Material constrained portfolio determination

Quarter 1 - 2025

29 May 2025

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Executive summary

This is the Economic Regulation Authority's determination of material constrained portfolios in the Wholesale Electricity Market (WEM), from constraint data in the three-month rolling test window from 8:00am 1 January 2025 to 7:59am 1 April 2025.[1]

This set of material constrained portfolios replaces the set of material constrained portfolios published by the ERA on 25 February 2025.[2] We have followed the WEM Procedure for portfolio determinations to derive this set.[3]

This determination is part of the WEM Rules' market power mitigation framework, which aims to focus regulatory monitoring and surveillance efforts on those entities with the greatest potential to exercise market power. The ERA monitors market participants' price offers in the Real-Time Market to ensure that they are compliant with the general trading obligations, with particular focus on those facilities assigned to a material constrained portfolio.[4]

Material constrained portfolios contain those facilities that have the potential to exert localised market power due to network constraints.[5] Market participants whose facilities received energy uplift payments in more than 10 per cent of relevant intervals over the associated three-month rolling test window are part of a material constrained portfolio.[6] All facilities identified in the material constrained portfolios must comply with the requirements under the WEM Rules, which includes record keeping obligations on offer price construction.[7]

Importantly, we still monitor the behaviour of market participants whose facilities are not included in these material constrained portfolios. The ERA monitors all market participant bidding in all intervals, as required by the WEM Rules. The ERA expects all market participants to comply with the offer construction guidelines, as required by the WEM Rules.[8]

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[1] The ERA must make its material constrained portfolios determination within 20 business days after the settlement date, as required by the Wholesale Electricity Market Rules (WA), 10 March 2025, Rule 2.16C.2, (online).

[2] Economic Regulation Authority, 25 February 2025, *Material constrained portfolio determination Q4 2024*, (online), and Wholesale Electricity Market Rules (WA), 10 March 2025, Rule 2.16C.2A, (online).

[3] Economic Regulation Authority, 27 November 2024, *WEM Procedure: Portfolio Determination*, (online).

[4] Wholesale Electricity Market Rules (WA), 10 March 2025, Rule 2.16C.4(b), (online).

[5] Energy Policy Western Australia, *Market Power Mitigation Strategy: Information Paper*, 10 November 2022, p. 21, (online).

[6] Wholesale Electricity Market Rules (WA), 10 March 2025, Rule 2.16C.2, (online). A 'relevant interval' is an interval in which the network constraint equation, for which the constrained portfolio was assigned, bound.

[7] Further information is available in Economic Regulation Authority, January 2025, *Offer Construction Guideline*, Chapter 8, (online). The record keeping requirement is in the Wholesale Electricity Market Rules (WA), 10 March 2025, Rule 2.16C.3, (online).

[8] Wholesale Electricity Market Rules (WA), 10 March 2025, Section 2.16D, (online).

1. Introduction

The market power mitigation framework requires the ERA to complete two processes to identify those facilities with the greatest potential to exercise market power in the Real-Time Market. These processes are to:

1. Identify portfolios of facilities, and of these portfolios, those that are material portfolios.[9] The ERA published its latest portfolio and material portfolio determination on 10 October 2024.[10]

2. Identify those portfolios of facilities with the potential to exercise localised market power, due to network constraints that bound and affected dispatch in the Real-Time Market. These portfolios are called material 'constrained' portfolios.[11]

This determination uses the portfolios published on 10 October 2024, the network constraints that bound, and the facilities that received uplift payments related to those binding network constraints, as inputs to the assessment. Those facilities that received constrained uplift payments in 10 per cent or more of relevant intervals over the three-month rolling test window (from 8:00am 1 January 2025 to 7:59am 1 April 2025) are considered material constrained portfolios.

As per the WEM Rules, all market participants with facilities that are determined to be in a material constrained portfolio must keep adequate records to substantiate and justify their offers into the WEM.[12]

1.1 ERA's determination process

To make this determination, the ERA:

1. Identified the constrained portfolios of facilities on 29 May 2025.[13]

2. Identified each material constrained portfolio, published this determination and notified the affected market participants of their registered facilities being classified under a material constrained portfolio on 29 May 2025.[14]

To identify the constrained portfolios, the ERA:

1. Identified each constraint equation that bound for at least one interval during the three-month rolling test window.

2. Identified each constrained portfolio of facilities for each identified constraint equation.

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[9] Wholesale Electricity Market Rules (WA), 10 March 2025, Rules 2.16B.1 and 2.16C.1, (online).

[10] Economic Regulation Authority, 10 October 2024, *Portfolio identification and material portfolio – Determination*, (online).

[11] Energy Policy Western Australia, *Market Power Mitigation Strategy: Information Paper*, 10 November 2022, p. 11, (online).

[12] Wholesale Electricity Market Rules (WA), 10 march 2025, Rule 2.16C.3, (online).

[13] Ibid, 2.16B.2, (online).

[14] Ibid, 2.16C.2, (online).

To identify each material constrained portfolio, the ERA:

1. Calculated the constrained uplift payment ratio for each constrained portfolio, for both the three-month rolling test window and any relevant fixed assessment period.[15]

2. Classified those constrained portfolios with constrained uplift payments in more than 10 per cent of all relevant intervals for which the relevant network constraint bound within the three-month rolling test window as material constrained portfolios.

