Guide to the WDRM Predictability of Load (PoL) Calculator

User guide version: 1.1
For tool version: 1.4

July 2021

Wholesale Demand Response Mechanism

Important Notice

PURPOSE

This Guide to the WDRM Predictability of Load (PoL) Calculator, prepared by the Australian Energy Market Operator (AEMO), provides guidance for Software name under the National Electricity Rules (Rules).

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VERSION HISTORY

1.0   first version of this document published to accompany version 1.0 of the WDRM PoL Calculator

1.1   subsequent version of this document published to accompany version 1.4 of the WDRM PoL Calculator

DOCUMENTS MADE OBSOLETE

The release of this document changes only the version of Guide to the WDRM Predictability of Load (PoL) Calculator.

FEEDBACK

Your feedback is important and helps us improve our services and products. To suggest improvements, please contact AEMO's Support Hub.

Contents

Chapter 1. Introduction

Purpose

This guide describes the intended use of the Wholesale Demand Response Mechanism (WDRM) Predictability of Load (PoL) Calculator. The calculator is designed to allow participants a way to determine:

- Which NMIs to include in their WDRM application,

- What baseline methodology might best suit their profile, and

- How the baseline results differentiate between the four available methodologies.

Audience

The primary audience for this document is market participants who intend to become Demand Response Service Providers (DRSPs) to participate in the Wholesale Demand Response Mechanism.

Assumed knowledge

It is assumed the audience of this document will understand the purpose of the WDRM project and specifically its registration requirements, including PoL and baselines. Further information can be found at the following links:

- Wholesale demand response mechanism | AEMC

- AEMO | Wholesale demand response mechanism

- AEMO | WDR Participant toolbox

- AEMO | WDR Demand Response Service Providers

- AEMO | Baselines Eligibility Compliance and Metrics Policy – Consultation

- AEMO | Baseline Methodology Register

How to use this guide

- The references listed throughout this document are primary resources and take precedence over this document.

- **Text in this format** indicates a reference to a document on AEMO's website.

- Text in this format indicates a link to related information.

- This document is written in plain language for easy reading.

- Where there is a discrepancy between the Rules and information or a term in this document, the Rules take precedence.

- Where there is a discrepancy between the Procedures and information or a term in this document, the Procedures take precedence.

- References to time are Australian Eastern Standard time (AEST) unless otherwise specified.

Chapter 2. Need to Know

Related procedures

Baseline Methodology Register	AEMO	Baseline Methodology Register
Baseline Eligibility, Compliance and Metrics Policy	AEMO	Baselines Eligibility Compliance and Metrics Policy – Consultation

Prerequisites

Submit a request to receive a copy of the calculator

To receive a copy of the calculator, please submit a request to the WDR Operations team at wdr@aemo.com.au with the following information:

WDRM PoL Calculator request template Please send to wdr@aemo.com.au	
Contact name and/or company name:	
WDR project contact email address:	Your organisation's contact email address for WDR project-related enquiries.
Settlements contact email address (if different to above contact):	Your organisation's contact email address for settlement-related enquiries.
Primary contact phone number:	
Existing participant?	Yes/No
Participant ID if existing participant:	
Short reason for your request:	E.g. Prospective DRSP

Meter data extract per NMI

NMI meter data extracts are required to input to the calculator to enable the calculation to run. Information on the format and quantity of metering data required can be found under
"How to use the WDRM PoL Calculator" à "Meter Data" section.

Enabling macros for Excel

Macros must be enabled within MS Excel for the calculator to work. Please see the "Enabling macros in MS Excel" under the "Troubleshooting" section of this guide for a step-by-step guide to enabling macros.

