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4 September 2024

Anna Collyer
Chair
Australian Energy Market Commission (AEMC)

By online submission

Your Reference: ERC0386

Dear Ms Collyer,

AEMC Consultation Paper – Inter-regional settlement residue arrangements for transmission loops

The Australian Energy Market Operator (AEMO) welcomes the opportunity to comment on the AEMC Consultation Paper – National Electricity Amendment (Inter-regional settlements residue arrangements for transmission loops) Rule 2025 (Paper).

AEMO thanks the AEMC for progressing this rule change according to the proposed timeframe. Despite delays in the physical delivery of Project Energy Connect (PEC) stage two, it remains important that inter-regional settlement residue arrangements be resolved soon. This will permit AEMO to consult on and implement consequential procedural changes and give clarity to Transmission Network Service Providers (TNSPs) and participants in the Settlement Residue Auction (SRA).

AEMO welcomes the Paper's initial support for the broad conclusions of AEMO's PEC Market Integration Papers[1]:

- The representation of PEC as part of an explicitly priced loop between New South Wales, Victoria and South Australia.
- Changes to Negative Residue Management (NRM) procedures such that negative residues on elements of the loop will not be clamped when the sum of all residues on the loop remains positive.
- To maintain the value of the Settlement Residue Distribution (SRD) instrument, negative residues should be recovered outside the SRD pool, namely from TNSPs.

The Paper presents an initial preference for a different allocation between TNSPs (Option 1) than AEMO's Rule Change Proposal. AEMO considers Option 1 can be implemented without additional effort compared to its own proposal. To assist the AEMC's deliberations, this submission provides further reasoning behind AEMO's original proposal in Appendix 2.

[1] AEMO | Project Energy Connect Market Integration Papers

The Paper then lists a range of further models grouped under Options 2 and 3. With respect to these:

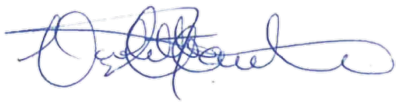
- AEMO considers they are inconsistent with the conclusions of its previously consulted PEC Market Integration Papers; and
- To varying degrees, these Options have additional design and implementation implications, with some being quite significant.

AEMO notes and welcomes the Paper's implied preference to not pursue these models grouped under Options 2 and 3. Should the AEMC pursue any of them further, AEMO would require an urgent assessment of implementation challenges and timeframes. AEMO would welcome an indication of whether any of these models are progressing to the next stage at the earliest opportunity.

AEMO has become aware of a technical problem of the operation of National Electricity Rules 3.9.5(c), 3.9.6A and 3.14.2(e). These rules scale price caps and floors across radial interconnectors to avoid negative residue but would be unfeasible during circular flows in a regional loop. AEMO considers an amendment would be within the scope of this Rule Change to address. AEMO is preparing an amendment and will provide it by late additional submission.

We have also provided some perspectives on the questions posed in the Issues Paper in Appendix 1 below. If you would like to discuss anything further, please contact Ben Skinner, Specialist – Wholesale Market Reform (benjamin.skinner@aemo.com.au).

Yours sincerely,



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APPENDIX 1: AEMO'S COMMENTS ON THE CONSULTATION PAPER

General comments

AEMO welcomes the AEMC's progression of this Rule Change in a timeframe that provides an adequate lead-time for AEMO to undertake consequential consultation and systems development ahead of the revised project schedule for the completion of the second stage of PEC[2]. AEMO's rule change and Option 1 have similar implementation implications and are feasible within this timeframe. The models grouped under Options 2 and 3 will require additional design and have not been assessed for feasibility. AEMO would welcome early clarity on whether any of these are likely to/not to progress.

The Paper's discussion implies a consistent view with the PEC Market Integration Papers' most important recommendations. These are that:

- PEC is to form part of an explicitly priced dispatch loop between Victoria, New South Wales and South Australia.
- Negative residues should be assessed for management as a net total across the loop and NRM should only apply when the net total goes negative.
- Consequential negative residues are to be collected from TNSPs whilst positive residues continue to accrue to SRDs in the relevant directional interconnector.

