



**Energy Transformation
Implementation Unit**

Transformation Design and Operation Working Group Meeting 26

Market Settlement – Part 1

30 October 2020





Ground rules and virtual meeting protocols

- Please place your microphone on mute, unless you are asking a question or making a comment.
- Please keep questions relevant to the agenda item being discussed.
- If there is not a break in discussion and you would like to say something, you can 'raise your hand' by typing 'question' or 'comment' in the meeting chat. Questions and comments can also be emailed to TDOWG@energy.wa.gov.au after the meeting.
- The meeting will be recorded. However no minutes will be issued.
- Please state your name and organisation when you ask a question.
- If you are having connection/bandwidth issues, you may want to disable the incoming and/or outgoing video.



How to provide feedback

- 
- By email, written submission or face-to-face
 - Preference is to receive feedback on rule sections rather than the entire package
 - Where feedback refers to specific clauses, please provide in table format
 - Please provide alternative drafting suggestions where possible
 - Consultation on Tranche 2 closes **Monday 16 November 2020.**

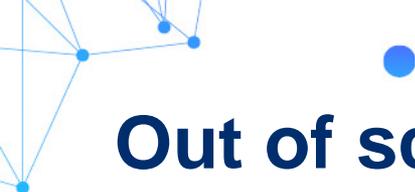


Agenda

- **New chapter 9 structure**
 - **Settlement timeline** (section 9.3)
 - Settlement statements and adjustments (sections 9.14-9.15)
 - Notice of Disagreement and Disputes (sections 9.16-9.17)
 - Invoicing (sections 9.18)
 - **The Metered Schedule** (section 9.5)
 - **Settlement calculations** (sections 9.6-9.13)
 - **Settlement items outside chapter 9**
 - Meter Data Submissions (sections 8.4-8.6A)
 - Prudential requirements and credit support (sections 2.37-2.43)
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Note – section 9.4 (settlement data) will be drafted in a future tranche of Amending Rules

Default (sections 9.19-9.20) are not discussed as there are no material changes.



Out of scope

- **ESS Settlement**

- ESS settlement will be covered at the second settlement TDOWG on Monday 2 November 2020.

- **RCM Settlement**

- The RCM team will present on RCM settlement at the TDOWG on Thursday 5 November 2020.

- **Five-minute settlement**

- Commences 1 October 2025.
- Amending Rules for five-minute settlement will be drafted following Market Start.
- Related amendments to the Metering Code are planned to be released for consultation in December 2020.

New Chapter 9 Structure

Topic	Amending Rules	Current rules
Conventions	9.1	9.1
Settlement Process	9.2	9.2
Settlement Timelines	9.3	9.16
Data Collection	9.4	9.3
The Metered Schedule	9.5	6.16
Settlement Calculations – Net settlement	9.6	9.14 (NSTEM)
Settlement Calculations – STEM	9.7	9.6
Settlement Calculations – Reserve Capacity	9.8	9.7
Settlement Calculations – Real-Time Energy	9.9	9.8
Settlement Calculations – Essential System Services	9.10	3.14 and 9.9
Settlement Calculations – Outage Compensation	9.11	9.10
Settlement Calculations – MP Market Fees and Regulator Fees	9.12	9.13
Settlement Calculations – Service Fees	9.13	9.15
Settlement Statements	9.14	9.17 and 9.18
Adjustment Process	9.15	9.19
Notices of Disagreement	9.16	9.20
Settlement Disputes	9.17	9.21
Invoicing and Payment	9.18	9.22
Default	9.19	9.23
Settlement in Default Situations	9.20	9.24
Financial Penalty Distribution	9.21	6.6.3A, 7A.2.19 and 7B.2.18

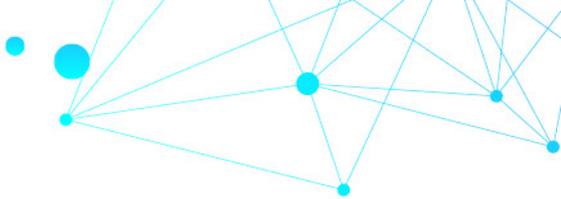
Former sections 9.4 and 9.5 are moved to Chapter 4 in the Tranche 3 Amending Rules.

