

Dispatchable demand - late bid revisions

Consultation Paper

Submissions close: 5.00pm Tuesday, 16 June 2015

5 May 2015

Executive summary

Under part 13 of the Electricity Industry Participation Code 2010 (Code), the dispatchable demand regime provides an opportunity for approved electricity users to elect to be dispatched based on their bid in a similar way to generators. Two industrial processes operated by Norske Skog Tasman Limited (Norske Skog) at the KAW0112 and KAW0113 nodes have participated in the regime since November 2014 (although the KAW0112 load participated only over a four day period).

Dispatch instructions to dispatch-capable load stations (DCLSs) are created from the short version of the non-response schedule (NRS). The NRS runs each trading period to determine dispatch instructions for the following trading period.

If a DCLS revises its bid after dispatch instructions have been produced, three problems can emerge. First, the formula for calculating constrained on and constrained off payments produces results that are not consistent with the economic purpose of constrained on and constrained off payments which is to encourage efficient compliance with dispatch instructions. Second, the DCLS may incur costs trying to comply with the dispatch instruction that is based on an outdated bid. Third, there is a potential opportunity for a DCLS to manipulate final prices by making “rogue” late bid revisions.

The Electricity Authority (Authority) has identified that \$176,017 was paid in constrained on and constrained off payments to DCLSs from 20 November 2014 to 28 February 2015. The amount consistent with the intended purpose for making constrained on and constrained off payments was \$2,880. This means \$173,137 of the amount paid was not consistent with the intended purpose. One trading period accounts for \$108,369 of this amount. There is the potential for such payments to be even greater in the future.

The Authority is proposing to amend part 13 of the Code to provide that, if a DCLS makes a revision to a nominated dispatch bid for a trading period during the 30 minutes prior to the start of the trading period:

- a) the revised bid must be a nominated non-dispatch bid
- b) the DCLS is not obliged to comply with a dispatch instruction during that trading period.

The drafting of the proposed Code amendment is contained in Appendix A.

The static efficiency benefits of the proposal have an estimated present value of \$108,762 over 15 years. The dynamic efficiency benefits have not been quantified. The costs of implementing the proposal have an estimated present value of \$42,800. The net present value (NPV) of the proposal is \$65,962 excluding dynamic efficiency benefits.

The Authority is also considering a separate issue relating to the calculation of constrained off payments when the NRS reaches an infeasible solution. This may be the subject of a separate consultation paper in future.

Contents

Executive summary	A
1. Your feedback is welcome	5
1.1 What this paper is about	5
1.2 How to make a submission	5
1.3 Deadline for receiving a submission	6
2. Issue the Authority would like to address	7
2.1 The existing arrangements	7
Dispatchable demand and the NRS	7
Constrained on and constrained off payments	8
Bid revisions and late bid revisions	10
Dispatch compliance and final pricing when there is a late bid revision	12
2.2 Issues with the existing arrangements	12
Summary of the problems	12
The problem with the constrained on and constrained off calculations	13
A problem related to NRS infeasibilities will be handled separately	15
2.3 Why the Authority is addressing these issues now	16
3. Regulatory Statement for the proposed Code amendment	19
3.1 Objectives of the proposed Code amendment	19
3.2 The proposed Code amendment	19
3.3 The proposed Code amendment's benefits are expected to outweigh the costs	20
Benefits	20
Costs	22
Benefits likely to exceed costs	22
3.4 The Authority has identified four alternative approaches for addressing the objectives sought by this proposed amendment	23
3.5 The proposed Code amendment is preferred to other options	27
3.6 The proposed Code amendment complies with section 32(1) of the Act	27
3.7 The Authority has given regard to the Code amendment principles	28
Glossary of abbreviations and terms	31
Appendix A Proposed Code amendment	33
Appendix B Format for submissions	37

Tables

Table 1: Overpayment of constrained on and constrained off payments due to late bid revisions	16
Table 2: Summary evaluation of options	26
Table 3: How proposal complies with section 32(1) of the Act	27
Table 4: Regard for Code amendment principles	28

Figures

Figure 1: Timeline showing NRS schedules and dispatch	8
Figure 2: Constrained on payment	9
Figure 3: Constrained off payment	10
Figure 4: Total MW associated with late bid revisions at KAW0113 between 20 November 2014 and 28 February 2015	12
Figure 5: Inappropriate constrained on payment	14
Figure 6: Inappropriate constrained off payment	15
Figure 7: Deadweight loss calculation	21

1. Your feedback is welcome

1.1 What this paper is about

- 1.1.1 The Authority is proposing to amend part 13 of the Electricity Industry Participation Code 2010 (Code) to provide that, if a dispatch-capable load station (DCLS) makes a revision to a nominated dispatch bid for a trading period during the 30 minutes prior to the start of the trading period:
 - (a) the revised bid must be a nominated non-dispatch bid
 - (b) the DCLS is not obliged to comply with a dispatch instruction during that trading period.
- 1.1.2 The proposed changes to the Code are set out in Appendix A.
- 1.1.3 The purpose of this consultation paper is to inform participants and persons likely to be affected by the proposal and to invite feedback on this proposal.

1.2 How to make a submission

- 1.2.1 Your submission is likely to be made available to the general public on the Authority's website. If necessary, please indicate any documents attached in support of your submission and any information that is provided to the Authority on a confidential basis. However, you should be aware that all information provided to the Authority is subject to the Official Information Act 1982.
- 1.2.2 The Authority's preference is to receive submissions in electronic format (Microsoft Word) in the format shown in Appendix B. Submissions in electronic form should be emailed to the Submissions' Administrator at submissions@ea.govt.nz with "Consultation Paper—Dispatchable demand - late bid revisions" in the subject line.
- 1.2.3 Do not send hard copies of submissions to the Authority unless it is not possible to do so electronically. If you cannot or do not wish to send your submission electronically, you should post one hard copy of the submission to either of the addresses provided below or you can fax it to 04 460 8879. You can call the Submissions' Administrator on 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, 16 June 2015**. Please note that late submissions are unlikely to be considered. 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. Issue the Authority would like to address

