ASX Electricity Futures and Options Contracts - Daily Settlement Price Methodology

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This ASX Electricity Futures Contracts – Daily Settlement Price Methodology is published pursuant to ASX 24 Operating Rules Procedure 2500.1 – Futures Daily Settlement Price Procedures and 2500.2 – Options Daily Settlement Price Procedures.

Terms used in this document that are not otherwise defined shall have the meaning given in the ASX 24 Operating Rules and the ASX 24 Operating Rules Procedures.

Where a Futures Market Contract has an Underlying Commodity that is Australian Electricity or New Zealand Electricity, the Daily Settlement Price shall be determined by calculating a preliminary daily settlement price for that Futures Contract in accordance with Part A (Preliminary Daily Settlement Price) and then applying the adjustment methodology set out in Part B (Adjustment Methodology).

Part A – Preliminary Daily Settlement Price

Process for Energy Futures

1. Where the Futures Contract has an Underlying Commodity that is Australian Electricity, the Preliminary Daily Settlement Price shall be calculated in accordance with the following:

    (a) Where one or more trades are entered into during the period two minutes prior to Trading Close ("Trade Pre-close Period"), then the Preliminary Daily Settlement Price shall be calculated in accordance with the following formula:

    $$PDSP = \frac{(\text{Trade VWAP} \times \text{Trade Volume}) + (\text{Order VWAP} \times \text{Order Volume})}{(\text{Trade Volume} + \text{Order Volume})}$$

    Where:

Trade VWAP =	volume weighted average price of all trades entered into during the Trade Pre-close Period
Trade Volume =	total volume (i.e. number of lots) of all trades entered into during the Trade Pre-close Period
Order VWAP =	volume weighted average price of all orders that were maintained during the period ten seconds prior to Trading Close ("Order Pre-close Period") and that were higher than the final bid or below the final ask

Order Volume =   total volume (i.e. number of lots) of all orders that were maintained during the Order Pre-close Period and that were higher than the final bid or below the final ask

(b)   Where no trades are entered into during the Trade Pre-close Period, then the Preliminary Daily Settlement Price shall be calculated in accordance with ASX 24 Operating Rules Procedure 2500.1(a)(ii) to (vii).

(c)   Where no orders are maintained during the Order Pre-close Period that are higher than the final bid or below the final ask, then Order VWAP and Order Volume shall be set to zero and the Preliminary Daily Settlement Price shall be an amount equal to Trade VWAP.

2.   Where the Futures Contract has an Underlying Commodity that is New Zealand Electricity, the Preliminary Daily Settlement Price shall be calculated in accordance with ASX 24 Operating Rules Procedure 2500.1(a)(ii) to (vii).

3.   Notwithstanding paragraphs 1 and 2 above, where there are no final quotes and no last trade on the first day of trading in the spot month or quarter (as applicable) for a Futures Contract with an Underlying Commodity that is Australian Electricity or New Zealand Electricity then the previous day's Daily Settlement Price for the nearest equivalent calendar month or calendar quarter (as applicable) shall be the Preliminary Daily Settlement Price.

Participant Registration of Strip Trade Leg Prices – Energy

Upon execution of an electricity strip, the Exchange will apply the algorithm outlined below to calculate the component futures prices[1]. The Exchange will register the allocated price levels resulting from the Strip trade in the Clearing system (Genium Clearing).

Year-long Strips:

1.   The previous Official Daily Settlement Prices (ODSPs) of the underlying futures contracts will be used as a starting point and adjusted by a Price Adjustment Factor[2] to achieve an implied Strip price which approximates the price of the executed underlying futures contracts;
2.   Price adjustments will be made via a consistent proportional price movement from ODSPs (to $0.01/MWh for electricity); with the exception that:
3.   The underlying futures contract with the longest dated expiry will be further adjusted up or down in increments of $0.01/MWh for electricity to the extent that such adjustment will achieve a more accurate implied Strip price as calculated to 4 decimal places (e.g. $109.2995/MWh).

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[1] Final futures price allocations will be rounded to the nearest $0.01/MWh.

[2] Price Adjustment Factors used for preliminary calculation purposes will be expressed as a % rounded to 4 decimal places (e.g. a Price Adjustment Factor of -0.1554%). See adjustment methodology outlined in the below table.

Process for Energy Options

The Daily Settlement Price (DSP) for Electricity Options will be determined in accordance with Steps 1 – 3 below.

In general, ASX will consider market data observed during the Trading Day in the form of trades and Valid Bid/Offer data at market close. Trade data will take precedence over Valid Bids and Offers. Block Trades will be included in the DSP determination if accepted by ASX prior to market close.

For the purpose of this Methodology, a Valid Bid or Offer means a concurrent Bid or Offer in a strike, which is present for a minimum duration of 10 seconds at market close.

> **Step 1**: The DSP will be the last traded price where the last traded price is more competitive than orders at market close. If a more competitive Bid or Offer exists at market close, this will be the DSP for this strike.

> **Step 2**: Where no trades have occurred in a strike and there is a Valid Bid or Offer that is more competitive than the previous Trading Day's close, the calculation will use that Bid or Offer combined with the underlying Futures Daily Settlement Price to determine implied volatility for that option.

> **Step 3**: Where a particular strike has no trade or Valid Bid or Offer, the DSP will be generated using the previous Trading Day's implied volatility and the current underlying futures settlement price.

