



Dispatchable demand during tight market conditions

Decision paper

September 2016

Introduction

- 1 The Electricity Authority (Authority) is an independent Crown entity responsible for promoting competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.¹
- 2 In May 2014 the Authority introduced a dispatchable demand regime into the electricity wholesale market. The dispatchable demand regime:
 - (a) is governed by part 13 of the Electricity Industry Participation Code 2010 (Code)
 - (b) enables an approved dispatch-capable load station (DCLS) to elect to have its load dispatched according to its bid (broadly similar to the way a generator is dispatched according to its offers).
- 3 In January 2016 the Authority consulted on a proposal to amend part 13 of the Code to better manage dispatchable demand during tight market conditions.² Tight market conditions occur when the scheduling, pricing, and dispatch (SPD) system schedules/dispatches on the highest value (most expensive) offer bands, and may look to schedule/dispatch off the highest value dispatchable bid bands (require that load to be turned off).
- 4 The January 2016 proposal would have required dispatchable demand bid band prices to be either:
 - (a) less than or equal to \$15,000/MWh, in which case the bid band would be dispatched on or off in merit order based on market conditions; or
 - (b) equal to \$600,000/MWh, in which case the bid band would always be dispatched on.
- 5 This paper sets out the Authority's decision to insert those requirements about bid band prices into the Code, with one relatively minor alteration. The figure of \$600,000/MWh was chosen because it is sufficiently high (above the relevant constraint violation penalties (CVPs)) to "force" the SPD system to schedule/dispatch that load. Since the CVPs can be changed by the system operator from time to time, the \$600,000/MWh figure ought to be able to be changed correspondingly.
- 6 The final Code amendment is included in the appendix to this paper. The summary of submissions and more information about the management of dispatchable demand during tight market

¹ This is the Authority's statutory objective. Refer to section 15 of the Electricity Industry Act 2010.

² <https://www.ea.govt.nz/development/work-programme/wholesale/operational-enhancements-to-dispatchable-demand/consultations/#c15753>

Decision

- 7 The Authority has decided to amend clause 13.13(1) of the Code to require that the price associated with a nominated dispatch bid band must be either:
- (a) less than or equal to \$15,000/MWh; or
 - (b) equal to \$600,000/MWh or a similarly high value determined by the system operator to ensure the nominated dispatch bid band is scheduled on.
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How the Authority made its decision

- 8 The objective of the Code amendment is to better manage the dispatch of dispatchable demand bid bands during tight market conditions.
- 9 The Authority consulted on its proposal to amend the Code in January 2016 and received submissions from five parties including generating/retailer companies and the Major Electricity Users' Group (MEUG). All five submissions broadly supported the proposal, although some changes were suggested.
- 10 In terms of the broad support for the proposal, submitters took the following positions:
- (a) Contact Energy Limited (Contact) supported the Authority's objectives to address the identified potential problems. Contact did not put forward any amendments to the proposal.
 - (b) Genesis Energy Limited (Genesis) agreed with the objectives of the proposed amendment. Genesis submitted that the "high standard of trading conduct" requirement (clause 13.5A of the Code) should apply to dispatchable demand participants. The Authority notes that Genesis' suggestion could be implemented in parallel with the proposal, and that Genesis does not disagree with the proposal. Consequently the Authority interprets Genesis' submission as broadly supporting the proposal, but with a suggestion that an additional parallel change also be made.
 - (c) Meridian Energy Limited (Meridian) generally agreed with the Authority's proposed amendment, subject to certain relatively minor wording adjustments. Meridian considered that the proposal provides a suitably low-cost method of addressing the identified problems. Meridian also suggested that the Authority further assess applying a high standard of trading conduct requirement to dispatchable demand participants.
 - (d) Mighty River Power Limited (MRP) "generally agrees" with the proposal, but submitted that "safe harbour" rules under clause 13.5B of the Code should apply to dispatchable demand participants, and that the part of the proposal that prevents bids above \$15,000 should be removed.³
 - (e) MEUG submitted that a "pragmatic solution" to manage unintended consequences of prices during tight market conditions is acceptable, but suggested that the pragmatic solution may

³ This latter suggestion would remove a key element of the proposal. This could call into question whether Mighty River does in fact "generally agree" with the proposal.

be to increase the proposed \$15,000 cap to the upper range of estimated Value of Expected Unserved Energy (VEUE) and value of lost load (VoLL).

