

instance, an hours-ahead market based on demand bids and generation offers is compatible with real-time prices calculated on the same basis (ie bids and offers).

- 7 Collectively, exploring RTP and hours-ahead markets are a priority 1 project, 'Spot market refinements', in the Authority's 2015/16 work programme.⁴ This is one of the Authority's six highest-priority regulatory projects.
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Introduction

- 8 The 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.⁵
- 9 In March 2015 the Authority published a discussion paper *Options to improve retail competition - findings of the spot market review*.
- 10 The discussion paper considered five options to refine the spot market to increase retail and hedge market competition. It sought feedback on a proposal that the Authority explore two of them in more detail in 2015/16:
- (a) base settlement on RTPs calculated and published in or near to the trading period in which electricity is produced and consumed
 - (b) add or facilitate some form of hours-ahead market so RTPs apply only to residual quantities not covered in the hours-ahead market.
- 11 This paper:
- (a) outlines the Authority's decisions on which initiatives it will progress during 2015/16
 - (b) considers the feedback it received on the discussion paper
 - (c) explains the reasons for each of its decisions.
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Feedback received

- 12 The Authority received 18 submissions from a variety of parties, including consumers and their representatives, small and large generators and retailers, service providers, distribution lines companies, and traders.⁶

⁴ <http://www.ea.govt.nz/dmsdocument/19496>

⁵ This is the Authority's statutory objective. Refer to section 15 of the Electricity Industry Act 2010.

⁶ Submissions are available at <http://www.ea.govt.nz/development/work-programme/wholesale/exploring-refinements-to-the-spot-market/development/authority-seeks-feedback-on-findings-on-the-spot-market-review/>

Table 1 List of submitters

Major generator/ retailers	Others generators and retailers	Service providers	Distributors	Traders and consultants	Consumers and reps
Contact Energy Genesis Energy Meridian Energy Mighty River Power Trustpower	Nova Energy Flick Electric Pioneer Generation	Transpower NZX	Orion	EMH Trade Smartwin Neil Walbran Consulting	MEUG Norske Skog NZ Steel EnerNOC

Reasons for each of its decisions

Decision to further explore RTP in 2015/16

13 The March 2015 discussion paper:

- (a) identified that:
 - (i) in the wholesale spot market, parties buying or selling electricity in each half hour trading period do not know the price they will pay or receive until at least two days after they have decided to transact
 - (ii) short-term forecasts of spot prices are usually reliable, but are significantly less accurate when the system is under stress – which is arguably the time when reliable signals are especially important
 - (iii) the lack of actionable spot price information impedes efficient outcomes for parties that can alter their actions close to real-time
- (b) reasoned that calculating prices in or near real time would provide more actionable price information which would, in turn:
 - (i) increase the quantity of demand and small-scale generation responding to spot prices
 - (ii) improve retail and hedge competition and efficiency
 - (iii) result in more efficient operation of demand response and generation
 - (iv) improve confidence in the market
- (c) provided advice from both Monitoring Analytics and Oakley Greenwood⁷ in support of this view
- (d) proposed that the Authority should further explore RTP options in 2015/16.

⁷ See Appendix A and B of the discussion paper, available here: <http://www.ea.govt.nz/development/work-programme/wholesale/exploring-refinements-to-the-spot-market/development/authority-seeks-feedback-on-findings-on-the-spot-market-review/>

