THE LANTAU GROUP

# SCRATCH TRADING ANALYSIS

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# 1. BACKGROUND

The Market Maker (MM) arrangements were designed to support two key Authority objectives:

- a robust forward price curve and
- greater availability of risk management contracts for participants

These objectives are being addressed by ensuring obligated volumes are consistently available within a 3% bid–ask spread during the MM trading windows.

Stakeholder feedback on the recent consultation paper[1] raised concerns that current MM settings may not be delivering these objectives effectively.

One concern raised is that under current arrangements, all traded volume counts towards meeting market making obligations, without distinguishing between market maker trades (resting orders that provide liquidity) and market taker trades (which initiate a trade and remove liquidity). Such trades count towards market making volume even though they may have the effect of removing liquidity.

This type of trading can have the effect of reducing risk transfer and volume available to participants as it can enable market makers to more quickly meet their obligations and leave the market. It could also potentially create a barrier to access for smaller participants by increasing margin calls due to increased price volatility.

To address this concern, the Authority has engaged the Lantau Group (TLG) to evaluate the level and impact of market taker trades taking place and to evaluate options that may better support meaningful liquidity.

## 1.1. CURRENT MARKET MAKER OBLIGATIONS

There are currently 5 MMs active for NZ electricity futures - 4 regulated by the Electricity Code[2] and 1 appointed by commercial contract[3].

The current MM obligations were introduced in September 2022, coinciding with the introduction of the commercial market maker[4]. Thes obligations are summarised in Table 1 below.

1 Market making review: Strengthening price discovery in the forward electricity markets, Consultation paper, 14 November 2025.

2 The regulated Market Makers operate under ASX agreements with backstop measures prescribed in Subpart 5B of Part 13 of the Electricity Industry Participation Code 2010 (refer Appendix B).

3 The commercial MM requirements are set by contract with the Authority which we understand to be identical to those of the regulated MMs.

4 These obligations were temporarily modified in August 2024 (relief of obligation) and September 2024 (temporary code change) but reverted back to 2022 settings following the expiry of the temporary code change in July 2025.

**Table 1: Market maker obligations**

| | Market Maker Requirements |
|---|---|
| Product coverage | Monthly and Quarterly baseload products at two reference nodes (Otahuhu and Benmore) on the ASX |
| Window coverage | 25 minutes in each 30 minute market maker window (4.30-5.00pm) or earlier cessation once required volume is traded |
| Volume | 24 lots (2.4MW) |
| Bid-Ask Spread | Not exceeding the greater of 3% or NZ$2 |
| Exemptions | 5 MM windows in rolling 20 MM windows[5] |
| Refresh | 12 lots initial order. If fully traded, then reload to meet volume requirement. |

The principal MM requirement that leads to the concern raised is that MMs can exit the trading window once they have traded the required volume (24 lots) regardless of whether these trades were 'passive' (another participant lifting the bid or offer) or 'aggressive' (the MM lifting another participant's bid or offer). Once the MM has traded the required volume it may withdraw any remaining quotes[6].

The data period we examine in this paper (refer Section 2.2) includes part of the period where MM obligations were temporarily modified with stress relief provisions (widening required spreads to 5% when contract prices exceeded $500/MWh). However, we note this provision never came into effect during our period of analysis as this price threshold was never reached.

5 ASX MM agreements provide 5 exceptions, but this will reduce to 2 should backstop measures in the Market Code be required (Paragraph 13.236N(1)(b) of Subpart 5B of Part 13 of the Electricity Industry Participation Code 2010 (refer Appendix C).

6 Paragraph 13.236L(3)(c) of Subpart 5B of Part 13 of the Electricity Industry Participation Code 2010 (refer Appendix C).

# 2. SCRATCH TRADING

## 2.1. DEFINING A SCRATCH TRADE

Several terms are often used interchangeably in referring to the type of trades which give rise to the concern raised - market taker trades, aggressive trades, active trades or scratch trades.

Strictly speaking, a scratch trade involves closing a position at or near breakeven. It is used by market makers primarily to manage inventory risk and/or minimise losses. Scratch trades can have the effect of inflating trade counts toward compliance obligations without necessarily providing liquidity or depth to the market.

Our analysis employs three measures to detect (filter) scratch trading:

1. Trade initiation - MM is on the aggressive side of the trade (scratch trades are always aggressive trades)
2. Round trip timing – how quickly after a position is taken is it closed out (scratch trading tends to happen soon after the position was opened to avoid potential losses from the open position)
3. PnL impact - closing a position at or near breakeven (scratch trades aim to minimise losses and avoid/reduce margin calls).

We explore each of these measures in the following sections. The smaller the latter 2 measures (round trip timing and PnL impact) the more likely that scratch trading took place.

We also look at the overall net position of trades taking place. While not being used as a filter for detecting scratch trades, it provides a useful overall indicator of the level of liquidity and depth being provided (scratch trades remove liquidity rather than add to liquidity).

### 2.1.1. Measure 1: Passive/aggressive trade classification

When two orders match to form a trade, one order was already resting in the order book (the maker, or **passive side**) and the other was a newly entered order that crossed the spread to immediately execute (the taker, or **aggressive side**). As noted, all scratch trades are aggressive trades, hence the importance of this measure.

### 2.1.2. Measure 2: Rapid round-trip timing

**Scope:** Per participant, per individual contract, sequential within the dataset.

For each aggressive trade event by a MM, we search forward through the same participant's trade history on the same contract for the next trade in the opposite direction. The time difference (in seconds) between the initial entry and the offsetting trade is recorded, along with both prices.

The intuition is straightforward: if a MM buys a contract and then sells the same contract seconds later, the buy-sell sequence is more likely to be a mechanical round-trip (generating two compliance-eligible trades from a position that existed for only seconds) than a genuine directional position. By contrast, if the offset occurs two days later, the market maker held genuine risk during that period.

In practice, the round-trip timing will also depend on whether automated trading (algorithmic or rule-based trading) is used, versus whether a more traditional manual approach is adopted. While a 5 second round trip is almost certainly an indication of automated trading, a longer round trip may also be a valid indicator of scratch trading, albeit that it was manually triggered.

### 2.1.3. Measure 3: PnL direction analysis

**Scope:** Applied to the round-trip pairs identified in Measure 2.

For each aggressive-offset pair, the price difference between the two trades is computed (e.g. if the market maker bought at $100.00/MWh and the offsetting sell occurred at $102.00/MWh, the PnL direction is +2%). We then examine the sensitivity of the %PnL threshold we set to filter scratch trading behaviour.

This method adds an economic dimension to the timing analysis. A rapid offset with a significant price move might reflect a genuine change in view (the market maker bought, new information arrived, and it reversed course). But a rapid offset at essentially the same price is more likely a sign of inventory management or volume generation for compliance rather than a change in view (a small time difference between trades limits the likelihood of new information coming to hand).

### 2.1.4. Net position analysis

**Scope:** Per participant, per individual contract, per trading date.

For each unique combination of (market maker, contract code, trading date), we sum all buy-side traded volume and all sell-side traded volume from trade events. The net position change is |Buy Volume – Sell Volume|. The gross volume is BuyVolume + SellVolume. The net-to-gross ratio is the effective liquidity ratio for that observation.

A net-to-gross ratio of zero means the MM bought and sold exactly the same volume of the same contract on the same day — the textbook definition of a scratch. A ratio near zero (for example, buying 48 contracts and selling 36) indicates that most of the gross volume was offsetting. A ratio of 1.0 means all trading was in one direction — pure directional risk transfer.

The optimum net position for a market maker is generally zero (flat inventory), as this minimizes exposure to directional price risk. However, in practice, market makers constantly manage a non-zero inventory, balancing the profitability of holding positions (capturing the spread) against the risk of unfavourable price movements.

### 2.1.5. Limitations of our definition

We note that our methodology for determining scratch trades has the following limitations:

- **No cross-product scratch detection**. The analysis does not detect near-scratch behaviour through closely correlated contracts (e.g., buying Q1 and selling Q2 of the same location). This is deliberate conservatism but means total scratch activity may be understated.
- **No order-book reconstruction**. The spread and depth metrics use session-level best prices rather than continuous time-weighted snapshots, because full order-book reconstruction from event data would require tracking the active-order state at every timestamp. Session-level metrics likely understate the typical quoted spread.
- **Conservative aggressive classification**. Any order whose entry timestamp cannot be conclusively matched to the trade timestamp is classified as passive, potentially understating the true aggressive share.
- **Day-level netting only**. Net position analysis computes the net within a single trading date. A market maker that scratches within a 5-minute window but also has genuine directional flow on the same contract later in the session would show a partially offsetting net — the intra-session scratch would be partially masked by the later directional trade.

## 2.2. Our Approach

In evaluating the extent to which scratch trading is occurring and what impact it is having we have undertaken the following analysis:

- Used the three measures (refer Section 2.1) to set the appropriate parameters to define and determine the level of scratch trading taking place.
- Reviewed MM behaviour over the period 3 January 2025 to 23 March 2026.[7]
- Looked at MM overall presence during windows and reasons for exiting a two-sided presence (passive vs active trading).
- Looked at the impact on market depth across each window.
- Looked at behaviour and impact across different MMs, products, reference nodes and throughout the year (seasonality).
- Assessed the level of correlation between increased trading activity and increased price volatility in a window.

## 2.3. Level of Scratch Trades

Our full methodology and analysis for determining the level of scratch trading taking place are provided in Appendix A: Our Methodology and Analysis – Scratch Activity. We summarise our findings in the following sections.

7 All data received on participant activity on the ASX over this period was anonymised to preserve participant confidentiality.

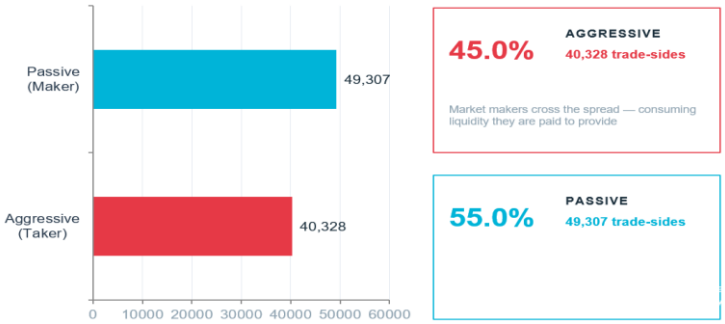
The first part of our approach to detecting the level of scratch trades is to identify the level of aggressive trading taking place and to set thresholds for the following measures:

- Round trip timing – how quickly after a position is taken is it closed out
- PnL impact - closing a position at or near breakeven

### 2.3.1. Aggressive vs passive trading

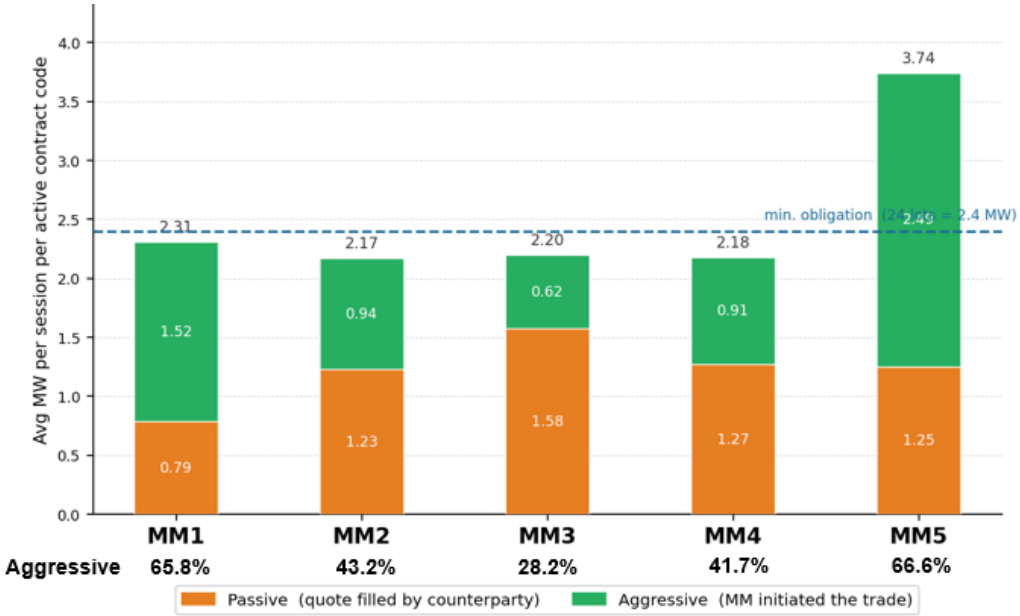
Overall, 45% of MM trades are aggressive - actively consuming rather than providing liquidity. But not all of these are classified as scratch trades.

**Figure 1: Aggressive vs passive trading**




Looking at the different levels of MM aggression (refer Figure 2) it can be seen that MM1 and MM5 are the most aggressive (with MM5 being an outlier for overall volumes of trades). MM3 is the most passive trader.

**Figure 2: Aggressive vs passive by MM**



### 2.3.2. Setting thresholds for round-trip timing

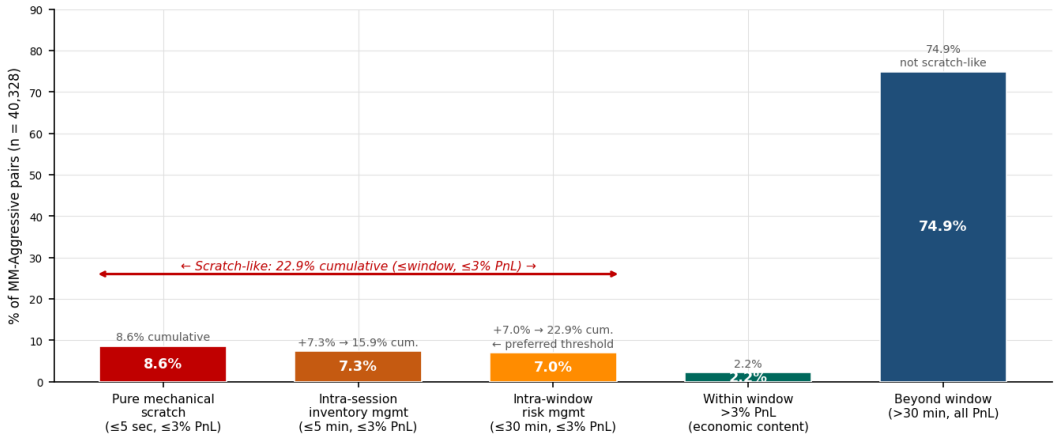
Table 2 shows the level of offsetting trades by various thresholds of round trip times. Offsetting trades ≤ 5 seconds are a strong sign of mechanical (automated) offsetting behaviour. Trades ≤ 5 minutes are also a strong sign of offsetting behaviour, albeit more likely to be manual trades.

**Table 2: Time window sensitivity**

| Time Window | Pairs | % of MM-Agg | Cumulative % |
|---|---|---|---|
| ≤ 5 seconds | 4,097 | 10.2% | 10.2% |
| ≤ 30 seconds | 4,846 | 12.0% | 12.0% |
| ≤ 60 seconds | 5,363 | 13.3% | 13.3% |
| ≤ 5 minutes | 7,214 | 17.9% | 17.9% |
| ≤ 30 minutes (window) | 10,112 | 25.1% | 25.1% |
| All matched (unlimited) | 39,915 | 99.0% | 99.0% |

Figure 3 shows the time-to-offset distribution has a clear two-cluster structure: a rapid reversal cluster (≤5 seconds: 10.2%) and a longer-horizon cluster (hours to days). The step from ≤window (25.1%) to ≤same day (42.8%) is 17.7 percentage points — confirming that substantial offsetting occurs after the session closes, behaviour inconsistent with mechanical scratch trading but consistent with end-of-day risk reduction. The denominator used is the 39,915 matched round-trip pairs.

