

Settlements Stakeholder Information Session

21 February 2023

v.2



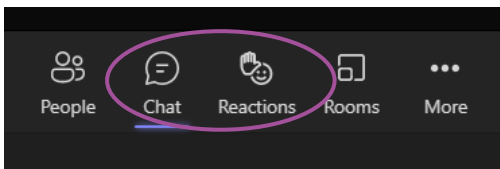
1. Welcome

We acknowledge the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters and culture.

We pay respect to their Elders past, present and emerging.

Introductions

- The purpose of this session is to:
 - Gather settlements experts across industry together on changes to settlements arising from the Integrating Energy Storage Systems rule.
 - Seek industry feedback on the draft implementation design and related matters
- To support discussion during this forum, we ask all attendees to please raise their virtual hand when they intend to speak or post questions in the Teams chat and be respectful to others speaking. There will be breaks to verbally answer questions throughout the presentation as well as at the end



- Please introduce yourself (name & organisation) before you speak.

AEMO Competition Law - Meeting Protocol

AEMO is committed to complying with all applicable laws, including the Competition and Consumer Act 2010 (CCA). In any dealings with AEMO, all participants agree to adhere to the CCA at all times and to comply with appropriate protocols where required to do so.

AEMO has developed meeting protocols to support compliance with the CCA in working groups and other forums with energy stakeholders. Before attending, participants should confirm the application of the appropriate meeting protocol.

Please visit: <https://aemo.com.au/en/consultations/industry-forums-and-working-groups>

Agenda

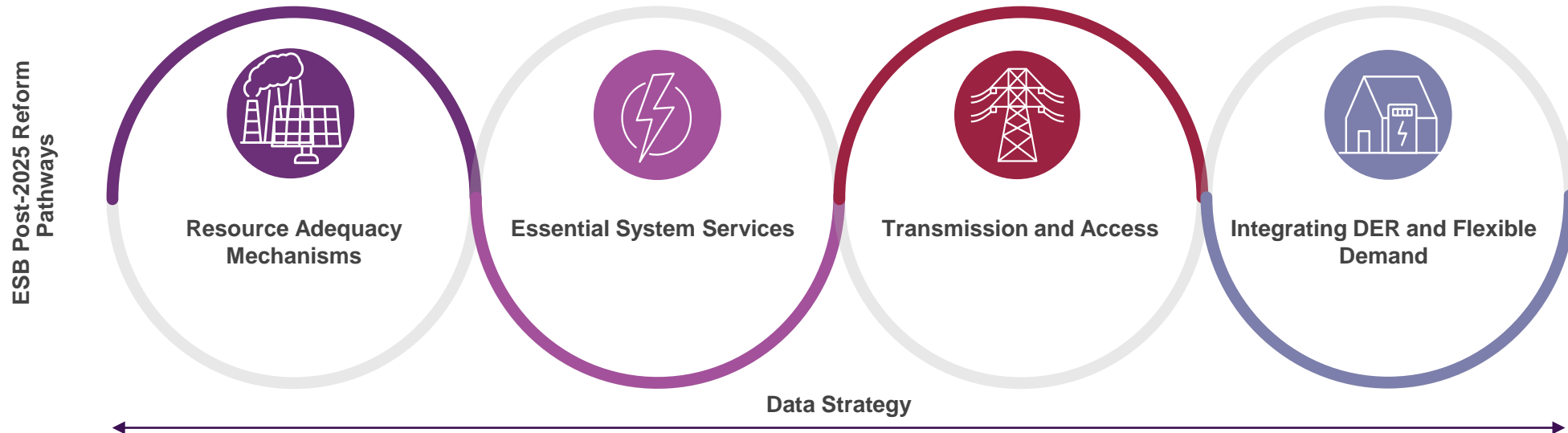
#	Time	Topic	Presenter
1	1:00pm – 1:05pm	Welcome	Ulrika Lindholm (AEMO)
2	1:05pm – 1:15pm	Context <ul style="list-style-type: none">• ESB reform and NEM2025 program• Outline of IESS changes	Emily Brodie (AEMO)
3	1:15pm – 1:20pm	IESS amendments rule change request	Emily Brodie (AEMO)
4	1:20pm – 1:30pm	IESS settlement changes	Dimi Botha (AEMO)
5	1:30 – 2:00pm	Energy changes <ul style="list-style-type: none">• Settlement table• Unaccounted for Energy (UFE)	Dimi Botha (AEMO)
6	2:00pm – 2:30pm	Non-Energy changes <ul style="list-style-type: none">• Intervention compensation• Ancillary services	Jesse Goh (AEMO)
7	2:30pm – 2:40pm	Changes to reporting and supporting changes	Jesse Goh (AEMO)
8	2:40pm – 3:00pm	Q&A	Ulrika Lindholm (AEMO)
9	3:00pm	Session Closed	Ulrika Lindholm (AEMO)