1.2 Record keeping obligations for facilities that are part of a material constrained portfolio

All market participants with facilities that are part of a material constrained portfolio must ensure that adequate records are kept that can be independently verified to support a market participant's price offers for those facilities made in the real-time market, within three months of receiving the notice from the ERA.

An example of the types of records that are required include:

- Internal governance arrangements.
- Methods, assumptions, and cost inputs.

This includes those documents that market participants use to develop their prices, quantities, and ramp rates for each identified facility.

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[15] This includes any Fixed Assessment Periods during the rolling test window, which is a period of at least seven consecutive trading days in which a relevant constraint equation has bound continuously within a rolling test window. This is defined in the Wholesale Electricity Market Rules (WA), 10 March 2025, Chapter 11, (online).

2. Assessment of constrained portfolios

The ERA has completed its assessment of constrained portfolios and identified each constraint equation for network constraints that bound within the rolling test window. Constraint equations are a mathematical representation of a constraint or limitation on how electricity can be transferred over parts of the network.[16] A constraint equation is considered binding when AEMO applies a constraint to limit the risk to power system security or reliability. When a constraint equation is applied, those registered facilities that are located behind that constraint are assigned to a constrained portfolio. The constrained portfolio includes all registered facilities behind the constraint equation that are in the same portfolio.

The ERA identified 140 unique binding network constraint equations in the rolling test window. This resulted in identification of 791 unique constrained portfolios. A full list of constraint equations and constrained portfolios is included in Appendix 4.

The ERA used the portfolios identified in October 2024 for this constrained portfolio identification process.[17]

2.1 Constraint equation identification

The ERA identified 140 unique binding network constraint equations over the rolling test window. The ERA used AEMO's constraint equation data to identify all network constraints that bound during the rolling test window. The data was filtered to include data for binding network constraints only from within the rolling test window. AEMO publishes this data on its public data site, which is embedded in the dispatch solution files.[18]

2.2 Constrained portfolio identification

The ERA identified 791 unique constrained portfolios over this rolling test window. The constrained portfolios consist of those registered facilities assigned to portfolios in the ERA's portfolio determination and where the facility is located behind a binding network constraint.[19] Registered facilities can be assigned to multiple constrained portfolios.[20]

Six facilities appear in constraint equation formulation but have not yet been considered in a portfolio determination process.[21,22] This is because these facilities have joined or have initiated a process of joining the WEM since the last portfolio determination. Many of these facilities are already flagged for inclusion in the upcoming portfolio determination, as per the ERA's recent updates to the published list of portfolios.[23] However, as the facilities are yet to be assigned to a portfolio, they have not been assigned to a constrained portfolio. The timing of these processes will mean facilities are excluded from material constrained portfolio

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[16]   Wholesale Electricity Market Rules (WA) 10 March 2025, Chapter 11, (online).

[17]   Economic Regulation Authority, 10 October 2024, *Portfolio Identification and Material Portfolio Determination*, p. 3, (online).

[18]   Australian Energy Market Operator, Market Data Western Australia, (online).

[19]   Economic Regulation Authority, 10 October 2024, *Portfolio Identification and Material Portfolio Determination*, p. 3, (online).

[20]   Wholesale Electricity Market Rules (WA) 10 March 2025, Rule 2.16B.3, (online).

[21]   ALINTA_WGP_ESR1, COLLIE_BESS2, ERRRF_WTE_G1, KWINANA_ESR2, PHOENIX_KWINANA_WTE_G1, SBSOLAR1_CUNDERDIN_PV1

[22]   Economic Regulation Authority, 10 October 2024, *Portfolio Identification and Material Portfolio Determination*, p. 3, (online).

[23]   Economic Regulation Authority, *Update to published list of Portfolios: WEM Rule 2.16B.5*, p.3-4, (online).

determinations until they are properly assessed as part of the portfolio determination process which concludes in October each year.

The ERA uses a combination of data provided by AEMO and information available in AEMO's public constraints library as part of its process for identifying the constrained portfolios.[24]

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[24] Australian Energy Market Operator, 'Operational Constraints Library', (online).

3. Material constrained portfolio determination

After identifying the constrained portfolios over a rolling test window, the ERA must determine the material constrained portfolios by calculating and applying the materiality threshold specified in the WEM Rules to the constrained uplift payment ratio (see section 3.1). The ratio is the number of dispatch intervals where a network constraint bound and registered facilities within the relevant constrained portfolio received an energy uplift payment, compared to the total number of dispatch intervals in which the constraint equation bound, expressed as a percentage.

A material constrained portfolio is a constrained portfolio that meets or exceeds the 10 per cent threshold in its constrained uplift payment ratio. The ERA has notified market participants that have registered facilities allocated to a material constrained portfolio. The ERA monitors any prices offered by the market participant in the real time market, in line with the materiality test.[25,26]

Market participants have three months from the date of receipt of a material constrained portfolio determination notice to maintain additional records to support their compliance with the general trading obligations under the WEM Rules.[27] Additional guidance regarding the record keeping obligations is available in the WEM procedure detailing portfolio determinations and in the offer construction guideline.[28,29]

3.1 Constrained uplift payment ratio

The ERA identifies those constrained portfolios that have received energy uplift payments in 10 per cent or more relevant dispatch intervals within the rolling test window.[30] Where this occurs, the constrained portfolio is deemed to be a material constrained portfolio and the facilities within each material constrained portfolio are considered to have the potential to exercise market power when located behind a network constraint.

