IESS Settlements Change Summary

June 2023

v.2

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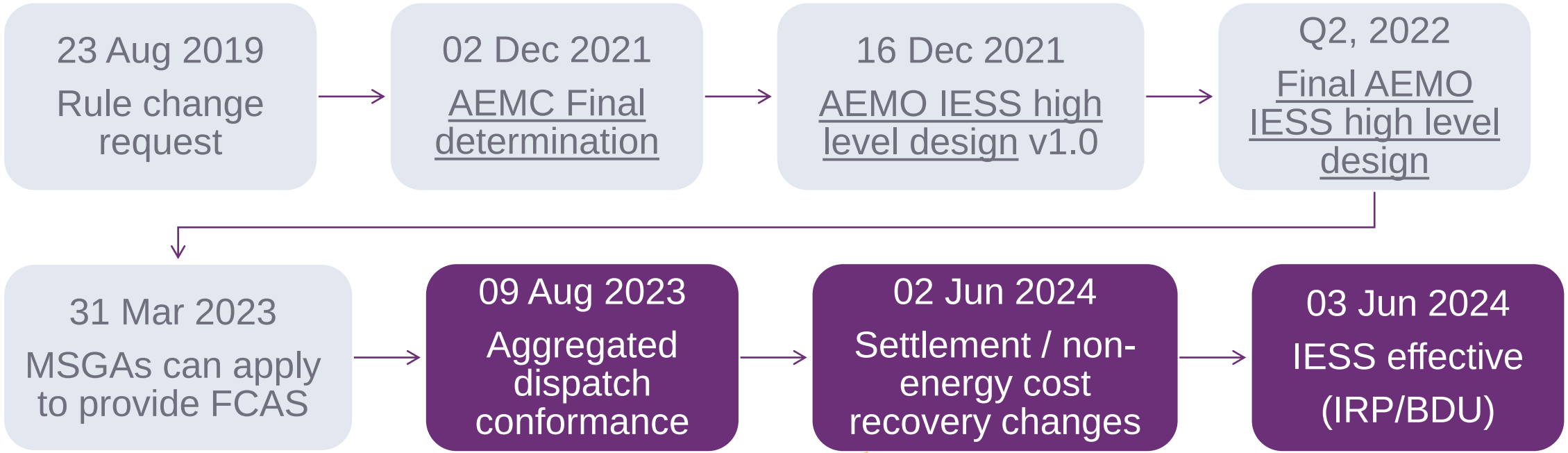
BACKGROUND: IESS high-level Timeline



