16 March 2018

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Mr John Pierce
Chairman
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

By online submission

Dear Mr Pierce

Rule Change Request – Global Settlement and Market Reconciliation

The Australian Energy Market Operator (AEMO) requests that the Australian Energy Market Commission (AEMC) consider making a rule change under section 91 of the National Electricity Law.

Specifically, AEMO requests that the AEMC amend the National Electricity Rules (NER) to enable AEMO to perform financial settlement of energy based on a global settlement framework as described in the attached proposal and the high level design in Appendix A. The current requirements for electricity settlement are established in Chapter 3 of the NER.

Should the AEMC decide to make a Rule based on AEMO's proposal, significant cost savings can be achieved if the necessary changes are implemented at the same time as those required for the recent five minute settlement rule. AEMO would appreciate the AEMC's consideration of this rule change request to facilitate this outcome.

For further information, please do not hesitate to contact myself or Violette Mouchaileh, Group Manager Market Enhancement on (03) 9609 8551.

Yours sincerely

Peter Geers
Executive General Manager, Markets

Attachments:

Rule Change Proposal: Global Settlement and Market Reconciliation

Appendix A – Global Settlement and Market Reconciliation: High Level Design

ELECTRICITY
RULE CHANGE PROPOSAL

GLOBAL SETTLEMENT AND MARKET RECONCILIATION

March 2018

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

CONTENTS

1. SUMMARY

The provision of a financial settlement service is a core function of AEMO, established in Chapter 3 of the National Electricity Rules (NER), and includes billing and clearance for all trading in the National Electricity Market (NEM).

AEMO has considered the suitability of the NER framework for energy settlement in the context of the current and emerging market dynamics in the NEM. This proposal and the associated High Level Design (HLD), provided as Appendix A, have been drafted to propose modifications to the NER to facilitate a global settlement framework, which AEMO considers is required to enhance the robustness, transparency and uniformity of energy market settlement and enable accurate reconciliation for the electricity retail market.

Settlement arrangements

The NEM is currently settled on a methodology known as 'settlement-by-differencing'. This methodology was established at market start so that electricity could be allocated between local and independent retailers.

In the early stages of retail competition, for simplicity, it was both practical and reasonable to operate a methodology where the relatively small volume traded by an independent retailer was simply subtracted from the total injection into a distribution network area. Since the start of retail competition, there have been high volumes of customer switching and a number of important market and regulatory shifts that have made legacy distinctions between local retailers and independent retailers less relevant, and have highlighted weaknesses in the continued operation of a settlement-by-differencing framework.

These weaknesses include:

- AEMO cannot perform a full reconciliation of energy being settled, which means errors and anomalies in settlement cannot easily be identified. This has resulted in disputes that have required resolution outside the NEM settlement process.
- Treatment of losses and information access is different for local and independent retailers, with local retailers fully exposed to inaccuracies in commercial losses, and to errors in the calculation of technical losses resulting from the distribution of electricity across the distribution network. Access to metering data is also differentiated with local retailers able to access all metering data, whereas independent retailers are only able to access metering data for their customers, within any given distribution network area.
- Lack of incentives for reducing commercial losses and metering inaccuracies, as independent retailers are only charged for metered energy and local retailers cannot identify or resolve these losses, other than where they are the retailer for a connection point.

Current market trends and regulatory developments are driving the industry further away from the acceptability of settlement-by-differencing as a methodology to settle the market.

Global settlement

Enhancements to the current settlement approach could overcome some of these challenges. An established alternative methodology to 'settlement-by-differencing' is known as 'global settlement' and has been adopted in international markets that have established competitive retail markets.

At a simple level, a global settlement methodology requires the measurement of all of the energy going into a distribution area (from the transmission system, interconnectors and embedded generation), and the measurement of all energy moving out of the distribution area (from loads or interconnectors). The total energy out is then deducted from the total energy in to identify the unaccounted for energy (UFE), which is made up of technical and commercial losses. The UFE is then allocated to all of the retailers operating in the given distribution area based on a pre-determined set of criteria.

The advantages of global reconciliation over differencing can be summarised as follows:

- Energy allocation is the same for all participants as all losses are identified, traceable and equitably allocated to retailers.

- AEMO can fully reconcile energy, allowing for better and timelier identification and prevention of settlement errors.
- Retailers are collectively incentivised to reduce commercial losses. This may include the adoption of advanced metering systems as a preventative measure.
- The inequity in access to customer metering data is removed.

Global settlement provides a sound platform for energy settlement in line with current developments and future trends.

Implementation

AEMO considers that process and system changes to support the introduction of global settlement are minimal and, in many cases, are aligned with changes required to support the adoption of five-minute settlement. AEMO will require all NEM metering data, rather than the sub-set of metering data received today and AEMO considers this is best achieved by Metering Data Providers adding AEMO to the list of recipients to the MDFF NEM12 and NEM13 formats for use in settlement.

If the AEMC, after consultation, decided to make a rule to implement global settlement, AEMO could adopt the required design and build for global settlement in line with the timelines set out in the AEMC's final determination for the implementation of five-minute settlement. As such, implementation activities, transition and market readiness would follow the same structure and format prepared for the introduction of five-minute settlement.

2. RELEVANT BACKGROUND

2.1 Current framework

Chapter 3 of the NER establishes the detailed rules for financial settlement of the NEM, requiring AEMO to operate a settlement process which includes billing and clearance for all market trading. Settlement is a process of allocating physical volumes of electricity to retailers and generators. The current framework facilitated the commencement of retail competition in the NEM via a method commonly known as 'settlement-by-differencing'.

The NEM still operates the 'settlement-by-differencing' methodology almost two decades after the commencement of retail competition. This methodology is simplistic and is predicated on a single retailer (the incumbent retailer) being responsible for all of the metered energy flowing to and from a given section of the electricity distribution system. To allow for retail competition, energy values for customers who have chosen independent retailers are determined and deducted from the incumbent retailer's metered energy for that sector of the electricity market. The 'settlement-by-differencing' methodology is explained further in section 2.1 of the HLD (Appendix A).

Market systems and data formats, including AEMO's Market Settlements and Transfer Solution (MSATS), have been designed to support the current settlement requirements in the NER.

2.2 Market development

Following the progressive rollout of retail competition across all regions of the NEM, the majority of NEM customers have chosen a competitive retailer offering, particularly in Victoria, New South Wales, South Australia and Queensland where competition in the retail market is well established.

For purposes other than market settlement, the role of the 'local retailer' in the NEM is now redundant. Full retail contestability has been implemented in all participating jurisdictions, and retailer of last resort processes administered by the AER and the Victorian Essential Services Commission do not depend on the NER local retailer concept.

More recent changes to the NER, such as the Competition in Metering Rule and Embedded Networks Rule, are expected to support extended competition in the NEM, in particular for the small customer segment (i.e. residential households and small business customers). Further detail on changing market dynamics in regard to this rule change proposal is provided in section 2.2 of the HLD.

3. STATEMENT OF ISSUE

3.1 Issues with the current Rule

The 'settlement-by-differencing' methodology, useful as part of an initial framework to enable retail competition due to its simplicity, has inherent weaknesses once full retail competition is firmly established. These weaknesses are increasingly exposed as more customers choose competitive retailer offers.

These weaknesses include:

- AEMO cannot perform a full reconciliation of energy being settled, which means errors and anomalies in settlement cannot easily be identified. This has resulted in disputes that have required resolution outside the NEM settlement process.
- Treatment of losses and information access is different for local and independent retailers, with local retailers fully exposed to inaccuracies in commercial losses, and to errors in the calculation of technical losses resulting from the distribution of electricity across the distribution network. Access to metering data is also differentiated with local retailers able to access all metering data, whereas independent retailers are only able to access metering data for their customers, within any given distribution network area.
- Lack of incentives for reducing commercial losses and metering inaccuracies, as independent retailers are only charged for metered energy and local retailers cannot identify or resolve these losses, other than where they are the retailer for a connection point.

Issues created by the current settlement methodology are explored in more detail in section 2.3 of the HLD.

To the extent authorised by the National Electricity Law in relation to any protected information, AEMO is happy to provide the AEMC with specific examples of disputes requiring resolution outside the NEM settlement process, to support the contention presented in section 2.3 of Appendix A, and the consideration of this rule change proposal more generally.

4. HOW THE PROPOSAL WILL ADDRESS THE ISSUES

4.1 How the proposal will address the issues

An established alternative methodology to 'settlement-by-differencing' is known as 'global settlement' and has been adopted in international markets, in particular those that have established and successful competitive retail markets.

A detailed description of the proposed 'global settlement' methodology and the benefits to the operation of the NEM resulting from its adoption are provided in section 3 of the HLD.

4.2 AEMO Procedure changes

Section 4 of the HLD details the impacts of a move to 'global settlement' on industry data flows including B2B, metering data and reconciliation reporting.

In summary, it is likely that adoption of this proposal will require consequential changes to the following AEMO Procedures:

- MSATS Procedures
- Metrology Procedures
- Service Level Procedures (including associated data formats)

It is also likely that the Information Exchange Committee would be required to consider changes to the B2B Procedures.

4.3 Stakeholder engagement

Due to the confidential nature of energy settlement, AEMO has not engaged with stakeholders through open forum. AEMO has discussed the settlement framework, the operation of global settlements and the effect of such a change with a range of stakeholders individually and has received either generally supportive or enthusiastically supportive responses. The greatest concerns raised by stakeholders have been related to timing, with all parties who provided feedback stating that the adoption of a 'global settlement' framework should be aligned with the planned implementation of five-minute settlement.

Section 5 of the HLD provides an overview of the impact on market participants, technology changes and timeframes to implement the 'global settlement' model, including consideration of the current plans to implement five-minute settlement following the AEMC's publication of the final rule and determination on Five Minute Settlement.

5. HOW THE PROPOSED RULE CONTRIBUTES TO THE NATIONAL ELECTRICITY OBJECTIVE (NEO)

Before the AEMC can make a rule change it must apply the rule making test set out in the NEL, which requires it to assess whether the proposed rule will or is likely to contribute to the National Electricity Objective (NEO). Section 7 of the NEL states the NEO is:

> *… to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to –*
> *(a) price, quality, reliability and security of supply of electricity; and*
> *(b) the reliability, safety and security of the national electricity system.*

The new settlement arrangements should contribute to the achievement of the NEO by establishing:

- A level playing field for all electricity retailers, with all retailers trading in the retail market on the same terms;
- Full reconciliation and transparency of energy flows in the retail market, enabling commercial losses to be identified, measured and fairly allocated over a trading period, and tracked over the long term; and
- The ability for AEMO to identify errors in settlement at early stages in the settlement process.

5.1 Retailers trading on the same terms

This proposal ensures that all retailers trade and compete in the electricity retail market on the same terms and that there is transparency for all retailers in the allocation of energy values for settlement in the NEM. The current arrangements where the incumbent retailer effectively subsidises their competitors due to the allocation of losses, will cease.

5.2 Incentivising all retailers to reduce commercial losses

Commercial losses are caused by actions external to the power system itself (not be confused with technical losses[1]) and consist primarily of unaccounted for unmetered connections, electricity theft, malfunctioning metering equipment and errors in accounting and record-keeping.