Support for further exploration of RTP in 2015/16

- 14 There was significant support among submitters for the Authority's reasoning and conclusion. Of the 18 submitters, 12 agreed that the Authority should further explore RTP in 2015/16. Several submitters argued persuasively in favour of RTP.
- 15 Contact did not support the introduction of RTP at this time, because it was concerned about the volatility and accuracy of 5-minute prices. It suggested improvements to 5-minute pricing that may help to mitigate these issues (discussed further below).
- 16 emhTrade considered that the issue of misalignment between forecast and settlement prices is not significant, and is largely driven by lack of understanding of, and transparency about, infeasible prices. It suggested that RTP would not be necessary if there was a short-term ahead market.
- 17 MEUG submitted, and NZ Steel agreed, that the Authority should take incremental steps to improve the alignment between forecast and settlement prices before progressing RTP.
- 18 Meridian submitted that incremental improvements to aligning forecast and settlement pricing should be pursued before RTP, that any move to real-time pricing should be based on sound evidence, and that both the scale of the benefits and the potential for unintended consequences should be thoroughly assessed.
- 19 Norske Skog submitted that the Authority should not proceed with RTP because 'accuracy is more important than certainty'.
- 20 The Authority has reviewed submissions and considers that the potential competition and efficiency gains from providing actionable price signals outweigh the risks presented by some submitters. It considers that participants should receive forecast prices and RTPs that do not include infeasibilities so they can make better operational and investment decisions. The forecast schedule should indicate what the price will be even when there is insufficient generation and transmission capacity to meet demand.
- 21 However, submitters presented many matters that the Authority will consider during the next phase of the project. For instance, the accuracy of metering is an important issue when exploring RTP options.
- 22 Therefore, the Authority intends to further explore RTP in 2015/16.

Consideration of 'quick win' incremental improvements associated with RTP elements

- 23 Some parties submitted that the Authority should take an incremental approach to introducing RTP by first taking actions to improve the alignment between forecast and settlement prices. Options suggested by submitters to improve the alignment between forecast and settlement pricing (short of full implementation of RTP) included:
 - (a) improving the accuracy of inputs to 5-minute pricing, and reducing the volatility of 5-minute prices (Contact)
 - (b) improving the accuracy of embedded generation forecasts (Contact, MRP)
 - (c) improving the accuracy of short-term demand forecasts (Contact, Genesis, Meridian, MRP, Orion, Pioneer, Transpower)
 - (d) improving the alignment between the NRSS and NRSL⁸ (Genesis)

⁸ The NRSS and NRSL refer to forecasts of wholesale spot prices in the absence of price-responsive demand bids.

- (e) educating participants about infeasible prices (emhTrade)
 - (f) improving forecasts when there are infeasible prices (emhTrade, Genesis, MEUG, Norske Skog, Trustpower)
 - (g) improving forecasts when there is a high spring washer situation (Trustpower)
 - (h) using consistent inputs in forecast and settlement pricing (Meridian)
 - (i) improving inputs into the pricing process such as metering data or standing data (NZX).
- 24 The Authority agrees that there may be the potential for 'quick wins' in improving the alignment between forecast and settlement prices. Therefore, it will consider which of them should be pursued during its evaluation of RTP alternatives.
- 25 The Authority has also planned stage gates between the phases of the project. The next stage gate is planned for the second quarter of 2016. It provides an opportunity for the Authority to re-evaluate the costs and benefits of continuing work on RTP after considering the potential benefits that could be achieved by implementing any quick wins.

Issues to be considered in the exploration of RTP

- 26 Some submitters raised issues that the Authority should consider in its exploration of RTP (in addition to those listed under the heading of 'quick wins' above). These included that:
- (a) the Authority should consider when prices should be established (MRP)
 - (b) prices should be established before, rather than during or after, the trading period (EnerNOC and Flick)
 - (c) the Authority needs to establish whether Transpower's metering is sufficiently accurate for use in RTP (MRP)
 - (d) the Authority should consider how prices will be set when there are infeasibilities (MRP, Transpower, Trustpower)
 - (e) the Authority should consider automated resolution of high spring washer situations (MRP, Trustpower)
 - (f) the Authority should put in place checks and balances to deal with pricing errors or market manipulation, and should consider whether it is appropriate to retain the ability to modify prices ex-post (Nova)
 - (g) the Authority should prioritise simplicity over (perceived) accuracy (Orion)
 - (h) the Authority should err in favour of consumers – for instance, when there is scarcity, prices should be set to the highest cleared generation offer as opposed to the (higher) cost of non-supply (Orion)
 - (i) the Authority should consider not just establishing prices in real time, but also calculating the final price for each trading period closer to real time (Transpower).
- 27 The Authority will consider these comments further during its exploration of options for RTP.