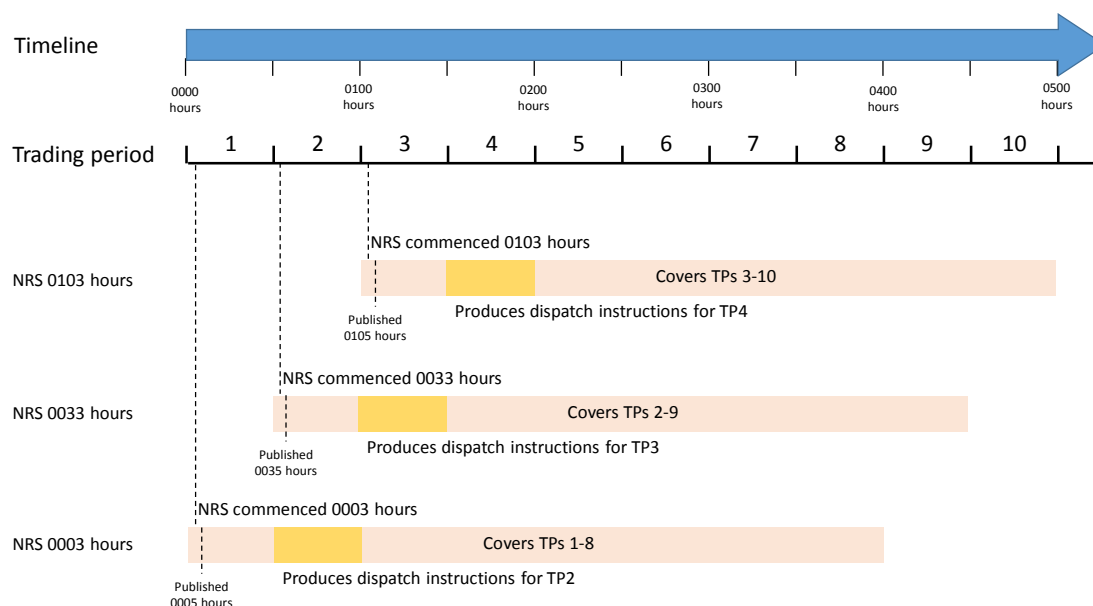
2.1 The existing arrangements

Dispatchable demand and the NRS

- 2.1.1 The Code was amended in mid-2014 to include dispatchable demand provisions. The provisions provide an opportunity for electricity users to elect to be dispatched based on their bid into the market in a broadly similar way to generators. A purchaser can apply to have a load recognised as a “dispatch-capable load station” (DCLS). Once approved, the purchaser can then submit “nominated dispatch bids” for that load. The system operator dispatches those loads. The purchaser is then known as a “dispatched purchaser”. Nominated dispatch bids are used in the final pricing schedule and may set the final price.
- 2.1.2 It remains optional for an approved DCLS to be actually dispatched. Bids can be changed from nominated dispatch bids to nominated non-dispatch bids (and vice versa) to indicate when the DCLS is to be dispatched. Nominated non-dispatch bids are not used in the final pricing schedule and so cannot set the final price
- 2.1.3 Two DCLSs have participated in the regime since November 2014. Norske Skog operates a DCLS at the KAW0113 node and has routinely submitted nominated dispatch bids since 20 November 2014. The other DCLS is also operated by Norske Skog and is located at the KAW0112 node, although it submitted nominated dispatch bids for only four days from 20 to 23 November 2014, inclusive.
- 2.1.4 Dispatch instructions to DCLSs are created from the non-response schedule (NRS).¹ The NRS is normally run once each trading period covering the current trading period plus the following seven trading periods. It commences solving about three minutes after the start of each trading period, and the results are normally available within a further two minutes. Dispatch instructions to each DCLS are derived from the NRS. The dispatch instructions are for the next trading period (not the current trading period) and are issued automatically through the Wholesale Information and Trading System (WITS). Consequently, dispatch instructions applying to a trading period are normally issued to the DCLSs around 25 minutes before the start of that trading period. This is illustrated in Figure 1.

¹ The actual NRS used is the “short” version as defined in clause 13.62(1)(b) of the Code. This is commonly called the NRSS, the non-response schedule (short)

Figure 1: Timeline showing NRS schedules and dispatch



- 2.1.5 Although it is not normal practice, it is possible for the system operator to run one or more further NRSs during a trading period. If a subsequent NRS solve completes and is published to WITS before the end of the trading period, it will be used as the basis for dispatch instructions to DCLSs for the next trading period.

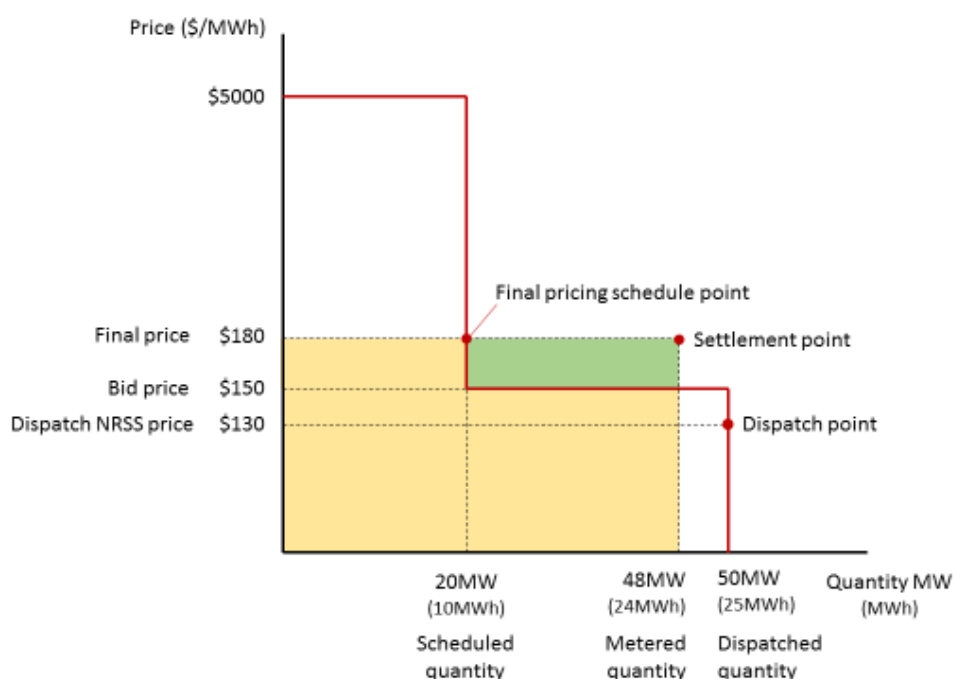
Constrained on and constrained off payments

- 2.1.6 One of the main benefits to a DCLS of participating in the dispatchable demand regime is that it will receive compensation if it is:

- (a) *dispatched* to use electricity from a bid band when the final price is *above* the value the DCLS has assigned to that bid band (constrained on); or
- (b) *not dispatched* from a bid band when the final price is *below* the value the DCLS has assigned to that bid band (constrained off).

- 2.1.7 Constrained on and constrained off compensation payments are funded by all purchasers on a pro rata basis.

- 2.1.8 Figure 2 illustrates a constrained on payment. In this diagram, the DCLS bid 20 MW at \$5000/MWh plus 30 MW at \$150/MWh. The DCLS was dispatched at 50 MW since the Dispatch NRS price was \$130/MWh. The diagram shows this dispatch point. The final price turned out to be \$180/MWh, and the quantity scheduled for the DCLS in final pricing was 20 MW (illustrated by the “final pricing schedule point”). The “settlement point” shows the relevant quantities for the energy settlement which are the final price and the metered quantity from the reconciliation process (which is 48 MW or 24 MWh in this example).

Figure 2: Constrained on payment

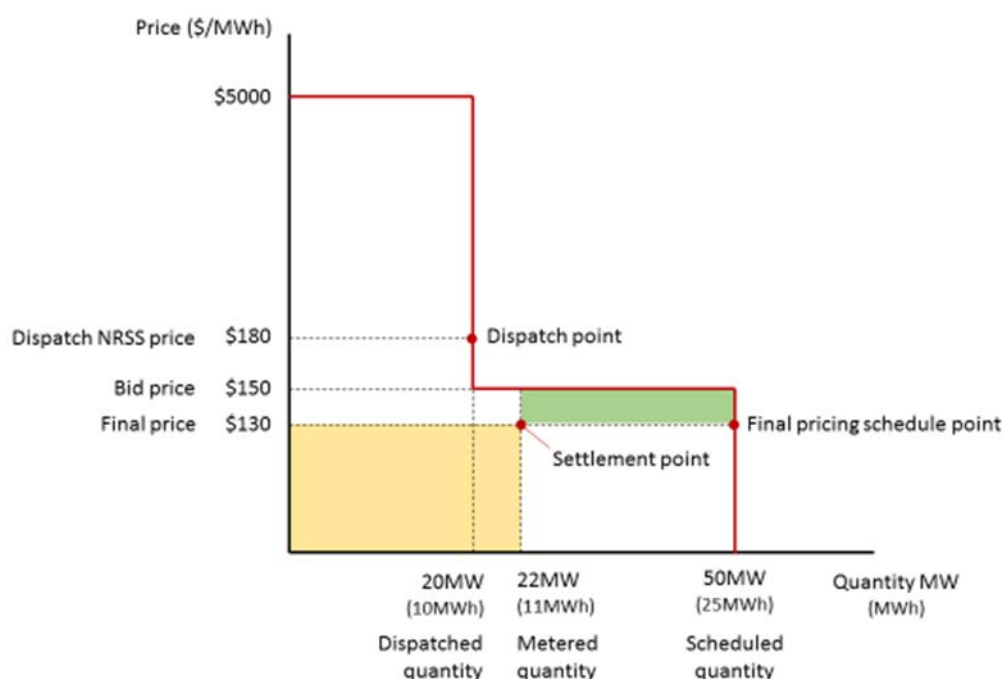
2.1.9 The DCLS will receive constrained on compensation equal to the green highlighted rectangle area. The constrained on compensation relates to the second bid band (with the bid price of \$150/MWh). For each affected bid band, the constrained on payment is the product of (a) and (b) below, where:

- (a) the difference (expressed in MWh) between the “scheduled quantity” (the quantity scheduled in the final pricing schedule) and the minimum of:
 - (i) the dispatch quantity
 - (ii) the metered quantity, and
- (b) the difference between the final price and the bid band price.

2.1.10 This amounts to 14 MWh * \$30/MWh which is \$420. This represents the value the DCLS has “lost” from using electricity in that bid band when the final price was above the price at which it was willing to use the electricity (as indicated in its bid).

2.1.11 Figure 3 illustrates the constrained off payment. In this case, the DCLS is dispatched at 20 MW because the Dispatch NRS price is \$180/MWh. However, if the DCLS had known the final price would be \$130/MWh it would have preferred to use 50 MW (according to its bid). The metered quantity in this example is assumed to be 22 MW (11 MWh).

Figure 3: Constrained off payment



2.1.12 The DCLS will receive constrained off compensation equal to the green highlighted rectangle area. For each affected bid band, this is the product of paragraphs (a) and (b) below, where:

(a) the difference (expressed in MWh) between the “scheduled quantity” (the quantity scheduled in the final pricing schedule) and the maximum of:

- (i) the dispatch quantity
- (ii) the metered quantity, and

(b) the difference between the final price and the bid band price.

2.1.13 This amounts to 14 MWh * \$20/MWh which is \$280. This represents the benefits the DCLS has “missed out on” from not using electricity in that bid band when the final price was below the price at which it was willing to use the electricity (as indicated in its bid).

2.1.14 The economic intuition behind constrained on and constrained off payments is that the compensation removes the incentive for the DCLS to deviate from its dispatch instruction based on subsequent information about likely final prices. In this respect it can be viewed as a “quid pro quo” for being dispatched.

Bid revisions and late bid revisions

2.1.15 The WITS system allows purchasers to revise their bids (including switching between nominated dispatch bids and nominated non-dispatch bids) at any time up to the beginning of the trading period. However, there are restrictions in the Code on how purchasers can change their bid within

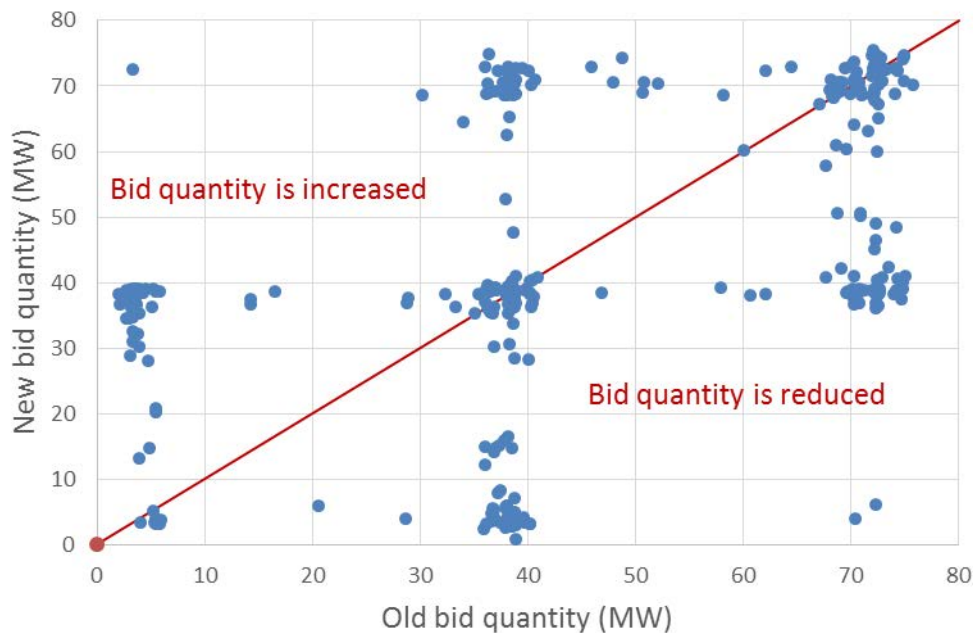
the two hours before the start of the trading period. Purchasers can still physically enter the bid revisions into WITS and they will be used in subsequent schedules, but the purchaser may later be found to be in breach of the Code if the revision is not properly allowed under the Code.

- 2.1.16 In this paper, the term “late bid revision” is used to refer to the submission of a revised nominated dispatch bid for a trading period after the normal commencement time of the Dispatch NRS (around 27 minutes before the start of the trading period). The term is not intended to express disapproval about the timing of the bid revision: just to attach a convenient label to the timing.
- 2.1.17 If an industrial plant experiences a significant and unexpected event that will affect its electricity usage over the next few trading periods, there is an obligation in the Code for that plant to signal its changed expectations through a bid revision. It may be that the plant (or some component within the plant) must shut down due to the unexpected event. In that case the bid quantities for the upcoming trading period will be revised down. Alternatively, it may be that some plant process is available to come back into operation more quickly than previously anticipated, in which case the bid quantities will be revised upwards. A late bid revision will generally indicate that the plant is no longer capable of complying with its previously issued dispatch instruction.
- 2.1.18 Publicly available data² shows that Norske Skog submitted late bid revisions for the DCLS at the KAW0113 node for around seven percent of trading periods from 20 November 2014 to the end of February 2015. The bid revisions are often for around 30 MW (up or down). Figure 4 shows each late bid revision over that period at KAW0113 as a point, with the total old bid quantity on the horizontal axis and the total revised bid quantity on the vertical axis.³

² Available on the Authority’s EMI website at <http://www.emi.ea.govt.nz/>.

³ Since the bid quantities are all whole numbers, a small positive random number less than 1 has been added to the MW quantities to allow each point on the diagram to be seen more clearly as a unique point. This helps the visual interpretation of the chart.

Figure 4: Total MW associated with late bid revisions at KAW0113 between 20 November 2014 and 28 February 2015



Dispatch compliance and final pricing when there is a late bid revision

2.1.19 If there is a late bid revision (and assuming the normal situation where the NRS is run only once during the trading period at the usual time):

- (a) **Dispatch:** the original dispatch instruction (based on the old bid) will continue to apply. Dispatch compliance will be assessed against that dispatch instruction, despite the DCLS having signalled through its revised bid that the dispatch instruction based on the old bid may no longer be realistic
- (b) **Final pricing:** the revised bid will be used in final pricing, even though the dispatch instruction to the DCLS is not based on that bid.