This document relates to Settlement changes

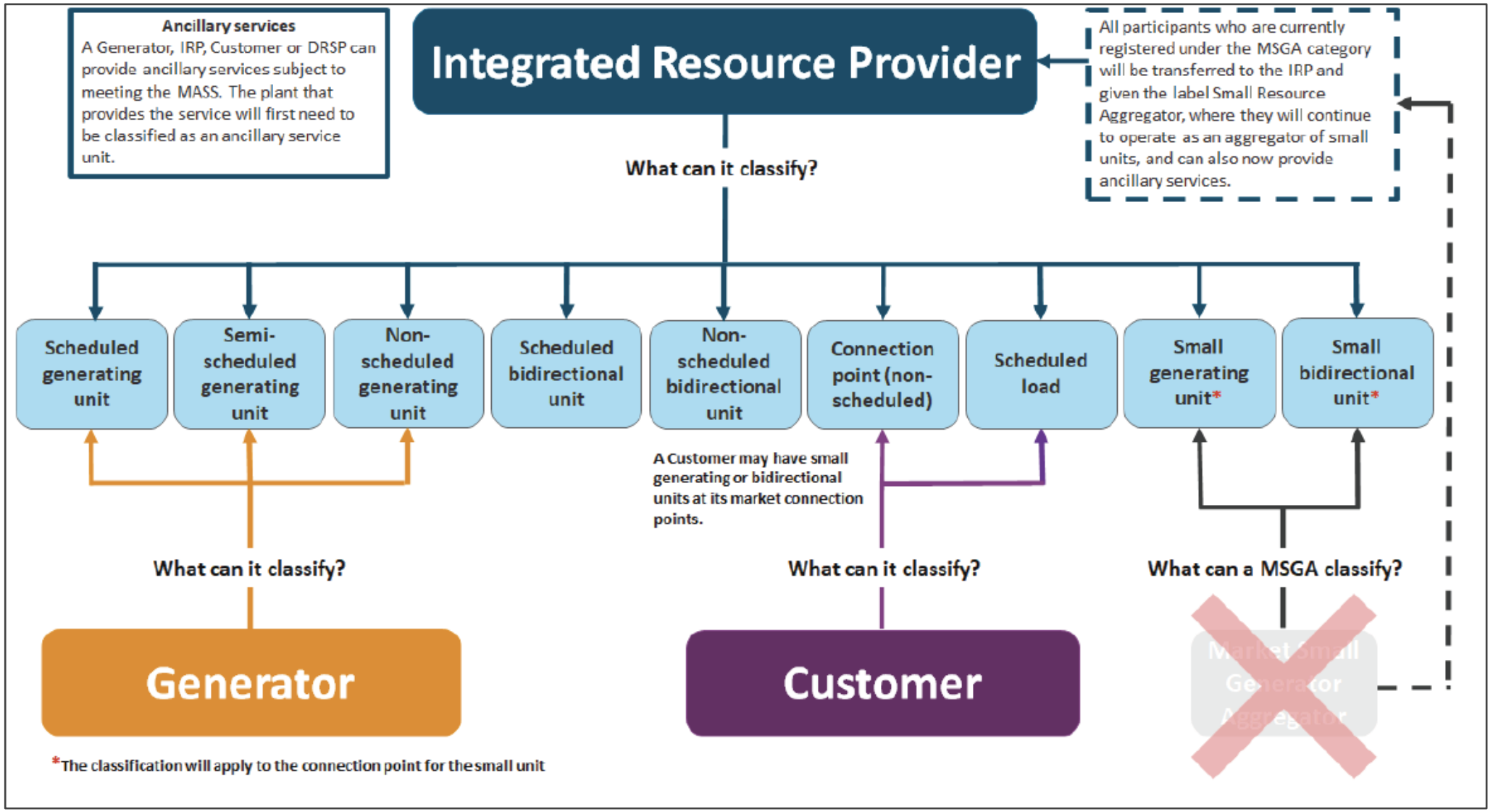
MSGA	Market small generation aggregator
FCAS	Frequency control ancillary service/s
IRP	Integrated resource provider
BDU	Bidirectional unit

REFERENCES

- **AEMC** IESS rule change
- **AEMC** Implementing IESS rule change
- **AEMO** IESS High Level Design and Implementation Strawperson
- **AEMO** IESS Participant Toolbox

IRP classification from 3 June 2024

Source: Australian Energy Market Commission, IESS Final Determination, 02 Dec 2021. p iv.



IESS major changes summary

- The headline change in the Integrating Energy Storage Systems (IESS) rule change is how batteries are to be registered, connected and managed in AEMO systems:
  - A new Integrated Resource Provider (IRP) participant registration type replaces the current requirement to register separately as both a Market Customer and Market Generator when connecting a battery
  - A single DUID is to be used in the bidding and dispatch of both the battery charging and discharge, which replaces the current requirement for separate DUIDs for each energy direction from the battery
  - A single NMI is to be used in the energy settlement, which replaces the current dual NMI configuration that sees the generation and load recorded against different NMIs and separated in the current settlement process

- An additional major change with the IESS rule significantly alters the calculation method to be used for the Non-Energy Cost Recovery (NECR) items:
  - Recovery calculations are to consider the gross (consumption separate from generation) energy amounts of all participants, rather than currently using net energy (generation – consumption) of specific participant types
  - Major settlements database structure changes are required to enable the new calculations, these changes will flow into the Data Model and impact participant reconciliation and reporting activities and also AEMO data provision
  - Embedded network management needs to change to ensure that the parent has the appropriate gross energy volumes available for settlement, which has resulted in the netting of children reads moving to the Metering system

IESS Settlement related changes

Data flow changes from 2 June 2024

Current Data Structure:

Participant Type	Market Customer	Market Customer (Battery - Load Only)	Market Generator (Battery - Gen Only)	Market Generator	Market Small Generator Aggregator
MSATS Configuration	AggFlag = Y Class: SMALL, etc	AggFlag = Y Class: WHOLESAL	AggFlag = N Class: GENERATR	AggFlag = N Class: GENERATR	AggFlag = Y Class: NREG (PID must end *SGA)
Reads Received	Aggregate Reads (imports & exports)	Aggregate Reads (exports only)	Individual Reads (imports only)	Individual Reads (imports & exports)	Aggregate Reads (imports & exports)
Table Reads Settled In	setcpdata	setcpdata	setgendata	setgendata	setsmallgendata *
Billing Week Summary	billingcpdata	billingcpdata	billinggendata	billinggendata	billinggendata