- 11 Parties that made submissions are listed in Table 1.
- 12 All submissions and summaries can be found on the Authority's website at:
<https://www.ea.govt.nz/development/work-programme/wholesale/operational-enhancements-to-dispatchable-demand/consultations/#c15753>.

Table 1 List of submitters

Submitter	Category
Contact	Generating company and retailer
Genesis	Generating company and retailer
Meridian	Generating company and retailer
MEUG	Major electricity users' group
MRP	Generating company and retailer

Why the Authority made this decision

- 13 The key problem identified by the Authority is that, without the proposed Code amendment, inefficient dispatch can occur for high value dispatch bid bands (that is, bid bands with a value above \$15,000/MWh). In particular, that high value load can be dispatched off when it would have been possible to achieve greater overall sector benefits by: dispatching the load on (this occurs when the non-response schedule is run around 25 minutes ahead of the trading period), waiting to see if there is any late voluntary response (from other loads and from non-dispatched generators) and, if there is no such response, directing mandatory load curtailment or operating on reduced reserves.
- 14 Further, DCLSSs that price a bid band very high (eg, at \$50,000/MWh) in order to try to ensure that load is dispatched on can end up setting market prices above marginal system costs during scarcity conditions. Such prices could cause large wealth transfers, which in turn create costs for participants trying to manage these risks, and undermine participants' confidence in the wholesale market.
- 15 Finally, large constrained off payments can occur in relation to high value dispatch bid bands that are dispatched off. This creates incentives for inefficient behaviour by dispatchable demand participants that are directed towards capturing those constrained off payments.

The amendment promotes efficiency but has no effect on reliability or competition

- 16 The Authority has considered all submissions on the Code amendment proposal. The Authority believes that the final Code amendment will deliver long-term benefits to consumers by improving the efficient operation of the electricity industry by ensuring that, during tight market conditions, lower-cost resources will be deployed before higher-cost resources. This means that a particular level of reliability (eg, a particular level of mandatory load curtailment) can be delivered more cheaply. This will result in slightly lower prices in the long run than would be the case without the Code amendment.

- 17 The Authority does not expect the Code amendment to have a material effect on reliability in the electricity industry. In tight market conditions, the proposal influences whether load reductions are achieved by dispatching off a high value dispatchable bid band, or by real time load curtailment (or a similar measure involving operating on reduced reserves). Either option involves switching off load in situations where reliability cannot be maintained. So the proposal does not affect overall reliability; rather it influences the allocation of curtailment between the high value dispatchable bid bands, and other load that could be curtailed in real time under grid emergency provisions.
- 18 The Authority does not expect the Code amendment to have a material effect on competition in the electricity industry.

The proposal's benefits are greater than its costs

- 19 The Authority has assessed the economic benefits and costs of the amendment and expects it to deliver a net economic benefit.
- 20 The primary benefit of the proposed Code amendment arises by avoiding the curtailment of high value dispatchable load when lower cost near real time alternatives are available. Over the long term this means that consumers avoid higher costs.
- 21 Secondary benefits arise from the increased participant and public confidence in the electricity market. This follows from avoiding the situation where bid bands with prices around \$50,000/MWh could set market prices at levels in excess of the marginal system costs during scarcity conditions. These benefits also follow from avoiding the creation of incentives for DCLs to trade in such a way as to try to obtain constrained off payments based on very high priced bid bands.
- 22 The costs and benefits of the proposal are described in more detail in section 3.3 of the January 2016 consultation paper.

The amendment is consistent with regulatory requirements

- 23 The Code amendment is consistent with the Authority's statutory objective and with the requirements of section 32(1) of the Electricity Industry Act 2010.
- 24 The amendment is also consistent with the Authority's Code amendment principles; it is lawful and it will improve the efficiency of the electricity industry of the long-term benefit of consumers. The Authority has used a quantitative cost-benefit analysis to assess the expected costs and benefits.