Commercial losses represent an avoidable financial loss for retailers to whom they are apportioned. Whilst it is clear that the amounts of electricity involved in commercial losses are in the main being consumed by end users that do not pay for them, once identified and corrected a significant proportion of those amounts becomes reduced demand due to:

- The loss being preventable in its entirety (e.g. an illegal connection); or
- The customer adjusting their consumption in relation to their ability to pay for electricity services that they were previously receiving at no cost.

That reduction in demand has exactly the same effect as a reduction in technical losses: less electricity needs to be generated.

From a social perspective, commercial losses have perverse effects as customers being billed for accurately measured energy consumption and regularly paying their bills are in effect subsidising those end users who do not pay for their energy consumption.

[1] Technical losses occur naturally and consist mainly of power dissipation in electricity system components such as transmission and distribution lines, transformers, and measurement systems.

This proposal ensures that all retailers are collectively incentivised to reduce commercial losses, which in turn will reduce overall demand for energy. It will also allow losses to be identified, measured and tracked over time.

This proposal will encourage the adoption of advanced metering systems as both a corrective measure for the reduction of historic commercial losses and as a preventative measure for the reoccurrence of losses, due to the security and monitoring capabilities of advanced metering. Importantly, the ability to identify the quantity of unaccounted for energy will enable AEMO to report on the effect of market initiatives on the accuracy of electricity settlement. For example, it is likely that the Victorian AMI rollout has significantly reduced Victorian commercial losses, however the effect has not been quantifiable.

5.3 Settlement error correction

This proposal will enable AEMO to fully reconcile energy within each distribution network. This will facilitate timelier identification, mitigation and prevention of settlement errors, reducing the likelihood of settlement errors requiring off-market settlement, dispute resolution and legal proceedings. As a result, all retailers will have increased confidence in the veracity of the settlement process and the costs of operating off-market disputes and proceedings will be avoided.

6. EXPECTED BENEFITS AND COSTS OF THE PROPOSED RULE

The High Level Design document provided as Appendix A, provides a detailed overview of the changes that would be required to affected parties to implement this proposal in section 5.2. In summary, the only material cost identified by AEMO to implement this proposal in line with the design presented in Appendix A, would reside with AEMO in making changes to market systems and data formats to accommodate the global settlement methodology. AEMO has identified potential savings for retailers currently engaged in attempts to reconcile their settlement statement and for Metering Data Providers, who would no longer be required to support and deliver an AEMO settlement-specific data format (i.e. the MDM file format)

AEMO considers that the cost to implement this proposal would be moderate and only incremental to the costs currently being determined by AEMO for the implementation of five-minute settlements, assuming both can be implemented in the same timeframe. This is due to the fact that there are a number of synergies between the requirements to implement global settlement and five-minute settlement[2], as both changes require:

- Changes to the market data formats
- Upgrades and modifications to MSATS
- Modifications to AEMO's settlement processing systems
- Modifications to participant settlement statements
- Modifications to the same set of AEMO Procedures and guidelines

As a result of the lack of visibility of unaccounted for energy in the NEM, the reasons for which are described in this proposal, AEMO is unable to identify the potential reduction in demand that could be obtained through adopting this proposal, however information provided to AEMO from the New Zealand Electricity Authority indicates that unaccounted for energy in the New Zealand market has reduced by a quantum of 0.8% of total energy settled per annum since the adoption of a global settlement framework in that market in 2009. It is reasonable to consider that corrections of a similar nature may be achievable in the NEM.

[2] As highlighted in the AEMO Five-Minute Settlement: High Level Design, published by the AEMC alongside the final rule and determination for Five Minute Settlement.

7. PROPOSED RULE

7.1 Description of the proposed Rule

Detailed drafting changes to the Rules are provided below for the AEMC's consideration. AEMO would welcome the opportunity to work with the AEMC in developing the drafting further.

In summary, AEMO considers that changes would be required to the following parts of the NER to implement the change to a global settlement methodology, and consequential changes:

- Chapter 3, to remove or replace those provisions of rule 3.15 that implement settlement-by-differencing, primarily the assignment of financial responsibility for transmission nodes to the Local Retailer.
- Chapter 2, to provide that all NEM-connected loads are to be classified as market loads, remove the concepts of first-tier and second-tier loads and the corresponding registration categories of First-Tier and Second-Tier Customer, and remove or replace other references to the Local Retailer. The criteria for classification of non-market generation (reflected in clauses 2.2.4 and 2.2.5) also requires amendment. Any non-market generation must, in effect, be credited to a registered Market Customer who is the financially responsible Market Participant at the connection point.
- Chapters 5, 6, 7, and 10, to remove or appropriately replace references to Local Retailers, franchise customers, First-Tier and Second-Tier Customers and, potentially, Non-Registered Customers.

7.2 Proposed Rule Drafting

AEMO Proposed Draft Rule
Global Settlement and Market Reconciliation

Marked up to National Electricity Rules v 106

2. Registered Participants and Registration

2.2.4 Market Generator

(a) A *generating unit* ~~whose *sent out generation* is not purchased in its entirety by the *Local Retailer* or by a *Customer* located at the same *connection point*~~ must be classified as a *market generating unit* if neither of the conditions in clause 2.2.5(a) is met.

(b) A *Generator* is taken to be a *Market Generator* only in so far as its activities relate to any *market generating units*.

(c) A *Market Generator* must sell all *sent out generation* through the *spot market* and accept payments from *AEMO* for *sent out generation* at the *spot price* applicable at the *connection point* as determined for each *trading interval* in accordance with the provisions of Chapter 3.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(d) A *Market Generator* must purchase all electricity *supplied* through the *national grid* to the *Market Generator* at that *connection point* from the *spot market* and make payments to *AEMO* for such electricity supplied at the *connection point* as determined for each *trading interval* in accordance with the provisions of Chapter 3.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

2.2.5 Non-Market Generator

(a) A *generating unit* must be classified as a *non-market generating unit* if either of the following applies:

(i) the *Market Customer* that has classified a *market load* at the same *connection point* purchases or is otherwise entitled to the benefit of all

the electricity *generated* from that *generating unit*, and there is no *sent out generation* at the *connection point*; or

(ii) the *connection point* is a *distribution connection point* and:

(1) all of the electricity *generated* from that *generating unit*, including *sent out generation*, is purchased by a *Market Participant*;

(2) if there is a *market load* at the same *connection point*, that *Market Participant* is the *Market Customer* who classified that *market load*; and

(3) the total *sent out generation* purchased by the *Market Participant* from all *non-market generating units* in the same *local area* will not exceed the total net *load* for that *Market Participant's market loads* in that *local area*. ~~whose *sent out generation* is purchased in its entirety by the *Local Retailer* or by a *Customer* located at the same *connection point* must be classified as a *non-market generating unit*.~~

[AEMO note: The term 'sent out generation' in the current rule should not apply to the situation where a Customer at the same connection point (not the LR) purchases all the energy. In that situation there should be no sent-out generation, because there should always be a net load at the connection point.

We consider there are two possible alternatives for non-market generation that would otherwise have been purchased by the Local Retailer:
Option 1. Require Generators to classify as market if their output exceeds load at the same connection point (current policy for energy purchased by Customers other than the Local Retailer) – this would most likely require a transitional arrangement for existing NM generation purchased by the LR. The transitional arrangement could look like option 2.
Option 2. (This is the option drafted above.) Extend the current LR arrangement to retailers generally, by allowing generation at that point to be purchased by [and assigned in MSATS to] any Market Customer as long as the generation will not exceed the sum of its market loads within the local area].

(b) A *Generator* is taken to be a *Non-Market Generator* only in so far as its activities relate to any *non-market generating unit*.

(c) A *Non-Market Generator* is not entitled to receive payment from *AEMO* for *sent out generation* except for any compensation that may be payable to it as a *Directed Participant* or *Affected Participant*.

2.3 Customer

2.3.1 Registration as a Customer

(a) A *Customer* is a person so registered by *AEMO* and who engages in the activity of purchasing electricity *supplied* through a *transmission or distribution system* to a *connection point*.

(b) To be eligible for registration as a *Customer*, a person must satisfy *AEMO* (acting reasonably) that:

(1) the person intends to classify within a reasonable period of time its electricity purchased at one or more *connection points* as a ~~*first-tier load*, *a second-tier load* or a~~ *market load* or an *intending load*; or

(2) registration is for the purpose of acting as a *RoLR*.

(c) A person must not engage in the activity of purchasing electricity directly from the *market* at any *connection point*, unless that person is registered by *AEMO* as a *Market Participant* and that *connection point* is classified as one of that person's *market connection points*.

(d) [Deleted]~~A person who engages in the activity of purchasing electricity at any *connection point* otherwise than directly from the *market* may, but is not required to, apply for registration by *AEMO* as a *First-Tier Customer*, a *Second-Tier Customer* or an *Intending Participant* provided that person is entitled to classify its electricity purchased at that *connection point* based on the threshold criteria set out in clause 2.3.1(e).~~

[AEMO note: This rule change proposal is based on acceptance that the concepts of franchise, first and second tier customers are redundant. We are not aware of any need or reason for continuing the provision for end-users to register as Customers without participating in the market. There are none registered, nor are we aware of any previous registrations, at least for many years]

(e) A person may not classify its electricity purchased at any *connection point* unless the person satisfies the requirements of the *participating jurisdiction* in which the *connection point* is situated so that (subject to compliance with the *Rules*) the person is permitted to purchase electricity in the *spot market* in relation to that *connection point*.

(f) A *Market Customer* may classify one or more of its *market loads* as an *ancillary service load* in accordance with clause 2.3.5.

2.3.2 [Deleted]~~First-Tier Customer~~

~~(a) If any electricity *supplied* through the *national grid* is purchased by a person at a *connection point* directly and in its entirety from the *Local Retailer*, the *load* at that *connection point* may be classified by that person as a *first-tier load*.~~

~~(b) A *Customer* is taken to be a *First-Tier Customer* only in so far as its activities relate to any *first-tier load*.~~

~~(c) A *First-Tier Customer* must not participate in the *spot market* for any *first-tier load*.~~

~~**Note**~~

~~This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)~~

2.3.3 [Deleted] ~~Second-Tier Customer~~

~~(a) Subject to clause 2.3.3(d), if any electricity *supplied* through the *national grid* is purchased by a person at a *connection point* other than directly from the *Local Retailer* or the *spot market* all electricity purchased by that person at that *connection point* may be classified by that person as a *second-tier load*.~~

~~(b) A *Customer* is taken to be a *Second-Tier Customer* only in so far as its activities relate to any *second-tier load*.~~

~~(c) A *Second-Tier Customer* must not participate in the *spot market* for any of its *second-tier loads*.~~

~~**Note**~~

~~This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)~~

~~(d) A person's purchase of electricity at a *connection point* may only be classified as a *second-tier load* while a *Market Customer*, from whom the person directly or indirectly purchases the electricity, classifies the *connection point* as one of its *market loads*.~~

2.3.4 Market Customer

(a) A *Customer* must classify the *load* at each *connection point* at which that *Customer* purchases electricity *supplied* through a *transmission or distribution system* ~~If electricity, *supplied* through the *national grid* to any person *connected* at a *connection point*, is purchased other than from the *Local Retailer* that *load* at the *connection point* may be classified by that person or, with the consent of that person, by some other person~~ as a *market load*.