* setsmallgendata in the data model is the table energy_generator_agg in the settlements database

- The current data split into 3 settlement tables allows separation of the participant types for things like data requests and fee calculations
- With IESS all reads will be settled via the single Energy_Transations table, with an IRP registered participant able to have all of these read types
- Market registered batteries will be updated for IESS to have a single NMI and DUID, as shown below

IESS Data Structure:

Participant Type	Market Customer	IRP (Single NMI / DUID for Battery)	Market Generator	IRP
MSATS Configuration	AggFlag = Y Class: SMALL, etc	AggFlag = N Class: TIRS, DIRS	AggFlag = N Class: GENERATR	AggFlag = Y Class: NREG
Reads Received	Aggregate Reads (imports & exports)	Individual Reads (imports & exports)	Individual Reads (imports & exports)	Aggregate Reads (imports & exports)

IESS data model table changes

Current Tables*	Replacement Tables**
SETCPDATA	**Settlements.Energy_Transactions** (table for settling all ACE & ASOE, by ParticipantID/ConnectionPointID) **Settlements.Energy_GenSet_Detail** (additional detail at the genset level for the market generators, including DUID and Station information, as per current setgendata)
SETGENDATA	
SETSMALLGENDATA	
ENERGY_CUSTOMER_SUMMARY	**Settlements.Energy_Transactions_Summary** (Energy_Transactions grouped by ParticipantID/RegionID)
ENERGY_GENERATOR_SUMMARY	
SETCPDATAREGION	**Settlements.Energy_Region_Summary** (Energy_Transactions grouped by RegionID)
SETGENDATAREGION	
BILLINGCPDATA	**Billing.Energy_Transactions** (Sum for the billing week by ParticipantID/ConnectionPointID) **Billing.Energy_GenSet_Detail** (Sum for the billing week by ParticipantID/GenSetID)
BILLINGGENDATA	

* Reference: MMS Data Model v5.1 and v5.2 from May 2023 Technical specification

** Subject to change pending development and testing outcomes

Data Model table DAILY_ENERGY_SUMMARY will remain with new columns added, settlements database will have a new Billing.Energy_Daily_Summary table created

New Energy_Transactions table fields

Field name*	Data type	Description
SettlementDate	DATE	The Settlement Date
VersionNo	INTEGER	The Settlement Run Number
PeriodId	INTEGER	The Settlement 5Min Period Id (1 to 288)
ParticipantId	VARCHAR	The Participant ID Identifier
ConnectionPointId	VARCHAR	The Connection Point ID for the Participant. This may be a TNI or the generators Connection Point ID
RegionId	VARCHAR	The Region ID associated with the ConnectionPointId
CE_MWh	NUMBER	The Consumed Energy in MWh, sum of the DLF adjusted metered exports from the grid (always negative)
DME_MWh	NUMBER	Distribution Metered Energy in MWh, the portion of CE_MWh that is distribution connected for UFE allocation
UFEA_MWh	NUMBER	The Unaccounted For Energy Allocation in MWh (negative with normal UFE, positive with negative UFE)
ACE_MWh	NUMBER	The Adjusted Consumed Energy in MWh **[CE_MWh + UFEA_MWh]**
ASOE_MWh	NUMBER	The Adjusted Sent Out Energy in MWh, sum of the DLF adjusted metered imports to the grid (always positive)
Total_MWh	NUMBER	The Total Energy in MWh **[ACE_MWh + ASOE_MWh]**
RRP	NUMBER	The Regional Reference Price
TLF	NUMBER	Transmission Loss Factor Applied for the energy amount**
ACE_Amount	NUMBER	The ACE dollar value amount with TLF applied **[ACE_MWh x RRP x TLF]**
ASOE_Amount	NUMBER	The ASOE dollar value amount with TLF applied **[ASOE_MWh x RRP x TLF]**
Total_Amount	NUMBER	The total dollar value amount with TLF applied **[ACE_Cost + ASOE_Cost]**
Case_Id	NUMBER	The Meter Case ID associated with the Settlement Run Number
Meter_Type	VARCHAR	Indicator of the type of energy (Generator/Customer/NREG/BDU) for fee calculation purposes only
Aggregate_Read_Flag	INTEGER	Indicator of whether the read record was received as part of the Aggregate Reads
Individual_Read_Flag	INTEGER	Indicator of whether the read record was received as part of the Individual Reads
LastChanged	DATETIME	The Date time of the record update

- Subject to change pending development and testing outcomes
- ** TLF applied will be derived from the net energy flow at the ConnectionPoint/TNI when dual TLFs exist i.e. the sum of ASOE and ACE where negative (ACE > ASOE) results in the primary (load) TLF being applied and where positive in the secondary (generation) TLF being applied

New genset detail example

- The new Energy_GenSet_Detail table will be at the genset level, as per the current setgendata table, where genset and NMI are one-to-one.
- As well as STATIONID/DUID/GENSETID identifiers currently stored in setgendata, the new table will also contain the NMI (Meter_ID field) and the ConnectionPointID, to facilitate reconciliation.
- The below example attempts to show the relationship between the 2 new tables, noting this is draft design, so the final data model may end up looking slightly different.

