



WEM Settlement Statement and Invoice Technical Guide

August 2021

Important notice

PURPOSE

The Australian Energy Market Operator (AEMO) has prepared this document to provide information about the Wholesale Electricity Market Settlement Statements and Invoices as at the date of publication.

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VERSION CONTROL

Version	Release date	Changes
1.0	25/08/2021	Initial Publication

DOCUMENT APPROVAL

Name	Position	Date
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1. Introduction

1.1 Relationship with the WEM Rules

This document is the WEM Settlement Statement and Invoice Technical Guide. It provides general information about the formats of the Wholesale Electricity Market Settlement Statements and Invoices produced by AEMO in accordance with the WEM Rules.

1.2 Purpose

The document provides the formats of the STEM Settlement Statements, Non-STEM Settlement Statements, adjusted Non-STEM Settlement Statements, and Invoices produced by the WEM PaSS system in accordance with the WEM Rules.

1.3 Application

This document applies to:

- AEMO who is required to issue Settlement Statement and Invoices to Rule Participants; and
- Rule Participants who are required to pay amounts owing on Invoices, or who are to receive amounts owing on Invoices.

All references to rules and procedures relate to the WEM.

This document is effective for all NSTEM and STEM trading periods with settlement Invoices issued on or after 1 August 2021 (in Production).

1.4 Supporting documentation

This guide should be in conjunction with the following documents:

- [WEM Metering, Settlement and Prudential Calculations](#)¹
- [Market Procedure: Settlement](#)²

1.5 Terms and abbreviations

The terms and abbreviations used in this document are outlined in Table 2.

Table 1 Terms and abbreviations

Abbreviation	Expanded name
AEMO	Australian Energy Market Operator
API	Application Programming Interface
Formulation	WEM Metering, Settlement and Prudential Calculations formulation document
MPI	Market Participant Interface
PCS	Product Configuration Specification

¹ Available at <https://aemo.com.au/en/energy-systems/electricity/wholesale-electricity-market-wem/procedures-policies-and-guides/guides>

² Available at <https://aemo.com.au/en/energy-systems/electricity/wholesale-electricity-market-wem/procedures-policies-and-guides/procedures>

Abbreviation	Expanded name
RC	Reserve Capacity
RCM	Reserve Capacity Mechanism
RoPE	Reduction of Prudential Exposure
WEMS	Wholesale Electricity Market System
WEM PaSS	Wholesale Electricity Market Prudential and Settlement Service

1.6 Further information

Please contact WA Market Operations for further information regarding the materials contained in this document.

Contact	Telephone	Email
Duty Operator – primary WA Market Operations contact number during office hours, after hours, weekends, and public holidays	1300 989 797	wa.operations@aemo.com.au

2. Calculation Formulation

2.1 Overview

The WEM PaSS is built on the basis of the independently certified WEM Metering, Settlement and Prudential Calculation document (the "Formulation"). This document creates a mathematically accurate representation of the WEM Rules, including:

- Representation of sets for use within the document;
- Mathematical equation representation of the WEM Rules;
- Specifications for variables used by the WEM PaSS system;
- Trading Margin calculation for Participants on a given Trading Day;
- Monthly (NSTEM) and Weekly (STEM) settlement; and
- Input estimation methodology for Prudential calculations.

This Formulation is the foundation for the prudential and settlement calculations implemented in AEMO's software.

2.2 Version

AEMO publishes the Formulation as a PDF file and as a text file.

The latest version of the Formulation can be found under [guides and useful information](#)³ on the AEMO Website.

³ Available at <https://aemo.com.au/en/energy-systems/electricity/wholesale-electricity-market-wem/procedures-policies-and-guides/guides>

3. Settlement Statements

3.1 Overview

AEMO provides Settlement Statements in two parts:

- Settlement Statement Summary: the high-level summary of a Settlement Statement for a Trading Week or Trading Month, associated with a Rule Participant.
- Settlement Statement Detail: the low-level details of a Settlement Statement for a Trading Day, associated with a Rule Participant.

Prior to the commencement of the WEM PaSS system, the Settlement Statement Detail was called the Participant Information Report (PIR).

Artefact	Content
Settlement Statement Summary	<ul style="list-style-type: none">• Contains the variables outlined in Section 4.12.3 "Variable Categorisation" of the Formulation.• Provided in granularity D (daily) and scope P (participant).
Settlement Statement Detail	<ul style="list-style-type: none">• Contains the variables in Section 4 "Calculation Engine" of the Formulation.• Contains the variables in Section 3 "Metering Schedules" of the Formulation as input values when those variables are used by the formulas in Section 4 "Calculation Engine".• Provided in the various granularities and scopes outlined in Section 1 "Introduction" of the Formulation.