Settlement Timeline



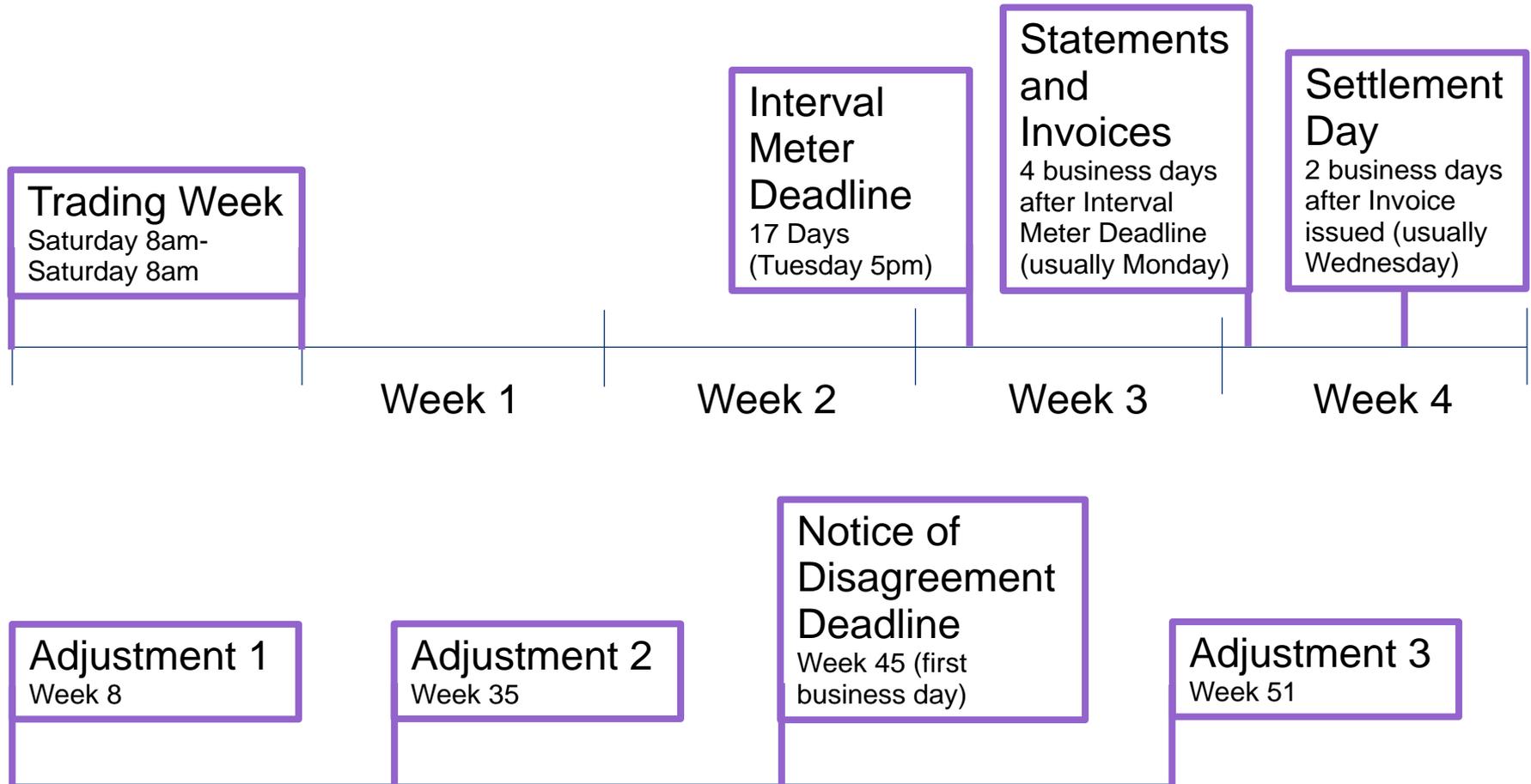
Settlement Timeline (1)

(Section 9.3)

