HVDC component of Transpower's proposed variation to the Transmission Pricing Methodology

Consultation Paper

Submissions close: 5 p.m. on 14 July 2015

23 June 2015

Executive summary

Transpower has carried out an operational review of the transmission pricing methodology (TPM). The TPM is Schedule 12.4 of the Electricity Industry Participation Code 2010 (Code).

In February 2015, Transpower submitted a proposed variation to the TPM, comprising a number of components. One of those components relates to the allocation of HVDC charges.

Transpower considers, and the Electricity Authority (Authority) agrees, that the historical anytime maximum injection (HAMI) allocation of the charge for the high voltage direct current (HVDC) interisland transmission link can distort operation of, and investment in, South Island generation.

To address this problem, Transpower has proposed that the TPM should be amended to allocate HVDC charges on a per-MWh basis, with an initial transition period.

The Authority had previously referred this proposal back to Transpower for more development, on the basis that derating the HVDC charge on Upper South Island (USI) generation could better promote the statutory objective. Transpower's response was to resubmit the proposal without modification, while undertaking to investigate USI derating separately over the coming year. The Authority agrees this is an appropriate approach, and is therefore consulting on the proposal now.

The Authority expects that by late in the 2016 calendar year, Transpower will submit either a proposal to amend the TPM so that the HVDC charge does not discourage Upper South Island generation investment that might help to defer transmission investment, or an explanation why such a proposal would not promote the Authority's statutory objective.

The proposal to allocate HVDC charges on a per-MWh basis is expected to promote competition, reliability and efficiency for the long-term benefit of consumers, primarily by reducing the incentive on South Island generators to withhold generation capacity.

Based on quantitative cost-benefit analysis provided by Transpower, the Authority considers that the proposal is preferable to alternatives that are consistent with the current TPM Guidelines. The Authority has not developed its own cost-benefit analysis of the proposal, because it is satisfied that Transpower's analysis is reasonable, given the sensitivity analysis that Transpower has provided.

There may be superior alternatives that are not consistent with the current TPM Guidelines. Such alternatives could be considered as part of the Authority's review of the TPM.

The Authority is now considering whether to amend the Code as proposed by Transpower. The Authority's process for considering Transpower's proposed variation meets both the requirements for a change to the TPM under the Code, and the requirements for an amendment to the Code under the Electricity Industry Act 2010 (Act).

Other components of Transpower's proposed variation

Transpower also proposed other changes to the TPM, which are not the subject of this consultation paper.

Transpower proposed to:

- use, in the calculation of the interconnection charge, N=100 for all four regional coincident peak demand (RCPD) regions
- exclude summer trading periods (ie from November to April inclusive) from the capacity measurement period used to calculate RCPD
- for the purpose of identifying regional peak demand periods in a region, require Transpower to disregard a change in a customer's offtake if Transpower is satisfied that:
    - the change would alter the incidence of most of the peaks in a relevant region
    - the customer would be unlikely to change their offtake absent Transpower disregarding that change
    - the change is unlikely to give rise to a need for transmission investment
- provide for Transpower to adjust transmission charges when a reverse flow situation occurs.

The Authority recently consulted on these four components. The consultation closed on Tuesday 2 June 2015. The Authority anticipates publishing a Decisions and Reasons paper on these matters in July 2015.

Transpower also proposed to:

- allow New Zealand Aluminium Smelters (NZAS) to increase electricity consumption from 572 MW to 636 MW in the summer months without this being reflected in the calculation of RCPD
- adjust the formula for the line maintenance component of the connection charge, so that it is based on a four-year average of the line maintenance rate.

However, Transpower subsequently withdrew these two proposals.

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1.1.2 Transpower considers, and the Electricity Authority (Authority) agrees, that the historical anytime maximum injection (HAMI) allocation of the high voltage direct current (HVDC) charge can distort operation of, and investment in, South Island generation.

1.1.3 To address this problem, Transpower has proposed that the TPM should be amended to allocate HVDC charges on a per-MWh basis, with an initial transition period. This proposal is referred to, throughout this paper, as 'the HVDC component of Transpower's proposed variation to the TPM', or simply 'the HVDC component'.

1.1.4 Code drafting to give effect to the HVDC component of Transpower's proposed variation to the TPM is attached as Appendix B.

1.1.5 The Authority is now considering whether to amend the Code as proposed by Transpower. The purpose of this paper is to consult with participants and persons that the Authority thinks are representative of the interests of those likely to be affected by the proposed amendments.

1.1.6 Section 39(1)(c) of the Electricity Industry Act 2010 (Act) requires the Authority to consult on any proposed amendment to the Code and corresponding regulatory statement. Section 39(2) provides that the regulatory statement must include a statement of the objectives of the proposed amendment, an evaluation of the costs and benefits of the proposed amendment, and an evaluation of alternative means of achieving the objectives of the proposed amendment. The regulatory statement for the proposed amendment is set out in Section 4 of this paper.

1.1.7 The Authority invites submissions on the proposed amendment and regulatory statement.

1.1.8 To assist interested parties to formulate their submissions, this consultation paper includes questions about specific aspects of the HVDC component. However, the Authority is interested in receiving submissions on any aspect of the HVDC component.

1.1.9 The Authority has recently consulted on four other components of Transpower's proposed variation to the TPM. That consultation is now closed, and the Authority

anticipates publishing a Decisions and Reasons paper that discusses the Authority's decisions in relation to the four other components in July 2015.

1.2 How to make a submission

1.2.1 The Authority would prefer to receive submissions in electronic format (Microsoft Word). It is not necessary to send hard copies of submissions, unless you cannot do so electronically. Submissions in electronic form should be emailed to submissions@ea.govt.nz with 'Consultation Paper – HVDC component of Transpower's proposed variation to the TPM' in the subject line.

1.2.2 The Authority is likely to make your submission available to the public on the Authority's website. If you have attached any supporting documents, you should indicate this in a covering letter and clearly indicate any confidential information. However, all information provided to the Authority is subject to the Official Information Act 1982.

1.2.3 If possible, provide your submission in the format shown in Appendix A. If you do not wish to send your submission electronically, post one hard copy of the submission to either of the addresses provided below or fax it to 04 460 8879. You can call 04 460 8860 if you have any questions.

Postal address

Submissions
Electricity Authority
PO Box 10041
Wellington 6143

Physical address

Submissions
Electricity Authority
Level 7, ASB Bank Tower
2 Hunter Street
Wellington

1.3 Deadline for receiving a submission

1.3.1 Submissions should be received by **5pm** on **Tuesday 14 July 2015**. Please note that late submissions are unlikely to be considered.

1.3.2 The Authority will acknowledge receipt of all submissions electronically. Please contact the Submissions Administrator if you do not receive electronic acknowledgement of your submission within two business days.

2. Background

2.1 The TPM sets out how Transpower recovers most of its costs

2.1.1 The TPM is Schedule 12.4 of the Code. It sets out how Transpower recovers the costs of providing the transmission grid, including the cost of capital, operations and maintenance, and overheads.

2.1.2 Some of Transpower's costs are not recovered under the TPM – including costs associated with:

(a) providing system operator services, which are paid for under a contract between the Authority and Transpower

(b) investment contracts between Transpower and connected parties allowed for under clauses 12.70, 12.71 and 12.95 of the Code[1]

(c) some historical contracts agreed under the TPM that applied prior to 2008

(d) Transpower's activities that are not regulated under Part 4 of the Commerce Act 1986, and are not included in Transpower's Maximum Allowable Revenue (MAR) – such as its role as the FTR manager.