The calculation of the constrained uplift payment ratio is:[31]

$$Constrained\ Uplift\ Payment\ Ratio = \frac{CP\_UP}{NC} \times 100$$

where:

i. *CP_UP* is the number of dispatch intervals in the rolling test window or fixed assessment period (as applicable) in which:

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[25] Wholesale Electricity Market Rules (WA) 10 March 2025, Rule 2.16C.2(d), (online).

[26] Ibid, Rule 2.16C.4, (online).

[27] Ibid, Section 2.16C.3, (online).

[28] Economic Regulation Authority, 27 November 2024, *WEM Procedure: Portfolio Determination*, p.9-10, (online).

[29] Economic Regulation Authority, 20 January 2025, *Offer Construction Guideline*, p. 6, (online).

[30] This includes any Fixed Assessment Periods during the rolling test window which is a period of at least seven consecutive trading days in which a relevant constraint equation has bound continuously within a rolling test window. This is defined in Wholesale Electricity Market Rules (WA), 10 March 2025, Chapter 11, (online).

[31] Wholesale Electricity Market Rules (WA), 10 March 2025, Rule 2.16C.2(a), (online).

1. The constraint equation relevant to the identification of the constrained portfolio identified under clause 2.16B.2(a) bound; and

2. A registered facility in the constrained portfolio received an energy uplift Payment; and

ii. NC is the total number of dispatch intervals in the rolling test window or fixed assessment period (as applicable) in which the constraint equation relevant to the identification of the constrained portfolio bound.

3.2 Constrained uplift payment ratio calculation results

The constrained uplift payment ratio calculation is applied to the rolling test window and in any relevant fixed assessment periods.[32] The calculation returned 102 of 791 identified constrained portfolios with a non-zero result.

Full results of the calculation are provided in Appendix 4.

3.3 Material constrained portfolios

The constrained uplift payment ratio calculation resulted in 83 material constrained portfolios, capturing a total of 30 different facilities, belonging to 14 different market participants.

Table 1 lists all material constrained portfolios. These are identified as all constrained portfolios that met or exceeded the 10 per cent threshold of the constrained uplift payment ratio calculation. In this rolling test window, two fixed assessment periods were identified to have occurred on 10 and 14 March 2025.[33] The constrained uplift payment ratios for the constrained portfolios during the fixed assessment periods are the same as during the rolling test window.

This list of material constrained portfolios replaces the previously published list of material constrained portfolios.[34] Differences between this material constrained portfolio determination and the previous determination are detailed in Section 3.5.

Table 1: **List of material constrained portfolios**

Constrained portfolio	Constraint equation	Registered facility	Constrained uplift payment ratio (%)[35]
6	MRT81-MNC > {WMK G501} [MU-NGS X1 (MU~)]	MERSOLAR_PV1	25
11	MRT81-MNC > {WMS G501} [MU-NGS X1 (MU~)]	MERSOLAR_PV1	26

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[32] Economic Regulation Authority, *WEM Procedure: Portfolio Determination*, 27 November 2024, 4.2.1, (online).

[33] Fixed Assessment Period is a period of at least seven consecutive Trading Days in which the Constraint Equation relevant to the identification of a Constrained Portfolio has continuously bound within a Rolling Test Window. This is defined in Wholesale Electricity Market Rules (WA), 10 March 2025, Chapter 11, (online).

[34] Wholesale Electricity Market Rules (WA), 10 March 2025, Rule 2.16C.2A, (online).

[35] Value rounded to the nearest percentage point.

Constrained portfolio	Constraint equation	Registered facility	Constrained uplift payment ratio (%)[35]
20	MRT81-MNC > {MRS-MRT X1} [MU-NGS X1 (MU~)]	INVESTEC_COLLGAR_WF1	56
25	NetworkCommit(PINJAR_GT5) * {NIL} [On(PINJAR_GT5)]	PINJAR_GT5	96
35	NIL > {PJR-CTB 81} [PJR-RGN 81 (RGN~)]	PINJAR_GT1 PINJAR_GT10 PINJAR_GT11 PINJAR_GT2 PINJAR_GT3 PINJAR_GT4 PINJAR_GT5 PINJAR_GT7 PINJAR_GT9	12
36	NetworkCommit(NEWGEN_KWINANA_CCG1) * {NIL} [On(NEWGEN_KWINANA_CCG1)]	NEWGEN_KWINANA_CCG1	100
44	NetworkCommit(PINJAR_GT11) * {NIL} [On(PINJAR_GT11)]	PINJAR_GT11	92
45	NetworkCommit(PINJAR_GT7) * {NIL} [On(PINJAR_GT7)]	PINJAR_GT7	69
46	NetworkCommit(PINJAR_GT4) * {NIL} [On(PINJAR_GT4)]	PINJAR_GT4	87
47	NetworkCommit(NEWGEN_KWINANA_CCG1_SteamBypass) * {NIL} [On(NEWGEN_KWINANA_CCG1)]	NEWGEN_KWINANA_CCG1	100
48	#E 1*PRK_AG >= 1 id-898	PRK_AG	80
68	NIL > {MRS-MRT X1} [MU-NGS X1 (MU~)]	INVESTEC_COLLGAR_WF1	16
70	NIL > {MRS-MRT X1} [MU-NGS X1 (MU~)]	STHRNCRS_EG	42
79	NIL > CVP0 {RO-WAI 81} [PNJ-APJ 81 (APJ~)]	TESLA_PICTON_G1	24
82	NIL > CVP0 {RO-WAI 81} [PNJ-APJ 81 (APJ~)]	PRK_AG	26
85	NIL > CVP0 {RO-WAI 81} [PNJ-APJ 81 (APJ~)]	NAMKKN_MERR_SG1	22

