

Australian Energy Market Commission

DRAFT RULE DETERMINATION

NATIONAL ELECTRICITY AMENDMENT (GLOBAL SETTLEMENT AND MARKET RECONCILIATION) RULE

PROPONENT

AEMO

30 AUGUST 2018

RULE

INQUIRIES

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ABOUT THE AEMC

The AEMC reports to the Council of Australian Governments (COAG) through the COAG Energy Council. We have two functions. We make and amend the national electricity, gas and energy retail rules and conduct independent reviews for the COAG Energy Council.

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SUMMARY

1 The Australian Energy Market Commission (AEMC, or Commission) has made a draft rule to introduce a 'global settlement' framework for settlement of the demand side of the wholesale electricity market. The draft rule, which is a more preferable rule, is in response to a rule change request submitted by the Australian Energy Market Operator (AEMO) on 16 March 2018. The draft rule is generally consistent with AEMO's rule change request but varies in some specific design elements of global settlements.

What are settlements, 'settlements by differencing' and 'global settlements'?

2 The national electricity market (NEM) is a gross electricity pool market operated by AEMO. All electricity supplied to the market and consumed by end users is transacted at the spot price for each trading interval in each region. The market settlement process requires that for each trading interval market generators are paid for the energy they provide to the NEM and market customers pay for the energy they use. Market customers are mainly electricity retailers who purchase wholesale electricity to on-sell to their retail customers, but also include some large industrial customers.

3 The current market settlement framework, known as 'settlement by differencing', has been in place since the start of the NEM. Under this approach, electricity supplied to a distribution area is billed by AEMO to the local retailer except for the loss-adjusted metered electricity that is consumed by the customers of independent retailers within the area. This means that the local retailer for an area bears the cost and risk of all residual electricity losses in that area – known as unaccounted for energy (UFE). UFE includes unaccounted for technical losses, commercial losses and errors in estimating the half-hourly consumption of basic metering installations that do not keep track of how electricity usage varies throughout the day.

4 Under a 'global settlement' framework every retailer is billed for the loss-adjusted metered electricity that is consumed by their customers within the area. The UFE is then allocated on the basis of a pre-determined methodology. Under the Commission's methodology in the draft rule, UFE is allocated to all market customers in a distribution network, pro-rated based on their 'accounted-for' energy.

Why move to a 'global settlements' framework?

5 The three key reasons why the Commission has made a draft rule to move to a global settlements framework are:

1. Improved transparency, leading to fewer settlement disputes and lower levels of UFE

6 Under global settlements, AEMO will be able to fully reconcile energy within each distribution network because it will receive data from all retailers in the area. Full reconciliation will allow for better and timelier identification, mitigation and prevention of settlement errors within the six month settlement finalisation period. This will reduce costs of resolving settlement disputes, which are currently substantial.

7 Increased transparency of UFE will also allow for investigation to take place to reduce UFE in

areas where high UFE is present. The Commission's draft rule puts in place a framework for AEMO to conduct technical reviews, in coordination with market participants, where UFE is above an AEMO defined threshold at a particular transmission node identifier (TNI).

2. Competition on equal terms

8 No matter how well designed, some UFE is inevitable within an electricity system. This is a shared cost of the system. The Commission considers that to facilitate effective retail competition in the long term it is important that where there are shared market costs, they are shared in a manner which does not distort competition by being disproportionately allocated to one group of retailers over others.

9 At market start, 'settlements by difference' was a practical compromise. The full allocation of UFE to local retailers did not distort competition because local retailers supplied the vast majority of customers. However, as retail competition has developed over time, local retailers have supplied a lower and lower proportion of customers. For example, in Victoria and NSW, local retailers now, on average, supply less than 25 and 30 per cent of small customers respectively. Furthermore, within these states there are local areas where the local retailer share is now below 15 per cent and continuing to decline. The Commission considers that it is now time for settlements arrangements to progress to the more advanced global settlements framework.

