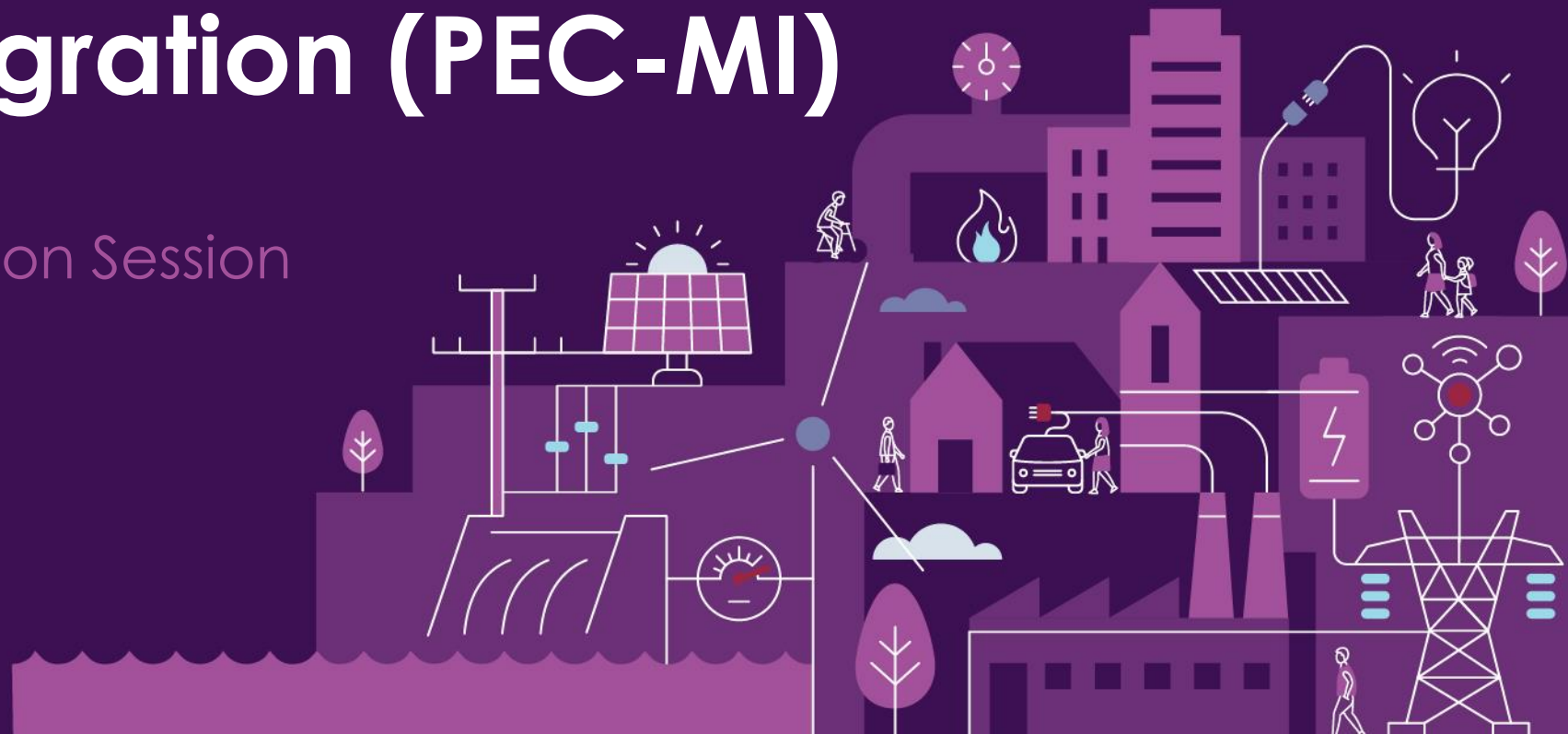


# Project Energy Connect – Market Integration (PEC-MI)

Stakeholder Information Session  
Thursday 15 February



# 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	11:00-11:15am	Welcome, Context & Agenda	Nicole Nsair
2	11:15-11:45am	Dispatch Integration Models	James Banks
3	11:45-12:00pm	Interregional Trade	David Scott
4	12:00-12:10pm	AEMO Rule Change Proposal	James Banks
5	12:10-12:30pm	Stakeholder Feedback & Discussion	Nicole Nsair
6.	1:00pm	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"*

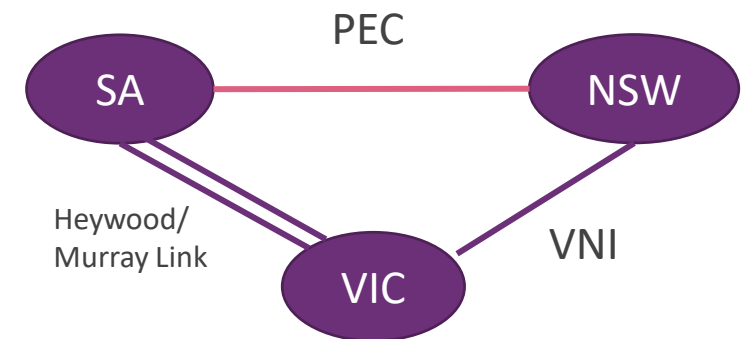
# Project Energy Connect – Market Integration

