

The Authority's approach to monitoring the new trading conduct rule

Information paper

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Disclaimer

The Electricity Authority (Authority) provides this document to inform participants about the approach and data that the Authority intends to use to monitor compliance with the wholesale market trading conduct provisions of the Electricity Industry Participation Code 2010 (Code).

The monitoring process is designed to identify possible Code breaches, which may then be the subject of further investigation. Importantly:

- This document is not intended to provide participants with guidance on how to meet their obligations under the Code. Nor is it intended to outline how the Authority interprets the relevant Code provisions beyond how this is relevant to the monitoring process.
- This document does not set out the approach that the Authority will take to investigating a suspected breach of the Code identified through monitoring. Conduct may still be in breach of the Code even if it is not detected by the Authority's monitoring systems, and conduct identified through monitoring will not necessarily be in breach of the Code.

The information in this document does not form part of the Code. It is provided for general information only and not as legal advice and does not establish any legal obligation in itself.

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The approach detailed in this document is subject to change if additional information is obtained through market reviews, compliance investigations, Rulings Panel or court decisions or from other information sources that may inform our approach.

Executive summary

This document sets out the Authority's intended approach to monitoring the new trading conduct rule and discusses the types of data the Authority will monitor as part of this approach.

The new rule is structured differently from the previous high standard of trading conduct (HSOTC) provisions. The Authority has decided to provide participants with some guidance on how the Authority intends to approach the monitoring of the new rule.

The Market Monitoring Team's approach to monitoring the new rule will include the following steps:

1. identify potential breaches by comparing prices with estimated economic costs, past prices in similar circumstances, and predicted prices
2. identify the offers that caused these prices
3. consider whether these offers appear to be consistent with the offer that the generator or ancillary service agent, acting rationally, would have made if no generator or ancillary service agent could exercise significant market power.

The new rule requires participants to ensure that their offers reflect the offers that would be made in a competitive market.

One way of looking at whether prices departed from those expected in a competitive market is to analyse indicators of the underlying supply and demand conditions. If price appears to be inconsistent with these indicators, it suggests a possible breach of the Code. The Market Monitoring Team will undertake this analysis visually using a dashboard of indicators, and also by comparing prices to predicted prices. These predicted prices will be obtained from regression analysis, with underlying supply and demand fundamentals used as the explanatory variables.

As economic efficiency is a good indicator of a competitive market, the Market Monitoring Team's approach will also include identifying trading periods where price appears to be divorced from economic costs.¹ This will involve the Authority estimating economic costs—including opportunity costs—for different generation technologies.

Once trading periods with prices of interest have been identified, the Market Monitoring Team will then need to establish which offers were associated with these prices, and consider whether to report a potential breach, which may ultimately result in the appointment of an investigator in accordance with the process set out in the Electricity Industry (Enforcement) Regulations 2010.

¹ See Annex 3 of the MDAG discussion paper for a definition of these costs: <https://www.ea.govt.nz/assets/dms-assets/26/26404High-Standard-of-Trading-conduct-MDAG-discussion-paper-on-pivotal.pdf>

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1 A new monitoring approach is required

- 1.1 The new trading conduct rule (clause 13.5A of the Code) differs markedly in structure to the previous HSOTC provisions and requires an alternative monitoring approach to identify potential breaches.
- 1.2 The Authority has decided to provide participants with its proposed monitoring approach to the new trading conduct rule.
- 1.3 The Authority will support the implementation of the new rule by strengthening its monitoring, enforcement, and compliance functions. The Market Development Advisory Group (MDAG) (in its review of the HSOTC provisions) noted that effective monitoring will be important for achieving the Authority's related policy objective and recommended the Authority put in place a more active monitoring regime of market performance, complemented by "please explain" notifications.
- 1.4 In this document we set out the steps involved in our approach to monitoring, and describe the modelling tools and the indicators and data that will be relied upon.
- 1.5 This document does not provide an exhaustive list of everything the Authority will monitor as part of this process. We expect that our approach to monitoring and the indicators and modelling tools utilised will evolve over time as the rule is 'bedded in'. This document will be updated accordingly.
- 1.6 Our monitoring will highlight any trading periods that appear inconsistent with competitive market conditions. For any such trading periods, further analysis will generally involve a detailed analysis of offers by traders and generation types, and a comparison of offers to economic cost (discussed in more detail below). We may also ask participants for information they hold in relation to the period of interest.
- 1.7 The Authority intends to publish 'false positives' – ie, instances where our monitoring may indicate prices of interest, but further analysis of the offers associated with this price suggest there was no breach of the new rule.