2.1.3 The TPM consists of three types of charges:

(a) HVDC charges

(b) interconnection charges

(c) connection charges.

2.1.4 The current HVDC charge is described in more detail in Appendix C.

2.2 Transpower may propose a variation to the TPM

2.2.1 Transpower may review the TPM and submit to the Authority a proposed variation to the TPM, provided the submission is at least a year after the Authority last approved the TPM.[2]

2.2.2 Transpower's proposed variation to the TPM must be developed consistent with:[3]

(a) any determination made under Part 4 of the Commerce Act 1986

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1 Note that operations and maintenance (O&M) costs for these assets are still recovered under the TPM.

2 Clause 12.85 of the Code. The Authority "approves" a TPM under clause 12.93 ("Decision on the transmission pricing methodology").

3 Clauses 12.87 and 12.89 (1) of the Code.

(b) the Authority's statutory objective

(c) the TPM Guidelines, which currently are those published by the Electricity Commission on 24 March 2006.[4]

2.2.3 As set out in Section 2.4, Transpower has submitted to the Authority a proposed variation to the TPM.

2.3 The Authority's process for considering Transpower's proposed variation is driven by the Code and the Act

2.3.1 Clause 12.87 of the Code states that the Authority must follow the process in clauses 12.91 to 12.94 when reviewing a transmission pricing methodology.

2.3.2 The Authority's view is that the reference to 'reviewing a transmission pricing methodology' in clause 12.87 includes the Authority considering a proposed variation submitted by Transpower under clause 12.85.

2.3.3 Consequently, the Authority will follow the process in clauses 12.91 to 12.94 in responding to Transpower's proposed variation.

2.3.4 In doing so, the Authority has necessarily read the references in those clauses to 'Transpower's proposed transmission pricing methodology' as references to 'Transpower's proposed variation to the transmission pricing methodology'. Therefore, clause 12.91 requires the Authority to either:

(a) approve the proposed variation having regard to the requirements of clause 12.89(1)[5], or

(b) refer the proposed variation back to Transpower if it does not adequately conform with the requirements of clause 12.89(1).

2.3.5 Further, the Authority reads the reference to 'approve' in clause 12.91(1)(a) as 'approve for consultation', given that clause 12.92 of the Code requires the Authority to publish the proposed variation for consultation.

2.3.6 Transpower's proposed variation has[6] a number of components. The Authority has considered whether it is open to the Authority to approve some of the components of the proposed variation for consultation, and refer some components back to Transpower.

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[4] http://www.ea.govt.nz/dmsdocument/2990 Clause 17.118 of the Code deems the guidelines published by the Electricity Commission to be published by the Authority under clause 12.83 of the Code.

[5] Clause 12.89 is summarised in paragraph 2.2.2 above.

[6] Five were submitted in February 2015, and two further components were added in March 2015. Two components have since been withdrawn.

2.3.7 The Authority is of the view that it would be consistent with the process in clause 12.91 to do so, unless doing so would undermine the integrity of the consultation process in relation to the components being progressed. For example, the integrity of the consultation process would be undermined if parties were prejudiced in their ability to assess and consider the components being progressed by not knowing what was proposed in respect of the component being referred back to Transpower.

2.3.8 This consultation paper addresses the consistency of the HVDC component with the requirements of Clause 12.89.

2.3.9 Given that a change to the TPM is a change to the Code, this consultation paper also addresses the requirements of section 39 of the Act,[7] which:

(a) requires the Authority to consult on any proposed amendment to the Code and corresponding regulatory statement

(b) provides that the regulatory statement must include:

(i) a statement of the objectives of the proposed amendment

(ii) an evaluation of the costs and benefits of the proposed amendment

(iii) an evaluation of alternative means of achieving the objectives of the proposed amendment.

2.3.10 In this consultation paper, the Authority has only considered alternative options that are consistent with the TPM Guidelines. Options that are not consistent with the current TPM Guidelines can instead be considered as part of the Authority's own review of the TPM (see Section 2.6).

2.3.11 This consultation paper includes an application of the Code amendment principles to the HVDC component. In applying the Code amendment principles, the counterfactual used by the Authority is the status quo – rather than some other possible outcome of the Authority's review of the TPM.

2.3.12 Paragraph 2.6 of the Authority's Consultation Charter states that the Authority will usually allocate six weeks for consultation on a Code amendment. In relation to consultation on the HVDC component of Transpower's proposed variation to the TPM, the Authority considers that a shorter period of three weeks will be sufficient, given that:

[7] The Authority need not meet these requirements if (a) the nature of the amendments is technical and non-controversial, or (b) there is widespread support for the amendment among the people likely to be affected by it, or (c) there has been adequate prior consultation so that all relevant views have been considered. However, in this instance, the Authority considers it is good practice to meet the requirements even if one or more of these exclusions applies.

(a) Transpower's proposed variation was submitted after Transpower had undertaken two rounds of consultation on issues relating to the existing HVDC charge

(b) interested parties are familiar with the issues and the proposal

(c) this paper relates to a discrete issue.

2.3.13 Within 40 business days of the end of the submission period (or such longer period as the Authority may allow), the Authority must consider submissions and decide whether to amend the TPM and (if a decision is made to amend the TPM) the date on which the Code amendment will come into force. As required by the Code, the Authority will consult with Transpower in determining a date on which the relevant Code amendments come into force. The Authority anticipates that it will be able to complete these processes, in relation to the HVDC component considered in this paper, in a shorter time frame.

2.3.14 In deciding whether to incorporate each of the components of the proposed variation into the Code, the Authority will be guided by its statutory objective and the Code amendment principles.

2.3.15 If the Authority decides not to incorporate into the Code one or more of the components of the proposed variation that it has approved for consultation, then it may consider progressing alternative means of achieving the relevant objective(s). In this case, further consultation may be required.

2.4 Transpower carried out an operational review of the TPM and proposed a variation

2.4.1 Transpower began an operational review of the TPM in May 2014, with the intention of *'addressing a number of potential problems identified with the current TPM'*.[8]

2.4.2 Transpower published an initial consultation paper in July 2014, and a second consultation paper in November 2014.[9] There were 19 submissions on the initial consultation paper and 17 on the second consultation paper.

2.4.3 Issues raised in submissions that specifically relate to the HVDC component are briefly summarised in Appendix D of this paper.

2.4.4 Other issues that were raised in the consultation papers and submissions are summarised in Appendix D of the Authority's consultation paper *'Transpower's proposed variation to the Transmission Pricing Methodology'*.[10]

[8] https://www.transpower.co.nz/about-us/industry-information/tpm-development

[9] https://www.transpower.co.nz/about-us/industry-information/tpm-development/tpm-operational-review-submissions

2.4.5 Transpower also:

(a) held stakeholder briefings in Auckland, Christchurch and Wellington

(b) held two rounds of bilateral discussions with stakeholders

(c) provided the Authority with regular progress updates.

2.4.6 On 13 February 2015, Transpower submitted to the Authority a proposed variation to the TPM. The submission consists of:[11]

(a) a cover letter

(b) Attachment A, which consists of five separate Code amendment proposal forms – one for each component of the proposed variation

(c) Attachment B *('Background and supporting information')*, which sets out Transpower's process, summarises the five components of the proposed variation, provides the rationale for each, and notes points raised in submissions

(d) Attachment C, which provides Transpower's proposed drafting (as opposed to the drafting in Appendix B of this paper, which has been revised by the Authority in consultation with Transpower)

(e) Attachment D, which provides quantitative analysis and indicative pricing effects

(f) a report by Scientia Consulting, and associated modelling files, in support of Transpower's analysis of the HVDC charge.