## Project EnergyConnect 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 PEC – Market Integration reform will manage:

- Negative inter-regional settlement residues (IRSR)
- ongoing operation of the Settlements Residue Auction (SRA)
- market certainty



# Journey from approach to change

## Current process

- Designed to manage negative settlement residues as a limited and abnormal part of dispatch
- Allocates negative settlements residues to the importing TNSP in accordance with NER 3.6.5(a) principles for the distribution of settlements residue
- AEMO notionally allocates all settlements residues calculated for a directional Interconnector to the TNSP responsible for the directional interconnector in the importing region
- Allocate negative IRSR for distribution on each directional regulated interconnector for the SRA

## Reason for change

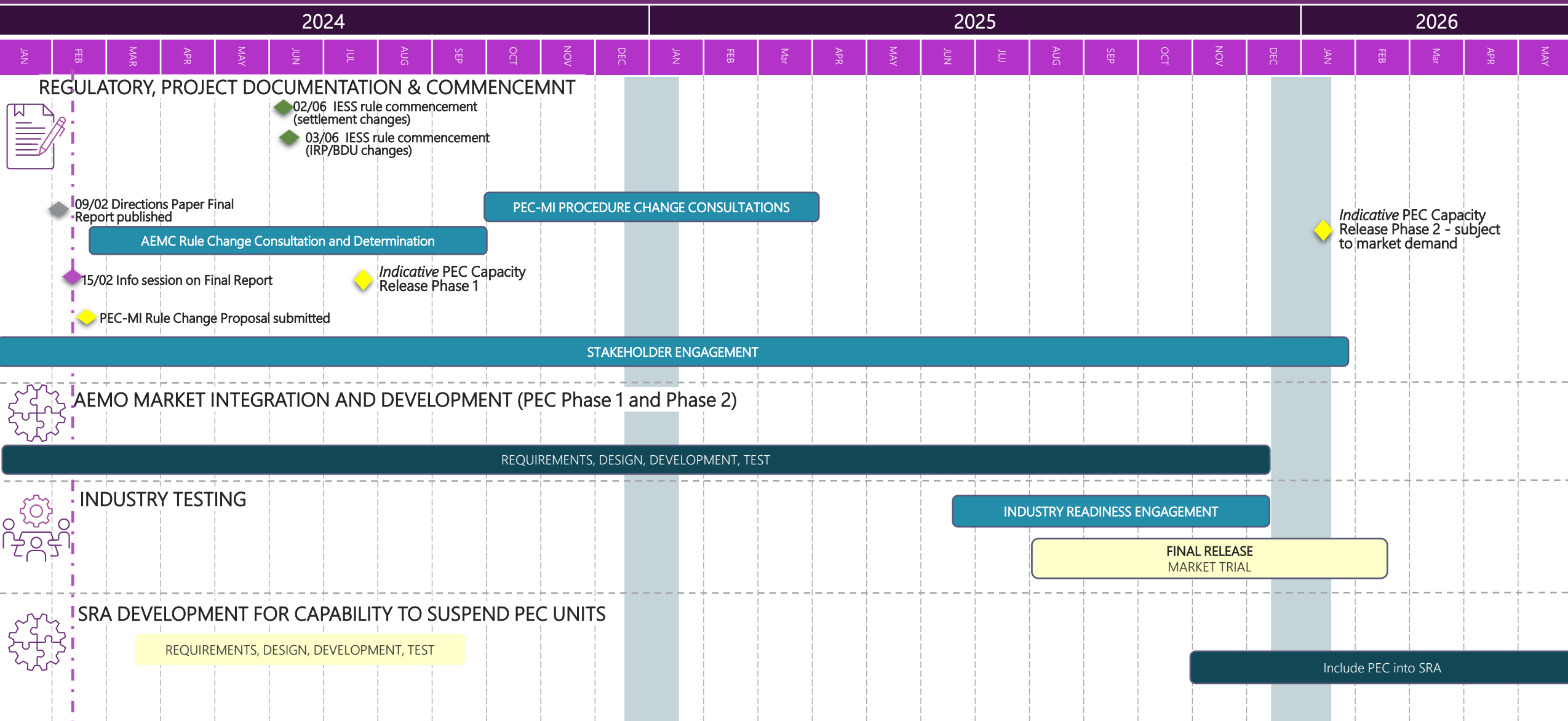
- Current process would see AEMO constraining interconnectors to reduce accumulation of counter price flows and expected negative settlement residue.
  - interconnectors become underutilised and consumer benefits reduced.
- If AEMO does not constrain the interconnectors, more settlement residues are created and distributed through the TNSPs
  - results in (unfair) significant wealth transfer between customers in the different NEM regions.
- PEC has implications for the settlement residue auction (SRA).
  - Uncertainty changes the value of the units available for the SRA.
  - Financial benefits from SRA and to customers is uncertain.