2 The new rule is structured differently to the previous high standard of trading conduct provisions

- 2.1 The new trading conduct rule will replace clauses 13.5A and 13.5B and the definition of "pivotal" in Part 1 of the Electricity Industry Participation Code 2010 (Code). The new rule is as follows:
 - (1) In the spot market –
 - (a) it is expected that offers and reserve offers will generally be subject to competitive disciplines such that no party has significant market power;
 - (b) however, there may be locations where, or periods when, one or more generators, or ancillary service agents, as the case may be, has significant market power.
 - (2) Accordingly –
 - (a) where a generator submits or revises an offer, that offer must be consistent with the offer that the generator, acting rationally, would have made if no

generator could exercise significant market power at the point of connection to the grid and in the trading period to which the offer relates;

- (b) where an ancillary service agent submits or revises a reserve offer, that offer must be consistent with the reserve offer that the ancillary service agent, acting rationally, would have made if no ancillary service agent could exercise significant market power at the point of connection to the grid and in the trading period to which the reserve offer relates;

(3) For the purposes of this clause –

- (a) market power becomes significant when its exercise would have a net adverse impact on economic efficiency, which includes productive, allocative and dynamic efficiency;
- (b) “spot market” has the same meaning as wholesale market except that it excludes the hedge market for electricity (including the market for FTRs).

2.2 The new rule requires generators to ensure any offers they make at the point of connection to the grid and in the trading period to which the offers relate are consistent with offers that the generator, acting rationally, would have made where no generator could exercise significant market power.²

2.3 This rule applies to all offers at the time or location where the offers are made, irrespective of whether a generator or ancillary service agent would have been considered pivotal under the old HSOTC provisions. It sets a clear standard of behaviour that uses a counterfactual approach based on an orthodox economic efficiency framework.

3 The Authority’s approach to monitoring the new rule

3.1 Our approach to monitoring the new rule will include the following steps:

- (a) identify potential breaches by comparing prices with estimated economic costs, past prices in similar circumstances, and predicted prices
- (b) identify the offers that caused these prices
- (c) consider whether these offers appear to be consistent with the offer that the generator, acting rationally, would have made if no generator could exercise significant market power.

3.2 This will require an empirical, economic approach that assesses offers and prices with reference to underlying conditions.

3.3 In a typical week there are about 60,000 final offers and around three times the number of offers and offer changes made at the pre-dispatch level. The work to identify potential breaches will therefore be forensic and resource intensive.

3.4 The steps involved in our empirical approach are set out in this section, with more details of the analysis and assumptions discussed in sections Appendix A to Appendix C.

² The same applies to ancillary service agents

The first step is to find trading periods where the spot price looks inconsistent with underlying conditions

- 3.5 To assess whether prices deviate significantly from what would be expected in a competitive market, we will undertake one or more of three separate – but complementary – analyses:
- (a) an interactive indicator dashboard (discussed in Appendix A).
 - (b) a model of final price to see when actual prices deviate from expected prices (discussed in Appendix B).
 - (c) a model of costs to produce values we can compare to prices (discussed in Appendix C).
- 3.6 The first approach provides a snapshot of what is happening in any trading period, allowing a high-level assessment of what is happening. It also allows us to compare to past prices where there may have been similar underlying supply and demand conditions. For example, a trading period with a high price (compared to pre-dispatch, trading periods immediately prior, or similar trading periods in the past), low demand, and no immediately obvious outages (either generation or transmission outages) may immediately suggest that closer examination is required.³ The indicators that will be used for this dashboard are discussed in more detail in Appendix A.
- 3.7 The second approach enquires further into whether the trading period (or periods) in question reflects underlying supply and demand conditions. A material difference in the expected spot price from a statistical model (with explanatory variables for the underlying supply and demand fundamentals such as storage, gas spot price, demand etc) and the final spot price will indicate the need for further investigation. The modelling approach is discussed in more detail in Appendix B.
- 3.8 The third approach sheds further light on the situation by comparing economic costs (that includes opportunity costs and scarcity pricing, where appropriate) to the spot price. If underlying costs are materially removed from the spot price, this will again signal the need for further investigation.
- 3.9 To obtain these economic cost estimates, we will use a modelling approach (discussed in Appendix C). These estimates will therefore not be a perfect representation of actual costs. They will however allow us to assess general trends and compare with similar past periods.
- 3.10 All three approaches will involve a certain amount of judgement and contain imprecision. It is important that we look at the information obtained from each approach together as a complete picture before determining whether we progress to the next step.