3. Improved risk allocation driving enhanced incentives

10 The Commission considers that generally risks should be allocated to those parties that are best placed to manage them. This provides incentives on those parties that are able to manage risks to manage them at the lowest possible cost.

11 Under settlements by differencing the local retailer bears all the risk and cost of UFE within its area. This provides the local retailer with an incentive to reduce UFE. However, the local retailer has no or limited control over UFE other than at its customers' connection points. In contrast, all independent retailers face a disincentive to reduce UFE under settlements by differencing because the local retailer – the independent retailers' competitor – is paying for the cost of UFE. This is despite independent retailers having some ability to reduce UFE at their customers' connection points, for example, by installing advanced metering with tampering detection.

12 Under the Commission's preferred global settlements design, UFE is allocated to all retailers in the local area, pro-rated based on their 'accounted-for' energy. By allocating the risk of UFE to retailers they will be provided with incentives to, where possible, reduce UFE because reductions in UFE result in reductions in cost for them. Through this process, it is expected that UFE levels will be lower under global settlement. Such an outcome was observed over time in the New Zealand electricity market after global settlement was introduced in 2008.

Is global settlement likely to produce a net benefit?

13 The Commission expects the largest benefits of global settlement to come from a reduction in UFE in the market and from avoiding settlement disputes. These benefits are estimated to be worth between \$3m and \$5m a year. There are also other possible benefits that could be

material but are harder to quantify, including from retail prices being more cost-reflective, contributing to the dynamic efficiency of the market over time.

14 In comparison, the one-off implementation costs are expected to be less than \$10 million. This estimate includes a \$5 million cost for AEMO, costs in the order of \$3 million for distribution network businesses to provide additional information to AEMO, and modest costs to retailers and metering data providers. Most of the costs to AEMO, retailers and metering data providers are expected to be incremental to the costs of implementing the five minute settlement rule owing to significant synergies between the two implementation projects. These synergies involve simultaneous:

- changes to AEMO, retailer and metering service provider IT systems and processes
- mobilisation of staff, teams and resources to achieve the changes
- changes to data provision and format processes.

15 Based on this analysis, the Commission considers that the benefits are likely to be greater than the costs associated with global settlement, providing for efficiency benefits from which consumers of electricity will ultimately benefit over the long term. This is the right time to implement this change owing to the synergies that can be achieved by implementing it at the same time as five minute settlement.

16 In reaching the conclusion that a move to a global settlements framework is likely to be in the long term interests of consumers the Commission notes that the relevant counterfactual is unlikely to be the status quo. Two key counterfactuals are relevant:

- If a global settlements regime is not introduced at this time, AEMO would likely require additional information from participants to allow the calculation of UFE to increase transparency and reduce settlement dispute resolution costs. This change would incur the incremental costs of additional data provision, resolution of National Metering Identifier (NMI) misallocation issues and additional information regarding unmetered loads. However, it would come without the incentive and competition benefits described above.
- As with markets around the world where retail competition is maturing, a move to global settlements is likely to be required at some point in the future if it is not undertaken at this time. The further development of retail competition across the NEM is likely to continue to decrease the proportion of customers served by local retailers. This will exacerbate the problem of local retailers bearing the costs and risks of UFE and is likely to eventually necessitate a move to a global settlements framework. Importantly, if this occurs at a later date it is likely to result in higher costs when the systems changes are not made in synergy with the five minute settlement rule change.

Key aspects of global settlements design under the draft rule

17 Within a global settlements design there are a number of important elements that must be decided on. The table below summarises the draft rule in relation to these elements. It also compares the Commission's draft rule to AEMO's proposed rule.