3.2 Settlement Statement Summary artefacts

3.2.1 JSON format

AEMO provides the Settlement Statement Summary in JSON format through an API.

The API model can be found in the WEM PaSS API documentation provided in Swagger (see Section 0).

3.2.2 CSV format

AEMO provides the Settlement Statement Summary in CSV format through WEMS MPI.

Field	Description	Type	Format and Example
RunId	The identifier of the settlement run	Integer	e.g. 50000
PublishedAt	The time the calculation was published by AEMO	String	yyyy-MM-ddTHH:mm:ss e.g. 2021-01-07T15:30:45
MarketType	The market type of the settlement run	String	STEM NSTEM
Designation	The designation of the settlement run used to indicate an initial calculation or an adjustment calculation	String	INITIAL for STEM, INITIAL ADJ1 ADJ2 ADJ3 for NSTEM
Period	The name of the settlement run as either the Trading Week or Trading month	String	TW WW/YY for STEM, MMM YYYY for NSTEM e.g. TW 30/21, Jun 2021
PeriodFrom	The Trading Day at the start of the settlement run	String	dd/mm/yyyy e.g. 01/06/2021
PeriodTo	The Trading Day at the end of the settlement run	String	dd/mm/yyyy e.g. 30/06/2021

Field	Description	Type	Format and Example
ParticipantId	The identifier of the Rule Participant associated with the settlement run	String	e.g. IMOWA
Variable	The variable associated with the settlement run	String	VariableName_P_D e.g. BSAD_P_D, BSAS_P_D
Timestamp	The Trading Day associated with the Variable	String	dd/mm/yyyy e.g. 15/06/2021
P Or C	Indicates whether the Variable is a payment from AEMO to the Rule Participant (Payment) or a charge paid by the Rule Participant to AEMO (Charge)	String	Payment Charge
GST Applicable	Indicates if GST is applicable (Y) or if GST is not applicable (N) to the Variable	String	Y N
Value	The value associated with the Variable	Number	Decimal(23,8) e.g. 123.12345678

3.3 Settlement Statement Detail artefacts

3.3.1 JSON format

AEMO provides the Settlement Statement Detail in JSON format through an API.

The API model can be found in the WEM PaSS API documentation provided in Swagger (see Section 0).

3.3.2 CSV format

AEMO provides the Settlement Statement Detail as a single ZIP file through WEMS MPI. The ZIP file contains one CSV file per Trading Day in the Trading Week or Trading Month.

Field	Description	Type	Format and Example
RunId	The identifier of the settlement run	Integer	e.g. 50000
PublishedAt	The time the calculation was published by AEMO	String	yyyy-MM-ddTHH:mm:ss e.g. 2021-01-07T15:30:45
MarketType	The market type of the settlement run	String	STEM NSTEM
Designation	The designation of the settlement run used to indicate an initial calculation or an adjustment calculation	String	INITIAL for STEM, INITIAL ADJ1 ADJ2 ADJ3 for NSTEM
Period	The name of the settlement run as either the Trading Week or Trading month	String	TW WW/YY for STEM, MMM YYYY for NSTEM e.g. TW 30/21, Jun 2021
PeriodFrom	The Trading Day at the start of the settlement run	String	dd/mm/yyyy e.g. 01/06/2021
PeriodTo	The Trading Day at the end of the settlement run	String	dd/mm/yyyy e.g. 30/06/2021
ParticipantId	The identifier of the Rule Participant associated with the settlement run	String	e.g. IMOWA
Settlement Trading Day	The Trading Day associated with the settlement run	String	dd/mm/yyyy e.g. 15/06/2021

Field	Description	Type	Format and Example
Variable	The variable associated with the settlement run	String	Name_Granularity_Scope e.g. MAXTES_F_I, BP_G_I, BSA_P_D, MFRATE_G_FY, RCP_F_CY
Scope	The identifier for the scope associated with the Variable, which changes depending on whether the Variable relates to a tranche, channel, NMI, contract, facility, participant, or global	String	e.g. Facility_GT1, Facility_WF1, IMOWA, Global, 8008008000
Timestamp	The time period associated with the Variable, which changes depending on the granularity of the Variable	String	dd/mm/yyyy hh:mm e.g. 01/10/2020 00:00, 17/10/2020 08:00
Value	The value associated with the Variable	Number	Decimal(23,8) e.g. 123.12345678

4. Settlement Invoices

4.1 Overview

Settlement Invoices contain an itemised list of payments from AEMO to the Rule Participant and charges paid by the Rule Participant to AEMO that are associated with the Settlement Statement.