- 
- A Trading Week is 8am Saturday to 8am the following Saturday.
 - STEM and NSTEM combined into a single timeline.
 - AEMO must publish the settlement timeline for each Trading Week:
 - **Interval Meter Deadline (IMD)** – 5pm 17th day (Tuesday) after the end of the Trading Week.
 - **Settlement Statement** and **Settlement Invoicing** dates – no later than four business days following the IMD (usually a Monday)
 - **Settlement Date** – no later than two business days following the Settlement Statement and Settlement Invoicing Dates (usually a Wednesday).
 - **Adjustment 1** – week 8
 - **Adjustment 2** – week 35
 - **Notice of Disagreement Deadline** – week 45 (first business day)
 - **Adjustment 3** – week 51

Settlement Timeline (2)

(Section 9.3)





Settlement Statements (1)

(Section 9.14)

- Dispatch Interval
 - Cleared energy quantity
 - Energy Uplift Payments
 - Energy and ESS Market Clearing Prices
- Trading Interval
 - STEM clearing price, STEM quantity, STEM settlement amount
 - Bilateral Contract quantities
 - Net Contract Position
 - Meter reading for each facility (and for Synergy, the NWM)
 - Reference Trading Price
 - Net Trading Quantity



Settlement Statements (2)

(Section 9.14)

- Trading Day
 - Net settlement amount
 - Reserve Capacity settlement amount
 - Real-Time Energy settlement amount
 - Essential System Services settlement amount
 - Outage Compensation settlement amount
 - Market Participant Market Fees and Market Participant Regulator Fees settlement amounts
- Capacity Credits allocated to/from the Market Participant
- Default items
- Adjustment details (if an Adjusted Settlement Statement)
- Net amount owing
- Interest and tax amounts

