Integrating Energy Storage Systems (IESS) June 2024



## Participant Impact Assessment

October 2023



## Disclaimer



This document includes material outlining AEMO's interpretation of indicative impacts of national energy market (NEM) reforms to energy market systems and processes for energy industry participants, as at 17 October 2023.

The interpretations expressed in this presentation are not binding on AEMO. The interpretation of the impact of NEM reforms may change at any time.

Anyone participating or intending to participate in the NEM should obtain detailed advice about the application of the National Electricity Rules and applicable laws, procedures and policies to their specific circumstances.

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## **IESS Glossary**

Term	Definition
5MPD	5-minute pre-dispatch
AGC	Automatic generation control
ASGU	Ancillary service generating unit
ASL	Ancillary service load
ASU	Ancillary service unit
B2B	Business-to-business
B2M	Business-to-market
BDU	Bi-directional 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
NEMDE	National electricity market dispatch engine
ΝΜΙ	National metering identifier
PAE	Profiling and allocation engine
PASA	Projected assessment of system adequacy
PD	Pre-dispatch
PMS	Portfolio management system
SCADA	Supervisory control & data acquisition
SRA	Small resource aggregator
SoC	State of charge
UFE	Unaccounted for energy
WDRU	Wholesale demand response unit



## AEMO

# IESS Draft participant impact assessment

- A. Initiative summary
- B. High-level impacts
- C. IESS impact assessment and affected participants
  - Registration
  - Bidding and dispatch
  - Retail and metering
  - Settlements and prudentials

