schedule 1 historical and standard method benefit-based investments – the settlement residue matched to lines and transformers built or modified through these BBIs would be allocated using the applicable BBC allocations.

(c) Simple method BBIs – the settlement residue matched to other grid assets that have had low-value (lifecycle) investment would be allocated via the simple method BBC allocators that applied when the investment was made.

(d) Settlement residue in respect of other assets would be allocated by matching it to simple method regions and using the applicable allocators for each region.[37]

4.12 Option C is essentially a more precisely targeted version of Option B, and so would likely have the same positive properties, but perform slightly better.

4.13 However, the tight targeting of Option C also makes it more prone to undermining the integrity of nodal pricing signals. It could:

(a) lead to unequal incentives, eg, two otherwise identical load parties could face differing marginal prices for consumption downstream of a congested line depending on their eligibility for settlement residual rebates

(b) extend the scope for strategic offers, eg, multi-site generators could be encouraged to structure their offers to cause – or worsen – price separation, which is a risk to competition as well as efficiency.

4.14 Further, Option C would be complex and costly. It operates at a more granular level than any other option – matching the settlement residue not only to every line and transformer, but to the specific cost allocators (or mix of allocators) used for each. In practice, each line is made up of many thousands of assets and those assets can have a range of allocations. This granularity would make initial implementation more challenging and time-consuming than other options and make ongoing operation more complex.

4.15 For these reasons, our current view is that this option will likely be ruled out.

Option D: WEM purchasers

4.16 This option would remove Transpower from the SRAM process. Instead, the Clearing Manager would return settlement residue to WEM purchasers directly in proportion to their energy purchases each month.

4.17 The operation of this option would be very simple, similar to a pro rata allocation based on transmission costs. However, Option D would likely severely undermine nodal pricing signals for load parties as rebates would be directly linked to WEM purchases. This would mute incentives for load to provide an operational response to congestion signals and would limit the influence of congestion signals on investment

[37] An alternative approach would be to allocate settlement residual rebates in line with residual charges, but this is a less targeted approach and could provide an inefficient incentive to a customer that incurs a large TPM residual charge to oppose a grid upgrade (in order to maximise its rebate).

choices such as where to locate new load or embedded generation. We would expect reduced responsiveness to nodal price signals would lead to increased price volatility and possibly reliability problems.

4.18 Further, Option D would also:

(a) not support the long-term signal for efficient long-term grid use and investment decisions provided by the benefit-based charge

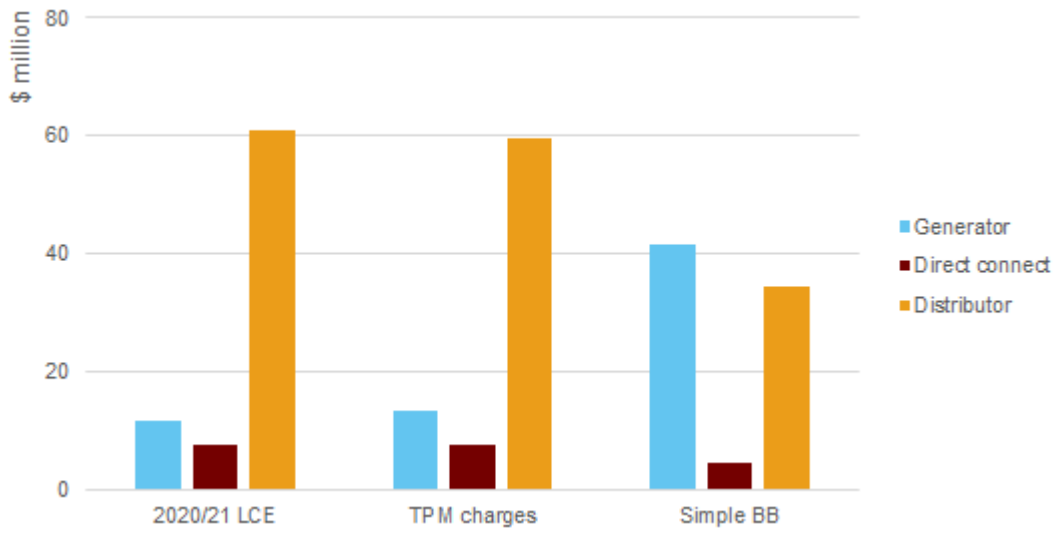
(b) be unbalanced in terms of aggregate cost and mitigation of volatility: it would more than offset congestion costs for purchasers but leave generators fully exposed to congestion costs (and not provide any offset for generators, who bear a cost of congestion through suppressed prices).