**Figure 3: Distribution of time to offset (round-trip pairs)**

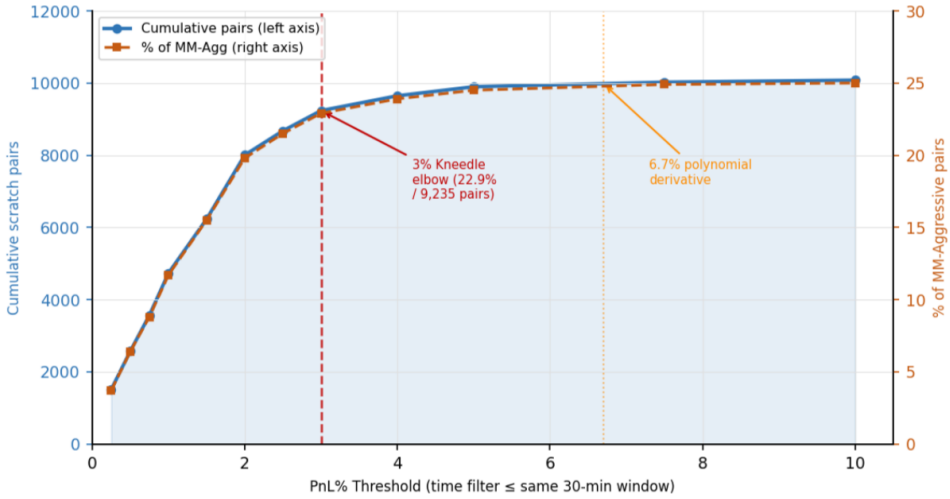



To ensure **consistency with the Authority's objectives to maintain liquidity and depth throughout the window we adopt a 'within window' roundtrip threshold.**

### 2.3.3. Setting threshold for PnL

Figure 4 shows the level of potential scratch pairs that would be captured at different thresholds of PnL measured as a percentage of the price traded.

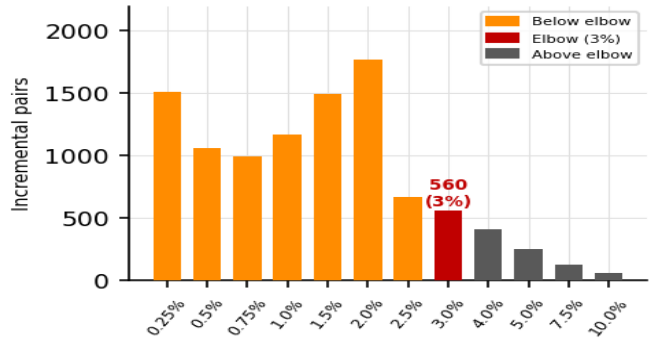
**Figure 4: Cumulative potential scratch pairs by PnL threshold (%)**




We noted that there was a data-identified inflection point at the 3%PnL threshold.[8]

Figure 5 shows the incremental potential scratch pairs that would be captured at each level of PnL measured as a percentage of the price traded.

**Figure 5: Incremental potential scratch pairs captured at each threshold step**



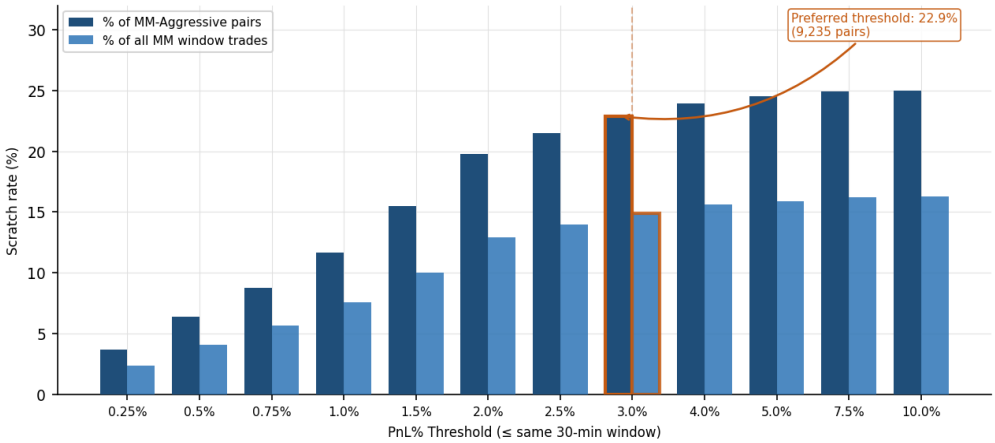

We also noted that marginal gains above 5% PnL are very small — under 300 new pairs per 1% increment (Refer Table 10, Appendix A.11) — confirming that the bulk of scratch-like activity is captured below 5%. However, **based on the 3% inflection point, and being consistent with the spread requirement, we adopt a PNL threshold of 3%.**

At the median contract price of $165/MWh, the 3% PnL threshold corresponds to approximately $4.95/MWh (Refer Table 12, Appendix A.14).

8 The Kneedle elbow-detection method places the inflection at exactly 3.00% (Refer Table 9, Appendix A.11).

Based on the 3% PnL threshold, 22.9% of MM-aggressive trade-sides (9,235 pairs) are scratch-like.

**Figure 6: Scratch share of MM aggressive trades vs PnL threshold**




## 2.3.4. Level of scratch trades

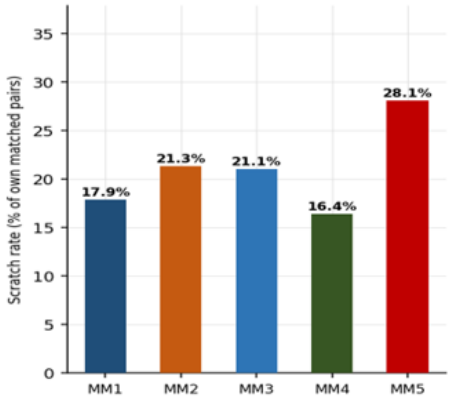
Consistent with considerations of the Authority's policy objectives for MMs to support a robust forward price curve and create a greater availability of risk management contracts for participants we concluded that the most appropriate thresholds to use for detecting scratch trades were:

- 3% for PnL (consistent with the spread requirement), and
- Round-trip threshold of within balance-of-window (consistent with maintaining liquidity and depth throughout the window)

On this basis we determined that 22.9% of MM-aggressive trade-sides (9,235 pairs) are scratch-like.

We then looked at the variance of scratch trade rates across the different MMs.

**Figure 7: Scratch rate by MM**



All MMs participate in scratch like behaviour, with MM5 having the highest rate of scratching.

**Figure 8: Scratch rate by contract type**

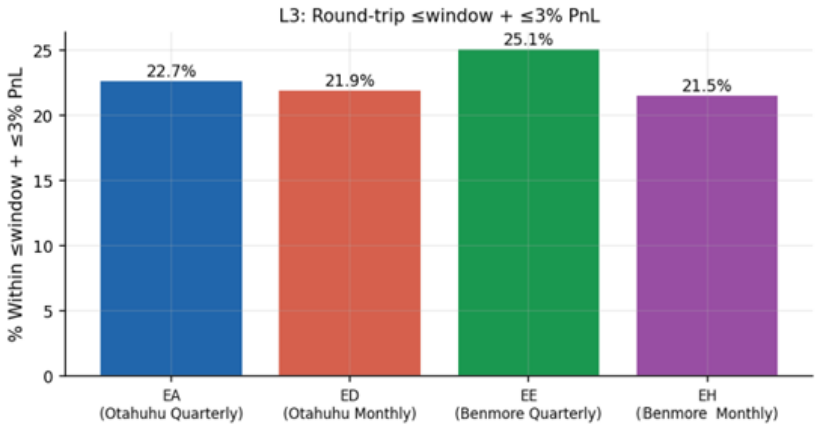
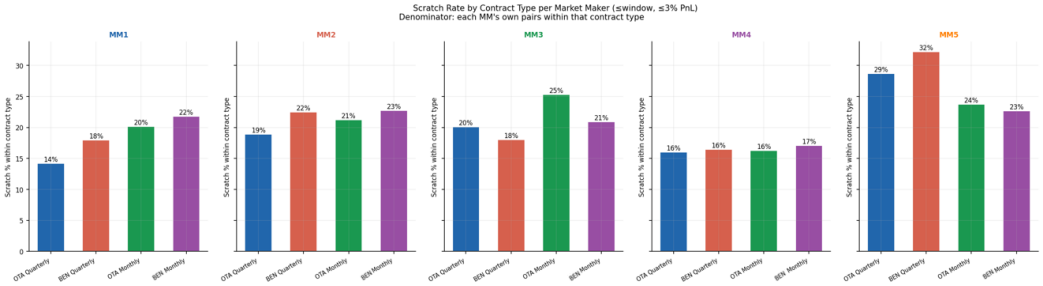



**Figure 9: Scratch trade by contract type per MM**




There are differences in scratch rates across products and reference locations (Otahuhu and Benmore) and these differences vary by MM. This may be due to different MMs having different underlying exposure at different locations and product tenure that help guide their inventory management targets.

## 2.3.5. Net-to-gross ratio

Our analysis did not find that MMs overwhelmingly ended up with near-zero net positions, which is what a "pure scratch" trading strategy would result in. We determined that **only 26.7% of contract-days did show near-zero net positioning** (NTG ≤ 0.10)[9] — these are the cases most consistent with scratch behaviour where the MM bought and sold essentially the same volume on the same contract on the same day. But the other 73.3% of contract-days showed meaningful retained net exposure.

9 Where a NTG of 0 indicates perfect offsetting and a NTG of 1 indicates fully one-directional.

The other key number from our net position analysis is the mean net-to-gross ratio of 0.633. This means that on average across all (MM, contract, trading date) combinations, MMs retained 63.3% of their gross traded volume as a directional net position by end of day. That is a **fairly substantial directional exposure and is inconsistent with a systematic strategy of purely scratching**.

At the intra-session level — which is the more relevant lens for scratch trading — 22.9% of MM-aggressive pairs (9,235 pairs) qualified as scratch-like under our adopted thresholds: offset within the same 30-minute window and price movement of ≤3%. The remaining pairs broke down as 8.6% being very rapid reversals (≤5 seconds), and 57.2% resulting in multi-day directional positions — classified in our view as **normal market-making activity**.

The conclusion from our net-to-gross analysis is that scratch trading exists and is quantifiable, but it did not dominate MM behaviour at the net position level. The mean NTG of 0.633 essentially exonerates MMs from the strongest version of the accusation — that their trades are systematically designed to generate compliance volume with no real market exposure. What it does confirm is that a meaningful minority of intra-session activity (~22.9%) had the statistical fingerprint of scratch trading, which is the basis for our consideration of alternative policy options rather than an outright claim that an alternative policy option is strictly necessary.

## 2.4. Impact of Scratch Trades

### 2.4.1. Market maker presence in windows

MMs generally have a good two-sided presence within the required spreads across the MM window with one notable outlier (MM1) – refer **Error! Reference source not found.** below.

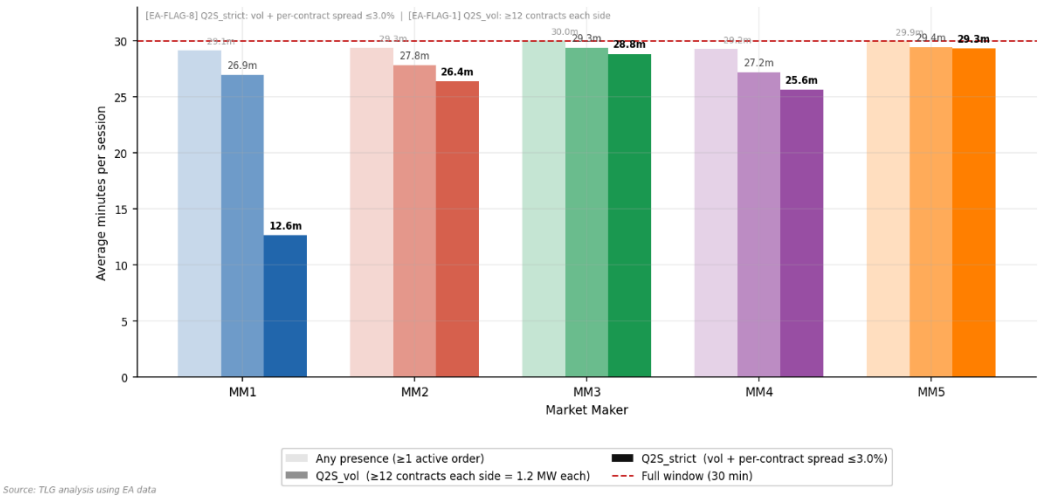
We tracked three levels of MM presence within each 30-minute window:

- Any-presence (98.4% on average): the MM has at least one active order on either side of the market.
- Volume presence (93.8% on average): the MM simultaneously has at least 12 contracts of active bid volume and 12 contracts of active offer volume (1.2 MW each side = 2.4 MW total). This is the instantaneous order-depth condition.
- Compliant presence (81.8% on average): Volume presence is satisfied and the MM simultaneously has a bid and ask on at least one contract within a 3% spread. This combines the volume-depth and spread conditions.

The average compliant window coverage of 81.8% is broadly equivalent to the 25-minute coverage requirement for each 30 minute window. We were initially concerned that some MMs might be hitting their traded volume requirements early in the window and then choosing to exit a two-side presence by cancelling their remining bids and offers. The high compliant window coverage shows this practice is not generally the case, with the exception of MM1 as the outlier.

**Figure 10: Average time present in MM window per market maker**

(each bar represents, in order, one of the three tracked levels described above)




### *MM1 is a significant outlier in spread-conditioned presence*

When the spread condition is applied (compliant presence), results are broadly consistent across MM2–MM5, with coverage falling by only 0.4–5.3 percentage points relative to the volume presence. The exception is MM1, where compliant presence falls to 42.2% — a reduction of 47.6 percentage points from its volume presence of 89.8%.

In practical terms, for most of the MM window, MM1 has sufficient total order depth on both sides of the market (meeting the volume condition) but does not simultaneously have an active bid and ask posted on the same contract within a 3% spread. The other four MMs do routinely achieve this.

## 2.4.2. Early exit from 2-sided presence in window

Although early window exit is not common, noting MM1 as the outlier (refer Section 2.4.1), we examined whether MMs are more likely to exit a two-sided presence in the remainder of the window following an aggressive (taker) trade versus a passive (maker) trade. This was assessed using an exit event study — measuring the probability that an MM moves from a qualified two-sided presence within five minutes of a trade.

The analysis distinguishes between two definitions of two-sided presence – volume only and compliant (refer Section 2.4.1).

Under the volume-only presence, exit probabilities are very low for all MMs — under 0.5% within five minutes of any trade, regardless of whether the trade was aggressive or passive. This is consistent with the high volume coverage rates (89.8–98.1% for all MMs).

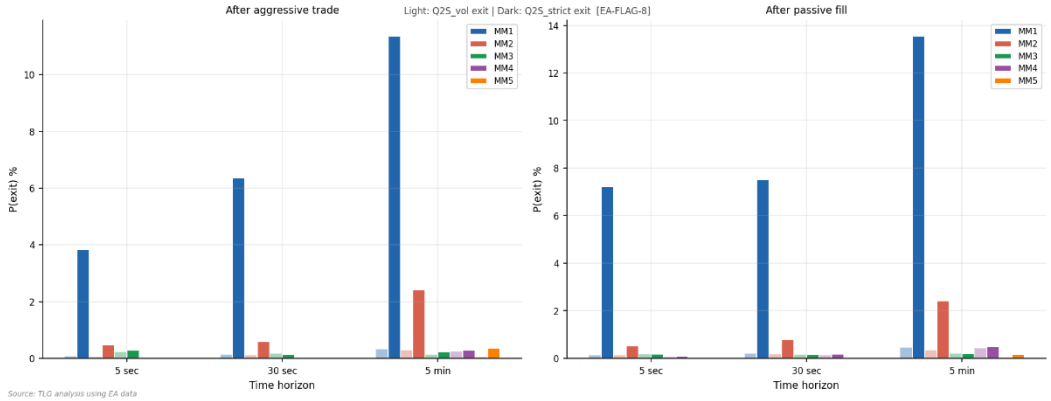
**Table 3: Exit event study — volume presence**

| MM | P(vol exit @5min \| aggressive) | P(vol exit @5min \| passive) |
|---|---|---|
| MM1 | 0.12% | 0.10% |
| MM2 | 0.03% | 0.06% |
| MM3 | 0.08% | 0.18% |
| MM4 | 0.32% | 0.47% |
| MM5 | 0.05% | 0.05% |

**Table 4: Exit event study — compliant presence (volume + ≤3% spread on same contract)**

| MM | P(strict exit @5min \| aggressive) | P(strict exit @5min \| passive) |
|---|---|---|
| MM1 | 11.33% | 13.38% |
| MM2 | 2.36% | 2.37% |
| MM3 | 0.22% | 0.20% |
| MM4 | 0.29% | 0.48% |
| MM5 | 0.36% | 0.16% |

**Figure 11: MM activity immediately after meeting their volume requirements**



Under the compliant presence definition, the picture changes substantially for MM1. Following any trade in the window, MM1 has an 11.3% probability (aggressive) and a 13.4% probability (passive) of no longer maintain a strict two-sided presence within five minutes. This rate is an order of magnitude higher than under the volume-only definition and materially higher than any other MM. MM2 shows a 2.4% exit rate under the strict definition; MM3–MM5 remain below 0.5%.