This PoL Calculator:

- Uses meter data input by the participant or prospective participants.
- Produces information which may differ from the final scores determined by AEMO for its assessment purposes, which use meter data that is automatically retrieved from AEMO's internal systems.
- Is for information purposes only, to provide participants with an additional tool to inform their consideration of the performance of their NMIs, depending on the relevant chosen methodology.
- Does not provide legal or business advice to the participant, therefore produces information which should be verified by the participant through independent expert advice.
- Is not a substitute for, and should not be in lieu of, the National Electricity Law (NEL), the National Electricity Rules (Rules) or any other relevant laws, codes, rules, procedures or policies.
- Should not be relied on as a substitute for obtaining detailed advice about the NEL, the Rules, or any other relevant laws, codes, rules, procedures or policies, or any aspect of the national electricity market or the electricity industry.
- Is used by the participant at the participant's own risk.
- Although developed by AEMO with due care and skill, produces information which neither AEMO, nor any of its employees, agents and consultants, warrant or represent is accurate, reliable, complete, current or suitable for particular purposes, including the purposes of informing a decision by the participant as to whether or not to apply to AEMO, or a determination by AEMO in respect of an application.
- Produces information in respect of which, to the extent permitted by law, AEMO and its advisers, consultants and other contributors to this PoL Calculator (or their respective associated companies, businesses, partners, directors, officers or employees) shall not be liable for any:
  - errors, omissions, defects or misrepresentations; or
  - loss or damage suffered by persons who use or rely on such information (including by reason of negligence, negligent misstatement or otherwise).
- If any law prohibits exclusion of such liability, AEMO's liability is limited, at AEMO's option, to the re-supply of the information, provided that this limitation is permitted by law and is fair and reasonable.

Chapter 3. About the WDRM PoL Calculator

What is the WDRM PoL Calculator used for?

The PoL Calculator provides Demand Response Service Providers (DRSPs) the ability to estimate a NMIs' indicative bias and accuracy metrics prior to registration. The calculator provides accuracy and bias scores for a NMI:

- based on meter data inputted by the participant, and

- using the logic and metrics outlined in the Baseline Eligibility Compliance and Metrics Policy.

What is PoL and why is it assessed?

A NMI must have and maintain a predictable load to be eligible to participate in WDR. This is so baseline energy can be accurately estimated and the NMI can be shown to satisfy the baseline compliance standard. The "predictability of load" (PoL) calculator has been developed to help participants estimate their NMIs' PoL.

As part of the registration and classification processes, each NMI in a WDRU must individually qualify based on a PoL assessment (baseline eligibility assessment). AEMO also uses PoL assessment to ensure the WDRU remains baseline compliant (baseline compliance testing).

For PoL assessment, AEMO uses a series of baseline calculations from relevant days in the NMI's recent history to return two outputs - one accuracy and one bias score - measuring PoL. PoL is determined by whether the accuracy and bias metrics for the NMI/WDRU, meet the accuracy and bias thresholds. This is calculated for the specified

baseline methodology using historical data for the load according to the relevant baseline eligibility assessment rules or baseline compliance testing rules for that baseline methodology. The Baseline Eligibility Compliance and Metrics Policy establishes the methodology by which AEMO will determine baseline eligibility and compliance under the WDRM and sets out the thresholds for baseline compliance metrics.

Information on available methodologies and the parameters that distinguish them can be found in the Baseline Methodology Register.

The calculation logic and formulae used by the PoL Calculator to produce accuracy and bias scores can be reviewed in the Baseline Eligibility Compliance and Metrics Policy. There are three variable inputs to this tool:

- Meter data (provided by the participant)

- Selection of baseline methodology from a drop-down menu

- Selection of the NMI's NEM region from a drop-down menu, which is used to identify regional public holidays

AEMO's Privacy and Legal Notices: What you need to know about using our website sets out important information in respect of the PoL Calculator, including a participant's use of the PoL Calculator.

Who can use the WDRM PoL Calculator?

The calculator is intended for use by prospective or existing Demand Response Service Providers (DRSP) with access to NMI metering data. The calculator is provided upon request to those looking to utilise the calculator for the purposes of WDRM registration. See "How do I request a copy of the WDRM PoL Calculator" in the next section.