Constrained portfolio	Constraint equation	Registered facility	Constrained uplift payment ratio (%)[35]
86	NIL > CVP0 {RO-WAI 81} [PNJ-APJ 81 (APJ~)]	TESLA_KEMERTON_G1	15
89	NIL > CVP0 {PIC-PNJ-BSN-KEM 81} [PNJ-APJ 81 (APJ~)]	TESLA_PICTON_G1	34
93	NIL > CVP0 {PIC-PNJ-BSN-KEM 81} [PNJ-APJ 81 (APJ~)]	TESLA_KEMERTON_G1	12
96	NIL > CVP0 {PIC-PNJ-BSN-KEM 81} [PNJ-APJ 81 (APJ~)]	PRK_AG	28
99	NIL > CVP0 {PIC-PNJ-BSN-KEM 81} [PNJ-APJ 81 (APJ~)]	NAMKKN_MERR_SG1	30
102	NIL > CVP0 {PIC-PNJ-BSN-KEM 81} [PNJ-APJ 81 (APJ~)]	COLLIE_G1 KEMERTON_GT11 KEMERTON_GT12	12
127	NIL > {NT-PJR 81} [JDP-WNO 81 (WNO~)]	PINJAR_GT1 PINJAR_GT10 PINJAR_GT11 PINJAR_GT2 PINJAR_GT3 PINJAR_GT4 PINJAR_GT5 PINJAR_GT7 PINJAR_GT9	14
148	AvoidDecommit(SWIS) * {NIL} [On(PINJAR_GT3)]	PINJAR_GT3	48
149	AvoidDecommit(SWIS) * {NIL} [On(PINJAR_GT2)]	PINJAR_GT2	52
150	AvoidDecommit(SWIS) * {NIL} [On(PINJAR_GT10)]	PINJAR_GT10	44
151	AvoidDecommit(SWIS) * {NIL} [On(PINJAR_GT7)]	PINJAR_GT7	51
152	AvoidDecommit(SWIS) * {NIL} [On(PINJAR_GT1)]	PINJAR_GT1	60
153	AvoidDecommit(SWIS) * {NIL} [On(TESLA_PICTON_G1)]	TESLA_PICTON_G1	74

Constrained portfolio	Constraint equation	Registered facility	Constrained uplift payment ratio (%)[35]
154	AvoidDecommit(SWIS) * {NIL} [On(PINJAR_GT5)]	PINJAR_GT5	30
155	AvoidDecommit(SWIS) * {NIL} [On(PINJAR_GT11)]	PINJAR_GT11	50
163	AvoidDecommit(SWIS) * {NIL} [On(PINJAR_GT4)]	PINJAR_GT4	61
164	AvoidDecommit(SWIS) * {NIL} [On(PRK_AG)]	PRK_AG	95
165	AvoidDecommit(SWIS) * {NIL} [On(NAMKKN_MERR_SG1)]	NAMKKN_MERR_SG1	83
170	#E 1*TESLA_KEMERTON_G1 >= 7 id-907	TESLA_KEMERTON_G1	65
172	#E 1*TESLA_PICTON_G1 >= 7 id-909	TESLA_PICTON_G1	53
181	NIL > {NBT-NT 91, SPS_MARNET} [NBT-WNO 81 (NBT~)]	TESLA_GERALDTON_G1	18
186	NIL ^ LA3-LE7 {TST-TS 81} [TST-TS 81 (TS-), ENB-TS 81 (TS-), MOR-TS 81 (TS-)]	TESLA_GERALDTON_G1	67
192	NIL > CVP0 {KEM-MRR 81} [KEM-MRR 82 (KEM~)]	NAMKKN_MERR_SG1	67
203	NIL > CVP0 {KEM-MRR 81} [KEM-MRR 82 (KEM~)]	TESLA_PICTON_G1 TESLA_KEMERTON_G1	67
208	NIL > {MGA-TS 81} [TS-MBA 81 (TS~)]	TESLA_GERALDTON_G1	100
209	#E 1*TESLA_GERALDTON_G1 >= 9 id-910	TESLA_GERALDTON_G1	40
213	NIL > {KW-CC-MED 81} [WM81-RWA (WM~)]	NAMKKN_MERR_SG1	36
216	NIL > {KW-CC-MED 81} [WM81-RWA (WM~)]	PRK_AG	32
220	NIL > {KW-CC-MED 81} [WM81-RWA (WM~)]	COLLIE_ESR1	14
227	NIL > {KW-CC-MED 81} [WM81-RWA (WM~)]	TESLA_KEMERTON_G1 TESLA_PICTON_G1	36
232	NIL > CVP0 {CT-MSS-PNJ 81} [MH-PNJ 81 (PNJ~)]	TESLA_PICTON_G1 TESLA_KEMERTON_G1	14