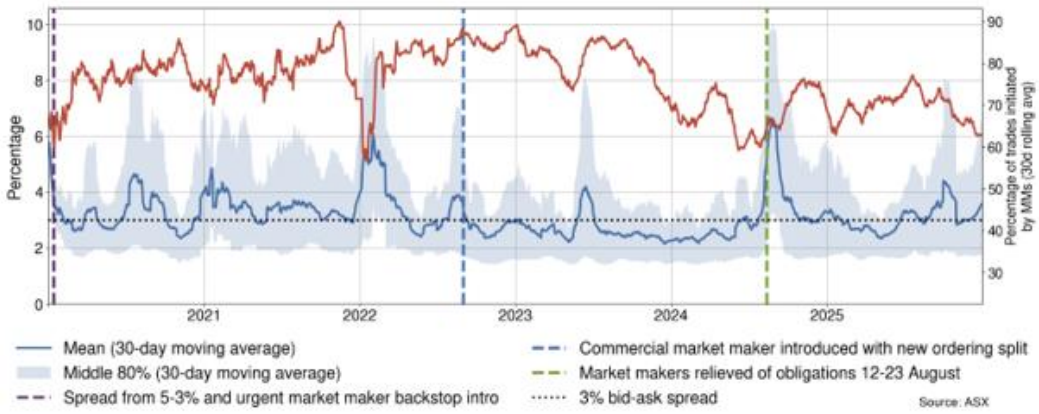
The asymmetry for MM1 between aggressive exits (11.3%) and passive exits (13.4%) is modest but directionally consistent: passive fills — where another participant lifts MM1's resting order — marginally increase the probability that MM1 loses strict presence. This suggests that when MM1's posted volume is traded by other participants, it does not consistently re-establish a within-spread two-sided quote on any single contract.

The broader implication is that MM1's low compliant coverage (42.2%, discussed in Section 2.4.1) is not simply a baseline structural feature — it is also dynamically reinforced by trade events.

### 2.4.3. Effective spreads

A key MM policy objective for the Authority is the development of a robust forward price curve. Ensuring a robust price curve requires liquidity within acceptable spreads (currently set by MM terms as a bid-ask spread within 3%). Figure 12 below (refer the blue line) shows the weighted average effective spreads in the MM windows.

**Figure 12: Time weighted average bid-ask spread vs amount MM initiate trades**




With the exception of the period where MMs were relieved of obligations (12-23 August 2024), effective spreads have fluctuated around the 3% required levels.

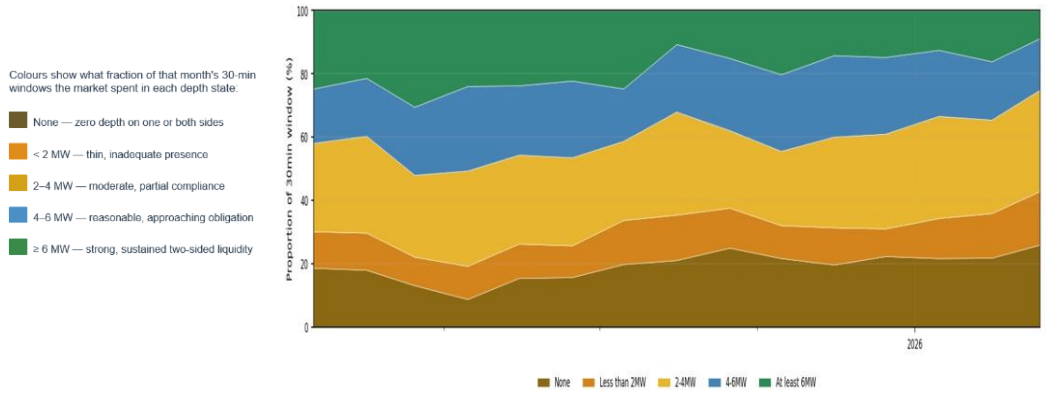
As MMs generally have a compliant two-sided presence for the majority of each window (refer Figure 10), this suggests that effective spreads are good (<3%) when MMs have a two-sided presence but then widen (>3%) outside of this. The moderate level of scratch trading taking may contribute to removing a MM two-sided presence towards the end of windows, thus causing spreads to widen after this point. This highlights the importance of participants not waiting till the end of windows to find hedge positions, when effective spreads are likely to be wider.

## 2.4.4. Market liquidity and depth

One of the key policy MM objectives of the Authority is to maintain availability of risk management contracts for participants. Market depth (within required MM spreads) is a good indicator of risk product availability.

We undertook an analysis of minimum market made volumes being provided throughout the MM trading window. At each moment in the 30-min window we compute how much volume MMs have within 3% of best bid and best ask. We take the minimum of the two sides because two-sided liquidity is constrained by the thinner side.

**Figure 13: Proportion of 30min window where different amounts of market made volume at appropriate spreads are maintained – all contracts**




Looking further at these levels of market depth by season and contract length shows that the provision of depth varies as follows:

- Long-term winter – best depth (refer Figure 14)
- Long term summer – improving trend (refer Figure 15)
- Short-term winter – variable but present (refer Figure 16)
- Short-term summer – worst depth (refer Figure 17).

**Figure 14: Long-term winter contracts**

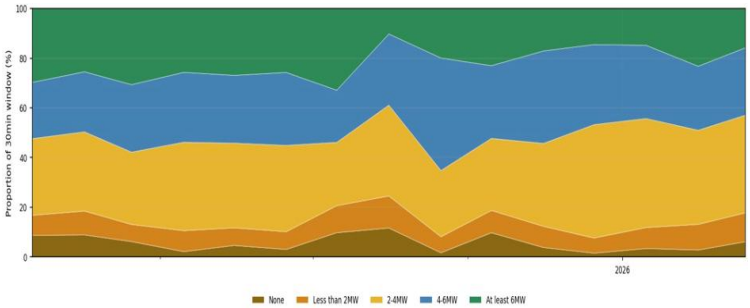


**Figure 15: Long-term summer contracts**

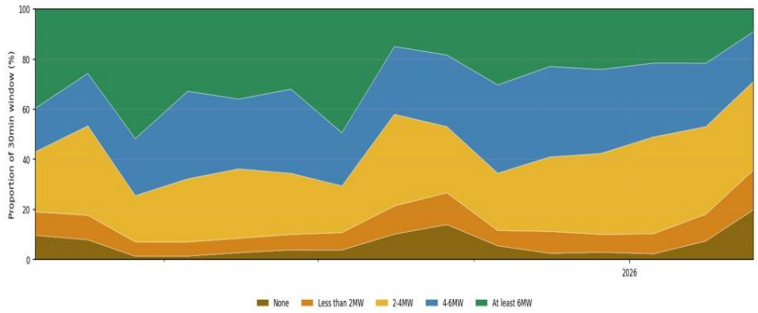



**Figure 16: Short-term winter contracts**

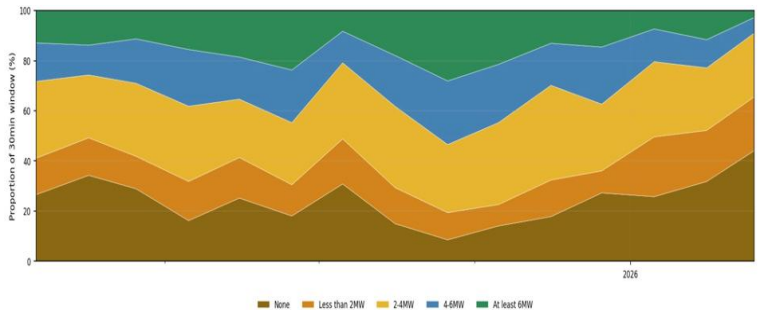
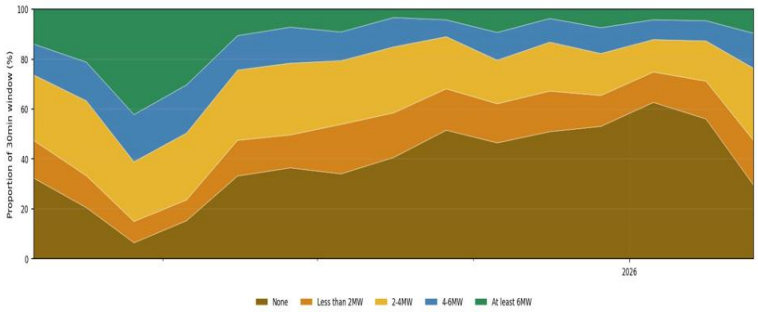



**Figure 17: Short-term summer contracts**




As seen in Figure 17, short term-summer contracts have thin depth for a significant proportion of the MM window. Brown (no liquidity or depth) is available for approximately 25-60% of the time, with green (strong two-sided depth) almost entirely absent. This may be because it is more difficult to price than other contracts due to near-term summer exposure, hydrology risk and/or spot volatility. Such factors may deter passive quoting.

The level of scratch trading taking place will be contributing to reduced depth in the market, with the above analysis highlighting that this is most extreme in the short-term summer contracts. If (with emphasise on the 'if') some form of policy intervention is required, it is most needed here. We revisit this point in Sections 2.5 and 5.1.

### 2.4.5. Volatility

A concern raised during the Authority's consultation process was that a higher level of scratch trades would create higher trade volumes in a window and lead to increased price volatility.

We analysed inter-window price volatility using return-based volatility (standard deviation of the natural log of price returns). We compared the level of volatility with the level of trades in each window to see if there was a degree of correlation between these two variables to test the hypothesis that a higher level of MM and other participant trades would lead to a higher level of price volatility. We note that for the purposes of this analysis it is the inter-window volatility (price movement within the window), rather than intra-window volatility (price movement between windows), that is more relevant. The later measure being more related to genuine price movement in the underlying spot market and expectations of conditions which would affect this in the future.

Figure 18 (monthly futures) and Figure 19 (quarterly futures) show price volatility vs traded volumes (each 'x' represents 1 trading window for a prescribed MM product). We concluded that that there is no strong correlation between higher volumes and higher volatility in the NZ futures market. Pearson r = 0.13 for monthly and 0.20 for quarterly — both near zero, confirming no meaningful relationship between trade count and intra-session price volatility at the individual contract level. The quarterly r of 0.20 is slightly higher, reflecting a few low-trade, high-volatility outliers in near-expiry codes, but nowhere near strong enough to suggest a systematic volume-volatility relationship.

**Figure 18: Volume vs. price volatility – monthly futures (per contract window)**

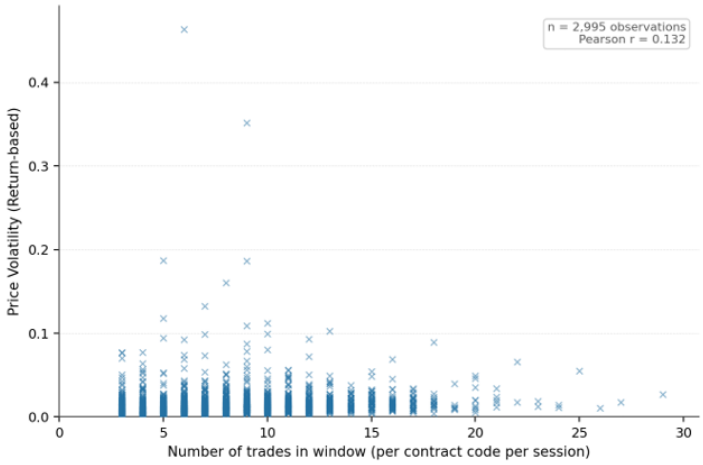



**Figure 19: Volume vs. price volatility – quarterly futures (per contract window)**

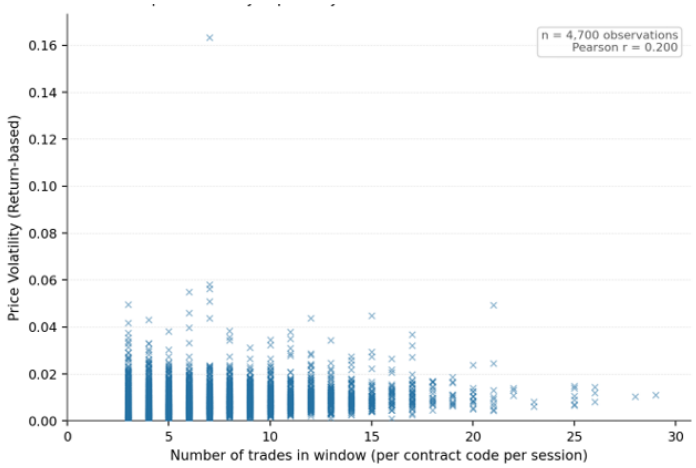
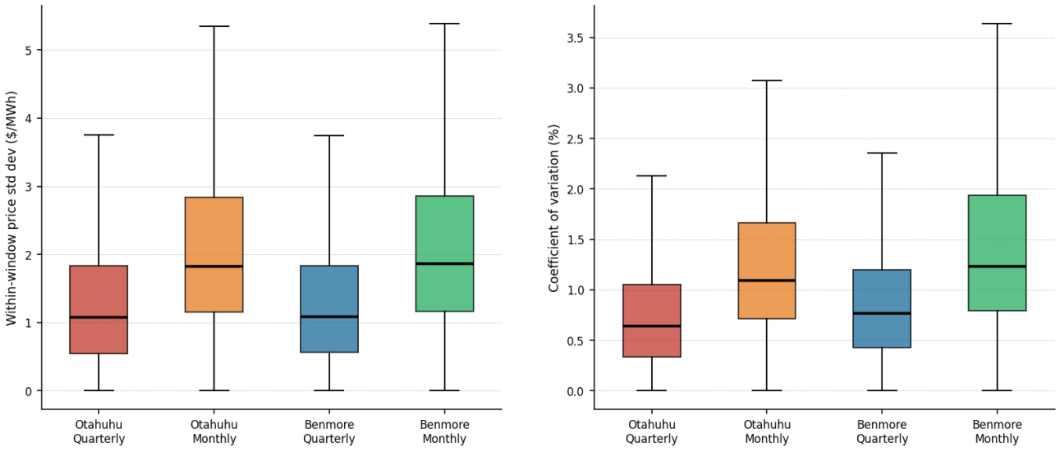


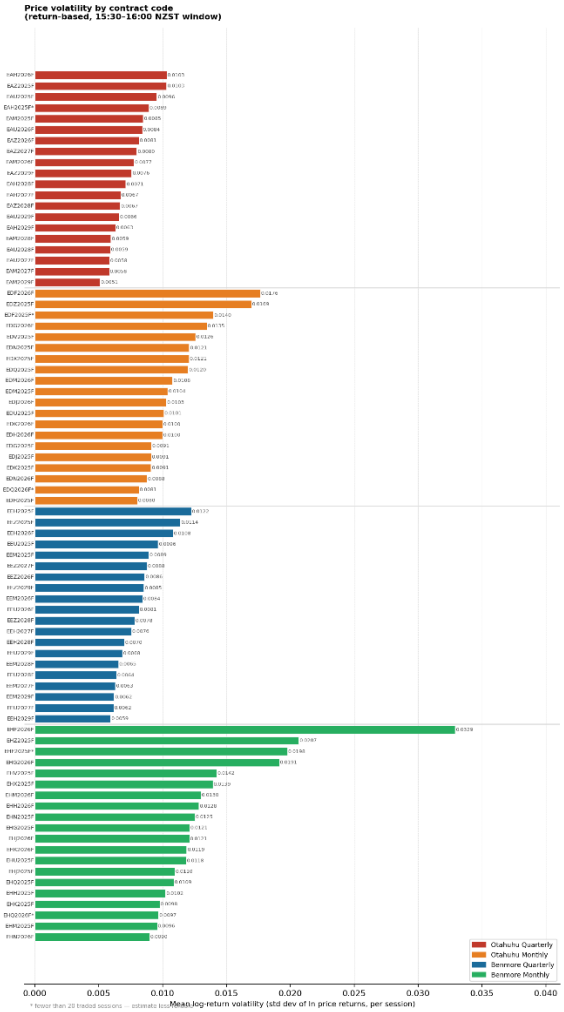
**Figure 20: Price standard deviation**




We note from prior Authority analysis of price movement that there is no material difference in price movement following aggressive trades vs any trade. This would indicate that there is no differential corelation of aggressive trade impact on price volatility vs. any trade other than any material difference in aggressive trade volumes vis-à-vis any trade volumes (a weighting difference).