[AEMO note: It will be necessary to consider whether the requirement to classify all Customer load connection points as market has any unintended consequences that need to be addressed. Embedded networks may be one area that requires attention]

(b) A *Customer* is taken to be a *Market Customer* only in so far as its activities relate to any *market load* and only while it is also registered with *AEMO* as a *Market Customer*.

(c) A *Market Customer* must purchase all electricity *supplied* at that *connection point* from the *spot market* and make payments to *AEMO* for electricity supplied at the *connection point* as determined for each *trading interval* in accordance with provisions of Chapter 3.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(d) A *Market Customer* may request *AEMO* to classify any of its *market loads* as a *scheduled load*.

(e) *AEMO* must classify a *market load* as a *scheduled load* if it is satisfied that the *Market Customer*:

(1) has submitted data in accordance with schedule 3.1;

(2) has adequate communications and/or telemetry to support the issuing of *dispatch instructions* and the audit of responses; and

(3) has requested that the *load* be so classified and has not withdrawn that request.

(f) A *Market Customer* may submit *dispatch bids* in respect of *scheduled loads* in accordance with the provisions of Chapter 3.

(g) A *Market Customer* who submits *dispatch bids* for *scheduled loads* and makes its *scheduled loads* available for *central dispatch* must comply with the *dispatch instructions* from *AEMO* in accordance with the *Rules*.

(h) [Deleted]~~A *Customer* who is also a *Local Retailer* must classify any *connection point* which *connects* its *local area* to another part of the *power system* as a *market load*.~~

~~Note~~

~~This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)~~

2.10 Ceasing to be a Registered Participant

2.10.1 Notification of intention

(a) A person may notify *AEMO* in writing that it wishes to cease to be registered in any category of *Registered Participant* or that it wishes to terminate any of its classifications of *loads*, *generating units* or *network services*.

(b) A person is not entitled to notify *AEMO* that it wishes to cease to be registered in relation to any category for which that person is required to be registered under the *National Electricity Law* or under the *Rules*.

(c) In any notice given under clause 2.10.1(a), the *Registered Participant* must specify a date upon which it wishes to cease to be so registered or for an existing classification to be terminated and, in the case of a *Market Participant*, the date upon which it will cease to *supply* or acquire electricity or trade directly in the *market* and whether entirely or in relation to one or more *connection points* or *market network services*.

(d) *AEMO* may reject a notice from a *Market Customer* that it wishes to terminate its classification of a *connection point* as one of its *market loads* or otherwise cease to be a *Market Customer* in relation to any of its *market loads* unless *AEMO* is satisfied that:

(1) another person has classified the *connection point* as one of its *market loads* and is registered as a *Market Customer*; or

(2) [deleted] ~~the relevant *Local Retailer* has agreed or is otherwise required by laws of the relevant *participating jurisdiction* to assume responsibility for payments to *AEMO* for electricity *supplied* to that *connection point*; or~~

(3) the *load* at that *connection point* will be *disconnected* on and from the date specified and, taking into consideration any relevant guidelines and procedures specified by the relevant *participating jurisdiction* to *AEMO*, that *disconnection* is not inappropriate.

(d1) *AEMO* may reject a notice from a *Market Small Generation Aggregator* which states that it wishes to terminate its classification of a *small generating unit* as a *market generating unit*, or otherwise cease to be a *Market Small Generation Aggregator* in relation to any of its *market generating units*, unless *AEMO* is satisfied that:

(1) another person has classified the *small generating unit* as one of its *market generating units* and that person is registered as a *Small Generation Aggregator* and a *Market Small Generation Aggregator*; or

(2) [deleted] ~~the relevant *Local Retailer* has agreed or is otherwise required by laws of the relevant *participating jurisdiction* to assume responsibility for payments with *AEMO* for electricity *supplied* to the *connection points* of the *market generating units*; or~~

(3) the *small generating unit* at that *connection point* will be *disconnected* on and from the date specified in the notice, and, after having regard to any relevant guidelines and procedures specified by the relevant *participating jurisdictions* to *AEMO*, *disconnection* is appropriate.

(e) Upon receiving a notice which complies with clause 2.10.1 from a person who wishes to cease to be registered in any category of *Market Participant*, or to terminate the classification of any of its *market loads*, *market generating units*, or *market network services*, *AEMO* must deliver a notice to the *AER* and the *AEMC* and notify all *Registered Participants* stating that:

(1) *AEMO* has received a notice under clause 2.10.1(a); and

(2) the person who gave the notice has stated that, from the date specified in the notice, the person intends to cease *supplying* or acquiring electricity or trading directly in the *market* and whether entirely or in relation to certain *connection points* or *market network services*.

(f) If a *Market Customer* that is a *retailer* gives a notice under this clause, *AEMO* must, before deciding whether to reject the notice under paragraph (d), consult with the *AER*.

2.12 Interpretation of References to Various Registered Participants

(a) A person may register in more than one of the categories of *Registered Participant*.

(b) Notwithstanding anything else in the *Rules*, a reference to:

(1) a "*Generator*" applies to a person registered as a *Generator* only in so far as it is applicable to matters connected with the person's *scheduled generating units*, *semi-scheduled generating units*, *non-scheduled generating units*, *market generating units* or *non-market generating units*;

(1A) a "*Small Generation Aggregator*" applies to a person registered as a "*Small Generation Aggregator*" only in so far as it is applicable to matters connected with the person's *small generating units* or *market generating units*;

(1B) a "*Market Ancillary Service Provider*" applies to a person registered as a "*Market Ancillary Service Provider*" only in so far as it is applicable to matters connected with the person's *ancillary service load*;

(2) a "*Scheduled Generator*", "*Semi-Scheduled Generator*", "*Non-Scheduled Generator*", "*Market Generator*" or "*Non-Market Generator*" applies to a person only in so far as it is applicable to matters connected with the person's *scheduled generating units*, *semi-scheduled generating units*, *non-scheduled generating units*, *market generating units* or *non-market generating units* respectively;

(3) a "*Customer*" or "*Market Customer*" applies to a person ~~registered as a *Customer*~~ only in so far as it is applicable to matters connected with the person's ~~*first-tier loads, second-tier loads* or~~ *market loads*;

(4) [deleted] ~~a "*First Tier Customer*", "*Second Tier Customer*" or "*Market Customer*" applies to a person only in so far as it is applicable to matters connected with the person's *first-tier loads, second-tier loads* or *market loads* respectively;~~

(4A) a "*Trader*" applies to a person only in so far as it is applicable to matters connected with the person's activities as a *Trader*;

(4B) a "*Reallocator*" applies to a person only in so far as it is applicable to matters connected with the person's activities as a *Reallocator*;

(5) a "*Network Service Provider*" applies to a person registered as a *Network Service Provider* only in so far as it is applicable to matters connected with the person's *network services*, including *market network services* and *scheduled network services*;

(6) a "*Market Network Service Provider*" or "*Scheduled Network Service Provider*" applies to a person only in so far as it is applicable to matters connected with the person's *market network services* or *scheduled network services* respectively;

(7) a "*Market Participant*" applies to a person who is a *Market Participant* and:

(i) where that person is registered as a *Market Generator*, in so far as it is applicable to matters connected with the person's *market generating units* or *ancillary services generating units*; and

(i1) where that person is registered as a *Market Small Generation Aggregator*, in so far as it is applicable to matters connected with the person's *market generating units*; and

(i2) where that person is registered as a *Market Ancillary Service Provider*, in so far as it is applicable to matters connected with the person's *ancillary service load*; and

(ii) where that person is registered as a *Market Customer*, in so far as it is applicable to matters connected with the person's *market loads* or *market ancillary service loads*; and

(iii) where that person is registered as a *Market Network Service Provider*, in so far as it is applicable to matters connected with the person's *market network services*; and

(iv) where that person is registered in any category of *Market Participant* additional to a *Market Generator* and/or a *Market Customer* and/or a *Market Network Service Provider*, to the extent to which the reference would otherwise apply to the person if it were not taken to be a *Market Generator*, *Market Customer* or *Market Network Service Provider*; and

(8) a "*Registered Participant*" applies to a person who is registered under Chapter 2 and:

(i) where that person is registered as a *Generator*, in so far as it is applicable to matters connected with any of the *Generator's scheduled generating units*, *semi-scheduled generating units*, *non-scheduled generating units*, *market generating units* and *non-market generating units*;

(ii) where that person is registered as a *Customer*, in so far as it is applicable to matters connected with any of the *Customer's* ~~*first-tier loads, second-tier loads or*~~ *market loads*; and

(iii) where that person is registered in any other *Registered Participant* category, to the extent to which the reference would apply to the person if it were not registered in another *Registered Participant* category.

(c) In rule 2.12, "*matter*" includes any assets, liabilities, acts, omissions or operations (whether past, present or future).

3. Market Rules

3.6 Network Losses and Constraints

3.6.2 Intra-regional losses

~~(c) An *intra-regional loss factor* is to be used as a price multiplier that can be applied to the *regional reference price* to determine the *local spot price* at each *transmission network connection point* and *virtual transmission node*.~~

[AEMO note: As there will be no spot market transaction and no FRMP for a virtual transmission node, or a transmission network connection point other than a market connection point, we consider this clause should be deleted. The 'local spot price' only appears in clause 3.9.1(c) (see below), and in fact is not referred to in settlement calculations. These refer only to the spot price at the RRP. The application of loss factors does not adjust the price, but the amount of energy.]

3.9 Price Determination

3.9.1 Principles applicable to spot price determination

(a) The principles applying to the determination of prices in the *spot market* are as follows:

[...]

(b) A single *regional reference price* which is the *spot price* at the *regional reference node* applies to *energy* traded at *market connection points*~~provides a reference from which the *spot prices* are determined~~ within each *region*, subject to the application of relevant *intra-regional loss factors*.

(c) [Deleted]~~The *local spot price* at each *transmission network connection point* is the *spot price* at the *regional reference node* for the *region* to which the *connection point* is assigned multiplied by the relevant *intra-regional loss factor* applicable to that *connection point*.~~

~~**Note**~~

~~Where two *intra-regional loss factors* are determined for a *transmission network connection point* under clause 3.6.2(b)(2), *AEMO* will determine the relevant *intra-regional loss factor* for use under this clause in accordance with the procedure determined under clause 3.6.2(d1).~~

3.15 Settlements

3.15.3 Connection point ~~and virtual transmission node~~ financial responsibility

(a) For each *market connection point* and each *Non-Market Generator connection point*, there is one person that is *financially responsible* for that *connection point*. The person that is *financially responsible* for such a *connection point* is:

(1) the *Market Participant* which has classified the *connection point* as a *market load*;

(2) the *Market Participant* which has classified the *generating unit connected* at that *connection point* as a *market generating unit*; ~~or~~

(3) the *Market Participant* which has classified the *network service connected* at that *connection point* as a *market network service*; or

(4) the *Market Participant* who purchases *sent out generation* from a *non-market generating unit* at a *connection point*.

