Summary of submissions

Making price forecasts more accurate

15 August 2017

Introduction

1 On 9 February 2017, the Electricity Authority (Authority) published the *Making hours-ahead price forecasts more accurate* consultation paper (consultation paper). The consultation paper and the submissions are available on the Authority's website.[1]

2 The consultation paper identified and assessed four options for improving spot price forecasts:

(a) Option A: improve inputs into price forecasts under existing incentive arrangements (administrative/beneficiaries pay arrangements)

(b) Option B: improve inputs into price forecasts and improve incentives (beneficiaries/exacerbators pay arrangements)

(c) Option C: encourage a voluntary hours-ahead market (market-like arrangements)

(d) Option D: pursue a formal hours-ahead market (market-like arrangements).

3 The consultation paper outlined a preference for Option A as it would provide a useful foundation to transition to other options in the future. The other options, that provide more accurate forecast pricing than Option A, may become more attractive in the future. This may be due to factors such as increased uptake of batteries and other similar technology, and increased quantity of load that responds to pricing signals.

4 In addition to the four options above, the Authority noted that it may be possible to make some quick improvements ('quick wins') to the quality of forecast price information including:

(a) correcting the apparent systematic average bias present in the conforming load forecast

(b) making other low-cost incremental improvements to the conforming load forecast

(c) examining the reasons for apparent relative differences in forecasting performance among intermittent generators, and among non-conforming load sources.

5 The Authority sought submissions on its qualitative and quantitative assessment of the options, and whether the Authority should consider any other options. Questions for submitters are set out in Appendix A.

6 This paper summarises stakeholder feedback. It does not contain an exhaustive list of the points made in the feedback received, but rather, summarises the key themes.

[1] https://www.ea.govt.nz/development/work-programme/wholesale/exploring-refinements-to-the-spot-market/consultations/

Feedback received

7 In response to the consultation paper, the Authority received feedback from the 15 parties listed in Table 1.

Table 1 List of parties that provided feedback

Major generator/ retailers	Other generators and retailers	Distributors	Consumers	Service providers and others
Genesis Energy Limited (Genesis) Mercury Energy Limited (Mercury) Meridian Energy Limited (Meridian) Trustpower Limited (Trustpower)	Flick Energy Limited (Flick) Nova Energy Limited (Nova) Pioneer Energy Limited (Pioneer)	Orion New Zealand Limited (Orion) Powerco Limited (Powerco)	Major Electricity Users' Group (MEUG) New Zealand Steel Limited (NZ Steel)	Electric Power Optimisation Centre (EPOC) NZX Limited (NZX) Tesla Asia Pacific Limited (Tesla) Transpower Limited (Transpower)

Summary of key areas covered in the feedback received

8 This section provides a summary of feedback in the following areas:

(a) the Authority's preferred option

(b) factors to be considered when improving hours-ahead price forecasting

(c) choosing between a proprietary or open source forecasting method

(d) quick-win improvements to the quality of forecast information

(e) option(s) to be investigated at a later stage

(f) the cost-benefit assessment.

The Authority's preferred option

9 There was broad support from submitters for implementation of Option A. Thirteen of the 15 submissions supported Option A being progressed at this stage in preference to the other identified options.

10 Reasons for supporting Option A included:

(a) it would be a useful platform for other options in the future (Flick, Meridian, Nova, Orion, Tesla, and Transpower)

(b) it would deliver worthwhile net benefits at relatively low risk (Genesis, Meridian, and MEUG)

(c) other options were too high risk (NZ Steel)

(d) it has the flexibility to react to changing market conditions (NZX)

(e) option B has too much ambiguity in how it would operate (NZX)

(f) it would be less complex than other options and does not create a barrier to entry (Pioneer)

(g) a market-based approach would not be justified given the scale of implementation cost (Powerco)

(h) an incremental approach would not limit future known options and could generate yet unknown options (Transpower)

(i) it would be sensible cost-effective solution (Trustpower).

11 While Genesis agreed that Option A was the most reasonable option in the short term, Genesis submitted that Option D was a better option in the long term. Genesis recommended that Option A be implemented as a 'stepping stone' for Option D.