2.2 Issues with the existing arrangements

Summary of the problems

2.2.1 The Authority has formed the view that, when a DCLS submits a late bid revision, three problems emerge:

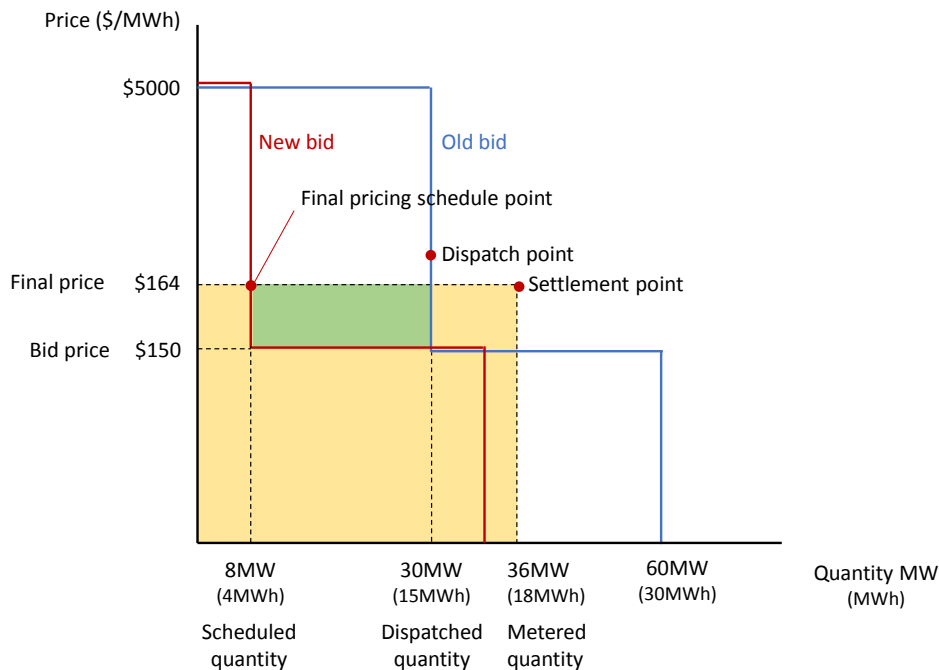
- (a) **Constrained on/off over-payments:** The constrained on and constrained off payment formulas result in payments that are not consistent with the intention of the constrained on and constrained off regime. This is explained further below.

- (b) **Costs of compliance with dispatch:** The dispatch instruction will remain in place based on the old bid, even though it may no longer be realistic for the DCLS to comply with that dispatch instruction. The DCLS may breach its dispatch obligation in the Code (clause 13.82) which may trigger a fact finding process and further consideration by the Authority's Compliance Committee. There may be costs for the DCLS in taking part in the alleged breach process.
- (c) **Opportunity to manipulate prices:** There may be some opportunity for a DCLS to manipulate final prices by submitting a "rogue" late bid revision (one not made for genuine operational reasons), because the revised bid is used as an input to final pricing but is not disciplined by being subject to dispatch (since dispatch is based on the previous bid). The Authority has no reason to believe that this is the reason for Norske Skog submitting late bid revisions.

The problem with the constrained on and constrained off calculations

- 2.2.2 When there is a late bid revision, some parts of the formulas for constrained on and constrained off payments reference the revised bid while other parts reference the older bid. This creates an inconsistency in the calculation. The formulas look at the revised bid when determining the "scheduled quantity", but at the old bid when determining the "dispatched quantity".
- 2.2.3 The problem is illustrated in Figure 5, which shows how an inappropriate constrained on payment can occur. This is based on an actual event. An old bid (30 MW at \$5000/MWh plus 30 MW at \$150/MWh) resulted in dispatch at 30 MW. A late bid revision was made reducing the quantity in the first bid band. The revised bid was 8 MW at \$5000/MWh plus 30 MW at \$150/MWh. The revised bid results in a scheduled quantity of 8 MW.
- 2.2.4 The dispatch price and the final price are close to each other so, in principle, there should be no constrained on or off payment. However, the formula determines a constrained on payment based on the difference between the dispatched and scheduled quantities (in this example the metered quantity is above the dispatched quantity). The green shaded area shows the constrained on payment resulting from application of the formula.

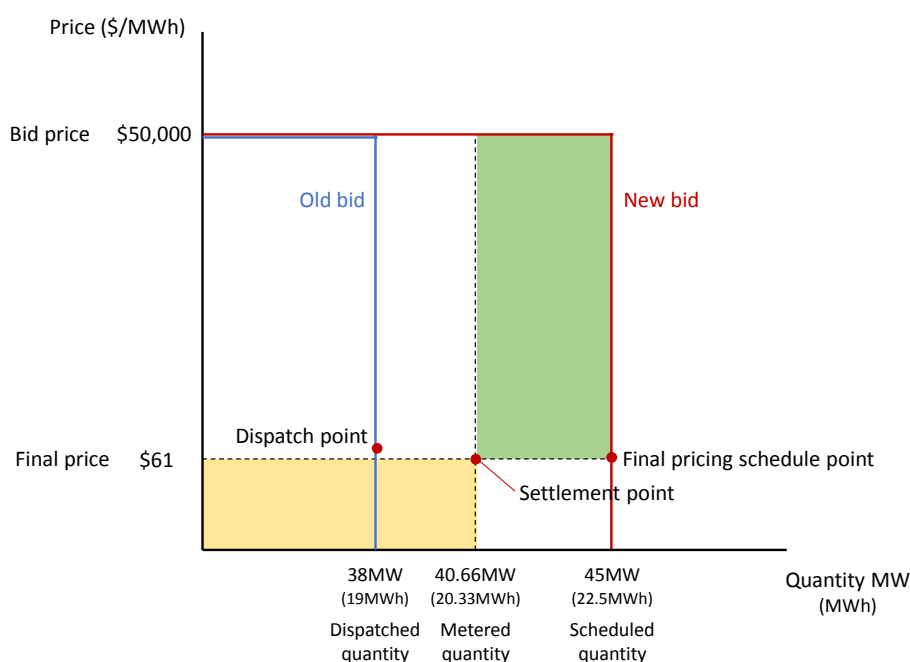
Figure 5: Inappropriate constrained on payment



2.2.5 If the old bid was used consistently for determining both the dispatched and scheduled quantities, or if the revised bid was used consistently to determine both those quantities, there would have been no constrained on amount. The payment arises only because different bids are used for determining the dispatched and scheduled quantities.

2.2.6 Figure 6 shows an inappropriate constrained off payment. This is based on an actual event (although some simplifications have been made). An old bid with a single bid band (38 MW at \$50,000/MWh) was used for dispatch and produced a dispatch instruction of 38 MW. A late bid revision was made resulting in a revised bid with a single bid band: 45 MW at \$50,000/MWh. The scheduled quantity was derived from the revised bid and was 45 MW.

2.2.7 The final price differed from the dispatch price only slightly so, in principle, there should be no constrained on or constrained off payment. However a constrained off payment was made based on the difference between the scheduled quantity and the maximum of the dispatched and metered quantity. The constrained off amount was 2.17 MWh. The green shaded area shows the constrained off payment resulting from application of the formula. The height of the green shaded is the difference between the final price of \$60.53/MWh and the bid band price of \$50,000/MWh: a difference of \$49,939.47/MWh. This explains why large inappropriate constrained off payments can result. In this case the constrained off payment for that trading period was \$108,368.65.

Figure 6: Inappropriate constrained off payment

- 2.2.8 If the old bid was used consistently for determining both the dispatched and scheduled quantities, or if the revised bid was used consistently to determine both those quantities, there would have been no constrained off amount. Again, the payment arises only because different bids are used for determining the dispatched and scheduled quantities.