(b) No person is *financially responsible* for a *virtual transmission node* or a *transmission network connection point* that is not a *market connection point*.

Note

These points represent the *connection* between a *transmission network* and a *distribution network* or another *transmission network*.

(c) Any difference between:

(i) the *energy* flow *metered* at a *transmission network connection point* that is not a *market connection point*; and

(ii) the aggregate *loss factor*-adjusted *metered energy* amounts for all *market connection points* and *Non-Market Generator connection points* assigned to that *transmission network connection point*,

is to be determined and allocated to *connection points* in accordance with clause 3.15.4 and 3.15.5. ~~For each *virtual transmission node* there is one person that is *financially responsible* for that *virtual transmission node*. The person that is *financially responsible* for such a *virtual transmission node* is the *Market Participant* which is the *Local Retailer* for all of the *market connection points* assigned to that *virtual transmission node*.~~

3.15.4 Adjusted gross energy amounts – connection points

(a) For each *market connection point* that is a *transmission connection point*, the *adjusted gross energy* amount for a *trading interval* is the *metered energy*, being the amount of electrical *energy*, expressed in MWh, flowing at the *connection point* in the *trading interval*, as recorded in the *metering data* in respect of that *connection point* and that *trading interval* (expressed as a positive value where the flow is towards the *transmission network connection point* to which the *connection point* is assigned and a negative value where the flow is in the other direction).

(b) For each *distribution connection point* that is either a *market connection point* or a *Non-Market Generator connection point* at which *sent out generation* is purchased~~Where a *connection point* is not a *transmission network connection point*~~, the *adjusted gross energy* amount ~~for that *connection point*~~ for a *trading interval* is calculated by the following formula:

AGE = (ME × DLF) + UFE

where:

AGE is the *adjusted gross energy* amount to be determined;

ME is the amount of electrical *energy*, expressed in MWh, flowing at the *connection point* in the *trading interval*, as recorded in the *metering data* in respect of that *connection point* and that *trading interval* (expressed as a positive value where the flow is towards the *transmission network connection point* to which the *connection point* is assigned and a negative value where the flow is in the other direction); ~~and~~

DLF is the *distribution loss factor* applicable at that *connection point*; and

UFEA is the share of unaccounted for *energy* allocated to that *connection point* under clause 3.15.5.

[AEMO note: As an alternate to the proposed drafting in clauses 3.15.4, 3.15.5, 3.15.5A and 3.15.6, the detailed settlement calculations could be removed from the Rules, and have them instead in procedures made by AEMO. This would be consistent with the regulated gas markets.]

3.15.5 Unaccounted for energy adjustment ~~Adjusted energy - transmission network connection points~~

(a) For each ~~Where a *connection point* is a~~ *transmission network connection point* that is not a *market connection point*, an amount representing unaccounted for *energy* in the *local area* is ~~the *adjusted gross energy* amount for that *connection point* for a *trading interval* is calculated~~determined for each *trading interval* by the following formula:

UFE~~AGE~~ = TME - ADME~~AGE~~

where:

UFE ~~AGE~~ is the total unaccounted for ~~*adjusted gross energy*~~ amount (in MWh) to be determined;

TME is the amount of electrical *energy*, expressed in MWh, flowing at the *transmission network connection point* in the *trading interval*, as recorded in the *metering data* in respect of a *transmission network* ~~that~~ *connection point* for ~~and~~ that *trading interval* (expressed as a positive value where the flow is towards the *transmission network*, and negative value where the flow is in the other direction); and

ADME~~AGE~~ is the aggregate of the ~~*adjusted gross energy*~~ amounts represented by (ME x DLF) in clause 3.15.4(b) for that *trading interval* for each *connection point* assigned to the ~~that~~ *transmission network connection point*, for which a *Market Participant* (other than a suspended *Market Participant*) is *financially responsible* (and in that aggregation positive and negative *adjusted gross energy* amounts are netted out to give a positive or negative aggregate amount).

(b) An allocation of the total unaccounted for *energy* amount is determined for each of the *connection points* included in the calculation of ADME in paragraph (a), by the following formula:

UFEA = UFE x (DME/ADME)

where:

UFEA is the allocation of the unaccounted for *energy* amount (in MWh) for the relevant *connection point* and *trading interval*;

UFE is the unaccounted for *energy* amount determined under paragraph (a) for the relevant *transmission network connection point* and *trading interval*;

DME is the amount represented by (ME x DLF) under clause 3.15.4(b) for the relevant *connection point* and *trading interval*; and

ADME is the amount represented by that term under paragraph (a) for the relevant *transmission network connection point* and *trading interval*.

3.15.5A [Deleted] ~~Adjusted energy - virtual transmission nodes~~

~~For each *virtual transmission node*, the *adjusted gross energy* amount for that *virtual transmission node* for a *trading interval* is calculated by the following formula:~~

~~AGE − AAGE~~

~~where:~~

~~AGE is the *adjusted gross energy* amount to be determined; and~~

~~AAGE is the aggregate of the *adjusted gross energy* amounts for that *trading interval* for each *connection point* assigned to that *virtual transmission node* for which a *Market Participant* (other than a suspended *Market Participant*) is *financially responsible* (and in that aggregation positive and negative *adjusted gross energy* amounts are netted out to give a positive or negative aggregate amount).~~

3.15.6 Spot market transactions

(a) In each *trading interval*, in relation to each *connection point* ~~and to each *virtual transmission node*~~ for which a *Market Participant* is *financially responsible*, a *spot market transaction* occurs, which results in a *trading amount* for that *Market Participant* determined in accordance with the formula:

TA= AGE × TLF × RRP

where

TA is the *trading amount* to be determined (which will be a positive or negative dollar amount for each *trading interval*);

AGE is the *adjusted gross energy* for that *connection point* ~~or *virtual transmission node*~~ for that *trading interval*, expressed in MWh;

TLF ~~for a *transmission network connection point* or *virtual transmission node*,~~ is the relevant *intra-regional loss factor* ~~at that *connection point* or *virtual transmission node* respectively, and for any other *connection point*, is the relevant *intra-regional loss factor*~~ at the *transmission network connection point* or *virtual transmission node* to which that *connection point* ~~it~~ is assigned in accordance with clause 3.6.2(b)(2); and

RRP is the *regional reference price* for the *regional reference node* to which the *connection point* ~~*or virtual transmission node*~~ is assigned, expressed in dollars per MWh.

Note

Where two *intra-regional loss factors* are determined for a *transmission network connection point* under clause 3.6.2(b)(2), *AEMO* will determine the relevant *intra-regional loss factor* for use under this clause in accordance with the procedure determined under clause 3.6.2(d1).

(b) *AEMO* is entitled to the *trading amount* resulting from a *AEMO intervention event* and, for the purposes of determining *settlement amounts*, any such *trading amount* is not a *trading amount* for the relevant *Market Participant*.

(c) A *Directed Participant* is entitled to the *trading amount* resulting from any service, other than the service the subject of the *AEMO intervention event*, rendered as a consequence of that event.

5. Network Connection, Planning and Expansion

Schedule 5.3 Conditions for Connection of Customers

S5.3.1a Introduction to the schedule

(a) This schedule applies to the following classes of *Network User*:

(1) [deleted]~~a *First Tier Customer* in respect of its *first tier load*~~;

(2) [deleted]~~a *Second Tier Customer* in respect of its *second tier load*~~;

(3) a *Market Customer* in respect of its *market load*;

(4) a *Transmission Customer* or *Distribution Customer* (other than a *Market Customer*) ~~*Non Registered Customer*~~ in respect of *supply* it takes from a *network* under a *connection agreement*; and

(5) a *Distribution Network Service Provider* in respect of its *distribution network*.

6 Economic Regulation of Distribution Services

6.20.1 Billing for distribution services

(a) A *Distribution Network Service Provider* must bill *Distribution Network Users* for *distribution services* as follows:

(1) *Embedded Generators*:

(i) by applying the *entry charge* as a fixed annual charge to each *Embedded Generator*; and

(ii) by applying any other charge the *Distribution Network Service Provider* makes consistently with these *Rules* and the applicable distribution determination.

(2) *Distribution Customers*:

The charges to *Distribution Customers* must be determined according to use of the *distribution network* as determined in accordance with a *metrology procedure* or, in the absence of a *metrology procedure* allowing such a determination to be made, by *meter* or by agreement between the *Distribution Customer* and the *Distribution Network Service Provider* by applying one or more of the following measures:

(i) demand-based prices to the *Distribution Customer's* metered or agreed half-hourly demand;

(ii) energy-based prices to the *Distribution Customer's* metered or agreed energy;

(iii) the *Distribution Customer* charge determined under this clause as a fixed periodic charge to each *Distribution Customer*;

(iv) a fixed periodic charge, a prepayment or other charge determined by agreement with the *Distribution Customer*;

(v) any other measure the *Distribution Network Service Provider* is authorised to apply by the applicable distribution determination.

(b) Subject to paragraph (c), where a *Distribution Customer* (other than a *Market Customer*) incurs *distribution service* charges, the *Distribution Network Service Provider* must bill the *Market Customer* from whom the *Distribution Customer* purchases electricity directly or indirectly for such *distribution services* in accordance with paragraph (a)(2).

(c) If a *Distribution Customer* and the *Market Customer* from whom it purchases electricity agree, the *Distribution Network Service Provider* may bill the *Distribution Customer* directly for *distribution services* used by that *Distribution Customer* in accordance with paragraph (a)(2).

(d) *Distribution Network Service Providers* must:

(1) calculate *transmission service* charges and *distribution service* charges for all *connection points* in their *distribution network*; and

(2) pay to *Transmission Network Service Providers* the *transmission service* charges incurred in respect of use of a *transmission network* at each *connection point* on the relevant *transmission network*.

(e) Charges for *distribution services* based on metered kW, kWh, kVA, or kVAh for:

(1) *Embedded Generators* that are *Market Generators*; and

(2) *Market Customers*; and

(3) *Distribution Customers* (other than *Market Customers*)~~*Second-Tier Customers*~~;

must be calculated by the *Distribution Network Service Provider* from:

(1) *settlements ready data* obtained from *AEMO's metering database*, for those *Embedded Generators*, *Market Customers* and other *Distribution* ~~*Second-Tier*~~ *Customers* with *connection points* that have a type 1, 2, 3 or 4 *metering installation*; and

(2) *metering data*, in accordance with a *metrology procedure* that allows the *Distribution Network Service Provider* to use *energy data* for this purpose, or otherwise *settlements ready data* obtained from *AEMO's metering database*, for those *Embedded Generators*, *Market Customers* and other *Distribution* ~~*Second-Tier*~~ *Customers* with *connection points* that have a type 4A, 5, 6 or 7 *metering installation*.

(f) Charges for *distribution services* based on metered kW, kWh, kVA or kVAh for *Embedded Generators* that are not *Market Generators*~~:~~.