2.4.7 At the request of the Authority, Transpower subsequently provided additional information, to assist the Authority in its consideration of the proposed variation. The items of information relevant to the HVDC component were:

(a) analysis of the consistency of Transpower's proposed variation with determinations made under Part 4 of the Commerce Act 1986 [12]

(b) a sensitivity analysis of the CBA of the HVDC component[13]

(c) modelling files providing detailed workings of the CBA of the HVDC component[14]

(d) an explanation of aspects of how the HVDC component would work.[15]

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10 https://www.ea.govt.nz/dmsdocument/19327

11 http://www.ea.govt.nz/development/work-programme/transmission-distribution/transpower-tpm-operational-review/development/operational-review-proposal-documents/

12 http://www.ea.govt.nz/dmsdocument/19316

13 https://www.ea.govt.nz/dmsdocument/19325

14 http://www.emi.ea.govt.nz/Datasets/Browse?directory=%2F20150421_Transpower_proposed_variation_to_TPM&parentDirectory=%2FDatasets%2FSupplementary_information%2F2015

2.4.8 The best starting point for the reader may be:

(a) Transpower's Code amendment proposal for the HVDC component

(b) Attachment B of Transpower's submission *('Background and supporting information')*.

2.4.9 Transpower's original proposed variation had five components:

(a) to allocate HVDC charges on a per-MWh basis, with an initial transition period *(the 'HVDC component')*

(b) in the calculation of the interconnection charge, to use N=100 for all four RCPD regions *(the 'N=100 component')*[16]

(c) for the purpose of the interconnection charge, to treat NZAS loads between 572 MW and 636 MW as if they were 572 MW, during the period from November to April inclusive *(the 'bespoke NZAS component')*

(d) to adjust the formula for the line maintenance component of the connection charge, so that it is based on a four-year average of the line maintenance rate *(the 'line maintenance component')*

(e) to provide for Transpower to adjust transmission charges when a reverse flow situation occurs *(the 'reverse flows component')*.

2.4.10 With regard to the HVDC component, the main differences from the proposals that Transpower consulted on in November 2014 are that:

(a) Transpower was previously proposing to allocate HVDC charges on a 'diluted HAMI' basis, but is now instead proposing a per-MWh allocation

(b) Transpower is no longer proposing, as part of the HVDC component, to derate HVDC charges in the Upper South Island (USI) region. (As set out in Section 2.6, Transpower now plans to address USI derating separately.)

2.4.11 Following discussion with the Authority, Transpower went on to propose two new components, which were to:[17]

(a) exclude summer trading periods (ie, from November to April inclusive) from the capacity measurement period (CMP) used to calculate RCPD *(the 'amended RCPD CMP component')*

(b) require Transpower to disregard a customer's offtake changes in a region for the purpose of determining regional peak demand periods, in cases where a

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15 http://www.ea.govt.nz/dmsdocument/19319

16 At present, the Upper North Island (UNI) and Upper South Island (USI) regions use N=12, while the Lower North Island (LNI) and Lower South Island (LSI) regions use N=100.

17 http://www.ea.govt.nz/development/work-programme/transmission-distribution/transpower-tpm-operational-review/development/operational-review-proposal-documents#march24

change in the customer's offtake would alter the incidence of a majority of peaks in the region, would not impact on transmission investment requirements, and would not occur in the absence of the adjustment for the change *(the 'RCPD quantity adjustment provision component')*.

2.5 The Authority approved four components of Transpower's proposed variation for consultation, and referred three back to Transpower

2.5.1 Following consideration of Transpower's proposed variation, the Authority decided to approve for consultation four of the seven components, on the basis that they are consistent with the Code requirements, and consult on those components under clause 12.92. These components were:

(a) the N=100 component

(b) the amended RCPD CMP component

(c) the RCPD quantity adjustment provision component

(d) the reverse flows component.

2.5.2 The Authority has completed consultation on the four components listed above,[18] and anticipates setting out its decisions in a Decisions and Reasons paper, to be published in July 2015.

2.5.3 The Authority decided to refer the remaining three components back to Transpower, on the basis that there were alternative options that better promote the statutory objective. These components were:

(a) the HVDC component

(b) the bespoke NZAS component

(c) the line maintenance component.

2.5.4 The Authority's reasoning for referring these three components back was set out in a letter to Transpower.[19] With regard to the HVDC component, the Authority commented that:

The proposal to allocate HVDC charges on a per-MWh basis does not fully meet the requirements in the Code. While this component would promote the Authority's statutory objective to some extent, there is an alternative that the Authority considers would better promote the statutory objective.

[18] https://www.ea.govt.nz/development/work-programme/transmission-distribution/transpower-tpm-operational-review/consultations/#c15231

[19] https://www.ea.govt.nz/dmsdocument/19326

In particular, the proposed per-MWh allocation could (like the current HVDC charge) deter investment in Upper South Island (USI) generation, which in turn could mean that opportunities to efficiently defer transmission investment into the USI are foregone.

In contrast, a per-MWh HVDC charge with derating for USI generation (USI derating) could better promote the statutory objective. Given the long lead times for generation investment, the Authority considers there would be benefit in Transpower further developing the USI derating option as soon as possible.

Transpower had already identified that USI derating could yield an economic benefit but then shifted its focus away from USI derating, on the basis that:

- *USI derating 'gained little support from submitters'*
- *Transpower considered USI derating 'would result in a substantive change to the design of the current TPM'*
- *Transpower considered that the benefits were likely to occur 'in the medium to longer term', so that 'the foregone benefits from deferring [USI derating] are likely to be low at this point'.*

Regarding the first point, the Authority notes that the fact that some parties do not support an amendment to the Code is not, in itself, determinative in the Authority's decision-making on that amendment.

Regarding the second point, the Authority does not consider that the fact that USI derating may result in a substantive change to the design of the current TPM should prevent the USI derating option being pursued, unless this would cause uncertainty about the TPM. The Authority does not consider that USI derating would result in a substantive change to the design of the current TPM, as USI derating would address a clearly identified problem with the current TPM that has been understood for some time.

In relation to the third point, as noted above, the long lead times for generation development mean there could be benefit in pursuing the USI derating option.

2.6 Transpower resubmitted the HVDC component, undertaking to investigate USI derating separately

2.6.1 On 8 May 2015, Transpower replied to the Authority:[20]

(a) resubmitting the HVDC component without modification

[20] https://www.ea.govt.nz/dmsdocument/19371

(b) undertaking to further investigate the issue of USI derating, for possible application from 1 September 2016

(c) withdrawing the bespoke NZAS component (on the basis that the problem can be addressed by the amended RCPD CMP component and/or RCPD quantity adjustment provision component)

(d) withdrawing the line maintenance component (on the basis that no amendment to the Code is needed).

2.6.2 With regard to the HVDC component, Transpower set out that:

(a) there are significant design issues that would need to be addressed before USI derating was proposed

(b) addressing these issues now would delay the introduction of the HVDC component, which would defer the resulting efficiency benefits

(c) it would be preferable to proceed with the HVDC component now, so that it can affect South Island generator behaviour from 1 September 2015, and consider USI derating separately

(d) a one-year delay in the introduction of USI derating (or some other solution to the same problem) is not expected to adversely affect efficiency

(e) therefore, Transpower will further investigate USI derating, for potential application from 1 September 2016.