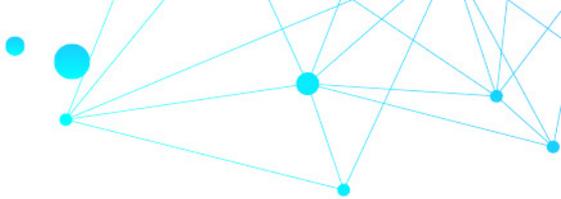
Settlement Calculations



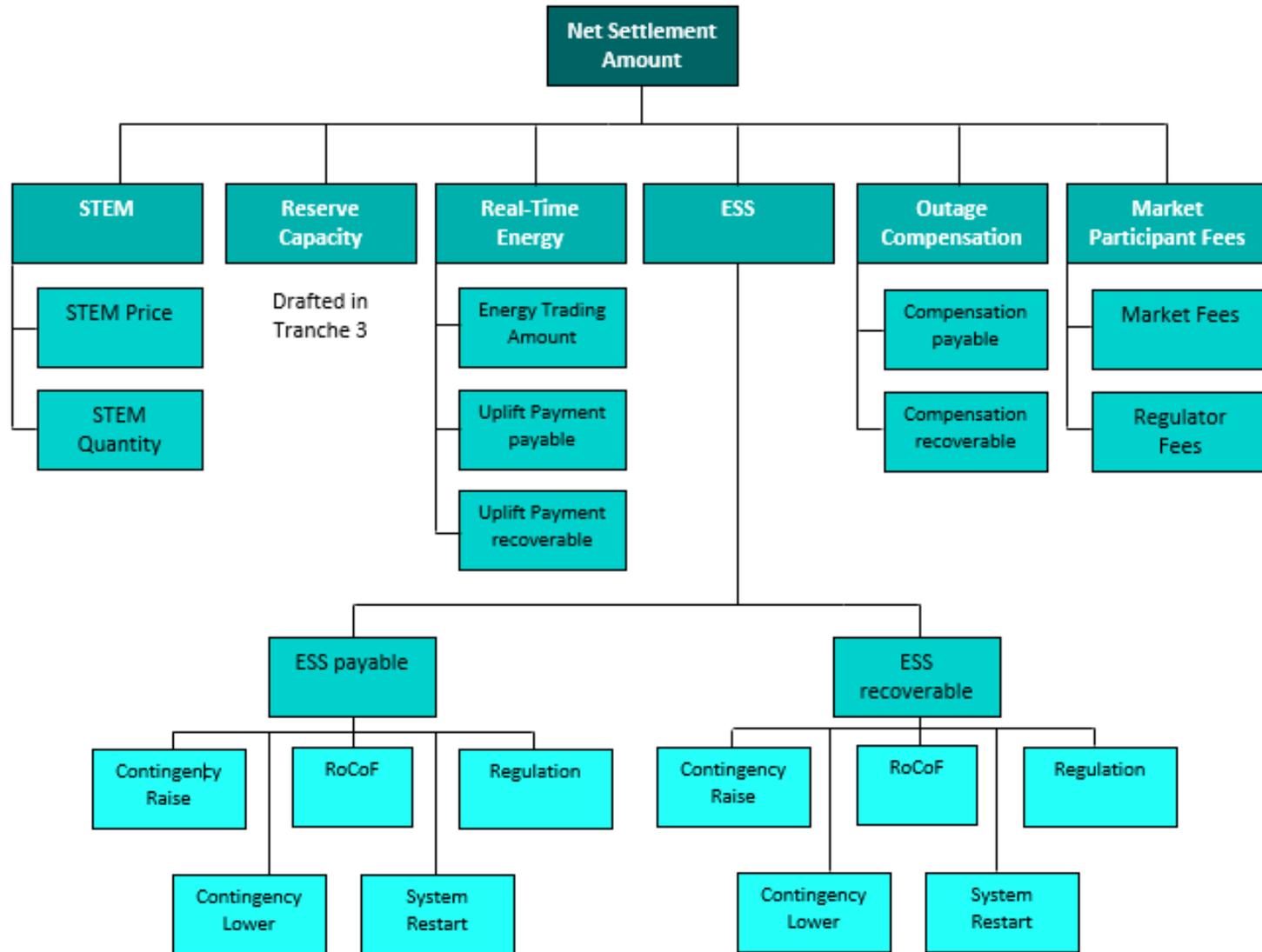


The Metered Schedule

Section 9.5

- Moved from Chapter 6.
 - AEMO will determine a Metered Schedule for:
 - Scheduled Facilities
 - Semi-Scheduled Facilities
 - Non-Scheduled Facilities
 - Non-Dispatchable Loads (including a single Metered Schedule for the Notional Wholesale Meter)
 - Interruptible Loads have been removed as they will no longer require a Metered Schedule for the ESS framework.
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Settlement Calculations – Structure





Settlement Calculations – Development and Validation

- The equations reflect the decisions in the Taskforce papers.
 - The rationale is not repeated in these slides (refer to papers).
- The equations have been checked/validated:
 - ETIU consultant (RBP)
 - AEMO
- We have tried to capture edge cases, however some may be unaccounted for.
 - Seeking stakeholder feedback on other edge cases.
- Equations will be formatted prior to finalising in the Amending Rules.
 - Some equations, including SESSM Refunds, will be simplified.

Settlement Calculations – Net Settlement Amount

Section 9.6

- Comprises the following components:
 - STEM
 - Reserve Capacity
 - Real Time Energy
 - Essential System Services
 - Outage Compensation
 - Market Participant Fees

$$Net_SA(p, d) = STEM_SA(p, d) + RC_SA(p, d) + RTE_SA(p, d) + ESS_SA(p, d) + OC_SA(p, d) + MFP_SA(p, d)$$

- Each component is calculated for a Rule Participant daily to provide a daily net settlement amount. This is then summed to a weekly net settlement amount.
- Financial penalty distribution is outside net settlement (consistent with current practice).

Settlement Calculations – STEM

Section 9.7

- No change from current approach – other than granularity.

$$\begin{aligned}STEM_SA(p, t) &= STEM_Price(t) \times STEM_Quantity(p, t) \\ &\times STEM_SuspensionFlag(t)\end{aligned}$$

- Inputs are calculated in chapter 6.
- This amount is then summed to a daily amount for the Market Participant.

$$STEM_SA(p, d) = \sum_{t \in d} STEM_SA(p, t)$$

Settlement Calculations – Real Time Energy

Section 9.9

- Calculated at 30-minute Trading Interval until 1 October 2025 when five-minute settlement commences.