AEMO proposed that the negative residue should be reallocated from the negative residue importing TNSP(s) to the positive residue importing TNSP(s) pro-rata to the magnitude of each positive residue stream. The Paper has proposed an alternative "do nothing", Option 1 that leaves all negative residues with the importing TNSP(s), i.e. no reallocation. The Paper has provided considerable justification for this based around the wholesale pricing, i.e. as the region of the importing TNSP will have a lower wholesale price and so customers in that region pay the negative residues. AEMO is not persuaded by this justification.

However, AEMO agrees Option 1 can be implemented at no additional cost to its proposal should stakeholders and AEMC support it into the next stage of the Rule change. AEMO considers the logic behind its original proposal deserves fuller clarification, which is presented in Appendix 2.

The models grouped under Options 2 and 3 were all broadly considered in AEMO's Market Integration work and ultimately not recommended. The Paper has listed these options without detailed specification, and so they are not comparable or assessable for implementation at this stage. AEMO is however interpreting from the Paper that they are not the AEMC's current preference, which aligns with AEMO's view. In that vein AEMO has not re-engaged with any of these models in this submission.

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[2] To be in service by the June quarter of 2026. Refer PEC Industry Update - 18 April 2024 https://www.projectenergyconnect.com.au/moreInformation.php

Should the AEMC become interested in exploring any of these models further, we would seek an immediate dialogue explaining why they were not previously recommended and investigating implementation considerations.

AEMO supports the Paper's listing in 3.3.4 of those Options not being considered.

Scope

AEMO has proposed this rule change to deal with the new regional loop upon the completion of PEC stage 2. AEMO considers that broader issues associated with interconnector residues and the SRD instrument should be dealt with in other processes. In that vein, AEMO supports the Paper's section 3.3.4 exclusion from consideration "Changes to IRSR or SRA arrangements that apply beyond inter-regional transmission loops".

The inclusion of Box 1 at page 13 however confuses scope by critiquing the historical SRD trading performance of radial interconnectors without explaining its relevance to future looped interconnectors. It goes on to present the transmission loop as further diminishing the performance of the SRD, by making it harder to assess and understand.

Whilst making that claim, Box 1 did not refer to AEMO's Final Market Integration section 3.4.5 which drew from the ACIL analysis that the new looped SRDs showed no evidence that an inter-regional transmission loop would trade worse than SRDs for existing radial interconnectors.

AEMO is concerned that Box 1 may confuse stakeholders as to the scope of the Rule Change and suggests that resulting feedback relating to the broader SRA regime be dealt with in other processes.

Responses to Questions:

Question 1: *The problem identified in the rule change request*

> *Do stakeholders consider that there is a problem with applying the current rules for managing IRSR to transmission loops, specifically with respect to:*
>
> - *clamping negative residues at the current threshold of $100,000*
> - *allocating negative residues to importing regions*
> - *allocating positive residues to importing regions (via settlement residue auctions)?*

For the record AEMO's motivation for this Rule change was not that it considered there is a problem in the Rules concerning clamping of negative residues at the $100,000 threshold, nor that there is a problem allocating positive residues to importing regions (via the SRA).

AEMO considers there is a problem allocating negative residues to importing regions in the loop flow case and this was set out on Page 9 of the rule change request:

> "Where negative IRSR is accruing on a single (or two) directional interconnector, but settlement is in aggregate surplus around the parallel transmission configuration, that negative IRSR is supporting the accrual and value of the positive IRSR into the other importing regions. Consumers in regions that are importing with positive IRSR accrue a positive cashflow (receive higher payments from the SRA) or are credited the positive IRSR for unsold units while consumers in importing regions with negative IRSR accrue a negative cashflow (debited via TUOS)."

As listed in the Paper's Appendix D, the present allocation to importing regions in the current radial configuration has a long historical background. This was however in the context of a radial regional representation that should not automatically extend to a looped representation. AEMO's rationale for reallocating from the default radial approach is further discussed in Appendix 2 to this submission.

