

AEMO DRAFT REPORT - CONSULTATION ON AUTOMATION OF NEGATIVE RESIDUE MANAGEMENT FOR THE IMPLEMENTATION OF TRANSMISSION LOOPS

18 OCTOBER 2025

INTRODUCTION

The Energy Users' Association of Australia (EUAA) is the peak body representing Australian commercial and industrial energy users. Our members are the engine room of the Australian economy, producing many of the products that households and business use every day including bricks, glass, steel, aluminium, paper, food and beverages. Combined, our members employ over 1 million Australians, pay billions in energy bills every year and in many cases are exposed to the fluctuations and challenges of international trade.

EUAA members are focussed on making products that meet their own customers' requirements where energy is just one input to the process albeit a critical one. Their expectation is that the energy industry continues to provide energy services that are fit for purpose and consistent with the National Electricity Objectives (NEO) so that our members can continue to provide a fit for purpose product for their customers.

Thank you for the opportunity to make a submission under the AEMO Draft Report - Consultation on Automation of Negative Residue Management (NRM) for the Implementation of Transmission Loops.

The EUAA supports proposed guideline changes where evidence points to an issue and the proposed rule change clearly leads to improved efficiency of markets and where the costs and risks are appropriately allocated to those best able to manage them. The EUAA does not support approaches that lack evidence or require consumers to take on risk best managed by others.

When electrical circuits contain "loops", the loop operates according to Kirchhoff's Law, that is the electricity will always circulate around the loop in one direction or the other. The legs of the loop will only behave as radial lines when the physical loop is broken, i.e. for the PEC loop, when one of the interconnectors involved is not operating (noting that NSW-Vic has multiple interconnectors that form redundancies in that leg of the loop if one NSW-Vic interconnector is offline).

All of our previous and current recommendations for the NRM in transmission loops is based on the fact that the electrical loop will always operate when the three jurisdictions are interconnected and that the three jurisdictions almost always have three different wholesale prices.

PEC RELATED CHANGES

It is pleasing to see that AEMO will now no longer clamp the negative leg(s) of a net positive loop as the negative leg(s) of a net positive loop represents efficient dispatch.

- As AGL's submission stated, clamping of one leg could introduce counter price flow on another leg i.e. creating inefficient dispatch.
- As we discussed in our earlier submission, all net positive loops will have at least one negative leg due to Kirchhoff's Law and differential pricing in each region i.e. the "spring-washer effect". Similarly, all net negative loops will have at least one positive leg.

We also agree with the comment in Transgrid's submission regarding the accumulation of inter-regional settlement residues (IRSR) that:

"...NRM processes and the cumulative negative residue threshold of \$100,000 per event should have regard to net-negative IRSR accumulating on the loop, rather than on each individual directional interconnector within the loop..."

We agree with Transgrid as it follows the logic established by Kirchhoff's Law, which dictates that each leg of a loop is there because of the other legs i.e. the very nature of physics prevents anything but looping on a topographical electrical loop and the very nature of the NEM market pricing creates at least one negative leg on a net positive loop (the spring-washer effect) and at least one positive leg on net negative loops, therefore when the loop is net negative, it is the sum of all the legs that should contribute to the cumulative negative threshold and each leg should not be treated individually as though they are physically radial lines.

Our approach is also consistent with AEMC's *Rule Determination for Interregional Settlement Residue (IRSR) Arrangements for Transmission Loops* where AEMC state:

"The power flows in a transmission loop behave in a fundamentally different way to power flows on Radial interconnectors, due to the physics of electrical circuits. Power flows impact the financial flows around the loop via their impact on the IRSR arising around the loop."

We therefore disagree with AEMO's response to Shell Energy that *"...the existing negative residue process will operate separately on each individual interconnector..."* as a loop is the product of the physics of the network topography and when there are two negative legs of a loop and as defined by Kirchhoff's Law, they are never separate events. To separate two legs and treat the negative residue accumulation separately is to ignore the physics of why the loop exists in the first instance and creates a potential scenario where future AEMO staff might treat each leg of the loop "operationally" as individual radial lines, which behave fundamentally different.

While summing the negative IRSR on net negative loops might be difficult for AEMO to implement using its current automated NRM process, the level of difficulty should not prevent an efficient process being developed (consistent with the NEO), and definitely should not cost consumers more through increasing the real-world negative IRSR loop threshold to \$200,000 by treating the separate legs as separate events outside of the actual physics. Kirchhoff's Law and looping occur whether the spring-washer effect (for net positive loops) is in play or not and thus we do not accept AEMO's argument for accumulating negative IRSR on each leg separately.

CYCLING

AEMO's states in the Draft Report that:

"...the predominant cause for premature exit from NRM management [sic] is the cessation of negative residue accumulation once clamping reduces physical flow limits on the directional interconnector to zero."

This statement is not surprising as the current NRM system uses the current 30 min "clamped" flows to forecast the future unclamped conditions. When speaking to AEMO operations, they describe that negative IRSR accumulation often occurs when a generator is behind a network constraint and bidding "in order" to be dispatched. We would suggest that until that network constraint is cleared, that the clamp should remain in place as the generators bidding behaviour will return as soon as the clamp is released.