We further look at any difference in volatility by product (refer Figure 21). This suggests that volatility is higher in front products.

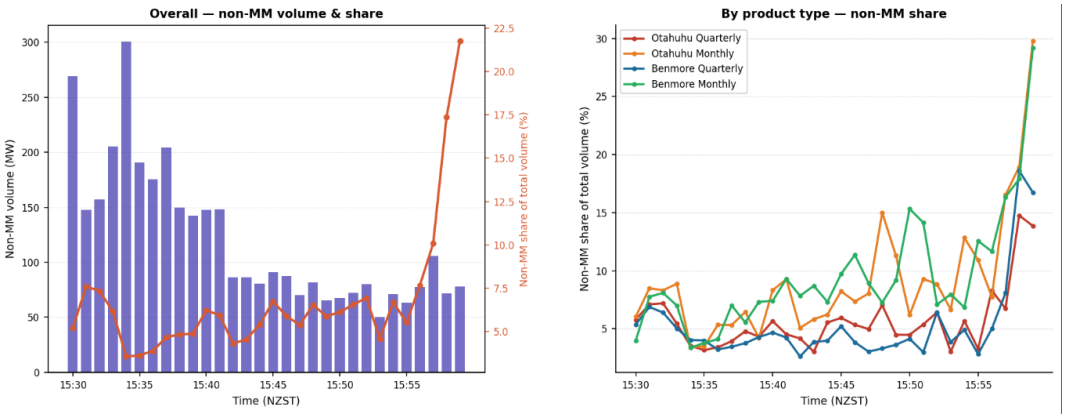
**Figure 21: Price volatility by product code**




## 2.4.6. Timing of participant hedging

We then looked at how non MM participants timed their trading in MM windows in order to achieve their sourcing of hedges. While this showed that participants were able to hedge throughout the window, it revealed that non MMs did favour hedging in the front half of windows where bid/ask spreads were at their tightest (refer Figure 22).

**Figure 22: Non-MM volume and share of trades**




## 2.5. CONCLUSIONS

From our analysis we do not believe the impact of scratch trades taking place by MMs detracts materially from the Authority achieving its key MM objectives of:

- a robust forward price curve, and
- availability of risk management contracts for participants.

However, we do have some concern that:

- there are certain seasonal periods (based on the contract coverage) where market depth was weaker, and
- that depth and liquidity were more available on average in the earlier part of each MM window prior to MMs meeting trade volume requirements (however, noting that window coverage by-and-large is good).

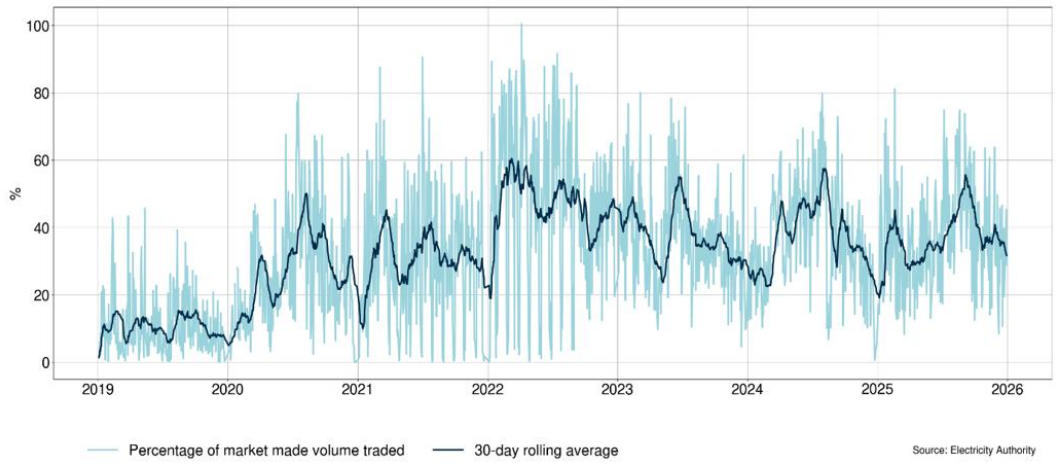
### *Forward price curve*

We do not believe that the level of scratch trades has a material impact on the robustness of the forward price curve. Consistent quoting within a 3% spread for on average the majority of each MM window (refer Figure 10**Error! Reference source not found.**), together with reasonable two-sided depth being present (refer Figure 13) support the curve formation process. The high level of trading, with or without scratch trades included (refer Figure 2), further supports this price formation to contribute towards a robust curve. Ultimately, the validity of price formation is driven by simple liquidity being present (a willing buyer being available for any seller, and a willing seller being available for any buyer, at reasonable spreads). This is the purest definition of liquidity, with depth being an additional qualification of once a buy or sell trade occurs, prices remain steady to allow the next trader to transact at similar price levels. Having MMs present, willing to take a two-sided price position within relatively tight spreads, provides honesty to the price discovery taking place. We do not however form a view on how well future prices represent expectations of the underlying price into the future as this falls outside of the scope of this engagement.

### *Availability of risk management contracts*

While there is no doubt that scratch trading removes liquidity and depth from the market (with our analysis suggesting that 22.9% of MM trades can be classed as being scratch trades on average) we do not believe this falls to a level below what is necessary to currently meet participants needs (refer Figure 23).

**Figure 23: Meeting volume requirements for hedging**




For 2025, an average of 37% of market made volume on offer was traded each day.

For participants seeking hedge contracts (especially larger quantity ones), we note that it may be necessary to be more active in the earlier part of the window due to market depth being more concentrated towards the front end of the window. Similarly, the front end of the window will have tighter effective spreads (refer Section 2.4.3). We note from Figure 22 that participants are already practicing this.

We also don't believe that the level of scratch trading has a material impact on in-window price volatility (refer Section 2.4.5). This was raised as a potential concern as creating a barrier to access for smaller participants by increasing margin calls due to increased price volatility.

# 3. ALTERNATIVE OPTIONS

While we do not believe the level of scratch trades taking place detracted materially from MMs supporting the Authority's key MM objectives - a robust forward price curve and availability of risk management contracts for participants – we did conclude that there were certain seasonal periods (based on coverage) where market depth was weaker and that depth and liquidity with tighter effective spreads were more available on average in the front of each MM window (refer Section 2.5).

We consider a range of policy options to assess what type of potential adjustment may be more efficacious in targeting these concerns.

## 3.1. JURISDICTIONAL SCAN

We undertook a quick high-level jurisdictional scan to see if we could capture any useful inputs to develop alternative options to better support the Authority's market making policy objectives. As is normally the case, lessons from other markets need to be qualified around differentiating factors such as market size, market maturity, underlying volatility etc.

Details of these case-studies are provided in Appendix B with lessons we believe relevant for the NZ market in the table below (refer Table 5).

**Table 5: Jurisdictional scan – lessons for the NZ market**

| Jurisdiction | Key lessons |
|---|---|
| Singapore | • Be cautious if considering a move to continuous MM quoting as this can lead to concerns from MMs over inventory management, maintaining flat books during volatile periods and potentially uncapped risk<br>• A fixed number of reloads (4 in the case of Singapore) prevents uncapped risk exposure for MMs (vis-a-vis continuous quoting)<br>• A phased approach to adjusting MM requirements over time allows for MMs to better calibrate the risks accordingly<br>• Requiring MMs to respond to a Request-for-Quote (RFQ) also helps ensure liquidity during MM windows when the MM is not actively quoting in the window |
| UK | • Concerns over unlimited MM exposure with continuous quoting can be addressed with a five minute grace period to reload and having a traded volume cap<br>• When addressing MM exposure, a net volume cap (the difference between bought and sold) can be considered<br>• A soft-landing provision (widen the bid-offer spreads during the first ten minutes of MM windows) can reduce price volatility at the beginning of windows and provide a more graduated price discovery<br>• Fast market rules are a necessary part of any MM arrangements. UK used a two-tiered approach based on price movement within the window (bids widen when first threshold hit, quote obligation ceases when second threshold hit)<br>• MM obligations must be considered in the context of the fast market rules in place as the fast market rules act as a breaker for MMs taking on excessive cost or risk during extraordinarily volatile market periods |
| Japan | • Where adopting an incentive-based scheme, a two-step qualification approach can be considered. In Japan (TOCOM), a minimum % coverage of the MM window is first required to be eligible for an incentive, with the incentive then linked to volume traded |
| NYMEX/CME | • Passive trades can be counted differently from active trades when determining MM traded volumes<br>• A ratio of passive to overall trades can be calculated with a minimum threshold required to qualify for incentives. Alternatively, incentives can be pro-rated based on this ratio |

## 3.2. PRICE VOLATILITY

In considering other options we were initially wary that options which required a higher trading volume from market makers could lead to higher levels of price volatility (and consequently higher exchange margins). However, from our earlier analysis of volatility (refer Section 2.4.5) we concluded that was much less of a concern.

# 4. EVALUATION OF OPTIONS

As noted, we do not believe that the level of scratch trading taking place materially impacts on the Authority achieving its policy objectives (a robust forward price curve and availability of risk management contracts for participants). We have considered the following options should additional support be required in the future:

A. **Counting only market making trades** (resting orders) toward meeting MM obligations. This is similar to some of the MM schemes used by CME and NYMEX (refer Appendix B.4). This option aims to credit only genuine liquidity provision (resting orders being hit).

B. **Increasing the total traded volume requirement to 3.6 MW** per market maker.

C. **Counting net traded volume** in a session. This option directly captures round-trip/scratch inflation of counted volume. There is however a high risk of over-penalising legitimate inventory management behaviour and creating a strong incentive for MMs to hold directional positions, potentially reducing market stability. It is an option we would advise using with caution.

D. The **first trade for each market maker does not count** towards their obligations.

## 4.1. OUR APPROACH

For each option we consider we have determined the additional economic costs and expected benefits using the following approach:

- We evaluate the impact on MMs achieving the traded volume window exit criteria (comparing to the scratch rate of each MM to see how well the option targets this behaviour)
- We evaluate the change in traded volumes required to meet the volume exit trigger (comparing to the scratch rate of each MM to see how well the option targets this behaviour)
- Determine any additional cost based on scaling the cost baseline (by the increase in MM requirements based on volume or risk). We note that this simple scaling approach infers that all MM costs are variable, however we don't believe this simplification will materially affect our analysis.
- Determine the additional benefits in terms of strengthening the two Authority MM objectives - a robust forward price curve and greater availability of risk management contracts for participants.

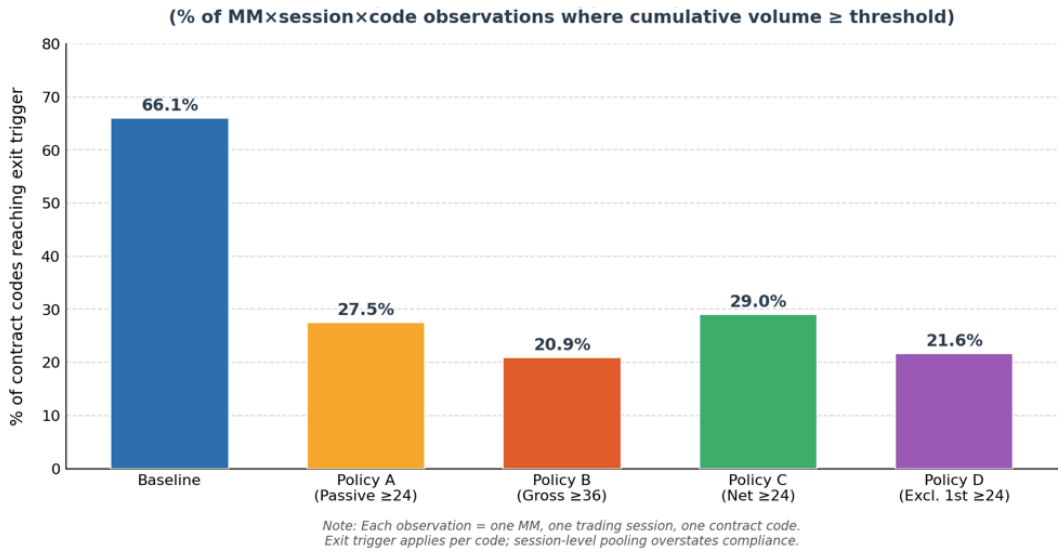
## 4.2. POLICY OPTION IMPACT

For each policy option we look at:

- The percentage of windows where the MM achieves the traded volume exit criteria based on their historic level of trading (refer Figure 24 and Figure 26). This is also shown relative to the current baseline exit criteria (24 lots).

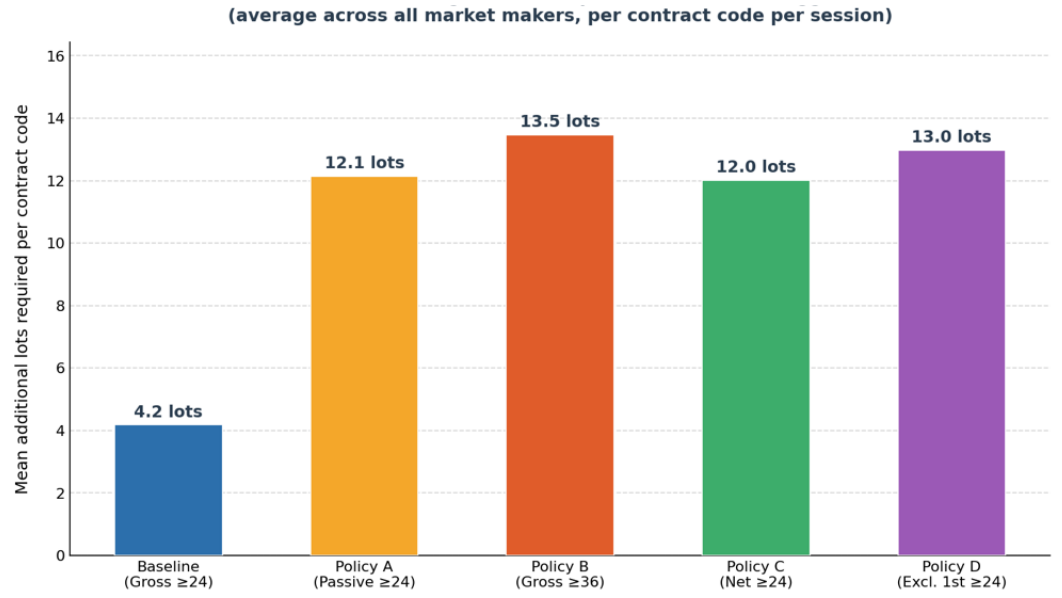
- The additional average traded volume required by each MM to achieve the traded volume exit criteria in all cases (refer Figure 27). This is also shown relative to what the MM would additionally need to trade (on average) in order to meet the current baseline exit criteria (24 lots) in all cases.