With respect to clamping negative residues at the current threshold in the presence of loop flows, AEMO considers there is a problem with AEMO's present NRM *procedure* rather than the Rules. This procedure, being designed for radial interconnectors, is inappropriate for priced loops where negative residues on individual elements are an expected consequence of efficient dispatch and are necessary to support the maximum total positive settlement residues.

The Paper has broadly affirmed this view and AEMO intends to alter the NRM procedure ahead of PEC stage 2 to monitor the residues across the loop rather than individually in each element. This requires consultation by AEMO which will also contemplate the threshold. No change to the Rules' present governance of this activity is required.

Question 2: *Will the proposed solution address the issue raised by the proponent?*

> *What do you consider success would look like if the issue identified by the proponent was solved? Do you consider that the proposed changes to the rules will solve the problem raised or are there other factors that would have a greater impact?*

During 2023 and early 2024, AEMO undertook a research project with two opportunities for comment. AEMO considers that this developed an appropriate solution that was broadly accepted by stakeholders. AEMO considers a major departure from its recommended solution, such as those canvassed in Options 2 and 3, would be inconsistent with the conclusions of that work.

Success for AEMO would be the AEMC determining either for or against AEMO's proposed amendment to reallocate negative settlement residues between importing TNSPs. Making the proposed rule, or rejecting it, would confirm the treatment (allowance) of these negative residues, clarify the inter-regional loop's treatment in the SRA, and allow AEMO to implement the necessary changes in dispatch and settlements for PEC. Failure would be a reopening of the dispatch implementation, governance of NRM processes, and confusion over the inclusion of the loop in the SRA.

Whilst the Paper's reason for Option 1 over the Rule Change is not shared by AEMO, simply resolving the treatment of negative settlement residues would represent success, and as such, AEMO is not opposed if stakeholders favour not making AEMO's proposed rule.

Question 3: *What are your views of the benefits and drawbacks of the proposed solution?*

> *What do you consider will be the benefits and drawbacks, or costs, of the proposed solution? If there are costs, will these be one-off or ongoing? Is there anything the Commission could do in designing the rule that would help to minimise the costs and maximise the benefits?*

The paper has correctly recognised that implementation of PEC will incur costs in AEMO's systems, including the dispatch engine, regardless of this rule change process.

The most significant discretionary cost will be changes to the NRM systems detecting and acting upon observed negative residues. However, to not make such a change and continue to clamp all negative residues including those arising from the spring washer effect would severely limit efficient dispatch. It is evident that this dispatch cost would far outweigh the one-off cost of changing NRM.

The settlement system cost of re-allocating the negative residue of one interconnector to the others in accordance with AEMO's proposed formula is a smaller task. The paper's alternative of Option 1 avoids this task but appears otherwise the same.

The models grouped under Options 2 and 3 would have progressively increasing implementation tasks. Recognising that the Paper does not appear to favour them, and that each would first require further design and specification, AEMO has not assessed any for costs at this time.

Question 4: *What are your views on these and other alternative solutions?*

> *Are any of the alternative options outlined above, including a continuation of the current arrangements, preferable to the proposed solution in section 3.1? Can you share any other alternative solutions that you think would be preferable and more aligned with the long-term interests of consumers?*

See response to question 2.

Question 5: *Assessment framework*

> *Do you agree with the proposed assessment criteria? Are there additional criteria that the Commission should consider or criteria included here that are not relevant?*

With respect to criterion one, "Outcomes for consumers", AEMO suggests clarifying that in this context the reference to "electricity pricing" implies total price as seen by consumers, including network charges and hedging, rather than just wholesale spot prices. For the avoidance of doubt, neither AEMO's proposal, nor any of the models grouped under the three alternative options, would have any impact on wholesale prices.

With respect to criterion three, "Principles of good regulatory practice", AEMO suggests explicitly considering the analysis and consultation previously performed by AEMO.