Once we find trading periods we are interested in, we need to understand offers in that period

- 3.11 Once our continuous monitoring of final prices described above has flagged a trading period (or group of trading periods) that warrants further consideration, we will then need to understand the offers during these periods.

³ Obviously not all examples will be as straightforward as this, and the second analysis approach may reveal trading periods where, on first examination, the visual dashboard may not have immediately revealed anything unusual.

- 3.12 In any one week there are around 60,000 final offers and around three times that amount of pre-dispatch offers. For any single trading period, there are about 200 offers. The volume of offers and the way they interact with each other makes this forensic evaluation challenging. We will continue developing our analytical tools to view offers and offer changes in a way that facilitates this task.
- 3.13 While we can view offers in aggregate, assessing whether certain offering behaviour warrants further consideration means looking through offers by station and by trading period. Longer time periods may mean we have to resort to representative trading periods and use aggregated data.
- 3.14 Our approach will likely include comparing offer prices to economic costs. To deal with the uncertainty associated with estimates of economic cost, we will use sensitivity analysis by producing a range of estimates. We will also examine the offers alongside the evidence gathered in one or more of the steps set out in the previous section.
- 3.15 The cause of high prices may not be straightforward, for example in the case of “economic withholding” – where an offer was dispatched as other generators removed lower priced offers, shifting the marginal generator and increasing the clearing price. In this case the offers that were shifted may be inefficient if a lower priced generator would otherwise have been marginal.
- 3.16 This step may warrant bespoke analysis, depending on the specific circumstances during the period of interest. It may also involve asking participants for information pertaining to the specific circumstances.

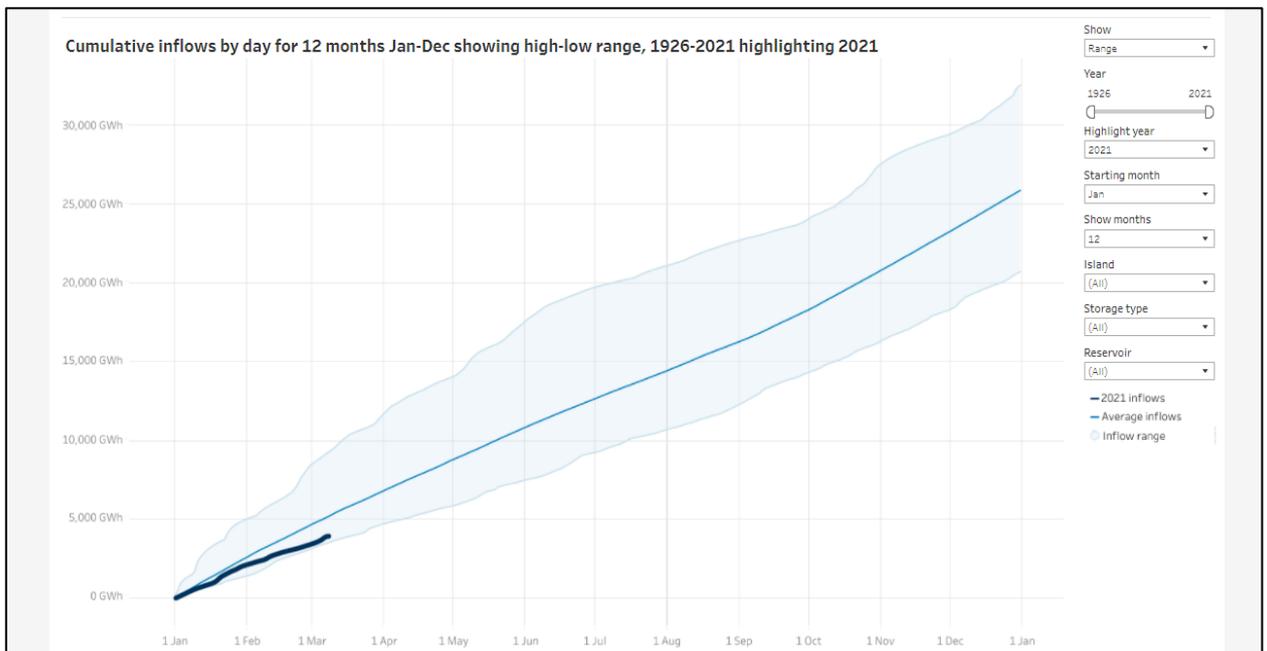
Once the above steps have been carried out, the Authority may seek an explanation and/or allege a breach