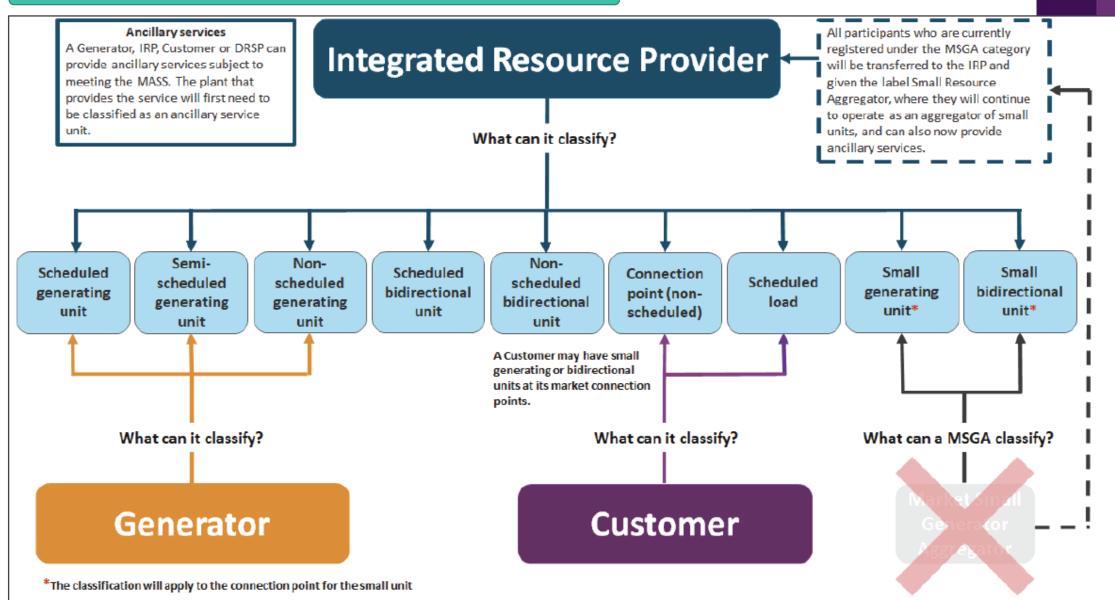
## **IESS: Initiative summary**



TIMING	ELEMENT	SUMMARY
02 Jun 2024	Settlement and non-energy cost recovery (NECR) changes	<ul> <li>Fundamental change - move from current category-based approach to a directional approach: <ul> <li>"Generator" and "customer" energy will become "sent out" and "consumed" energy, regardless of the type of connection point</li> </ul> </li> <li>Changes to the way NEM participants pay for "non-energy" services i.e. costs of ancillary services, interventions etc.</li> <li>Major AEMO database structure changes required to enable the new calculations, these changes will flow into the Data Model and affect participant reconciliation and reporting activities and also AEMO data provision.</li> <li>Non-energy cost recovery will change to recovery from cost recovery market participants (CRMPs) based on their proportion of sent-out or consumed energy. CRMPs are: <ul> <li>Market generators</li> <li>Integrated resource providers</li> <li>Market customers</li> </ul> </li> </ul>
	New/updated National Meter Identifier (NMI) Classification Codes	<ul> <li>Via the <u>Retail Procedures</u>, 3 new codes and amendments to 2 further codes will be implemented under IESS for:         <ul> <li>Identifying integrated resource systems (IRS) and removing the current use of two NMIs for grid-scale storage facilities</li> <li>Appropriate application of market fees and unaccounted-for-energy (UFE)</li> <li>Incorporating changes relating to the new Small Resource Aggregator category</li> <li>Enabling appropriate compliance monitoring to protect the integrity of market settlements.</li> </ul> </li> </ul>
	Facilitating a new category, near universal participant type – Integrated Resource Provider (IRP)	<ul> <li>An Integrated Resource Provider will be able to classify a wide range of units.</li> <li>New category will help simplify registration, particularly for battery participants who currently need to register as both a customer and a generator.</li> <li>Existing Bi-directional unit (BDU) participants (generator/customer) transition to IRPs</li> <li>Small Generation Aggregators become IRPs</li> </ul>
03 Jun 2024	Facilitating bi-directional units (BDU)	<ul> <li>A new unit type for plant (such as a battery) that can act as a generator and a consumer of electricity.</li> <li>There will also be a new approach to bidding whereby a BDU will use a single bid form, rather than the current two (one each for generation and consumption).</li> </ul>

#### IRP classifications & services from 02 Jun 2024

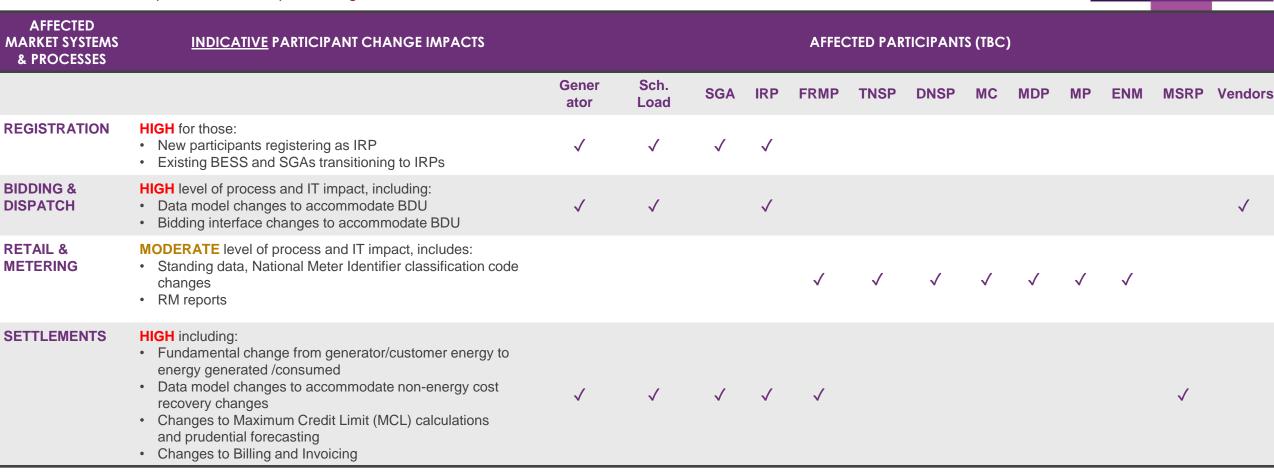
Source: Australian Energy Market Commission, IESS Final Determination, 02 Dec 2021. p iv.



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### **IESS: Indicative high-level impacts**

The information presented here is general in nature. AEMO encourages industry participants to undertake their own due diligence to assess energy market reform impacts on their respective organisations.