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2. Context

Context

- The Energy Security Board (ESB) was tasked by the former Council of Australian Governments Energy Council (COAG EC), to advise on design changes required in the National Electricity Market (NEM) as it transitions from a fleet of largely coal fired generation to more variable renewable generation.
- The ESB divided the work into four interrelated reform pathways complimented by a Data strategy for the NEM.
- National Cabinet subsequently approved the Post-2025 reform recommendations on 29 October 2021.



- One of the main enablers for the reforms is the development of IT systems and business processes.
- In November 2021, AEMO established the Reform Delivery Committee (RDC) to inform the development of a roadmap to navigate the breadth of the ESB reforms, de-risk delivery and inform implementation timings.

NEM Reform Implementation Roadmap

*The **NEM Reform Implementation Roadmap** establishes a basis upon which AEMO, and stakeholders may navigate the breadth of ESB and other energy market reforms over the coming few years, de-risking delivery, and informing implementation timing.*

The Roadmap integrates the Regulatory implementation roadmap (version 7) and NEM2025 implementation roadmap (version 2) to provide a holistic view of regulatory reforms and IT uplift initiatives.

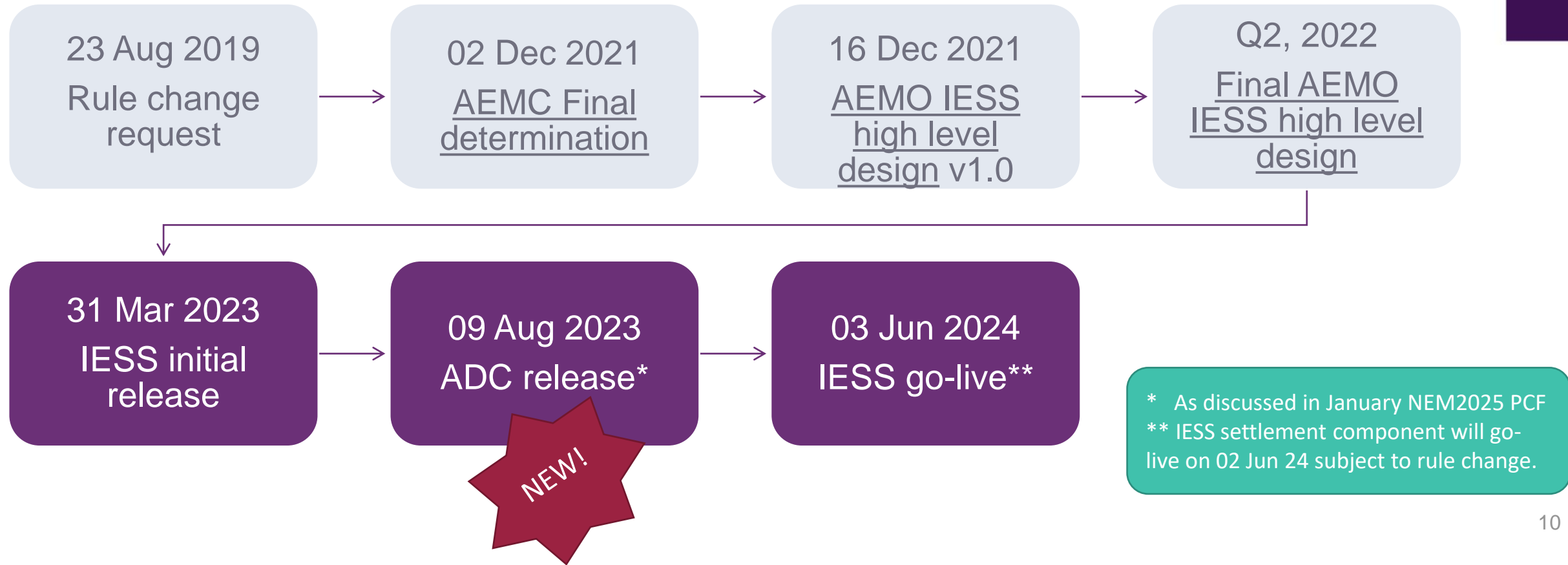
Why is it required?