Decision to further explore hours-ahead markets in 2015/16

- 28 The March 2015 discussion paper:

- (a) identified that inaccurate bidding and offering by some participants caused uncertainty about prices and created an impediment to efficient decision-making by parties responding to prices
- (b) suggested an hours-ahead market would provide further support for more efficient decision making by generators and demand response participants
- (c) included advice from Monitoring Analytics in support of this view⁹
- (d) raised issues that would need to be addressed in considering options for ahead markets
- (e) proposed the Authority further explore hours-ahead markets in 2015/16.

Further exploration of hours-ahead markets in 2015/16

- 29 There was some support among submitters for the Authority's stance. Of the 18 submitters, nine agreed that the Authority should further explore hours-ahead markets in 2015/16.
- 30 Of those that did not support further exploration of an hours-ahead market, most were sceptical about the benefits and suggested that it be considered only after other initiatives were completed:
- (a) the costs of an ahead market appear at this stage to exceed the benefits so it should examine it further only after real-time pricing is in place (Flick Electric)
 - (b) there is little justification for an ahead market at this stage and it should be considered only as a very long-term option after real-time pricing be developed (MEUG and NZ Steel)
 - (c) the Authority should not consider an ahead market until after RTP has been introduced and gate closure has been shortened, and a voluntary short-term hedge market might be preferable (MRP)
 - (d) the Authority should not consider an ahead market until alignment between forecast and settlement prices has been improved, and, if necessary, RTP has been introduced (Meridian Energy)
 - (e) the Authority should not consider an ahead market until after RTP has been introduced (Pioneer)
 - (f) Trustpower did not support an ahead market being considered prior to the implementation of real-time pricing.

⁹ Oakley Greenwood was sceptical about the benefits of an ahead market but suggested a trial as a means to evaluate its merits.

- 31 Meridian Energy submitted that an ahead market is likely to provide limited benefit in the New Zealand context, would cause costs to consumers, would disadvantage intermittent generation, would reduce the flexibility of generation operation, and would reduce liquidity in the longer-term hedge market. Meridian Energy also commented that it is more efficient for participants to use a voluntary hedge market than to create a compulsory ahead market.
- 32 Similarly, Contact Energy felt a day ahead market would add complexity but be of benefit to few participants and a voluntary day-ahead hedge market would be more efficient.
- 33 Norske Skog did not support an ahead market, as it considered an ahead market would transfer wealth from unpredictable loads to others, which would not improve efficiency.
- 34 Trustpower submitted that an ahead market would introduce additional complexity and is likely to be a barrier to entry for retail and generation. Trustpower commented that the Authority should instead investigate barriers to financial ahead markets.
- 35 The Authority acknowledges the reservations that some submitters hold about ahead markets. However, it does not agree that an hours-ahead market would only create wealth transfers. There are parties with unpredictable load or generation that make forecast prices less accurate. This decrease in the accuracy of price signals is an externality that increases the cost of responding to spot price signals to parties that need notice to respond.
- 36 An hours-ahead market is a mechanism that could increase the number of consumers willing to have some level of exposure to spot prices (greater than those willing to respond to forecast prices and RTPs). For example, an hours-ahead market could enable consumers to lock in quantities and prices, for instance, to charge electric vehicles or increase discretionary generation to take advantage of low/high spot prices. In large numbers, even small changes in demand in response to high prices could reduce their impact and incidence. This could significantly reduce wholesale electricity market costs, reduce the cost to retailers, and put downward pressure on hedge and retail rates.
- 37 Therefore, the Authority still considers it worth exploring the potential efficiency gains and costs from an hours-ahead market. The Authority acknowledges the various alternative forms of an ahead market suggested by submitters and will actively support the establishment of any voluntary short-term hedge market that may provide an effective alternative or complement a mandatory market.
- 38 The Authority considers that it is important for its explorations of RTP and hours-ahead markets to proceed largely in parallel, so that it can determine which RTP options are compatible with the introduction of an hours-ahead market, and vice versa.¹⁰ However, the Authority considers that RTP is a higher priority than hours-ahead markets. Therefore, the Authority intends to progress its exploration of RTP more rapidly than its exploration of hours-ahead markets.

¹⁰ For instance, an RTP option under which prices would be determined just *before* real time might not be consistent with the later introduction of an hours-ahead market in conjunction with a balancing market in which prices were determined just *after* real time.