New main settlement table aggregated to ConnetionPointID: Settlements.Energy_Transactions

Settlement Date	Version No	Period Id	Participant Id	Connection PointId	Region Id	CE_ MWh	DME_ MWh	UFEA_ MWh	ACE_ MWh	ASOE_ MWh	Total_ MWh	RRP	TLF	ACE_ Amount	ASOE_ Amount	Total_ Amount	Case_Id	Meter_Type	Aggregate_ Read_Flag	Individual_ Read_Flag	IRP_Flag	LastChanged
2/06/2024	1	1	XXXBATT	VCPID1	VIC1	-20	-20	0	-20	30	10	$10	0.98	-$196	$294	$98	9999	BDU	N	Y	Y	3/06/2024
2/06/2024	1	1	XXXGEN	VCPID2	VIC1	-0.5	-0.5	0	-0.5	40	39.5	$10	0.98	-$5	$392	$387	9999	GENERATOR	N	Y	N	3/06/2024

New detailed settlement table at GenSet level: Settlements.Energy_GenSet_Detail

Settlement Date	Version No	Period Id	Participant Id	StationID	DUID	GenSet Id	MeterID	Connection PointId	Region Id	CE_ MWh	DME_ MWh	UFEA_ MWh	ACE_ MWh	ASOE_ MWh	Total_ MWh	RRP	TLF	ACE_ Amount	ASOE_ Amount	Total_ Amount	Case_Id	LastChanged
2/06/2024	1	1	XXXBATT	BATT1	BATT1	BATT1	NMI1111111	VCPID1	VIC1	-20	-20	0	-20	30	10	$10	0.98	-$196	$294	$98	9999	3/06/2024
2/06/2024	1	1	XXXGEN	GEN1	GEN1	GEN1	NMI1111112	VCPID2	VIC1	0	0	0	0	20	20	$10	0.98	$0	$196	$196	9999	3/06/2024
2/06/2024	1	1	XXXGEN	GEN1	GEN1	GEN2	NMI1111113	VCPID2	VIC1	-0.5	-0.5	0	-0.5	10	9.5	$10	0.98	-$5	$98	$93	9999	3/06/2024
2/06/2024	1	1	XXXGEN	GEN1	GEN1	GEN3	NMI1111114	VCPID2	VIC1	0	0	0	0	10	10	$10	0.98	$0	$98	$98	9999	3/06/2024

Energy settlement example

Current Calculations

Market Customer
Imports = 10MWh
Exports = 30MWh
TA = AGE x TLF x RRP
TA = (10 - 30) x 0.95 x $50
TA = -$950

Market Generator
Imports = 27MWh
Exports = 5MWh
TA = AGE x TLF x RRP
TA = (27 - 5) x 0.95 x $50
TA = $1045

Total Statement Amount
= -$950 + $1045
= $95

New Rule

All Participants
TA = AGE x TLF x RRP
Where AGE = ACE + ASOE
ACE = - (30 + 5) = -35MWh
ASOE = 10 + 27 = 37MWh

TA = (-35 + 37) x 0.95 x 50
TA = $95

Total Statement Amount
= $95

IESS Calculations

All Participants
TA = (ACE x TLF x RRP) +
(ASOE x TLF x RRP)