4.19 For these reasons, our current view is that this option will likely be ruled out.

SRAM options: indicative impact on aggregate of rebates

4.20 To help provide some context, in this section we set out indicative estimates of the impact of SRAM options on transmission customers' settlement residual rebates. We compared, in aggregate, rebates received for the year ended March 2021 with estimated rebates under SRAM option A (TPM charges) and option B (Simple BB).[38] The results are summarised below.[39]

Figure 2 – Customer impact - summary by consumer type



4.21 Our estimates for the Simple BB option use Transpower's actual rebates for connection assets rather than assessing connection asset congestion directly. We then mapped the settlement residue to BB investments as required by each method. For the TPM charges option we use Transpower's indicative charges for 2021/22.

4.22 We would observe that the TPM Charges option would result in an allocation of rebates that is similar to the status quo. This position would shift over time as the

[38] We have not included Option D, as this does not allocate settlement residual rebates to transmission customers. Also, in our view it is the least desirable option given the extent to which it would undermine nodal pricing signals. We have also not included results for Option C – these are similar to Option B.

[39] The modelling underlying this graph will be presented in a spreadsheet "SRAM impact assessment" on the Authority's website alongside this consultation paper.

TPM residual charge declines.[40] Note also that the allocation for the Simple BB option is sensitive to the BBC simple method assumption of a 50:50 benefit split between generation and load.

Consultation questions

Do you have comments on our initial thinking on options under consideration for the SRAM?

Do you wish to propose an alternative option for consideration?

Do you have comments on anything else in this chapter?

[40] Transpower's impact modelling projects residual charges falling from 63% of total TPM charges in 2023 to 20% by 2035.

5 Proposal to require distributors to pass settlement residual rebates to customers

5.1 In this chapter we set out our thinking on a matter closely related to the SRAM: a proposal to ensure that settlement residual rebates are passed through to wholesale purchasers of electricity (retailers and large consumers).

Settlement residual rebates do not need to be passed though

5.2 The Code currently does not prescribe how settlement residual rebates should be allocated or to whom. It also does not include any requirement on distributors (who receive rebates from Transpower) to pass through any rebates received to their customers (retailers and network-connected large consumers).

5.3 The Authority received a Code change proposal from Mercury in 2019 seeking introduction of a clause that would require distributors to pass rebates through to retailers. The proposal was supported by a report,[41] indicating that:

(a) nearly 20% of settlement residual rebates (by value) may be retained by distributors

(b) around 50% is passed through to retailers, and

(c) the balance (30%) is either used to reduce transmission charge pass-through on an annual basis or is passed directly to end consumers.

Wholesale purchasers of electricity should receive rebates

5.4 As discussed earlier in this paper, the new SRAM principles seek to both fix a basic problem (current allocation is based on the existing TPM which is likely to be replaced) and to promote the Authority's statutory objective. To do this the principles set out to align the SRAM with the incentives created by nodal pricing and the proposed new TPM, while also allowing it to play a specific role in offsetting regional nodal price volatility.

5.5 However, some of these outcomes can only be achieved if wholesale purchasers of electricity (retailers and industrial consumers) receive the settlement residual rebates. Retailers charge end users both network charges and the cost of energy purchases, so the cost of wholesale market electricity and rebates are united at the retail level (and at the level of the network-connected large consumer). However, if distributors do not pass on the rebates, retailers and industrial consumers appear to be overpaying for use of the grid and do not receive any benefit from settlement residual rebates offsetting volatile congestion costs.

5.6 To best support the potential benefits identified earlier – offsetting congestion costs and creating efficient short and long-term incentives for grid use and investment – our initial view is that distributors should pass their rebates through to their customers each month, using distribution charges as an allocator. This arrangement:

(a) largely decouples rebates from usage, ie, helps preserve the integrity of nodal price signals

[41] *Loss and constraint rentals - economic analysis of Mercury code change proposal*, Kieran Murray, Dean Yarrall, Sapere Research Group, 26 March 2019.

(b) would better support the long-term signal for efficient long-term grid use and investment decisions provided by the benefit-based charge – as a grid user whose use of the grid increases rapidly would pay higher transmission charges relating to a subsequent grid upgrade

(c) returns settlement residual rebates broadly to the parties who bear the cost of congestion (in particular, to wholesale purchasers of electricity) and broadly offsets monthly congestion charge volatility, ie, provides a partial offset of that volatility.

Requiring distributors to pass settlement residual rebates on

5.7 We are considering amending the Code to require distributors to pass settlement residual rebates through to their customers. We think this option should be effective, and simple to implement and enforce.