Invoices are issued for initial Settlement Statements and adjusted Settlement Statements.

Artefact	Content
Invoice for initial Settlement Statement	<ul style="list-style-type: none"> Contains line items for the variables outlined in Section 4.12.3 “Variable Categorisation” of the Formulation. Provided in granularity X (Trading Week for STEM and Trading Month for Non-STEM) and scope P (participant). For each line item, aggregate to a Trading Week or Trading Month, then display the total amount calculated for the current run.
Invoice for adjusted Settlement Statement	<ul style="list-style-type: none"> Contains line items for the variables outlined in Section 4.12.3 “Variable Categorisation” of the Formulation. Provided in granularity X (Trading Week for STEM and Trading Month for Non-STEM) and scope P (participant). For each line item, aggregate to a Trading Week or Trading Month, then display the difference between the amount calculated for the current run to the amount calculated for the previous run.
“Transition” Invoice for adjusted Settlement Statement ⁴	<ul style="list-style-type: none"> Displays each line item from the old system, aggregated for all previous runs for the same period, and then negated. Displays each line item from the WEM PaSS current run: <ul style="list-style-type: none"> Contains lines item for the variables outlined in Section 4.12.3 “Variable Categorisation” of the Formulation. Provided in granularity X (Trading Week for STEM and Trading Month for Non-STEM) and scope P (participant).

4.2 Invoice sections

Invoices contain various sections of information in accordance with the WEM Rules and Australian tax legislation.

Section	Content	Application
Payment Summary	<ul style="list-style-type: none"> Lists all GST applicable payments and charges line items. Lists all GST not applicable payments and charges line items. Displays total amount payable for all listed items, less any prepayments applied. Displays prepayment balance, less any prepayments applied. 	<ul style="list-style-type: none"> All Invoices
Recipient Created Tax Invoice (RCTI)	<ul style="list-style-type: none"> Supplier is the Participant and Recipient is AEMO. Lists all GST applicable payments line items, negated. Lists all GST not applicable payments line items, negated. Displays total payable by AEMO for the listed items. 	<ul style="list-style-type: none"> All Invoices
Tax Invoice	<ul style="list-style-type: none"> Supplier is AEMO and Recipient is the Participant. Lists all GST applicable charges line items. 	<ul style="list-style-type: none"> All Invoices

⁴ AEMO provides special “transition” Invoices for adjusted Settlement Statements where the previous run was performed in the old system and the current run was performed in WEM PaSS. In this scenario, AEMO cannot compare the old line items to the new line items via a one-to-one mapping, and as such, these Invoices are presented differently.

	<ul style="list-style-type: none"> • Lists all GST not applicable charges line items. • Displays total payable to AEMO for the listed items. 	
Adjustment Information	<ul style="list-style-type: none"> • Displays difference between current run and previous run for the Recipient Created Tax Invoice. • Displays difference between current run and previous run for Tax Invoice. 	<ul style="list-style-type: none"> • Only Invoices for adjusted Settlement Statements

4.3 Invoice artefacts

4.3.1 JSON format

AEMO provides Invoices in JSON format through an API and WEMS MPI.

The API model can be found in the WEM PaSS API documentation provided in Swagger (see Section 0).

4.3.2 PDF file format

AEMO provides Invoices in PDF file format through an API and WEMS MPI.

The API can be found in the WEM PaSS API documentation provided in Swagger (see Section 0).

4.4 Map of Invoice line items

One-to-one mappings for all variables do not exist. The table below may be used to help map previous Invoice line items to WEM PaSS Invoice line items.

Refer to Section 4.12.3 "Variable Categorisation" of the Formulation for information on WEM PaSS payments and charges, and for understanding how these payments and charges are related.