Matters the Authority considered in making this decision

- 25 The Authority has considered the issues raised by submitters. Submitters suggested changes to the proposal in the following areas:
- (a) the high standard of trading conduct provision in clause 13.5A (and the related safe harbour provision in clause 13.5B) should apply to dispatchable demand or should at least be further assessed (Genesis, Meridian and MRP)
 - (b) the \$15,000/MWh cap should be higher or removed (MRP and MEUG)
 - (c) the drafting of the proposal should be changed to make it robust to changes in CVP levels (Meridian)
 - (d) the drafting of the proposal should be changed to refer to "must-run load" (Meridian).
- 26 Submitters (Meridian and MEUG) also suggested the Authority should conduct a post-implementation review of the dispatchable demand regime.

27 Each of these suggested changes is discussed below.

Submission that trading conduct provisions should apply to dispatchable demand

What the Authority proposed

- 28 Clause 13.5A of the Code provides that each generator and ancillary service agent must ensure that its conduct in relation to offers and reserve offers is consistent with a high standard of trading conduct. Clause 13.5A does not apply to bids submitted by a dispatchable demand participant. Clause 13.5B provides that a generator complies with clause 13.5A if it meets certain “safe harbour” criteria.
- 29 The Authority proposed an approach that limits the range for prices associated with dispatchable bid bands. The Authority did not propose to extend the trading conduct provisions to apply to the behaviour of dispatchable demand participants in setting their bid band prices.

Submitters' views

- 30 Genesis submitted that the trading conduct requirement was intended to promote behaviour that ensures prices do not increase to inefficiently high levels. The same logic can be applied to dispatchable demand market participants. The Code should be amended to require the same high standard of trading conduct from dispatchable demand participants. This adds credibility to the market, improves consistency, and clearly sets the Authority's expectations for future participants.
- 31 MRP made the same points as Genesis.
- 32 Meridian questioned why “market conduct type” standards (similar to clauses 13.5A and 13.5B) were not analysed in the consultation paper and requested that the Authority further assess this type of approach.

The Authority's decision

- 33 The Authority agrees with submitters that it would be useful to consider extending the “high standard of trading conduct” provisions to dispatchable demand participants (the “conduct approach”). The Authority understands that submitters envisage that the conduct approach would work alongside rather than instead of the existing proposal (or some variation on that proposal). The Authority considers that the conduct approach would not be sufficient on its own to address the problems identified in the consultation paper. For example, a DCLS bidding the first part of its load at a very high price such as \$80,000/MWh (in an effort to have that dispatched on) would not necessarily be breaching a high standard of trading conduct. What is needed is a clear mechanism for the DCLS to use to ensure that load is dispatched on. Without such a mechanism it would be difficult to argue that their efforts to keep that load on were inconsistent with a high standard of trading conduct.
- 34 The way in which the conduct approach would apply to bids could require further consideration. For example, the Authority would have to consider how the principle behind the “safe harbour” requirement in clause 13.5B(1)(a) (the generator makes offers in respect of all of its generating capacity that is able to operate in a trading period) would apply to a bid. The Authority would need to consult stakeholders before the Code could be amended to implement the conduct approach.
- 35 Further policy development and consultation on a parallel change to the trading conduct provisions would take time. This delay would be counterproductive. Given the broad stakeholder acceptance of the proposal, it is better to progress with the proposal (possibly with some amendments) and

consider the conduct approach as a separate project in the future. Any such consideration would need to be prioritised alongside other work on the Authority's work programme.

Submission that the proposed \$15,000/MWh cap should be higher or removed

What the Authority proposed

- 36 The Authority proposed that dispatchable demand bid band prices must be either:
- (a) less than or equal to \$15,000/MWh, in which case the bid band would be dispatched on or off in merit order based on market conditions, or
 - (b) equal to \$600,000/MWh, in which case the bid band would always be dispatched on.