5.8 We have discussed alternatives with Transpower, essentially involving changing the way money is deducted or credited by Transpower to its customers in invoices/credit notes. However, as we understand it this would not ensure these customers (distributors) will pass on the savings or credits to their customers (wholesale electricity purchasers including retailers).

5.9 As Transpower has no contractual relationship with many wholesale electricity purchasers, the Authority considers at this stage requiring Transpower to directly rebate settlement residue to these customers would be impractical to operationalise and would place an additional burden on Transpower.

5.10 We therefore consider that an appropriate Code amendment would likely require Transpower to calculate the appropriate rebates in respect of each wholesale electricity purchaser in accordance with the SRAM, rebate an amount covering all relevant wholesale electricity purchasers to each distributor, and then require those distributors to rebate the appropriate amounts to each customer.

5.11 Following consideration of submissions, the Authority will consider whether to develop a draft Code amendment on pass-through of settlement residual rebates by distributors to their customers and may consult on it around the September quarter.

Consultation questions

Do you have any comments on the proposal for passing settlement residual rebates to distributors' customers that is discussed in this chapter?

Appendix A Current LCE and settlement residue

A.1 This appendix contains information on the revenue flows and elements that currently determine the total settlement residue that can be rebated.

A.2 LCE is typically the main contributor to the overall WEM excess held by the clearing manager at the end of each month. Figure 3 illustrates the cashflows:

(a) from the wholesale market to the clearing manager: a **WEM excess** (largely LCE)

(b) a portion of the WEM excess is made available by the clearing manager to the FTR market ('**FTR rentals**') – this is used, with FTR auction revenue, to make FTR payments

(c) funds flow back from the FTR market to the clearing manager ('**FTR excess**'), which are then passed on to Transpower

(d) the portion of WEM excess that doesn't flow to the FTR market ('**non-FTR excess**') instead flows straight to Transpower

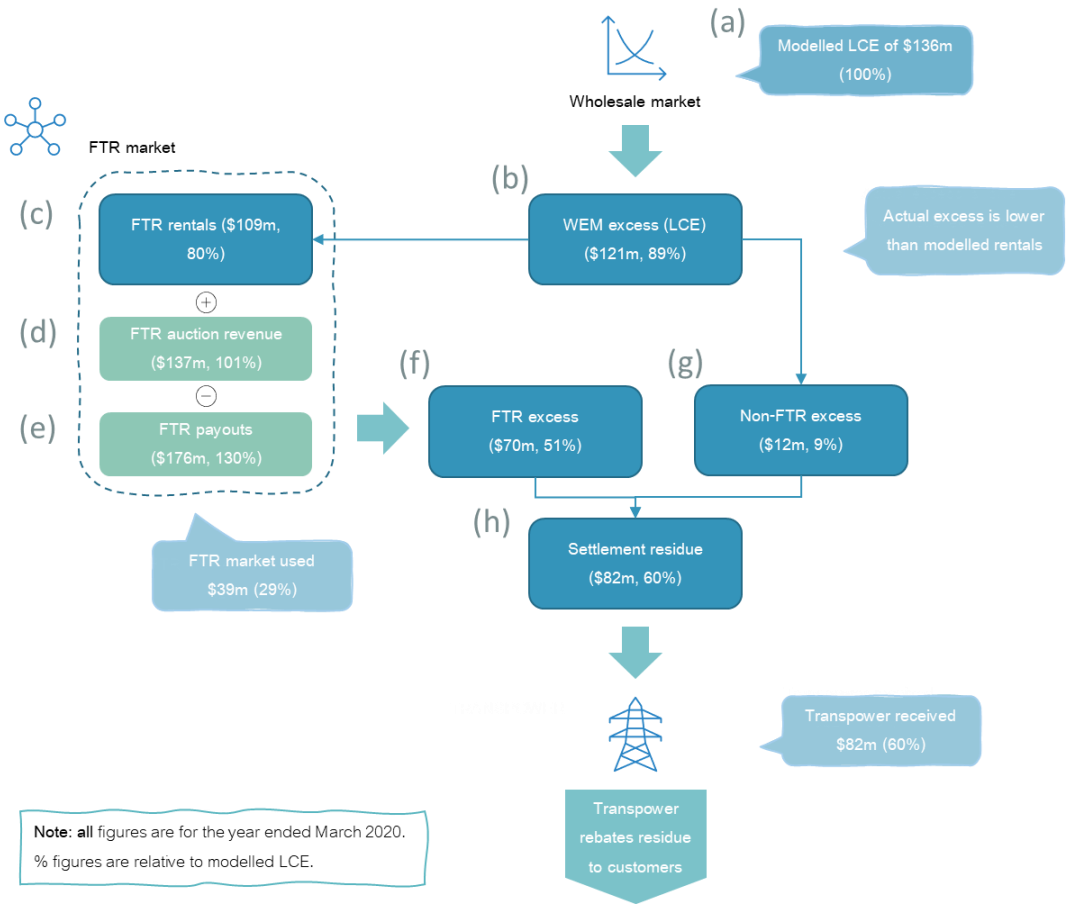
(e) so Transpower receives both the FTR excess and the non-FTR excess, termed the **settlement residue** (also known as residual LCE), which it then rebates to grid customers.