~~(1) *Embedded Generators* that are not *Market Generators*; and~~

~~(2) *Non-Registered Customers*; and~~

~~(3) *franchise customers*,~~

~~must be calculated by the *Distribution Network Service Provider* using data that is consistent with the *metering data* used by the relevant *Local Retailer* in determining *energy settlements*.~~

(g) [Deleted] ~~The *Distribution Network Service Provider* may bill the relevant *Local Retailer* for *distribution services* used by *Non-Registered Customers* and *franchise customers*.~~

(h) Where the billing for a *Distribution Customer* for a particular *financial year* is based on quantities which are undefined until after the commencement of the *financial year*, charges must be estimated from the previous year's billing quantities with a reconciliation to be made when the actual billing quantities are known.

(i) Where the previous year's billing quantities are unavailable or no longer suitable, nominated quantities may be used as agreed between the parties.

7 Metering

7.6.2 Persons who may appoint Metering Coordinators

(a) A *Metering Coordinator* may only be appointed:

(1) with respect to a *connection point* or proposed *connection point* on a *transmission network*, by the *Market Participant* which is *financially responsible* at the *connection point*;

(2) with respect to a *connection point* (other than the *connection point* of a *retail customer*) that connects, or is proposed to *connect*, a *generating system* to a *distribution network*, by:

(i) the *Market Participant* which is *financially responsible* at the *connection point*;

(ii) a *Non-Market Generator* who owns, controls or operates the *generating system* that is connected to the *distribution network* at the *connection point*; or

(iii) a person who owns, controls or operates the *generating system* that is connected to the *distribution network* at the *connection point* and is exempt from the requirement to register as a *Generator* under clause 2.2.1(c); and

(3) with respect to any other *connection point*, by:

(i) the *Market Participant* which is *financially responsible* at the *connection point*; or

(ii) the *large customer* whose premises are supplied at the *connection point*.

(b) A person making an appointment under paragraph (a) must do so in accordance with the *Rules* and procedures authorised under the *Rules*.

(c) The *Market Settlement and Transfer Solution Procedures* must specify that a *Metering Coordinator* at a *connection point* is responsible for the *metering installation*:

(1) where the change in the *Metering Coordinator* at a *connection point* is effected due to a change in the *financially responsible Market Participant* at that *connection point*, on the day that the *market load* at the *connection point* transfers to the new *financially responsible Market Participant*; and

(2) otherwise, on any other day.

7.10.5 Periodic energy metering

(a) The *Metering Data Provider* must, for type 1, 2, 3, 4, 4A and 5 *metering installations*, collate *metering data* relating to:

(1) the amount of *active energy*; and

(2) *reactive energy* (where relevant) passing through a *connection point*,

in *trading intervals* within a *metering data services database* unless it has been agreed between *AEMO*, the *Local Network Service Provider*, *Embedded Network Manager* in relation to *child connection points* and the *financially responsible Market Participant* that *metering data* may be recorded in sub-multiples of a *trading interval*.

(b) For type 6 *metering installations*, *metering data* relating to the amount of *active energy* passing through a *connection point* must be converted into *trading intervals* in the *profiling* process undertaken by *AEMO* in accordance with the *metrology procedure* and the *metrology procedure* must specify:

(1) the parameters to be used in preparing the *trading interval metering data* for each *market load*, including the algorithms;

(2) the *metering data* from *first-tier loads* that is to be used in the conversion process;

(3) the quality and timeliness of the *metering data* from the *first-tier loads*;

(4) the party responsible for providing the *metering data* from the *first-tier loads*; and

(5) if required, the method of cost recovery in accordance with clause 7.5.2.

(c) The *Metering Data Provider* must, for type 7 *metering installations*, prepare *metering data* relating to the amount of *active energy* passing through a *connection point* in accordance with clause 7.10.1(a)(4) in *trading intervals* within a *metering data services database*.

7.16.3 Requirements of the metrology procedure

(a) *AEMO* must establish, maintain and *publish* the *metrology procedure* that will apply to *metering installations* in accordance with this clause 7.16.3 and this Chapter 7.

(b) The *metrology procedure* must include a minimum period of 3 months between the date when the *metrology procedure* is *published* and the date the *metrology procedure* commences unless the change is made under clause 7.16.7(e) in which case the effective date may be the same date as the date of *publication*.

(c) The *metrology procedure* must include:

(1) information on the devices and processes that are to be used to:

(i) measure, or determine by means other than a device, the flow of electricity in a power conductor;

(ii) convey the measured or determined data under subparagraph (i) to other devices;

(iii) prepare the data using devices or algorithms to form *metering data*; and

(iv) provide access to the *metering data* from a *telecommunications network*;

(2) the requirements for the provision, installation and maintenance of *metering installations*;

(3) the obligations of *Metering Coordinators*, *financially responsible Market Participants*, *Local Network Service Providers*, *Metering Providers*, *Metering Data Providers* and *Embedded Network Managers*;

(4) details on:

(i) the parameters that determine the circumstances when *metering data* must be delivered to *AEMO* for the purposes of Chapter 3 and such parameters must include, but are not limited to, the volume limit per annum below which *AEMO* will not require *metering data* for those purposes;

(ii) the timeframe obligations for the delivery of *metering data* relating to a *metering installation* for the purpose of *settlements*; and

(iii) the performance standards for *metering data* required for the purpose of *settlements*;

(5) subject to clause 7.16.4(d)(2), zero MWh as the specification for the *type 5 accumulation boundary*;

(6) procedures for:

(i) the validation and substitution of *metering data*;

(ii) the estimation of *metering data*;

(iii) the method~~:~~ by which *accumulated metering data* is to be converted by *AEMO* into *trading interval metering data*; and

~~(A) by which *accumulated metering data* is to be converted by *AEMO* into *trading interval metering data*; and~~

~~(B) of managing the *first-tier load metering data* that is necessary to enable the conversion referred to in subparagraph (A) to take place; and~~

(7) other matters in the *Rules* required to be included in the *metrology procedure*.

7.17.10 Nomination, election and appointment of Members

(a) A person may only be nominated and elected as a *Member* in accordance with the *Information Exchange Committee Election Procedures* and the *Rules* including, without limitation, this clause 7.17.10 and clause 7.17.11.

(b) *AEMO* must appoint a *Consumer Member*. Prior to making such appointment, *AEMO* must consult with Energy Consumers Australia and may consult with any other person or persons determined by *AEMO*.

(c) *AEMO* must appoint an *AEMO Member* and the *AEMO Member* must be a director of *AEMO*.

(d) *AEMO* must appoint at least two, but may appoint up to four, *Discretionary Members* to represent a class or classes of persons who, in *AEMO's* reasonable opinion, have an interest in the *B2B Procedures* and those interests are not adequately represented on the *Information Exchange Committee*. Prior to making such appointments, *AEMO* may consult with any person or persons determined by *AEMO*.

(e) *Distribution Network Service Providers* must elect a *Distribution Network Service Provider Member*.

(f) *Retailer*s ~~*Member Voters*~~ must elect a *Retailer Member*.

(g) *Metering Member Voters* must elect a *Metering Member*.

(h) *Third Party B2B Participants* must elect a *Third Party B2B Participant Member*.

(i) Any person who is:

(1) [deleted]~~both a *retailer* and a *Local Retailer*, may nominate and vote only once in respect of the appointment of a *Retailer Member*; and~~

(2) registered with *AEMO* in two or more of the categories of *Metering Coordinator*, *Metering Provider* and *Metering Data Provider*, may nominate and vote only once in respect of the appointment of a *Metering Member*.

(j) If two or more persons are *related bodies corporate* and belong to the same *Voter Category* (**related voters**) then only one of the related voters may nominate and vote in respect of an election for a *Distribution Network Service Provider Member*, a *Retailer Member*, *Metering Member* or *Third Party B2B Participant Member*, as the case may be.

Schedule 7.1 Metering register

S7.1.2 Metering register information

Metering information to be contained in the *metering register* should include, but is not limited to the following:

(a) *Connection* and *metering point* reference details, including:

(1) agreed locations and reference details (eg drawing numbers);

(2) loss compensation calculation details;

(3) site identification names;

(4) details of *Market Participants* and *Local Network Service Providers* associated with the *connection point* and the *Embedded Network Manager* in relation to a *child connection point*;

(5) details of the *Metering Coordinator*; and

(6) transfer date for ~~*Second-Tier Customer* and *Non-Registered Second-Tier Customer*~~ *metering data* (i.e. to another *Market Customer*).

(b) The identity and characteristics of *metering* equipment (ie *instrument transformers*, *metering installation* and *check metering installation*), including:

(1) serial numbers;

(2) *metering installation* identification name;

(3) *metering installation* types and models;

(4) *instrument transformer* ratios (available and connected);

(5) current test and calibration programme details, test results and references to test certificates;

(6) asset management plan and testing schedule;

(7) calibration tables, where applied to achieve *metering installation* accuracy;

(8) *Metering Provider*(s) and *Metering Data Provider*(s) details;

(9) summation scheme values and multipliers; and

(10) data register coding details.

(c) Data communication details, including:

(1) telephone number(s) for access to *energy data*;

(2) communication equipment type and serial numbers;

(3) communication protocol details or references;

(4) data conversion details;

(5) user identifications and access rights; and

(6) 'write' password (to be contained in a hidden or protected field).

(d) Data validation, substitution and estimation processes agreed between affected parties, including:

(1) algorithms;

(2) data comparison techniques;

(3) processing and alarms (eg *voltage* source limits; phase angle limits);

(4) *check metering* compensation details; and

(5) alternate data sources.

(e) Data processing prior to the *settlement* process, including algorithms for:

(1) *generation* half-hourly 'sent out' calculation; and

(2) customer half-hourly *load* calculation.~~; and~~

~~(3) *Local Retailer* net *load* calculation.~~

10. Glossary

adjusted gross energy

The *energy* adjusted in accordance with clause ~~3.15.5 (for a *transmission network connection point*) or clause 3.15.5A (for a *virtual transmission node*) or clause~~ 3.15.4 ~~(~~for a relevant ~~ny other~~ *connection point*~~)~~.

connection point

In relation to a *network* other than an *embedded network*, the agreed point of *supply* established between *Network Service Provider(s)* and another *Registered Participant*, *Transmission Customer* or *Distribution Customer*~~*Non-Registered Customer* or *franchise customer* and includes a *parent connection point*~~.

In relation to an *embedded network*, the *child connection point*, unless otherwise specified.