Part B – Adjustment Methodology

1. The adjustment methodology set out in the table below shall be applied to the Preliminary Daily Settlement Price for each Futures Contract that has an Underlying Commodity that is Australian Electricity that has been calculated in accordance with Part A (Preliminary Daily Settlement Price) to determine the Daily Settlement Price for each of those Futures Contracts.

2. The adjustment methodology set out in the table below shall be applied to the Preliminary Daily Settlement Price for each Futures Contract that has an underlying Commodity that is New Zealand Electricity that has been calculated in accordance with Part A (Preliminary Daily Settlement Price) to determine the Daily Settlement Price for each of those Futures Contracts.

	Step	Calculation
1.	**Monthly Futures Contacts (MF) – Preliminary Daily Settlement Price**	Preliminary Daily Settlement Price (PDSP) for each Monthly Futures Contract shall be calculated in accordance with Part A (Preliminary Daily Settlement Price) above.
2.	**Quarterly Futures Contracts (QF) – Preliminary Daily Settlement Price**	An adjusted Preliminary Daily Settlement Price (PDSP) for each Quarterly Futures Contract shall be calculated in accordance with paragraphs (a) and (b) below: (a) Preliminary Daily Settlement Price (PDSP) for the Quarterly Futures Contract shall be calculated in accordance with Part A (Preliminary Daily Settlement Price) above. (b) PDSP for that Quarterly Futures Contract shall then be adjusted to an amount equal to the sum of the PDSP for the three corresponding Monthly Futures Contracts calculated in accordance with Step 1 above.
3.	**Half Year Futures (HYF) - Preliminary Daily Settlement Price**	Preliminary Daily Settlement Price (PDSP) for each Half Year Futures, which shall comprise the two corresponding Quarterly Futures Contracts, shall be calculated in accordance with paragraphs (a) to (c) below.[3] (a) PDSP of each Half Year Futures that comprises the relevant financial year and calendar year (HYF_{AB}; HYF_{CD}) shall be calculated in accordance with the following formulas: PDSP HYF_{AB} = WAv($QF_A + QF_B$) PDSP HYF_{CD} = WAv($QF_C + QF_D$) Where:

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[3] Preliminary Daily Settlement Price for Half Year Futures shall be calculated for the purposes of this adjustment methodology only. Half Year Futures Contracts are not listed for trading on the ASX 24 market.

		WAv = MWh[4] weighted average of the adjusted Preliminary Daily Settlement Price (PDSP) for each of the two corresponding Quarterly Futures Contracts (QF) calculated in accordance with Step 2 above.
		(b) PDSP of each Half Year Futures is then adjusted on a face value-weighted basis to equate on a $/MWh basis to the two Half Year Futures that correspond to the relevant Financial Year Strip (FYF). This is shown in the formula below:
		PDSP HYF_{AB} + HYF_{CD} = FYF_{ABCD}
		(c) PDSP of each Half Year Futures is then adjusted on a face value-weighted basis to equate on a $/MWh basis to the two Half Year Futures that correspond to the relevant Calendar Year Strip (CYF). This is shown in the formula below:
		PDSP HYF_{AB} + HYF_{CD} = CYF_{ABCD}
4.	**Financial Year Strip (FYF) and Calendar Year Strip (CYF) – Daily Settlement Price**	Daily Settlement Price (DSP) for each Financial Year Strip and Calendar Year Strip shall be calculated in accordance with the following formulas: DSP FYF_{AB} = AvHr(HYF_A + HYF_B) DSP CYF_{AB} = AvHr(HYF_A + HYF_B) Where: AvHr = combined average hourly price of the PDSP of the two corresponding Half Year Futures (HYF) calculated in accordance with Step 3 above.
5.	**Quarterly Futures Contracts (QF) – Daily Settlement Price**	Daily Settlement Price (DSP) for each Quarterly Futures Contract shall be calculated in accordance with paragraphs (a) and (b) below: (a) DSP for the Quarterly Futures Contract shall be calculated as a sum equal to the adjusted Preliminary Daily Settlement Price (PDSP) for that Quarterly Futures Contract calculated in accordance with Step 2 above. (b) DSP for that Quarterly Futures Contract and the other Quarterly Futures Contract corresponding to the relevant Half Year Futures shall be adjusted on a face value-weighted basis to equate on a $/MWh basis to the PDSP of the Half Year Futures (HYF) calculated in accordance with Step 3 above. This is shown in the formula below: DSP QF_A + DSP QF_B = PDSP HYF_{AB}

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[4] MWh = Mega Watt Hour and is the unit of measurement for ASX Electricity Futures Contracts.

6.	**Monthly Futures Contracts (MF) – Daily Settlement Price**	Daily Settlement Price (DSP) for each Monthly Futures Contract shall be calculated in accordance with paragraphs (a) and (b) below:
		(a) DSP for the Monthly Futures Contract shall be calculated as a sum equal to the Preliminary Daily Settlement Price (PDSP) for that Monthly Futures Contract calculated in accordance with Step 1 above.
		(b) DSP for that Monthly Futures Contract, and any of the other Monthly Futures Contracts corresponding to the relevant Quarterly Futures Contract that have not settled, shall then be adjusted on a face value-weighted basis so that the DSP of the three corresponding Monthly Futures Contracts equate on a $/MWh basis to the DSP of the Quarterly Future (QF) calculated in accordance with Step 5 above. This is shown in the formula below: $$\text{DSP } MF_A + \text{DSP } MF_B + \text{DSP } MF_C = \text{DSP } QF_{ABC}$$

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