ACE TA = -35 x 0.95 x $50
= -$1662.50

ASOE TA = 37 x 0.95 x $50
= $1757.50

Total Statement Amount
= -$1662.50 + $1757.50
= $95

Changes to non-energy cost recovery

Non-Energy Cost	Current Recovery	IESS Recovery
FCAS Contingency Lower Services	Market Customer participants based on the **net energy** (imports – exports) from **setcpdata**	All participants based on **ACE** from **Energy_Transations**
NMAS Network Support Control Ancillary Services (NSCAS) including test payments		
Energy or FCAS Contingency Lower Directions		
RERT (Reliability and Emergency Reserve Trader)		
Market Suspension		
APC (Administered Price Claim)		
FCAS Contingency Raise Services	Market Generator and Market Small Generator Aggregator participants based on the **net energy** (imports – exports) from **setgendata** and **setsmallgendata**	All participants based on **ASOE** from **Energy_Transations**
FCAS Contingency Raise Directions		
NMAS System Restart Ancillary Services (SRAS) including test payments	All participants based on the **net energy** (imports – exports) from **setcpdata, setgendata** and **setsmallgendata**	All participants based on **ACE** and **ASOE** from **Energy_Transations**
Non-Energy and Non-AS Directions		
FCAS Regulation Services Costs	"Causer Pays" method from those Market Generators with Market Participant Factors (MPFs), with the residual from Market Customers **net energy** from **setcpdata**	Same, but with the residual from all participants **ACE**

Note: Unaccounted for Energy (UFE) while technically not a NECR item, does also move from being only allocated to Market Customers (when their NMIs are consuming energy in an interval only) to being allocated to all participants based on ACE.

Changes to Embedded network management calculations

- The embedded network calculations for the parent NMIs will move from the Settlements system to the Metering system, so that the parent calculation is completed before being aggregated with the other reads of the parent FRMP
- Embedded network children are unaffected by the changes for IESS, the Local Retailer (LR) on their read is no longer relevant for settlements
- A simplified example below shows the reads for a single parent and child NMI on an embedded network, plus a single non-embedded NMI:

NMI	FRMP	LR	TNI	Imports	Exports	
NMI0000001	PARENTFRMP	GLOPOOL	VXXX	1	4	Single embedded network Parent NMI
NMI0000002	CHILDFRMP	PARENTFRMP	VXXX	2	2	Single embedded network Child NMI
NMI0000003	PARENTFRMP	GLOPOOL	VXXX	0.5	3	non-embedded normal NMI

Current Settlements calculation, aggregating all classes at once with parent netting:

FRMP	LR	TNI	Imports	Exports	
PARENTFRMP	GLOPOOL	VKT2	-0.5	5	negative imports (1 - 2 + 0.5 = -0.5) moved to exports

FRMP	LR	TNI	Imports	Exports	Net	
PARENTFRMP	GLOPOOL	VXXX	0	5.5	-5.5	current volumes billed

With IESS first Metering will net the child from the parent:

FRMP	LR	TNI	Imports	Exports	
PARENTFRMP	GLOPOOL	VXXX	-1	2	negative imports (1 - 2 = -1) move to exports
PARENTFRMP	GLOPOOL	VXXX	0	3	final netted parent read

Then Metering will aggregate this netted parent with other reads:

FRMP	LR	TNI	Imports	Exports	Net	
PARENTFRMP	GLOPOOL	VXXX	0.5	6	-5.5	final volumes to bill by Settlements

- There will be a change to the RM16 report as this will contain the Parent read after the children NMIs have been subtracted
- Participants will still be able to reconcile RM16 with settlements values in statements, but will no longer be able to easily reconcile RM16 against RM21/27, without first performing the embedded network parent calculations

- Most embedded network parents will not see any change in the total energy $ amount billed however for the very limited embedded networks having children with a different TNI than the parent, the altered energy volumes applying each TLF, will result in a change

For more information visit

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IESS Glossary

Term	Definition
5MPD	5-minute pre-dispatch
ADC	Aggregated Dispatch Conformance
ADG_ID	Aggregate Dispatch Group identifier for an Aggregate System
AGC	Automatic generation control
ASL	Ancillary service load
ASU	Ancillary service unit
B2B	Business-to-business
B2M	Business-to-market
BDU	Bidirectional unit
BESS	Battery energy storage system
CR	Change request
CRMP	Cost recovery market participant
DRSP	Demand response service provider
DUID	Dispatchable unit identifier
FRMP	Financially responsible market participant
IESS	Integrating Energy Storage Systems rule
IRP	Integrated resource provider

Term	Definition
IRS	Integrated resource system
MSATS	Market settlements and transfer solutions
MSGA	Market small generation aggregator
MT PASA	Medium-term PASA
NCC	NMI classification code
NECR	Non-energy cost recovery
NEM	National electricity market
NEMDE	National electricity market dispatch engine
NMI	National metering identifier
PAE	Profiling and allocation engine
PASA	Projected assessment of system adequacy
PD	Pre-dispatch
PDM	Participant Data Model
PMS	Portfolio management system
SCADA	Supervisory control & data acquisition
SoC	State of charge
UFE	Unaccounted for energy
WDRU	Wholesale demand response unit