How do I request a copy of the WDRM PoL Calculator?

To request a copy of the WDRM PoL Calculator, please email wdr@aemo.com.au and include the following details in your request:
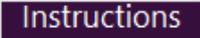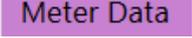
WDRM PoL Calculator request template Please send to wdr@aemo.com.au	
Contact name and/or company name:	
WDR project contact email address:	Your organisation's contact email address for WDR project-related enquiries.
Settlements contact email address (if different to above contact):	Your organisation's contact email address for settlement-related enquiries.
Primary contact phone number:	
Existing participant?	Yes/No
Participant ID if existing participant:	
Short reason for your request:	E.g. Prospective DRSP

Chapter 4. How to use the WDRM PoL Calculator

Instructions to run the calculator

The WDRM PoL Calculator has been developed using Microsoft Excel macros. The format of this tool is Microsoft Excel Macro-Enabled Worksheet, aka .xlsm file.

The following icons reference the three different sheets present in the PoL Calculator and will be utilised throughout this guide where instructions pertain to a specific sheet in the calculator:

Sheet 1	Instructions
Sheet 2	PoL Calculations
Sheet 3	Meter Data

Step 1: Finding the required meter data

- The following high-level checklist can be used to ensure meter data meets the expected format.

- Details for each item in the below checklist can be found in the following pages.

- Meter data can be provided in 30-minute, 15-minute or 5-minute intervals. All data will be converted to 5-minute data in the backend of the calculator as well as displayed in 5-minute intervals on the PoL Calculations sheet.

Meter data checklist

1. ☐	Exclusion days removed from meter data.	
2. ☐	Minimum 100 days of meter data extracted.	
3. ☐	Dates in column preceding first TIs, in ascending order, i.e. **oldest to newest**, in dd/mm/yyyy or d/mm/yyyy format.	
4. ☐	Trading intervals (TIs) provided in the first row in ascending order starting from the TI specified in item 5 depending on the interval of the meter data, through to the last TI 00:00.	
5. ☐	Sufficient TIs provided based on interval of meter data: • **30-minute:** 48 columns of data starting with TI 00:30. • **15-minute:** 96 columns of data starting with TI 00:15. • **5-minute:** 288 columns of data starting with TI 00:05.	
6. ☐	All data populated in the correct data type, i.e. numeric values, and no blanks.	
7. ☐	Meter data input from cell B2 onwards in the `Meter Data` sheet.	
8. ☐	**Optional:** include meter data references in column A of the `Meter Data` sheet to assist any reference back to the meter data in the `PoL Calculations` sheet.	

Refer to the 'Meter data' tab in the PoL Calculator to see a template of the expected format.

1. PoL Exclusion days

PoL Exclusion Days must be removed from the meter data prior to running the calculation. This means when meter data is input to the PoL Calculator it does not include any dates that were intended for exclusion. Such days may include those where there was planned maintenance leading to a shutdown of the site for the entire day or any circumstance resulting in the day's meter data not being reflective of the normal consumption of the site.