Constrained portfolio	Constraint equation	Registered facility	Constrained uplift payment ratio (%)[35]
239	NIL > CVP0 {CT-MSS-PNJ 81} [MH-PNJ 81 (PNJ~)]	COLLIE_ESR1	21
246	NIL > CVP0 {CT-MSS-PNJ 81} [MH-PNJ 81 (PNJ~)]	NAMKKN_MERR_SG1	57
254	NIL > {KW-CC-MED 81} [RO81-RWA (RO-)]	NAMKKN_MERR_SG1	33
261	NIL > {KW-CC-MED 81} [RO81-RWA (RO-)]	COLLIE_ESR1	33
272	AvoidDecommit(SWIS) * {NIL} [On(TESLA_NORTHAM_G1)]	TESLA_NORTHAM_G1	20
273	AvoidDecommit(SWIS) * {NIL} [On(TESLA_GERALDTON_G1)]	TESLA_GERALDTON_G1	100
274	AvoidDecommit(SWIS) * {NIL} [On(TESLA_KEMERTON_G1)]	TESLA_KEMERTON_G1	100
276	#E 1*KEMERTON_GT11 >= 155 id-913	KEMERTON_GT11	79
277	#E 1*KEMERTON_GT12 >= 155 id-914	KEMERTON_GT12	52
283	NIL > {PIC-PNJ-BSN-KEM 81} [PNJ-APJ 81 (APJ~)]	TESLA_PICTON_G1	28
287	NIL > {PIC-PNJ-BSN-KEM 81} [PNJ-APJ 81 (APJ~)]	TESLA_KEMERTON_G1	27
298	NIL > {PIC-PNJ-BSN-KEM 81} [PNJ-APJ 81 (APJ~)]	COCKBURN_CCG1 KWINANA_GT2 KWINANA_GT3	28
300	NIL > {PIC-PNJ-BSN-KEM 81} [PNJ-APJ 81 (APJ~)]	TIWEST_COG1	16
364	ST-BTY 81, ST-EP 82 > {NT-EP-BEL 81} [SF-AMT 81 (SF~)]	PINJAR_GT1 PINJAR_GT10 PINJAR_GT11 PINJAR_GT2 PINJAR_GT3 PINJAR_GT4 PINJAR_GT5 PINJAR_GT7 PINJAR_GT9	14

Constrained portfolio	Constraint equation	Registered facility	Constrained uplift payment ratio (%)[35]
367	NetworkCommit(PINJAR_GT3) * {NIL} [On(PINJAR_GT3)]	PINJAR_GT3	75
376	ST-BTY 81, ST-EP 82 > {ST-SF 81} [NT81-NEB (NT~)]	PINJAR_GT1 PINJAR_GT10 PINJAR_GT11 PINJAR_GT2 PINJAR_GT3 PINJAR_GT4 PINJAR_GT5 PINJAR_GT7 PINJAR_GT9	25
427	NIL > {NT-SPK 81} [NT81-NEB (NT~)]	ALINTA_PNJ_U1	67
431	#E 1*TESLA_PICTON_G1 = 10 id-920	TESLA_PICTON_G1	97
432	#E 1*TESLA_KEMERTON_G1 = 10 id-919	TESLA_KEMERTON_G1	74
434	NetworkCommit(ALINTA_WGP_U2) * {NIL} [On(ALINTA_WGP_U2)]	ALINTA_WGP_U2	100
462	NT-NOR 81 > {D-SVY 81} [MW-WUN 71 (WUN-)]	MERSOLAR_PV1	100
469	#E 1*PRK_AG >= 7 id-933	PRK_AG	84
478	NetworkCommit(PRK_AG) * {NIL} [On(PRK_AG)]	PRK_AG	67
479	#E 1*PRK_AG >= 5 id-937	PRK_AG	79
506	NIL > {CGT-CGW X1} [MU-NGS X1 (MU~)]	INVESTEC_COLLGAR_WF1	100
522	NetworkCommit(ALINTA_WGP_GT) * {NIL} [On(ALINTA_WGP_GT)]	ALINTA_WGP_GT	97
524	NIL > {WMK G501} [MU-NGS X1 (MU~)]	MERSOLAR_PV1	31
534	NIL > {WMS G501} [MU-NGS X1 (MU~)]	MERSOLAR_PV1	27
570	MSR-KMK 81 * {NIL} [RegLower(TIWEST_COG1)]	TIWEST_COG1	59
571	MSR-KMK 81 * {NIL} [RegRaise(TIWEST_COG1)]	TIWEST_COG1	59