Generator	Generators
Sch. Load	Scheduled loads
SGA	Small generation aggregators
IRP	Integrated resource providers

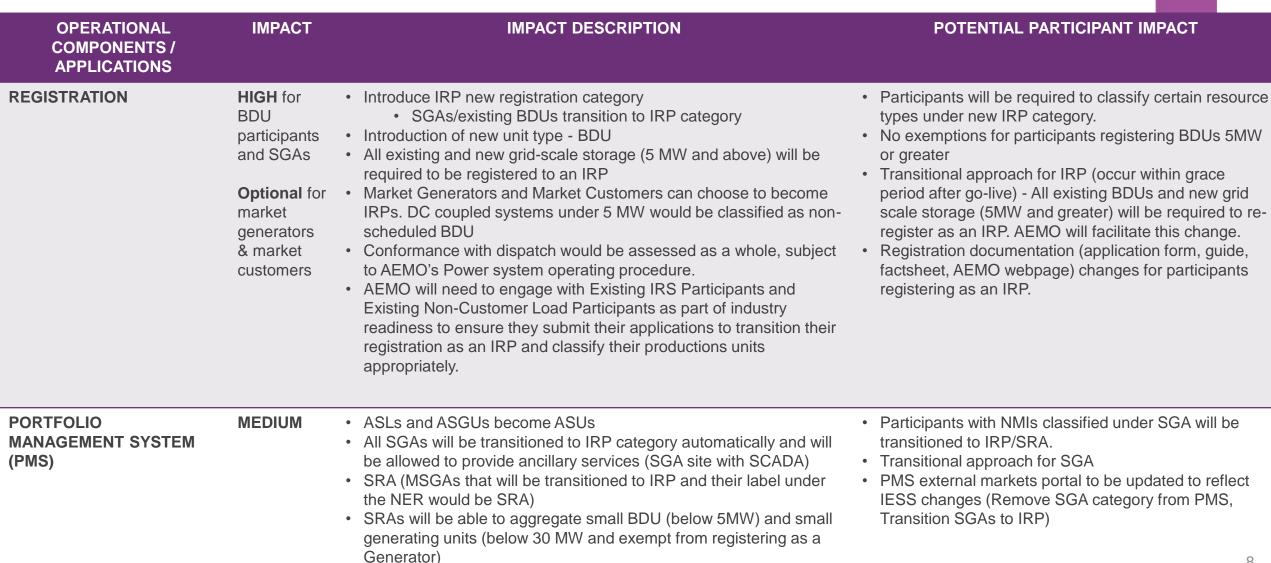
FRMP	Financially responsible market participant
TNSP	Transmission network service provider
DNSP	Distribution network service provider
МС	Metering coordinator

MDP	Metering data provider
MP	Metering provider
ENM	Embedded network manager
MSRP	Market SAPS resource provider

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### **IESS impacts: Registration**

The information presented here is general in nature. AEMO encourages industry participants to undertake their own due diligence to assess energy market reform impacts on their respective organisations.



#### **IESS affected participants: Registration**

PARTICIPANT TYPE	REGISTRATION	PMS
Metering Co-ordinator		
FRMP (Retailer)		
FRMP (Market Customer)		
FRMP (Generator/IRP)		
FRMP (MSRP)		
DNSP		
TNSP		
Accredited Embedded Network Managers		
Accredited Metering Data Providers		
Accredited Metering Providers, Cat A and B		
Market NSP		
Generator- Scheduled	х	
Generator - Semi Scheduled	х	
Generator – Non Scheduled		
Load - Scheduled		
Generator - exempt		
IRP	х	х
MSGA	х	х
MSRP		
DRSP - ASL	х	
DRSP - WDRU		
Trader		
Reallocator		



## IESS impacts: Bidding & dispatch\*

The information presented here is general in nature. AEMO encourages industry participants to undertake their own due diligence to assess energy market reform impacts on their respective organisations.

