



TRANSPower

Addendum to CUWLP case study following Refer Back response

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1 Introduction

1. The Electricity Authority (**Authority**) asked Transpower to reconsider some aspects of the proposed TPM that Transpower submitted on 30 June 2021 (**30 June proposed TPM** and **30 June proposal**) relating to the benefit-based charge (**BBC**) allocation methodologies.¹ The Authority otherwise accepted the BBC allocation methodology related aspects of the proposed TPM for the purpose of its upcoming consultation.
2. Our response to the Authority's request (**BBC refer back paper**)² included some updates to the standard method allocation methodologies. The purpose of this document is to indicate how these would affect BBC allocations in the price-quantity method case study (**CUWLP case study**) included in the 30 June proposal.³
3. There were three updates to the price-quantity method in the resubmitted proposed TPM:
 - 3.1 Number of regions possible under the clause 52 method (previously in clause 50A).⁴
 - 3.2 Criteria for choosing between the clause 52 method and clause 53 method (previously in clause 50B).⁵
 - 3.3 Flexibility of regional definition.⁶
4. This addendum describes how these updates affect the CUWLP case study, with which it should be read.
5. The proposed TPM will not be formally applied to CUWLP until after the new TPM has been approved and finalised by the Authority. Hence the allocations and pricing in the original case study and this addendum are indicative only and subject to change.

¹ Authority letter to Alison Andrew, [Transpower's proposed TPM](#), 18 August 2021.

² The BBC refer back paper (part 2) and resubmitted proposed TPM are available on our [TPM webpage](#).

³ [TPM Proposal Reasons paper](#), 30 June 2021, Appendix D: BBC Price quantity method case study – CUWLP.

⁴ [TPM Proposal 30 June 2021 Decision Part 2 refer back: Transpower response](#), 15 September 2021 – Section 3

⁵ [TPM Proposal 30 June 2021 Decision Part 2 refer back: Transpower response](#), 15 September 2021 – Section 2

⁶ [TPM Proposal 30 June 2021 Decision Part 2 refer back: Transpower response](#), 15 September 2021 – Section 4

2 Summary of changes

6. Of the updates we made in the resubmitted proposed TPM, only the one relating to the number of regions under the clause 52 method results in changes to BBC allocations in the CUWLP case study.
7. This update increases the number of modelled regions for CUWLP, by splitting the rest of country region (downstream of the CUWLP export constraint) into a North Island region (**NI**) and an Upper South Island region (**USI**). The simplified analysis we have been able to complete in the time available results in a 4% decrease to BBCs for NI offtake, compensated by a 6% increase to BBCs for all other beneficiaries including USI offtake.
8. NI offtake benefits from periods when the CUWLP export constraint is binding in the counterfactual because the prices they face will fall if the constraint is alleviated by the investment. Applying the resubmitted proposed TPM, we have excluded from their periods of benefit those times when the HVDC north flow constraint is also binding in the counterfactual. This is because during these times there will be no fall in prices in the NI from alleviating the CUWLP export constraint.
9. The other two updates in the resubmitted proposed TPM do not affect the CUWLP case study because:
 - 9.1 most of the regional supply groups' benefits are to existing generating plant (therefore clause 52(1)(a) does not apply, which in turn means the update to clause 51(1)(b) and new clause 51(3) are not relevant);
 - 9.2 most of the benefits relate to alleviating constraints that bind either during periods of high hydrological inflows or low reservoir levels, and do not relate to consumers avoiding their cost of self-supply (therefore clause 53(1)(b)(i) does not apply); and
 - 9.3 In our view, the clause 52 method does produce BBC allocations that are broadly proportionate to the expected positive net private benefits (**EPNPB**) from CUWLP (therefore clause 53(1)(b)(ii) does not apply).

3 Number of regions under clause 52 method

10. In the resubmitted proposed TPM we have proposed to enhance the clause 52 method by allowing additional factors, including other important constraints, to be taken into account when determining modelled regions for the relevant benefit-based investment.
11. Specifically, the changes in the resubmitted proposed TPM are as follows:
 - 11.1 The rules for determining modelled regions (and regional customer groups) have been separated out from clauses 52 and 53 into new clause 51, for clarity. Clause 51 applies to determining the modelled regions (and regional customer groups) for both clauses 52 and 53.
 - 11.2 Clause 51(1)(c) allows for the larger regions based on the direction of price or quantity changes (clause 51(1)(a) and (b)) to be divided into smaller regions based on the

magnitude of the changes, the times they occur, and the market scenarios in which they occur.