- 3.17 Once our monitoring, using the steps set out above, identifies any offers of concern, the Market Monitoring Team may:
- (a) invite an explanation from the parties, which may include commenting on our monitoring analysis or providing further information that may be relevant, and/or
 - (b) formally report an alleged breach to the Authority’s Compliance Team.
- 3.18 If this second step is taken, the Authority will follow the compliance process and will ultimately decide whether to appoint an investigator. If an investigator is appointed, the investigator will apply the elements of the rule to the case and establish whether the offer behaviour constitutes a breach of the rule.
- 3.19 The Authority will publish details of cases that are not progressed to the formal investigation stage. It will be helpful for confidence in the spot market to publish false positives. This will also help inform the sector of where the boundaries are.

Appendix A The Authority will set up an interactive indicator dashboard

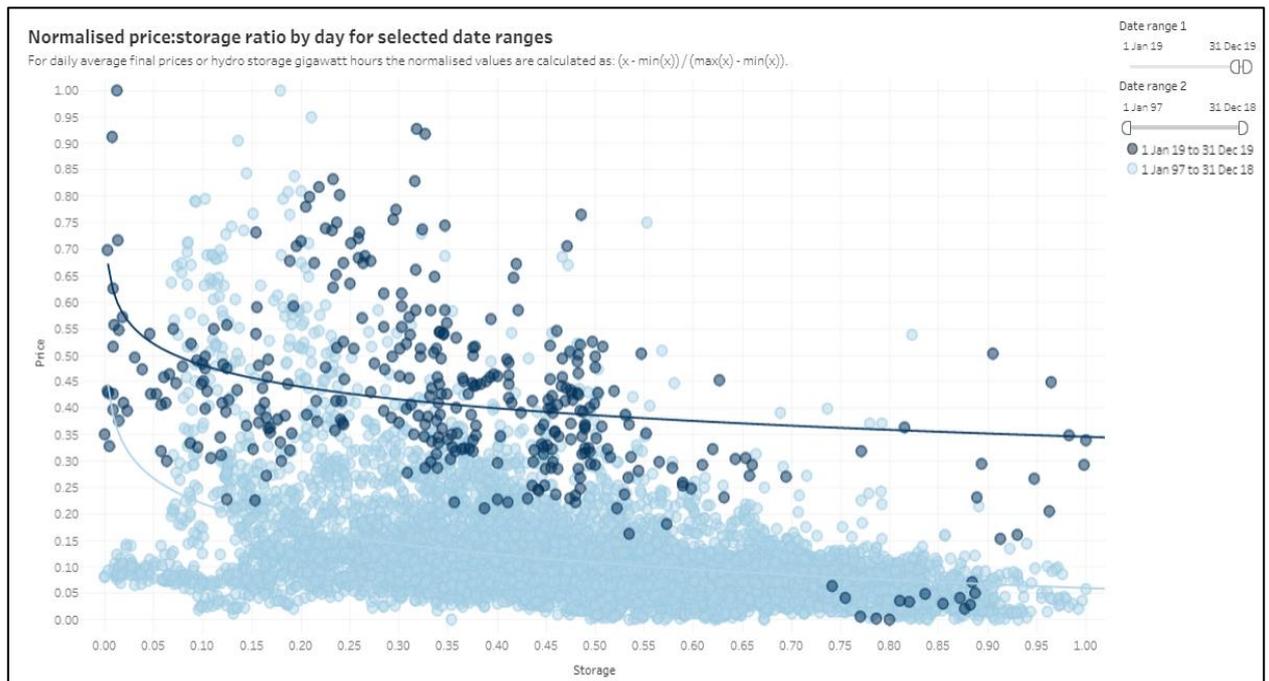
- A.1 The Authority will create a set of indicators that it will produce daily and make available on a dashboard. These indicators should be viewed together. The dashboard will be published externally on the Authority’s website (excluding any confidential data).
- A.2 The dashboard will allow interactive charts to be created. These charts will enable the user to examine an overall trend in any indicator. The user will be able to drill down to specific trading periods or other dimensions (eg, by trader, island, point of connection etc). An example of cumulative inflows is provided in Figure 1 below.
- A.3 The chart shows the total cumulative inflows in all reservoirs. The drop down menu to the left of the chart enables the user to reproduce this chart for any selected reservoir, or for each island, or storage type.