Distribution Customer

A *Customer*, *Distribution Network Service Provider*~~, *Non-Registered Customer*, *franchise customer*,~~ or *retail customer* having a *connection point* with a *distribution network*.

financially responsible

In relation to any *market connection point* and each *Non-Market Generator connection point* at which *sent out generation is purchased*, a term which is used to describe the relevant *Market Participant* specified under clause 3.15.3(a).~~which has either:~~

~~1. classified the *connection point* as one of its *market loads*;~~

~~2. classified the *generating unit connected* at that *connection point* as a *market generating unit*; or~~

~~3. classified the *network services* at that *connection point* as a *market network service*.~~

~~***First-Tier Customer***~~

~~A *Customer* which has classified any *load* as a *first-tier load* in accordance with Chapter 2.~~

~~***first-tier load***~~

~~Electricity purchased at a *connection point* directly and in its entirety from the *Local Retailer* and which is classified as a *first-tier load* in accordance with Chapter 2.~~

~~***franchise customer***~~

~~A person who does not meet its local jurisdiction requirements to make it eligible to be registered by *AEMO* as a *Customer* for a *load*.~~

~~***Local Retailer***~~

~~In relation to a *local area*, the *Customer* who is:~~

1. a business unit or *related body corporate* of the relevant *Local Network Service Provider*; or
2. responsible under the laws of the relevant *participating jurisdiction* for the *supply* of electricity to *franchise customers* in that *local area*; or
3. if neither 1 or 2 is applicable, such other *Customer* as *AEMO* may determine.

local spot price

A price determined according to clause 3.9.1(c). [AEMO note: see explanatory note on clause 3.6.2]

market generating unit

A *generating unit* whose *sent out generation* is not purchased in its entirety by the *Market Participant* who is *financially responsible* for the *generating unit's connection point*, *Local Retailer* or by a *Customer* located at the same *connection point* and which has been classified as such in accordance with Chapter 2. [AEMO note: see comment on options for clause 2.2.5]

non-market generating unit

A *generating unit* from which there is no*whose* *sent out generation*, or whose *sent out generation* is purchased in its entirety by the *Market Participant* who is *financially responsible* for the *generating unit's connection point*, *Local Retailer* or by a *Customer* located at the same *connection* point and which has been classified as such in accordance with Chapter 2. [AEMO note: see comment on options for clause 2.2.5]

Non-Registered Customer

A person who:

1. purchases electricity through a *connection point* with the *national grid* other than from the *spot market*; and
2. is eligible to be registered by *AEMO* as a *Customer* and to classify the *load* described in (1) as a *first-tier load* or a *second-tier load*, but is not so registered.

Retailer Member Voters

Retailers and *Local Retailers*.

Second-Tier Customer

A *Customer* which has classified any *load* as a *second-tier load* in accordance with Chapter 2.

second-tier load

Electricity purchased at a *connection point* in its entirety other than directly from the *Local Retailer* or the *spot market* and which is classified as a *second-tier load* in accordance with Chapter 2.

spot price

The price for electricity in a *trading interval* at a *regional reference node* ~~or a *connection point*~~ as determined in accordance with clause 3.9.2. [AEMO note: see explanatory note on clause 3.6.2]

Transmission Customer

A *Customer*, ~~*Non-Registered Customer* or~~ *Distribution Network Service Provider* or *retail customer* having a *connection point* with a *transmission network*.

APPENDIX A

GLOBAL SETTLEMENT AND MARKET RECONCILIATION: HIGH LEVEL DESIGN

HIGH-LEVEL DESIGN TO SUPPORT AEMO RULE CHANGE REQUEST

February 2018

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

IMPORTANT NOTICE

Purpose

AEMO has prepared this document to provide information about the potential design of AEMO processes and systems to support the introduction of a global settlement and market reconciliation methodology, as at the date of publication.

Disclaimer

This document or the information in it may be subsequently updated or amended. This document does not constitute legal or business advice, and should not be relied on as a substitute for obtaining detailed advice about the National Electricity Law, the National Electricity Rules, or any other applicable laws, procedures or policies. AEMO has made every effort to ensure the quality of the information in this document but cannot guarantee its accuracy or completeness.

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- are not liable (whether by reason of negligence or otherwise) for any statements or representations in this document, or any omissions from it, or for any use or reliance on the information in it.

CONTENTS

1. INTRODUCTION

1.1 Purpose

The purpose of this report is to provide a high level operational design (HLD) for the implementation of a global settlement framework for the NEM, in support of AEMO's rule change proposal, titled Global Settlement and Market Reconciliation.

The objectives of this paper are to:

- Provide the AEMC and other interested parties with a suggested design for the implementation of a global settlement and market reconciliation framework to provide context for the rule change proposal.
- Enable market participants and other affected stakeholders to evaluate the system and process changes they would need to make, and quantify the associated one-off and ongoing costs, upon a change in the settlement process as advocated by AEMO.

This HLD was drafted following the AEMC's final determination on the Five-Minute Settlement rule. Whilst there is no dependency between a potential change to a global settlement framework and a move toward five-minute settlement, considerable synergies could be found for the design and build of technology platforms and information technology systems within the NEM should they be progressed in tandem. These are identified at various points throughout this HLD.

1.2 Document Structure

This report is structured as follows:

- Section 1 provides an introduction to the HLD and outlines the purpose of the work undertaken by AEMO and the structure of the document.
- Section 2 focuses on the context of this report, providing an overview of the current settlement-by-differencing framework and its suitability to both the current and future market arrangements.
- Section 3 provides details of the proposed global settlement model and settlement calculations, the treatment of losses and the management of unaccounted for energy.
- Section 4 focuses on industry data flows including B2B, metering data and reconciliation reporting.
- Section 5 deals with implementation, including impact on market participants, technology changes and timeframes.

2. CONTEXT FOR THIS DESIGN

2.1 Situation today

NEM settlement is carried out weekly and is a process of allocating physical volumes of electricity to Customers (primarily retailers) and Market Generators. Metering data providers (MDPs) perform the collection, processing and delivery of metering data each week to market participants in a rich data format and to AEMO in a simplified data format for the calculation of settlement. MDPs must also provide updates to metering data 6 months later under a revision process that enables AEMO to improve the quality of data used for settlement and to deal with retrospective retailer transfers and error corrections.

The NEM is currently settled on a methodology known as 'settlement-by-differencing'. This methodology was established at market start so that electricity could be allocated between 'local', or 'first-tier', retailers (the franchise or default retailer for a defined distribution network area) and independent, or 'second-tier', retailers.

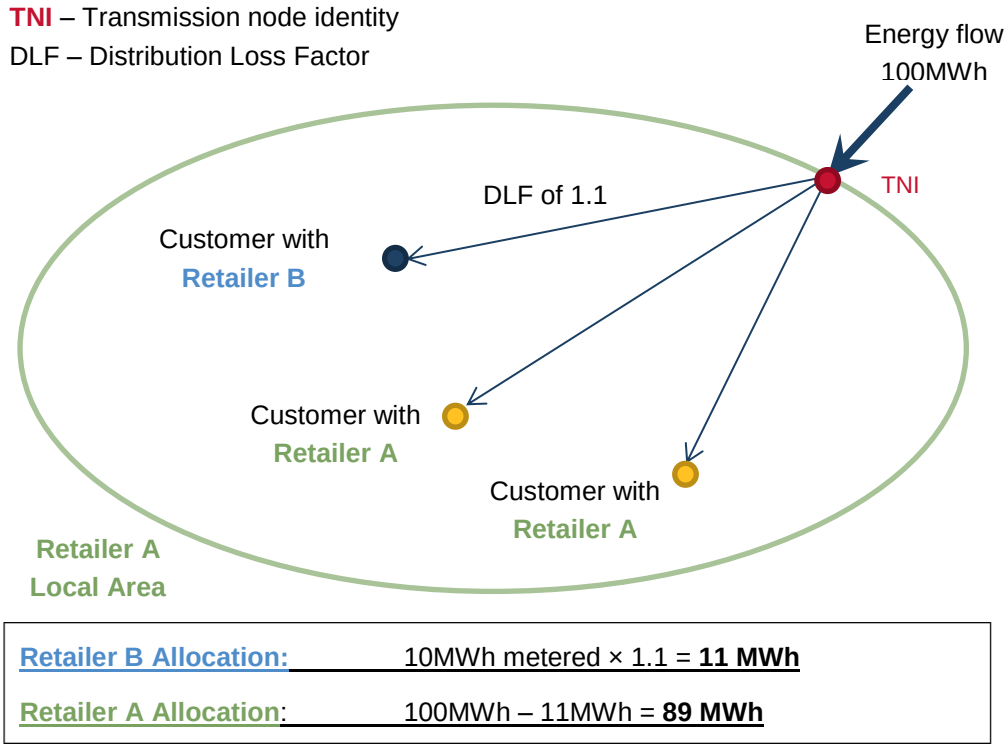
In the early stages of retail competition, for simplicity and to reduce the volume of data being delivered and stored to support energy settlement, it was both practical and reasonable to operate a methodology where the relatively small volumes traded by independent retailers were simply subtracted from the total injection of electricity to a distribution network area. Independent retailers are invoiced on the basis of the electricity metered at their customer connection points, as adjusted by a distribution loss factor (DLF). Local retailers are invoiced for the residual amount of electricity that entered a distribution area less that invoiced to independent retailers (i.e. the difference between the total energy into their area and all local retailers' metered energy (DLF adjusted)).

2.1.1 Settlement by differencing

Figure 1 provides a simplified example of settlement by differencing.

The independent retailer (B) is invoiced on the basis of the electricity metered at their customer locations, as adjusted by a DLF. The local retailer (A) is invoiced on the residual amount of electricity that entered its distribution area less that invoiced to the independent retailer.

Figure 1– Settlement-by-differencing



2.1.2 Defining Losses

In simple terms, there are two primary categories of losses within a distribution system that must be accounted for in any energy settlement process:

Technical losses - caused by the distribution of electricity across the distribution network to the independent retailer's customer metering installation. Technical losses arise for physical reasons, such as energy flows through the network, and the operating characteristics of lines and transformers.

Commercial losses - can be considered to fall into two main sub-categories:

1. **Losses caused by loads being unmetered** and not otherwise accounted for in the settlement process, such as bus shelter lighting, traffic lights (other than in NSW where traffic lights load is calculated), phone boxes, etc.
2. **Losses caused by other issues** including errors, omissions, theft and fraud, such as incorrect meter wiring, illegal meter bypassing, shorted transformers and incorrectly applied transformer scaling factors. Disparities between the net system load profile (the deemed energy load) and actual energy use for accumulation meter customers also fall into this category.

Technical losses are accounted for in the settlement process by the application of a DLF, which is a multiplying factor determined by the distributor to be representative of the average losses incurred by a connection within each designated distribution area. Commercial losses are not accounted for in the settlement process and are, therefore, allocated to the incumbent retailer by default in the settlement-by-differencing calculation[1].

[1] Some unmetered loads such as traffic lights and bus shelters are not measured and are treated as commercial losses, however in some circumstances the incumbent retailer may have established an off-market financial agreement with the local authority to compensate for the default allocation of these losses through settlement (See section 3.5 of this HLD).

As AEMO only receives the information required to support settlement by a differencing methodology, the quantum of loss which is known as Unaccounted for Energy (UFE) cannot be calculated or monitored by AEMO.

2.2 Changing market dynamic

Since the start of retail competition, there have been a number of important market and regulatory shifts that have made legacy distinctions between local retailers and independent retailers less relevant.

The NEM has experienced some of the highest levels of retailer transfers globally, and with sustained strong rates of customer switching over the past few years local retailers now only serve a relatively small proportion of customers in the majority of the local areas in the NEM regions (Figure 1).