**Figure 24: Percentage of windows where MMs meet trade volume exit requirements**



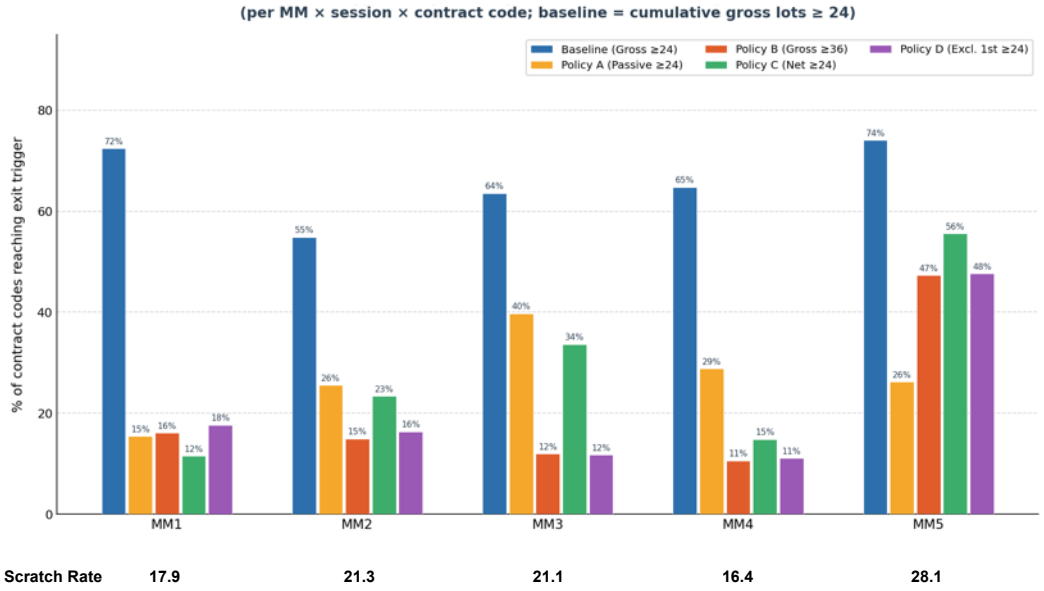

This shows that on average MMs achieve the traded volume exit requirements in 66.1% of all MM windows based on the current (baseline) requirement of 24 lots. If traded volume exit requirements changed to counting only passive trades, MMs would only achieve exit criteria 27.5% of the time based on historically traded volumes.

**Figure 25: Additional average volume of trades (in lots) for a MM to meet exit criteria in all windows**



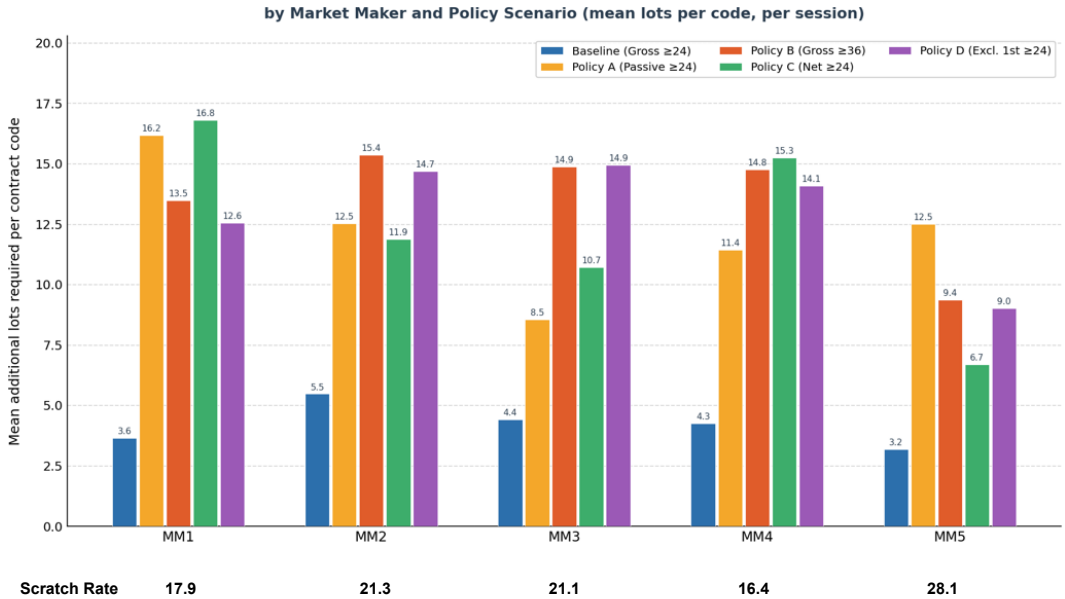
This shows that on average MMs would need to trade an additional 4.2 lots in order achieve the traded volume exit requirements in all MM windows based on the current (baseline) requirement of 24 lots. If traded volume exit requirements changed to counting only passive trades, MMs would, on average, need to increase their passive traded volumes by 12.1 lots in order to achieve exit criteria in all windows.

**Figure 26: Percentage of windows where MM meets trade volume exit requirements**




For example, this shows that MM1 is currently achieving the volume exit criteria in 72% of all MM windows – however, if only passive trades count towards the volume exit criteria (option A), it would only achieve 24 passive lots in 15% of all MM windows.

**Figure 27: Additional average volume of trades (in lots) for a MM to meet exit criteria in all windows**



For example, this shows that MM1 would need to trade an additional 3.6 lots on average in order to achieve meeting the current 24 lot volume exit criteria in all MM windows – however, if only passive trades count towards the volume exit criteria (option A), it would need to trade an additional 16.2 passive lots to achieve meeting the exit criteria in all MM windows.

All policy options serve to increase the required traded volume target necessary to exit an MM window. In response to these higher trade targets MMs have 2 options:

1. increase their traded volumes to the new requirements and try and exit the window early, or

2. keep two-way quoting across the window without seeking an early exit.

We believe the true response lies somewhere between these two 'book ends' with MMs ultimately still constrained by physical limits and risk management constraints. Imposing additional requirements runs the risk of just creating additional noise and compliance costs while MMs still aim to achieve equivalent net positions. However, regardless of how MMs respond they will all incur some additional risk of being traded against at higher volumes before the trade volume requirement safety valve triggers at a higher point. Although, their exposure will remain limited to the 24 lots of 2-sided bids and offers they are required to make (and this is also further moderated by the 5 in 20 window exemptions allowed).

A summary of different policy options is shown below (refer Table 6). It is important to note that all results are historical counterfactuals - not forecasts of behavioural responses.

**Table 6: Summary of the impact of each policy option**

| Criteria | Market Making Trades Only (A) | Increase Trading Volume to 3.6MW (B) | Net Traded Volume (C) | First Trade Doesn't Count (D) |
|---|---|---|---|---|
| Potential Increase in Traded Volumes | Up to 12.1 lots | Up to 13.5 lots | Up to 12.0 lots | Up to 13.0 lots |
| Cost | Highly dependent on how MMs respond to higher trade targets, but their risk remains capped at the 24 lot quoting requirements (see above) | | | |
| Impact Outlier MM5 | ✓ | × | ✓ | × |
| Most/Least affected | MM1/MM3 | MM34/MM5 | MM1/MM5 | MM1234/5 |
| Targets | Aggressive trading | Absolute trade level | Directional imbalance | Initial passive loading (and potentially deferring sweeping behaviour to later in the window) |
| Strengthen forward curve | ✓ (but curve already supported) | ? | ✓ (but curve already supported) | ? |

| Criteria | Market Making Trades Only (A) | Increase Trading Volume to 3.6MW (B) | Net Traded Volume (C) | First Trade Doesn't Count (D) |
|---|---|---|---|---|
| Increase Hedge Volumes | ✓ (but already sufficient volumes to meet participants' needs) | × | ✓ (but already sufficient volumes to meet participants' needs) | × |
| Target Seasonality | × | × | × | × |
| Extend Period of Tight Spreads | ✓ (but already good coverage) | ✓ (but already good coverage) | ✓ (but already good coverage) | ✓ (but already good coverage) |
| Contain Volatility | × | × | × | × |

We have made the following assumptions in the above table:

- MMs will still look to close out unwanted positions (so net position likely to remain unaffected)
- MM5 will continue sweeping unless their overall required trades surpass the already high volume of trades taking place (there will be a limit to how much open positions MM5 can cover by risk limits and underlying physical assets)
- Price volatility continues low correlation with traded volumes (but there may be a tipping point)

# 5. RECOMMENDATIONS

As we noted, from our analysis we do not believe the impact of scratch trades taking place by MMs detracts materially from the Authority achieving its key MM objectives of:

- a robust forward price curve, and
- availability of risk management contracts for participants.

However, we do have some concern that:

- there are certain seasonal periods where market depth was weaker, and
- that depth and liquidity were more available on average in the first half of each MM window.

We don't believe any of the options considered are necessary at this time, as they are either too broad (policy options B, C and D), or they are more targeted at scratch trading, are not particularly effective (policy option A).

We would rather suggest that if the two concerns we noted (reduced depth in short-term summer contracts and less liquidity towards the end of MM windows) are impacting the ability of participants to find sufficient hedges then a more targeted policy response be considered (see below).

## 5.1. ADDRESSING SEASONAL REDUCED MARKET DEPTH

If seasonality of available depth (we noted that short term-summer contracts have thin depth for a significant proportion of the MM window – refer Figure 17) is preventing participants from meeting their demand for hedges then a targeted supplementary measure could be considered to improve the availability of supply of these hedges such as introducing an RFQ requirement on MMs when not actively quoting in the window, such as was used in Singapore (refer Appendix B.1.)

> *MMs would be required to respond to a RFQ for the monthly and quarterly contracts (as the case may be), based on the prevailing MM Volume requirement during the MM Window when they are not quoting. The RFQ had a maximum two-way price making spread of no more than 1.5 times the prevailing maximum two-way price making spread.*

In New Zealand, such a regulatory response could be further targeted by being product type specific to address only those products where market depth concerns are affecting participants from genuinely meeting their hedge requirements.

However, we do note that we are not aware that this issue has been specifically raised by participants and prior studies by the Authority would suggest that, on average, there is a good supply of MM-made hedge contracts available (refer Figure 23).

## 5.2. EXTENDING WINDOW COVERAGE

None of the policy options considered are particularly well targeted at extending the period of two-sided coverage in the MM window without increasing the level of required MM trade volumes (which doesn't appear to be a problem that needs solving – refer Figure 23).

If window coverage is impacting the ability of participants to find hedge cover when needed (not that we are aware that it is), then increasing the number of MM reloads may be considered while reducing the number of lots at the same time; e.g. 3 x 8 lots would give the same volume as the current 2 x12 lots without impacting overall required volumes. This would help to extend the window coverage, especially if also considered in conjunction with adding a 5-minute grace period for reloading as was used in the UK market (refer Appendix B.2).

# 6. ABOUT THE LANTAU GROUP

The Lantau Group (TLG) provides strategy and economic consulting services focused on energy sector challenges mainly in the Asia Pacific region, drawing on expertise from around the world. We advise a full range of energy sector stakeholders, including regulatory and policy making bodies; commercial investors in the fuel and power sectors; banks and financial parties; vertically integrated utilities, independent power producers, network monopolies, market operators, and large end users and multi-nationals seeking secure and competitive electricity supplies and pursuing challenging sustainability objectives.

**Figure 28: Our reach**


Our origins and the experience of key team members extend back over three decades in the energy sector. Within our team we have regulatory, commercial, technical, and market institutional expertise. Several of our team members and affiliated advisors are also ex-practitioners – well-grounded in implementing and operating markets, closing commercial transactions, and applying rigorous economic analysis to address important regulatory challenges.

We apply economics and analytics rigorously to solve complex market and regulatory problems. Our clients face a range of issues, and we aim to provide them timely, well-grounded, and insightful support:

- Infrastructure Access, Pricing, Competition, and Economic Regulation
- Market Design, Commercial and Societal Value, and Transactions Support –
- Sustainability
- Strategy for the Energy Transition

Our senior team members are deeply and actively involved in all aspects of our engagements.

# APPENDIX A: OUR METHODOLOGY AND ANALYSIS – SCRATCH ACTIVITY

**Important notice.** This detailed Appendix presents descriptive and inferential analysis of observed trading behaviour in the New Zealand ASX electricity futures market. All findings are drawn from the data described in A.3. The report does not constitute legal advice, findings of breach, or an allegation of market manipulation. Where the data permit inference of patterns consistent with specific behaviours, those inferences are explicitly distinguished from established facts.

## A.1 OVERVIEW

### *Data Period:*

3 January 2025 – 23 March 2026 (approximately 15 months covering (303 trading days)

### *Level of Trading:*

The analysis covers 64,388 executed trades from 3 January 2025 to 23 March 2026. Market makers (MM1–MM5) are involved in 58,279 of 62,037 window trades. The analysis identifies 40,328 MM-aggressive trade-sides, of which 39,915 are matched to an eventual offset.

### *Definition-sensitivity:*

Defining what constitutes a scratch trade is the key determinant of the analysis. The headline scratch rate varies from approximately 8% to 99% of MM-aggressive trade-sides depending on the definition applied. This is not a contradiction — it reflects the fact that "scratch trading" has no single universally agreed definition, and the appropriate choice depends on the policy question being asked.

### *The preferred policy-aligned definition:*

After reviewing our initial analysis with the Authority we landed on — round-trip within the same 30-minute window, price difference ≤ 3% of initial price (consistent the bid/offer obligated spread) — identifies 9,235 scratch-like pairs: 22.9% of MM-aggressive trade-sides and 14.9% of all MM-window trades. At the median contract price of $165/MWh, a 3% PnL threshold corresponds to approximately $4.95/MWh.

### *Sensitivity to PnL threshold uses – inflection point:*

The Kneedle elbow-detection method identifies 3% as the natural inflection point in the cumulative scratch-rate curve, providing data-grounded support for this threshold. However, the polynomial derivative method places the inflection at approximately 6.7%, and the curve is not sharply discontinuous — the 3% threshold should be treated as both policy-motivated and data-consistent, not definitively data-determined alone.

## A.2 Questions Asked / Decision Context

This analysis is commissioned to assist in understanding the prevalence and character of scratch-like trading activity by market makers in the NZ ASX electricity futures market. The specific questions addressed were:

4. What is scratch trading under the broadest plain-vanilla definition, under alternative denominators?
5. How much does the percentage change when an explicit round-trip requirement is added?
6. How much further does it fall when short time windows are imposed?
7. How much further when near-zero PnL percentage thresholds are applied?
8. Is 3% a meaningful threshold, and does the data support it as an inflection point?
9. Is there a defensible elbow in the PnL% sensitivity curve?
10. Which definition is most appropriate for policy purposes and why?
11. Which results are robust to methodology variation and which are sensitive?
12. What should the Authority rely on with high confidence, and what requires caution?

## A.3 Materials Reviewed and Data Sources

### *Primary Data Sources:*

**File 1: ASX_AnonymisedTrades.csv** — Source of truth for executed trades and prices.

Row count: 64,388 | Date range: 3 Jan 2025 – 23 Mar 2026 | Key fields: TradeDateTime, ContractCode, BuyPrivateOrderID (as string), SellPrivateOrderID (as string), TradePriceDollarsPerMegawattHour, AnonymisedBuyParticipant, AnonymisedSellParticipant

**File 2: orders_combined.parquet** — Source of truth for aggressor classification and order-book metrics.

Row count: 3,924,077 | Date range: 3 Jan 2025 – 23 Mar 2026 | Key fields: PrivateOrderID (as string), OrderStatusCode, OrderPriceDollarsPerMegawattHour, OrderDirectionCode, AnonymisedParticipant

**File 3: round_trip_pairs_*.csv** — Pre-computed round-trip pairs; derived, validated in this run.

Row count: 40,328 aggressive trade-sides | 39,915 matched | Key new field: PnlPct = abs(OffsetPrice − InitPrice) / abs(InitPrice) × 100

### *Critical Technical Note Preserved: String Treatment of PrivateOrderIDs:*

Order IDs in the trade file are large integers that lose precision if treated as float64. The prior analysis implemented a critical fix: PrivateOrderIDs are read and stored as strings throughout. This fix is preserved. Failure to apply it causes incorrect order-to-trade matching and incorrect aggressor classification.

## A.4 Analytical Framework and Competing Definitions

### *PnL% Formula:*

Primary definition used throughout:

PnL% = |OffsetPrice − InitPrice| / |InitPrice| × 100

where InitPrice is the price of the initial aggressive trade and OffsetPrice is the price of the next opposite trade from the same market maker in the same contract. A low PnL% indicates a near-zero economic outcome; a high PnL% indicates material price movement between the two legs of the trade.