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**\*NO IMPACT** for non-BDU participants

OPERATIONAL COMPONENTS / APPLICATIONS	IMPACT	IMPACT DESCRIPTION	POTENTIAL PARTICIPANT IMPACT			
BIDDING FORMAT	HIGH	<ul> <li>Extend JSON-based bid submission format (multiple participant submission methods - FTP, API, web UI) to support introduction of BDUs.</li> <li>For Energy bids: <ul> <li>20 bid price bands (10 load / 10 generation)</li> <li>Dual up / down ramp rates for gen and load (4)</li> <li>Dual PASA availabilities for gen and load (2)</li> <li>Minimum and maximum energy SoC (optional)</li> </ul> </li> <li>For FCAS bids: <ul> <li>Allow negative and positive enablement min / max and low / high break point values (currently positive values only)</li> </ul> </li> </ul>	<ul> <li>For BDU participants submitting BDU bids: <ul> <li>Adapt to modified bid format</li> <li>Process any additional BDU-related bid-validation error responses</li> </ul> </li> <li>Participants querying their BDU bids via APIs will need to support extended format.</li> </ul>			
BIDDING INTERFACES	HIGH	<ul> <li>FTP, Markets Portal and APIs to be extended to support:         <ul> <li>Processing of modified BDU bid format</li> <li>Application of existing and new business validations / responses for BDU DUIDs</li> <li>GetBid(s) and GetSubmission(s) API requests extended to support BDU-related data</li> </ul> </li> <li>Transition process from 2 DUIDs to 1 DUID to be determined via IESS readiness approach.</li> </ul>	<ul> <li>Participants registering BDUs required to use the changed interfaces i.e. develop ability to submit / query BDU bids.</li> </ul>			



#### IESS impacts: Bidding & dispatch (continued)

OPERATIONAL COMPONENTS / APPLICATIONS	IMPACT	IMPACT DESCRIPTION	POTENTIAL PARTICIPANT IMPACT
DISPATCH AND PRICING	HIGH	<ul> <li>AEMO will implement the changes so that NEMDE will optimise a single BDU DUID and determine one dispatch instruction for each scheduled BDU.</li> <li>The Energy Target (MW) value in Dispatch Instructions (all run types i.e., Dispatch, PD and 5MPD) will be a single positive or negative value for BDU units via data interchange and AGC i.e. a positive value represents a generation target, a negative value represents a load target.</li> <li>No change to FCAS dispatch instructions i.e. FCAS enablement remains a positive value.</li> <li>The new BDU information will be added to existing EMMS data interchange reports / NEM web reports (i.e. Bids, Dispatch, P5Min, Pre-dispatch and 7-day Pre-dispatch packages)</li> </ul>	<ul> <li>For participants that consume dispatch outcomes (dispatch targets, constraints and pricing etc), there will be new information that relates to the BDU services.</li> <li>Scheduled BDUs will receive a single (bidirectional) dispatch instruction representing the net energy flow to be achieved.</li> <li>Storage resources capable of simultaneously charging and discharging are responsible for conforming to a single net energy dispatch target.</li> <li>Participants with existing bidirectional resources will need to ensure that their bidding and dispatch systems can accommodate this change.</li> <li>Participants will need to adapt to the BDU MMS Data Model Report</li> </ul>
PRE-DISPATCH / 5-MIN PD/ 7-DAY PRE-DISPATCH	HIGH	See Dispatch and Pricing	See Dispatch and Pricing



#### IESS impacts: Bidding & dispatch (continued)

OPERATIONAL COMPONENTS / APPLICATIONS	IMPACT	IMPACT DESCRIPTION	POTENTIAL PARTICIPANT IMPACT
CONSTRAINTS	HIGH	<ul> <li>New BDU constraints to be formulated and applied in NEMDE constraint calculations</li> </ul>	<ul> <li>IRPs with registered BDUs and interested parties can leverage the IRP enhanced related displays, tools and calculators</li> </ul>
PASA (SHORT TERM and PRE DISPATCH)	NONE	<ul> <li>ST PASA and PD PASA calculations and existing outputs will include BDU generation side availabilities</li> </ul>	No changes
MEDIUM TERM PASA	LOW	<ul> <li>MT PASA extended to support the introduction of IRP and BDU.</li> <li>Submissions of MT PASA offer(s) by IRPs via FTP, API, and Markets Portal (no change to offer format)</li> <li>Data Interchange and MT PASA DUID availability report supports provision of IRP offer(s).</li> </ul>	<ul> <li>IRPs with registered scheduled generation, load or BDU DUIDs need to provide MT PASA information</li> </ul>
MARKET NOTICES	ТВС	Changes to the relevant Market Notices to include IRPs.	• TBC



