NEM SETTLEMENT UNDER ZERO AND NEGATIVE REGIONAL DEMAND CONDITIONS

CONSULTATION OUTCOMES

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ABOUT THIS REPORT

In late 2020 AEMO undertook a limited consultation with Market Participants on a series of proposed options to prevent the failure of National Electricity Market settlement processes in future periods if net regional customer energy in a region falls below one megawatt hour. The purpose of this document is to report on the outcomes of that consultation and how it informed AEMO's subsequent proposal to amend the National Electricity Rules.

1. ISSUE

In late November 2020, AEMO published an issues paper[1] and convened an information session for National Electricity Market (NEM) Market Customer representatives to seek feedback on options to prevent the failure of AEMO's NEM settlement systems if net regional demand is zero or negative (less than 1 MWh) in trading intervals when AEMO is required to recover non-energy costs from Market Customers.

In brief, the settlement equations for the allocation of NEM costs such as ancillary service payments and compensation amounts require a positive denominator representing the regional aggregate customer energy totals. If that denominator is below 1 MWh, AEMO's integrated settlement process will fail.

The issues paper explains how the use of net metering data (adjusted gross energy or AGE in the National Electricity Rules), combined with continued high growth in distributed PV and other energy resources at 'load' connection points, means there is potential for net regional demand in South Australia to reach zero as early as spring 2021. This means that AEMO needs a solution to avoid NEM settlement failure in place by September 2021 to address that scenario if it does occur.

AEMO recognised that a comprehensive review of non-energy cost recovery principles is necessary to resolve broader equity issues arising from very low operational demand given increasing two-way flows at load connection points. This is already being considered in the context of the AEMC's consultation on AEMO's rule change proposal to integrate energy storage systems (ESS proposal). Accordingly, the solution put forward is intentionally limited to the immediate issue of preventing settlement system failure and is expected to be superseded by a long-term change in the basis for cost recovery.

2. CONSULTATION AND OUTCOMES

AEMO requested stakeholder feedback on several options focused on how to determine appropriate substitution values for Market Customer AGE values when the aggregate of all customer energy AGEs falls below 1 MWh. The objective of substitution is to yield an aggregate net positive total demand (over 1 MWh), while minimising the change to settlement outcomes as far as practical.

Section 3 summarises the options presented in the issues paper, stakeholder feedback on those options and proposed alternative methodologies, and AEMO's responses. AEMO held individual meetings with each stakeholder who made a submission, to discuss alternative options proposed by stakeholders and AEMO's considerations.

Informed by stakeholder views, and after assessing how potential solutions met the objectives of being low cost, low impact to the market, and capable of implementation by September 2021, AEMO has commenced development work on a substitution mechanism. On 8 February 2021, AEMO also submitted an urgent rule change proposal to the AEMC to address the non-compliance that would result if the AGE values were substituted based on that solution[2].

The substitution mechanism has the following key elements.

- Categories of non-energy costs for which substitution is required:
  - To minimise the scope of work and cost required to implement system changes, AEMO excluded the categories of non-energy costs that are, by their nature, highly unlikely to be incurred during minimum demand periods. On this basis reliability and emergency reserve trader (RERT) costs and compensation for administered price cap or floor events have been excluded. Substitution will

[1] AEMO, *NEM Settlement under Zero and Negative Regional Demand Conditions, Issues Paper,* November 2020, available at: https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/nem-settlement-under-zero/nem-settlement-under-zero-and-negative-regional-demand-conditions.pdf?la=en

[2] Refer to the AEMC's website: https://www.aemc.gov.au/rule-changes/nem-settlement-under-low-zero-and-negative-demand-conditions

occur if required in the recovery calculations for market and non-market ancillary service costs, and compensation amounts relating to directions or market suspension.

- Threshold level of actual aggregate AGE for substitution to occur:
  - Non-energy cost recovery settlement calculations will fail when the denominator of any applicable formula is less than 1 MWh. AEMO selected this value to ensure settlement outcomes are only changed when absolutely necessary for the settlement systems to work.
- Substitute Market Customer AGE values:
  - AEMO will determine substitute energy values using an average of the AGE amounts in the last four complete billing periods for each relevant Market Customer in an affected region. The substitution period should allow smoothing of any unusual events and produces a net positive figure overall while using actual demand for a Market Customer's own connection points. As a starting point, AEMO considers this substitution period to be a reasonable proximate period that is sufficient to minimise the impacts of customer churn and seasonal differences.
  - AEMO recognises that stakeholders had different views and there are several variables that can impact whether the selected substitution period produces a representative substitute demand or, conversely, could have unintended outcomes for Market Customers. AEMO's proposed rule allows for a review of the period after a minimum period of operational experience, if AEMO or a Market Customer consider it necessary.