As with the proposed Loop NRM Flag field where AEMO sets a value of 0 or 1 for when a net positive loop is not part of NRM versus when a net negative loop is part of NRM respectively, we would support a similar approach with a *Network Constraint NRM Flag* to be used to retain the clamp when a network constraint equation is creating negative IRSR through generator bidding behaviour. This step alone would prevent many cycling events, saving consumers paying for network events that they have no ability to manage.

CYCLING – COUNTER-PRICE FLOW LIMIT

While generally supportive of AEMO's proposal to not clamp to zero flow and instead clamp to AEMO's suggested 20MW, we are still concerned about the accumulation of negative residues for consumers to pay under this scenario. While the additional accumulated negative IRSR is relatively small, the NEO and NER demand that AEMO aim for zero negative IRSR above the \$100,000 threshold, not a small number that AEMO is proposing to target.

While, Shell Energy suggested 20MW was too small, and Transgrid suggested 20MW was too large, we are even more concerned with AEMO's response that it therefore proposes to test and change the proposed 20MW to another amount *"based on experience"* without the mention of consultation. By stakeholders agreeing to AEMO adjusting the proposed 20MW counter-price flow limit to whatever AEMO determines, we have the following concerns; what maximum flow during clamping are we agreeing to? 50MW? 100MW? Higher? At what cost to consumers? Will AEMO consult? And through what forum or methodology?

AEMO considers that consumers were overcharged up to \$35 million over a 40-month period for negative residue accumulation suspected of being cycling, and now proposes that instead consumers could have been "only overcharged \$1.7 million" with AEMO's 20MW counter-price flow limit. We believe that AEMO's proposal to knowingly aim for an overcharge is contrary to the NEO and NER.

CYCLING – GRADUATED RELEASE

As identified by AEMO operations, cycling often occurs when generator bidding behind a network constraint produces counter-price flow outcomes, which return after a clamp is released.

AEMO therefore proposes to gradually release clamping in pre-defined graduated amounts to allow the NRM period to continue if negative IRSR recommence. We believe this would create a new type of cycling, alternating between slower negative IRSR accumulation and full clamping, but nonetheless still increasing the cost to consumers.

A graduated release does not prevent the type of generator bidding that generally creates negative IRSR cycling. What it does do is accumulate more negative residues for consumers to pay for. Even if this accumulation is small, it still represents an inefficient overcharge to consumers.

Subject to further modelling, should AEMO create a Network Constraint NRM Flag that prevents negative IRSR accumulation due to generator bidding behaviour behind a network constraint, we might support a slow release of clamping after the network constraint equation has been lifted, to ensure other errant behaviour does not emerge.

NRM IRSR ESTIMATION

While we support moving the NRM process from 30-minute settlement (30MS) to a 5-minute settlement (5MS), we are still concerned with AEMO's resolve that the "benefits outweigh the risks" when it justifies the move with statements like:

*"AEMO's analysis **suggests** a clear majority of suspected cycling events would not have occurred had both the offset and 5MS estimation of IRSR been in place"*

Analysis "suggesting" an outcome is a very weak position to base a decision that may impact consumers financially. We would expect that AEMO would require stronger evidence in protecting the interests of consumers as is required by the NEO and NER than "analysis suggesting". We believe any knowingly designed over-accumulation of negative IRSR to consumers is a breach of the NEO and NER.

USE OF PREDISPATCH ESTIMATES

We note the changes to the NRM Guidelines that now have actual dispatch results in the methodology rather than the incorrect reference to pre-dispatch, however we are now concerned that the Guideline contains a mix of pre-dispatch and actual dispatch in its forecast for reaching the price accumulation threshold. Using two data sets from two different sources as inputs to a model is an incorrect methodology to any statistical or correlation analysis.

Contrary to AEMO's response to our proposal to have two runs of NEMDE as time consuming, costly and onerous, AEMO operations has advised that the average NEMDE run is finalised in much less than a minute, and in extreme events i.e. in February 2024 when Victoria lost the Mooroolbark to Sydenham 500kV transmission line, NEMDE solved in less than 5 min allowing for dispatch instructions to be sent. Given dispatch instructions are sent every 5 minutes, and unless there is an extreme event, NEMDE solves in under a minute, we reject AEMO's stance that running NEMDE twice, once with the clamp and once without is time consuming and onerous.

CONCLUDING REMARKS

While we support AEMO updating the NRM Guideline, we do not accept AEMO designing methodologies that result in inefficient charges flowing through to consumers. Treating a transmission loop as radial lines for negative IRSR accumulation or anything but aiming for zero negative IRSR accumulation during cycling transfers risk and cost to consumers. We believe that AEMO's proposed solutions for accumulation of negative IRSR in looped transmission lines and reducing cycling are contrary to AEMO's requirements under the NEO and NER.

While we acknowledge that to change the current NRM to accumulate across net loops instead of individual legs, or to target zero negative IRSR cycling may be harder than AEMO's proposed approach, the level of difficulty to implement should not be an excuse to not make the requisite changes or to operate contrary to the NEO and NER.

The EUAA looks forward to further discussions around the issues raised in this submission.

Do not hesitate to be in contact with EUAA Policy Manager Dr Leigh Clemow, should you have any questions.



Andrew Richards
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