



Stakeholder Information Session

Project Energy Connect – Market Integration (PEC-MI)

Tuesday 14 November



1. Welcome, Agenda & Context

Nicole Nsair

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.

Agenda

#	Time	Topic	Presenter
1	9:30-9:35am	Welcome, Context & Agenda	Nicole Nsair
2	9:35-9:45am	Modelling results and Current Processes	David Scott
3	9:45-10:00am	Future Approach Options	David Scott
4	10:00-10:15am	Implications for Settlement Residue Auction	Stephen Harrison
5	10:15-10:55am	Q&A	Nicole Nsair
6	10:55-11:00am	How to get involved & close	Nicole Nsair

Appendix A:

Competition law meeting protocol

"Please note that this meeting will be recorded by AEMO and may be accessed and used by AEMO for the purpose of compiling minutes. By attending the meeting, you consent to AEMO recording the meeting and using the record for this purpose. No other recording of the meeting is permitted"

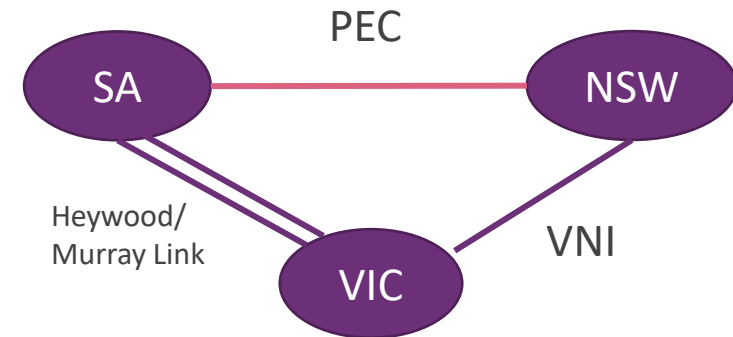
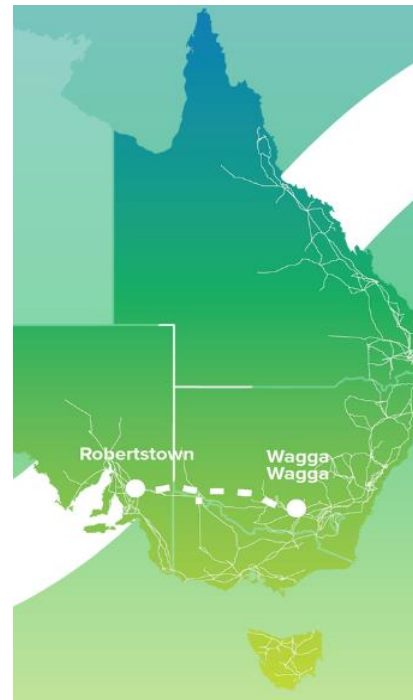
Project Energy Connect – Market Integration

PEC will establish:

- a new major physical transmission connection between South Australia and New South Wales,
- an additional interconnection between Buronga (New South Wales) and Red Cliffs (Victoria).

The interconnection of these three regions will establish a **loop flow** across these three NEM regions of

- Victoria – New South Wales Interconnector (VNI),
- Heywood/Murray Link Interconnector and
- Project Energy Connect (PEC)



Context and Consultation

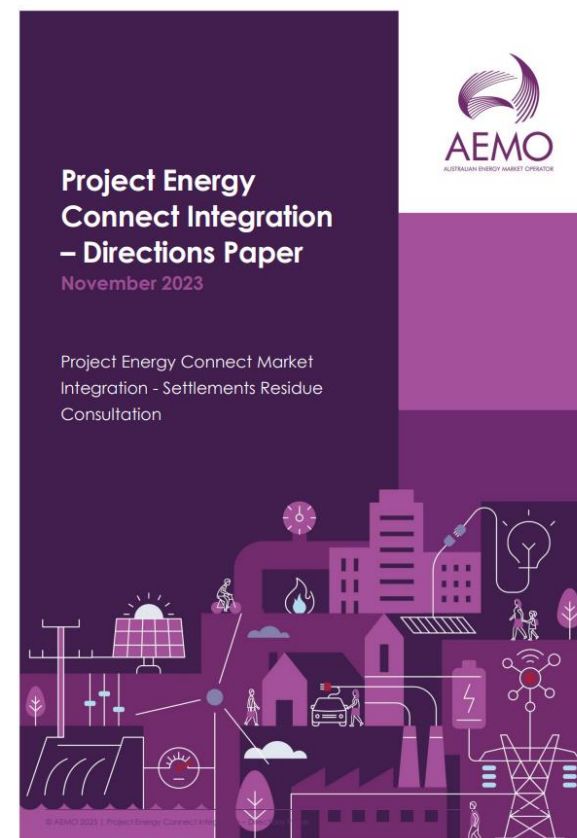
For AEMO, from 1 Jan 2026:

- Without changes to existing arrangements, the loop flows would result in significant disruption to market in outcomes, in particular settlement outcomes.
- Asset that isn't fully utilised

PEC – MI looks at challenges for managing:

- inter-regional settlements residues (IRSR) and
- Ongoing operation of the Settlements Residue Auction (SRA)
- Providing certainty to the market

Directions Paper released for
Consultation on
Thursday 2 November



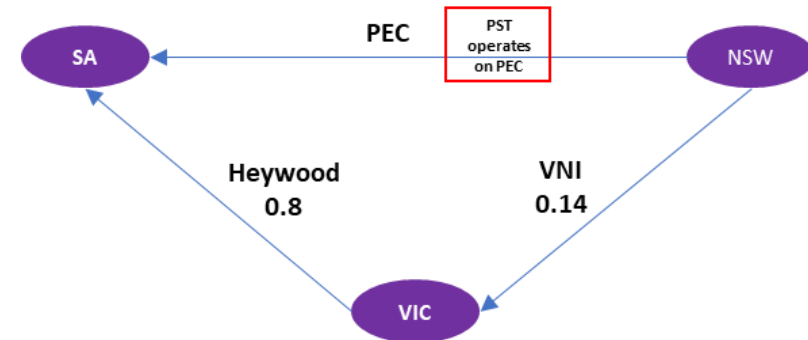
2. Modelling results and Current Process

David Scott

Modelling the settlement effects of PEC

- ACIL Allen modelled dispatch and settlement outcomes of PEC via the loop flow constraint
- Loop flow constraint operates as an **equality constraint** and always binds in dispatch
- The Θ PST will operate as an input into NEMDE – the loop flow constraint applied in NEMDE will differ depending on the Θ PST tap setting
- Modelling focused on addressing:
 - To what extent will loop flow negative IRSR accrue?
 - What are the key drivers/ scenarios where negative IRSR occurs?
 - What methods are available to distribution negative IRSR around the loop?
- The current approach of “clamping” negative IRSR above >\$100,000 was removed in modelling

$$PEC = x_{VNI} * VNI + x_{Heywood} * Heywood + \theta_{PST}$$



Scenario	Coefficients - Analytical Estimation		
	x_{VNI}	$x_{Heywood}$	θ_{PST}
1) No outage, PST -6.73°	0.1413	0.8084	-20.9260
2) No outage, PST 0°	0.1410	0.8073	73.7164
3) No outage, PST 8°	0.1408	0.8090	186.6568

Modelling results

1. Negative IRSR will become a common part of dispatch

- Negative IRSR can be reasonably expected as a part of efficient dispatch
- Driven by the loop flow constraint (representing physical flow limits of the loop) but most prevalent where intra-regional constraints bind

2. Negative IRSR typically occur where overall IRSR around the loop in aggregate is in surplus

- Balancing of flows between the three regions will commonly result in one or two directional interconnectors delivering counter-price flows to maximise the value of economic dispatch

3. Occurrences of aggregate around the loop in deficit occur in the minority

- Likely increase over time as intra-regional constraints increase
- May need to maintain some of form negative residue management in dispatch

Occurrences of IRSR

	VNI	PEC	Heywood
Positive	42% - 66%	30% - 47%	20% - 29%
Negative	3% - 10%	18% - 23%	25% - 38%