Constrained portfolio	Constraint equation	Registered facility	Constrained uplift payment ratio (%)[35]
572	MSR-KMK 81 * {NIL} [Manual(TIWEST_COG1)]	TIWEST_COG1	59
573	NetworkCommit(PINJAR_GT9) * {NIL} [On(PINJAR_GT9)]	PINJAR_GT9	95
594	PJR-YP 81 > {NBT-NT 91, SPS_MARNET} [NT-HBK 81 (HBK~)]	PINJAR_GT1 PINJAR_GT10 PINJAR_GT11 PINJAR_GT2 PINJAR_GT3 PINJAR_GT4 PINJAR_GT5 PINJAR_GT7 PINJAR_GT9	88
748	NIL > {PJR-ENB-EMD 81, PJR-CTB 81} [PJR-RGN 81 (RGN~)]	PINJAR_GT1 PINJAR_GT10 PINJAR_GT11 PINJAR_GT2 PINJAR_GT3 PINJAR_GT4 PINJAR_GT5 PINJAR_GT7 PINJAR_GT9	11
768	KW-KEM-OLY 91 > {LWT-ST 91} [PNJ81-PPBK (PNJ-)]	TIWEST_COG1	100
791	KW-KEM-OLY 91 > {PIC-PNJ-BSN-KEM 81} [PNJ-APJ 81 (APJ~)]	TIWEST_COG1	100

Source: ERA analysis of WEM data.

3.4 Market participants and facilities in a material constrained portfolio

Table 2 is a list of market participants with facilities that are part of a material constrained portfolio.

Table 2: Market participants and those facilities that are part of a material constrained portfolio

Market participant	Facility
ALINTA	ALINTA_PNJ_U1
ALINTA	ALINTA_WGP_GT
ALINTA	ALINTA_WGP_U2
COLLGAR	INVESTEC_COLLGAR_WF1
COL_BESS	COLLIE_ESR1
GLDFLDPW	PRK_AG
MERREDIN	NAMKKN_MERR_SG1
NEWGEN	NEWGEN_KWINANA_CCG1
STHRNCRS	STHRNCRS_EG
SUNAUST22	MERSOLAR_PV1
TIWEST	TIWEST_COG1
TSLA_GER	TESLA_GERALDTON_G1
TSLA_KEM	TESLA_KEMERTON_G1
TSLA_MGT	TESLA_PICTON_G1
TSLA_NOR	TESLA_NORTHAM_G1
WPGENER	COCKBURN_CCG1
WPGENER	COLLIE_G1
WPGENER	KEMERTON_GT11
WPGENER	KEMERTON_GT12
WPGENER	KWINANA_GT2
WPGENER	KWINANA_GT3
WPGENER	PINJAR_GT1
WPGENER	PINJAR_GT2
WPGENER	PINJAR_GT3
WPGENER	PINJAR_GT4
WPGENER	PINJAR_GT5

Market participant	Facility
WPGENER	PINJAR_GT7
WPGENER	PINJAR_GT9
WPGENER	PINJAR_GT10
WPGENER	PINJAR_GT11

Source: ERA assessment of WEM data.

3.5   Comparison to previous determination

The differences between the most recent and previous rolling test windows are detailed below:

Table 3 is the number of constraint equations identified to have bound.

Table 4 is the number of unique constrained portfolios identified.

Table 5 is the number of unique facilities that were part of a material constrained portfolio.

Table 6 is the number of unique market participants that have facilities that are part of a material constrained portfolio.

Table 3: **Number of constraint equations identified**

Rolling test window	Number of constraint equations identified
Q1 2025	140
Q4 2024	115

Source: ERA analysis of WEM data.

Table 4: **Number of unique constrained portfolios identified**

Rolling test window	Number of unique constrained portfolios
Q1 2025	791
Q4 2024	374

Source: ERA analysis of WEM data.

Table 5: **Number of unique facilities within material constrained portfolios**

Rolling test window	Number of unique facilities
Q1 2025	30
Q4 2024	26

Source: ERA analysis of WEM data.

Table 6: **Number of unique market participants that have facilities in a material constrained portfolio**

Rolling test window	Number of unique market participants
Q1 2025	14
Q4 2024	13

Source: ERA analysis of WEM data.

Appendix 1 List of Tables

Appendix 2 List of Figures

Appendix 3 Constrained portfolio method

The ERA developed and applied the process and method, outlined in this Appendix, to identify constrained portfolios and calculate the constrained uplift payment ratio for determining material constrained portfolios. The method is outlined in **Figure 1**, with additional detail provided in the following sections.