#### IESS impacts: Bidding & dispatch (continued)

OPERATIONAL COMPONENTS / APPLICATIONS	IMPACT	IMPACT DESCRIPTION	POTENTIAL PARTICIPANT IMPACT
DATA INTERCHANGE / DATA MODEL	HIGH	<ul> <li>The Data Model requires extension to support the introduction of the new IRP participant category and BDU.</li> <li>Specifically model extension and new model release to support:         <ul> <li>new BDU related fields and values to Bids package tables, changes to allowable values for existing table fields, new BDU bid tables</li> <li>new Target SoC BDU field and Energy Targets support -ve/+ve values for Dispatch, Predispatch and P5MIN packages.</li> </ul> </li> </ul>	<ul> <li>IRPs registering BDUs (and interested parties) to adopt new data model</li> <li>Non-interested parties can defer implementing only until next release becomes available (model supports backward compatibility for 1 version)</li> <li>Settlement changes require FRMPs to adopt new data model</li> </ul>
CONFORMANCE MONITORING	LOW	<ul> <li>BDU will be included in conformance monitoring reports.</li> </ul>	<ul> <li>During transition period conformance monitoring applied to original two DUID arrangement and replacement single BDU DUID until two DUID retired</li> </ul>

#### IESS affected participants: Bidding and dispatch

PARTICIPANT TYPE	BIDDING FORMAT	BIDDING INTERFACES	DISPATCH & PRICING	PD / 5-MIN PD / 7-DAY PD	CONSTRAINTS	MT PASA	AGC/SCADA (Dispatch & Inputs)	CONFORMANCE MONITORING
Metering Co-ordinator								
FRMP (Retailer)								
FRMP (Market Customer)								
FRMP (Generator/IRP)								
FRMP (MSRP)								
DNSP								
TNSP								
Accredited Embedded Network Managers								
Accredited Metering Data Providers								
Accredited Metering Providers, Cat A & B								
Market NSP								
Generator- Scheduled	Х	Х	Х	х	Х	Х	х	х
Generator - Semi Scheduled								
Generator - Non Scheduled								
Load - Scheduled	Х	Х	Х	х	Х	Х	х	х
Generator - exempt								
IRP	Х	Х	Х	х	Х	Х	х	х
MSGA								
MSRP								
DRSP - ASL								
DRSP - WDRU								
Trader								
Reallocator								



## IESS affected participants: Bidding and dispatch (continued)

AEMO has not identified any participant impacts in the following operational components / applications:

- SHORT TERM PASA and PRE DISPATCH PASA calculations and existing outputs will include BDU generation side availabilities
- DEMAND FORECASTING will be extended to support inclusion of BDU
- AGC/SCADA (DISPATCH AND INPUTS)
- MARKET NOTICES Impact to the participants to be determined



## **IESS impacts: Retail & metering**

The information presented here is general in nature. AEMO encourages industry participants to undertake their own due diligence to assess energy market reform impacts on their respective organisations.

OPERATIONAL COMPONENTS / APPLICATIONS	IMPACT	IMPACT DESCRIPTION	POTENTIAL PARTICIPANT IMPACT
STANDING DATA CHANGES	MEDIUM	<ul> <li>New NMI Classification Codes: TIRS, DIRS, DGENRATR</li> <li>Amended NMI Classification Codes: GENERATR, NREG</li> </ul>	<ul> <li>Need to work on BDU transition from 2 NMIs to 1 NMI</li> <li>MDPs no longer need to separate Sent Out Energy &amp; Consumed Energy data to 2 different NMIs</li> </ul>
B2M INTERFACES / aseXML CHANGES	LOW	Additional NCCs and Amended NCCs will impact CRs	Participants will need validations to address new NCCs
ENERGY PROFILING AND AGGREGATION	LOW	<ul> <li>UFE Calculations</li> <li>PAE to handle the transition period of Pre and Post IESS Logic</li> <li>New NMI Classification Codes</li> </ul>	<ul> <li>Participants need to understand the financial impact of UFE methodology change</li> </ul>