### *Definition Layers:*

The analysis applies filters cumulatively in four layers:

Layer 0 — Broad vanilla: any MM-aggressive trade with a prior opposite exposure from the same MM in the same contract on the same day. No round-trip matching; no PnL filter.

Layer 1 — Round-trip: explicit matched pair (next-opposite-trade method). Any time elapsed; no PnL filter.

Layer 2 — Time window: Layer 1 with TimeToOffsetSec ≤ threshold (5s / 30s / 60s / 5min / window / day).

Layer 3 — PnL%: Layer 2 with PnlPct ≤ threshold. Primary thresholds: 0.25% through 10.00%. Policy-aligned highlight: 3.00%.

## A.5 Data Quality, Audit Checks, and Pre-processing

64,388 rows loaded; no duplicate TradeTransactionIDs. All 5 MM codes (MM1–MM5) present. 62,037 of 64,388 trades (96.3%) occur within the 15:30–16:00 MM window. No negative prices or zero-volume trades identified. 40,328 aggressive trade-sides identified; 39,915 (99.0%) matched to an eventual offset. All 39,915 matched pairs have valid InitPrice (> $0.01/MWh). PnlPct range: 0.00% to 75.00%.

## A.6 Aggressor Classification

A three-layer classification method uses the order-event parquet (3,924,077 events). Layer A checks for A-type (new order) event matching the order ID just before the trade. Layer B checks for A/M events within a narrow time window. Layer C assigns by time proximity. Result: 40,328 MM-aggressive trade-sides (45.0% of 89,505 total MM trade-sides). MM-passive: 49,177 (55.0%). Ambiguous: 297 (<0.7%); excluded.

## A.7 Layer 0 — Plain-Vanilla Broad Baseline

Layer 0 identifies MM-aggressive trades that partially or fully offset a prior open position from the same MM in the same contract on the same trading day, without requiring a strict matched pair.

**Table 7: Layer 0 baseline results**

| Measure | Value |
|---|---|
| L0 scratch-like trades | 3,362 |
| As % of MM-aggressive trade-sides | 8.3% |
| As % of total MM trade-sides in window | 3.8% |
| As % of all window trades | 5.4% |

The difference between Layer 0 (5.4% of window trades) and the initial EA methodology (~21%) is not an inconsistency. Key reasons: (1) Layer 0 counts only aggressive-leg-initiated offsets; EA methodology likely includes passive-leg restorations. (2) Data period difference: EA covers 2022–2025 including higher pre-CMM scratch rates. (3) Definitional nuances in what constitutes an "offset." Section 12 provides full reconciliation.

## A.8 Layer 1 — Round-Trip Requirement

Layer 1 requires an explicit matched round-trip: each MM-aggressive trade-side is paired with the next opposite aggressive trade from the same MM in the same contract, regardless of how much time has elapsed (next-opposite-trade method).

**Result:** 39,915 matched pairs (99.0% of 40,328 MM-aggressive trade-sides). 413 unmatched (positions opened near data end-date with no observed subsequent offset).

The 99% matching rate means almost all aggressive trades eventually find an offset — not that 99% are "scratch." The time between initial and offset ranges from zero to over 46 days. Time-window filters in Layer 2 are what distinguish rapid reversal from longer-horizon risk management.

## A.9 Layer 2 — Time-Window Filters on Round-Trips

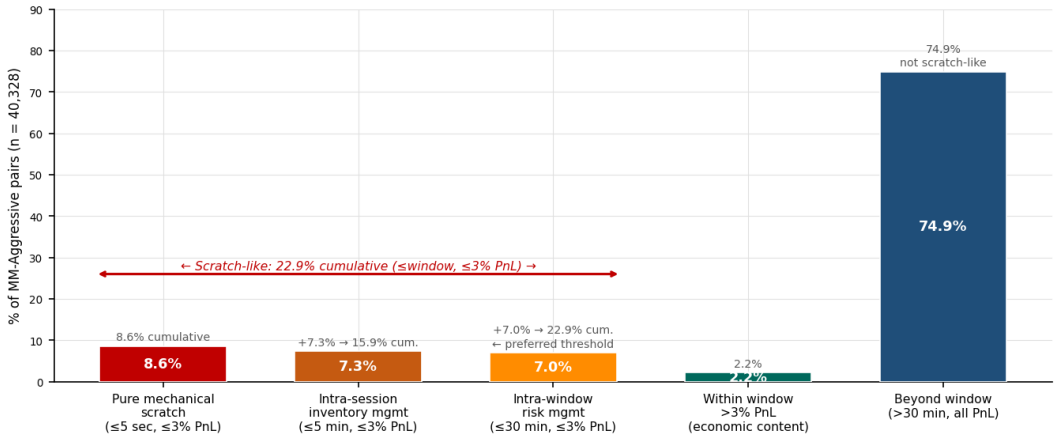
**Table 8: Layer 2 time window sensitivity**

| Time Window | Pairs | % of MM-Agg | Cumulative % |
|---|---|---|---|
| ≤ 5 seconds | 4,097 | 10.2% | 10.2% |
| ≤ 30 seconds | 4,846 | 12.0% | 12.0% |
| ≤ 60 seconds | 5,363 | 13.3% | 13.3% |
| ≤ 5 minutes | 7,214 | 17.9% | 17.9% |
| ≤ 30 minutes (window) | 10,112 | 25.1% | 25.1% |
| All matched (unlimited) | 39,915 | 99.0% | 99.0% |

Figure 29 shows the time-to-offset distribution has a clear two-cluster structure: a rapid reversal cluster (≤5 seconds: 10.2%) and a longer-horizon cluster (hours to days). The step from ≤window (25.1%) to ≤same day (42.8%) is 17.7 percentage points — confirming that substantial offsetting occurs after the session closes, behaviour inconsistent with

mechanical scratch trading but consistent with end-of-day risk reduction. The denominator used is the 39,915 matched round-trip pairs.

**Figure 29: Distribution of time to offset (round-trip pairs)**




## A.10 Layer 3 — Percentage-PnL Filters

### *Results: ≤ Window Time Filter × PnL% Thresholds:*

**Table 9: Layer 3 PnL% threshold sensitivity**

| PnL% Threshold | Pairs (≤window) | % of MM-Agg | % of Window Trades |
|---|---|---|---|
| ≤ 0.25% | 1,511 | 3.7% | 2.4% |
| ≤ 0.50% | 2,573 | 6.4% | 4.1% |
| ≤ 0.75% | 3,567 | 8.8% | 5.7% |
| ≤ 1.00% | 4,733 | 11.7% | 7.6% |
| ≤ 1.50% | 6,231 | 15.5% | 10.0% |
| ≤ 2.00% | 8,004 | 19.8% | 12.9% |
| ≤ 2.50% | 8,675 | 21.5% | 14.0% |
| **≤ 3.00% ← 3% SPREAD LIMIT** | **9,235** | **22.9%** | **14.9%** |
| ≤ 4.00% | 9,646 | 23.9% | 15.6% |
| ≤ 5.00% | 9,897 | 24.5% | 15.9% |
| ≤ 7.50% | 10,023 | 24.9% | 16.2% |
| ≤ 10.00% | 10,080 | 25.0% | 16.3% |

The 3% threshold is highlighted because: (1) Regulatory alignment — the current MM obligation requires bid-ask spreads ≤ 3%; a reversal within this band has not materially

profited from the position. (2) Data-identified inflection — the Kneedle algorithm identifies 3% as the geometric elbow. (3) Bridge to prior analysis — 3% PnL at median price ($165/MWh) ≈ $4.95/MWh, enabling direct comparison with the prior $3–$5/MWh thresholds. The denominator used is the 40,328 MM-aggressive trade-sides.

**Figure 30: Cumulative scratch share vs PnL% threshold, by time window**

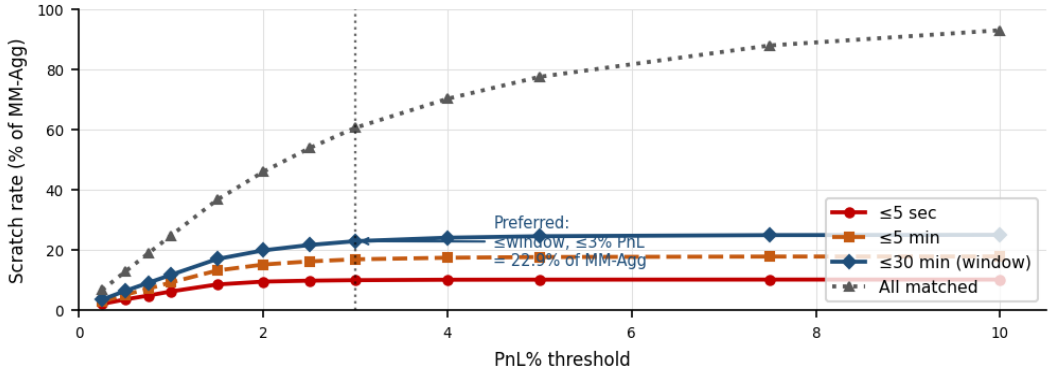
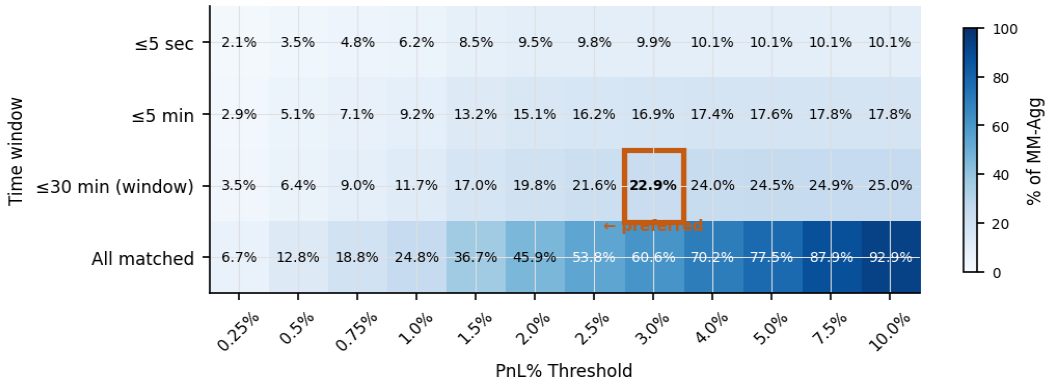



**Figure 31: Heatmap: Scratch share (% of MM-Agg pairs) by time window x PnL% threshold**




## A.11 Inflection / Elbow Analysis

### *Methods and Results:*

**Table 10: Inflection estimate**

| Method | Inflection Estimate |
|---|---|
| Marginal gain drop | ~3–4% range |
| Polynomial derivative | ~6.7% |
| Kneedle algorithm | 3.00% |

The three methods do not converge on a single precise threshold. Readers should treat the 3% threshold as both policy-motivated and data-consistent — not as definitively data-

determined. The marginal gains above 5% are very small (under 300 new pairs per 1% increment), confirming the bulk of scratch-like activity is captured below 5%.

**Figure 32: Inflection/elbow analysis – PnL% threshold sensitivity**

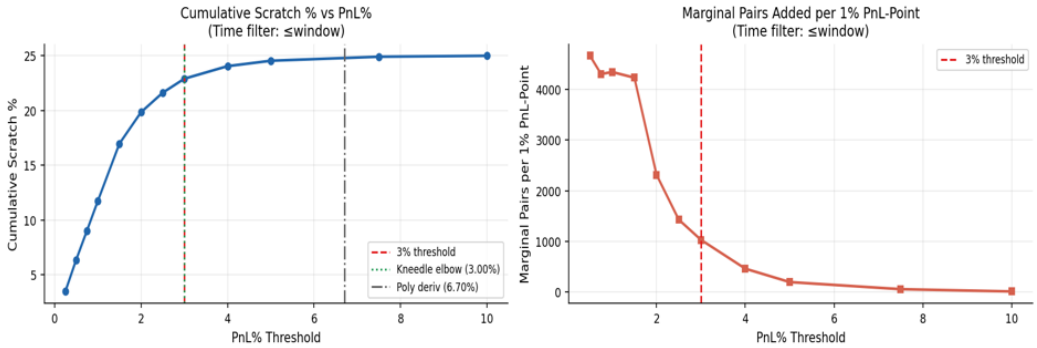
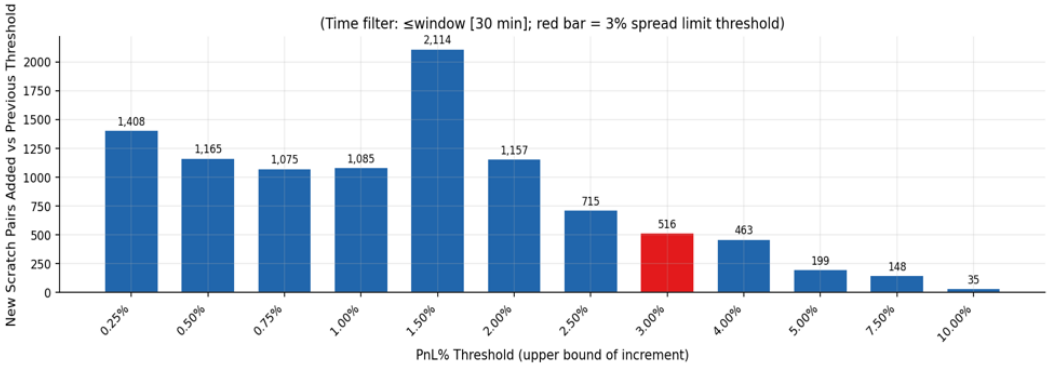



**Figure 33: Incremental scratch pairs added at each PnL% threshold**




## *Incremental pairs:*

**Table 11: Incremental pairs (≤window time filter)**

| Threshold | Cumulative Pairs | Cumulative % of MM-Agg | Incremental Pairs | Marginal Gain |
|---|---|---|---|---|
| 0.25% | 1,511 | 3.7% | 1,511 | — |
| 0.50% | 2,573 | 6.4% | 1,062 | 4,248/% |
| 0.75% | 3,567 | 8.8% | 994 | 3,976/% |
| 1.00% | 4,733 | 11.7% | 1,166 | 4,664/% |
| 1.50% | 6,231 | 15.5% | 1,498 | 2,996/% |
| 2.00% | 8,004 | 19.8% | 1,773 | 3,546/% |
| 2.50% | 8,675 | 21.5% | 671 | 1,342/% |
| **3.00% ← Kneedle elbow** | **9,235** | **22.9%** | **560** | **1,120/%** |
| 4.00% | 9,646 | 23.9% | 411 | 411/% |
| 5.00% | 9,897 | 24.5% | 251 | 251/% |

| | | | | |
|---|---|---|---|---|
| 7.50% | 10,023 | 24.9% | 126 | 50/% |
| 10.00% | 10,080 | 25.0% | 57 | 23/% |

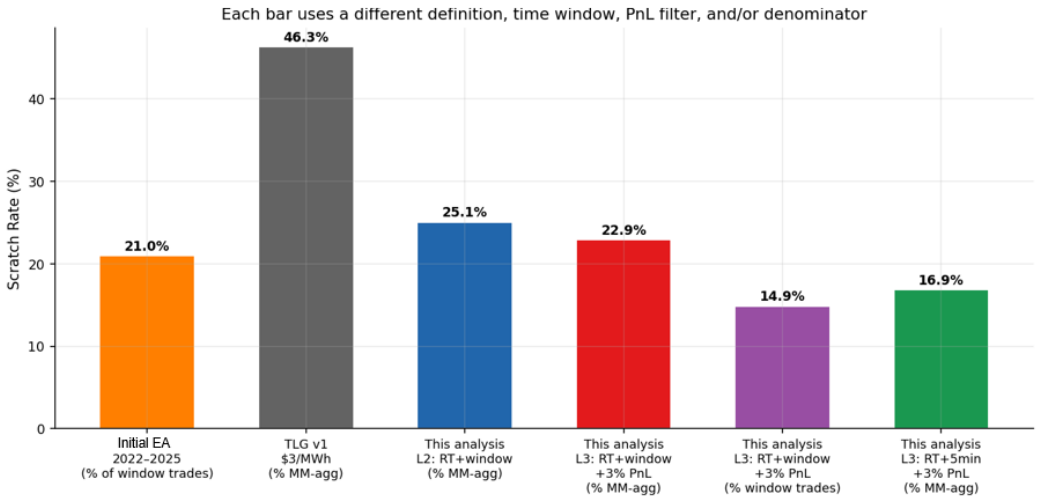
## A.12 Reconciliation: Why Different Studies Yield Different Scratch Percentages

This section is the critical "exhibit" explaining why headline rates range from 14.9% to 46.3% across different studies. None of these numbers are wrong; each answers a different question with a different scope.