Submitters' views

- 37 MEUG submitted that the Authority should consider changing the proposed cap from \$15,000/MWh to a higher number.
- 38 MEUG submitted that dispatchable bids could usefully provide certainty of response even if they have bid prices somewhat above the \$20,000/MWh figure used in the Code for the Value of Expected Unserved Energy (VEUE),⁴ or somewhat above the Value of Lost Load (VoLL) figure of \$17,335/MWh quoted in the consultation paper. If the system operator could dispatch those bids off, it could be more confident of balancing the system compared to the situation where the load was dispatched on (in which case the system operator would be hoping that lower cost voluntary response would emerge). MEUG suggested the cap could be set at the upper range of VEUE and VoLL.
- 39 MEUG also noted that there may be potential new entrant dispatchable demand participants that would not enter the market if the cap was \$15,000/MWh, but that might enter if the cap was higher. Encouraging new entry would deliver greater benefits. A higher cap would also signal the Authority's intention "to actively continue dispatchable demand as one of many demand side response opportunities for end consumers".
- 40 MRP supported the requirement that "must-run" load be offered at \$600,000/MWh, but disagreed with the "discretionary load" cap of \$15,000/MWh. MRP says, "This is mainly because this figure has been set by the Authority on the basis of its assessment of voluntary and involuntary load curtailment. Current or prospective *dispatchable demand* participants may even feel that potentially being dispatched off at \$15,000/MWh (or whatever the cap might be) is insufficient compensation for the impact on their processes." MRP also noted that VoLL can vary significantly depending on the circumstances and customer.

The Authority's decision

- 41 The proposed bid cap of \$15,000/MWh is well justified on efficiency grounds and should be retained.
- 42 MEUG has suggested that the proposed bid cap of \$15,000/MWh should be set at a higher value. To explore this suggestion further, we could imagine a situation where a DCLS has some load with a genuine value of (for example) \$20,000/MWh which it would like to bid at that value. The question is whether it would be more efficient to:

⁴ This is used for the purposes of the grid reliability standards.

- (a) under the proposed approach, prevent the DCLS from bidding at that value and invite them instead to bid the load at \$600,000/MWh to ensure the load is dispatched on; or
- (b) under MEUG's suggestion, allow the DCLS to bid the load at \$20,000/MWh and rely on the outcome of the non-response schedule (NRS) to dispatch it either on or off.

43 The answer to this question turns on:

- (a) the probability that late voluntary response⁵ would occur and the value of any late voluntary response; and
- (b) the value of other real time alternatives such as operating the system with lower reserves or requiring mandatory load curtailment.

44 The Authority notes:

- (a) If mandatory load curtailments are implemented, the value of that curtailed load will depend on many circumstances, including how well the curtailments are directed towards lower-value uses. However, figures mentioned in the consultation paper such as the \$20,000/MWh figure used in the Code for VEUE and the \$17,335/MWh VoLL figure emerging from a survey appear reasonable as point estimates.
- (b) It is possible that the cost of operating the system with reduced reserves could be substantially less than the figures used for VEUE or VoLL (substantially less than say \$20,000/MWh). In New Zealand the system operator tends to operate on reduced reserves in preference to issuing directions that will cause some electricity users be cut off. This practice seems reasonably well accepted. This "revealed preference" for reducing reserves suggests that the cost of operating with reduced reserves is typically significantly lower than VoLL.
- (c) The Authority considers that if the NRS running 25 minutes ahead of the trading period is infeasible or otherwise signalling prices above \$15,000/MWh, it is somewhere between "quite possible" and "likely" that some late demand response will occur. This finding is not based on hard data, but on circumstantial evidence such as an awareness that there are a number of electricity users who monitor spot prices quite closely. A figure of 50% was used in the CBA as an indicative number, and this does not seem unreasonable.
- (d) The value of the load foregone as a result of any late voluntary response is unknown, but it seems likely that it would be substantially less than the figures used for VEUE or VoLL (substantially less than say \$20,000/MWh). Parties who monitor such price indications do so because they have something to gain, and there is more to gain for those who have lower load values. A value of \$5000/MWh was used in the CBA as an indicative figure, and this does not seem unreasonable.

45 Applying these observations to the question raised above, it seems inefficient to dispatch off some dispatchable load valued at \$20,000/MWh, 25 minutes ahead of the trading period. It would be more efficient to dispatch that load on and to provide an opportunity for late voluntary response. If late voluntary response does not arrive, the system can in any case be operated on reduced reserves at a cost likely below \$20,000/MWh.

46 MEUG considers that turning off the dispatchable load would provide certainty. However, certainty regarding system balance (generation equal to load) is still maintained if the dispatchable load is

⁵ "Late voluntary response" is an increase in non-dispatched generation and/or a reduction in non-dispatched load that occurs so late that the information about that response is not included in the NRS which is used to dispatch DCLSs and which runs around 25 minutes before the beginning of the relevant trading period.

kept on. It is just that other resources have to be used (either late voluntary response, reduced reserves, or mandatory load curtailment).

