WDRM – BASELINE METHODOLOGY REGISTER

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VERSION RELEASE HISTORY

Version	Effective Date	Summary of Changes
1.0	4 June 2021	First Issue

CONTENTS

1. INTRODUCTION

1.1. Purpose and scope

This is the Baseline Methodology Register. It outlines the key baseline settings for each baseline methodology available under the wholesale demand response mechanism (WDRM).

1.2. Related documents

Title	Location
Wholesale Demand Response Guidelines (AEMO)	https://aemo.com.au/en/consultations/current-and-closed-consultations/wdr-guidelines
Baseline Eligibility Compliance and Metrics Policy	https://aemo.com.au/en/consultations/current-and-closed-consultations/wdrm-becm-policy

1.3. Definitions and interpretation

1.3.1. Glossary

Terms defined in the NEL and NER have the same meanings in this Baseline Methodology Register, unless otherwise specified in this clause.

The words, phrases and abbreviations in the table below have the meanings set out opposite them, when used in this Baseline Methodology Register.

Term	Definition
AEMO	Australian Energy Market Operator Limited
NMI	National Metering Identifier
PoL	Predictability of Load
TI	Trading interval
TNI	Transmission Node Identifier
WDRM	Wholesale Demand Response Mechanism
WDRU	Wholesale Demand Response Unit

2. BACKGROUND

2.1. Rules reference

Under 3.10.3 of the NER, AEMO must develop one or more baseline methodologies and publish these in the baseline methodology register. The baseline methodology register must include information to facilitate the assessment of a wholesale demand response unit (WDRU) against the baseline methodology and associated baseline settings.

2.2. Baseline fundamentals

Baselines are an estimate of the consumption at a NMI per trading interval during a day, based on a history of like days in the near past. Baselines are required for two main purposes:

1. Demand response settlement.
2. To assess performance against dispatch targets.

Additionally, to participate in the WDRM, the load must demonstrate a level of predictability against an identified baseline methodology, so that a baseline can be calculated, against which demand response settlement and dispatch performance assessment will occur.

2.3. Predictability of load assessment

The predictability of each load needs to be tested to ensure it meets the eligibility criteria for participating in WDRM. This is referred to as predictability of load (PoL) assessment. The baseline is set at the single WDRU level for demand response settlement purposes. Predictability of the WDRU's load can be tested by applying the baseline methodology to a history of days for which a demand response did not occur and using statistical techniques to demonstrate that they meet the baseline methodology metrics.

The metrics used for PoL assessment are:

- Accuracy - the statistical measure of deviation between the actual consumption or export of a WDRU (as recorded by metering data) and its baseline (in periods when it is not providing demand response).
- Bias - the statistical measure of deviation between the actual consumption or export of a WDRU (as recorded by metering data) and its baseline for each of the measures of baseline accuracy consistently exhibiting error:
    - in a single direction; or
    - under the same circumstances.

The PoL assessment determines whether the accuracy and bias metrics, calculated for the specified baseline methodology using historical data for the load according to the baseline eligibility assessment or baseline compliance testing rules for that baseline methodology, meet the proposed thresholds outlined in the Baseline Eligibility Compliance and Metrics Policy[1].

PoL assessment is undertaken:

- Prior to classification of a WDRU (baseline eligibility assessment).
- At regular intervals during normal operations (baseline compliance testing).

The baseline eligibility assessment ensures that only sufficiently predictable NMIs are able to participate In WDRM, whereas the baseline compliance testing ensures that a NMI's baseline remains sufficiently predictable thereafter.