**Table 12: Reconciliation of different scratch percentages**

| Study | Headline Rate | Denominator | Time Filter | PnL Filter | Data Period |
|---|---|---|---|---|---|
| EA Initial Analysis | ~21% | All window trades | Within window | None | 2022–2025 |
| TLG v1 ($3/MWh) | 46.3% | MM-agg pairs | None (unlimited) | $3/MWh | 2025–2026 |
| This analysis L2 (≤window) | 25.1% | MM-agg pairs | ≤ 30 min | None | 2025–2026 |
| **This analysis L3 PREFERRED** | **22.9%** | **MM-agg pairs** | **≤ 30 min** | **≤ 3%** | **2025–2026** |
| L3 (as % of window trades) | 14.9% | All window trades | ≤ 30 min | ≤ 3% | 2025–2026 |
| This analysis L3 (≤5min, ≤3%) | 15.9% | MM-agg pairs | ≤ 5 min | ≤ 3% | 2025–2026 |

**Figure 34: Reconciliation of different scratch percentages**




**Key explanation:** The prior TLG $3/MWh analysis (46.3%) applies no time window — a multi-day reversal within $3/MWh counts as a "scratch." Adding the ≤window (30-min) time filter reduces the count by 75% before the PnL screen is applied. The EA/Rebecca 21% figure uses all window trades as the denominator; this analysis's L3 preferred case

(22.9%) uses MM-aggressive pairs — the same 9,235 numerator expressed as 14.9% of window trades compares more directly with EA's 21%.

## A.13 Market Microstructure Interpretation

### *13.1 Spectrum of behaviour:*

1. Pure mechanical scratch (≤5 sec, ≤3% PnL — 8.6% of MM-agg): Almost certainly deliberate rapid reversal; economic content near-zero.
2. Rapid inventory management (≤5 min, ≤3% PnL — 15.9%): Consistent with session-level inventory limits; small but not zero economic content.
3. Intra-session risk management (≤30 min, ≤3% PnL — 22.9%): May reflect tactical re-positioning around price signals during the window.
4. Multi-day directional risk-taking (>same day trading — 57.2%): Normal market-making activity; economically significant; not scratch-like

**Caution on causal inference.** The analysis establishes statistical association between pairs of trades. It does not, and cannot, establish whether the initial trade was taken on with intent to reverse it at minimal cost (deliberate scratch strategy) versus intent that was subsequently abandoned. Rapid reversals at near-zero PnL are consistent with mechanical behaviour, but consistency is not proof of intent.

**Figure 35: Monthly scratch rate under broad baseline, round-trip, and 3% PnL cases**

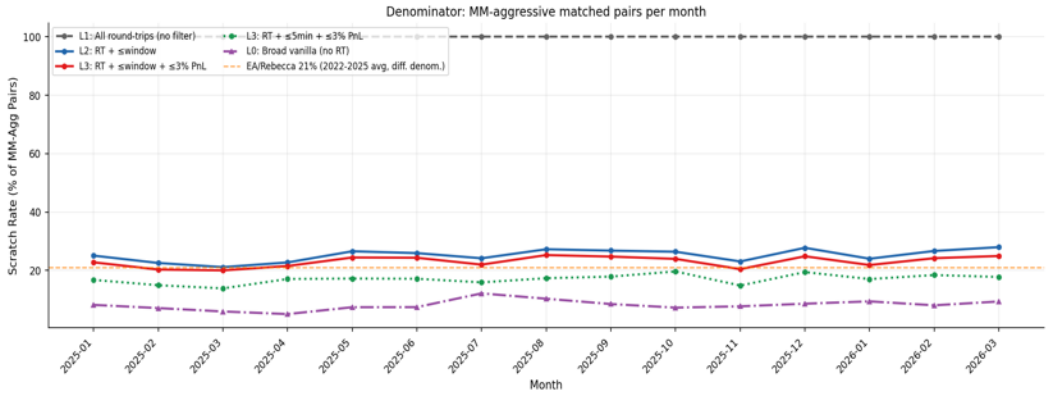
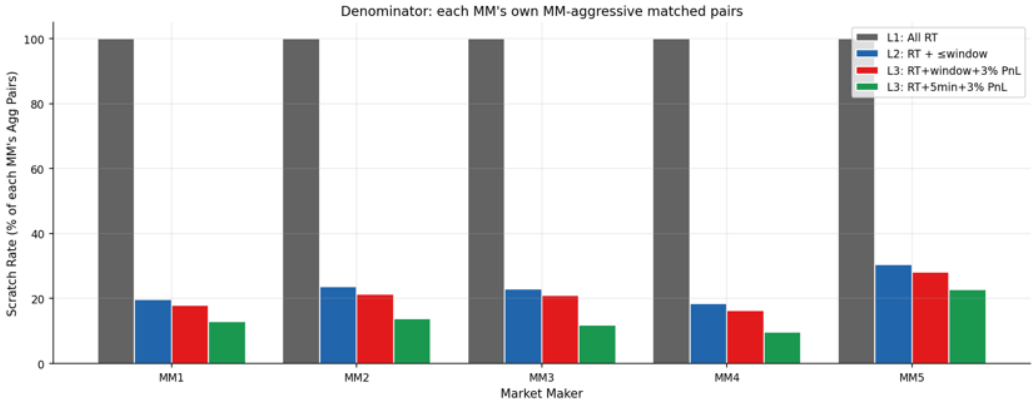



**Figure 36: Scratch rate by MM under alternative definitions**



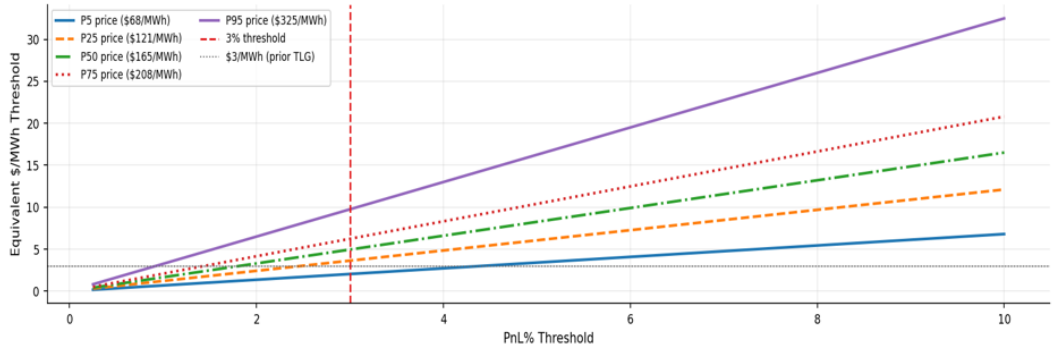
## A.14 Bridge Table: PnL% Thresholds to $/MWh

This table translates each PnL% threshold to an equivalent $/MWh threshold at key price percentiles. This enables direct comparison with our prior $/MWh-based analysis.

**Table 13: PnL% thresholds translated to equivalent $/MWh threshold**

| PnL% | P5 ($68) | P25 ($121) | P50 ($165) | P75 ($208) | P95 ($325) |
|---|---|---|---|---|---|
| 0.25% | $0.17 | $0.30 | $0.41 | $0.52 | $0.81 |
| 0.50% | $0.34 | $0.60 | $0.82 | $1.04 | $1.63 |
| 0.75% | $0.51 | $0.91 | $1.24 | $1.56 | $2.44 |
| 1.00% | $0.68 | $1.21 | $1.65 | $2.08 | $3.25 |
| 1.50% | $1.02 | $1.81 | $2.48 | $3.12 | $4.88 |
| 2.00% | $1.36 | $2.42 | $3.30 | $4.16 | $6.50 |
| 2.50% | $1.70 | $3.02 | $4.13 | $5.20 | $8.13 |
| **3.00%** | **$2.04** | **$3.63** | **$4.95** | **$6.24** | **$9.75** |
| 4.00% | $2.72 | $4.84 | $6.60 | $8.32 | $13.00 |
| 5.00% | $3.40 | $6.05 | $8.25 | $10.40 | $16.25 |
| 7.50% | $5.10 | $9.07 | $12.38 | $15.60 | $24.38 |
| 10.00% | $6.80 | $12.10 | $16.50 | $20.80 | $32.50 |

**Figure 37: Bridge table – PnL% threshold to $/MWh at key price percentiles**




**Key translation:** At the median contract price of $165/MWh — the 3% PnL threshold equals $4.95/MWh; the 1.82% PnL threshold equals $3.00/MWh. The prior TLG analysis at $3/MWh (no time window) corresponds to approximately the 1.82% PnL threshold with no time filter, which would give a much higher count than this analysis's time-windowed 3% case.

## A.15 Limitations and Matters Requiring Caution

1. **Data period:** January 2025 to March 2026 only. The EA methodology note reports higher pre-CMM scratch rates (2022). Trend analysis over time is therefore limited.
2. **String treatment of Order IDs:** Critical fix. Any reproduction that reverts to float64 treatment of PrivateOrderIDs will produce incorrect aggressor classification. This is a fragility risk.
3. **Matching method limitation:** The next-opposite-trade method may not always identify the economically intended offset trade. The FIFO sensitivity shows the difference is small (10.2% vs 10.6% at ≤window, no PnL), but this remains a methodological caveat.
4. **Aggressor classification uncertainty:** 297 trade-sides (0.7%) are ambiguous and excluded. This introduces a small downward bias in the denominator.
5. **EFP transactions:** If positions are closed via Exchange-for-Physical transactions, those closing legs are invisible in this dataset. This may cause a modest understatement of the matched-pair count.
6. **Reconciliation with EA is approximate:** The comparison with the initial EA 21% figure is based on the description in the EA reference document, not a side-by-side replication of the EA's code. A precise reconciliation would require the EA's analysis file.
7. **Causality:** The association between scratch-like trades and bid-ask spread changes is noted in the EA reference materials. This analysis does not test this association on the 2025–2026 data. No causal claim is made.

## A.16 Conclusions

***High confidence (robust to reasonable definition variation):***

1. Market makers are aggressive on 45.0% of their trade-sides — consistent with active participation beyond passive liquidity provision.
2. 99.0% of MM-aggressive trade-sides eventually find an offset. This is expected behaviour for position-managing participants, not evidence that everything is "scratch."
3. 25.1% of MM-aggressive pairs are offset within the same 30-minute market-making session (no PnL filter). This is the cleanest descriptor of intra-session reversals.
4. 9,235 pairs (22.9% of MM-agg; 14.9% of window trades) qualify as scratch-like under the preferred definition (≤window, ≤3% PnL). This figure is robust: the count varies by less than 2 percentage points between the 2.5% and 4.0% PnL thresholds.
5. The 3% PnL threshold is identified by the Kneedle algorithm as the geometric elbow. While not conclusive, this provides data-grounded support for using 3% as a policy reference.

## A.17 Moderate confidence (directionally clear but methodologically sensitive):

1. Rapid reversals (≤5 sec, ≤3% PnL) account for 8.6% of MM-aggressive pairs — the most mechanically distinctive pattern observable in the data.
2. Our initial $3/MWh threshold (46.3%) substantially overstates the policy-relevant scratch rate because no time window was applied. The time-window filter is the most important correction; the $/MWh-to-% conversion is secondary.
3. There is meaningful heterogeneity in scratch rates across market makers.

## A.18 Lower confidence (inference from limited data or sensitive to assumptions):

1. The closeness of L3 preferred (22.9%) to EA/Rebecca (21%) likely reflects genuinely similar underlying activity captured by different methods, but a formal attribution of the remaining difference is not possible from available materials.
2. The inflection at 3% is confirmed by the Kneedle method but not by the polynomial method (6.7%). The Authority should not rely on the elbow analysis alone to justify 3% — the regulatory alignment argument is independently more persuasive.

## A.19 Formulas

**Primary PnL%:** PnlPct = abs(OffsetPrice − InitPrice) / abs(InitPrice) × 100

**Layer 0 (broad vanilla):** For each MM-aggressive trade T in contract C on date D: T is L0 scratch if there exists at least one prior MM-aggressive trade from same MM in contract C on date D in opposite direction to T.

**Layer 1 (round-trip):** For each MM-aggressive Buy T: matched pair = next MM-aggressive Sell from same MM in same contract (vice versa for Sells). Next-opposite-trade method.

**Layer 2 (time window):** Layer 1 with TimeToOffsetSec ≤ threshold.

**Layer 3 (PnL%):** Layer 2 with PnlPct ≤ threshold.

## A.20 Quality Assurance

**Table 14: QA checks**

| Check | Result | Pass? |
|---|---|---|
| Total trade count consistent with prior run | 64,388 ✓ | Yes |
| MM-aggressive count consistent | 40,328 ✓ | Yes |
| Matched pairs consistent | 39,915 ✓ | Yes |
| PnlPct: all valid (no NaN in matched pairs) | 39,915 valid ✓ | Yes |
| Time-window counts monotonically increasing | Verified ✓ | Yes |

| | | |
|---|---|---|
| Bridge table: 3% × $165 = $4.95/MWh | $165.10 × 0.03 = $4.95 ✓ | Yes |
| Monthly series reconcile to period totals | Cross-footed ✓ | Yes |
| FIFO count within 1pp of next-opp-trade | 10.6% vs 10.2% ✓ | Yes |
| No denominator switching without note | Reviewed ✓ | Yes |

***Challenge:***

**Challenge 1:** "The 3% threshold is policy-motivated, not data-driven." Response: Correct — partly. The report acknowledges this. The Kneedle algorithm also identifies 3%, but the polynomial method places it at 6.7%. The Authority should be prepared to defend 3% on regulatory alignment grounds.

**Challenge 2:** "The MM-aggressive denominator understates the true scratch rate." Response: Using window trades as denominator gives 14.9% vs 22.9%. Both are reported. The choice depends on the policy question.

**Challenge 3:** "The next-opposite-trade method overstates scratching." Response: This is precisely why Layer 2 time windows are included. L1 (99%) is not presented as a scratch rate — it is the starting point of the definitional ladder.

**Challenge 4:** "Layer 0 (8.3%) is too low vs EA's 21%." Response: Layer 0 counts only aggressive-leg-initiated offsets. The EA likely counts a broader set including passive-leg restorations. The reconciliation in Section 12 explains the gap.

# APPENDIX B: JURISDICTIONAL SCAN

## B.1 SINGAPORE

Singapore introduced market making terms for electricity futures initially in 2015 under the Forward Sales Contract (FSC) and then from 2018 under the Futures Incentive Scheme (FIS). Singapore initially modelled their market making terms on what New Zealand were using but they evolved much faster with narrowing bid/ask margins and reload requirements. While Singapore's electricity futures market never recovered from the major disruptions to their retail market in 2021, there are still some salient observations on market making obligations prior to this point.

When moving from the FSC scheme to the FIS scheme in 2018, EMA (the market regulator) proposed to move from the existing one reload requirement to **continuous market making** across the MM window[10]. During the consultation on these changes about half of the respondents disagreed with the continuous quoting requirement. Common reasons cited included potentially arduous risk (effectively uncapped) and inventory management, as well as difficulty in maintaining flat books during volatile periods.

EMA noted the industry's concerns regarding the risks to MMs under a continuous quoting regime. Hence, a phased approach with fixed reloads was adopted to gradually increase the number of reloads over time, allowing for MMs to calibrate the risks accordingly. While the ultimate position of 4 reloads was significantly more onerous than the single reload being practiced, it did at least **provide a cap on potential MM exposure**.