Table 1: Comparison of AEMO's proposal and the Commission's draft rule

ISSUE	AEMO PROPOSED RULE	DRAFT RULE
Who pays for UFE?	All market customers (i.e. retailers).	As proposed. All market customers.
How UFE is allocated	<p>AEMO proposed that UFE would be allocated at the transmission connection point level. The process would have involved calculating UFE by subtracting the total energy consumed by customers connected to the transmission connection point from the total energy supplied at the same connection point.</p> <p>UFE would be allocated to all market customers operating at the transmission connection point, in proportion to their share of the loss-adjusted consumption at that connection point.</p>	<p>UFE to be allocated at the local area (i.e. DNSP network) level.</p> <p>UFE is calculated in the same way as AEMO's proposal, but it is then summed up across all transmission connection points for the whole local area. UFE is allocated to all market customers operating in a local area, in proportion to their share of the loss-adjusted consumption in the local area.</p> <p>AEMO will also publish UFE volumes for each transmission connection point, to aid in the identification and reduction of UFE.</p>
Treatment of virtual transmission nodes	<p>AEMO proposed that the ability for network businesses to assign customers to VTNs be removed from the regulatory framework.</p> <p>AEMO subsequently provided five options which the Commission considered.</p>	<p>VTNs are retained for settlement purposes and there is no change to the VTN policy arrangements. However, distribution network businesses using VTNs are required to provide additional information to AEMO to allow AEMO to accurately calculate UFE for each transmission connection point.</p>
Accounting for energy associated with unmetered loads	<p>AEMO proposed two options for the treatment of unmetered loads under global settlement which would avoid all retailers being incorrectly charged for this energy.</p>	<p>The energy associated with off-market (i.e. non-type 7), unmetered loads is to be explicitly included in AEMO's settlement processes. AEMO is to include in its metrology procedures guidance on how this should occur.</p>

- 19 The design and testing work prior to this date will also be aligned with five minute settlement implementation, including the requirement for AEMO to have updated its relevant procedures by 1 December 2019. It is expected that this implementation timeframe will allow for AEMO to calculate and publish UFE data for 12 months in advance of the rule commencing. To facilitate this, the draft rule includes transitional provisions for AEMO to be provided with the NMI-to-TNI mapping data that it will require for this purpose, and additional data on the estimated energy consumption of unmetered loads, from 1 July 2020.

Submissions

- 20 Submissions to the draft determination and draft rule are due by 25 October 2018.

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1 RULE CHANGE REQUEST AND BACKGROUND

1.1 The rule change request

On 16 March 2018, the Australian Energy Market Operator (AEMO) submitted a rule change request to the Australian Energy Market Commission (AEMC or Commission) proposing to apply a 'global settlement' framework instead of the existing 'settlement by differencing' approach for settlement of the demand side of the wholesale electricity market. AEMO considers that a global settlement framework will improve the efficiency of the market by providing a level playing field for electricity retailers, and enable AEMO to more accurately reconcile the wholesale electricity market.

Along with the rule change request and proposed rule, AEMO also provided a 'high level design' document that set out an operational design for global settlement.

1.2 Current arrangements

1.2.1 Settlement by difference and UFE

The national electricity market (NEM) is a gross pool electricity market operated by AEMO. All electricity supplied to the market and consumed by end users is transacted at the spot price for each trading interval in each region.¹ The market settlement process ensures that for each trading interval market generators are paid for the energy they provide to the NEM and market customers pay for the energy they use. Market customers are mainly electricity retailers who purchase wholesale electricity to on-sell to their retail customers.²

The current retail settlement framework, known as 'settlement by differencing', has been in place since the start of the NEM. Under this approach, all electricity is billed to the local retailer except for the loss-adjusted metered electricity that is consumed by the customers of independent retailers. This means that the local retailer for an area bears the cost and risk of all residual electricity losses, including unaccounted for technical losses and other retailers' commercial losses. Box 1 explains the different types of electricity losses that exist in the settlement process.