Category	WEM PaSS Variables	=	Previous Settlements Variables
Market Fee charges	$\sum_{d \in D(m)} MFSAD_P_D$	=	$-MPMFSA$
Market Fee payments	$\sum_{d \in D(m)} MFSAS_P_D$	=	$MFRRSA$
Regulator Fee charges	$\sum_{d \in D(m)} RFSAD_P_D$	=	$-MPRFSA$
Regulator Fee payments	$\sum_{d \in D(m)} RFSAS_P_D$	=	$RFRRSA$
System Management Fee charges	$\sum_{d \in D(m)} SFSAD_P_D$	=	$-MPSOFSFA$
System Management Fee payments	$\sum_{d \in D(m)} SFSAS_P_D$	=	$SOFRRSA$
Coordinator Fee charges	No equivalents (was not calculated in previous settlement system)		
Coordinator Fee payments			
STEM charges	$STEMSAD_P_D$	=	$-\sum_{i \in I(d)} STEMSAD$
STEM payments	$STEMSAS_P_D$	=	$\sum_{i \in I(d)} STEMSAS$
Load Following payments	$\sum_{d \in D(m)} LFSA_P_D$	=	$LFASMP$
Contracted Ancillary Service payments	$\sum_{d \in D(m)} (CASD_P_D + CASL_P_D + CASR_P_D + CASSR_P_D)$	=	$ASPSAS$
Uncontracted Ancillary Service payments	$\sum_{d \in D(m)} (UASLR_P_D + UASSR_P_D)$	=	$VASPP$
Ancillary Service charges	$\sum_{d \in D(m)} (COSTLR_P_D + COSTD_P_D + SRAC_P_D + LFCC_P_D + LFMC_P_D)$	=	$-ASSAD$
Balancing Market payments	$BSAS_P_D$	=	$\sum_{i \in I(d)} BSA$
Balancing Market charges	$BSAD_P_D$	=	$-\sum_{i \in I(d)} BDA$
Constrained On payments	$CONC_P_D$	=	$\sum_{i \in I(d)} CONC$
Constrained Off payments	$COFFC_P_D$	=	$\sum_{i \in I(d)} COFFC$

Category	WEM PaSS Variables	=	Previous Settlements Variables
Reconciliation charges	$\sum_{d \in D(m)} (CCDSMT3C_P_D + LRSF_P_D)$	=	$-(RSAD + RSAS)$
Tranche 3 Non-Balancing Facility DIP	$DIPT3_P_D$	=	$\sum_{i \in I(d)} NBF_DIP$
Changed Outage payments	$\sum_{d \in D(m)} COCP_P_D$	=	$OCSAS$
Changed Outage charges	$\sum_{d \in D(m)} COCC_P_D$	=	$-OCSAD$
Generator Capacity payments	$\sum_{d \in D(m)} GCCSA_P_D$	=	$NAGC_Payment$
DSM Capacity payments	$\sum_{d \in D(m)} DSMCCSA_P_D$	=	$DSMC_Payment + DSP_PR$
TRCC charges	$\sum_{d \in D(m)} TRCC_P_D$	=	$ITRCC$
SRCC charges	$\sum_{d \in D(m)} SRCC_P_D$	=	$ISRCC$
Intermittent Load Refund charges	$\sum_{d \in D(m)} IMLR_P_D$	=	$IILR$
Load Following Capacity Rebate payments	$\sum_{d \in D(m)} LFREBATE_P_D$	=	$RCLFRCR$
Capacity Cost Refunds charges	$\sum_{d \in D(m)} CCR_P_D$	=	CCR
Capacity Cost Refunds payments	$\sum_{d \in D(m)} CAPREBSA_P_D$	=	$RCREFCR$
Capacity Credit Overallocation payments	$\sum_{d \in D(m)} CCAOASA_P_D$	=	$Over_Allocation_Payment$
Capacity Special Price Arrangement payments	$\sum_{d \in D(m)} SPACCSA_P_D$	=	$NASPA_Payment$
Supplementary Capacity payments	$\sum_{d \in D(m)} SUPCAPSA_P_D$	=	$SC_Payment$
Tranche 2 DSM Dispatch payments	$\sum_{d \in D(m)} DIPT2_P_D$	=	$RCDSMDP$

5. Swagger

AEMO uses the third party Swagger platform to document the APIs for the WEM PaSS system and share the information with Rule Participants.

To utilise the APIs, a web certificate must be obtained from AEMO. Please contact WA Market Operations if you require a certificate (see Section 1.6). Web certificates are issued by Digicert and are replaced annually. Rule Participants using web services should ensure their systems trust certificates issued by this authority.

API information	URL
Swagger documentation	https://wems.aemo.com.au/prudential/api/docs/
End points (hostname)	<ul style="list-style-type: none">• Market Trial: wems-mkt.aemo.com.au• Production: wems.aemo.com.au