AEMO recommends taking a conservative approach to exclusion days and only choosing to exclude days on rare occasions. AEMO will be required to approve your exclusion days during the actual assessment used in the registration process for WDRM or in future baseline compliance testing during normal operations.
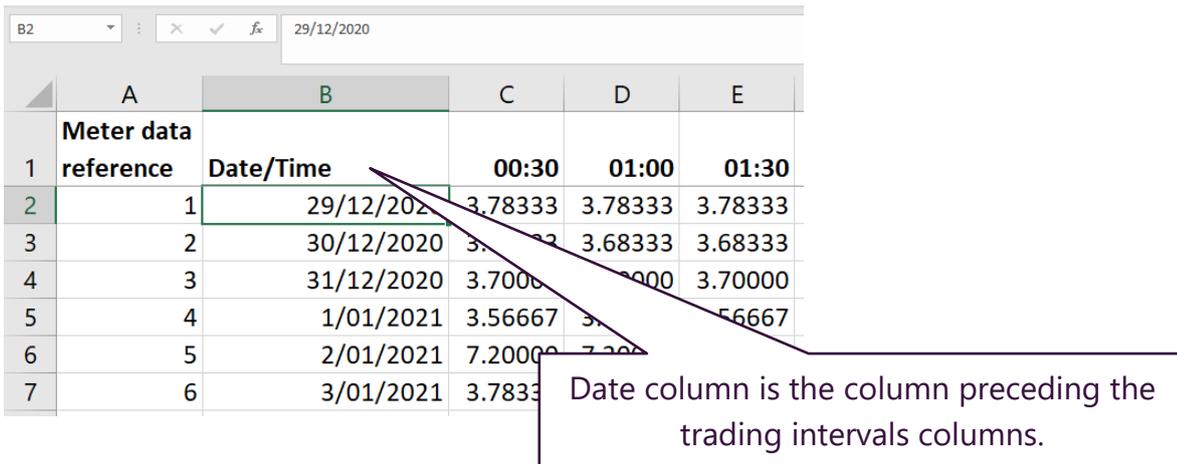
2. 100 days of meter data

This is the minimum number of days' worth of meter data that the calculator requires to sufficiently run. 60 days of meter are required where the 50 PoL Eligibility Days are required to calculate an accuracy and bias score, as on the 50th day 10 prior days of history will be required to calculate day 50's results. Where methodology excludes weekends and public holidays, there is a risk that providing any less than 100 days will result in an error due to insufficient days being provided. For more information on days used in the calculation please see the Baseline Methodology Register.

Why are 100 days of meter data required?

For the calculator to still access enough days where the methodology chosen must exclude certain day types, such as public holidays, it is important that there is substantial data for the calculator to process. The calculator will throw an error if less than 100 days is provided.

3. Dates preceding the column of the first TI

The dates must start in **cell B2**, and the trading intervals must start from column C in the Meter Data sheet. This is due to the layout in the sheet of the calculator and how Excel reads this data, see example below. Dates must be provided in ascending order, i.e. oldest to newest, and must be in dd/mm/yyyy or d/mm/yyyy format.

Date column is the column preceding the trading intervals columns.

4. Trading intervals in first row

Each trading interval of the meter data should be provided in ascending order starting from the TI specified in item 5 below depending on the interval of the meter data, through to the last TI 00:00. The TI header columns should begin from the first column following from the date column, as in the example provided in item 3.

5. Meter data interval and corresponding trading interval quantity

The trading interval columns should begin after the date column and should always end with trading interval 0:00 and begin with trading intervals outlined in the table below depending on the meter data interval.

The remaining trading intervals and their quantity depends on the interval of meter data being provided as outlined in the table below:

Meter data interval	First TI	Last TI	Number of TIs
30-minute data	00:30	00:00	48
15-minute data	00:15	00:00	96
5-minute data	00:05	00:00	288

Trading interval references in row one of the "Meter Data" sheet will automatically update to match the trading intervals provided after the calculation completes.

6. Data type requirement of meter data

The calculator expects numeric values in all cells containing meter data energy values. The Excel format of the cells can be 'general' or 'numeric' if the data provided in each cell contains numeric values.

7. Input meter data from cell B2 in the Meter Data sheet

The calculator will read data starting from B2 onwards in the "Meter Data" sheet. Dates must be input starting in this cell and in ascending order, as specified in items 3 and 4 and shown in the below example.