[1] Available at: https://aemo.com.au/en/consultations/current-and-closed-consultations/wdrm-becm-policy

3. BASELINE METHODOLOGIES – KEY SETTINGS SUMMARY TABLE

	All Days	Business Days	Non-Business Days	Business + Non-Business Days Composite
BM ID	BM1	BM2	BM3	BM4
Framework	CAISO 10 of 10	CAISO 10 of 10	CAISO 4 of 4	CAISO 10 of 10 CAISO 4 of 4
Day type	All days.	Business days only.	Non-business days only.	Business days and non-business days.
Baseline window	50 days	50 days	50 days	50 days
Selected days	Most recent 10 days (minimum 5).	Most recent 10 business days (minimum 5).	Most recent 4 non-business days (minimum 4).	Most recent 10 business days (minimum 5). Most recent 4 non-business days (minimum 4).
Unadjusted baseline energy for TI	Average metered energy for TI for selected days.	Average metered energy for TI for selected days.	Average metered energy for TI for selected days.	Average metered energy for TI for selected days.
Baseline adjustment	Multiplicative adjustment with ±20% cap.	Multiplicative adjustment with ±20% cap.	Multiplicative adjustment with ±20% cap.	Multiplicative adjustment with ±20% cap.
Baseline adjustment window (settlement)	3 hrs ending 1 hr prior to the first TI of WDR.	3 hrs ending 1 hr prior to the first TI of WDR.	3 hrs ending 1 hr prior to the first TI of WDR.	3 hrs ending 1 hr prior to the first TI of WDR.
Baseline adjustment window (PoL)	3 hrs ending 1 hr prior to TI.	3 hrs ending 1 hr prior to TI.	3 hrs ending 1 hr prior to TI.	3 hrs ending 1 hr prior to TI.
Required number of eligibility days	50	50	20	50
Eligibility TIs window	3pm to 8pm (market time)	3pm to 8pm (market time)	3pm to 8pm (market time)	3pm to 8pm (market time)
Required number of compliance days	50	50	20	50
Compliance TIs window	3pm to 8pm (market time)	3pm to 8pm (market time)	3pm to 8pm (market time)	3pm to 8pm (market time)

4. ALL DAYS BASELINE METHODOLOGY

Component	Baseline settings
General	
Name	All Days
Baseline Methodology ID	BM1
Framework	CAISO 10 of 10
Applicable day types	All days Monday through Sunday, no exceptions.
Qualifying days	Qualifying days are all days of the applicable day types for the baseline methodology. Qualifying days for this methodology are all days Monday through Sunday, with no exceptions. In addition, some specific days may be designated as not being qualifying days for a baseline calculation both under the settlement calculations (see description of 'days not included in settlement calculation') or PoL calculations (see description of 'days not included in PoL calculation')
Baseline window	The baseline window is the period of days preceding a baseline calculation TI, from which qualifying days are selected for the purpose of calculating baseline energy for that TI. Baseline window = 50 qualifying days.
Selected days	The selected days are the most recent 10 qualifying days within the baseline window. If there are less than 10, but 5 or more qualifying days available within the baseline window, then the available 5 to 10 days are used in the baseline calculation. If there are less than 5 qualifying days available in the baseline window, previous days with WDR are reincluded as selected days, starting with the most recent day with WDR, until 5 days is reached.
Unadjusted baseline energy	The unadjusted baseline energy for a TI is the average metered values for the corresponding TI on each of the selected days.
Adjustment type	Multiplicative adjustment with cap.
Adjustment logic	The percentage difference between actual consumption and the unadjusted baseline over the adjustment window period.
Adjustment cap	±20%
Average actual adjustment energy	The average metered energy over the adjustment window.
Average baseline adjustment energy	The average unadjusted baseline energy over the adjustment window.