A.3 These cashflows are illustrated below, with amounts and proportions from the year ending March 2020.

A.4 The settlement residue varies each month, driven by factors such as FTR market use (the final excess is lower if FTR pay-outs are high relative to FTR auction revenues, and vice versa) and due to additional cashflows that flow into the WEM excess (following the WEM pricing and settlement processes due to other elements such as wash-ups and delayed settlements).

A.5 See below for further information on the revenue flows and what elements currently determine the total settlement residue that can be rebated.

Figure 3 Illustration of cashflows from wholesale market to Transpower



To explain the terms in Figure 3:

(a) modelled LCE – Transpower's assessment of expected LCE based on grid flows and prices[42]

(b) WEM excess – actual amount held by the clearing manager at month end

(c) FTR rentals – the portion of (b) allocated to the FTR market

(d) FTR auction revenue – proceeds from the sale of FTR products

(e) FTR payouts – payments to holders of FTR products

(f) FTR excess – (c), transformed by adding (d) and deducting (e)

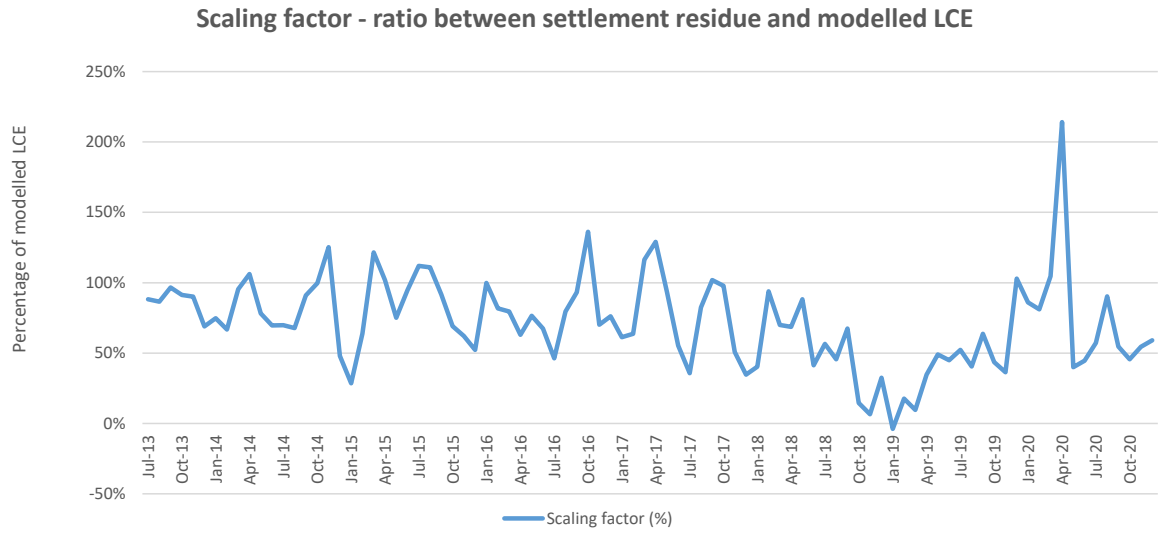
(g) non-FTR excess – the portion of (b) not allocated to the FTR market

(h) settlement residue – the sum returned to Transpower, made up of (f) and (g).

42 Transpower assesses modelled LCE in the first month after market settlement. This information is refined in later months for WEM purposes, but Transpower does not reassess rebates or operate a wash-up process. As is shown below, Transpower publishes a 'scaling factor' each month that is the ratio between settlement residue and modelled LCE.

A.6 The following chart (Figure 4) shows monthly variation over the period for July 2013 to October 2020 in the scaling factor (the ratio between the settlement residue and modelled LCE), which provides a good indication of volatility. [43]

Figure 4: Settlement residue cashflows are volatile



[43] Transpower publishes a regularly updated time series for the scaling factor on its website at Pricing | Transpower

Size of LCE compared to transmission charges

A.7 The following table compares historical revenue Transpower has recovered via transmission charges with the historical WEM excess – which is largely LCE.