$$RTE_SA(p, t) = EnergyTradingAmount(p, t) + EnergyUplift_Payable(p, t) - EnergyUplift_Recoverable(p, t)$$

$$RTE_SA(p, d) = \sum_{t \in d} RTE_SA(p, t)$$

Settlement Calculations – Energy Trading Amount

Section 9.9

$$\begin{aligned} \text{EnergyTradingAmount}(p, t) \\ = \text{ReferenceTradingPrice}(t) \times \text{NetTradingQuantity}(p, t) \end{aligned}$$

- Reference Trading Price – average six five minute Energy Market Clearing Prices

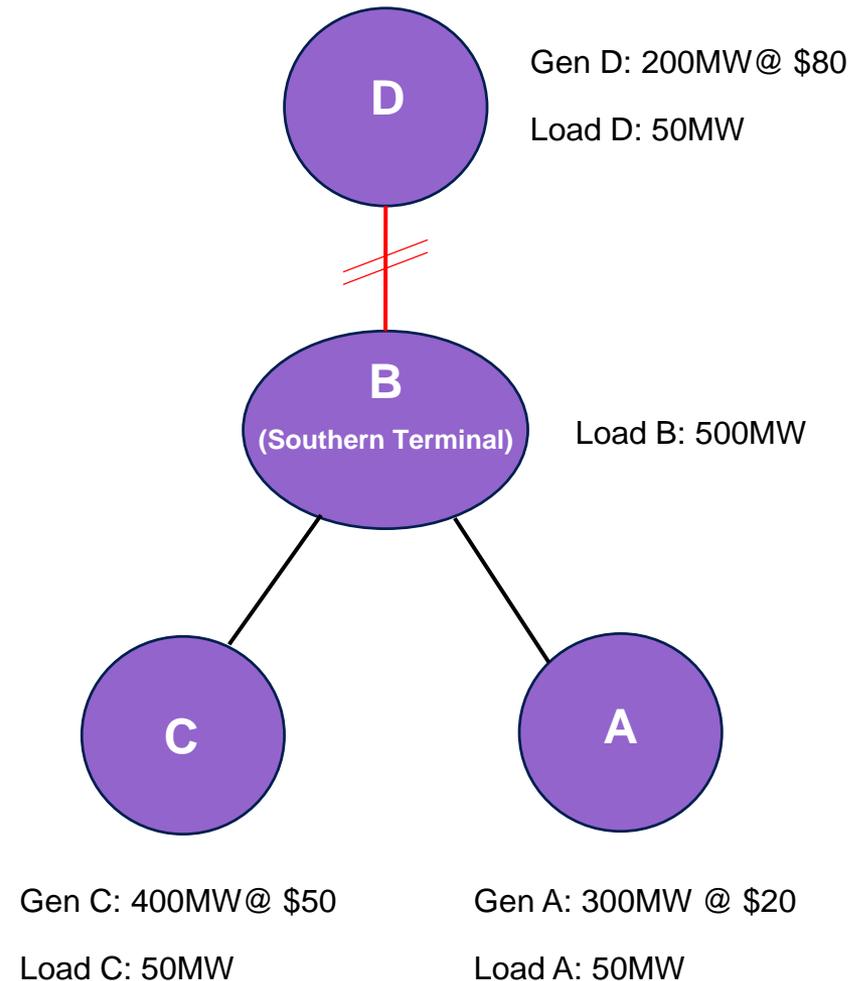
$$\begin{aligned} \text{NetTradingQuantity}(p, t) \\ = \left(\sum_{f \in p} \text{MeteredSchedule}(f, t) \right) - \text{NetContractPosition}(p, t) \end{aligned}$$

(Formerly Metered Balancing Quantity)

Settlement Calculations – Energy Uplift Payments

Section 9.9

- Generator C is the marginal generator for locations A, B and C. The Energy Market Clearing Price is \$50.
- A constraint requires Generator D to generate 50MW to serve Load D. Its marginal offer price is \$80.
- $\$80 > \50 , and therefore Generator D is negatively mispriced.
- An Uplift Payment will be provided to Generator D to ‘make it whole’.