Component	Baseline settings
Baseline adjustment	$$Baseline\ adjustment\ (\%) = \frac{\text{Average actual adjustment energy} - \text{average baseline adjustment energy}}{\text{average baseline adjustment energy}}$$ The baseline adjustment may be positive or negative and is capped at 20%.
Baseline energy	$$Baseline\ energy = unadjusted\ baseline\ energy \times (1 + baseline\ adjustment)$$
Calculating baselines for settlement	
Settlement baseline adjustment window	The baseline adjustment window is a period of time prior to a TI with WDR, from which meter data is used to adjust the baseline to reflect conditions on the day of the WDR. The settlement baseline adjustment window is the TIs comprising the 3 hours ending one hour prior to the first TI of WDR.
Settlement baseline adjustment window application	The same baseline adjustment is applied to any contiguous TIs of WDR. If more than one WDR event occurs in the same day, the first calculated adjustment is applied to those further WDR events, unless there is a 4 hour period between WDR events (i.e. a clear period of consumption without a WDR event occurrence). If there is a 4 hour period between WDR events a new baseline adjustment is calculated.
Days not included in settlement baseline calculation	Any previous WDR days are excluded from the calculation.
Calculating baselines for PoL	
PoL baseline adjustment window	The baseline adjustment window is a period of time prior to a TI for which the baseline is calculated from which meter data is used to adjust the baseline to reflect conditions on the day. The PoL baseline adjustment window is the TIs comprising the 3 hours ending one hour prior to the TI for which the baseline is being calculated.
PoL baseline adjustment window application	A new baseline adjustment is calculated for each TI of a PoL calculation.
Eligibility days	Eligibility days are days for which baselines can be calculated for the load, for the purposes of conducting baseline eligibility assessment. Starting from the most recent eligibility day, the PoL calculation uses any historical eligibility day falling on a weekday, weekend, or public holiday, until the required number of eligibility days are found.
Required number of eligibility days	50 days

Component	Baseline settings
Eligibility TIs window	The eligibility TIs window refers to the TIs from which meter data is taken for the load for the purpose of conducting baseline eligibility assessment. The eligibility TIs window is 3pm to 8pm (market time).
Compliance days	Compliance days are days for which baselines can be calculated for the load, for the purposes of conducting baseline compliance test. Starting from the most recent compliance day, the PoL calculation uses any historical compliance day falling on a weekday, weekend, or public holiday, until the required number of compliance days are found.
Required number of compliance days	50 days
Compliance TIs window	The compliance TIs window refers to the TIs from which meter data is taken for the load for the purpose of conducting baseline compliance testing. The compliance TIs window is 3pm to 8pm (market time).
Days not included in PoL calculations	Any AEMO approved eligibility or compliance exclusion days and any previous WDR days are excluded from the PoL calculation.

5. BUSINESS DAYS BASELINE METHODOLOGY

Component	Baseline settings
General	
Name	Business Days
Baseline Methodology ID	BM2
Framework	CAISO 10 of 10
Applicable day types	Monday through Friday excluding market and region-based (based on NMI's TNI location) public holidays.
Qualifying days	Qualifying days are all days of the applicable day types for the baseline methodology. Qualifying days for this methodology are days Monday through Friday excluding market and region-based (based on NMI's TNI location) public holidays. In addition, some specific days may be designated as not being qualifying days for a baseline calculation both under the settlement calculations (see description of 'days not included in settlement calculation') or PoL calculations (see description of 'days not included in PoL calculation')
Baseline window	The baseline window is the period of days preceding a baseline calculation TI, from which qualifying days are selected for the purpose of calculating baseline energy for that TI. Baseline window = 50 qualifying days.
Selected days	The selected days are the most recent 10 qualifying days within the baseline window. If there are less than 10, but 5 or more qualifying days available within the baseline window, then the available 5 to 10 days are used in the baseline calculation. If there are less than 5 qualifying days available in the baseline window, previous days with WDR are reincluded as selected days, starting with the most recent day with WDR, until 5 days is reached.
Unadjusted baseline energy	The unadjusted baseline energy for a TI is the average metered values for the corresponding TI on each of the selected days.
Adjustment type	Multiplicative adjustment with cap.
Adjustment logic	The percentage difference between actual consumption and the unadjusted baseline over the adjustment window period.
Adjustment cap	±20%
Average actual adjustment energy	The average metered energy over the adjustment window.
Average baseline adjustment energy	The average unadjusted baseline energy over the adjustment window.