Figure 1:   High level steps in the constrained portfolio method
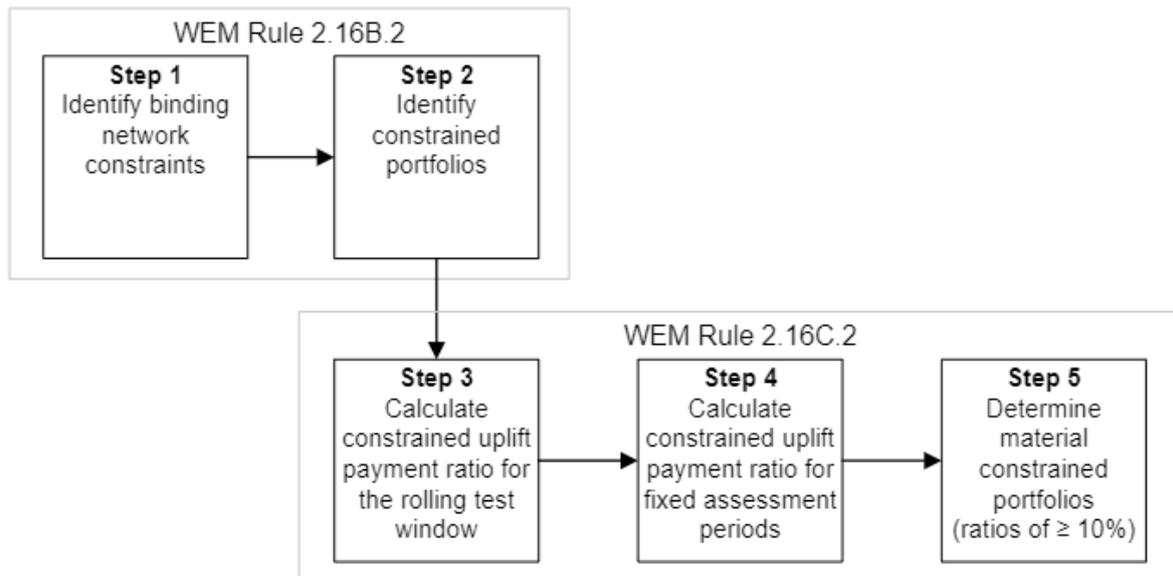
The assignment of constrained portfolios and the calculation of the constrained uplift payment ratio is completed using R within RStudio.[36]

Data sets

The following data sets were used as inputs to this process:

1. WEMDE dispatch solution constraints.[37]

2. 'Left Hand Side' terms of network constraints, which lists all facilities located behind each network constraint.

3. Energy uplift payment data.

4. Portfolios identified under WEM Rule 2.16B.1.[38]

Data set 1 is available publicly via AEMO's public data site.[39] Data set 2 is partially available publicly via the Operational Constraints Library, however discretionary constraints are not included.[40] Data set 3 is not publicly available. Data set 4 is published by the ERA.[41]

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36   Libraries used were "tidyverse", "readxl" and "here".

37   WEMDE stands for the Wholesale Electricity Market Dispatch Engine.

38   Wholesale Electricity Market Rules (WA) 10 March 2025, Rule 2.16B.1, (online).

39   Australian Energy Market Operator, Market Data Western Australia: Dispatch Solution Files, (online).

40   Australian Energy Market Operator, Operational Constraints Library, (online).

41   Economic Regulation Authority, 27 November 2024, WEM Procedure: Portfolio Determination, (online).

Data cleansing

All data underwent cleansing processes. This included filtering the data to include only dispatch intervals falling within the rolling test window, ensuring consistent variable naming and formatting across data frames, and extracting facility names from string variable values.

Step 1 - Binding network constraint identification

The first step in the process of identifying constrained portfolios is to identify all binding network constraints within a rolling test window. [42]

A network constraint is a limitation or requirement in a part of a network that may impact one or more registered facilities in the central dispatch process, such that it would be unacceptable to transfer electricity across that part of the network at a level or in a manner outside the limit or requirement.[43]

This step in the process requires the list of WEMDE dispatch solution constraints. This data was checked against the publicly available data. The three filters applied are date range, constraintType = "Network" and isBindingConstraint = "TRUE".

The list of unique constraint IDs are the network constraints that bound within the rolling test window.

Step 2 - Constrained portfolio identification

Following identification of all network constraints that bound during the rolling test window, the ERA then identified all constrained portfolios for each constraint equation.[44] A constrained portfolio is, for each constraint equation, a set comprising all the registered facilities within a single portfolio that are located behind the relevant network constraint.[45]

This step requires three data sets:

5. The list of unique binding network constraints resulting from part A of this process.

6. The 'Left Hand Side' terms of those network constraints, which lists all the facilities located behind each network constraint.

7. The portfolios identified under WEM Rule 2.16B.1.[46]

Some network constraints had version changes that applied through the rolling test window. Whilst most version changes only affect facility coefficients in the constraint equation, if a facility is commissioned or decommissioned, the terms of the equation would change. A strict interpretation of the definition of a constrained portfolio in the WEM Rules is used, and the set comprising all the registered facilities that are located behind any version of the network constraint are considered.

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42   Wholesale Electricity Market Rules (WA) 10 March 2025, Rule 2.16B.2(a), (online).

43   Ibid, Chapter 11, p. 742, (online).

44   Ibid, Rule 2.16B.2(b), (online).

45   Ibid, Chapter 11, p. 715, (online).

46   Economic Regulation Authority, 27 November 2024, WEM Procedure: Portfolio Determination, (online).

The three data sets are merged, the first two by network constraint ID and the last two by facility. Only those facilities which sit behind a network constraint that bound during the period are included in this process.

The data frame is arranged alphabetically by constraint ID, then numerically by portfolio, and then alphabetically by facility. An exception to this ordering is where a constraint ID uses a numerical suffix, in which case those constraints are arranged numerically by their suffix.