	B2	fx	29/12/2020		
	A	B	C	D	E
1	Meter data reference	Date/Time	00:30	01:00	01:30
2	1	29/12/2020	3.78333	3.78333	3.78333
3	2	30/12/2020	3.68333	3.68333	3.68333
4	3	31/12/2020	3.70000	3.70000	3.70000
5	4	1/01/2021	3.56667	3.56667	3.56667
6	5	2/01/2021	7.20000	7.20000	7.20000
7	6	3/01/2021	3.78333	3.78333	3.78333

8. Recommended step to assist with reconciliation of results (optional)

If you wish to see an identifier for the meter data for referencing the TI which the meter data was retrieved from, ensure you include number references in column 1 of the meter data sheet. This will be copied to the PoL Calculations sheet for easy referral back to the meter data sheet provided. If this step is not taken, the corresponding column in the PoL Calculations sheet will simply be blank.

Step 2: Running the calculator

For every new calculation, a copy of the file should be saved for future reference and to avoid any issues with caching data. For example, NMI 1 on All Days Methodology; then NMI 1 on Business Days Methodology, should be saved in separate copies of the file.

> **Important**: If you run into any error messages whilst running a calculation, you must rectify issues with your meter data and input this to a new, fresh copy of the calculator to avoid further issues. See "avoiding unwanted errors" for more info.

1. Entering in NMI information

A free text field has been provided for users to input their NMI and participant info. This is to allow for distinguishable results when each new calculation is run and saved.

The field for baseline methodology will automatically populate when the calculation runs, based on the selection from the dropdown menu in 2.

2. Setting the NEM region and methodology and select 'calculate' to run.

The NEM region and baseline methodology must be selected from respective dropdown menus for the calculation to run successfully. Not selecting these values will not allow the calculation to run, or it will run on a default option and the scores produced may vary from what was expected.

NEM region of the NMI is required to accurately identify the regional public holidays where the baseline methodology's "Day Type" parameter must include or exclude public holidays. For example, in the "Business Days" methodology, all public holidays from Monday through Sunday will be excluded from the calculation.

Select calculate once a NEM region and baseline methodology have been chosen.

3. Displaying the results

The results section displays the following:

- Accuracy score (dynamic)

- Bias score (dynamic)

- Accuracy threshold (static)

- Bias threshold (static)

- Eligibility status field (dynamic)

- Reason for ineligibility (dynamically populated when eligibility status = FAIL)

- Date and time of the calculation (dynamically populated with the date and time that the calculate button was selected)

Avoiding unwanted errors

When the calculator has been run once and calculations are reattempted, whether the end result is successful or ends unsuccessfully with an error message, there may be results from these calculations populated in the 'Meter and calculation data per interval' section of the PoL Calculations sheet.

Detailed explanation

If the calculator runs into an error part-way through calculating the results, the calculation data rows are populated to the point at which the calculator failed. For example, if an error occurs in calculating meter data for Day 31, only the first 30 days (i.e. 30 rows) of current results are displayed as the calculation and results are dynamically displayed one day at a time, that is, any results displayed from row 31 of results onwards are from the previous calculation.

It is likely the meter data provided caused any error being thrown by the calculator, so once this is rectified, revised meter data should be input to a new, fresh copy of the calculator. This issue should not occur when simply switching between methodology or region selections on meter data that originally did not error but can occur when inputting or making changes to the meter data.

Due to this limitation, if any error message is encountered during calculation it is highly recommended that a new, fresh copy of the calculator is used to run new calculations on new meter data.

Please refer to the "Error Handling" or "Troubleshooting" section of the guide if this does not resolve the issue you are encountering.

For information on the methodology logic used by the calculator, please see the Baseline Eligibility and Compliance Policy.