Table 2 Settlement residue is a material part of overall transmission revenue

Item	Pricing Year (ending 31 March)						
	2014-15	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21[4]**
WEM excess (largely LCE)[1]	$53m	$56m	$68m	$87m	$124m	$121m	$140m
Settlement residue[1]	$43m	$56m	$55m	$63m	$43m	$83m	$80m
TPM revenue[2]	$944m	$918m	$943m	$991m	$942m	$927m	$786m
WEM excess (LCE), relative to TPM charges[3]	6%	6%	7%	9%	13%	13%	18%
Settlement residue relative to TPM charges	5%	6%	6%	6%	5%	9%	10%

Notes:

1. Cashflow figures sourced from the clearing manager.
2. TPM revenue sourced from Transpower information disclosures.
3. WEM excess (largely LCE), relative to TPM revenue.
4. For 2020-21 we assume actual LCE is 88% of modelled LCE.

A.8 The WEM excess has been relatively substantial when compared to Transpower's TPM charges in recent years. The proportion increased significantly for the 2021 pricing year because LCE was relatively higher than in previous years and because Transpower's maximum allowable revenue was reduced compared to previous years (via the RCP3 reset).[44]

[44] RCP3 refers to regulatory control period three, the five years from April 2020. A key driver of the reduction is prevailing low financing costs, which flow through to a reduced allowable rate of return.

Appendix B How to make a submission

B.1 The Authority's preference is to receive submissions in electronic format (Microsoft Word). Submissions in electronic form should be emailed to network.pricing@ea.govt.nz with 'Consultation Paper— congestion rebate methodology' in the subject line.

B.2 If you cannot send your submission electronically, please contact the Authority at network.pricing@ea.govt.nz to discuss alternative arrangements.

B.3 Please note the Authority wants to publish all submissions it receives. If you consider that the Authority should not publish any part of your submission, please:

(a) Indicate which part should not be published.

(b) Explain why you consider that part should not be published.

(c) Provide a version of your submission that can be published (if the Authority agrees not to publish your full submission).

B.4 If you indicate there is part of your submission that should not be published, we will discuss with you before deciding whether to not publish that part of your submission.

B.5 However, please note that all submissions received, including any parts that are not published, can be requested under the Official Information Act 1982. This means the Authority would be required to release material that was not published unless good reason existed under the Official Information Act to withhold it. The Authority would normally consult with you before releasing any material that you said should not be published.

B.6 Please deliver your submissions by **5pm** on **Tuesday 1 March 2022**.

B.7 We will acknowledge receipt of all submissions electronically. Please contact the Authority at network.pricing@ea.govt.nz or if you do not receive electronic acknowledgement of your submission within two business days

Appendix C Questions to assist submitters

C.1 You are welcome to comment on any matter relevant to the Authority's proposal.

C.2 We have posed questions throughout the consultation paper and appendices to help prompt responses to specific aspects of the proposal. These are repeated here.

C.3 Please do not feel that you need to limit your responses to the consultation questions or that you need to answer them all. Please explain your answers in terms consistent with the Authority's statutory objective in section 15 of the Electricity Industry Act 2010.

	Question
Chapter 2	Do you have any comments on the problem definition and background material in this chapter?
Response	
Chapter 3	Do you have comments on the proposed SRAM principles, or on anything else in this chapter?
Response	
Chapter 4	Do you have comments on our initial thinking on options under consideration for the SRAM?
Response	
	Do you wish to propose an alternative option for consideration?
Response	
	Do you have comments on anything else in this chapter?
Response	
Chapter 5	Do you have any comments on the proposal for passing settlement residual rebates to distributors' customers that is discussed in this chapter?
Response	
Other	Do you have any other feedback on any other aspect of this consultation paper?
Response	

Glossary of abbreviations and terms

Act	Electricity Industry Act 2010
Authority	Electricity Authority
BB	Benefit-based
BBC	Benefit-based charge
BBI	Benefit-based investment
Code	Electricity Industry Participation Code 2010
SRAM	Settlement Residual Allocation Methodology
FTR	Financial transmission rights
HVDC	High voltage direct current
LCE	Loss and constraint excess
RCP3	Regulatory Control Period 3 (the five years from April 2021)
TPM	Transmission Pricing Methodology
Transpower	Transpower New Zealand Limited
WEM	Wholesale electricity market

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Loss and constraint rentals – economic analysis of Mercury code change proposal, Sapere Research Group, March 2019

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Transmission rentals guide (Loss and Constraint Excess Booklet) – 2017, Transpower, September 2017