### IESS impacts: Retail & metering (continued)



OPERATIONAL COMPONENTS / APPLICATIONS	IMPACT	IMPACT DESCRIPTION	POTENTIAL PARTICIPANT IMPACT
ENERGY ALLOCATION	HIGH	<ul> <li>NECR Calculations</li> <li>Embedded networks will be calculated in PAE, changing energy allocation for Parents in Embedded Networks. IRPs – ACE and ASOE to be sent through as individual reads</li> <li>ImportNet and ExportNet will no longer be required</li> <li>Changes to DME, ADMELA, UFEF and UFE calculations and reports</li> <li>MeterTCD and PeelOff logic to cater for new NCC</li> </ul>	<ul> <li>Changes to calculations are seen in RM Reports</li> </ul>
RM REPORTS	HIGH	<ul> <li>This change will impact the RM16 file for FRMPs with Parent EN's whereby RM27 file will no longer match, impacting participant settlements systems/audit.</li> </ul>	<ul> <li>Changes to RM 16</li> <li>Participants will need to use updated RM 16 along with RM21 and RM27 to reconcile settlement statements.</li> </ul>

#### IESS affected participants: Retail & metering



PARTICIPANT TYPE	STANDING DATA	METER DATA INTERFACES / FORMAT	B2M INTERFACES	ENERGY PROFILING & AGGREGATION	ENERGY ALLOCATION	RM REPORTS
Metering Co-ordinator	Х		Х			
FRMP (Retailer)	х		х			Х
FRMP (Market Customer)	Х		Х			Х
FRMP (Generator/IRP)	х		х			Х
FRMP (MSRP)	х		Х			Х
DNSP	х		х			
INSP	х		Х			
Accredited Embedded Network Managers	х		х			
Accredited Metering Data Providers	х		Х			
Accredited Metering Providers, Cat A & B	х		х			
Market NSP						
Generator- Scheduled						
Generator - Semi Scheduled						
Generator - Non Scheduled						
.oad - Scheduled						
Generator - exempt						
RP						
MSGA						
MSRP						
DRSP - ASL						
DRSP - WDRU						
rader						
Reallocator						



## IESS affected participants: Retail and metering (continued)

AEMO has not identified any participant impacts in the following operational components / applications:

- METER DATA INTERFACES / FORMAT
- B2B INTERACTION
- aseXML no schema change
- MSATS BROWSER will only see new/amended NCCs in existing fields

### **IESS impacts: Settlements & Prudentials**

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The information presented here is general in nature. AEMO encourages industry participants to undertake their own due diligence to assess energy market reform impacts on their respective organisations.

OPERATIONAL COMPONENTS / APPLICATIONS	IMPACT	IMPACT DESCRIPTION	POTENTIAL PARTICIPANT IMPACT
SETTLEMENT	HIGH	<ul> <li>Energy settlement inputs updated to use gross imports and exports (ACE and ASOE) in a single calculation table for all generation/consumption data, with no netting of imports and exports as currently occurs in SETCPDATA</li> <li>NECR will be from CRMPs, with calculations updated to the relevant ACE and/or ASOE, no longer reliant on participant category</li> <li>No functional change to scheduled load carve outs for NECR</li> <li>Market fee structure is under consultation until ~October 2023 and likely to use ACE &amp; ASOE data inputs</li> <li>IRPs fees be calculated on gross ACE and ASOE, this includes SGAs moving to IRP category</li> <li>Intra-regional residue inputs to be based on ACE and ASOE</li> <li>Existing processes for inter-regional SRA being extended to IRPs</li> <li>Settlement shortfall calculations and processes to be extended to IRPs</li> <li>CO2E calculations impacted - likely to be based on ASOE for generators and implemented for IRPs</li> </ul>	<ul> <li>Participant systems will require updates to implement the data model changes to align to ACE and ASOE from a new single table Energy_Transaction, instead of using deprecated tables SETGENDATA, SETCPDATA and ENERGY_GENERATOR_AGG for interval level energy volumes and amounts</li> <li>Current summary participant and weekly level billing aggregation tables will also be replaced with new equivalent tables</li> <li>Invoice reconciliation will be significantly changed as per the above, with NECR relying on ACE and/or ASOE from the new table</li> <li>NEM reports updated for ACE and ASOE</li> </ul>