~40% no IRSR, unconstrained

	Loop aggregate
Positive	46% - 69%
Negative	2% - 6%

Aggregate around the loop is in deficit

Positive on all interconnectors
7% - 12%

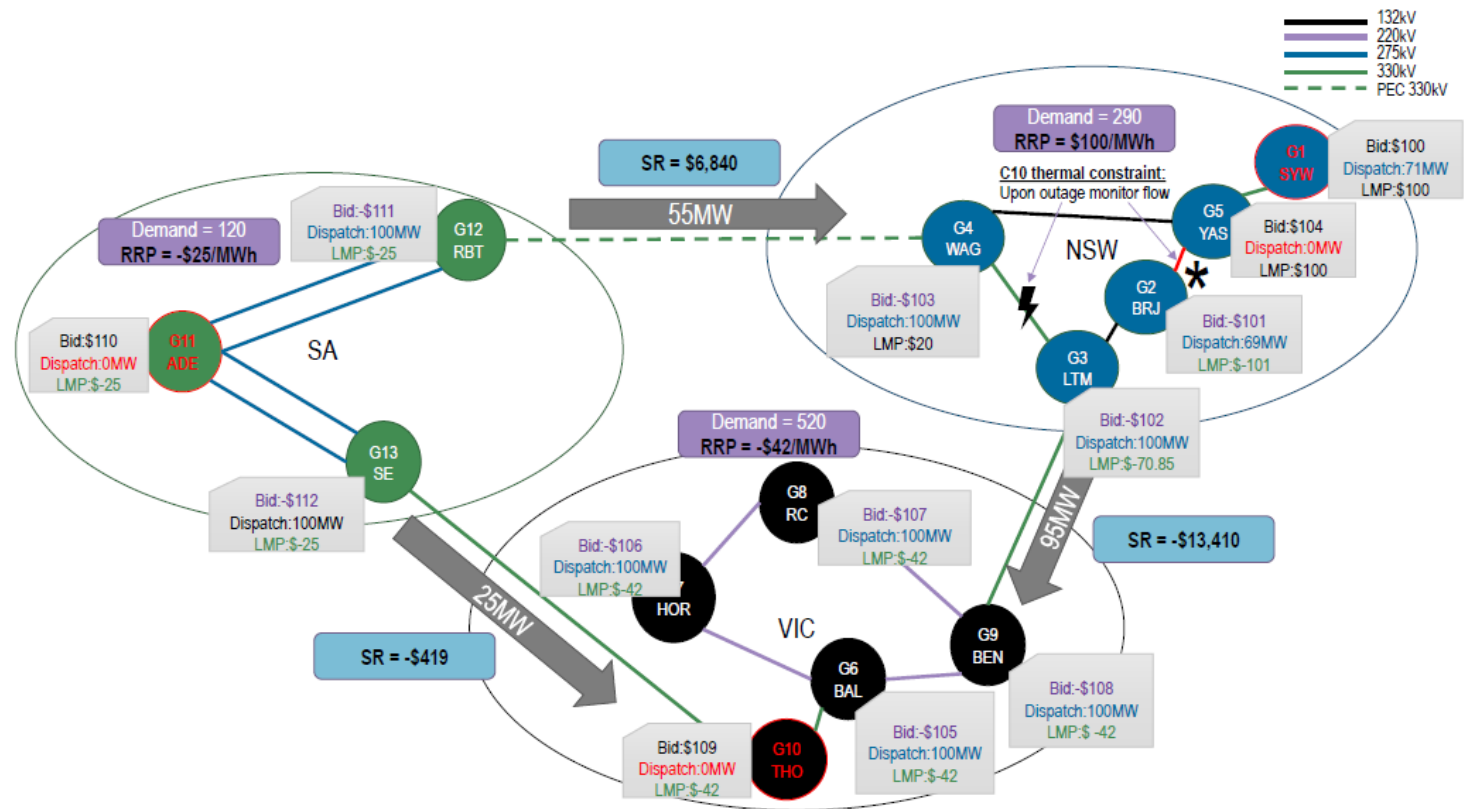
Negative on one or two interconnectors
88% - 91%

Negative on one leg but aggregate in surplus - Most common IRSR outcome

Example – aggregate around the loop in deficit

Example scenario - binding intra-regional constraints and negative pricing causing aggregate IRSR in deficit around the loop.