A problem related to NRS infeasibilities will be handled separately

- 2.2.9 A separate problem arises if the NRS reaches an infeasible solution at the DCLS's node. In these cases temporary prices (called infeasibility prices) are assigned to the node based on an artificial parameter in SPD (called the constraint violation penalty, which is typically set at \$100,000/MWh). The problem is the NRS dispatches the DCLS to zero when the bid band prices are below the constraint violation penalty amounts (say below around \$100,000/MWh). When the infeasibilities are resolved in final pricing the final price may turn out to be substantially lower than the bid band prices for bids that have been "dispatched off". This will result in very large constrained off payments.
- 2.2.10 The Authority is working with dispatchable demand participants and the system operator to identify options for resolving this issue. In the meantime, Norske Skog at KAW0113 (which is the only DCLS currently submitting nominated dispatch bids) is generally bidding less than about 13 MW in their highest priced nominated dispatch bid band at \$5000/MWh, while further bid bands are priced at \$251/MWh or less. This limits the constrained off payment to less than around \$35,000 for a trading period in the rare event that the dispatch NRS reaches an infeasible solution.

- 2.2.11 The infeasibility issue may be the subject of a separate consultation paper in future.

2.3 Why the Authority is addressing these issues now

- 2.3.1 The Authority has identified that over-payment of constrained on and constrained off amounts to dispatched purchasers from 20 November 2014 to the end of February 2015 (inclusive) was \$173,137. The Authority considers these over-payments do not serve a useful economic purpose and are a transfer of value from purchasers (who fund constrained on and constrained off payments) to dispatched purchasers. There is the potential for these amounts to be substantially greater in future. Calculations of the total constrained on and constrained off payments, the economically correct payments, and the difference are shown in Table 1.

Table 1: Overpayment of constrained on and constrained off payments due to late bid revisions

Month	Economically correct payment (\$)	Over-payment (\$)	Total payments made (\$)
November 2014	0	131,021	131,021
December 2014	77	6,595	6,673
January 2015	1,904	24,097	26,002
February 2015	898	11,424	12,322
Total over those 4 months	2,880	173,137	176,017

- 2.3.2 The highest over-payment relating to a single trading period was \$108,369 for trading period three on 20 November 2014 at KAW0112 (refer to Figure 6).
- 2.3.3 The overpayments relate almost entirely to constrained off amounts rather than constrained on amounts. This is because constrained off payments can be calculated against very high-priced bid bands (refer to Figure 6) while constrained on payments do not have that same characteristic.
- 2.3.4 The constrained on and constrained off payments create an incentive for dispatched purchasers to revise bids in the 25 minutes before the start of the trading period. In particular, the incentive is to bid higher quantities with high-priced bid bands. These revisions could be for reasons that the dispatched purchaser considers legitimate (e.g. maintenance on a machine has finished early) or, potentially, to take advantage of a flaw in the system for calculating those payments. The Authority has no reason to believe that this has occurred in the past.

Question 1 Do you agree the issues identified by the Authority are worthy of attention?

3. Regulatory Statement for the proposed Code amendment

3.1 Objectives of the proposed Code amendment

3.1.1 The objectives of the proposed Code amendment are:

- (a) to ensure that constrained on and constrained off payments are made only where they contribute to the intention of the constrained on and constrained off regime, which is to encourage efficient compliance with dispatch instructions
- (b) to avoid imposing unnecessary costs on DCLSs from having to comply with dispatch instructions that are no longer realistic
- (c) to ensure that there is no opportunity to manipulate final prices by making late bid revisions to nominated dispatch bids.

Question 2 Do you agree with the objectives of the proposed amendment? If not, why not?

3.2 The proposed Code amendment

3.2.1 The Authority is proposing to amend part 13 of the Code to provide that, if a DCLS makes a revision to a nominated dispatch bid for a trading period during the 30 minutes prior to the start of the trading period:

- (a) the revised bid must be a nominated non-dispatch bid
- (b) the DCLS is not obliged to comply with a dispatch instruction during that trading period.

3.2.2 The drafting of the proposed amendment is contained in Appendix A.

3.2.3 There are three important implications of this proposal:

- (a) No constrained on and constrained off payment will be made because the bid is a non-dispatch bid. This resolves the problem relating to over-payments of constrained on and constrained off compensation. There will not be a situation where the constrained on and constrained off formulas use inconsistent information from two separate bids.
- (b) The DCLS will not incur costs dealing with the Authority's dispatch compliance regime for those trading periods, because there will be no dispatch instruction with which the DCLS must comply.
- (c) The non-dispatch bid will not be used to determine final prices, so there is no opportunity for the DCLS to manipulate final prices by making "rogue" late bid revisions.

- 3.2.4 The Authority considers that a potential criticism of the proposed Code amendment is that it removes any opportunity for a DCLS to earn constrained on and constrained off payments when it makes a late bid revision. However, this criticism is difficult to sustain. A DCLS that has made a late bid revision to a nominated dispatch bid will have a dispatch instruction based on the previous bid. The DCLS must comply with that dispatch instruction. However, the DCLS is signalling that it expects to operate at a different level of electricity usage. If we view constrained on and constrained off payments as a reward for dispatch, then the DCLS should not be paid the constrained on and constrained off payment in this instance. The DCLS cannot expect to receive a reward for dispatch, while at the same time signal that it does not expect to comply with dispatch.
- 3.2.5 If this proposed Code amendment proceeds, we may see DCLSs stop making late bid revisions. However, this does not appear to be a problem if the DCLS complies with its dispatch instruction. If a DCLS cannot comply with the dispatch instruction, then it is appropriate that it does not have the opportunity to earn constrained on and constrained off payments.
- 3.2.6 NZX has advised the Authority that implementation of the proposed Code amendment would require capital expenditure by the WITS provider of \$13,000, and capital expenditure by the clearing manager of \$9,800. The Authority estimates that its costs of implementing the proposed Code amendment would be \$20,000. There would be no costs incurred by the system operator from implementing the proposed Code amendment. Therefore the total costs of the proposal are estimated to be \$42,800.

3.3 The proposed Code amendment's benefits are expected to outweigh the costs

Benefits

- 3.3.1 The economic benefits of the proposed Code amendment are:

Static efficiency benefits

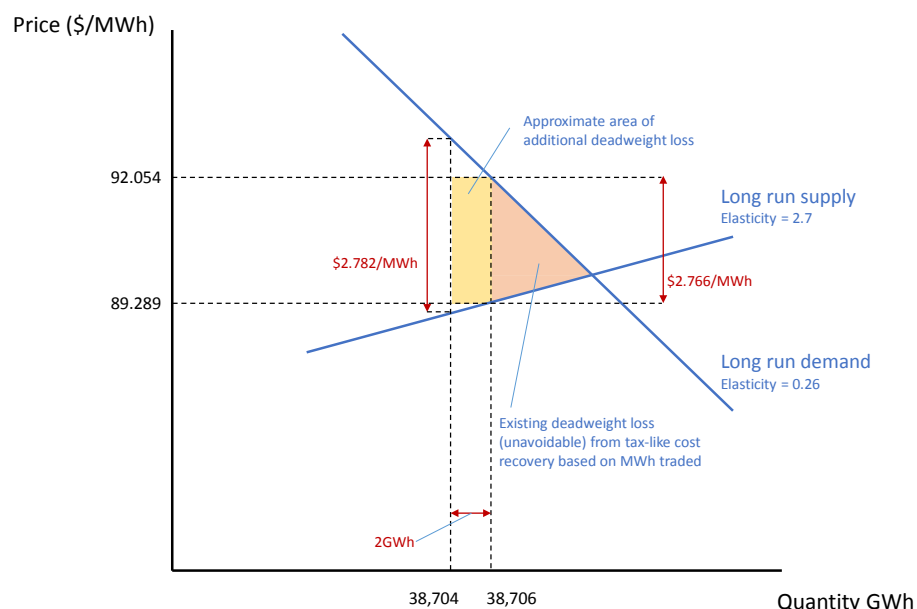
- (a) *Avoiding deadweight loss:* Minimising the economic deadweight loss associated with constrained on and constrained off payments by ensuring purchasers do not pay more than the true economic cost of constrained on and constrained off quantities.