Figure 1: Proportion of small customers with Local Retailer per NEM region (September 2017)

This transition is expected to continue into the future, driven by a number of regulatory changes. The implementation of Power of Choice initiatives (from December 2017) will lower barriers and enhance competition in metering and enable the deployment of advanced metering technology and associated customer service offerings. The rule change on Unbundling Ancillary Services disaggregates the provision of energy from ancillary services in a retail context – allowing different participants to provide different services to the same customer. Furthermore, recent changes now allow independent retailers with sufficient capability to provide retailer of last resort (ROLR) services, removing the prior reliance on jurisdictional licensing of local retailers.

These shifts have created an increasing need to establish a level playing field between retailers and to allow for greater transparency in settlement.

2.3 Drivers for change

Whilst the existing methodology was not designed to support high levels of retail competition, it remains effective in terms of enabling the market to settle. However, as retail competition continues to thrive, the inherent weaknesses of the framework become increasingly exposed. These weaknesses include:

- **AEMO unable to reconcile settlement.** Under the current system AEMO cannot perform full settlement reconciliation, which means errors and anomalies in settlement cannot easily be identified and may be created and sustained beyond the six-month settlement 'window'. This has resulted in disputes that have required resolution outside the NEM settlement process.
- **Treatment of losses and information access is different for local and independent retailers.** Local retailers are fully exposed to inaccuracies in commercial losses, and to errors in the calculation of technical losses. Access to metering data is also differentiated. Local retailers are able to access all metering data within any given distribution network area, including those customers with a competing independent retailer, while independent retailers are only able to access metering data for their own customers.
- **Lack of incentives for reducing commercial losses and metering inaccuracies.** Independent retailers have limited incentive to identify and resolve commercial losses (as they are only charged for metered energy). Local retailers cannot identify these losses, other than where they are the retailer for an affected connection point.

The continued success of retail competition will further exacerbate the inequities that are inherent in a settlement-by-differencing methodology. Should a local retailer deploy advanced metering systems to the majority of their customers in any one area, the inequity in their trading position will become increasingly apparent. The effect of the current settlement approach is likely to have the perverse effect of incentivising independent retailers not to roll out advanced metering systems (other than for the limited circumstances where the NER or jurisdictional regulation mandate it), as the identification of errors could lead to a legacy dispute with the local retailer outside of the six-month settlement window, and potentially impacts the nature and longevity of customer relationships.

3. GLOBAL SETTLEMENT

3.1 Global Settlement and Reconciliation Methodology

Enhancements to the current settlement approach could overcome some of these challenges. An established alternative methodology to 'settlement-by-differencing' is known as 'global settlement' and has been adopted in some international energy markets, in particular those that have established and successful competitive retail markets.

At a simple level, a global settlement methodology requires the measurement of all of the energy going into a distribution area (from the transmission system, interconnectors and embedded generation), and the measurement of all energy moving out of the distribution area (from loads or interconnectors). The total energy out is then deducted from the total energy in to identify the UFE, which is made up of technical and commercial losses. The UFE is then allocated to all of the retailers operating in the given distribution area based on a pre-determined set of criteria.[2]

The advantages of global reconciliation over differencing reconciliation can be summarised as follows:

- Energy allocation is the same for all participants as all losses are identified, traceable and equitably allocated to retailers. Commercial losses can be identified, measured and allocated over a trading period, and tracked over the long term.
- AEMO can fully reconcile energy within each distribution network, enhancing AEMO's ability to fulfil its statutory function. Full reconciliation allows for better and timelier identification, mitigation and prevention of settlement errors within the 6 month settlement period[3].
- Retailers are collectively incentivised to reduce commercial losses. This may include the adoption of advanced metering systems as a preventative measure. The settlement methodology could be structured to encourage advanced metering systems potentially through the adjustment of loss factors. For example, connection points with an interval metering installation with remote acquisition of metering data does not receive an allocation of commercial losses.
- The inequity in access to customer metering data is removed as the local retailer will not require all metering data to assist in reconciliation. Indeed the regulatory requirement for a local retailer is removed, consistent with broader market trends.

3.2 Global Settlement – simplified example

A simplified example of the algorithm to determine market reconciliation under the global framework is provided below:

$$0 = \text{TNI meter} - (\Sigma\text{Pretail} \times \text{PL}) +/- \Sigma\text{UFE}$$

Where:

TNI meter = volume of electricity per trading period metered for each transmission node identity

ΣPretail = volume of retailed electricity per trading period invoiced to the retailer, determined by meter readings and calculated metering data for each retailer

PL = loss factor to be applied to account for technical losses

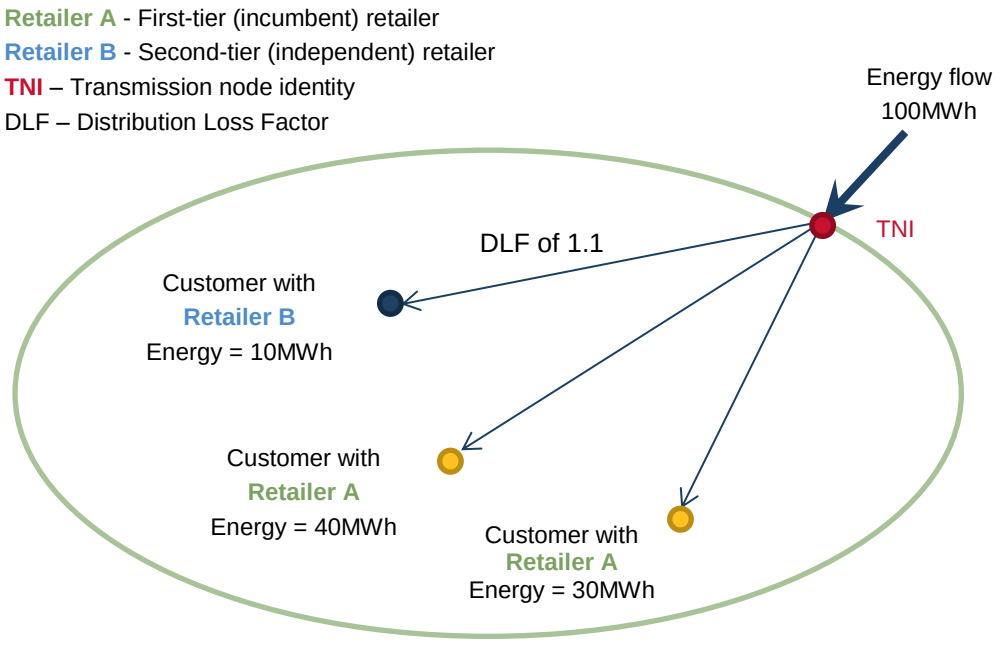
UFE = Unaccounted For Electricity. The balance volume of electricity required to "0" each trading period at each TNI, which is pro-rated between purchasers (retailers) from the NEM

[2] This HLD proposes that the allocation of UFE be determined based on the percentage of energy consumed by each retailer within each designated settlement area, although it could be determined based on other criteria, such as numbers of connection points, numbers of large and small customers, etc..

[3] AEMO's data validation process is currently limited to the identification of major excursions (for example, the Net System Load turning negative).

Figure 2 sets out an example of the application of global settlement in a simplified case. Each retailer (independent and local) is treated equally, with each getting an allocation of UFE based on their energy use.

Figure 2– Global Settlement Methodology



UFE = Energy in – Energy Metered = 100 – ((10+40+30)*1.1) = **12 MWh**

Retailer Allocation = (Energy Metered*DLF) + (Allocation Factor) * UFE

Retailer A Allocation: (40MWh*1.1) + (40/80)*12 + (30MWh*1.1) + (30/80)*12 = **87.5MWh**

Retailer B Allocation: (10MWh*1.1) + (10/80)*12 = **12.5 MWh**

In practice, this calculation will separate out technical and commercial loss components and will be presented as such in participant settlement statements.

3.3 Calculation and allocation of losses (UFE)

One of the principal benefits of global settlement is the equitable way in which both technical and commercial losses are allocated.

Distribution loss factors (technical losses)

The calculation of DLFs and their application in the settlement process is still required under global settlement in order that technical losses can be calculated. Site specific DLFs that identify connection points with high technical losses and ensure those losses are appropriately assigned, also continue to be required in the global settlement model.

Global settlement requires AEMO to apply the DLF to all connection points in the settlement calculation, whereas the settlement-by-differencing model only requires the DLF to be applied to the independent retailer connection points.

If the DLF calculation has resulted in the technical losses in any one distribution area being over-estimated, this will simply decrease the amount of UFE required to be allocated to each retailer. In the unlikely event that the technical loss calculation was over-estimated, to the extent that it was greater than the total amount of loss in any one distribution area, this would lead to a credit, rather than a debit, being allocated to each retailer.

Unaccounted for energy (commercial losses)

Once identified, there are several ways in which commercial losses may be allocated. The most simplistic allocation, and the method favoured by AEMO, is to allocate losses based on the proportion of 'accounted-for'[4] energy allocated to each retailer in the distribution area.

AEMO would be able to track UFE by trading week to identify anomalies, enabling the prevention of settlement errors prior to the final and revision settlement statements, minimising disruption to market participants and the likelihood of errors being sustained for an extended period, including after the second revision, where off-market arrangements are required to settle disputes between participants.

3.4 Wholesale energy and embedded network settlement

The changes to implement global settlement for the retail market would not extend to the settlement of wholesale energy, enabling the retention of all existing arrangements and processes for the settlement of electricity trades at connection points for generators feeding the energy pool, and NEM interconnectors. Consequently, there would be no impact to the existing inter-regional settlement residue (allocated through settlement residue agreements) or the intra-regional settlement residue (allocated to TNSPs).

Embedded networks will continue to be settled by the settlement-by-differencing methodology. Global settlement cannot be applied to an embedded network as only the parent connection point and the on-market child connection points are recognised by the NER and, therefore, are the only connection points where metering data is available for use in settlement by AEMO.

AEMO's retention of the capability to operate under the settlement-by-differencing methodology provides the capability for appropriate bodies, such as jurisdictional regulators, to utilise this simplistic approach in jurisdictions or regions where there is limited, or no retail competition. Similarly, it may be used for a new region to the NEM and where there is a desire to limit market data flows for the commencement of retail competition.

3.5 Unmetered declared loads

Where the current local retailer has reached an agreement with a local authority, or other such party, for the energy delivered to unmetered loads (other than type 7 metering installations), such as bus shelter lighting, road signage lighting and traffic lighting, these will need to be identified to ensure that they are removed from the calculation of UFE.

[4] 'Accounted-for' energy would include all energy recorded and calculated at metering installations, all declared energy and the calculated technical losses (DLFs).

There are two methods by which this can be achieved:

1. The Minister of the participating jurisdiction may submit changes to jurisdictional metrology material that require AEMO to update the Metrology Procedure with new categories of unmetered loads that can be treated as contestable type 7 metering installations.

   Once established as a type 7 unmetered load, calculations would need to be determined to facilitate the treatment of the load in AEMO's Market Settlement and Transfer Solution (MSATS) for settlement.

2. The retailer and DNSP agree the quantum of energy being traded for the unmetered loads within the distribution area and declare that total load to AEMO for use in settlement.