- The reform program is significant
- Piecemeal implementation of initiatives may cause resource and mobilisation challenges for AEMO and market participants
- Industry wide reform requires industry wide knowledge and collaboration
- Opportunity to identify where strategic investments can deliver efficient outcomes for AEMO, market participants and consumers
- Informs implementation timing decisions by market bodies.

Roadmap Objectives

- The objectives of the NEM2025 Implementation Roadmap is to set out a program that:
 - Implements reforms in a timely and efficient manner;
 - Co-ordinates regulatory and IT change;
 - Aims to remove costs associated with implementation of individual initiatives; and
 - Provides transparency to stakeholders on the implementation program

Integrating Energy Storage System (IESS) rule change



Outline of IESS changes

REFERENCES:

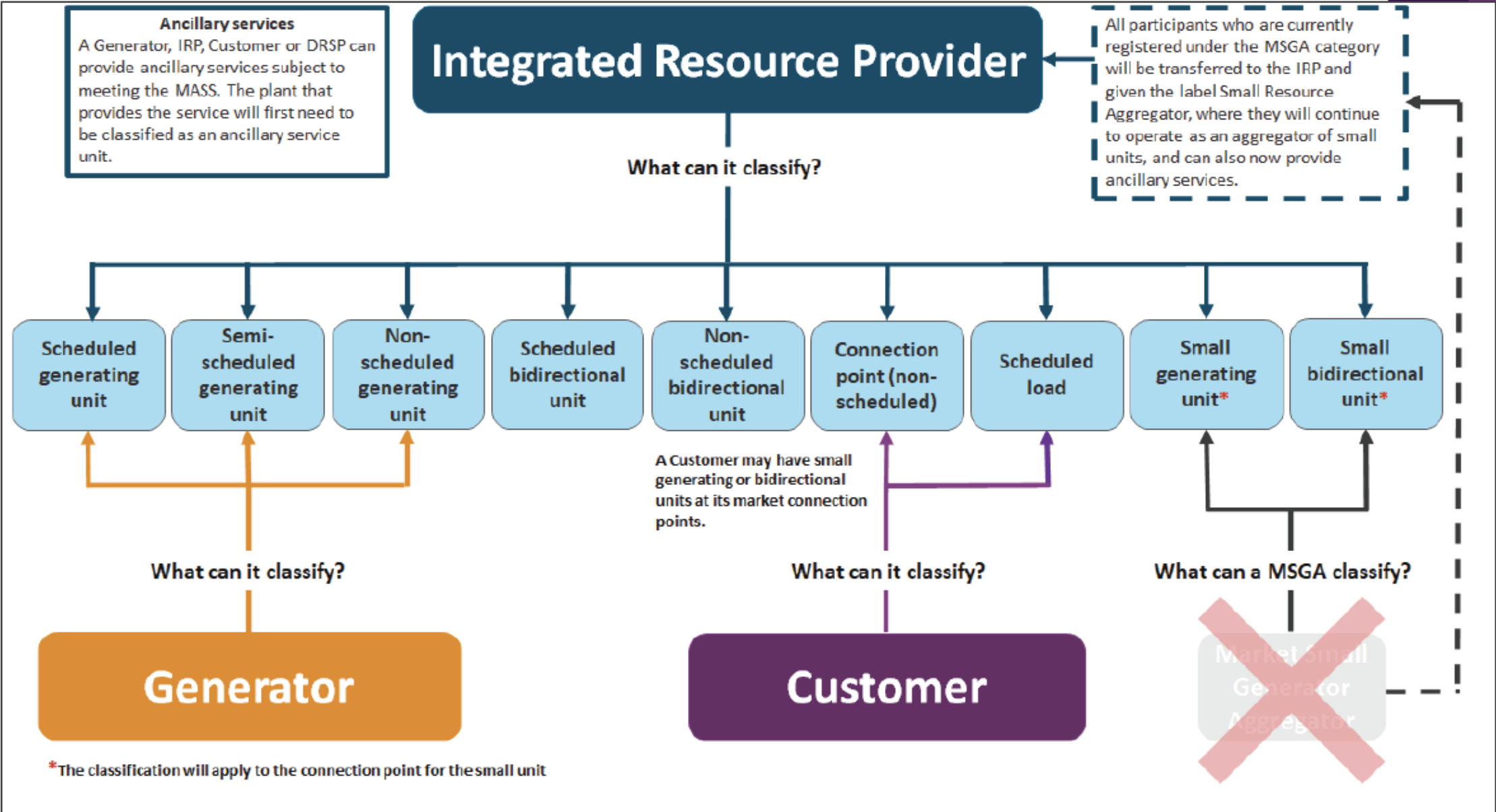
- [AEMC IESS rule change](#)
- AEMO, [IESS High Level Design and Implementation Strawperson](#)