The size of this benefit will depend on the bidding practices of DCLSs and the size of any “over-payments” of constrained on and constrained off amounts that would result under the status quo. There is potential for these over-payments to be substantially larger in future than they have been historically.

Authority staff has assessed this benefit as \$5,565 per year over 15 years (see below). This figure is derived by extrapolating historical

over-payments out to around \$625,693 per year which amounts to around \$0.016/MWh of additional uplift payments for purchasers. The deadweight loss calculations are illustrated in Figure 7.

Figure 7: Deadweight loss calculation



Since annual purchases are around 38,706 GWh, and the Authority's assessment of long run demand and supply elasticities is -0.26 and -2.7 respectively, the increase in uplift of \$0.016/MWh is expected to reduce purchases by 2 GWh per year.⁴ The existing tax-like uplift payments for both purchasers and generators amount to around \$2.766/MWh. This is based on \$1.04/MWh of purchaser levy uplift, \$0.85/MWh of purchaser frequency keeping uplift, \$0.16 of constrained on uplift (not attributable to the system operator), and \$0.71/MWh of generator levy costs from bringing a MWh to market. So each additional MWh reduction in the quantity of electricity traded will increase deadweight loss by around \$2.766. The height and width of the yellow highlighted approximate deadweight loss area is \$2.766/MWh * 2000MWh per year, which is \$5565 per year.

- (b) *Reducing costs to DCLS of complying with dispatch:* Reducing the costs that a DCLS might face from having to comply with a dispatch instruction based on a bid that may not reflect the current plant conditions faced by the DCLS.

This benefit is estimated using an estimate of Authority and DCLS staff hours in dealing with the additional compliance issues that may arise. This approach assumes that the actual usage of a DCLS in trading periods affected by a late bid revision will not change as a result of the proposal. Rather, it is assumed the DCLS will breach its

dispatch instruction and deal with the Authority's compliance process if necessary. This benefit has been estimated at \$5000 per year, which is 50 hours of staff time per year over all DCLs valued at \$100/hour.

- (c) *Removing opportunity to manipulate prices:* If final prices were manipulated through making "rogue" late bid revisions, we would expect various inefficiencies to follow because prices are no longer representing marginal system costs. Removing those inefficiencies, which may occur under the status quo, would be a further benefit of the proposal.

This benefit is assigned a token present value of \$5,000. There is a chance that price manipulation (under the status quo) could have a significant economic cost, either through creating large price effects in a small number of trading periods, or through smaller price effects over a longer period of time. However, it is not clear whether DCLs would engage in this manipulative behaviour even if it could be implemented successfully. Consequently a conservative token figure is used.

Dynamic efficiency benefits

- (d) Participants' confidence in the dispatchable demand regime could be damaged if the status quo is retained. Over the longer term this could create risks for investment and pressure for larger scale market reviews.

The Authority has not quantified this benefit. At the end of the analysis we adopt an approach that asks "what would we have to believe" about the size of these benefits to justify progressing the proposal over the status quo?

- 3.3.2 These benefits (excluding the dynamic efficiency benefits) have a present value of \$108,762 assessed over a 15 year timeframe with a discount rate of six percent.

Costs

- 3.3.3 The costs of the proposal are estimated at \$42,800. These include the one-off capital costs to the clearing manager and WITS provider of \$22,800 plus \$20,000 as the cost to the Authority of implementing the proposal.
- 3.3.4 The system operator has advised that no changes would be required to their systems to implement the proposal.

Benefits likely to exceed costs

- 3.3.5 The expected net present value of the proposal compared with the status quo (but excluding any dynamic efficiency benefits) is \$65,962. The

Authority believes the benefits of the proposal are likely to exceed the costs.

Question 3 Do you agree the benefits of the proposed amendment outweigh its costs?

3.4 The Authority has identified four alternative approaches for addressing the objectives sought by this proposed amendment

3.4.1 The Authority has identified four alternative approaches for addressing the objectives sought by this amendment:

- (a) **Alternative A:** Re-dispatching in the current trading period DCLSs that have made late bid revisions using their revised bids

This would require a change to the way the system operator's dispatch log is created. It could also require changes to the WITS DCLS dispatch screen. However, no changes would be required to the way the clearing manager calculates constrained on and constrained off payments.

The two benefits of this approach (compared with the proposal) are:

- (i) that dispatch for a DCLS will be based on the latest information the DCLS has submitted to WITS, which will reduce the costs for the DCLS in complying with dispatch instructions, and
- (ii) the bids used in final pricing will be subject to dispatch, which removes opportunities for manipulating prices.

The disadvantage of this approach (compared with the proposal) is that dispatch for DCLSs submitting late bid revisions would be revised after the beginning of the trading period. It could be difficult to enforce compliance with dispatch instructions in those circumstances.

Another disadvantage of this approach is the high cost of implementing it compared to the proposal. The system operator estimated a cost of \$425,000 to implement Alternative A and NZX estimated a cost of \$32,000.

The Authority considers that cost of this approach is too high and that the identified problems can be resolved at a much lower cost through the proposal. The Authority also considers that the problems that arise from "retrospective dispatch" are significant enough to outweigh the potential benefits of this approach relative to the proposal. Consequently the proposal is preferred to Alternative A.

- (b) **Alternative B:** Revising the calculation of constrained on and off payments to use the bids that were used for dispatch

This approach would remove the constrained on and constrained off over-payments by ensuring that the constrained on and constrained off formulas consistently use the dispatch bids (c.f. the present formulas which use dispatch bids for one part of the calculation and revised bids for another). However, it would not address the problems with the unnecessary costs of complying with dispatch instructions, or the opportunities for price manipulation.

The Authority considers that this option would require a data feed from the system operator to the clearing manager of the dispatch bid data. The system operator has estimated the capital cost for this option at \$315,000.

NZX has estimated it would cost around \$33,000 to implement Alternative B.

The Authority prefers the proposal to Alternative B because of the higher cost of Alternative B, and because Alternative B does not address the problem relating to the unnecessary costs to DCLSs from complying with dispatch instructions based on outdated bids.

- (c) **Alternative C:** Providing that a DCLS will not receive any constrained on and constrained off payments in relation to a trading period where it has submitted a late bid revision

This approach was originally proposed by the clearing manager as an urgent Code amendment. It is very similar to the proposal. The proposal achieves the same outcome (no constrained on and constrained off payments where there has been a late bid revision) by making any late bid revision non-dispatchable.

The disadvantage of Alternative C compared with the proposal is that it would not address the problems with the unnecessary costs of complying with dispatch instructions, or the opportunities for price manipulation.

The Authority has not requested a cost estimate for this approach from NZX (the clearing manager and WITS provider). The Authority understands that the system operator would not incur any costs from implementing this approach.

- (d) **Alternative D:** Running another NRS schedule towards the end of each trading period

This approach would result in updated dispatch instructions being issued for a trading period shortly before the beginning of the trading period.

This would largely resolve the over-payment problem (the problem could still arise if bid revisions were made within the last few minutes

before the start of the trading period). If Alternative D was implemented in conjunction with Alternative B, this problem would be entirely resolved.

Alternative D would largely remove any unnecessary costs associated with having to comply with a dispatch instruction based on an old bid (again, the exception is where the late bid revision is made within the last few minutes before the start of the trading period).

Alternative D would not fully remove the opportunity for deliberate manipulation of final prices, because late bid revisions could still be made within the last few minutes before the start of the trading period. It might make manipulative activity more obvious, though.