## IESS impacts: Settlements & Prudentials (continued)



OPERATIONAL COMPONENTS / APPLICATIONS	IMPACT	IMPACT DESCRIPTION	POTENTIAL PARTICIPANT IMPACT
BILLING	HIGH	<ul> <li>Implement billing and invoicing processes for IRPs</li> <li>Billing summary tables impacted, with the former billing week summary tables of SETGENDATA and SETCPDATA replaced by summaries of the new single Energy_Transaction table</li> <li>Invoicing reports (SR, SRR) impacted, with sales/purchase volumes being replaced by ACE and ASOE</li> <li>External reporting impacted (NEMWEB, website, EMMS, CDEII)</li> </ul>	Same as Settlement
SETTLEMENTS DATA INTERCHANGE / DATA MODEL	HIGH	<ul> <li>SETGENDATA, SETCPDATA and ENERGY_GENERATOR_AGG tables replaced by single Energy_Transaction table storing ACE and ASOE</li> <li>Summary tables of the above data are similarly to be replaced</li> <li>Participant systems will require updates to implement the data model changes</li> <li>Invoice reconciliation data will be significantly changed</li> </ul>	Same as Settlement

## IESS impacts: Settlements & Prudentials (continued)



OPERATIONAL COMPONENTS / APPLICATIONS	IMPACT	IMPACT DESCRIPTION	POTENTIAL PARTICIPANT IMPACT
PRUDENTIALS	HIGH	<ul> <li>Inclusion of Ancillary Services into the MCL calculation</li> <li>MCL calculations will be updated to use ACE and ASOE</li> <li>Display of graphs for MCL calcs analysis uses up to 36 months of data so there will be a transition period of where the MCL calcs will use both the old data (SETGEN and SETCP) and the new data (ACE and ASOE)</li> <li>Extension of Prudential processes to IRP</li> <li>Prudential Forecasting will be updated to use ACE and ASOE</li> <li>New (internal) Alert for IRPs with increase in NMI counts</li> <li>New (internal) Alert for Increase of average load</li> <li>Prudential Adjustment Tool will be updated to use ACE and ASOE</li> </ul>	<ul> <li>Ancillary Services will now be included in MCL calculation taking the payments and recoveries into account to reduce or increase MCL</li> <li>Participant systems will require updates to implement the data model changes to align to ACE and ASOE instead of SETGEN and SETCP</li> </ul>
SETTLEMENT ESTIMATION	LOW	<ul> <li>Methodology being updated for days D-1 calculation using ACE and ASOE</li> <li>Proposed change for calculation of estimations using Multiple Linear Regression methodology</li> </ul>	<ul> <li>Participant systems will require updates to implement the data model changes to align to ACE and ASOE instead of SETGEN and SETCP</li> </ul>

#### IESS affected participants: Settlements & prudentials



PARTICIPANT TYPE	SETTLEMENT ESTIMATION	SETTLEMENT	BILLING	SETTLEMENT DATA INTERCHANGE / DATA MODEL	PRUDENTIALS
Metering Co-ordinator					
FRMP (Retailer)	х	Х	Х	Х	Х
FRMP (Market Customer)	Х	Х	Х	Х	Х
FRMP (Generator/IRP)	Х	Х	Х	Х	Х
FRMP (MSRP)	Х	Х	Х	Х	Х
DNSP					
TNSP					
Accredited Embedded Network Managers					
Accredited Metering Data Providers					
Accredited Metering Providers, Cat A and B					
Market NSP					
Generator- Scheduled		Х	Х	Х	
Generator - Semi Scheduled		Х	Х	Х	
Generator - Non Scheduled		Х	Х	Х	
Load - Scheduled		Х	Х	Х	
Generator - exempt		Х	Х	Х	
IRP		Х	Х	Х	
MSGA		Х	Х	Х	
MSRP		Х	Х	Х	
DRSP - ASL					
DRSP - WDRU					
Trader					
Reallocator					



## IESS affected participants: Settlements & prudentials (continued)

AEMO has not identified any participant impacts in the following operational components / applications:

- REALLOCATIONS existing reallocation processes being extended to IRPs
- SETTLEMENT DIRECT only the content of the reports and statements being exported are impacted, but not the interface itself