## Integrate PEC Stage 2 in AEMO systems

- Use the interconnector dispatch integration model
- Revise existing automated Negative Residue Management constraints
  - Limit the application of interconnector clamping, to when aggregate loop IRSR is negative. This would limit the extent interconnector clamping is a driver of dispatch outcomes.
- Reallocate negative IRSR when settlement, in aggregate, is in surplus across the three interconnectors for each trading interval.
- Negative IRSRs reallocated are payable by the importing TNSP
- Include PEC in the SRA
- Post implementation, continue to monitor value of units available for SRA

# PEC-MI – Indicative Industry Timeline

As of 15/2



- PEC-MI Confirmed
- PEC-MI Indicative
- Concurrent initiatives
- Completed activities
- Summer holiday periods

# Stakeholder consultation timeline

Deliverable	Timeline
Directions Paper Consultation	1 November 2023 – 1 December 2023
Stakeholder Information session #1	14 November 2023
Settlement Residue Committee (SRC)	2 February 2024 (Quarterly)
Final Report – PEC-MI	9 February 2024
AEMO Rule Change Proposal Submitted to AEMC	February 2024
Stakeholder Information session #2	15 February 2024
Electricity Wholesale Consultative Forum (EWCF)	20 February 2024 (Monthly)



# 2. Dispatch Integration Models

David Scott / James Banks

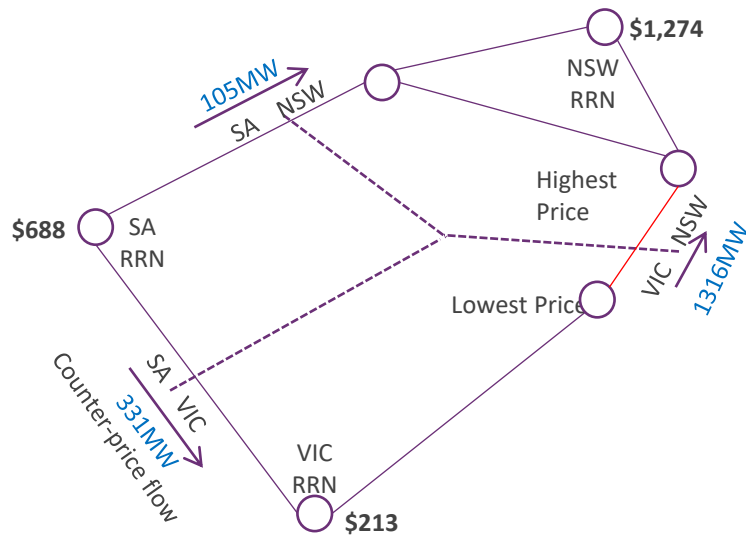
# Stakeholder feedback on the Directions Paper

- Stakeholders responded to a range of consultation questions in the [Directions Paper](#)
- There were two clear areas where further explanation could aid stakeholder thinking; these are emphasised in the [Final Report](#) and in this presentation:
  - 1) **Dispatch integration models**, and the decision to implement PEC using an ‘interconnector’ rather than a ‘micro-slice’
  - 2) How **inter-regional trading** will be influenced by PEC, including how this would be influenced by the choice of dispatch integration model

# Dispatch integration models – definitions

## Interconnector

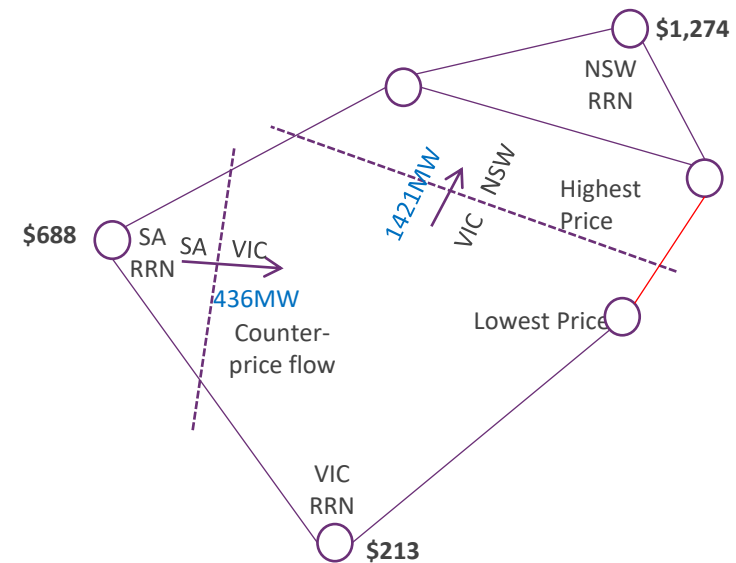
*Separate line linking NSW and SA*



- Interconnector model would be used in addition to reallocation of negative residues (in settlements)
- Allows interregional trade to reflect all of the physical flow pathways