3.6 Market fees and charges

From 1 July 2019, Electricity full retail competition (FRC) market fees will be charged on a per connection point basis, rather than MWh energy consumed. As a result, the change in settlement framework will have no impact on the FRC market fees.

Non-energy charges and fees that are calculated or apportioned based on energy allocated through settlement, such as ancillary services charges, will take into account all allocated energy, inclusive of the allocation of UFE.

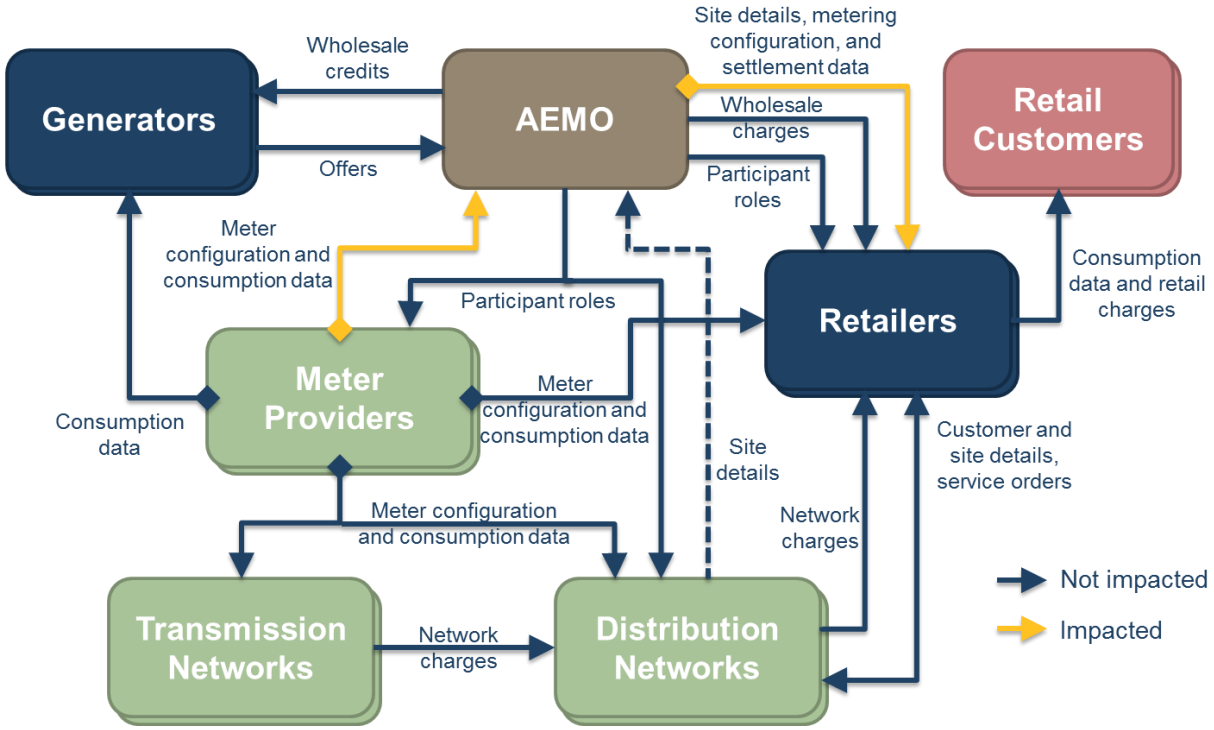
3.7 Market and Non-market generators

The change in settlement framework will have the effect of lessening the distinction between the current categories of Market Generator and Non-market Generator in the NER. With the role of Local Retailer removed, all generators must either be on-market (if necessary through an intermediary who is registered as the Market Generator), or any exported generation must be supplied at the same connection point as a market load and traded by the Market Customer who has classified that load. In practice, this should not have any material effect on parties currently registered in either role as the required metering and connection arrangements, and role appointments in MSATS are already established. Where there are current arrangements for Local Retailers to buy generation from Non-market Generators that aren't associated with a market load, the Local Retailer would be eligible to be registered as the intermediary if required.

4. INDUSTRY DATA FLOWS

The introduction of a global settlement and market reconciliation framework will involve changes to a strictly limited number of data flows, and presents an opportunity to simplify and standardise those flows. Figure 1 represents the high-level electricity data flows, with those being impacted by a change from settlement-by-differencing to global settlement highlighted in yellow.

Figure 1 Impacted data flows



The following sections outline the areas of impact.

4.1 Metering data to support settlement

The primary enabler of the global settlement and market reconciliation framework is the provision to AEMO of metering data for all connection points in the NEM.

The settlement-by-differencing framework requires MDPs to provide metering data to the local retailer, LNSP and the energy retailer or generator at the connection point, in a rich data format for all connection points within the retail market (known as the Meter Data File Format (MDFF)). AEMO receives a simplified metering data file in an aggregated net format (known as the Meter Data Management file format (MDM)) and only for those connection points within the retail market that for which the financially responsible market participant is an independent retailer.

As the NER requires AEMO to determine the market data file formats and delivery requirements, AEMO can determine the optimal method for obtaining and processing the metering data required to support the new settlement framework through changes to AEMO's procedures and systems following consultation with interested parties.

There are two existing processes that could be leveraged to ensure the delivery of metering data for all connection points to AEMO, and both are presented below as options for implementation for information purposes:

Option 1 - MDM file delivery for all connection points

MDPs would be required to create and deliver MDM files for all connection points, including where the connection point is with the incumbent retailer.

In many cases, MDM files are already sent to AEMO for connection points where the retailer is the incumbent retailer, however, these files are ignored in the settlement-by-differencing processes. Requiring MDPs to create and deliver an MDM to AEMO for all connection points in the NEM would eliminate the need for AEMO to change the MSATS methodology for receiving and processing metering data and should require minimal changes to MDP processes and systems.

Option 2 – Replacing MDM with MDFF delivery to AEMO

MDPs would be required to include AEMO as an additional recipient of the MDFF and would no longer be required to create and deliver the MDM file. This not only simplifies the method of delivery of data for MDPs, but also removes the need for MDPs to create a separate MDM file to support the settlement process.

This option appears additionally attractive as it ensures that all participants and AEMO are for receiving, the first time, the same metering data in the same format at the same time, which is likely to assist the reconciliation process and reduce errors in settlement and, consequentially, customer and network billing.

AEMO's MSATS will have to be changed to allow for the receipt and processing of data delivered in the rich, MDFF data format, however, such changes will be required to deliver other complementary rule changes, such as the five-minute settlement rule, the final determination for which will be established prior to AEMO's formal consideration of this matter.

4.2 Reconciliation reporting

In the current settlement-by-differencing framework, AEMO produces a range of reporting data associated with settlement statements to support reconciliation by participants. The global settlement framework enables AEMO to manage a market reconciliation process where all energy is identified (metered, calculated, technical loss (DLF) and commercial loss) and allocated to each market participant.

AEMO will provide reconciliation reporting to each market participant for all relevant trading weeks, identifying energy and loss components.

Energy retailers will be required to change their systems and processes to accommodate the changes in reconciliation reporting, however, the foundation and timing of the settlement, prudentials and clearing mechanisms will remain unchanged.

4.3 Other data flows

Local Retailers rely on the provision of metering data from MDPs at connection points where there is an independent retailer to enable them to attempt a reconciliation of metering data. As the role of Local Retailer is effectively made redundant in the global settlement process, with AEMO performing full market reconciliation there is no need for the Local Retailer role to continue to receive metering data for connections points where they are not also the energy retailer or the generator.

AEMO has not identified any other data flows that require direct or consequential change as a result of a change to a global settlement and market reconciliation framework.

5. IMPLEMENTATION

5.1 Technology

Changes required to AEMO's technology systems and platform to facilitate the implementation of five-minute settlement, in addition to those already made to facilitate competition in metering, allow the implementation of global settlement to be achieved with relatively minor additional enhancements.

Additional requirements to enable the operation of global settlement are limited to:

- Accepting NEM 13 MDFF for any type 6, 1st tier connection point that AEMO is not currently receiving; and
- Changes to the algorithm for the settlement calculation and settlement process for the calculation and creation of settlement statements.

5.2 Impacts and timeframes

The AEMC has recently published the final determination for a rule to implement five-minute settlement. Whilst there is no dependency between a potential change to a global settlement framework and a move toward five-minute settlement, considerable synergies could be found for the design and build of technology platforms and information technology systems within the NEM should they be progressed in tandem.

Assuming the AEMC proposes, after consultation, to make a rule to implement global settlement, AEMO could adopt the required design and build for global settlement in line with the timelines set out in the final determination for the implementation of five-minute settlement. Key timelines in respect of the process for five-minute settlement implementation being:

- Commencement date of 1 July 2021
- AEMO to amend and publish its relevant procedures that apply from the commencement date by 1 December 2019.
- AEMO will provide a market test environment for changes required to implement global settlement in advance of the commencement date.

Implementation activities, transition and market readiness would follow the same structure and format prepared for the introduction of five-minute settlement.

The systems and data changes that require consideration in an implementation, for AEMO, market participants and service providers, are highlighted in Table 1.

Table 1: Implementation Impacts

Impacted Party	Implementation Impact and Mitigation
AEMO	• The Market Management System (MMS) is likely to require system changes in processing of settlement. • MSATS storage capacity will need to be expanded given increased meter data and National Metering Identifiers (NMIs) required to be processed. • MMS / MSATS would need to be modified to allow for reconciliation of downstream metering data with wholesale energy at each Transmission Node Identity (TNI), and allocation of the losses to the Financially Responsible Market Participant (FRMP) associated with those downstream NMIs.

Impacted Party	Implementation Impact and Mitigation
	• AEMO's systems will need to be revised to receive metering data in rich data format to process it for use within the MMS. Certain processing algorithms may need amendment given the revised methodology.
MDPs	• Currently, MDPs already create the rich metering data file format (MDFF), which is delivered via the AEMO B2B e-hub and would need to add AEMO to the list of recipients. • MDPs could cease creating the metering data management format file (MDM file), which is created specifically for AEMO under the current differencing framework.
Retailers	• Retailers would need to adjust their processes to accept a modified settlement statement. • Incumbent retailers would no longer need to perform in-house reconciliation processes as market reconciliation would be performed by AEMO as part of the settlement process.

GLOSSARY

This document uses many terms that have meanings defined in the National Electricity Rules (NER). The NER meanings are adopted unless otherwise specified.

Term	Definition
AEMO	Australian Energy Market Operator
AEMC	Australian Energy Market Commission
B2B	Business-to-business
DLF	Distribution loss factor
First-tier	A distribution connection point for which the local retailer is financially responsible
FRC	Full retail competition
HLD	High Level Design
MDFF	Meter data file format
MDM	Meter data management
MSATS	Market Settlement and Transfer Solution
NMI	National metering identifier
NER	National Electricity Rules
NEM	National Electricity Market
Second-tier	A distribution connection point for which a retailer other than the local retailer is financially responsible
Settlement residue	A surplus (or deficit) of funds for energy transactions between what AEMO receives from market customers and pays to market generators
TNI	Transmission node identifier
TNSP	Transmission network service provider