The system operator estimated that it would have to spend around \$560,000 in capital costs to implement Alternative D. NZX advised it would not incur any costs from implementing this approach.

The Authority does not prefer this alternative because the extra benefits are unlikely outweigh the higher costs.

- 3.4.2 Table 2 summarises the pros and cons of each option. The options are the proposal and each of the alternatives described above, including the combination of Alternative D and Alternative B. The table considers the impact of each option on the three identified problems, the cost of each option, and any other key considerations. It also summarises the main reason or reasons why the proposal is preferred to each alternative option.

Table 2: Summary evaluation of options

	Proposal	Alternatives options				
		A	B	C	D	D&B
Short description	Make bid non-dispatchable	Re-dispatch using revised bids	Use dispatch bids for con on/off	No con on/off if late bid revision	Run another NRS	Run another NRS & use dispatch bids for con on/off
Does it solve problems?						
1. Con on/off over-payments	Yes	Yes	Yes	Yes	Largely but not always	Yes
2. Costs of compliance with dispatch	Yes	Yes	No	No	Largely	Largely
3. Opportunity to manipulate prices	Yes	Yes	No	No	Limits opportunities to some degree	Limits opportunities to some degree
SO estimated capital cost	\$0	\$425,000	\$315,000	\$0	\$560,000	>\$560,000
NZX estimated capital cost	\$22,800	\$32,000	\$33,000	Likely <\$22,800	\$0	\$32,000
Is there an opportunity to earn constrained on and constrained off payments if there is a late bid revision?	No	Yes	Yes	No	Generally	Generally
Other pros/cons		Problems could arise if dispatch occurs after start of trading period		This option could be implemented very quickly on a temporary basis		
Reason proposal preferred	NA	Expensive. Dispatch after start of trading period is problematic	Expensive. Doesn't resolve some problems	Doesn't resolve some problems	Expensive. Doesn't resolve some problems	Expensive. Doesn't resolve some problems

3.5 The proposed Code amendment is preferred to other options

- 3.5.1 The Authority has evaluated the other means for addressing the objectives and prefers the proposed Code amendment for the reasons provided above.

Question 4 Do you agree the proposed amendment is preferable to the other options? If you disagree, please explain your preferred option in terms consistent with the Authority's statutory objective in section 15 of the Electricity Industry Act 2010.

3.6 The proposed Code amendment complies with section 32(1) of the Act

- 3.6.1 Table 3 (below) demonstrates how the proposal complies with section 32(1) of the Act.

Table 3: How proposal 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.	The proposal is consistent with this objective because it will promote the efficient operation of the electricity industry for the long-term benefit of consumers.
The proposed amendment is necessary or desirable to promote any or all of the following:	
(a) competition in the electricity industry;	The proposal will not materially affect competition in the electricity industry.
(b) the reliable supply of electricity to consumers;	The proposal will not materially affect the reliable supply of electricity to consumers.

(c) the efficient operation of the electricity industry;	The proposal improves static efficiency primarily by: a) reducing deadweight loss associated with the higher purchaser uplift payment (under the status quo) needed to fund constrained on and constrained off compensation b) reducing costs to DCLSs of complying with dispatch. The proposal also improves dynamic efficiency. The proposal also has costs, but the Authority expects that the benefits will exceed the costs.
(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.

Question 5 Do you agree the Authority's proposed amendment complies with section 32(1) of the Act?

3.7 The Authority has given regard to the Code amendment principles

3.7.1 When considering amendments to the Code, the Authority is required by its consultation charter⁵ to have regard to the following Code amendment principles, to the extent that the Authority considers that they are applicable. Table 4 (below) describes the Authority's regard for the Code amendment principles in the preparation of the proposal.

Table 4: Regard for Code amendment principles

Principle	Comment
1. Lawful	The proposal is lawful, and is consistent with the statutory objective (see section 3.6) and with the empowering provisions of the Act.

⁵ The consultation charter is one of the Authority's foundation document and is available at: <http://www.ea.govt.nz/about-us/documents-publications/foundation-documents/>

2. Provides clearly identified efficiency gains or addresses market or regulatory failure	The efficiency gains are set out in the evaluation of the costs and benefits (section 3.3). The proposal will improve static efficiency primarily by: a) reducing deadweight loss associated with the higher purchaser uplift payment (under the status quo) needed to fund constrained on and constrained off compensation. recovery b) reducing costs to DCLSs of complying with dispatch. It will also improve dynamic efficiency. The proposal also has costs, but the Authority is confident that the benefits will exceed the costs.
3. Net benefits are quantified	The extent to which the Authority has been able to estimate the efficiency gains is set out in the evaluation of the costs and benefits (section 3.3).

Glossary of abbreviations and terms

Act	Electricity Industry Act 2010
Authority	Electricity Authority
Code	Electricity Industry Participation Code 2010
DCLS	Dispatch-capable load station. A load that has registered with the Authority to participate in the dispatchable demand regime
Dispatched purchaser	A purchaser who purchases electricity at a DCLS that is dispatched
Dispatched quantity	The quantity of electricity in MWh that the DCLS was dispatched
Late bid revision	The submission by a DCLS of a revised nominated dispatch bid relating to a trading period after around 27 minutes before the beginning of the trading period (which is when the NRS is normally scheduled to commence its run)
NRS	Non-Response Schedule prepared under clause 13.62 of the Code. In this paper, NRS refers to the schedule that covers 8 trading periods and is (at present) run once every half hour (clause 13.62(1)(b)). The NRS that runs during a trading period determines dispatch instructions to DCLSs for the following trading period
NRSS	Non-Response Schedule (Short), the common term for the NRS defined in clause 13.62(1)(b) of the Code.
Scheduled quantity	The quantity of electricity in MWh scheduled for a DCLS in the final pricing schedule.

Appendix A Proposed Code amendment

The following amendments are proposed to Part 13 of the Electricity Industry Participation Code 2010.

13.19A Bids may be revised or cancelled

- (1) Each **purchaser** may—
 - (a) revise any of its **bid** prices or **bid** quantities for any **trading period** by submitting a new **bid** to the **system operator**; or
 - (aa) revise a **nominated bid**—
 - (i) from being a **nominated dispatch bid** to being a **nominated non-dispatch bid**; or
 - (ii) from being a **nominated non-dispatch bid** to being a **nominated dispatch bid**; or
 - (b) cancel any of its **bids** by notice in writing to the **system operator**.
- (2) Despite subclause (1), a **purchaser** must not do any of the following within the 2 hours before the beginning of the **trading period** in respect of which a **bid** is made:
 - (a) revise the **bid** price;
 - (b) revise the **bid** quantity;
 - (ba) revise a **nominated bid**—
 - (i) from being a **nominated dispatch bid** to being a **nominated non-dispatch bid**; or
 - (ii) from being a **nominated non-dispatch bid** to being a **nominated dispatch bid**;
 - (c) cancel the **bid**.
- (3) Despite subclause (2),—
 - (a) a **purchaser** may do any of the following within the 2 hours before the beginning of the **trading period** in respect of which a **bid** is made, if the **purchaser** has a **bona fide physical reason** necessitating the **purchaser** to do so:
 - (ia) revise a **nominated bid**—
 - (A) from being a **nominated dispatch bid** to being a **nominated non-dispatch bid**; or
 - (B) from being a **nominated non-dispatch bid** to being a **nominated dispatch bid**;
 - (i) revise its **bid** quantities;
 - (ii) cancel the **bid**;
 - (b) before the beginning of the **trading period** to which a **nominated bid** applies, the **purchaser** that submitted the **nominated bid** must immediately submit a revised **nominated bid** quantity to the **system operator** if the **purchaser** expects, or ought reasonably to expect, that the quantity of **electricity** likely to be purchased by the **purchaser** at the prices indicated in the **nominated bid** will,—
 - (i) if the **nominated bid** is a **nominated non-dispatch bid**, differ from the quantity in the **nominated bid** by more than the lesser of—
 - (A) 20MW; and
 - (B) 20% of the **nominated bid** quantity; or

- (ii) if the **nominated bid** is a **nominated dispatch bid**, differ from the quantity in the **nominated bid** by more than the lesser of—
 - (A) 10MW; and
 - (B) 10% of the **nominated bid** quantity; or
- (c) if the **system operator** declares a **grid emergency**, a **purchaser** must comply with clauses 13.99 to 13.100.