## Micro-slice

*Inserts a small slice of the VIC region between NSW and SA*



- Micro-slice model inherently reallocates all settlements residues on PEC – several possible outcomes in terms of sign (+/-) of resulting residues
- **Numerical adjustments are the basis of settlement modelling in coming slides**
- Retains the radial network topology

- **The models assume different flow paths between regions, and therefore have differences in settlement**
- **Dispatch outcomes and prices are the same**
- **The equality constraint does not define the interconnector model (nor lack thereof for the micro-slice model)**
- **Reallocation of negative residues also does not define the interconnector model**

# Key stakeholder questions

...and qualitative responses

Would a radial implementation remove loop flows?

- Micro-slice only removes the transmission loop in settlement, not the physical loop flows
- Prices do not necessarily increase in the direction of flow (spring washer effect)
- Subsume the settlements of NSW-SA into the settlements of the other interconnectors – credit **or** debit
- Complex to apply NRM clamp

Applicability to the Snowy region

- NEM did not operate under an interconnector model; instead, Snowy was in between two regions VIC then Snowy then NSW: Snowy was a “micro-slice”.
- Being a micro-slice, Snowy region had a transmission loop running through it. It was the middle region that the loop straddled – rather than part of a three-region dispatch.
- Implementing a micro-slice model would be making VIC, the middle region that the loop straddled, like Snowy.
- The Snowy micro-slice had an enduring constraint - the Murray Tumut constraint within it.
- Counter price flows tended to occur, as did negative residues, and therefore the AEMC determined that abolishing Snowy was sensible, and the region boundary was set at the Murray Tumut constraint

Is it better for interregional trading under a micro-slice?

- Under a micro-slice, NSW-SA would not generate IRSR, and have no auction under the SRA
- Under an interconnector model, and allowing counter price flows, participants are exposed to the price difference between regions.
  - However, where settlement is in surplus around the loop, negative residues on one interconnector should increase hedging value to other interconnectors.
- Irrespective of the model, traders will need to assess the spring washer pricing effect.

Quantitative responses provided in later slides

# Comparative settlement analysis – explainer

## APPROACH

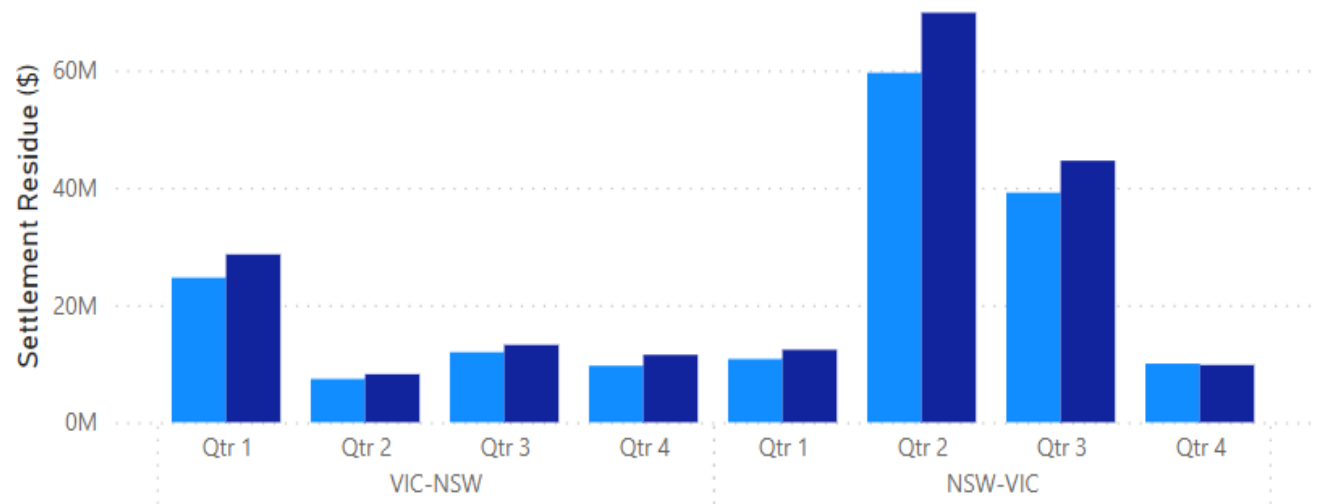
- Settlement was adjusted as per diagrams on ‘definitions’ slide
- Dispatch integration models have the same physical representation of the system
- Results are shown for the interconnector model *prior* to the reallocation of negative residues\*