BOX 1: TYPES OF ELECTRICITY LOSSES

Technical losses mainly consist of power dissipation in electricity system components such as distribution lines and transformers. Technical losses are estimated by applying estimated distribution loss factors (DLFs) and transmission marginal loss factors (MLFs). The DLFs used in settlements are single, annual values that represent average network losses. They are calculated by the relevant Distribution Network Service Provider (DNSP) using methodologies that are approved by the Australian Energy Regulator (AER). The AER also approves the final

1 Trading intervals in the NEM are currently 30 minute periods, reducing to five minute periods in July 2021 as a result of the National Electricity Amendment (Five minute settlement) Rule 2017 No 15. The Five minute settlement final rule and determination can be viewed at: <https://www.aemc.gov.au/rule-changes/five-minute-settlement>

2 Remaining market customers tend to be large industrial electricity users such as smelters. See current market registration lists at www.aemo.com.au.

DLF calculation.

Unaccounted for technical losses are the difference between the estimated losses calculated with DLFs and the actual losses that occur in the distribution network.

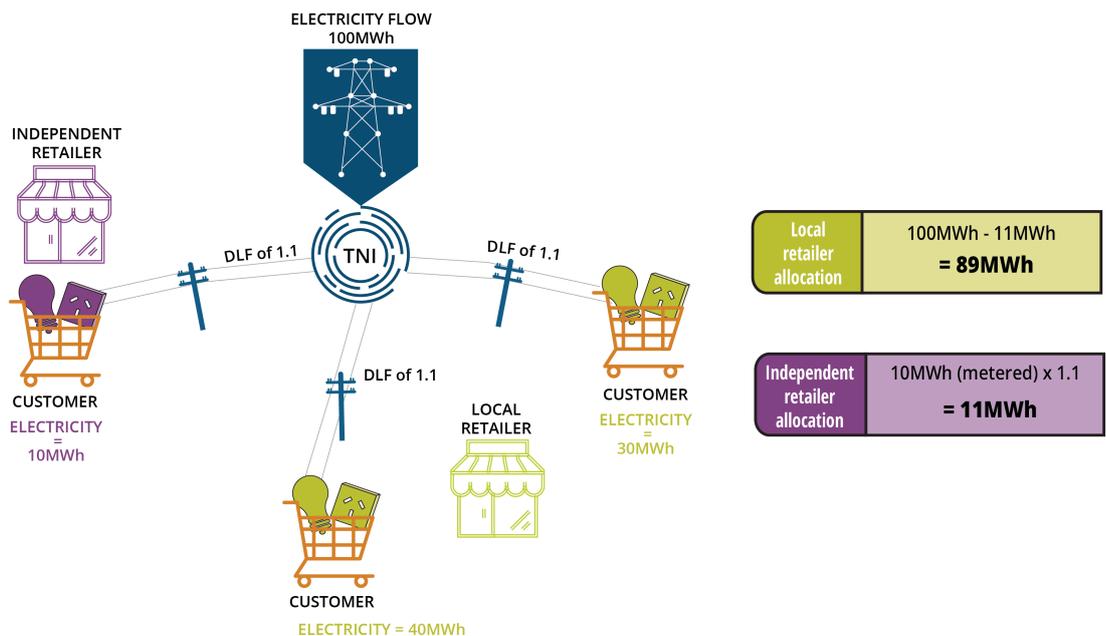
Commercial losses mainly consist of unaccounted for unmetered connections, electricity theft, inaccurate metering equipment (including due to a malfunction) and errors in accounting and record-keeping.

Estimation errors associated with profiling accumulation metering. Energy usage data from accumulation meters cannot be used in its raw form for wholesale settlement purposes. This is because the market is settled on 30 minute trading intervals (and from July 2021, five minute trading intervals) whereas an accumulation meter reading is a single reading relating to several months of usage. To estimate accumulation metering energy volumes for settlement, AEMO calculates and applies the net system load profile (NSLP) for each trading interval. The difference between the estimated volumes and actual volumes in each half hour are estimation errors.