12 EPOC did not express support for any specific option.

13 Mercury preferred a form of Option B because, "it will ensure that intermittent generators are providing accurate forecasts which we see as important (particularly for wind generation given this is difficult to forecast accurately without bespoke information and tools that wind generators have to hand)". However, Mercury also thought that "demand forecasting should, except in the case of wind, be centralised". This was because requiring 29 individual retailers to provide demand forecasts would impose additional costs on retailers for little benefit and it may act as barrier for new entrant retailers.

Factors to consider when improving hours-ahead price forecasting

14 Two submitters noted issues associated with demand response that they thought should be considered when improving demand forecasting:

(a) NZX submitted that the impact of demand shifting technologies (DST) on forecast accuracy should be considered. NZX considered that the adoption of DST may initially distort the ability to accurately predict consumption at different price levels. This was due to both the degree of uptake of DST but also due to the relative price elasticity of each consumer. However, NZX expected this increase in forecasting error to be temporary because over time they expected the system operator could map consumers' consumption profiles and reduce the base level of forecast error due to conforming load. NZX submitted that there was a need to develop the forecast methodology in a way that can most effectively accommodate the adoption of DST.

(b) Orion submitted that load management could materially impact on the accuracy of demand and price forecasts. Orion noted that load management could change the shape of the load profile significantly across the day compared to what it could have been. However, Orion also contended that because load management is relatively rare, and varies considerably in extent, it could materially impact on the accuracy of any forecasts that are not aware of it. This has two key implications:

- it could overstate peak demand and understate minimum demand

- as a result, PRS 'peak' prices could be overstated and 'off-peak' prices could be understated compared to the actual prices that result.

Orion submitted that there are ways for real time load management activity to be incorporated into an improved forecast of conforming load. Orion noted that they had previously discussed this with Transpower. In addition, Orion noted the Energy Networks Australia Synthesis report on 'Future Market Platforms and Network Optimisation' explored this issues.[2]

15 Nova and Orion noted some other factors that should be considered when improving demand forecasting:

(a) Nova submitted that an improved centralised demand forecasting methodology would be the best place to start in improving forecasts, but it needed to be accompanied by additional requirements on intermittent generation and load control to submit more accurate information to the system operator.

(b) Orion considered that a good forecast should at least be unbiased, and thought that a consistent bias in demand forecasts should be easily addressed (for example, by adding or subtracting a factor), but it would need to take account of any consistent real-time demand response that may occur.

Choosing between a proprietary and open source forecasting method

16 Meridian and Tesla supported a proprietary methodology over an open source methodology:

(a) Meridian submitted that the additional time it would take to pursue an open source methodology and the greater uncertainty as to the level of improvements that such a methodology would ultimately deliver, made it second best to a proprietary methodology.

(b) Tesla submitted there were several benefits of a proprietary methodology over an open source forecast. This includes the third party forecast provider being incentivised to choose the best possible methodologies and staff, being more likely to already have dealt with market innovations in other jurisdictions before New Zealand adoption, and additional tools over and above basic load forecast. Tesla also noted that a good third party vendor would take into consideration the changing shape of energy usage.

17 Pioneer supported the system operator, not a different service provider, implementing the new forecasting tool it had identified. However, NZX supported the creation of a new contestable independent forecaster role (separate from the system operator). NZX believed this would lower the compliance costs for participants as it would give them an open source default forecasting methodology and would give the industry a greater level of control over its development path.

18 The remaining submitters did not express a preference for either a proprietary or open source forecast methodology.

[2] CSIRO and Energy Networks Australia 2017, Electricity Network Transformation Roadmap. Synthesis Report: Future Market Platforms and Network Optimisation.

Quick-win improvements to the quality of forecast information

19 Genesis and Meridian submitted that of the three 'quick wins' included in the consultation paper, the Authority should focus on examining the reasons for the apparent relative differences in forecasting performance among intermittent generators, and among non-conforming load sources:

(a) Genesis noted that the Authority had identified this as the largest source of induced pricing error per MWh of input, and that an increase in intermittent generation would have the potential to increase pricing errors more than increases in any other inputs. Genesis submitted that this would be concerning as a greater share of this generation type is expected in the future.