Figure 1: Example of interactive chart - cumulative inflows



- A.4 Another example which shows price and storage is provided in Figure 2 below. On the interactive version of the chart, the user can hover over each data point to see which day it relates to. An option could be added in the dashboard that shows specified days as a different colour. Any outliers can then be easily detected. The sliders on the right of the chart also allow different date ranges to be used for comparison.

Figure 2: Example of interactive chart - price versus storage



- A.5 The Authority will continue to develop the interface of the dashboard and the configuration of the charts. We anticipate that the dashboard will include the indicators listed in Table 1 below. This list will evolve over time. Table 1 also sets out the reasons for including each indicator and the questions that these indicators will help us to answer.
- A.6 An example of a dashboard interface (including a subset of indicators that may be included in our final interface) is available at:
<https://public.tableau.com/profile/electricity.authority#!/vizhome/Wholesalemarketsnapshot/Wholesalemarketsnapshot>.
- A.7 This example dashboard has been created using quarterly data. The dashboard created to monitor the new trading conduct rule will be at a more granular level (with options for weekly, daily, or trading period analysis). It will also (as with the quarterly example above) provide comparison to different time periods (eg, the same period in the previous year, the previous day, and/or the previous week).
- A.8 Within this dashboard interface, we will include links that will enable us to drill down further for more information on each indicator.⁴ For example, by clicking on the hydro generation icon at the top of this dashboard, it might take the user through to the example charts shown in Figure 1 and Figure 2 above. Links to external websites will be provided when the Authority does not hold the data. This enables us to access all the information in the set of indicators from one location. The Authority will continue to configure the dashboard interface.

⁴ Examples of such links (to EMI charts) can be found in the Authority's publicly available retail data dashboard:
<https://public.tableau.com/profile/electricity.authority#!/vizhome/Retailmarketsnapshot/Retailmarketsnapshot>

Table 1: List of indicators

Indicator	Examples of questions the indicator will help us answer
Prices at key nodes	Was the price level consistent with underlying supply and demand conditions? Was there any price separation? Did the final price differ substantially to pre-dispatch prices?
Forward price changes	Has there been a change in forward prices? If so, is this explainable with publicly available information (that was available to everyone at the time of the change)?
Storage by reservoir	Current levels, trends, approaching ERCs?
Pohokura production	Current levels, trends, outages
Thermal generation, by plant	The percentage of total generation that was thermal generation – does this explain the higher prices? What thermal plants were dispatched?
Demand	Was demand high? Forecast to be high? What was the difference compared to forecast?
Tiwai load	Any differences from usual in Tiwai load?
Wind generation	Was wind generation low? Did this drop compared to previous trading periods?
Offer stacks and dispatch, accounting for frequency keeping and reserves	Where did the cleared price fall in the offer stack? How was this affected by reserves and frequency keeping?
QWOP by generator and generation type	Was there a change in QWOPs? Was this change explainable by other indicators of supply and demand conditions and our estimates of economic costs?
Trading Activity Index (TAI) by generator	Number of actions taken (ie, offer price or quantity changes) by trader. Was there a change for any trader? Was this change explained by other indicators?
HVDC transfer	Was energy flowing north or south? Was the HVDC binding or close to binding?
Flow out of LSI compared to capacity	What was the level compared to other indicators of supply and demand conditions?
Outages (in MW)	Were there any planned or upcoming outages?
Marginal generator	Who was the marginal generator?
Quantity of offers above \$350 (with options for different thresholds within the interactive chart)	Was there an increase in this indicator? If so, was the increase explainable by changes in other indicators of supply and demand conditions?
Offered versus dispatched by injection node and generation type	Were there any changes in the percent of offers dispatched for any generator or generation type? If so, was the change explainable by other indicators of supply and demand conditions?