## EXAMPLE

Settlement residue for both VIC-NSW directional interconnectors, 2027

Sum of Settlement Residue by Interconnector, Quarter and Approach

Approach ● IC ● MS



IC = interconnector\*

MS = micro-slice

# Comparative settlement analysis – findings

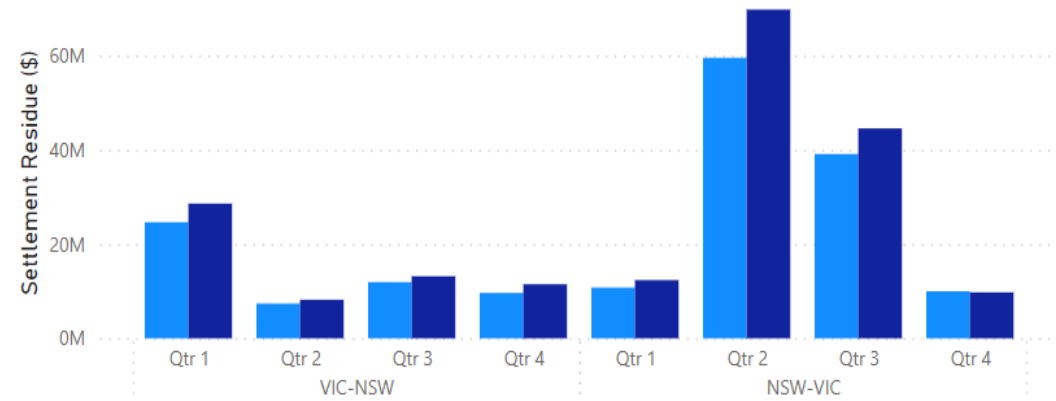
1) The micro-slice often sees residues tend more positive on the two existing interconnectors compared to a baseline with no reallocation.

2) Result (1) often reflects the cumulative effects of increased negative residues combined with increased positive residues of greater magnitude.

Settlement residue for both VIC-NSW directional interconnectors, 2027

Sum of Settlement Residue by Interconnector, Quarter and Approach

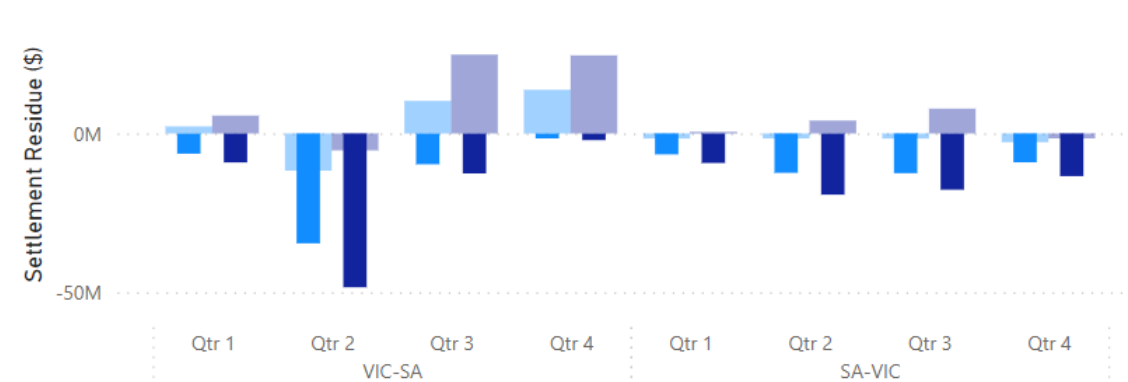
Approach ● IC ● MS



Cumulative settlement residues for both VIC-SA directional interconnectors, 2027-2030

Sum of Settlement Residue by Interconnector, Quarter and Approach

Approach ● IC ● MS



**Please note:** These results are not a criticism of the IC model, as negative residues under IC are shown before reallocation