(3A) If a purchaser revises a nominated bid for a dispatch-capable load station in the trading period that is immediately before the trading period to which the nominated bid applies, the revised nominated bid is a nominated non-dispatch bid.

- (4) Despite subclause (3)(b), a **purchaser** is not required to submit a revised **nominated bid** quantity, if the expected change in the quantity is less than 5 MW.
- (5) Whether or not the cancellation or revision was in accordance with this clause must be determined in accordance with clause 13.21(2).

...

13.82 Dispatch instructions to be complied with

- (1) This clause applies to—
 - (a) a **generator**; and
 - (b) an **ancillary service agent**; and
 - (c) a **dispatched purchaser**.
- (2) Each **participant** to which this clause applies must comply with a **dispatch instruction** properly issued by the **system operator** under clause 13.72 unless,—
 - (a) in the **participant's** reasonable opinion,—
 - (i) personnel or plant safety is at risk; or
 - (ii) following the **dispatch instruction** will contravene a law; or
 - (b) the **generating plant** or **dispatch-capable load station** is already responding to an automated signal to activate—
 - (i) **capacity reserve**; or
 - (ii) **instantaneous reserve**; or
 - (iii) **automatic under-frequency load shedding**; or
 - (iv) **over frequency reserve**; or
 - (c) the **participant** is a **generator** or **ancillary service agent** acting in accordance with clause 13.86; or
 - (d) the **participant** is an **intermittent generator** that has complied with clause 13.17, and the **system operator** has not advised that there is—
 - (i) a **grid emergency**; or
 - (ii) a system constraint that directly affects the **intermittent generator**; or
 - (e) the **participant**—
 - (i) is a **generator**; and
 - (ii) deviates from a **dispatch instruction** for **active power** to comply with clause 8.17; or
 - (f) the **participant**—
 - (i) is a **dispatched purchaser**; and
 - (ii) deviates from the **dispatch instruction**—
 - (A) to comply with a request issued by the **system operator** under clause 5(4) of **Technical Code B** of Schedule 8.3; or
 - (B) to comply with clause 8.18; or

- (g) the **participant**—
 - (i) is a **dispatched purchaser**; and
 - (ii) cannot comply with the **dispatch instruction** because of a disconnection of **demand** under clause 7A of **Technical Code B** of Schedule 8.3; or
- (ga) the **participant**—
 - (i) is a **dispatched purchaser**; and
 - (ii) the **dispatch instruction** is issued for a **trading period** for which the latest **nominated bid** for the relevant **dispatch-capable load station** is a **nominated non-dispatch bid**; or
- (h) the **participant**—
 - (i) is a **generator** or an **ancillary service agent**; and
 - (ii) deviates from a **dispatch instruction** to comply with clause 9 of **Technical Code B** of Schedule 8.3; or
- (i) the **participant**—
 - (i) is a **generator** or an **ancillary service agent**; and
 - (ii) is acting in accordance with a commissioning or test plan that—
 - (A) is required under clause 2(6) of **Technical Code A** of Schedule 8.3; and
 - (B) expressly allows the **generator** or **ancillary service agent** to depart from the **dispatch instruction** for the purpose of the commissioning or test plan; and
 - (iii) has no reasonable means of complying with the **dispatch instruction** while acting in accordance with the commissioning or test plan.

...

13.141 Pricing manager to use certain input information

- (1) The **pricing manager** must use the following **input information**:
 - (a) for existing generation configuration—
 - (i) data specifying the instantaneous **MW injection** at the **grid injection point** at the beginning of each **trading period** for each **generating plant** and each **generating unit** that was the subject of **offers** for that **trading period**; or
 - (ii) if no such data is available, a reasonable estimate of such data:
 - (b) for actual **demand** over the **trading period**,—
 - (i) the **demand half-hour metering information** described as LMA below must be calculated as follows:

$$\text{LMA} = \text{GEA} + \text{LMX} - \text{LDCLS} \text{ (for a grid exit point)}$$

$$\text{LMA} = \text{GEA} - \text{LMI} - \text{LDCLS} \text{ (for a grid injection point)}$$

$$\text{LMA} = \text{LMX} - \text{LDCLS} - \text{UIGEA} \text{ (for an intermittent generating station with a point of connection to the grid and/or unoffered generation from a generating station with a point of connection to the grid)}$$
 where
 LMA is the adjusted quantity of **electricity** measured in **MWh** by a **metering installation** at a **grid exit point** or **grid injection point**
 LMX is the unadjusted **half-hour metering information** for the quantity of **electricity** measured in **MWh** at a **grid exit point**
 LMI is the unadjusted **half-hour metering information** for the quantity of **electricity** measured in **MWh** at a **grid injection point**

LDCLS is the adjusted **half-hour metering information** for the quantity of **electricity** measured in **MWh** used by a **dispatch-capable load station** for the **trading periods** that the **system operator** listed under clause 13.138B
GEA is the adjusted **half-hour metering information** given to the relevant **grid owner** under clause 13.136

UIGE is the information given to the relevant **grid owner** under clause 13.137:

- (ii) if any of the **half-hour metering information** is not available, an **initial estimate** for each **grid exit point** or **grid injection point**:
- (iii) to avoid doubt, each **grid owner** must provide the **half-hour metering information** to the **pricing manager** required under this clause in accordance with Part 15 for the collection of that **grid owner's volume information**:
- (c) the final **offers** for each **trading period** submitted by **generators** and provided to the **pricing manager** by the **system operator** in accordance with clause 13.63. The **pricing manager** must remove all **offers** from **intermittent generators** from this information before using it in the pricing process:
- (ca) the final submitted **nominated dispatch bid** for each **dispatch-capable load station** (other than a **dispatch-capable load station** for which the final submitted **nominated bid** for the **trading period** was a **nominated non-dispatch bid**) **dispatched in each trading period** that was provided to the **pricing manager** by the **system operator** in accordance with clause 13.63:
- (d) the final **reserve offers** for each such **trading period** as given by **ancillary service agents** in accordance with clauses 13.37 to 13.54:
- (e) the final information provided to the **system operator** by a **grid owner** under clauses 13.29 to 13.34 for each **trading period** that the **system operator** notifies in accordance with clause 13.63.

Question 6 Do you have any comments on the drafting of the proposed amendment?

Appendix B **Format for submissions**

Submitter	
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Question	Comment
Question 1 Do you agree the issues identified by the Authority are worthy of attention?	
Question 2 Do you agree with the objectives of the proposed amendment? If not, why not?	
Question 3 Do you agree the benefits of the proposed amendment outweigh its costs?	
Question 4 Do you agree the proposed amendment is preferable to the other options? If you disagree, please explain your preferred option in terms consistent with the Authority's statutory objective in section 15 of the Electricity Industry Act 2010.	
Question 5 Do you agree the Authority's proposed amendment complies with section 32(1) of the Act?	
Question 6 Do you have any comments on the drafting of the proposed amendment?	