A constrained portfolio number is assigned to each facility, row by row, according to the constraint ID and portfolio number. If either the constraint ID or the portfolio changes, then a new constrained portfolio number is assigned, see **Table 7**.

Table 7: **Example of constrained portfolio identification**

Constraint ID	Facilities	Portfolio	Constrained portfolio number
Constraint-equation-1	Facility A	1	1
Constraint-equation-1	Facility B	1	1
Constraint-equation-1	Facility C	2	2
Constraint-equation-2	Facility A	1	3
Constraint-equation-3	Facility A	1	4

Source: ERA created example based on WEM data.

Step 3 - Constrained uplift payment ratio calculation (rolling test window)

Steps 1 and 2 of the process meet the WEM Rule 2.16B.2 requirements.[47] From this point on, the steps are designed to apply the calculation required under the materiality test set in market rule 2.16C.2 to determine which of the constrained portfolios meet or exceed the materiality threshold in the WEM Rules.[48] This step calculates the constrained uplift payment ratio for each of the constrained portfolios within the rolling test window.

This calculation is applied to each constrained portfolio.

$$Constrained\ Uplift\ Payment\ Ratio = \frac{CP\_UP}{NC} \times 100$$

Where:

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47 Wholesale Electricity Market Rules (WA) 10 March 2025, Rule 2.16B.2, (online).

48 Ibid, Rule 2.16C.2, (online).

CP_UP is the count of dispatch intervals within the rolling test window for a bound network constraint where uplift payments were made.

NC is the count of dispatch intervals within the rolling test window where a network constraint equation bound.

This process requires the following data sets:

1. WEMDE dispatch solution constraints.

2. 'Left Hand Side' (LHS) terms of those network constraints, which lists all the facilities located behind each network constraint.

3. Energy uplift payment data.

4. Constrained portfolios assigned in part B of this process.

The denominator (NC) is extracted for each constrained portfolio by filtering the WEMDE dispatch solution constraints by the network constraint for which the constrained portfolio was assigned. The row count is the number of dispatch intervals in the rolling test window for which the network constraint bound.

The numerator (CP_UP) is found by merging the solution constraints with the facilities from the LHS terms, and then with the facilities receiving energy uplift. The same filter for the relevant constraint is then applied as before. The data is then filtered to include intervals for which there is an energy uplift payment received by a facility within that constrained portfolio only. The number of unique dispatch intervals is counted, which forms the numerator.

For example, **Table 8** below shows a hypothetical example where all the dispatch intervals in which constraint equation 1 bound. This constraint equation resulted in identification of example constrained portfolios 1 and 2. Constrained portfolio 1 includes facilities A and B, while constrained portfolio 2 includes facility C. From this example, NC is determined to be 4 for both constrained portfolios, and CP_UP is the count of gold and blue shaded intervals for constrained portfolios 1 and 2, respectively.

Table 8: Example of determining constrained facilities that received energy uplift payments by dispatch interval

Dispatch interval	Constrained facilities	Energy uplift recipients
2023-10-01 11:00	A, B, C	A, B
2023-10-01 11:05	A, B, C	A
2023-10-02 17:30	A, B, C	-
2023-10-02 17:35	A, B, C	C

Source: ERA example based on WEM data.

These numbers are then input to a second table, in which the ratio is calculated according to the formula set out in the WEM Rules. **Table 9** below shows the calculation of constrained uplift payment ratios for example constrained portfolios 1 and 2.

Table 9:   Example of how the constrained uplift payment ratio is calculated

Constrained portfolio	CP_UP	NC	Constrained uplift payment ratio (%)
1	2	4	50
2	1	4	25

Source: ERA example based on WEM data.

Step 4 - Constrained uplift payment ratio calculation (fixed assessment periods)

The process for calculating the fixed assessment period is the same used for the whole of the rolling test window period. However, instead of using the rolling test window, the calculation is applied where the constraint equation relevant to the constrained portfolio has continuously bound for a period of a least seven consecutive trading days within the rolling test window. A rolling test window may contain multiple fixed assessment periods.[49]

This process is the same as outlined in step 3 and uses the same data set, however the key difference is first filtering the network constraint data to consider only fixed assessment periods. This is done by creating a duration variable, by ordering the data by constraint ID, then by chronological order. Rows are then checked to see if they are five minutes apart. If they are, then this is added to a cumulative duration. If they are not, a new count is started.

The duration variable is then filtered to only include those which exceed seven days. The numerator and denominator are then extracted as before, and the constrained uplift payment ratio is calculated. If there are multiple fixed assessment periods for the same network constraint, the highest constrained uplift payment ratio is provided.

Step 5 – Material constrained portfolios

A filter is applied to the calculation tables generated in steps 3 and 4 to only include those portfolios with a constrained uplift payment ratio greater than 10 per cent from either of steps 3 or 4.

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49 Wholesale Electricity Market Rules (WA) 10 March 2025, Chapter 11, (online).

Appendix 4 Constrained uplift payment ratio results

The ERA must publish the results of the calculations carried out for the WEM Rule clause 2.16C.2(a). This includes both the results of the constrained uplift payment ratio for all constrained portfolios for both the rolling test window and any fixed assessment periods.

This table has been published as a .csv file, available on the ERA's [Portfolio Assessment](#) page.