Settlement Calculations – Energy Uplift Payment

Section 9.9

- Calculated by Dispatch Interval – may be mispriced in some but not all Dispatch Intervals in a Trading Interval.

$$\begin{aligned} & \text{EnergyUpliftPayment}(f, DI) \\ &= \text{IsMisPriced}(f, DI) \\ & \times (\text{EnergyUpliftPrice}(f, DI) \times \text{EnergyUpliftQuantity}(f, DI)) \end{aligned}$$

Settlement Calculations – Mispriced Trigger (1)

Section 9.9

$$\text{IsMisPriced}(f, DI) = \begin{cases} 1 & \text{if } \text{ClearedQuantity}(f, DI) > 0 \\ & \text{and } \text{CongestionRental}(f, DI) > 0 \\ & \text{and } \text{MarginalOfferPrice}(f, DI) > \text{Energy_MCP}(DI) \\ & \text{and } f \text{ is not a member of the set } \text{FacilitiesInBindingDownRampRate}(DI) \\ & \text{and } f \text{ is not a member of set } \text{FacilitiesInBindingESSEnablementMinimum}(DI) \\ 0 & \text{otherwise} \end{cases}$$

- The Congestion Rental is calculated in Chapter 7 (clause 7.14).

$$\text{CongestionRental}(f, DI) = \sum_{n \in N} \text{ConstraintCoefficient}(f, n, DI) \times \text{MarginalConstraintValue}(n, DI)$$

Settlement Calculations – Mispriced Trigger (2)

Section 9.9

To be eligible for an Uplift Payment, the following conditions must hold for the Facility (as in the equation on the previous slide).

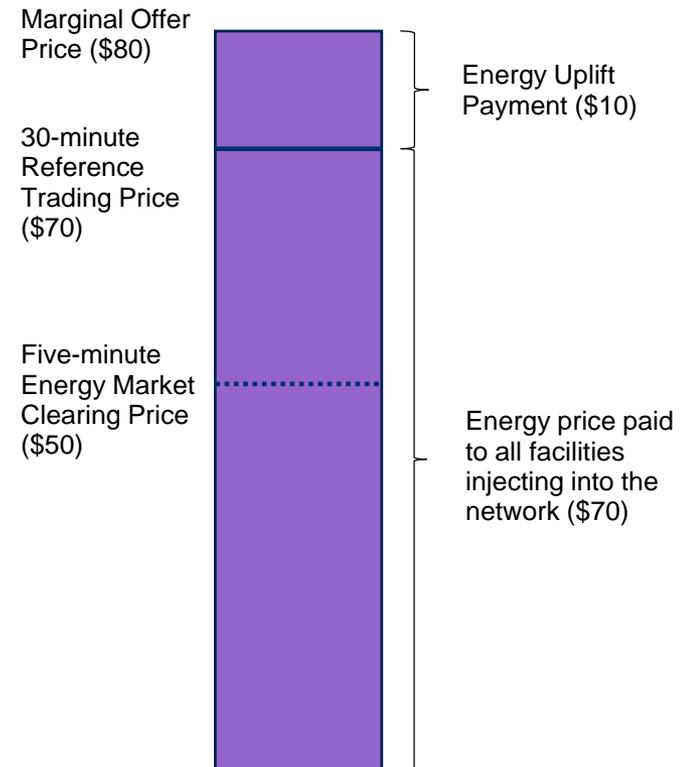
1. Cleared Quantity > 0 : The Facility must be generating.
2. Congestion Rental > 0 : The constraint is alleviated by the Facility generating.
3. $MOP > \text{EnergyMCP}$: The Facility is negatively mispriced.
4. The Facility is not in a binding down ramp rate constraint: It is only being dispatched as it can not ramp down quickly enough to a lower priced tranche or zero.
5. The Facility is not in a binding ESS enablement minimum: This is to avoid compensating a more expensive unit through the uplift mechanism when it is generating due to being trapped in the ESS trapezium, not due to congestion.

Settlement Calculations – Energy Uplift Price (1)

Section 9.9

$$\begin{aligned} & \text{EnergyUpliftPrice}(f, DI) \\ &= \text{Max}(0, (\text{MarginalOfferPrice}(f, DI) \\ & - \text{ReferenceTradingPrice}(t))) \end{aligned}$$

- The Uplift Price must be positive.