APPENDIX 2: EXPLANATION OF AEMO'S PROPOSED REALLOCATION

The Paper indicates a preference for a different allocation of the negative residue to TNSPs (Option 1) than AEMO's proposal. AEMO can implement Option 1 at no additional effort and has no objection if this is ultimately the preference of stakeholders and the Rule maker.

However, AEMO considers that the theoretical basis for its reallocation may not have been clear in its proposal and so this is further articulated below. At the same time, the theoretical rationale for Option 1 may be weaker than the Paper presents.

AEMO wishes to clarify some background which applies to both models:

1. There is no "natural" allocation of residues in a non-nodal network representation such as the NEM's regional hub and spoke arrangement. Any allocation will have elements of arbitrariness and anomaly. This is particularly the case as:
    a. Interconnectors exist only in the abstract, in that they are not identifiable transmission elements, but rather a mathematical dispatch representation of the ability of the underlying complex network to flow power from one Regional Reference Node (RRN) to another.
    b. Interconnectors exist across assets owned by multiple TNSPs.
    c. The network is heavily affected by intra-regional congestion. This is especially the case for PEC where the regional boundaries are all very remote from the three RRNs, with considerable generation sharing the same flow paths as the interconnectors.
2. A loop's ability to support trade is mutually reliant on all three interconnectors, i.e. pro-price flowing interconnector(s) are reliant on counter-price flowing interconnector(s).
3. Spring washer dispatch, where one link in a constrained loop flows counter-price, is efficient. This form of dispatch achieves the greatest possible value of beneficial trade that the constrained network can accommodate:
    a. In doing so, it also converges the three regional prices to the extent possible given the network capacity.
    b. Were the spring washer effect to be suppressed (say through clamping the counter-price link) or not explicitly represented (say by representing as a radial "microslice"), dispatch would be necessarily less efficient, with less total trade and regional prices more divergent.

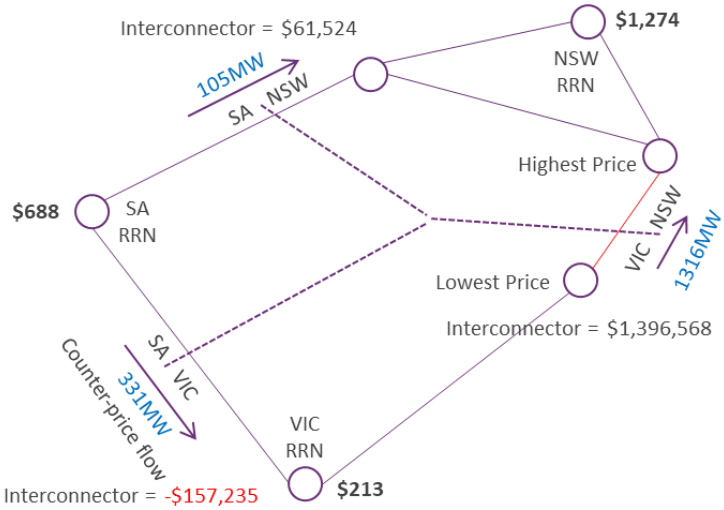
AEMO Reallocation

Given that background, AEMO's proposal was based on two key theoretical rationales:

- The implied "ownership" of network assets as represented by Transmission Use of System Charges (TUOS); and
- Recovering costs from those customers likely to benefit in the long run from the value of SRD instruments as realised in the SRA.

This is explained in the diagram below, that should be approached as:

1. Taking the surplus around the loop as being an economic surplus the network created.
2. Assuming the owner[3] of this surplus is the TUOS customers in each importing region.
3. Ignoring for a moment the cash deferment effect of the SRA, i.e. simply assuming the inter-regional surplus residue is equivalent to SRA proceeds. As such TUoS paying customers would be indifferent.



	VIC-NSW	SA-NSW	SA-VIC	Total
IC	$1,396,568	$61,524	-$157,235	$1,300,858

Then in the case above, without a reallocation, the owners of SA-NSW & VIC-NSW are being cross-subsidised by the owner of SA-VIC. The amount of money going to NSW is larger than the real economic surplus of the lines – this is because the deficit on SA-VIC is facilitating the surplus on the other two.