2.6.3 Having regard to the above – and, in particular, that there are significant design issues to address, such that it is not clear, at this point, that a per-MWh charge plus USI derating would actually better promote the statutory objective – the Authority considers that the HVDC component adequately conforms to the requirements of clause 12.89(1). Accordingly, the Authority has therefore decided to approve the HVDC component for consultation, without amending the component under clause 12.91(2) of the Code to provide for USI derating.

2.6.4 In consultation with Transpower, the Authority has made some drafting changes to the HVDC component for the purposes of this consultation. The drafting changes are intended to clarify and give better effect to Transpower's intended proposal, as well as to be consistent with the Authority's drafting conventions in relation to the Code.

2.6.5 The Authority anticipates setting out its decision on the HVDC component in a Decisions and Reasons paper, which it expects to publish in August 2015.

2.6.6 If the decision was to proceed with the proposed Code amendment, then the Authority would anticipate that the change would be published in the *Gazette* in August, with changes coming into force 28 days after that, during September 2015. If a change is to be implemented, the Decisions and Reasons paper would highlight the incentive for South Island generators to change their behaviour in

reaction to the amendment from 1 September 2015 – as prices for the 2017/18 pricing year would be influenced by MWh output during the year beginning 1 September 2015.

2.6.7 In relation to when Transpower may submit a proposed variation to the TPM to implement USI derating, clause 12.85 of the Code states that Transpower may submit to the Authority a proposed variation of its TPM, provided that the submission is made at least 12 months after the last Authority approval of the TPM. Assuming that the Authority approves a revised TPM to implement one or more of the components of Transpower's current proposed variation, Transpower would not be able to submit a further variation for 12 months from that approval – ie, towards the end of the 2016 calendar year.

2.6.8 Therefore, the Authority expects that by late 2016, Transpower will provide either:

(a) a new proposed variation to stop the HVDC charge from discouraging USI generation investment located such that it might help to defer transmission investment, or

(b) an explanation why such a component would not promote the Authority's statutory objective.

2.7 In parallel, the Authority is carrying out its own review of the TPM

2.7.1 The Authority is currently reviewing the TPM.

2.7.2 The Authority's review is considering whether changes to the TPM, which would necessitate changes to the Guidelines, are required to better promote the statutory objective. The Authority's review therefore has a broader scope than Transpower's review, and focuses on changes that would promote efficient operation and investment.

2.7.3 Transpower's review is considering changes that could be made to the TPM within the existing guidelines that could better promote the statutory objective, with an emphasis on changes that could deliver near-term efficiency gains.

2.7.4 The Authority considers that the current TPM can be improved so as to better meet the Authority's statutory objective of promoting competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.

2.7.5 The Authority decided to advance the processes of reviewing the TPM by developing a second TPM issues paper (second issues paper) for consultation following consideration of submissions on the Authority's October 2012 paper "TPM: Issues and Proposals" (October 2012 issues paper) and information

provided at the TPM conference held in Wellington 29 – 31 May 2013. The second issues paper will include a revised TPM proposal and, if applicable, draft guidelines for Transpower to develop a new TPM (as referred to in clause 12.89 of the Code).

2.7.6 Prior to developing a second issues paper, the Authority is further considering and consulting on key aspects of a revised TPM proposal through a series of working papers, which will provide key inputs into the second issues paper.

2.7.7 Working papers that the Authority has completed can be found at http://www.ea.govt.nz/development/work-programme/transmission-distribution/transmission-pricing-review/consultations/.

3. Problem definition

3.1 The HAMI allocation of the HVDC charge can distort operation of, and investment in, South Island generation

3.1.1 It is well established that the HAMI allocation of the HVDC charge has distortionary effects.

3.1.2 The Authority discussed the HVDC charge in its working paper 'Transmission pricing methodology: problem definition relating to interconnection and HVDC assets' (Authority's problem definition paper).[21]

3.1.3 The Authority's problem definition paper set out that the HAMI allocation of the HVDC charge incentivises South Island generators to withhold existing capacity, which leads to out-of-merit dispatch. The Authority estimated the scale of the resulting inefficiency at approximately $12 million in present value terms.

3.1.4 The Authority's problem definition paper also set out that the HAMI allocation of the HVDC charge may discourage upgrades to South Island generation capacity.[22] However, it did not quantify the resulting inefficiency.

3.1.5 The Authority's problem definition paper also identified some inefficiencies that arise from placing a HVDC charge on South Island generation alone, irrespective of whether the HVDC charge is allocated on a HAMI, per-MWh or capacity basis. These types of inefficiencies are not discussed further in this paper, however, as they cannot be remedied within the current TPM Guidelines.

3.1.6 Transpower's proposal sets out that the HAMI allocation of the HVDC charge incentivises South Island generators to withhold existing capacity, which leads to out-of-merit dispatch. Transpower initially estimated the scale of the resulting inefficiency at approximately $13 million *per year* – much larger than the Authority's estimate.[23] However, Transpower subsequently carried out sensitivity analysis that suggested the inefficiency might be smaller than it had initially estimated – ie, as low as $6 million per year.[24] Transpower's cost-benefit analysis is discussed further in Section 4.6 of this paper.

3.1.7 Transpower also suggests that the HAMI allocation of the HVDC charge may:

(a) reduce wholesale market competition

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[21] http://www.ea.govt.nz/dmsdocument/18474

[22] The Authority's problem definition paper sets out that South Island generation capacity could be upgraded in several ways – one of which is to refurbish existing hydro plants to allow increased maximum output.

[23] Section 7 of Attachment B of Transpower's proposal.

[24] https://www.ea.govt.nz/dmsdocument/19325

(b) reduce reliability during tight supply conditions, citing the Authority's Market Performance Enquiry of 9 November 2014 [25]

(c) disincentivise efficient investment in South Island generation.

3.1.8 The Authority broadly agrees with Transpower's characterisation of the problem definition.

Q1. Do you have any comments on the problem definition?

[25] http://www.ea.govt.nz/monitoring/enquiries-reviews-and-investigations/2014/grid-emergency-on-19-august/

4. Regulatory statement

4.1 Transpower's proposal

4.1.1 Transpower proposes that, from the 2021/22 pricing year onwards, the HVDC charge should be allocated to HVDC customers[26] in proportion to their South Island mean injection (SIMI). A customer's SIMI is defined as their total annual injection into the South Island grid, in MWh terms, averaged over the previous five pricing years.[27]

4.1.2 Averaging over five years would reduce the volatility of the charge.

4.1.3 For pricing years from 2017/18 to 2020/21, Transpower proposes a transitional arrangement, under which:

(a) in the 2016/17 pricing year, the current HAMI-based HVDC change would continue to apply

(b) in the following three pricing years, a SIMI (MWh)-based component would be progressively introduced, making up 25% of the HVDC charge in the 2017/18 pricing year, 50% in the 2018/19 pricing year, and 75% in the 2019/20 pricing year

(c) in the 2020/21 year, HVDC costs would be recovered through the SIMI (MWh)-based HVDC charge alone.

4.1.4 Under the proposal, some provisions relating to the existing HVDC charge would apply to the revised HVDC charge:

(a) if, in Transpower's view, there are exceptional operating circumstances that have led to distortions in SIMI, Transpower will still be able to adjust SIMI quantities to minimise the distortion[28]

(b) if South Island generation is permanently reduced in capacity or decommissioned, then Transpower will still be able to adjust SIMI quantities downwards to reflect the reduction in capacity[29]

(c) if new South Island generation connects to the grid, Transpower will still base the new generator's charges on an estimate of its SIMI[30]

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[26] HVDC customers are (a) grid-connected South Island generators, and (b) South Island distributors that have embedded generators connected to their networks.