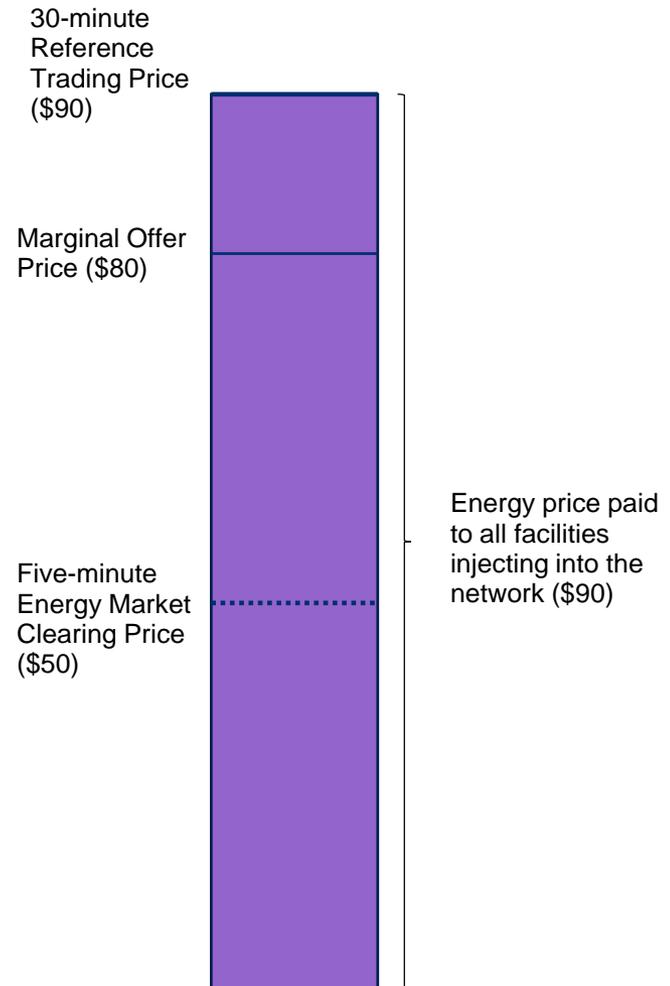


Settlement Calculations – Energy Uplift Price (2)

Section 9.9

$$\begin{aligned} & \text{EnergyUpliftPrice}(f, DI) \\ &= \text{Max}(0, (\text{MarginalOfferPrice}(f, DI) \\ & - \text{ReferenceTradingPrice}(t))) \end{aligned}$$

- The Uplift Price must be positive.



Settlement Calculations – Energy Uplift Quantity

Section 9.9

- An Energy Uplift Payment is provided to positive metered quantities.

$$\text{EnergyUpliftQuantity}(f, DI) = \text{Max}(0, \widehat{\text{MeteredQuantity}}(f, DI))$$

$$\widehat{\text{MeteredQuantity}}(f, DI) = \begin{cases} \frac{\text{SCADAMWh}(f, DI)}{\sum_{DI \in t} \text{SCADAMWh}(f, DI)} \times \text{MeteredSchedule}(f, t), & \text{if } \sum_{DI \in t} \text{SCADAMWh}(f, DI) \neq 0 \\ \frac{\text{MeteredSchedule}(f, t)}{6}, & \text{if } \sum_{DI \in t} \text{SCADAMWh}(f, DI) = 0 \end{cases}$$

Settlement Calculations – Energy Uplift Payment

Section 9.9

$$\begin{aligned} \text{EnergyUpliftPayment}(f, DI) &= \text{IsMisPriced}(f, DI) \\ &\times (\text{EnergyUpliftPrice}(f, DI) \times \text{EnergyUpliftQuantity}(f, DI)) \end{aligned}$$

- All Uplift Payments for a Trading Interval are summed to a total amount to input into cost recovery calculations.

$$\text{EnergyUplift_Recoverable}(t) = \sum_{p \in P} \text{EnergyUplift_Payable}(p, t)$$

Settlement Calculations – Energy Uplift Recoverable

Section 9.9

- Calculated based on Consumption Share for the Trading Interval.

$$\begin{aligned} \text{EnergyUplift_Recoverable}(p, t) \\ = \text{EnergyUplift_Recoverable}(t) \times \text{ConsumptionShare}(p, t) \end{aligned}$$

$$\text{ConsumptionShare}(p, t) = \frac{\text{ConsumptionContributingQuantity}(p, t)}{\sum_{p \in P} \text{ConsumptionContributingQuantity}(p, t)}$$

$$\text{ConsumptionContributingQuantity}(p, t) = \sum_{f \in p} \text{MeteredSchedule}(f, t)$$

- $f \in p$ includes facilities, including the NWM, that have a *negative* Metered Schedule in the Trading Interval.