# Comparative settlement analysis – findings

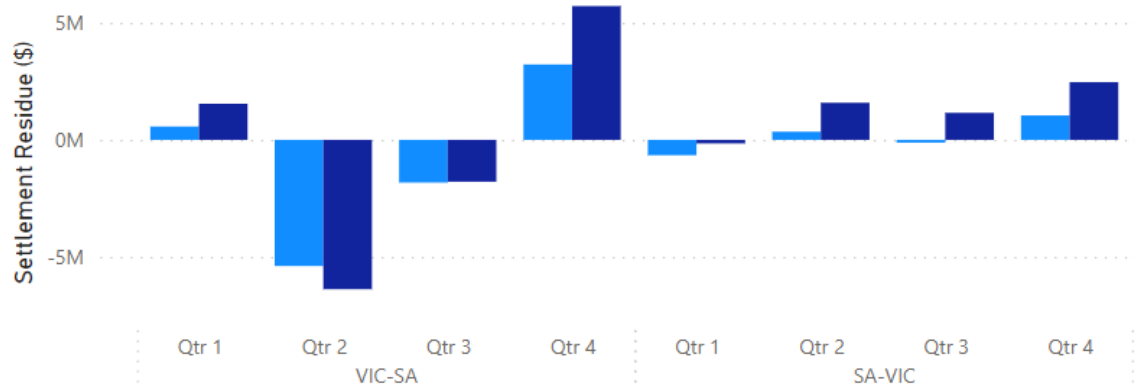
- 3) The micro-slice is inconsistent in its tendency to make negative residues more positive:
- Net residues can tend more positive but not to an extent that shifts net negative residues to net positive (e.g. SA-VIC Q1 2027)
  - There were instances where the MS made net residues more negative over whole quarters (e.g. VIC-SA Q2 2027)
  - Net negative residues over whole quarters is problematic – indicates a lack of positive residues to fund negative residue costs (e.g. VIC-SA Q2+Q3 2027, SA-VIC Q1 2027)

- 4) Additional risks associated with the micro-slice may exist:
- Quarterly deficits and cumulative negative residues are large at times for specific interconnectors
  - In some cases, the frequency of negative residues is very high under the micro-slice

## Settlement residue for both VIC-SA directional interconnectors, 2027

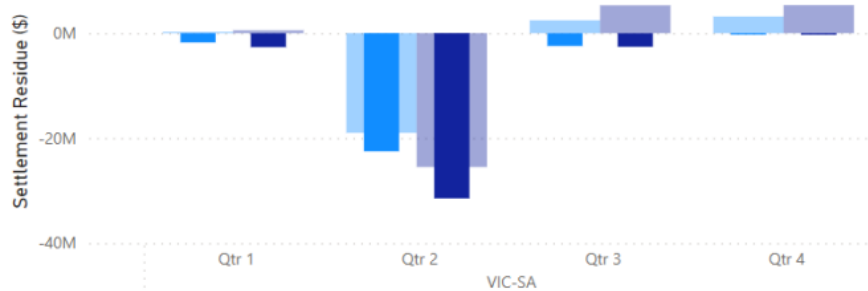
Sum of Settlement Residue by Interconnector, Quarter and Approach

Approach ● IC ● MS



Sum of Settlement Residue by Interconnector, Quarter and Approach

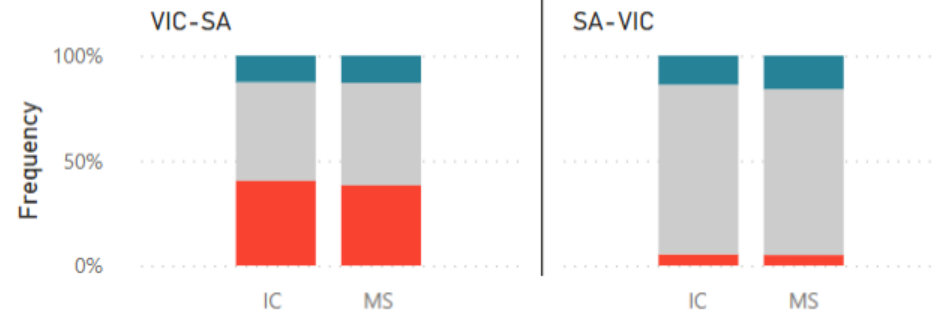
Approach ● IC ● MS



Settlement residue for VIC-SA, 2028

Frequency of residues with various signs for both VIC-SA directional interconnectors, Q2 2028