39 Note that the next stage gate for the project (planned the second quarter of 2016) provides the Authority an opportunity to re-evaluate the costs and benefits of continuing work on an ahead market after considering the benefits of any voluntary market already planned or established.

Issues to be considered in the exploration of ahead markets

- 40 Some submitters raised issues that the Authority should consider in its exploration of hours-ahead markets. These include that:
- (a) an hours-ahead market would be preferable to a day-ahead market (EnerNOC)
 - (b) participation by generators should be mandatory (EnerNOC)
 - (c) an ahead market should be settled on blocks of multiple periods (Neil Walbran Consulting)
 - (d) the Authority should consider how an ahead market would interact with hedge trading (Neil Walbran Consulting, Orion, Pioneer)
 - (e) it would be important to consider the quality of input data into the ahead market (NZX)
 - (f) virtual bidding¹¹ arrangements may be desirable (Smartwin)
 - (g) Transpower wishes to work with the Authority to explore design options and compatibility with existing schedules and tools.
- 41 The Authority will take these comments into account in its investigation of hours-ahead markets.

Decision not to explore zonal pricing in 2015/16

- 42 The discussion paper:
- (a) acknowledged that locational price risk (LPR) can inhibit retail competition
 - (b) reasoned that adopting zonal pricing – ie reducing the number of nodes at which wholesale prices are set, for load and/or generation – could reduce LPR, but would also reduce efficiency by diluting locational pricing signals
 - (c) included advice from both Monitoring Analytics and Oakley Greenwood stating that New Zealand should maintain nodal pricing for both generation and load, based on their overseas experience
 - (d) showed how existing and planned mechanisms can mitigate LPR
 - (e) indicated that the Authority did not intend to further investigate zonal pricing in 2015/16.
- 43 There was broad support among submitters for the Authority's stance. Of the 18 submitters, 14 agreed that the Authority should not explore zonal pricing in 2015/16.
- 44 Contact encouraged the Authority to remove some lower voltage pricing nodes in order to reduce the complexity of the market and reduce the risk of high spring washer price events.

¹¹ Virtual bidding is a term referring to offers and bids made in the ahead market that are automatically reversed in the real-time (balancing) market. Virtual bidders make or lose money on the price differences between the two markets.

- 45 Norske Skog submitted that more FTR nodes should be added, and that in the absence of more FTR nodes, zonal pricing should be seriously considered.
- 46 Orion encouraged the Authority to consider how the number of pricing nodes might be reduced in a way that does not unduly compromise operational efficiency.
- 47 Pioneer's submission included a substantial research report that attempted to provide an empirical assessment of the costs and benefits of having more or fewer nodes. The report concluded that it seems possible there is scope to reduce the number of pricing nodes without materially impacting the accuracy or strength of the pricing signals. Therefore, the Authority should consider zonal pricing in order to reduce the complexity of the market and support retail competition.
- 48 However, while the Authority accepts Pioneer's findings, the Authority has not received any indication in submissions that the competition benefits claimed are likely to exceed the loss of competition and inefficiency in the long run.
- 49 The high correlation between the prices at many nodes also suggests that market participants can effectively hedge the locational price risk at relatively few trading hubs.
- 50 Further, the experience in PJM and the NEM suggests that there might be significant value in maintaining nodal pricing. As demand within and between zones change and the network changes in response, zonal prices become more compromised and stifle efficient behaviour changes. Once zones are implemented, they are locked in and have proven impossible to alter in both PJM and the NEM.
- 51 Consequently, the Authority will continue to address LPR through improvements to hedge and FTR markets, rather than through zonal pricing. In particular, the Authority is seeking to improve the liquidity of the ASX market as part of its hedge market development initiative.
- 52 The Authority also considers that the trading conduct provision introduced in 2014 will continue to exert a moderating influence on LPR.