[27] Pricing years, as opposed to capacity measurement periods.

[28] Clause 34(2) of the Code. The Authority anticipates that exceptional operating circumstances would be declared less often under the proposal than under the current TPM.

[29] Clause 34(3) of the Code.

[30] Clause 34(6) of the Code.

(d) under the prudent discount policy, Transpower will still be able to enter into a prudent discount agreement in order to avoid incentivising inefficient embedding of South Island generation.[31]

4.2 Impacts on participants

4.2.1 Transpower has provided a spreadsheet that explains the workings of the proposed charge and shows indicative impacts on the charges faced by participants (assuming no changes in investment or operation).[32]

4.2.2 Transpower's analysis indicates the following impacts on current HVDC customers:

(a) all South Island networks with embedded generation that inject into the transmission network (Alpine Energy, Aurora Energy, Buller Electricity, Electricity Ashburton, Powernet and Westpower) would face a lower charge than before[33]

(b) Meridian Energy would face a lower charge than before

(c) Contact Energy, Genesis Energy and Trustpower would face a higher charge than before. (Nevertheless, Contact, Genesis and Trustpower all supported the proposal when Transpower consulted on it, on the grounds that it will bring efficiency benefits.)

4.3 The objectives of the proposed amendment

4.3.1 The primary objective of the proposed amendment is to promote static efficiency by reducing the incentive of South Island generators to withhold generation capacity to avoid HVDC charges.

4.3.2 Transpower has suggested that the proposed amendment would also promote:

(a) competition in the wholesale market, by reducing withholding of South Island generation

(b) reliability, by reducing the incentive for withholding of South Island generation when supply conditions are tight

(c) dynamic efficiency, by reducing the disincentive against investing in some forms of South Island generation.

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[31] Clauses 36-42 of the Code.

[32] Sheet 'Indicative charges HVDC' of "8 Attachment_D_TPM_OpRev_Price_Effects_and_RCPD_avoided costs_13Feb2015.xlsx", which can be downloaded at http://www.ea.govt.nz/dmsdocument/19123.

[33] Presumably the relevant embedded generators would also face a lower charge, on the assumption that the charge would be passed through by relevant networks.

4.4 The proposed amendment is expected to meet the objectives

4.4.1 Under the proposed amendment, South Island generators would no longer have an incentive to withhold generation capacity in order to reduce their HAMI, from 1 September 2015 onwards. This would promote static efficiency, competition and reliability.

4.4.2 SI generators would instead have an incentive to withhold generation capacity in a way that reduces their total MWh injection. However, the Authority anticipates that South Island generators would rarely act on this incentive:

(a) intermittent generators (eg wind, run-of-river hydro) would only be incentivised to withhold generation capacity if the spot price was less than the HVDC charge of about $7/MWh

(b) discretionary generators (eg hydro backed by storage) would only be incentivised to withhold generation capacity if they expected that this would reduce their total MWh injection (ie through increased spill), *and* they considered that the value of their storage was less than the HVDC charge of about $7/MWh.

4.4.3 The proposed amendment:

(a) would considerably reduce the disincentive to invest in South Island embedded generation (because embedded generation would no longer incur a significant charge unless it frequently injected power into the national grid)

(b) could also reduce the disincentive to invest in South Island grid-connected wind generation (because wind generation typically has average output of approximately 40%, which is relatively low compared to its maximum output. Therefore, wind generation is likely to face a lower charge under a regime where charges are linked to average output, than under a regime where charges are linked to maximum output)

(c) would probably have little effect on the disincentive to invest in South Island grid-connected hydro generation (because new grid-connected hydro generation would likely pay approximately the same charge under the proposal as under the status quo).

4.4.4 The overall impact on dynamic efficiency would probably be positive.

4.5 The Authority has considered other options for addressing the objective, but tentatively considers the proposed amendment is preferable

4.5.1 Transpower considered the following alternative options:

(a) a 'diluted HAMI' option, under which the HAMI allocator would be retained, but a much greater number of peak periods would be used in the calculation of HAMI[34]

(b) a capacity charge on South Island generation

(c) an 'incentive-free' capacity charge on existing South Island generation, under which the allocation would not change even if generators' capacity increased or decreased over time, or new generation was built

(d) a per-MWh charge (as per the proposal), but with a derating applied to Upper South Island (USI) generation.

4.5.2 The Authority agrees that this is a reasonable range of alternatives, given the requirement to be consistent with the TPM Guidelines.

4.5.3 Having considered Transpower's analysis of the above options, the Authority concludes that:

(a) the proposal is preferable to the 'diluted HAMI' option – because 'diluted HAMI' would have a lower expected net economic benefit (see section 4.6 of this paper)

(b) the proposal is preferable to the capacity charge option – because the capacity charge would disincentivise investors from building new South Island generation with a low capacity factor or from increasing the capacity of existing South Island generation

(c) the proposal is preferable to the 'incentive-free' capacity charge option – because an 'incentive-free' charge might be perceived as 'arbitrary', in that new generation would avoid it but owners of existing investments would be unable to avoid it. This could undermine investment incentives across the electricity industry by setting a precedent – investors could be concerned that an incentive-free charge could be applied to their investments in future,[35]

(d) USI derating may help to promote the statutory objective, but (as set out earlier in the paper) will be investigated by Transpower separately.

[34] Currently, HAMI is based on the top 12 half-hours in each pricing year or capacity measurement period.

[35] In this sense, it would not be 'incentive free'.

4.5.4 In its second consultation paper, Transpower also considered:

(a) expanding the use of 'exceptional operating circumstances' to include warning notices as well as grid emergencies

(b) aggregating stations on a river chain for the purpose of calculating the HVDC charge.

4.5.5 However, the two options above would be less effective at achieving the objective than the proposal, because they would not remove the incentive for South Island generators to reduce their maximum injection. Nor would they add incremental value if the proposal was adopted. Therefore, they are not considered further here.

4.5.6 Another alternative option would be a per-MWh charge (as per the proposal), but with no transition period. The Authority would favour this alternative if it led to the benefits of the proposal being realised earlier. However, removing the transition period would have no incremental efficiency benefits, as the incentives on participants would be the same with a transition as they would be if there was no transition. The Authority is not convinced that the magnitude of the changes in charges faced by participants is sufficient to require a transition, but agrees that a transition may be appropriate to provide an adequate lead time for the introduction of the new approach. Therefore, the no-transition alternative is not considered further here.

4.5.7 Another alternative option would be a per-MWh charge (as per the proposal), but on total generation rather than net injection. However, this option would not be consistent with the TPM Guidelines, because it would result in charges being levied on embedded generators that do not inject power into the transmission grid. The TPM Guidelines set out that HVDC costs should be recovered from *'all South Island generating stations that inject into the grid'*.[36]

4.5.8 Another alternative option would be a per-MWh charge (as per the proposal, but calculated based on output in a single year rather than averaged over five years). However, this alternative would be less preferable than the proposal because it would result in charges that were more volatile over time.

4.5.9 The Authority concludes that the proposal is preferable to alternatives that are consistent with the current TPM Guidelines.

4.5.10 There may be superior alternatives that are *not* consistent with the current TPM Guidelines. Such alternatives could be considered as part of the Authority's review of the TPM.