Component	Baseline settings
Baseline adjustment	$$Baseline\ adjustment\ (\%) = \frac{\text{Average actual adjustment energy} - \text{average baseline adjustment energy}}{\text{average baseline adjustment energy}}$$ The baseline adjustment may be positive or negative and is capped at 20%.
Baseline energy	$$Baseline\ energy = unadjusted\ baseline\ energy \times (1 + baseline\ adjustment)$$
Calculating baselines for settlement	
Settlement baseline adjustment window	The baseline adjustment window is a period of time prior to a TI with WDR, from which meter data is used to adjust the baseline to reflect conditions on the day of the WDR. The settlement baseline adjustment window is the TIs comprising the 3 hours ending one hour prior to the first TI of WDR.
Settlement baseline adjustment window application	The same baseline adjustment is applied to any contiguous TIs of WDR. If more than one WDR event occurs in the same day, the first calculated adjustment is applied to those further WDR events, unless there is a 4 hour period between WDR events (i.e. a clear period of consumption without a WDR event occurrence). If there is a 4 hour period between WDR events a new baseline adjustment is calculated.
Days not included in settlement baseline calculation	Any previous WDR days are excluded from the calculation.
Calculating baselines for PoL	
PoL baseline adjustment window	The baseline adjustment window is a period of time prior to a TI for which the baseline is calculated from which meter data is used to adjust the baseline to reflect conditions on the day. The PoL baseline adjustment window is the TIs comprising the 3 hours ending one hour prior to the TI for which the baseline is being calculated.
PoL baseline adjustment window application	A new baseline adjustment is calculated for each TI of a PoL calculation.
Eligibility days	Eligibility days are days for which baselines can be calculated for the load, for the purposes of conducting baseline eligibility assessment. Starting from the most recent eligibility day, the PoL calculation uses any historical eligibility day falling on days Monday through Friday excluding market and region-based (based on NMI's TNI location) public holidays, until the required number of eligibility days are found.
Required number of eligibility days	50 days

Component	Baseline settings
Eligibility TIs window	The eligibility TIs window refers to the TIs from which meter data is taken for the load for the purpose of conducting baseline eligibility assessment. The eligibility TIs window is 3pm to 8pm (market time).
Compliance days	Compliance days are days for which baselines can be calculated for the load, for the purposes of conducting baseline compliance test. Starting from the most recent compliance day, the PoL calculation uses any historical compliance day falling on days Monday through Friday excluding market and region-based (based on NMI's TNI location) public holidays, until the required number of compliance days are found.
Required number of compliance days	50 days
Compliance TIs window	The compliance TIs window refers to the TIs from which meter data is taken for the load for the purpose of conducting baseline compliance testing. The compliance TIs window is 3pm to 8pm (market time).
Days not included in PoL calculations	Any AEMO approved eligibility or compliance exclusion days and any previous WDR days are excluded from the PoL calculation.

6. NON-BUSINESS DAYS BASELINE METHODOLOGY

Component	Baseline settings
General	
Name	Non-business Days
Baseline Methodology ID	BM3
Framework	CAISO 4 of 4
Applicable day types	Saturdays, Sundays and market and region-based (based on NMI's TNI location) Public Holidays from Monday-Sunday.
Qualifying days	Qualifying days are all days of the applicable day types for the baseline methodology. Qualifying days for this methodology are Saturdays, Sundays and market and region-based (based on NMI's TNI location) Public Holidays from Monday-Sunday. In addition, some specific days may be designated as not being qualifying days for a baseline calculation both under the settlement calculations (see description of 'days not included in settlement calculation') or PoL calculations (see description of 'days not included in PoL calculation')
Baseline window	The baseline window is the period of days preceding a baseline calculation TI, from which qualifying days are selected for the purpose of calculating baseline energy for that TI. Baseline window = 50 qualifying days.
Selected days	The selected days are the most recent 4 qualifying days within the baseline window. If there are less than 4 qualifying days available in the baseline window, previous days with WDR are reincluded as selected days, starting with the most recent day with WDR, until 4 days is reached.
Unadjusted baseline energy	The unadjusted baseline energy for a TI is the average metered values for the corresponding TI on each of the selected days.
Adjustment type	Multiplicative adjustment with cap.
Adjustment logic	The percentage difference between actual consumption and the unadjusted baseline over the adjustment window period.
Adjustment cap	±20%
Average actual adjustment energy	The average metered energy over the adjustment window.
Average baseline adjustment energy	The average unadjusted baseline energy over the adjustment window.