- 11.3 Clause 51(1)(d) confirms that Transpower's region determination must ensure the BBC allocations produced are broadly in proportion to EPNPB, consistent with the Guidelines.
12. In the CUWLP case study we have applied clause 51(1)(c) to split the original Rest of country region into NI and USI, resulting in three modelled regions overall - LSI, USI, NI.
13. This allows us to ensure no benefits or disbenefits are counted for NI customers when alleviation of a CUWLP constraint would not result in a NI price change because an HVDC constraint is binding at the same time. Specifically:
- 13.1 If both the HVDC *north flow* constraint and the CUWLP *export* constraint are binding in the counterfactual, prices *fall* in the USI but are unchanged in the NI as a result of alleviating the export constraint. This means during these times NI offtake does not *benefit*, and NI injection does not *disbenefit*, from the investment.
- 13.2 If both the HVDC *south flow* and the CUWLP *import* constraint are binding in the counterfactual, prices *rise* in the USI but not in the NI as a result of alleviating the import constraint. This means during these times NI offtake does not *disbenefit*, and NI injection does not *benefit*⁷, from the investment.
14. After determining the new modelled regions, our application of clause 52(2) changes.
15. The periods of benefit identified, as required under clause 52(2)(b), stay the same as the original CUWLP case study. As discussed in paragraph 151 of the case study, the periods of benefit related to price changes are defined as times when either the import or export constraint is binding in the counterfactual.
16. However, we now do not count quantities under clauses 52(2)(c) and (d) for regional customer groups in the NI during periods when an HVDC constraint is binding in the counterfactual in the same direction as the relevant CUWLP constraint, i.e. when the HVDC north constraint is binding at the same time as the export constraint, or when the HVDC south constraint is binding at the same time as the import constraint⁸. This is because clauses 52(2)(c) and (d) count only positive or negative quantities depending on the direction of price change from the counterfactual to the factual, but there is no price change in the NI during these times. Quantities are only counted for regional customer groups in the LSI and USI regions during these periods.
17. Quantities are counted under clause 52(c) and (d) for regional customer groups in all three modelled regions during all other periods where the export or import constraint is binding in the counterfactual. For example, positive quantities are counted for both USI and NI offtake

⁷ Note, if the HVDC were binding at the same time but in the opposite direction to a CUWLP constraint, we would expect a price change in the North Island from alleviating the CUWLP constraint. For example, if the HVDC north flow constraint were binding in the counterfactual at the same time as the CUWLP import constraint, alleviating the import constraint results in increased flows into LSI, reducing the available supply to both the USI and NI.

⁸ We acknowledge that that the benefits and disbenefits may also be limited for NI compared to USI customers if an HVDC constraint was close to but not quite binding in the counterfactual. In applying the TPM formally we would further consider what are the appropriate periods of benefit applying to each regional customer group.

during periods when the export constraint is binding in the counterfactual but the HVDC north constraint is not.

18. This update could also affect the composition of NI sub-regional customer groups beyond those imposed by the additional modelled region, as benefits to beneficiaries within the NI will be different depending on how customers' exposures during periods of benefit change with the update. This could include expanding or contracting sub-groups and may even result in new sub-groups of positive beneficiaries whose benefits were calculated as net negative in the original CUWLP case study.
19. However, for the purposes of this addendum, we have performed a simplified analysis that does not include reassessing the definition of regional customer groups beyond splitting the current rest of country groups into NI and USI groups.
20. In applying the new TPM formally, we intend to model whether, how, and when the HVDC link would be upgraded during the standard method calculation period. An upgrade to the HVDC link would reduce any difference in the benefits the NI received compared to the USI because there would be fewer periods in which both the CUWLP and HVDC constraints are binding in the counterfactual. We did not model an HVDC upgrade in the original CUWLP case study, but we have for the purposes of this addendum given its importance in the context of the update.
21. For the purposes of this addendum, we have assumed the HVDC link will be upgraded at the start of 2031, based on a commissioning date of 1991 for the existing HVDC cables and a cable design life of 40 years. This assumption is for illustrative purposes only and is not an estimate of when any future HVDC upgrade will occur. For simplicity, we also assume the HVDC constraints will never bind in the counterfactual following the assumed upgrade in 2031 until the end of the standard method calculation period (2041).
22. We note we have made several simplifying assumptions in order to complete the analysis for this addendum within the available timeframe. These are not limited to those explicitly mentioned.
23. We estimate the following present values of regional net private benefit (PVRNPB), allocations, and percentage changes to BBCs compared to those in the original CUWLP case study:

Region	Sub-group	PVRNPB		Allocation		% new to old BBC
		old way	new way	old way	new way	
LSI	Direct connect gen	31,183	31,183	21.73%	22.95%	106%
LSI	Tiwai load	7,709	7,709	5.37%	5.67%	106%
USI	Offtake	16,711	16,711	11.64%	12.30%	106%
NI	Industrial offtake	4,857	4,435	3.38%	3.26%	96%
NI	All other offtake	82,945	75,737	57.79%	55.73%	96%
NI	Direct connect peakers	113	113	0.08%	0.08%	106%

24. NI offtake customers receive a lower BBCs due to reduced benefit attributed to alleviating the export constraint. We have assumed for simplicity the same percentage change for industrial and non-industrial customers. NI peakers' estimated benefits remain virtually unchanged as reductions in benefits at times of the import constraint binding are offset by

reductions in disbenefits at times of the export constraint binding. Overall, BBCs are lower for NI offtake customers and therefore higher for all other previously identified beneficiaries of CUWLP.

25. In paragraph 134 of the case study we acknowledged that the application of the clause 50A method depended on the suitability of assuming at most two modelled regions. We determined that allocations were broadly proportionate to EPNPB despite not accounting for a separate NI region. As the application of the new clause 52 method has allowed us to better differentiate benefits between NI and USI customers, we consider that the allocations in this addendum are broadly proportionate to EPNPB, subject to the accuracy of our assumptions.