- 47 The analysis above strongly suggests that the option described in paragraph 42(a) is more efficient than the option described in paragraph 42(b). This may not be true in every possible individual case, but it certainly appears more likely than the alternative (that option (b) is more efficient). In fact, the case for a lower bid cap (below \$15,000/MWh) may well be stronger than the case for a higher figure.
- 48 The Authority notes MEUG's argument that the proposal will not successfully encourage a load to participate in the dispatchable demand regime with load valued at \$20,000/MWh. However, given the analysis above we can say that participating load with a value of \$20,000/MWh is not likely to provide value to the system as a whole, given the use of the NRS for dispatching participating demand. Consequently, any failure to attract such participation is not a genuine concern.
- 49 MRP considers that there should not be any restriction on dispatchable bid values (no \$15,000/MWh cap). MRP noted that VoLL can vary significantly depending on the circumstances and customer, and appears concerned that that Authority is effectively forcing on the market its own "assessment of voluntary and involuntary load curtailment". Under MRP's submission, it would be possible for DCLS load with a value of say \$80,000/MWh to be bid at that value and dispatched off with 25 minutes' notice. The Authority considers it highly unlikely that this could be an efficient outcome, given that there is still 25 minutes for late voluntary response to occur, and given that reduced reserves and mandatory load curtailment almost certainly have a lower cost. It is difficult to argue that the dispatching off of the \$80,000/MWh load is the outcome of a genuine market process. There is no mechanism available in the NRS schedule for load (apart from load participating in the dispatchable demand regime) to signal a willingness to curtail load based on price.⁶

Submission that Code drafting should be robust to changes in CVP levels

What the Authority proposed

- 50 The Authority proposed that clause 13.13(1)(c) should provide that dispatchable demand bid band prices must be either:
- (a) less than or equal to \$15,000/MWh, or
 - (b) equal to \$600,000/MWh.

Submitters' views

- 51 Meridian submitted that proposed clause 13.13(1)(c) should provide for the Authority to change the \$600,000/MWh figure if CVPs are changed.

The Authority's decision

- 52 The CVPs are referred to as "model parameters" in the Code in clause 13.189 and Schedule 13.2 of the Code. The system operator can change the model parameter values by giving the pricing manager an updated list of values (clause 13.189(2)). Any changes become effective from the date

⁶ At conforming GXPs the NRS schedule uses the system operator's load forecast (and difference bids are not used). Consequently there is no opportunity for load at conforming GXPs to signal an intention to reduce usage at high prices. Even at non-conforming nodes, the NRS uses the sum of all bid band quantities without using the prices associated with those bid bands. So there is also no opportunity for load at non-conforming nodes for electricity users to signal to the NRS a willingness to curtail load (except through participation in the *dispatchable demand* regime).

specified by the system operator, subject to the pricing manager's agreement (clause 13.189(4)). The list of model parameters without their associated values is set out in Schedule 13.2 of the Code.

- 53 The Authority agrees with Meridian that the \$600,000/MWh figure should be robust to any future decision by the system operator to change the model parameter values. The proposal has been amended to reflect that. The changes to the proposed amendments are highlighted in the final Code amendment (in the appendix to this paper).

Submission that Code drafting should refer to “must-run load”

What the Authority proposed

- 54 The Authority proposed that clause 13.13(1)(c) should provide that dispatchable demand bid band prices must be either:
- (a) less than or equal to \$15,000/MWh; or
 - (b) equal to \$600,000/MWh.

Submitters' views

- 55 Meridian suggested that clause 13.13(1)(c) should provide that for "load that may be dispatched on or off" the \$15,000/MWh cap applies, and for "must-run load" the \$600,000/MWh figure (or its equivalent if CVPs change) should apply.