CHANGE	AFFECTED PARTICIPANTS	TIMING
Small generating units can provide contingency FCAS (optional for participants)	<ul style="list-style-type: none"> • Small generation aggregators (SGA) choosing to provide contingency FCAS 	Applications will be taken from initial release 31-Mar-23
Aggregated dispatch conformance (optional for participants, will be available to systems with two or more technologies behind the connection point)	<ul style="list-style-type: none"> • Participants choosing to adopt new conformance model 	Available from 09-Aug-23
Integrated Resource Provider (IRP) category: <ul style="list-style-type: none"> • Integrated resource system • Bidirectional units 	<ul style="list-style-type: none"> • Current and future bi-directional system participants • Participants that analyse AEMO's operational data 	Effective 03-Jun-24 with a grace period for existing IRPs
Settlement based on gross energy* <ul style="list-style-type: none"> • Non-energy cost recovery • Scheduled load carve outs • Unaccounted for Energy (UFE) calculations • Embedded networks 	<ul style="list-style-type: none"> • All market participants 	Final release 03-Jun-24
Aggregation of small resources by IRP <ul style="list-style-type: none"> • Transition SGAs to IRP 	<ul style="list-style-type: none"> • SGAs 	Final release 03-Jun-24

*This change has a flow-on impact to how NEM market fees are calculated. This topic will be the subject of a separate consultation (timing TBC), and is out of scope for today's discussion.

IRP classifications & services from 03 Jun 2024

Source: Australian Energy Market Commission, [IESS Final Determination](#), 02 Dec 2021. p iv.



3. IESS amendments rule change request

IESS amendments rule change request (1/3)

- In Dec 2022, AEMO submitted a [Rule change request](#) to the AEMC to reduce the implementation costs, market uncertainty and unintended consequences of implementing the IESS Rule.
- One of the proposed changes is aligning the start of the new Non-Energy Cost Recovery framework with a NEM settlement week.

IESS amendments rule change request (2/3)

- IESS effective date is Mon 03 June 2024 for:
 - Changes to non-energy cost recovery (NECR) calculations
 - Bi-directional unit (BDU) bidding
- As NEM billing week starts on a Sunday, current go-live date requires AEMO to design, test and run a settlement ‘transitional week’ from Sun 02 June 2024 comprising:
 - 1 day of current NECR calculations
 - 6 days of new NECR calculations
- Transitional week = significant additional cost and time for both AEMO and participants.