[36] Guideline 15.

4.6 Assessment of costs and benefits

4.6.1 Transpower has estimated the industry costs of implementing the proposal to be less than $0.1 million PV.[37] As discussed below, these costs are expected to be more than offset by the static efficiency benefits described in Section 4.4. Therefore, the proposal is expected to provide a net economic benefit relative to the status quo.

4.6.2 Transpower engaged Scientia Consulting to analyse the efficiency benefits of a per-MWh charge and a diluted HAMI option, compared to the status quo.[38] Scientia used the Authority's vSPD model to simulate dispatch outcomes under each of these three options, for August 2013 – July 2014 (the period when Pole 3 of the HVDC became available).

4.6.3 Key aspects of the analysis included that:

(a) a 'HAMI-limited level' of output was estimated for each station based on historic data

(b) if output from a unit was withheld (defined as offered quantity being within 1% of the 'HAMI-limited level' in a trading period), the counterfactual cases treated withheld capacity as being offered at the same price as that applying to the quantity tranche immediately below the 'HAMI-limited level'

(c) original offers were updated to account for the incremental HVDC cost under the different HVDC charging options (approx. $7/MWh for the MWh option and a higher value applied over fewer number of periods for the diluted HAMI options)

(d) daily energy constraints were applied to each hydro scheme to restrict hydro storage deviating materially from historical levels unless there was a significant gain greater than a specified $82/MWh penalty price

(e) vSPD was used to re-dispatch the system for each trading period between August 2013 and July 2014 using the revised offer data and subject to daily energy constraints

(f) system dispatch costs were assumed to equate to offer prices multiplied by cleared quantities at each injection location

(g) efficiency benefits were defined as the difference in system dispatch costs between the status quo and counterfactual cases.

4.6.4 Based on this analysis, Transpower estimated the efficiency benefit of the proposal at approximately $12.8 million, over the period from August 2013 to July

[37] Including its own costs, the Authority's costs, and costs incurred by participants.

[38] http://www.ea.govt.nz/dmsdocument/19124

2014. The equivalent benefits for the diluted HAMI options were estimated at $10.7 million (with N=10,000) and $12 million (with N=25,000). Scientia noted that these were indicative estimates, based on the assumptions used.

4.6.5 The Authority considered the overall modelling approach used for the analysis to be reasonable, but raised concerns that:

(a) the results might be overly driven by estimated benefits occurring during a relatively short period in which there was a Tekapo canal outage

(b) a large proportion of the estimated benefits stem from generation rescheduling within the Waitaki and Clutha hydro schemes. The benefits of such rescheduling might be overstated.

4.6.6 Transpower addressed these concerns by carrying out a sensitivity analysis, which has subsequently been published by the Authority.[39]

4.6.7 In the process of preparing the sensitivities, Transpower identified a problem with the way in which daily energy constraints had been modelled. Correcting this problem reduced the base case estimated benefit for a per-MWh charge from $12.8 million to $11.3 million, and for the diluted HAMI charge from $10.7 million to $10 million (in both cases, relative to the status quo).

4.6.8 Transpower carried out two sensitivity analyses:

(a) in which the Tekapo canal outage period (7 January – 26 February 2014) is excluded from the analysis

(b) in which the benefits of generation rescheduling within a river chain are excluded.

4.6.9 The results of the sensitivity analyses are summarised in Table 1.

Table 1: Sensitivity analysis of the proposal and 'diluted HAMI' options

	Estimated economic benefit relative to the status quo (millions of dollars per year)	
Scenario	**Per-MWh charge (the proposal)**	**Diluted HAMI with N=10,000**
Base case	11.3	10.0
Sensitivity 1	8.8	7.9
Sensitivity 2	6.1	5.0

4.6.10 Under both sensitivities, the proposal is expected to yield a net economic benefit relative to the base case and the diluted HAMI option.

[39] https://www.ea.govt.nz/dmsdocument/19325

4.6.11 The two sensitivities reduce the estimated benefit of the proposal, relative to the status quo, by $2.5 million and $5.2 million respectively. Under both sensitivities, the estimated benefit of the proposal is far in excess of the estimated implementation cost of less than $0.1 million present value.

4.6.12 Further, as set out in Section 4.4, the proposal may have further benefits, in terms of dynamic efficiency, that are not included in the cost-benefit analysis.

4.6.13 It might be thought that the proposal might create an economic disbenefit by bringing forward further investment in the HVDC link. However, Transpower has advised the Authority that *'though the change to a per-MWh charge will alter generator offers of existing plant... and, at the margin, could be expected to affect new [generation] investment decisions… it's difficult to see this having any material impact on [HVDC] investment timing – as might be the case, for example, if DC charges were not allocated to SI generators full stop'*. Therefore, the Authority considers that the proposal would be unlikely to create such an economic disbenefit.

4.7 Assessment under section 32(1) of the Act

4.7.1 Section 32(1) of the Act provides that Code provisions must be consistent with the Authority's objective and be necessary or desirable to promote any or all of the following:

(a) competition in the electricity industry

(b) the reliable supply of electricity to consumers

(c) the efficient operation of the electricity industry

(d) the performance by the Authority of its functions

(e) any other matters specifically referred to in the Act as a matter for inclusion in the Code.

4.7.2 Table 2 sets out an assessment of the proposed amendment against the requirements of section 32(1) of the Act.

Table 2: How the proposal to allocate HVDC charges on a per-MWh basis complies with section 32(1) of the Act

Requirement	Comment
The proposed amendment is consistent with the Authority's objective under section 15 of the Act, which is to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.	As set out in Section 4.4, the proposed amendment is expected to promote competition, reliability and efficiency for the long-term benefit of consumers, primarily by reducing the incentive on South Island generators to withhold generation capacity.
The proposed amendment is necessary or desirable to promote any or all of the following:	
(a) competition in the electricity industry;	The proposed amendment is expected to promote wholesale market competition, by reducing the incentive on South Island generators to withhold generation capacity, which will increase participation of South Island generation in the wholesale market.
(b) the reliable supply of electricity to consumers;	The proposed amendment is expected to promote reliability, by reducing the incentive on South Island generators to withhold generation capacity when supply conditions are tight.
(c) the efficient operation of the electricity industry;	The proposed amendment is expected to promote static efficiency, by reducing the incentive on South Island generators to withhold generation capacity to minimise their transmission charges. The proposed amendment may promote dynamic efficiency, by promoting efficient investment in South Island embedded generation and grid-connected wind generation.
(d) the performance by the Authority of its functions;	The proposed amendment will not materially affect the performance by the Authority of its functions.

(e) any other matter specifically referred to in this Act as a matter for inclusion in the Code.	The proposed amendment will not materially affect any other matter specifically referred to in the Act for inclusion in the Code.

4.8 Assessment under the Code amendment principles

4.8.1 Table 3 describes the Authority's consideration of the Code amendment principles in assessing the proposal.

Table 3: Application of Code amendment principles

Principle	Comment
1. Lawful	The proposal is lawful, and is consistent with the statutory objective and with the empowering provisions of the Act.
2. Provides clearly identified efficiency gains or addresses market or regulatory failure	The proposal is expected to provide clearly identified efficiency gains, relative to the status quo (Section 4.4) and the diluted HAMI option (Section 4.5).
3. Net benefits are quantified	The proposal is expected to provide a net economic benefit, relative to the status quo and the diluted HAMI option (Section 4.6).
Because principles 1-3 are satisfied, and the assessment of costs and benefits concludes that the proposal is preferable to the status quo and the other option included in the cost benefit analysis, there is no need to apply principles 4-9.	