AEMO's proposed reallocation attempts to compensate the owner of SA-VIC from the owners of SA-NSW and VIC-NSW, for the service the former has provided the others. And it recovers this compensation pro-rata to the size of each of the others' shares of surplus.

By extension, the re-allocation could be larger than funding just the negative residues, with instead the net total surplus distributed between each limb. In previous consultations AEMO investigated this, but found distributing all the residues rather unreliable, and so limited its task to the funding of negative residues, which could be performed adequately by using the proportion of positive residues on the other interconnectors. Further, after making the decision to preserve the positive residues for SRD, to ensure positive residues are available to "hedge" the largest price difference on the loop, AEMO

[3] AEMO acknowledged recognising the "owner" as the importing TNSP is merely a convention used in the NEM under clause 3.6.5 (4B)(i).

decided that it was sensible to allocate the negative residues to the importing TNSP that would be receiving payment (via the SRA) for these positive residues.

Option 1 Rationale

In AEMO's reading, the Paper's preference of retaining the existing Rules' allocation of all negative residue with importing TNSP is justified on four rationales:

- Simplicity, in that it requires no change of Rules nor settlement logic. AEMO concurs.
- Precedent, in that this has always applied for radial interconnectors (to the extent negative residue exists despite clamping) and that there are parallels in historical decisions about asset funding. This is explored in the Paper's Appendix D and was outlined in previous Reports published by AEMO[4]. AEMO considers this precedent is relevant for negative residues on radial interconnectors, and for loop interconnectors if aggregate settlements are negative, but not for the case where AEMO has applied to reallocate negative residues between importing TNSPs. This is discussed below.
- Fairness, in that the importing region of a counter-price flow has, during that trading interval, lower wholesale prices than the other regions in the loop. This means these customers would perhaps have more capacity to pay additional network charges. AEMO understands the rationale but is unsure of its strength, as there may be no relationship between negative residues and wholesale prices when averaged over time.
- Beneficiary, in that customers in the importing region of a counter-price link are the beneficiaries of the loop flow by having the lowest price. This argument appears weakest and is discussed below.

Where a network is operated as a priced loop, the resulting dispatch is as efficient as the network can support, i.e. trade is maximised. When trade is maximised, wholesale prices converge. If we imagine a counter-factual of the network being suddenly taken away, high priced regions will move to even higher prices, and the low priced regions would move to even lower prices. As such, it could be argued that customers in the importing region of a counter-price flow are in fact disbeneficiaries of the looped network interconnection.

The paper's discussion of beneficiaries seems to begin from a presumption that the interconnection imposes costs and thus the solution should be thought of from a cost allocation angle. However, the loop and spring washer does not impose costs; by maximising trade it reduces costs to the extent the network allows.

The counter-price flows that are the subject of this Rule Change are "good" counter price flows associated with efficient dispatch when *aggregate settlements are in surplus*. They should not be confused with "bad" counter price flows when *aggregate settlements are in deficit*.

It is worth considering what would have happened were the network a single TNSP spanning multiple pricing regions. Under that scenario negative residue would be netted off by the positive residue which

[4] See Project Energy Connect Market Implementation Directions Paper Section 2.1

is what the Rule change proposal attempts to achieve. By contrast Option 1 pays positive residues (via the SRA) to one set of consumers while another set must pay negative residues.

Alternatively, AEMO would suggest a better rationale for Option 1 could be that the distribution of cash-flows around the inter-regional transmission loop of negative residues, positive residues, and clearing prices (and therefore proceeds) from the SRA, are so volatile and unpredictable that they do not necessitate a reallocation of negative residues when the *aggregate settlements are in surplus*. On this basis, it may not be expected that that one set of consumers will systematically be paying another and therefore there would be no justification for implementing a superior theoretical approach. AEMO would not disagree with that observation if used to justify Option 1.