(b) Meridian considered this was the most promising of the 'quick wins', as the other two initiatives listed in the consultation paper could prove to be more difficult. However, Meridian also queried the following comment made by the Authority in the consultation paper:

"The accuracy of forecasts also varies noticeably among wind generators and none are very accurate. For example, forecasts submitted at 2 ½ hours before real time appear to be less accurate than persistence forecasts."[3]

Meridian submitted that this comment did not make sense because the forecast it submits 2 ½ hours before real time is a persistence forecast. Meridian said they would discuss this with Authority staff.

20 Nova submitted that it would be important to remove any incentive for parties to build bias into their demand bids or projections. This is because the bias gets included in decision making by price setting generators, and offers could be withheld in anticipation of where final prices would be set. Nova also submitted that there would be a need to improve wind generation forecasts, either through participants or centrally.

21 Orion agreed that the forecasting of conforming load could be materially improved and that this would improve price forecasts, in the absence of any change in unforecasted/unbid demand response. However, Orion noted that if these better forecasts of conforming load lead to changes in unforecasted/unbid demand response it would be unclear whether this would be a better outcome.

22 Flick considered that the Wholesale Advisory Group would be best placed to consider 'quick wins'.

23 Mercury was the only submitter to suggest an additional 'quick win' initiative. Mercury submitted that Transpower should disclose information on its demand response programme to the market as soon as possible after a demand response event is scheduled and programme participants have been contacted. Mercury noted the information disclosed should include MW quantity sought, region affected and timeframe.

24 The remaining submitters (EPOC, MEUG, NZ Steel, NZX, Pioneer, Powerco, Tesla, Transpower, and Trustpower) did not comment on the suggested 'quick wins' or provide any further 'quick-win' improvements.

[3] Paragraph 5.4.6(6) of the consultation paper.

Options to be investigated at a later stage

25 Most submitters were supportive of maintaining optionality to move to another option (ie, from Option A) at a later stage if conditions change.

26 Four submitters considered that further analysis and/or monitoring should be done over time to determine whether another option would become more appropriate:

(a) Flick considered that, if implemented, Option A would have a bearing on the quantitative assessment of the other options and therefore a secondary assessment of options B, C, and D should be done following implementation of Option A

(b) Pioneer recommended the Authority redo the quantitative accuracy and error analysis with current or more recent data and continue to do this analysis to determine the value of implementing any of the other options

(c) Powerco considered that price forecast accuracy should be re-assessed after other market design changes (such as shortening gate closure, altering wind generation offers, and introducing real-time pricing) had been bedded in, or could at least be estimated with confidence

(d) Trustpower recommended the Authority establish appropriate metrics for ongoing monitoring of forecasting performance and undertake a review in two years' time of whether market conditions had changed and therefore whether another option had become more appropriate.

27 Nova and NZX considered that Option C could be the next best step, but had differing views on the merits of Option D:

(a) Nova submitted that if a voluntary hours-ahead market developed sufficient liquidity (such as under Option C), then additional investment could be made in the Scheduling Pricing and Dispatch model to introduce a formal hours-ahead market (such as Option D)

(b) NZX believed Option C could allow for a more organic development of an hours-ahead market as participants would be able to take advantage of the market according to their willingness and ability (as opposed to a mandate from the Authority, such as under Option D).

28 Genesis recommended the Authority set a clear pathway for transition to a market-based approach, based on Option D. Genesis thought Option D was the most attractive option and had the potential to deliver higher net benefits (than Option A) that would ultimately be in the best interests of consumers. Genesis noted that implementation of Option D would need to follow consultation with key stakeholders to ensure its optimal design.

29 Three submitters were hesitant towards Options C and D developing in the future:

(a) Mercury submitted that:

- Options C and D would be more complicated and costly to implement that Options A and B
- there would be no need for Option C or D as there would be plenty of hedge products available to provide price certainty to participants

(b) NZ Steel considered the “degree of implementation risk” for Options C and D would be of concern due to a high likelihood of unintended consequences (positive and negative) that may become apparent as real-time pricing (RTP) matures

(c) Orion were concerned that under Options C and D:

- parties could be concerned about being gamed by counterparties
- a new basis risk could be created with quantities being settled at hours-ahead prices, but futures, CFDs, and other instruments being settled at ex-post actual prices
- real-time demand response that is not necessarily efficient would be facilitated.