Settlement Calculations – Outage Compensation

Section 9.11

- Calculated for a Registered Facility for a Trading Interval, and then summed by Market Participant and Trading Day.
- The amount payable is as calculated in Chapter 3 (clause 3.18H.5(c)).

3.18H.5. AEMO must in respect of a claim for compensation under clause 3.18H.1:

- (a) determine the amount of compensation to be paid to a claimant, within one month of AEMO receiving the claim;
 - (b) notify the claimant of the amount determined and the reasons for its decision; and
 - (c) calculate the amount of compensation on a per Trading Interval basis for the purposes of clause 9.11.4 for every Trading Interval covered by the Outage Period.
- The amount recoverable is calculated based on consumption share in the period when the outage was to occur.

$$OC_Recoverable(p, t) = OC_Payable(t) \times ConsumptionShare(p, t)$$

Settlement Calculations – Market Participant Fees

Section 9.12

- Comprise Market Participant Market Fees and Market Participant Regulator Fees.

$$MPF_SA(p, d) = MPMF_SA(p, d) + MPRF_SA(p, d)$$

- The amount payable is based on the applicable fee rate (calculated in Chapter 2) and the Participant Contribution.

$$ParticipantContribution(p, d) = \sum_{t \in d} \sum_{f \in p} |MeteredSchedule(f, t)|$$

- Service fees are unchanged (see section 9.13).

Settlement Calculations – Financial Penalty Distribution

Section 9.21

- Financial Penalties include Civil Penalties and Infringements.
- All Financial Penalties will be distributed to Market Participants (other than the Offending Rule Participant) based on their Participant Contribution (Metered Schedule).
 - This is the same share as Market Fees.

FinancialPenaltyShare(p)

$$= \frac{\left[\sum_{d \in \text{DistributionDays}} \frac{\text{ParticipantContribution}(p, d)}{\text{TotalParticipantContribution}(d) - \text{ParticipantContribution}(\text{ORP}, d)} \right]}{n}$$

- Distribution Days are the Trading Days in the 12 months up to and including the day the Financial Penalty was issued.

Settlement clauses outside Chapter 9





Prudential Requirements and Credit Support

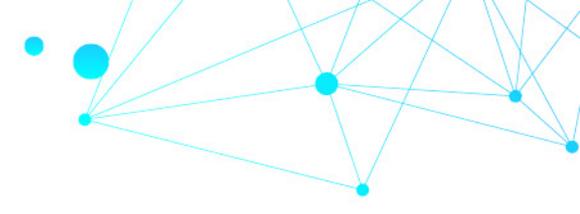
Sections 2.37-2.43

- The maximum Credit Limit has been reduced from 70 days to 35 days to reflect the decreased exposure due to:
 - Weekly settlement
 - Decreased lag between the Trading Week and Settlement Day
 - Aligning STEM and NSTEM settlement
- Market Participant has been amended to Rule Participant to include the Network Operator.
- For sections 2.37-2.43, Rule Participant excludes AEMO.



Meter Data Submissions

Sections 8.4-8.6A

- 
- Specify that Meter Data Submissions are for a Trading Week.
 - Remove clauses 8.4.3, 8.4.4 and 8.4.5 to streamline administrative processes. These processes will be captured in the WEM Procedure in clause 8.6.2.
 - Clauses 8.6.7(f) – (h) have been moved to a new clause 8.6A as information on non-interval and accumulation meters is provided separately to Meter Data Submissions and will continue to be provided for a Trading Month.



Meeting close

Questions or feedback can be emailed to TDOWG@energy.wa.gov.au
or contact:

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Next meeting: Monday 2 November – ESS settlement