- Negative IRSR between VIC and NSW cause by negative bid of G3
- The binding C10 constraints in NSW prevents optimal intra-regional flows and causes southward flows on VNI
- Higher NSW price demonstrates the cost of congestion within the region and the impact of bidding
- Negative IRSR also occurs on Heywood with counter price from SA to VIC - the loop constraint binding



Current Process

The current process is designed to manage negative IRSR settlement residues as a limited and abnormal part of dispatch

1) Negative residue management (NRM)

- AEMO limits the extent to which negative IRSR accrue in dispatch with constraint “clamping”
- \$100,000 threshold AEMO applies a NRM constraint, subject to power system security
- NRM clamping balances increased costs of negative IRSR with minimising intervention in the market
- Not designed for frequent application and many limit maximising flow around the loop

2) Allocation of negative IRSR

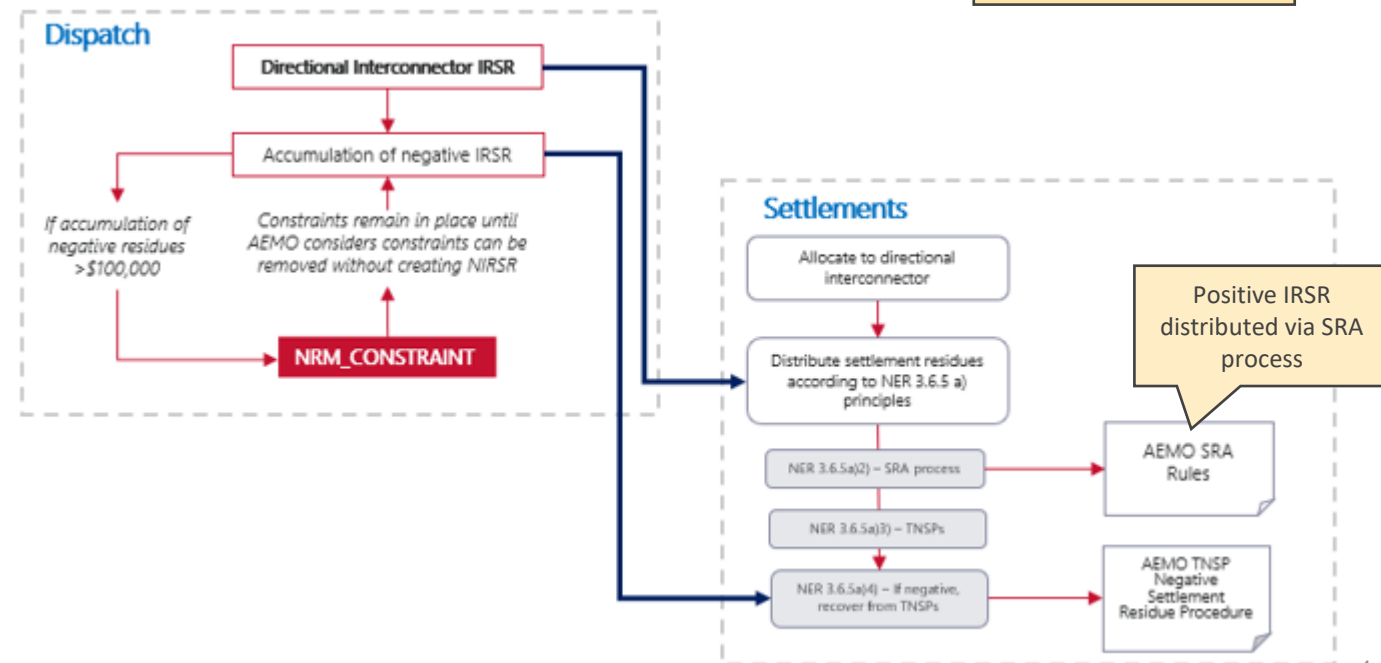
- Negative IRSR is allocated to the **importing TNSP** in accordance with NER 3.6.5(a) principles for the distribution of settlements residue
- Significant increase in negative IRSR has a potential to create working capital issues for TNSPs
- With PEC negative IRSR is supporting the accrual of positive into other importing regions.