Q2. Do you consider that the proposal is preferable to the status quo and other options? If not, please explain your preferred option in terms consistent with the Authority's statutory objective.

Q3. Do you consider that the proposal complies with section 32(1) of the Act, and with the Code amendment principles, and should therefore proceed?

Q4. Do you have any comments on the drafting of the proposal, which is included in Appendix B?

Glossary of abbreviations and terms

Act	Electricity Industry Act 2010
'Amended RCPD CMP component'	Transpower's proposal to exclude summer trading periods from the calculation of RCPD in all four RCPD regions
Authority	Electricity Authority
'Bespoke NZAS component'	Transpower's proposal to treat, for the purpose of the interconnection charge, NZAS loads between 572-636 MW as if they were just 572 MW, during the period from November to April inclusive
CMP	Capacity measurement period – a 12-month period from 1 September to 31 August inclusive – used to calculate transmission charges for subsequent pricing years
Code	Electricity Industry Participation Code 2010
Connection charge	The component of the TPM that recovers the costs of providing connection services
HAMI	Historical anytime maximum injection – the allocator currently used in the HVDC charge
HVDC charge	The component of the TPM that recovers the costs of the high voltage direct current inter-island link
'HVDC component'	Transpower's proposal to allocate HVDC charges on a per-MWh basis, with an initial transition period
Interconnection charge	The component of the TPM that recovers all TPM costs not recovered through the HVDC charge or connection charge
'Line maintenance component'	Transpower's proposal to adjust the formula for the line maintenance component of the connection charge, so that it is based on a four-year average of the line maintenance rate
LNI, LSI	Lower North Island and Lower South Island – two of the four regions used in the calculation of the RCPD allocator of the interconnection charge
MAR	Maximum allowable revenue – the amount of money that Transpower can recover for its regulated services under the Commerce Act 1986
N	The number of regional coincident peaks used in the calculation of the RCPD allocator of the interconnection charge – currently 12 for UNI and USI, 100 for LNI and LSI

'N=100 component'	Transpower's proposal to, in the calculation of the interconnection charge, use N=100 for all four RCPD regions
NZAS	New Zealand Aluminium Smelters Ltd
Pricing year	A twelve-month period from 1 April to 31 March, for which transmission charges are calculated
RCPD	Regional coincident peak demand – the allocator used in the interconnection charge
'RCPD quantity adjustment provision component'	Transpower's proposal to require Transpower to disregard customer's offtake changes in a region for the purpose of determining regional peak demand periods, in cases where a change in the customer's offtake would alter the incidence of a majority of peaks in the region, would not impact on transmission investment requirements, and would not occur in the absence of the adjustment for the change
'Reverse flows component'	Transpower's proposal to provide for Transpower to adjust transmission charges when a reverse flow situation occurs
SIMI	South Island mean injection – the proposed new allocator to be used for the HVDC charge
TPM	Transmission pricing methodology
UNI, USI	Upper North Island and Upper South Island
USI derating	The concept of applying a lower HVDC charging rate to generators in the USI region, in order to avoid disincentivising new generation in the area.

Appendix A Format for submissions

Question	Comment
Q1. Do you have any comments on the problem definition?	
Q2. Do you consider that the proposal is preferable to the status quo and other options? If not, please explain your preferred option in terms consistent with the Authority's statutory objective.	
Q3. Do you consider that the proposal complies with section 32(1) of the Act, and with the Code amendment principles, and should therefore proceed?	
Q4. Do you have any comments on the drafting of the proposal?	

Appendix B Proposed Code amendment

Appendix C The current HVDC charge

C.1 The current TPM comprises:

(a) the HVDC charge (which uses the HAMI allocator)

(b) the interconnection charge (which uses the RCPD allocator)

(c) the connection charge.

C.2 This Appendix describes the HVDC charge.

C.3 The HVDC charge recovers the costs of the HVDC link between the North Island and SI. In simple terms, it is a charge on all South Island generation, in proportion to maximum net injection into the transmission grid.

C.4 The HVDC charge is paid by customers at each South Island generation connection location – ie where any generating unit or station located in the South Island is either connected directly to the grid, or connected to a local network that is connected (directly or indirectly) to the grid.[40]

C.5 For a given year, the HVDC charge is calculated for each HVDC customer at each South Island generation connection location by multiplying Transpower's required HVDC revenue by the ratio of the customer's HAMI at the location to the sum of the HAMI of all HVDC customers at all South Island generation connection locations.[41]

C.6 HAMI for a transmission customer at a South Island generation connection location in a given pricing year[42] is defined as the highest of:[43]

(a) the average of the 12 highest injections at that location during the capacity measurement period[44] for the pricing year, or

(b) the average of the 12 highest injections at that connection location during any of the four immediately preceding pricing years. (Note, there is overlap between the capacity measurement period for the pricing year, and the previous pricing year.)

C.7 If, in Transpower's view, there are exceptional operating circumstances that have led to distortions in HAMI, the Code allows Transpower to adjust HAMI quantities to minimise the distortion.[45]

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40 Clause 31 of the TPM.

41 Clauses 32-33 of the TPM.

42 Under clause 3 of the TPM, a pricing year runs from 1 April to 31 March.

43 Clause 3 of the TPM.

44 Under clause 3 of the TPM, the capacity measurement period means for any pricing year, the 12 month period starting 1 September and ending 31 August inclusive, immediately before the commencement of the pricing year.

45 Clause 34(2) of the TPM.

C.8 If South Island generation is permanently derated or decommissioned, then Transpower can adjust HAMI quantities downwards to reflect the new capacity.[46]

C.9 If new South Island generation connects to the grid, Transpower will initially base the new generator's charges on an estimate of its maximum injection.[47]

C.10 Under the prudent discount policy, Transpower can enter into a prudent discount agreement in order to avoid incentivising inefficient embedding of South Island generation.[48] Also, some 'notional embedding contracts' – the precursor to prudent discount agreements – were signed before 2008 and are still operative.

C.11 In the 2015/16 pricing year, the HVDC rate is forecast to be $46.49/kW and the HVDC charge is forecast to collect $149.93 million.[49] The capacity measurement period for 2015/16 is 2013/14.

[46] Clause 34(3) of the TPM.

[47] Clause 34(6) of the TPM.

[48] Clauses 36-42 of the TPM. See also https://www.transpower.co.nz/about-us/industry-information/revenue-and-pricing.

[49] https://www.transpower.co.nz/about-us/industry-information/revenue-and-pricing#pricing

Appendix D Issues raised in Transpower's consultations that specifically relate to the HVDC component

D.1 Transpower's initial consultation paper under its operational review of the TPM, published in July 2014:

(a) set out the purpose of the review and the process that Transpower would follow

(b) explained how Transpower's review would interact with the Authority's review

(c) identified the following problems:

(i) the HAMI allocator of HVDC charges has distortionary effects

(ii) the interconnection charge may provide an excessively strong signal for reductions in net load in the UNI, LNI and/or LSI regions

(iii) the large size of the Tiwai smelter relative to LSI regional demand can cause *'unstable pricing signals'*

(iv) there has been a *'significant uplift in the maintenance rate for poles'*, which is not cost-reflective

(v) charges *'are not allocated as expected'* when there are reverse flows

(d) identified the following possible solutions:

(i) greatly increasing the number of peaks used in the HAMI allocator, or moving to a per-MWh or 'incentive-free' allocator

(ii) increasing the value of N used for the RCPD allocator in the UNI, LNI and/or LSI regions

(iii) combining the UNI, LNI and LSI RCPD regions

(iv) changing the formula for the line maintenance component of the connection charge to use *'a shorter averaging period, or an approach based on the average rate ($/km) rather than average cost'*

(v) correcting for the 'double-counting' that occurs when there are reverse flows

(e) sought stakeholder feedback.