Component	Baseline settings
Baseline adjustment	$$Baseline\ adjustment\ (\%) = \frac{\text{Average actual adjustment energy} - \text{average baseline adjustment energy}}{\text{average baseline adjustment energy}}$$ The baseline adjustment may be positive or negative and is capped at 20%.
Baseline energy	$$Baseline\ energy = unadjusted\ baseline\ energy \times (1 + baseline\ adjustment)$$
Calculating baselines for settlement	
Settlement baseline adjustment window	The baseline adjustment window is a period of time prior to a TI with WDR, from which meter data is used to adjust the baseline to reflect conditions on the day of the WDR. The settlement baseline adjustment window is the TIs comprising the 3 hours ending one hour prior to the first TI of WDR.
Settlement baseline adjustment window application	The same baseline adjustment is applied to any contiguous TIs of WDR. If more than one WDR event occurs in the same day, the first calculated adjustment is applied to those further WDR events, unless there is a 4 hour period between WDR events (i.e. a clear period of consumption without a WDR event occurrence). If there is a 4 hour period between WDR events a new baseline adjustment is calculated.
Days not included in settlement baseline calculation	Any previous WDR days are excluded from the calculation.
Calculating baselines for PoL	
PoL baseline adjustment window	The baseline adjustment window is a period of time prior to a TI for which the baseline is calculated from which meter data is used to adjust the baseline to reflect conditions on the day. The PoL baseline adjustment window is the TIs comprising the 3 hours ending one hour prior to the TI for which the baseline is being calculated.
PoL baseline adjustment window application	A new baseline adjustment is calculated for each TI of a PoL calculation.
Eligibility days	Eligibility days are days for which baselines can be calculated for the load, for the purposes of conducting baseline eligibility assessment. Starting from the most recent eligibility day, the PoL calculation uses any historical eligibility day falling on Saturdays, Sundays and market and region-based (based on NMI's TNI location) Public Holidays from Monday-Sunday, until the required number of eligibility days are found.
Required number of eligibility days	20 days

Component	Baseline settings
Eligibility TIs window	The eligibility TIs window refers to the TIs from which meter data is taken for the load for the purpose of conducting baseline eligibility assessment. The Eligibility TIs window is 3pm to 8pm (market time).
Compliance days	Compliance days are days for which baselines can be calculated for the load, for the purposes of conducting baseline compliance test. Starting from the most recent compliance day, the PoL calculation uses any historical compliance day falling on Saturdays, Sundays and market and region-based (based on NMI's TNI location) Public Holidays from Monday-Sunday, until the required number of compliance days are found.
Required number of compliance days	20 days
Compliance TIs window	The compliance TIs window refers to the TIs from which meter data is taken for the load for the purpose of conducting baseline compliance testing. The compliance TIs window is 3pm to 8pm (market time).
Days not included in PoL calculations	Any AEMO approved eligibility or compliance exclusion days and any previous WDR days are excluded from the PoL calculation.

7. BUSINESS + NON-BUSINESS DAYS COMPOSITE BASELINE METHODOLOGY

Component	Baseline settings
General	
Name	Business + Non-Business Days Composite
Baseline Methodology ID	BM4
Framework	For baselines calculated for a business day – CAISO 10 of 10 For baseline calculated for a non-business day – CAISO 4 of 4
Applicable day types	For baselines calculated for a business day – applicable day types are Monday through Friday excluding market and region-based (based on NMI's TNI location) public holidays. For baselines calculated for a non-business day – applicable day types are Saturdays, Sundays and market and region-based (based on NMI's TNI location) Public Holidays from Monday-Sunday.
Qualifying days	Qualifying days are all days of the applicable day types for the baseline methodology. For baselines calculated for a business day – qualifying days are Monday through Friday excluding market and region-based (based on NMI's TNI location) public holidays. For baselines calculated for a non-business day – qualifying days are Saturdays, Sundays and market and region-based (based on NMI's TNI location) Public Holidays from Monday-Sunday. In addition, some specific days may be designated as not being qualifying days for a baseline calculation both under the settlement calculations (see description of 'days not included in settlement calculation') or PoL calculations (see description of 'days not included in PoL calculation')
Baseline window	The baseline window is the period of days preceding a baseline calculation TI, from which qualifying days are selected for the purpose of calculating baseline energy for that TI. Baseline window = 50 qualifying days.