Yearly negative IRSR – percentage of total IRSR

	Cal 2021	Cal 2022	Region paying for negative IRSR
SAVIC	\$0.26M (2%)	\$2.39M (7%)	VIC
VICSA	\$1.00M (2%)	\$2.61M (3%)	SA
NSWVIC	\$0.66M (13%)	\$8.25M (41%)	VIC
VICNSW	\$1.50M (1%)	\$2.60M (1%)	NSW

Increase driven by NIL_3 voltage constraint limiting exports

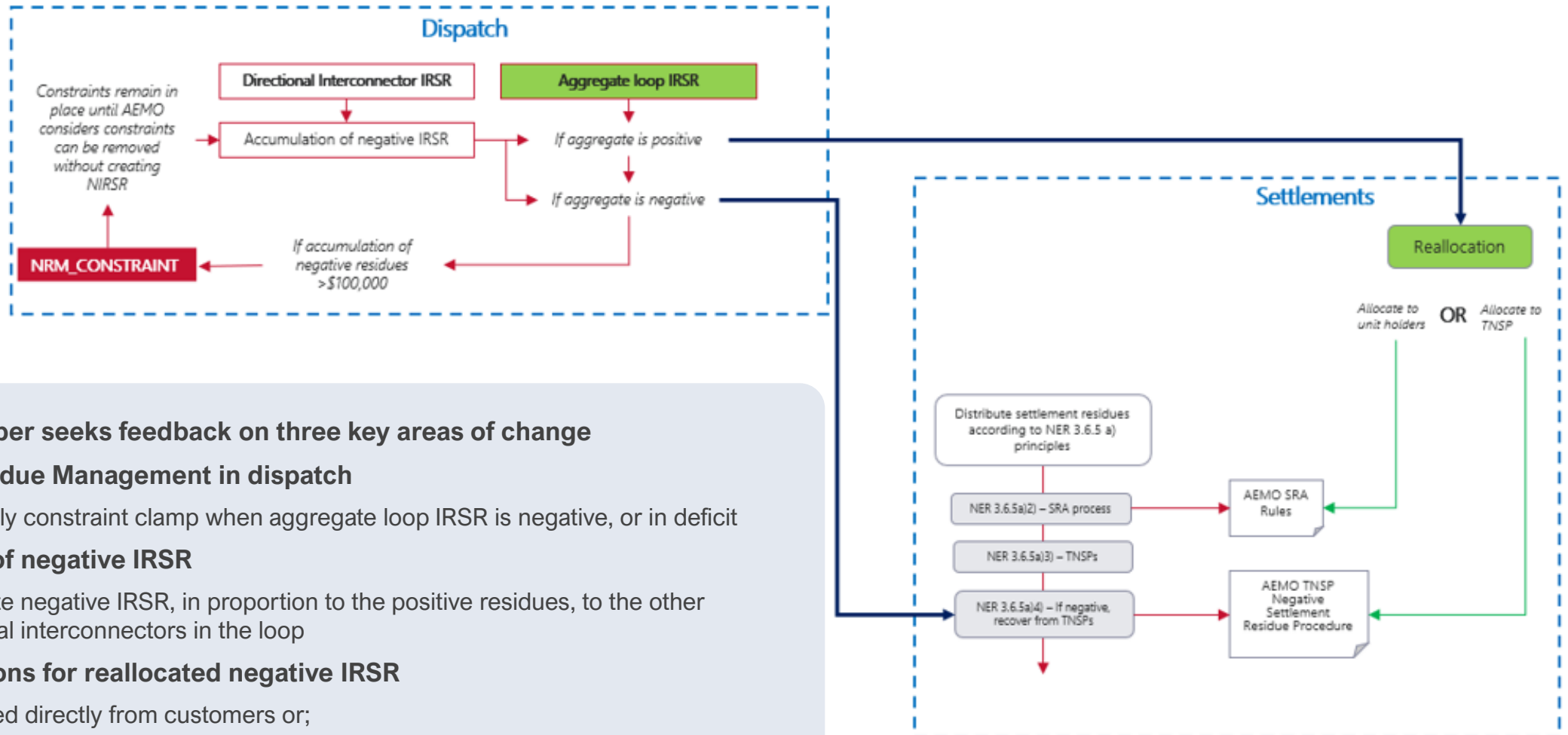
High level current dispatch and settlements process