Residue Sign ● Negative ● Neutral ● Positive

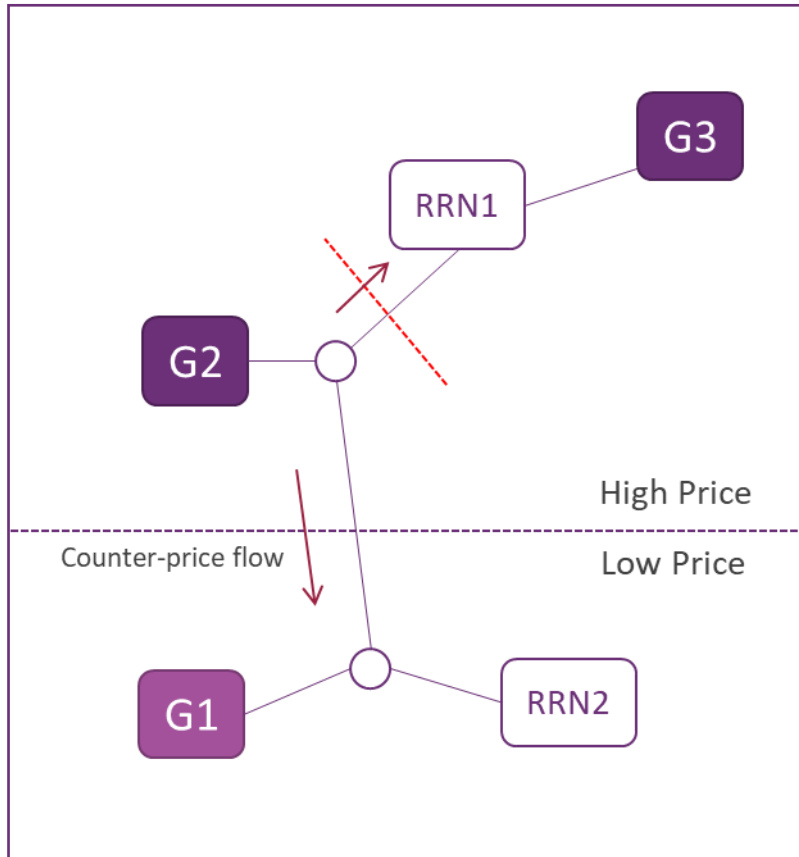


# 3. Interregional Trade

David Scott



# Why did we complete this work?



- There is a positive price difference between regions, flow is counter price (or constrained at 0MW by NRM constraints).
- No funds are distributed to SRA unit holders.
- Participants with interregional positions that are hedged by SRA units are exposed to the price difference.
- If this happens regularly, one presumes the “hedging value” of SRA units would diminish.
- Albeit not AEMO’s speciality, we considered it sensible to consider how and why would participants trade in the SRA.

# Hedging analysis – approach

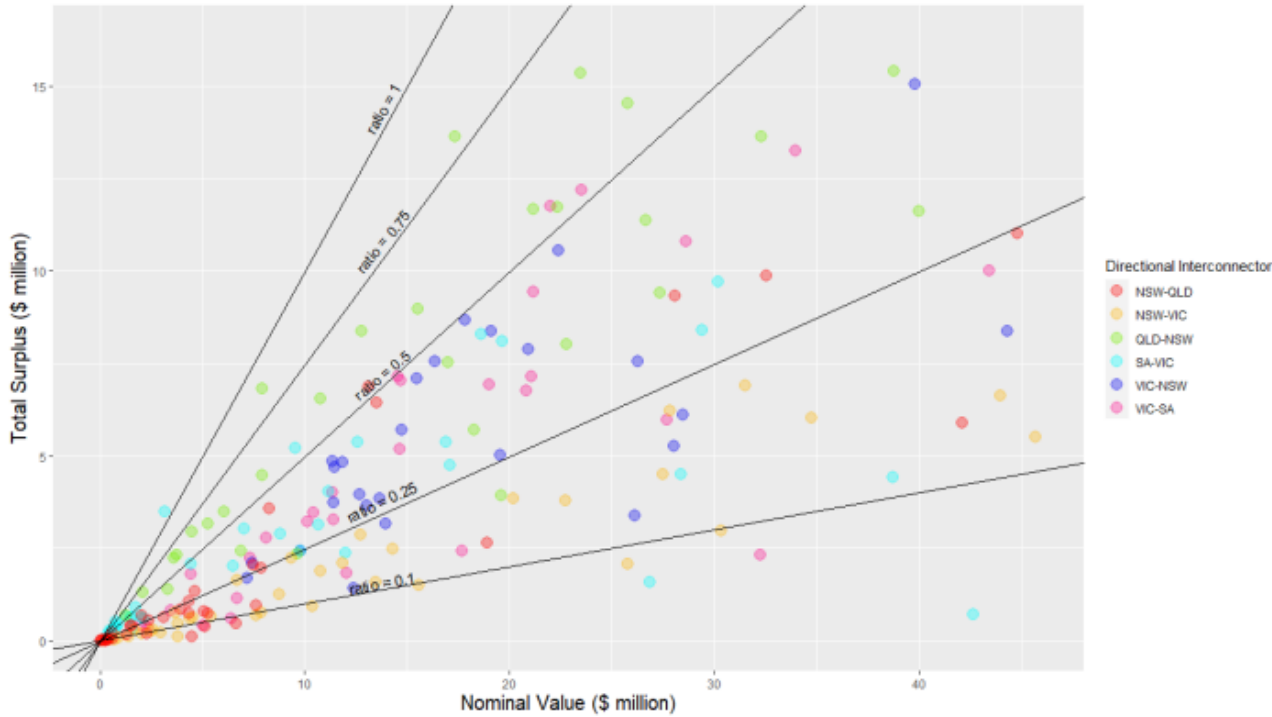
To explore the question of how inter-regional trading would be affected by the introduction of PEC, AEMO calculated a simplified ‘**hedging ratio**’, which measures SRA payouts as a proportion of the theoretical payout if interconnectors always flowed at maximum capacity from low- to high-priced region.

$$\text{Hedging ratio} = \frac{\text{Total quarterly surplus}}{\text{Nominal value}}$$