D.2 Transpower received 19 submissions on its initial consultation paper, and summarised them in terms of the following key themes:[50]

(a) *'support for the clause 12.85 review as a process to improve the operation of the current TPM without major overhaul (though views differ over what should be in scope) but desire for coherency and coordination between this work and the Electricity Authority's clause 12.86 TPM review'*

(b) *'encouragement to do more work on problem definitions, in particular to take account of real-world conditions and empirical evidence, as well as pricing theory'*

(c) *'recommendation to consider additional options, particularly to address the RCPD and HAMI problems'*

(d) *'encouragement to prepare robust cost-benefit analysis (CBA) for any change proposal, but especially for substantive issues eg RCPD and HAMI'.*

D.3 Transpower's second consultation paper, published in November 2014:

(a) summarised and acknowledged feedback received on its initial consultation

(b) set out Transpower's analytical approach

(c) provided further context on the environment in which the operational review was occurring

(d) revised the problem definition

(e) considered various possible solutions, and proposed to recommend some or all of the following solutions to the Authority:

(i) greatly increasing the number of peaks used in the HAMI allocator, or failing that, moving to a per-MWh allocator

(ii) expanding the use of 'exceptional operating circumstances' to include warning notices as well as grid emergencies

(iii) aggregating stations on a river chain for the purpose of the HVDC charge

(iv) derating USI generation for the purposes of the HAMI allocator

(v) using N=100 for all four RCPD regions

(vi) amalgamating the UNI, USI and LSI regions into a single RCPD region

(vii) adjusting the formula for the line maintenance component of the connection charge, so that it is based on average rates rather than average costs

[50] https://www.transpower.co.nz/sites/default/files/uncontrolled_docs/TPM-Operational-Review-Update-Paper.pdf

(viii) providing for Transpower to adjust transmission charges when a reverse flow situation occurs

(f) sought stakeholder feedback.

D.4 Transpower received 16 submissions on its second consultation paper. The issues raised in submissions that relate specifically to the HVDC component are briefly summarised below.

D.5 Transpower invited comments on the effects of the existing HAMI charge. Replies included:

- recent significant improvements to transmission capacity mean that going forward the limitation on offered generation capacity is solely due to the HVDC charging regime (Contact, p.7)
- the transmission charge does appear to cause existing generators to withhold capacity (ENA, p.6)
- the proposed MWh charge on net injection volumes is the simplest solution (Pioneer, p.2)
- HAMI charge acts as a disincentive to peaking generation but also inflexible intermittent generation with relatively low load factors (eg wind) (Trustpower, p.5)
- unconvinced that the HAMI charge has resulted in reduced generation capacity expansion, as other factors (access to fuel or resources for generation, demand forecasts, consumer growth patterns) are more likely to be relevant (Genesis, p.11)
- likely to have encouraged less-efficient dispatch decisions by South Island generators (Genesis, p.11)
- the derating of USI generation in terms of the HAMI charge appears to be ad hoc, and caution is therefore warranted (ENA, p.6)

D.6 There was little support for Transpower's (tentative) proposal to recommend that the Authority consider changing the HVDC charges from HAMI to a diluted HAMI.

D.7 Submitters that did not support a diluted HAMI charge included the following comments:

- it distorts generation offers in the market (Genesis, p.2)
- it will not result in a material change to generation offer behaviour and therefore will not resolve the ensuing security risks and price volatility during times of low committed thermal capacity (these concerns can be overcome with a MWh approach) (Contact p.8)
- a very large N value would introduce a level of complexity into the market that may not be justified (Trustpower, p.6)

- it is difficult to model (Genesis, p.5)
- a piecemeal approach to HVDC issues is not appropriate, and HVDC charging should be dealt with by the Authority as part of its overall review (Meridian p.10)
- Transpower's analysis to date is not sufficiently robust to determine an optimal value for N (Meridian, p.10)
- a diluted HAMI charge will not result in a material change to offer behaviour (Contact, p.1)
- there has not been a full consideration of available options (eg removing the distortion created by having a separate HVDC charge) (Meridian, p.10)
- potential for gaming still exists (Genesis, p.5)
- risk of unintended consequences due to complexity (Genesis, p.5)
- a MWh charge is preferable to a diluted HAMI (see below) (Genesis, p.2)

D.8 A number of submitters supported a MWh charge over a HAMI charge or diluted HAMI charge. Comments included:

- benefits relative to HAMI or diluted HAMI are that it would enable full capacity to be offered at peak periods, increase security for Transpower, reduce price volatility for purchasers during capacity shortfalls, and avoiding unnecessary spill of water or wind (Contact, p.1)
- a MWh charge is easier to implement and will lead to lower levels of distortion of consumer and generation decisions (Genesis, p.2)
- likely to provide the optimal mix of efficiency, benefits to wholesale prices, transparency and simplicity (Trustpower, p.6)
- it would reduce the prices offered for previously underutilised peaking generation capacity in South Island (or ensure that capacity was offered more often) (Trustpower, p.6)
- it enables consistent treatment of all South Island generators without the need to make allowances for river chains (Genesis, p.5)
- short-term distortions from a MWh allocation will be less than those from a MW allocation, however, significant dynamic inefficiencies will remain (eg major deterrent to new South Island grid connected generation, impediment to maximising utilisation of South Island renewable generation resources) (Meridian, p.4)
- could provide a short term arrangement (5 year cumulative MWh charge) pending completion of the Authority's full review of transmission charges (Meridian, p.10)
- minimal impact on generation investment decisions (Genesis, p.6)

- introduces a price-floor for South Island generation, but this is likely to be minimal and is unlikely to affect consumer decisions (Genesis, p.5)
- the possibility (raised by Transpower) that moving to a MWh charge could increase overnight prices is not a material issue (Contact, p.2)

D.9 Some did not support the proposal or were unconvinced at this time, and their reasons included the following:

- concerns with assumptions, the estimates of costs and benefits, and aspects of the analytical approach (WPI, p.1)

D.10 Some submitters commented on the proposed derating for USI generation. Comments included:

- all South Island generators should be treated consistently under any allocation mechanism, and there is no evidence to suggest otherwise (Genesis, p.6)
- a USI discount amounts to a cross-subsidy of USI generation by other South Island generators, and market-based mechanisms should instead be explored, targeted to the specific capacity issues (Genesis, p.6)
- this diverges from the current TPM principle that the HVDC charge is applied to South Island grid-connected generation (Contact, p.3)
- this is ad hoc, inadequately justified and open to legal challenge as it is inconsistent with the relevant pricing guideline (Powerco, p.2)
- such a fundamental change to the HVDC charge should only be considered as part of the Authority's review of the methodology (Powerco, p.2)
- Transpower should not use transmission charges to carry out a central planning role (Meridian, p.2)
- USI derating is beyond the scope of an operational review (Contact, p.3)

D.11 Other comments on HAMI included the following:

- Transpower should consider further the option to change the TPM to allow river chain aggregation as a permanent measure (Contact, p.10)
- supportive of river chain aggregation as a permanent measure although due consideration should be given to approval of what constitutes a river chain in each case (MRP, p.3)