3. Future Approach Options

David Scott

Proposed future state – NRM and allocation of negative IRSR



The Directions Paper seeks feedback on three key areas of change

1. Negative Residue Management in dispatch

- Only apply constraint clamp when aggregate loop IRSR is negative, or in deficit

2. Reallocation of negative IRSR

- Reallocate negative IRSR, in proportion to the positive residues, to the other directional interconnectors in the loop

3. Payment options for reallocated negative IRSR

- Recovered directly from customers or;
- Deducted from the payout of units purchased in the SRA

Proposed future state – NRM and allocation of negative IRSR

Negative Residue Management

- Remove NRM clamp for negative IRSR when the aggregate IRSR is positive
 - Efficient dispatch outcome
 - Maximise the value of loop flows
 - Limit the extent to which clamp impacts dispatch outcomes
- Retain NRM clamp for negative IRSR when aggregate IRSR is negative
 - Manage the accumulation of inefficient counter-priced flows
 - Limit the accrual to negative IRSR when there is not enough money to pay generators in settlement around the loop

It is not guaranteed NRM clamp will limit negative IRSR – other interconnectors will be affected by the constraint.

Alternative approaches:

Retain NRM in all scenarios or remove NRM in all scenarios

Reallocation of negative IRSR

- Reallocate negative IRSR to directional interconnectors, or regions, who have received positive IRSR for each period
 - Spread the impact of negative IRSR
 - Align to transmission loop flows
 - Reflects the role counter-priced flows are having in allowing positive interconnectors to achieve those flows
- Reallocation method based on the **ratio of positive IRSR**
 - Takes into account interregional dynamics of price and MW flow
 - Aligns negative IRSR with those with the capacity to pay for them

Alternative approaches: reallocate all IRSR not just negative IRSR – this alternative approach assumes negative IRSR is deducted from unit holders and allocates positive IRSR to regions already realising the benefits of lower prices

Proposed future state – Payment for negative IRSR

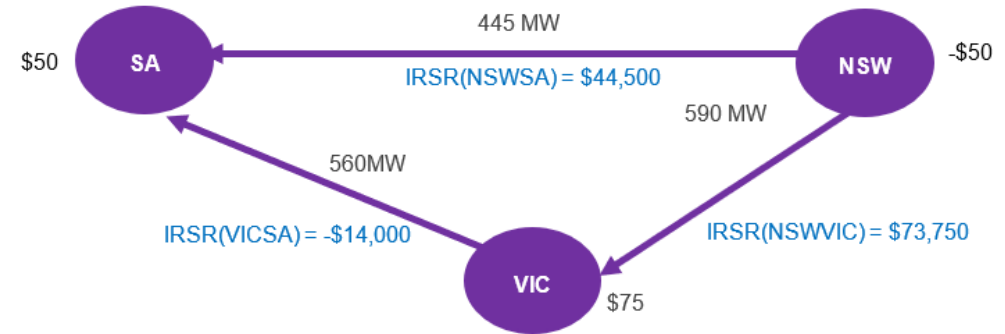
Payment for negative IRSR

1. Deduct reallocated negative IRSR from payout to SRA unit holders

- Allow reallocated negative IRSR to be netted against positive IRSR around the loop, [that was enabled in part by counter-priced flows]
- Introduces additional uncertainty to IRSR distributions and consequently SRA value
- Possible decrease of firmness and trading performance of SRA units
- Previous regulatory determinations shifted the allocation to TNSPs

2. Reallocated negative IRSR is recovered from customers in importing regions

- Retain current principles of recovering directly from customers in importing regions
- Both negative IRSR where aggregate loop is in deficit and reallocated negative IRSR would be borne by customers
- Impacts on TNSPs cash flow with increases in value and variability of negative IRSR



Reallocation process:

Total positive IRSR = \$118,250

Negative IRSR(NSWVIC) = $\$73,750 / \$118,250 * -\$14,000 = -\$8,732$

Negative IRSR(NSWSA) = $\$44,500 / \$118,250 * -\$14,000 = -\$5,269$

If deducted from SRA unit holders		If recovered from customers (TNSPs)	
IRSR(VICSA)	\$0	VIC customers	-\$8,732
IRSR(NSWVIC)	\$65,019	SA customers	-\$5,269
IRSR(NSWSA)	\$39,232		

4. Implications for Settlement Residue Auction to Consider

Stephen Harrison

Settlement Residue Auction (SRA)

Implications SRA

- The introduction of PEC and transmission loop flows will impact the interregional settlements residue available for the SRA distribution on each directional interconnector
- Changes to the method for allocation of negative IRSR may also impact the settlements residue available for distribution if deducted from IRSR payments to unit holders
- For units that have already been auctioned, there are provisions in the Auction Participation Agreement (APA) for cancelling units

Uncertainty around SRA Units

- The relationship between auction proceeds to TNSPs and until holders' entitlement of IRSR means that where the value of SRA increase, auction proceeds should similarly increase to TNSPs.
- Auction Participants should consider the potential uncertainty and changes associated with this consultation process when purchasing units.

Auction Participation Agreement

16.5 Settlements Residue Calculation

The Auction Participant may, by notice to AEMO, terminate an SRDA if there is a change in the way in which the *settlements residue* is calculated during the term of the SRDA that affects the calculation of *settlements residue* the subject of the SRDA Units.

5. Q&A

Nicole Nsair

Questions Received

Question received	AEMO's response
<p>Regarding clamping – my understanding is that AEMO intends to maintain clamping when there is net negative residue around the loop. Could you clarify how this will work in practice?</p> <p>Will all 3 links be clamped or just links producing negative residue?</p> <p>How will this interact with the reallocation of residues?</p>	<p>The current process via constraint automation or “clamping” of negative residue management applies where the accumulation of actual or forecast negative IRSR reaches -\$100,000, with a negative residue management constraint equation specific to each directional interconnector automatically activated. Clamping the interconnector will be a difficult task and AEMO will seek to implement and integrate a dispatch solution. The Directions Paper sets out the objective and explains why.</p> <p>Refer to the alternative approaches outlined in the Directions Paper.</p> <p>AEMO is still considering how the net negatives impact positive residue allocation on directional interconnectors around the loop.</p>
<p>Does AEMO have a view on whether SRA units will be eligible to be cancelled in the event the reallocation of residues are implemented as recommended in the working paper? It would be more efficient if AEMO voiced an opinion on this rather relying on each individual participant to form an opinion separately. Additionally, this will promote liquidity in the auction.</p>	<p>AEMO refers stakeholders to Section 16.5 of the Auction Participation Agreement (APA) which allows an Auction Participant to terminate a Settlements Residue Distribution Agreement (SRDA) if there is a change in the way in which settlements residue is calculated that has an effect on the calculation of settlements residue the subject of the SRDA. If terminated, remaining units that were the subject of that SRDA at the time of termination may be reaucted in later tranches.</p> <p>The optionality for stakeholders to terminate units could present issues for the SRA into the future. AEMO is keen to provide certainty through an amended methodology to give the market visibility on the future of the SRA.</p>

6. How to get involved & Close

Nicole Nsair

PEC Market Integration Directions Paper Consultation

Consultation Activity	Indicative Date	Status
Directions Paper published	1 November 2023	Completed
Settlement Residue Committee Meeting	Friday 3 November 2023	Completed
PEC-MI Information Session	Tuesday 14 November 2023	Completed (this session)
Submissions and Feedback	Friday 1 December 2023	
Final Recommendations published	Thursday 21 December 2023	

Link to website <https://www.aemo.com.au/consultations/current-and-closed-consultations/project-energy-connect-market-integration-paper>

Email contact NEMReform@aemo.com.au

Appendix A: Competition law meeting protocol

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.

To access the full protocol at AEMO's website, visit: <https://aemo.com.au/en/consultations/industry-forums-and-working-groups>