Unaccounted for technical losses, commercial losses and estimation errors associated with accumulation meter profiling are collectively **unaccounted for energy** (UFE). UFE can be a surplus or a deficit.

Figure 1.1 provides a simplified example of settlement by differencing. It shows two retailers serving customers from a transmission node identifier (TNI) within a local area - the local retailer and an independent retailer. The independent retailer is invoiced on the basis of the electricity metered at its customers' connection points, adjusted by the relevant distribution loss factor (DLF, an estimation of technical losses). The local retailer is invoiced on the amount of electricity that was measured at the TNI minus the electricity invoiced to the independent retailer.

Figure 1.1: Simplified example of settlement by difference



Source: Adapted from AEMO, High level design, p. 6.

In reality the settlement equation is more complex. This is because the number of independent retailers in a local area and the DLF values vary. Settlement calculations also need to account for:

- Type 7 metering installations, such as street lights. The type 7 category is used to determine the consumption of loads where it is not practical or economic to meter on a connection by connection basis, but whose energy consumption can be calculated to a reasonable level of accuracy using an algorithm. Type 7 loads are contestable and therefore can be served by local or independent retailers. The electricity associated with type 7 loads are captured in AEMO’s Market Settlement and Transfer Solution (MSATS) database and are included in the wholesale market settlement process.
- Unmetered loads, including traffic lights (in some jurisdictions), bus shelter and telecommunications equipment. It is also not practical or economic to install a meter for these loads. These loads are not contestable and are the financial responsibility of the local retailer. Unmetered loads form part of UFE at settlement so local retailers pay for them but can recover their costs through off-market agreements with customers. In many cases, the local retailer will have an off-market agreement with a local council or other relevant party for unmetered loads. The agreement would be based on an estimation of the electricity consumption of the applicable unmetered loads.

Table 1.1 shows how different categories of electricity are allocated among the local retailer and independent retailers under settlement by differencing.

Table 1.1: Allocation of electricity to retailers under settlement by difference

COST CATEGORY	PAID BY LOCAL RETAILER?	PAID BY INDEPENDENT RETAILER?
Metered electricity	Yes	Yes
Calculated technical losses (DLF applied to metered electricity)	Yes	Yes
Type 7 metering installation	Yes	Yes
Unmetered loads	Yes	No
Unaccounted for technical losses (part of UFE)	Yes	No
Commercial losses (part of UFE)	Yes	No
NSLP estimation error (part of UFE)	Yes	No

1.2.2

Electricity distribution and the settlement process

Governments in participating jurisdictions are responsible under jurisdictional electricity legislation for:

- allocating 'local areas' to a Distribution Network Service Provider (DNSP)³
- appointing a local retailer (referred to in the National Energy Retail Law (NERL) as a 'local area retailer') for each local area.⁴

Within a local area, there are metered connection points linking the transmission network and the distribution network, as outlined in Figure 1.2.⁵ A transmission node identifier (TNI) is a code for the metering installation at the point where energy is supplied to the distribution network from the transmission substation. There are also National Metering Identifier (NMI) codes for each metering installation measuring the energy at a customer's connection to the distribution network. In general, each NMI is assigned to the TNI corresponding to the physical transmission connection point supplying the customer. Using Figure 1.2 below as an example, NMI₁ to NMI₆ would generally be assigned to TNI₁.