IESS TRANSITION WEEK: Estimated effort for AEMO

	Effort (Days)
Development	100
System test/SIT	200
UAT	30
TOTAL	330

IESS amendments rule change request (3/3)

AEMO has asked the AEMC to consider shifting the settlements go-live to a Sunday. This will reduce cost for industry and AEMO by eliminating the need for a “transition week”:

- **Sun 02 Jun 2024:** NECR go-live (likely via rule change)
- **Mon 03 Jun 2024:** BDU bidding go-live (no rule change needed as NECR and BDU changes are independent of each other)

Please consider making a submission to the rule change when it opens for consultation:
<https://www.aemc.gov.au/rule-changes/amendment-rule-integrating-energy-storage-systems-nem>

4. IESS settlement changes

IESS rule changes to NECR framework

- Fundamental change to settlements with a move away from the current category-based approach to a directional approach
 - “generator” and “customer” energy will become “sent out” and “consumed” energy, regardless of the type of connection point from which it derives.
- Significant impact on non-energy cost recovery which now includes recovery from *cost recovery market participants* (CRMPs) based on their proportion of ASOE or ACE. CRMPs are:
 - Market generators
 - Integrated resource providers
 - Market customers

Key changes to AEMO's settlement systems to accommodate IESS

SYSTEM	KEY SYSTEM CHANGES
Wholesale settlements engine	<ul style="list-style-type: none">• Receive and store aggregated consumed and sent out metering data to replace existing generation and load data• Settle each NMI on a consumed energy and sent out energy basis• Implement new non-energy recovery calculations based on consumed and sent out energy

Today's discussion

IESS affects:

- Energy
- Non-energy
 - Market and non-market ancillary services: FCAS, NSCAS, SRAS
 - Interventions, directions, Reliability and Emergency Reserve Trader (RERT) suspension, administered price cap (APC) etc
- Settlement table and settlement statement changes

5. Energy changes

Rule changes

- Settlement energy calculation
 - $TA = \text{AGE} \times TLF \times RRP$

- Changes to **AGE**:
 $AGE = ACE + ASOE$

Where:

ACE = adjusted consumed energy amount for the market connection point and trading interval

ASOE = adjusted sent out energy amount for the market connection point and trading interval.

AGE = adjusted gross energy

Worked Example

INPUTS
RRP = \$50
TLF = 0.35

Current Energy Module

Customer

IMP = 10MWh
EXP = -30MWh
 $TA = AGE \times TLF \times RRP$
 $TA = 10 + (-30) \times .35 \times 50$
 $TA = -\$350$

Generator

IMP = 27MWh
EXP = -5MWh
 $TA = AGE \times TLF \times RRP$
 $TA = 27 + (-5) \times .35 \times 50$
 $TA = \$385$

Total Statement amount
= $-\$350 + \385
= \$35

New Rule

All Participants

$TA = AGE \times TLF \times RRP$
Where $AGE = (ACE + ASOE)$
ACE = -35MWh
ASOE = 37MWh
 $TA = (-35 + 37) \times .35 \times 50$
 $TA = \$35$

Total Statement amount
= \$35

Settlement tables

All Participants

$TA = (ACE \times TLF \times RRP) + (ASOE \times TLF \times RRP)$

ACE TA = $-35 \times .35 \times 50$
TA = \$-612.5

ASOE TA = $37 \times .35 \times 50$
TA = \$647.5

Total Statement amount
= $-\$612.5 + \647.5
= \$35

Unaccounted for Energy (UFE)

Background

- UFE is the difference between electricity drawn into a distribution area and what is recorded as consumption on end-user meters after technical losses are considered.
- UFE is calculated by Metering systems where it is also Distribution Loss Factor (DLF) adjusted
- Settlements systems allocate the amounts calculated to the correct participants (Unaccounted for Energy Allocation, UFEA)

IESS changes

- UFEA = the share of unaccounted for energy allocated to the connection point
- Currently only allocated to participant category 'Customers'
- Post-IESS, all ACE energy is included in UFEA calculation
 - e.g. distribution connected auxiliary loads are now part of UFEA

MMS Data Model - Settlement Tables Changes

- The concept of 'participant category' (Customer, Generator, SGA, etc) for energy tables is made irrelevant with the complete spectrum of changes introduced by the IESS rule.
- Current category-based approach will become adjusted sent-out energy (ASOE) and adjusted consumed energy (ACE) regardless of the type of connection point it derives from.
- As a result, a new set of tables is required to facilitate these changes.