10 Enhancing the Development of the Electricity Futures Market, Final Determination Paper, EMA, 13 February 2018

**Table 15: Singapore revised MM terms**

| | Requirement |
|---|---|
| **Product parameters** | Quarterly: MMs are required to put up<br>i. 6 lots of 0.5MW contracts (totalling 3 MW) for each side, for each of the first 5 listed quarterly contracts; and<br>ii. 4 lots of 0.5MW contracts (totalling 2 MW) for each side, for each of the next 4 listed quarterly contracts<br>Monthly: MMs are required to put up 6 lots of 0.5MW contracts (totalling 3 MW) for each side, for each of the 4 – 6 listed monthly contracts |
| **Spread** | Quarterly: August to December 2018: $2/MWh<br>January 2019 onwards: $1/MWh or 2% of bid price whichever is lower<br>Monthly: Prevailing quarterly contract two-way price making spread + $1/MWh |
| **Refresh period / Quantity** | Old (FSC): Quarterly and Monthly:<br>• Not less than one reload<br>• Refresh of quotes needs to be as soon as technically or operationally feasible and at most within a 60 second grace period<br>New (FIS): Quarterly and Monthly:<br>• August 2018 to January 2019: Not less than 2 reload<br>• February to July 2019: Not less than 3 reloads<br>• August 2019 to January 2020: Not less than 4 reloads<br>• No grace period for refreshing of quotes |

The 2018 reforms also introduced a requirement for MM's to **respond to a Request-for-Quote (RFQ).** MMs would be required to respond to a RFQ for the monthly and quarterly contracts (as the case may be), based on the prevailing MM Volume requirement during the MM Window when they are not quoting. The RFQ had a maximum two-way price making spread of no more than 1.5 times the prevailing maximum two-way price making spread.

The increased coverage requirements and RFQ were intended to provide assurance that prices were continuously available during the MM Window.

## B.2 UK

UK introduced market making obligations on the 6 largest vertically integrated companies on 31 March 2014 (through the Secure and Promote (S&P) licence condition). The obligations were removed in November 2019[11] with the suspension of the S&P licenses. Following a period of mergers between the larger UK market participants only 2 MMs remained. The UK regulator (Ofgem) concluded that mandating only two parties under the current obligations placed disproportionate costs on these parties so suspended arrangements.

While in place, these obligations required market making across two separate liquidity windows from 10:30 to 11:30 and 15:30 to 16:30.

11 Ofgem open letter to stakeholders dated 14 November 2019

While requiring continuous coverage of these windows for MM quoting, this effectively translated to a fixed number of reloads (albeit many) due to **5 minutes being allowed to reload** (refer concerns of unlimited risk exposures with continuous quoting in the Singapore case-study, Appendix B.1). However, this exposure was further limited by a **volume cap based on the difference between bought and sold volumes** (30MW net cap vs quoting requirements of 5 or 10MW). This effectively meant that only net exposure was counted.

During the 2017 review of MM terms by Ofgem key changes to MM obligations included introducing a soft-landing provision and revising the fast market rule[12].

The **new soft-landing provisions** widened the bid-offer spreads during the first ten minutes of market making windows. This was intended to facilitate a more natural process of price discovery while helping to reduce costs for licensees due to higher price volatility being seen at the start of windows.

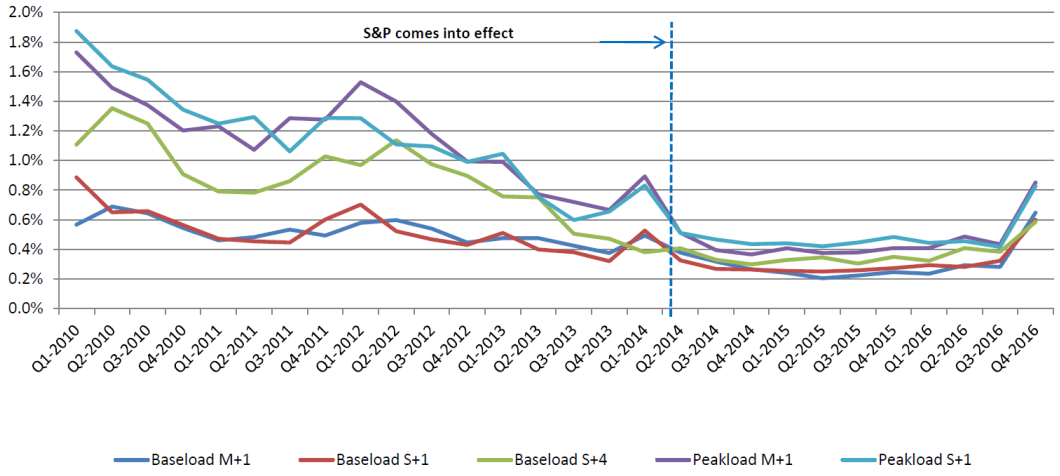
**Table 16: Proposed bid-offer spreads for fast markets and soft landing, with the current spreads in brackets**

| | Baseload | Peak |
|---|---|---|
| Month+1 | 1.0% (0.5%) | 1.0% (0.7%) |
| Month+2 | 1.0% (0.5%) | 1.0% (0.7%) |
| Quarter+1 | 1.0% (0.5%) | 1.0% (0.7%) |
| Season+1 | 1.0% (0.5%) | 1.0% (0.7%) |
| Season+2 | 1.0% (0.5%) | 1.0% (0.7%) |
| Season+3 | 1.0% (0.6%) | 1.0% (1%) |
| Season+4 | 1.0% (0.6%) | N/A |

The **revised fast market rule** allowed MMs to stop quoting once a 4% price movement within window was seen, with a secondary relaxing of spreads at a 1% movement. These thresholds need be viewed in the contexts of the UK market operating with very tight spreads relative to that seen in New Zealand (refer Figure 38).

12 Secure and Promote review: Consultation on changes to the special licence condition, Ofgem, 13 December 2017

**Figure 38: Bid Offer Spread of selected S&P products, UK[13]**




## B.3 JAPAN

Japan is undergoing a new wave of electricity industry reforms. JERA (the largest genco trader) has long term bilateral contracts with its retail affiliates (Tokyo and Chebu) expiring 1 April 2026. With the expiration, JERA is obliged to offer electricity to all retailers equally (aka. level playing field), through private bilateral deals or the open spot power market, raising the prospect of more trading of futures contracts.

Retailers will be required to contract longer term beginning as soon as fiscal 2030. METI (the ministry overseeing the electricity industry) wants retailers to lock in 50% of their projected demand three years in advance, rising to 70% one year ahead of delivery.

In preparation for these reforms, TOCOM (Tokyo Commodity Exchange) has launched new MM terms. Two options are provided for MMs to select. Option 1 requires more daily coverage while option 2 is more confined to a narrower window.

TOCOM's MM scheme operates as an incentive based scheme, providing a discount on fees and volume bonuses. MMs must meet a minimum %coverage for quoting to receive an incentive, with the incentive based on volume of contracts traded (refer Table 17).

13 Secure & Prompt Stakeholder Workshop, 2 May 2017

**Table 17: New MM terms TOCOM, Japan**

| Items | | Electricity (Monthly contract) | | | | | |
|---|---|---|---|---|---|---|---|
| Eligible Products | | East Area Baseload Electricity Futures | | West Area Baseload Electricity Futures | | Chubu Area Baseload Electricity Futures | |
| Type of requirements(*1) | | Type 1 | Type 2 | Type 1 | Type 2 | Type 1 | Type 2 |
| Requirements | Quoting Time Period (*2) | 10:00-15:40(Day session)<br>16:30-18:00(Night session) | 15:10-15:40(Day session)<br>16:30–18:00(Night session) | 10:00-15:40(Day session)<br>16:30-18:00(Night session) | 15:10-15:40(Day session)<br>16:30–18:00(Night session) | 10:00-15:40(Day session)<br>16:30-18:00(Night session) | 15:10-15:40(Day session)<br>16:30–18:00(Night session) |
| | Eligible Issues | 5th and 6th Contract Months | 2nd ,3rd and 4 th Contract Months | 5th and 6th Contract Months | 2nd ,3rd and 4 th Contract Months | 5th and 6th Contract Months | 2nd ,3rd and 4 th Contract Months |
| | Maximum Spread | Determined based on bid price level (Refer to appended table 1-1) | 50 ticks (JPY 0.50) | Determined based on bid price level (Refer to appended table 1-1) | 50 ticks (JPY 0.50) | Determined based on bid price level (Refer to appended table 1-1) | 50 ticks (JPY 0.50) |
| | Minimum Quantity | 5 contracts | 20 contracts | 5 contracts | 20 contracts | 5 contracts | 20 contracts |
| Incentives | Criteria for Receiving Incentives | Performance rate of 50% or more. | Performance rate of 60% or more. | Performance rate of 50% or more. | Performance rate of 60% or more. | Performance rate of 50% or more. | Performance rate of 60% or more. |
| | Discount on Trading Fee(*3)(*4) | Transactions for the eligible product JPY 146 per contract | Transactions for the eligible product JPY 146 per contract | Transactions for the eligible product JPY 146 per contract | Transactions for the eligible product JPY 146 per contract | Transactions for the eligible product JPY 146 per contract | Transactions for the eligible product JPY 146 per contract |
| | Incentives related to the subject transaction | JPY 50 per contract | - | JPY 50 per contract | - | JPY 50 per contract | - |
| | Payment of rewards in accordance with trading (*4) | Monthly Trading Volume / Fixed Amount<br>Less than 50 / JPY 50,000<br>50 or more / JPY 100,000 | Monthly Trading Volume / Fixed Amount<br>Less than 100 / JPY 100,000<br>100 or more / JPY 500,000 | Monthly Trading Volume / Fixed Amount<br>Less than 50 / JPY 50,000<br>50 or more / JPY 100,000 | Monthly Trading Volume / Fixed Amount<br>Less than 100 / JPY 100,000<br>100 or more / JPY 500,000 | Monthly Trading Volume / Fixed Amount<br>Less than 50 / JPY 50,000<br>50 or more / JPY 100,000 | Monthly Trading Volume / Fixed Amount<br>Less than 100 / JPY 500,000<br>100 or more / JPY 1,000,000 |

Notes: 100kJPY ~1100NZD; Also have MM for Peakload, Weekly Baseload and Fiscal Year Baseload. Contract size = 100kWh

## B.4 NYMEX/CME

NYMEX and other parts of the CME Group have a wide range of market maker terms dependent on the market and product. Terms vary widely but NYMEX and CME generally distinguish between **passive** and **aggressive** volume when calculating market maker incentives, but not always. While the primary role of a market maker is to provide passive liquidity (resting orders), aggressive trades (orders that take liquidity) can still count toward overall volume requirements, often subject to specific ratios or tier-based rules.

### *Passive vs. Aggressive Volume Balance*

Market maker programs often implement a passive volume requirement to ensure participants are primarily providing liquidity rather than just taking it.

- Minimum Passive Thresholds: In many programs, a participant must meet a specified minimum percentage of passive volume (trades where their resting order was hit) to qualify for full incentives.
- Consequence of High Aggression: If a participant meets their quoting obligations (spread and size) but fails the passive volume percentage—meaning they were too "aggressive"—they may only receive partial incentives (e.g., only a fee waiver but no fee credits).

### *Aggregate Volume for Tiered Incentives*

Aggressive trades often count toward the aggregate volume used to determine a participant's pro-rata share of incentive pools or their tier placement. Some monthly incentive pools are allocated based on aggregate volume across specific products without distinguishing between maker (passive) and taker (aggressive) sides.

# APPENDIX C: MARKET MAKER CODE REQUIREMENTS

Market Maker requirements for the regulated market maker are set out in Subpart 5B of Part 13 of the Electricity Industry Participation Code 2010.

**Subpart 5B—Hedge market arrangements**

**13.236J Contents of this subpart**

This subpart provides for an active market for trading financial hedge contracts for electricity by specifying requirements for certain participants.

**13.236K Application of subpart**

(1) Subject to subclause (2), this subpart applies to the following participants:

(a) Contact Energy Limited;

(b) Genesis Energy Limited;

(c) Mercury NZ Limited;

(d) Meridian Energy Limited.

(2) This subpart applies to a participant specified in subclause (1) if that participant—

(a) is not a party to a NZEF market-making agreement that includes the requirements set out in clause 13.236L; or

(b) does not perform market-making services in accordance with the NZEF market-making agreement on three or more separate occasions in a period of 90 days, and that non-performance is not permitted by an exemption or otherwise under the NZEF market-making agreement.

(3) A participant to whom subclause (2) applies is relieved of its obligations under this subpart when the Authority—

(a) is satisfied that the participant has complied with its obligations under this subpart for a period of 90 days; and

(b) has given written notice to that effect to the participant, which the Authority must do within 5 business days of being satisfied as to compliance.

**13.236L Requirement to quote**

(1) Subject to subclauses (2) to (5), the participant must, for a minimum of 25 minutes in every NZEF market-making period, provide quotes for a minimum of—

(a) 24 monthly NZ electricity futures for each of the Otahuhu reference node and the Benmore reference node (being 24 buy quotes and 24 sell quotes for each reference node) for the current month and each of the five months following the current month; and

(b) 24 quarterly NZ electricity futures for each of the Otahuhu reference node and the Benmore reference node (being 24 buy quotes and 24 sell quotes for

each reference node) for each calendar quarter that is available for trade on an exchange.

(2) The participant must not provide a quote under subclause (1) with a bid-ask spread that exceeds the greater of 3% or NZ$2. For the avoidance of doubt, where there are multiple buy orders and sell orders for a particular reference node for a particular month or calendar quarter in a NZEF market-making period, the requirement in this subclause means the bid-ask spread between the lowest priced buy order and the highest priced sell order (across those multiple orders) must not exceed the greater of 3% or NZ$2.

(3) Under subclause (1) for each NZEF market-making period, the participant must provide a quantity of initial quotes and (as applicable) volume refresh its quotes until it has traded the total required volume for each of the Otahuhu reference node and the Benmore reference node in relation to each particular month and calendar quarter as follows:

(a) when first placing orders at or after the start of the NZEF market-making period, the participant is required to place a buy order of at least 12 quotes in total and a sell order of at least 12 quotes in total:

(b) if either initial buy order or sell order is fully traded then that participant must (as applicable) volume refresh its order(s) such that where the amount of the total traded NZEF up to that point in time in the NZEF market-making period is—

(i) 12, then at the end of the volume refresh period the buy order must comprise at least 12 quotes and the sell order must comprise at least 12 quotes:

(ii) greater than 12, then at the end of the volume refresh period that participant must ensure that the number of quotes comprising each of the buy order and sell order respectively are a minimum of X, where—

$$X = 24 \text{ quotes} - \text{total traded NZEF}$$

(c) once the participant has traded the total required volume it may withdraw any remaining quotes.

(4) A participant required to volume refresh in accordance with clause 13.236L(3)(b) may also carry out any other changes not inconsistent with their obligations under this subpart that the participant chooses to make to any other order(s) for the particular month or calendar quarter and particular reference node that is the subject of the volume refresh.

(5) For the purpose of determining whether a participant has met the minimum time requirement of 25 minutes under clause 13.236L(1), a quote will not be treated as being provided during a volume refresh period.

**13.236LA [Expired]**

**13.236M [Revoked]**

**13.236N Exemptions from requirement to quote**

(1) The participant is exempt from the requirements in clause 13.236L in the following circumstances:

(a) for a NZEF market-making period if—

(i) the participant cannot comply with a requirement in clause 13.236L in that NZEF market-making period because an exchange trading platform is disrupted or unavailable; or

(ii) in the reasonable opinion of the participant, entering into a contract for a NZ electricity future in that NZEF market-making period may cause the participant to breach an applicable law;

(b) in addition to the exemptions in paragraph (a), for up to two NZEF market-making periods within any 20 consecutive NZEF market-making periods at the participant's discretion.

(2) To avoid doubt, if the participant meets the criteria for exemption in subclause (1)(a)(i) or (1)(a)(ii) in relation to a NZEF market-making period, that NZEF market-making period will not count towards the participant's two exemptions in subclause (1)(b).

(3) If the participant relies on an exemption under this clause 13.236N from the requirement to quote, the participant must notify the Authority of the exemption it has relied on and the basis for the exemption as soon as practicable but in any case no later than 1700 New Zealand time on the same business day that an exemption is relied on.