Component	Baseline settings
Selected days	For baselines calculated for a business day: • The selected days are the most recent 10 qualifying days within the baseline window. • If there are less than 10, but 5 or more qualifying days available within the baseline window, then the available 5 to 10 days are used in the baseline calculation. • If there are less than 5 qualifying days available in the baseline window, previous days with WDR are reincluded as selected days, starting with the most recent day with WDR, until 5 days is reached. For baselines calculated for a non-business day: • The selected days are the most recent 4 qualifying days within the baseline window. • If there are less than 4 qualifying days available in the baseline window, previous days with WDR are reincluded as selected days, starting with the most recent day with WDR, until 4 days is reached.
Unadjusted baseline energy	The unadjusted baseline energy for a TI is the average metered values for the corresponding TI on each of the selected days.
Adjustment type	Multiplicative adjustment with cap.
Adjustment logic	The percentage difference between actual consumption and the unadjusted baseline over the adjustment window period.
Adjustment cap	±20%
Average actual adjustment energy	The average metered energy over the adjustment window.
Average baseline adjustment energy	The average unadjusted baseline energy over the adjustment window.
Baseline adjustment	$$Baseline\ adjustment\ (\%) = \frac{\text{Average actual adjustment energy} - \text{average baseline adjustment energy}}{\text{average baseline adjustment energy}}$$ The baseline adjustment may be positive or negative and is capped at 20%.
Baseline energy	$$Baseline\ energy = unadjusted\ baseline\ energy \times (1 + baseline\ adjustment)$$
Calculating baselines for settlement	
Settlement baseline adjustment window	The baseline adjustment window is a period of time prior to a TI with WDR, from which meter data is used to adjust the baseline to reflect conditions on the day of the WDR. The settlement baseline adjustment window is the TIs comprising the 3 hours ending one hour prior to the first TI of WDR.

Component	Baseline settings
Settlement baseline adjustment window application	The same baseline adjustment is applied to any contiguous TIs of WDR. If more than one WDR event occurs in the same day, the first calculated adjustment is applied to those further WDR events, unless there is a 4 hour period between WDR events (i.e. a clear period of consumption without a WDR event occurrence). If there is a 4 hour period between WDR events a new baseline adjustment is calculated.
Days not included in settlement baseline calculation	Any previous WDR days are excluded from the calculation.
Calculating baselines for PoL	
PoL baseline adjustment window	The baseline adjustment window is a period of time prior to a TI for which the baseline is calculated from which meter data is used to adjust the baseline to reflect conditions on the day. The PoL baseline adjustment window is the TIs comprising the 3 hours ending one hour prior to the TI for which the baseline is being calculated.
PoL baseline adjustment window application	A new baseline adjustment is calculated for each TI of a PoL calculation.
Eligibility days	Eligibility days are days for which baselines can be calculated for the load, for the purposes of conducting baseline eligibility assessment. Starting from the most recent eligibility day, the PoL calculation uses any historical eligibility days falling on business days or non-business days until the required number of eligibility days are found. The logic for calculating the baselines for a particular eligibility day depends on the day type.
Required number of eligibility days	50 days
Eligibility TIs window	The eligibility TIs window refers to the TIs from which meter data is taken for the load for the purpose of conducting baseline eligibility assessment. The eligibility TIs window is 3pm to 8pm (market time).
Compliance days	Compliance days are days for which baselines can be calculated for the load, for the purposes of conducting baseline compliance test. Starting from the most recent compliance day, the PoL calculation uses any historical compliance days falling on business days or non-business days until the required number of compliance days are found. The logic for calculating the baselines for a particular compliance day depends on the day type.

Component	Baseline settings
Required number of compliance days	50 days
Compliance TIs window	The compliance TIs window refers to the TIs from which meter data is taken for the load for the purpose of conducting baseline compliance testing. The compliance TIs window is 3pm to 8pm (market time).
Days not included in PoL calculations	Any AEMO approved eligibility or compliance exclusion days and any previous WDR days are excluded from the PoL calculation.