The following *INDICATIVE* settlement tables accommodate the IESS changes.
We are seeking your feedback on the proposed changes.

Deprecated Tables*

Table name ¹	Description
SETCPDATA	Customer Energy Data for each Settlement Date , Participant ID and TNI
SETCPDATAREGION	Customer Energy Summary Data for each Region
SETGENDATA	Generator Energy Data at DUID Level
SETGENDATAREGION	Generator Energy Summary for each Region
ENERGY_CUSTOMER_SUMMARY	Customer Energy Summary at Participant – Region ID Level
ENERGY_GENERATOR_SUMMARY	Generator Energy Summary at Participant – Region ID Level
BILLINGCPDATA	Customer Energy Weekly Summary at TNI Level
BILLINGGENDATA	Generator/SGA Energy Weekly Summary at Connection Point ID Level
ENERGY_GENERATOR_AGG	The Small Generator Data Summary for each Settlement date, Participant ID and Region ID
DAILY_ENERGY_SUMMARY	<p>The Energy Summary Data incl Customer/Energy/SGA for each Settlement date, Participant Id and Region ID.</p> <p>This table can still be retained as the data is for all participants, not a certain category. I was only thinking a new table because all existing columns will become obsolete after IESS and hence adding more new columns to the same table, I thought of making a clean table. But happy to retain this table if it is easy for all.</p>

* Indicative changes only, not finalised as changes are still in development.

¹. Reference: [MMS Data Model v5.1](#) and [v5.2 from May 2023 Technical specification](#)

New IESS Tables*

Table name	Description
SETTLEMENTS.ENERGY_TRANSACTIONS	The table for all the participants Sent out Energy and Consumed Energy values
SETTLEMENTS.ENERGY_TRANSACTION_SUMMARY	Energy Transaction Summary for each Participant and Region
SETTLEMENTS.ENERGY_REGION_SUMMARY	Energy Transaction Summary for each Region
BILLING.ENERGY_TRANSACTIONS	The table for all the participants Sent out Energy and Consumed Energy values for each Billing Week
BILLING.ENERGY_DAILY_SUMMARY	The Energy Summary for each Participant and Settlement Date00

* Indicative changes only, not finalised as changes are still in development.

Replacement Tables*

Table name	Description
SETCPDATA	SETTLEMENTS.ENERGY_TRANSACTIONS
SETGENDATA	
ENERGY_GENERATOR_AGG	
SETCPDATAREGION	SETTLEMENTS.ENERGY_REGION_SUMMARY
SETGENDATAREGION	
ENERGY_CUSTOMER_SUMMARY	SETTLEMENTS.ENERGY_TRANSACTION_SUMMARY
ENERGY_GENERATOR_SUMMARY	
BILLINGCPDATA	BILLING.ENERGY_TRANSACTIONS
BILLINGGENDATA	
DAILY_ENERGY_SUMMARY	BILLING.ENERGY_DAILY_SUMMARY

* Indicative changes only, not finalised as changes are still in development.

Settlements: Energy_Transactions*

Field name	Data type	Description
SettlementDate	DATE	The Settlement Date
VersionNo	INTEGER	The Settlement Run No
PeriodId	INTEGER	The Settlement 5Min Period Id
ParticipantId	VARCHAR	The Participant ID Identifier
ConnectionPoint_Id	VARCHAR	The Connection Point ID for the Participant. This may be TNI or Actual Connection Point ID
RegionId	VARCHAR	The Region ID associated with the Connection Point Id
RRP	NUMBER	The Regional Reference Price
TLF	NUMBER	Transmission Loss Factor Applied for the energy amount ¹
Meter_type	VARCHAR	Type of energy ie Generator/Customer
ACE_MWh	NUMBER	The Adjusted Consumed Energy (ACE) by the Participant in MWh
CE_MWh	NUMBER	The Consumed Energy (CE) by the Participant in MWh Adjusted by UFEA
ASOE_MWh	NUMBER	The SentOut (ASOE) Energy for the Participant in MWh
CE_Amount	NUMBER	The Consumed Energy (CE) Dollar Value with TLF Applied and UFEA Adjusted
ASOE_Amount	NUMBER	The Sent-Out Energy (ASOE) Dollar Value with TLF Applied
UFEA	NUMBER	The UFE Allocation Value MWh
Case_Id	NUMBER	The Meter Case ID associated with the Settlement runno
Total_Energy_MWh	NUMBER	Total Energy (CE_MWh+ASOE_MWh)
Total_Amount	NUMBER	Total Cost(CE_Cost + ASOE_Cost)
LastChanged	DATETIME	The Date time of the record update/insertion.