Indicator	Examples of questions the indicator will help us answer
Rankine fuel	Was coal or gas being used?
Gas spot price	Was the gas spot price high?
Coal price	Was the cost of coal high?
Water value by reservoir	Was water value high or low?
Lerner Index, by trader/island/generation type	The Lerner Index relates price to marginal cost – in a competitive market, the Lerner Index is equal to zero (if marginal cost includes scarcity pricing). Values closer to one indicate strong market power.
Total offered as a percent of total capacity, by injection node	Does this correspond to what is on POCP? If not, why not?
Percent of offers above cost, by injection node	Were many offers above cost?
Offers in pre-dispatch compared to final, by generator and generation type	Did offers change in pre-dispatch? If so, is this explainable by other indicators of underlying supply and demand? If not, why not?
Predictions from regression analysis	What was the predicted price compared to the final price?

Appendix B The Authority will model expected prices

- B.1 The Authority has developed two models of the spot price. One relates to the weekly average spot price and the other to daily average spot price. The spot price for both models is regressed on underlying supply and demand fundamentals, including:
- (a) Gas spot price
 - (b) Storage
 - (c) Demand
 - (d) Wind generation
 - (e) Generation Herfindahl-Hirschman Index⁵
 - (f) The ratio of offers to generation (as a measure of excess capacity)
 - (g) A dummy variable for the period since the unplanned Pohokura outage in 2018 (as a measure of gas supply risk)
- B.2 The regression involving weekly data is discussed in our July 2020 Quarterly Review, available here: <https://www.ea.govt.nz/assets/dms-assets/27/27142Quarterly-Review-July-2020.pdf>
- B.3 If the predicted price from either model varies significantly from the average actual final price, this will indicate that the final price may not be representative of underlying supply and demand conditions during some of the relevant period.
- B.4 The reason for looking at both regressions (daily and weekly) is to provide an indication of the extent of the deviation from underlying supply and demand conditions. For example, if the predicted price from the daily regression differs significantly from final price, but the predicted price from the weekly regression does not, then we may restrict our analysis to individual days within that week.
- B.5 Consideration will then need to be given to the other indicators of economic inefficiency, if the inefficiency does not appear to be large enough to show up in the weekly analysis. This again highlights the need to consider all evidence together, due to the imprecision in any one piece of evidence. The model outputs should not be viewed in isolation. As with the other indicators we will continue to refine these models.

⁵ The Herfindahl-Hirschman Index is a measure of market concentration.

Appendix C The Authority will model generator costs

- C.1 As part of our monitoring approach set out in section 3, we will estimate the economic costs-including opportunity costs-of the various generation technologies within New Zealand.
- C.2 For thermal generation the main input - whether this is gas or coal - is traded in markets. We will develop a method for converting the cost of thermal fuel into a cost per MWh for electricity (by fuel type or specific station). We can then use the forward curve to estimate the value of storing fuel for future use and therefore estimate its opportunity cost.
- C.3 The cost of hydro generation (and to a lesser extent other renewable generation) is not readily observable and so will need to be modelled. For several years the Authority has published a model that can estimate a water value conditional on the next increment of water use.⁶ We are working on operationalising this model so we can use it to calculate a weekly benchmark for hydro costs. The hydro costs from this model produce the opportunity cost of water.
- C.4 This opportunity cost represents the benefit obtained from using water in the future. This means that opportunity cost incorporates periods of genuine scarcity.⁷ That is, the opportunity cost increases during periods of tight supply. Therefore our comparison of hydro offers to opportunity cost will not falsely identify the exercise of market power when offer prices have been raised to reflect these periods of genuine scarcity.
- C.5 It is more than likely that we would get different water values from different models. Likewise there is uncertainty about operational and maintenance costs for any particular trading period.⁸ Our modelled outputs will be used as a benchmark only, providing an indication of general trends.

⁶ <https://www.emi.ea.govt.nz/Wholesale/Tools/Doasa>

⁷ Excluding periods in extreme situations where demand may need to be limited, as discussed in Annex 3 of the MDAG discussion paper: <https://www.ea.govt.nz/assets/dms-assets/26/26404High-Standard-of-Trading-conduct-MDAG-discussion-paper-on-pivotal.pdf>

⁸ Some estimates of operational and maintenance costs are available from: <https://www.mbie.govt.nz/assets/98fa09efab/2011-nz-generation-data-update-v006a.pdf>