Decision not to explore 'paid for' demand response programmes

- 53 The March 2015 discussion paper:
- (a) discussed the option, employed in some jurisdictions, where wholesale electricity market participants pay consumers for demand response through 'side payments'
 - (b) set out the Authority's view that it is more efficient for consumers to respond to avoid high spot prices, rather than offer side payments
 - (c) indicated that the Authority did not intend to further investigate side payments for demand response.
- 54 There was broad support among submitters for the Authority's stance. Of the 18 submitters, 16 agreed that the Authority should not explore 'paid for' demand response programmes in 2015/16. The exceptions were EnerNOC and Orion.
- 55 EnerNOC submitted that it would be preferable for consumers to be paid for demand response, relative to some baseline level of consumption. EnerNOC submitted that such arrangements are not difficult to implement and would promote broad demand-side participation.

- 56 Orion neither agreed nor disagreed with the Authority's stance, but raised other issues relating to demand response, including the importance of short-term demand forecasting and the potential of demand response to drive more efficient dispatch.
- 57 Having considered submissions, the Authority does not consider there is good reason why it should amplify the signal for demand response over and above providing an efficient spot price. Therefore, it will continue to incentivise greater demand response by making spot prices more actionable, rather than by exploring supplementary side payments.
- 58 In keeping with this decision, the Authority has recently published a paper outlining a set of principles that should apply when considering demand response initiatives.¹²

Decision not to explore mandatory capacity markets

- 59 The March 2015 discussion paper:
- (a) discussed the possibility of introducing a capacity mechanism to incentivise generators to make capacity available ('mandatory capacity products')
 - (b) set out the Authority's view that it is more efficient to incentivise new investment in generating capacity through well-functioning spot and hedge markets
 - (c) indicated that the Authority did not intend to further investigate capacity mechanisms.
- 60 There was broad support among submitters for the Authority's stance. Of the 18 submitters, 15 agreed that the Authority should not explore mandatory capacity products in 2015/16. The exceptions were Contact, Genesis and Norske Skog.
- 61 Contact submitted that the Authority should further explore capacity markets and raised a concern that failing to do so could create a need for demand response.
- 62 Genesis did not comment on capacity mechanisms.
- 63 Norske Skog suggested it was not too keen to pay generation capacity to sit idle just in case it was needed. On the other hand it indicated a willingness to shut down the plant to alleviate a supply shortage in return for a suitable payment.
- 64 The Authority agrees that the energy only market design in New Zealand means that high prices accompany supply shortages that will induce demand response. However, it sees this as an important feature it should ensure works efficiently rather than a problem to avoid.
- 65 Also, it is proving difficult to define exactly how capacity is delivered. The Authority notes that PJM has recently altered its capacity market because the capacity procured was not made available during the 'polar blast' in January 2014, when it was most needed.
- 66 Consequently, the Authority continues to consider it more efficient to incentivise investment in new generating capacity via well-functioning energy and hedge markets. Therefore, it will not look any further at a capacity market or any other mechanism to amplify the incentive on parties to invest in new generating capacity.

Other initiatives suggested by submitters

- 67 Norske Skog enquired why the Authority had not considered vertical disintegration or development of the FTR market. In a similar vein, Pioneer submitted that requiring

¹² [Link to DR principles paper, when published](#)

generators to offer a proportion of their volumes to a third party would improve liquidity in the hedge market.

- 68 Ideas like these were considered by the Authority to be out of scope of the spot market review. However, they were considered as part of its hedge market development initiative.
- 69 Orion submitted that the Authority should:
- (a) consider addressing the uncapped nature of the spot market and the potential for very high prices when there is scarcity pricing – both of which may act as barriers to entry
 - (b) analyse the value of optimising dispatch over longer periods – eg a day
 - (c) consider whether the experience with hot water load management in the upper South Island can support improved demand forecasting, and potentially inform an approach to demand-side response, for example, through the use of local system operators for coordinating load, and optimising over a longer period.
- 70 The Authority is not considering capping spot prices or reducing the level to which prices are set when there is island- or national-level scarcity. In an energy-only market, it is important for prices to be able to reach high levels at times of genuine scarcity, in order to drive efficient investment in, and operation of, capacity.
- 71 The Authority will be considering the value of optimising dispatch over longer periods as part of its exploration of hours-ahead markets.
- 72 Finally, the Authority acknowledges that distributors may well be able to contribute to improvements in the quality of the system operator’s short-term demand forecast. It also acknowledges the useful role that distributors can play in coordinating load management.
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