* indicative changes only, not finalised as changes are still in development.

¹ TLF applied will be derived from the net flow at TNI level – i.e. the difference between the total of ASOE and total of ACE - if resulting amount is positive, apply primary TLF (load); if amount is negative apply secondary TLF (generation)

Early thinking on transition/go-live approach

AEMO is starting to consider elements of transition/go-live for settlement changes:

- The current settlement tables for billing week after 2nd June 2024 would not be populated.
- For any billing weeks prior to 2nd June 2024, i.e. the 20-week and 30-week revision, the data would continue to be stored in these tables.
- Basing reconciliation on new energy tables, single source of truth.

- What are your views on the possible implementation approach?
- What else should AEMO consider?
- How much time do you need to adapt your systems and processes?
- Aside from the technical specification, what other information or support would you like from AEMO?

6. Non-Energy changes

Intervention and APC

	Current Recovery	IESS Recovery
ENERGY DIRECTION	Recovered from Customers based on SETCP data	Recovered from CRMP based on ACE
ANCILLARY SERVICE DIRECTION	Recovered from Customers and Generators based on SETCP and SETGEN data	Recovered from CRMP based on ACE and ASOE
RERT (Reliability and Emergency Reserve Trader)	Recovered from Customers based on SETCP data	Recovered from CRMP based on ACE
MARKET SUSPENSION	Recovered from Customers based on SETCP data	Recovered from CRMP based on ACE
APC (Administered Price Cap)	Recovered from Customers based on SETCP data	Recovered from CRMP based on ACE

Contingency and regulation ancillary services recovery

	Current Recovery	IESS Recovery
CONTINGENCY LOWER	Recovered from Customers based on SETCP data	Recovered from CRMP based on ACE
CONTINGENCY RAISE	Recovered from Generators based on SETGEN data	Recovered from CRMP based on ASOE
REGULATION	<ul style="list-style-type: none"> Recovered from Generators with Market Participant Factors (MPF) assigned Residual calculation - recovered from Customers based on SETCP data 	<ul style="list-style-type: none"> Recovered from CRMP with Market Participant Factors (MPF) assigned <ul style="list-style-type: none"> Residual calculation - recovered from CRMP based on ACE for those not assigned with MPF

Non-market ancillary services recovery

	Current Recovery	IESS Recovery
Network support control ancillary services (NSCAS) including test payments	Recovered from Customers based on SETCP data	Recovered from CRMP based on ACE
System restart ancillary services (SRAS) including test payments	Recovered from Generators and Customers based on 50/50 split from SETCP and SETGEN data	Recovered from CRMP based on 50% ASOE and 50% ACE

7. Changes to reporting and supporting documents

Statements and Settlement report

Report/Statement	Changes
PDF Statement	No change
TXT Settlement Report (SR)	Update to reflect ACE and ASOE changes: see example on next slide
Settlements Direct reports ie: <ul style="list-style-type: none"> • Confidential settlements/billing • Public settlements/billing 	Update to reflect ACE and ASOE changes
NEMWEB	Structure of report will remain the same, output calculations may be different due to ACE and ASOE changes
Data Interchange	Update to reflect ACE and ASOE changes