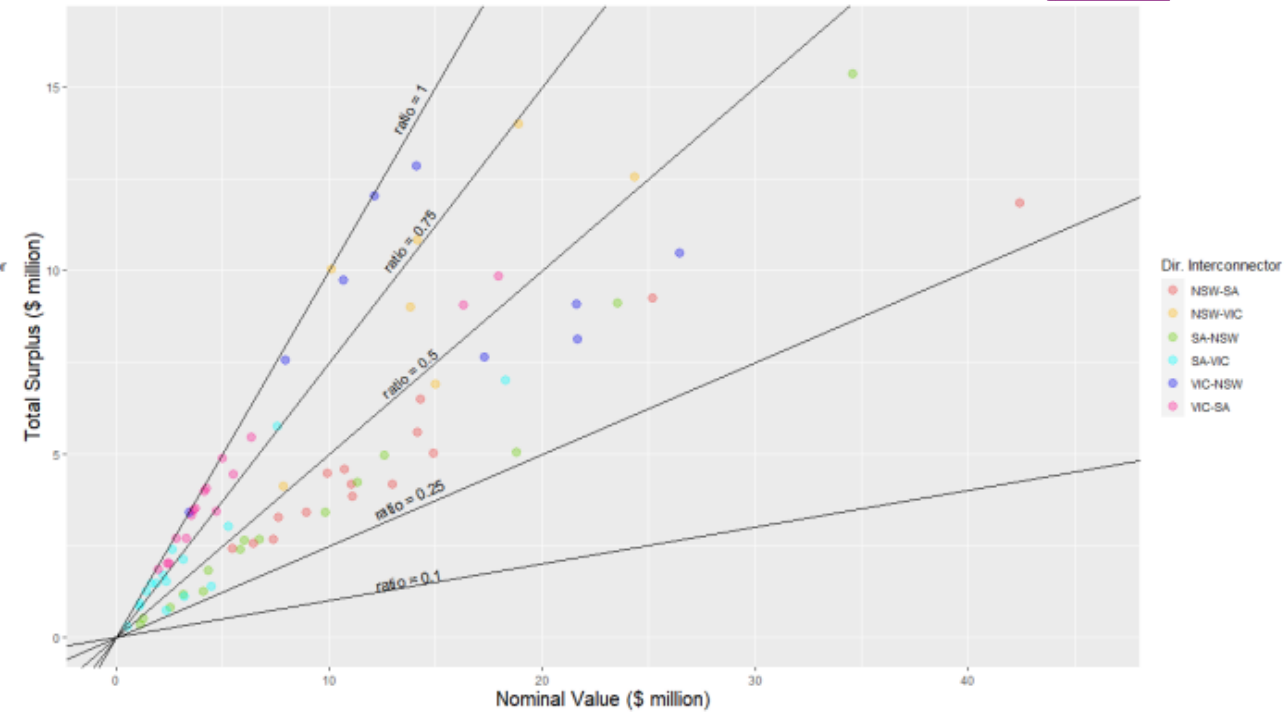
the sum of the positive interregional settlement residues distributed to unit holders for the quarter

the positive price difference multiplied by the number of auctioned units (i.e. the maximum interconnector capacity), summed for the quarter

# Hedging analysis – results and implications



Estimated hedging value of SRA units based on 2013-2023 historical data



Estimated hedging value of SRA units based on 2027-2030 ACIL-Allen modelling

- It appears that, with the introduction of PEC, traders may be able to access a historically-comparable hedging value through SRAs. This is true both:
  - 1) When trading directly between NSW and SA via the PEC interconnector
  - 2) When trading across the existing inter-regional boundaries
- (1) is a benefit that cannot be realised under the micro-slice model. (2) does not suggest a need for the micro-slice model.

# 4. AEMO's Rule change proposal

James Banks

# Proposal summary

AEMO will shortly lodge a proposal with the AEMC for changes to the NER that would give effect to elements of the approach described in the Final Report

## PROPOSED CHANGES

- Alter NER 3.6.5 to provide flexibility around the distribution of negative IRSR by allocating negative settlement residues to the importing TNSPs from the flows on the parallel transmission configuration
- Distinguish between a **radial transmission configuration** and a **parallel transmission configuration**.
  - A **radial transmission configuration** means a transmission configuration between *regions* that is not a parallel transmission configuration.
  - A **parallel transmission configuration** means a transmission configuration where the transfer of electricity between three adjacent *regions* can occur through *regulated interconnectors* that directly connect each of those *regions* to the other two adjacent *regions*.

# 5. Stakeholder Feedback & Discussion

Nicole Nsair

# 6. Close

Nicole Nsair



[NEMReform@aemo.com.au](mailto:NEMReform@aemo.com.au)



- [Project Energy Connect](#)
- [Project Energy Connect Market Integration Paper](#)

# 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>