Error Handling

Resolving common errors

Error message	Issue	Resolution
"Inconsistent amount of metering reads detected. Amount of meter reads EACH DAY must be 48 (30 minute interval), 96 (15 minute interval) or 288 (5 minute interval)."	The number of trading intervals (TIs) provided in the "Meter Data" sheet is incorrect. This may mean a cell expected to be populated is blank, or that an entire column of TIs is missing.	If the data provided is 30-minute interval data, ensure there are 48 columns of correctly populated meter data for every row where a date is provided. If the data is 15-minutes = 96 columns of corrected meter data. If the data is 5-minutes = 288 columns of corrected meter data.
"X eligible days of meter reads were found. 100 minimum eligible days are required for Baseline Methodology X."	The number of days required to produce a calculation have not been provided.	100 days of correctly populated meter data is required in the "Meter Data" sheet. For more information, please refer to the Meter Data section of How to use the WDRM PoL Calculator in this guide.
"Meter data type provided incorrect, please amend and attempt to re-run calculation."	The data type of the meter reads in the "Meter Data" sheet is incorrect.	The format of each meter read must be updated to a numeric value. Alphabetic characters, blanks and NULL values are not accepted.
"Error occurred in calculation."	An unexpected error has occurred in running the code.	Use a new, unused copy of the calculator and start again.
"Please select a methodology!"	Methodology was not selected when attempting to run the calculator.	Select a baseline methodology from the "baseline methodology" dropdown before selecting the "calculate" button.
"Please select a region then try again!"	NEM region was not selected when attempting to run the calculator.	Select a NEM region from the "NEM region" dropdown before selecting the "calculate" button.

Troubleshooting

This section outlines commonly encountered issues with Excel. For error messages produced by the calculator and how to resolve them, please see the "Error Handling" section of this guide.

Enabling macros in MS Excel

Macros enable the code configured in Visual Basic Application (VBA) of Excel to run. The baseline methodology parameters and calculation steps are written into VBA as well as instructions to the calculator, such as to where to populate the results. If macros are disabled, the calculator will not be able to run.

To enable macros in Excel, go to:

1. File

2. Options

3. Trust Center

4. Microsoft Excel Trust Center → Trust Center Settings…

5. Macro Settings → select **"Enable all macros"** → OK

If this option is unavailable to you, please contact your system administrator for assistance.

Reoccurring errors

If you are experiencing repetitive error messages and have been unable to resolve this using the Error Handling section of this guide, the most fail-safe way to avoid further errors is to start fresh with a new, unused copy of the calculator. It is recommended that a new copy of the calculator is used for each time the calculator is run, i.e., each time the "calculate" button is selected.

Software requirements

The following software is required to run the calculator:

- Microsoft Excel

The calculator should be able to run on any version of Microsoft Excel where macros are enabled. The run time of each calculation may vary between different versions of Excel and depending on the operating system running Excel.

Chapter 5. Needing Help

Support Hub

For non-urgent issues, normal coverage is 8:00 AM to 6:00 PM on weekdays, Australian Eastern Standard Time (AEST).

IT assistance is requested through one of the following methods:

- Phone: 1300 AEMO 00 (1300 236 600)

- Contact Us form on AEMO's website

AEMO recommends participants call AEMO's Support Hub for all urgent issues.

Information to provide

Please provide the following information when requesting IT assistance from AEMO:

- Your name

- Organisation name

- Participant ID (if existing participant)

- System or application name

- Problem description

- Screenshots

Feedback

Your feedback is important and helps us improve our services and products. To suggest improvements, please contact AEMO's Support Hub.

References

Wholesale Demand Response: the landing page for the WDRM project provides information related to the project and its implementation for affected participants and other interested parties.

WDRM Predictability of Load (PoL) Calculator: the landing page for the PoL Calculator provides context and supporting information for those planning to use the calculator as well as hosts the attachments for the calculator and this user guide.

Baseline Eligibility Metrics and Compliance Policy: provides information on the bias and accuracy metrics and thresholds as well as the statistical analyses used to determine these values.

Baseline Methodology Register: provides information about the distinguishing settings of each of the four available baseline methodologies to understand how the logic applied to baseline metrics differ.

Glossary

Abbreviation	Explanation
AEST	Australian Eastern Standard Time
DRSP	Demand Response Service Provider
MW	Megawatt
PoL	Predictability of Load
WDRM	Wholesale Demand Response Mechanism