3. STAKEHOLDER FEEDBACK

Table 1 shows the four options AEMO initially proposed by AEMO in its issues paper.

Table 1 AEMO options for substituted AGE

Option	Reference AGE values for substitution
1 (AEMO's preferred option)	Market Customer's AGE with its average AGE for all relevant connection points in the region over the previous calendar year; and Aggregate regional demand (represented by AAGE) with the sum of the substituted Market Customer average AGEs in the region over the previous calendar year
2	Use a rolling 365-day period average energy consumption which is calculated dynamically every time a factor is required
3	Use the last interval which has a total region consumption larger than 1MWh
4	Divide the non-energy cost to be recovered by the number of active Market Customers and recover equally from all

AEMO received six submissions to the Issues Paper, all of which indicated support to address the urgent settlement issue before September 2021. All submissions have been published on AEMO's website.[3]

Engie and Origin supported Option 1 (AEMO's preferred approach) on the basis that it was relatively simple to implement. The Australian Energy Council (AEC), AGL, Infigen and SA Water noted that Option 1 was not the ideal solution and (along with Origin) suggested alternative approaches, these are in table 2.

Table 2 Alternative approaches and AEMO's response

Alternative	Stakeholder	AEMO's response
Modify option 1 by calculating Market Customer's average energy values using a one-month's data instead of for a year. This	AGL	AEMO agrees that a shorter reference period to calculate the average customer energy (AGE) amounts would reduce the risk of significantly under-

[3] NEM settlement under zero and negative regional demand conditions consultation page: https://aemo.com.au/en/consultations/current-and-closed-consultations/nem-settlement-under-zero-and-negative-regional-demand-conditions

would reduce the risk of retail customer churn over a longer period.		or over-representing a Market Customer's demand due to customer churn.
Option 3 was preferable because it is the closest approximation to real-time pricing and would reflect adjustments in a Market Customer's load and generation.	SA Water	This option is more complex and costly to implement. Potentially, in the absence of actual metering data, this approach could require AEMO to use substituted metering data for affected trading intervals. This could under-or-over represent a Market Customer's demand and is more likely to result in inequitable outcomes.
Implement a simplified approach similar to what AEMO proposed in the ESS rule change, that is, based on the consumed and sent out energy.	SA Water	AEMO is unable to implement this option by September 2021 because the consumed and sent out energy metering data is only available to AEMO once the Global Settlement rule comes into effect on 1 May 2022. Without this metering data, AEMO is unable to implement this alternative.
AEMO consider applying a manual adjustment following the settlement week that provides for a more accurate allocation of non-energy costs to relevant market participants.	Origin	Using substituted energy values, the market settlement system will calculate Market Customers' AGE each time with the latest data. Therefore, if the proposed solution is implemented, there is no need to apply a manual adjustment.

Some stakeholders raised additional issues relating to non-energy cost recoveries in the information session, in submissions and stakeholder meetings. Although AEMO considers these are material, they have not been addressed in the proposed urgent rule change proposal because they will not cause the settlement systems to fail. As noted above, it is important for the broader market design issue to be addressed in the National Electricity Rules, to allow the necessary system changes to resolve unintended market outcomes. In particular, stakeholders noted:

- If a Market Customer has a net negative AGE overall for the entire recovery period, some non-energy cost recovery formulas could result in that participant receiving a payment, funded by Market Customers consuming in the affected trading interval(s) in addition to the total non-energy cost amount[4].
  - AEMO agrees this is a potential settlement outcome because the settlement systems were set up not to 'floor' load amounts at zero, based on the differences between the definitions of customer energy, generator energy and small generator energy in clauses 3.15.6A(o) and 3.15.8(h) of the NER.
  - AEMO agrees that it is unlikely to have been intended for Market Customers to receive payments under most non-energy cost recovery calculations.
- Using a 1 MWh threshold value for substitution would still mean that non-energy costs are potentially being allocated based on very low levels of regional customer energy, resulting in Market Customers without significant distributed photovoltaic (DPV) bearing a disproportionate share of those costs. Selecting a different threshold value (e.g. 100 MWh) could achieve more equitable and efficient market outcomes. While AEMO agrees that this is a significant concern, using another value would be a departure from the scope of it urgent rule change proposal.

Both of these additional issues would be addressed by resolving the more fundamental market design issue that the AEMC has incorporated into its current consultation on the ESS proposal, and AEMO considers that is the appropriate mechanism to assess the necessary changes to re-establish efficient non-energy cost recovery mechanisms.

[4] The issue was raised in the stakeholder session (30 November 2020) and Infigen's submission