30 Four submitters (Meridian, MEUG, Tesla, and Transpower) had no comment on the process or specific options going forward, but were open to further development.

31 EPOC did not comment on the process going forward.

The cost benefit assessment

32 Three submitters (Meridian, Tesla and Transpower) stated they agreed with the cost benefit assessment (CBA).

33 Genesis noted they were unable to verify the CBA figures provided by the Authority, while Mercury had “no comments to make on the cost benefit analysis as we do not have sufficient information to make such an assessment”.

34 Six submitters submitted on the specific costs and benefits of each of the options. These comments are summarised in Table 2 below.

Table 2: Costs and benefits of the four options

Option	Submitter	Comment
A	Orion	Some risk that the potential benefits (which could arise from more efficient dispatch) could be offset by the effects of a possible increase in demand response to 'better' forecasts of demand and price.
B	Nova	The challenges with this option are under-estimated. While retailers currently estimate expected ICP demand, it is not necessary to do this to the level of detail required to improve the SPD schedules.
	Powerco	Powerco would face additional costs if real-time forecast capability is required to support conforming load forecasts. It is not clear if these costs are included in the cost benefit analysis for options C and D, and possibly B.
C	Flick	Given the Authority is not aware of any other jurisdiction that has implemented a voluntary-hours ahead market, the uncertainty of operation and uptake would be a considerable cost for Option C.
	Nova	A primary constraint on a voluntary hours-ahead market would seem to be the transaction costs involved.
	NZ Steel	The "Degree of implementation risk" for options C and D is of concern. There is a high likelihood of unintended consequences (positive and negative) that could become apparent as real time pricing matures. For example, with a forward market we may see a consumer out of balance to an ahead market commitment and therefore potentially make inefficient decisions.
	Powerco	See comment on Option B.
D	Flick	The benefits and costs of this option will be dependent on how much can be improved and gained by improving inputs into price forecast under existing arrangements.
	NZ Steel	See comment on Option C.
	Powerco	See comment on Option B.

35 Some submitters made more general comments on the CBA:

(a) MEUG submitted that the CBA is helpful to give the relative scale of impacts for light (such as Option A) versus heavy (such as Option D) intervention. In addition, MEUG noted that the estimated net present value (NPV) of real-time pricing was higher than the estimated NPVs for Options A and D, which supported their preferred priority for real-time pricing

(b) MEUG also submitted that a difference in the assumed capture ratio was driving the present value of gross benefits for Option D to be twice that of Option A. MEUG noted the number of uncertainties and assumptions that need to be made to determine the capture ratios. Given this, they were unsure that the estimated gross benefit for Option D over Option A for dispatch efficiency is robust as a predictor of future benefits

(c) Nova submitted that a process of centralised demand forecasting would provide significant economies of scale over a disaggregated approach and would benefit consumers

(d) Pioneer recommended the Authority redo the quantitative accuracy and error analysis using more recent data.[4]

36 EPOC, NZX, and Trustpower did not make any comments on the CBA.

[4] Price data from January 2013 to July 2015 was used.

Appendix A Consultation paper questions

	Question
Q1	Are there any major options you think we missed? If so, please describe them.
Q2	Are there any 'quick wins' you think we missed? If so, please describe them.
Q3	Are there any issues that are common to all options that should be examined? If so, please describe them.
Q4	Are there any qualitative benefits and costs for Option A we missed? If so, please describe them.
Q5	Are there any qualitative benefits and costs for Option B we missed? If so, please describe them.
Q6	Are there any qualitative benefits and costs for Option C we missed? If so, please describe them.
Q7	Are there any qualitative benefits and costs for Option D we missed? If so, please describe them.
Q8	Do you disagree with the options chosen for quantitative assessment? If so, please describe the reasons why.
Q9	Do you agree with the cost benefit assessment? If not, why not?
Q10	Do you agree that Option A is preferred at this point? If not, why not?
Q11	If Option A is implemented, are there any factors that should be taken into account to maintain the potential to move on to Options B, C, or D at a later point?