The Authority's decision

- 56 The Authority disagrees with Meridian's drafting suggestion for different rules for (1) "load that may be dispatched on or off" and (2) "must-run load". It is not possible to work out which category the load is in until the bidder reveals its value through the bid band price. This creates a circular reference problem. To illustrate further: if the Code were to say "must-run load must be bid at \$600,000/MWh", there would have to be some way to define "must-run load" without reference to its bid price (otherwise it is a circular statement). The Authority considers there is no clear way to define "must-run" load without reference to its bid price. The Authority's proposal avoids this circularity by saying that any dispatchable bid band must be priced either below \$15,000/MWh or at \$600,000/MWh. The DCLS can then decide for itself which category it wants to bid its load in. Its bid price will reveal whether it wants the load to be dispatched based on market conditions or whether it wants to force the load to be dispatched on.

Submission that a post-implementation review may be timely

What the Authority proposed

- 57 The Authority has a general commitment to carry out post-implementation reviews, having completed a review of multiple frequency keeping and almost completed a review of demand-side bidding and forecasting. The Authority has not yet programmed work to review the *dispatchable demand* regime.

Submitters' views

- 58 Meridian noted that participation in *dispatchable demand* remains low. "This may be an opportune time for the Authority to undertake a full review of the dispatchable demand regime to assess whether it is meeting its original objectives."
- 59 MEUG noted the Authority's investigation into adopting real-time-pricing (RTP). MEUG expects New Zealand will adopt RTP and notes it will provide an opportunity to make changes to market

systems to provide for a full dispatchable demand regime as originally proposed. There may be some interim steps that could be taken towards a full dispatchable demand regime ahead of final decisions on RTP. Those possible interim steps could be uncovered through a post implementation review of the dispatchable demand regime.

The Authority's decision

- 60 The Authority agrees that a post-implementation review of the dispatchable demand regime would be useful. The Authority plans to conduct a review although this work needs to be prioritised against the Authority's other projects.

Appendix: Code amendment

Text in **red** indicates changes to the original proposed Code amendment included in the consultation paper.

1. Amend clause 13.13 as follows:

13.13 Information to be contained in bids

- (1) A **purchaser** must ensure that each of its **nominated bids**—
 - (a) contains all information required by Form 4 in Schedule 13.1; and
 - (aa) if it is a **nominated bid** for a **dispatch-capable load station**, specifies whether it is—
 - (i) a **nominated dispatch bid**; or
 - (ii) a **nominated non-dispatch bid**; and
 - (b) *[Revoked]*
 - (c) if it is a **nominated dispatch bid**, specifies a price for each band that is one of the following—
 - (i) \$15,000/MWh or less; or
 - (ii) if the **Authority** has **published** a price for the purposes of this subparagraph, the **published price**; or
 - (iii) if the **Authority** has not **published** a price for the purposes of subparagraph (ii), **\$600,000/MWh.**
- (1A) The **Authority** may **publish** a price for the purposes of subclause (1)(c)(ii) if,—
 - (a) the **system operator** has given to the **Authority** an updated list of the values of model parameters in accordance with clause 13.189(2)(a), and the **Authority** has considered any advice it has received from the **system operator** under clause 13.189(2)(b) and (2A); or
 - (b) the **Authority** considers that it is necessary to **publish** a new price.
- (2) A **purchaser** must ensure that each of its **difference bids** contains all information required by Form 4A in Schedule 13.1.

13.189 System operator to give pricing manager **and Authority** list of model variable values

- ~~(1) The **system operator** must provide the **pricing manager** with a list of the values of the model parameters used by the **software** to produce **final prices** and **final reserve prices** as listed in Schedule 13.2.~~
- (2) If the value of the model parameters listed in Schedule 13.2 are to be changed, the **system operator** must immediately—
 - (a) give the **pricing manager** **and the Authority** an updated list of values in writing; and
 - (b) advise the **Authority**, in relation to the price under clause 13.13(1)(c)(ii) or (iii), if—
 - (i) the price remains appropriate; or
 - (ii) a new price is appropriate.
- (2A) If the **system operator** advises the **Authority** that a new price is appropriate under subclause (2)(b)(ii), the **system operator** must give to the **Authority** in writing the proposed new price, and an explanation for the proposed new price.
- (3) The **pricing manager** **and the Authority** must acknowledge receipt of the updated list in writing.
- (4) Changes specified in any updated list must become effective from a date specified by the **system operator**, subject to ~~the **pricing manager's**~~ the **pricing manager** and the **Authority** agreement in writing from both the **pricing manager** and the **Authority**.