Settlement Report (SR) Example

SETTLEMENT REPORT

REPORT FOR ABC Energy Pty Limited

FINAL Settlements ref 2022/045/014/ABCEENERGY
MSATS CASEID: 9000

30-Oct-2022 to 05-Nov-2022

Week No 45

Energy Transactions

	Aggregate Energy (MWh)	Aggregate Amount (\$)	UFEA (MWh)
Total Adjusted Sent Out Energy	51000.00	\$5,100,000.00	0.00
Total Adjusted Consumed Energy	-21500.00	-\$2,150,000.00	0.00
Nett Sales (Purchases)	29500.00	\$2,950,000.00	0.00

Sales (Purchases) by Connection Point

Connection Point	Description	Total Amount (\$)	Load Wtd Avg. Price (\$/MWh)	Total Energy (MWh)	UFEA (MWh)	ASOE (MWh)	ACE (MWh)	ASOE Amount (\$)	ACE Amount (\$)
ABCD1	ABC Unit 1	\$1,000,000.00	100.00	10000.00	0.00	15000.00	-5000.00	\$1,500,000.00	-\$500,000.00
ABCD2	ABC Unit 2	\$1,500,000.00	100.00	15000.00	0.00	25000.00	-10000.00	\$2,500,000.00	-\$1,000,000.00
ACBD3	ABC Unit 3	\$500,000.00	100.00	5000.00	0.00	10000.00	-5000.00	\$1,000,000.00	-\$500,000.00
ABCD4	ABC Unit 4	-\$50,000.00	100.00	-500.00	0.00	1000.00	-1500.00	\$100,000.00	-150,000.00

Settlement Report (SR) Example Ctn.

Market Frequency Control Ancillary Services by Transmission Connection Point (Payments By AEMO)

Connection Point	FCAS Comp.	Fast raise	Fast lower	Slow raise	Slow lower	Delayed raise	Delayed lower	Reg raise	Reg lower	Total
XXXXX1	\$0.00	\$5,213.70	\$463.75	\$2,681.75	\$2,562.39	\$232.29	\$796.89	\$29,712.04	\$2,490.91	\$44,153.72
XXXXX2	\$0.00	\$4,026.04	\$471.89	\$2,512.38	\$2,428.77	\$230.70	\$858.84	\$33,730.53	\$2,486.47	\$46,745.62
XXXXX3	\$0.00	\$4,148.69	\$270.76	\$2,374.78	\$1,669.03	\$206.55	\$704.17	\$28,184.83	\$1,987.15	\$39,545.95
XXXXX4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
YYYYY1	\$0.00	\$1,143.91	\$3,962.00	\$740.77	\$8,668.42	\$0.00	\$0.00	\$754.16	\$964.68	\$16,233.94
YYYYY2	\$0.00	\$1,359.83	\$540.92	\$945.82	\$2,342.30	\$0.00	\$0.00	\$634.35	\$685.45	\$6,508.67
YYYYY4	\$0.00	\$878.44	\$4,327.48	\$961.26	\$13,670.15	\$0.00	\$0.00	\$2,538.76	\$2,221.30	\$24,597.39
Total	\$0.00	\$16,770.60	\$10,036.81	\$10,216.77	\$31,341.06	\$669.54	\$2,359.89	\$95,554.66	\$10,835.97	\$177,785.29

Market Ancillary Service Transactions - Recovery

Service Provided	ACE Amount (\$)	ASOE Amount (\$)	Total Amount (\$)
Fast raise	\$0.00	-\$57,799.97	-\$57,799.97
Slow raise	\$0.00	-\$26,555.96	-\$26,555.96
Delayed raise	\$0.00	-\$3,284.18	-\$3,284.18
Total Recovery(Payment to AEMO)	\$0.00	-\$87,640.12	-\$87,640.12

Non Market Ancillary Service Transactions - Recovery

NMAS Type	ACE Amount (\$)	ASOE Amount (\$)	Total Amount (\$)
SRAS	\$0.00	-\$33,317.30	-\$33,317.30
Total Recovery (Payment To AEMO)	\$0.00	-\$33,317.30	-\$33,317.30

NOTE:

This SR example demonstrates ACE & ASOE split for Ancillary service reconciliation for IESS project. It does not yet include the new **Fast Frequency** FCAS service that will begin 09 October 2023.

8. Q&A

9. Session Closed



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[I ESS Project](#)





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