Alternatively, a number of adjacent transmission node connection points used to supply a single distribution network local area can, with the approval of the AER, be aggregated to form a virtual transmission node (VTN). Where this has occurred, individual customer NMIs

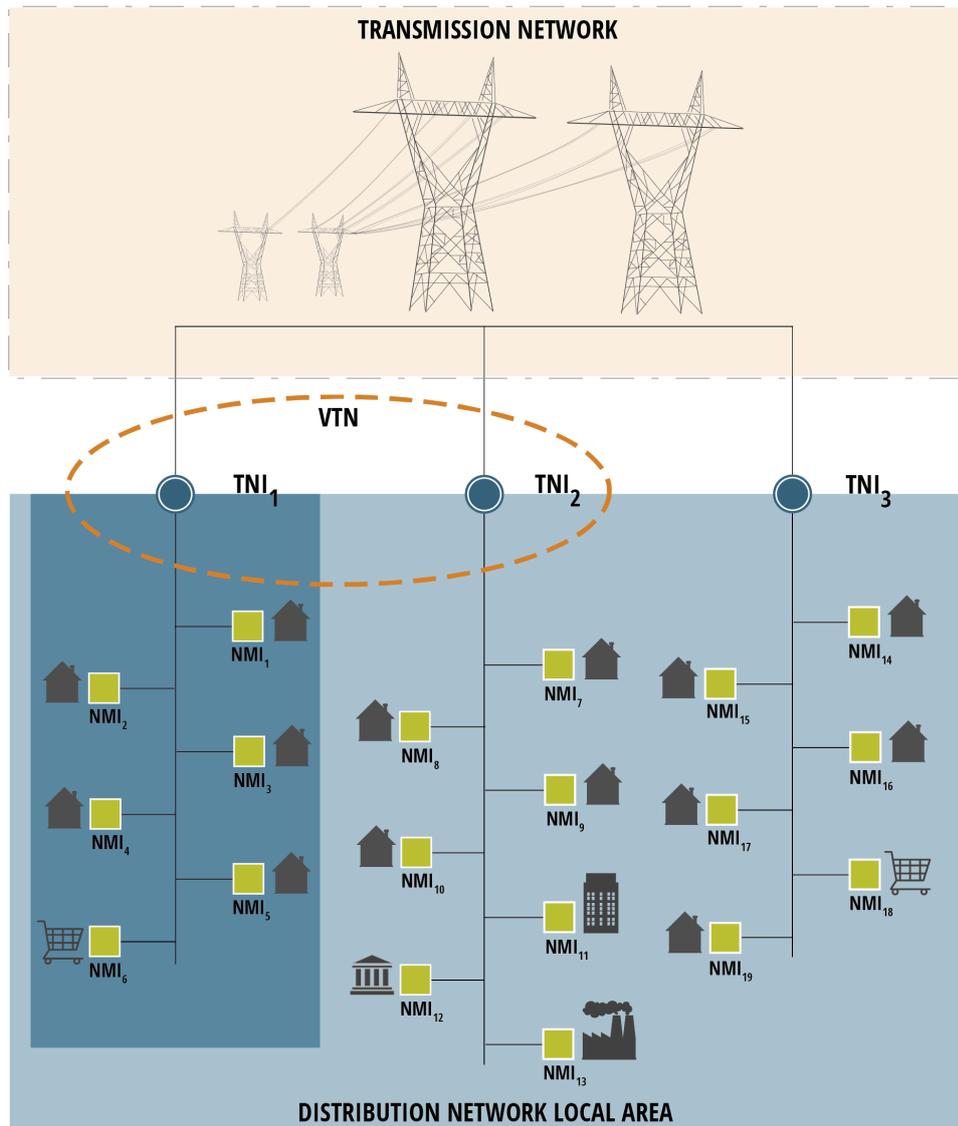
³ A local area is defined in NER, Chapter 10 as "the geographical area allocated to a Network Service Provider by the authority responsible for administering the jurisdictional electricity legislation in the relevant participating jurisdiction.

⁴ NERL, s. 11.

⁵ TNIs apply to every connection to a transmission network, including for example large generating systems and smelters. However, only TNIs associated with distribution networks are relevant to the proposed rule change.

can be assigned to either a TNI or a VTN. Again using Figure 1.2 as an example, NMI₁ to NMI₆ could either be assigned to TNI₁ or the VTN.

Figure 1.2: Transmission and distribution network connection points



1.2.3

Industry data flows for settlement

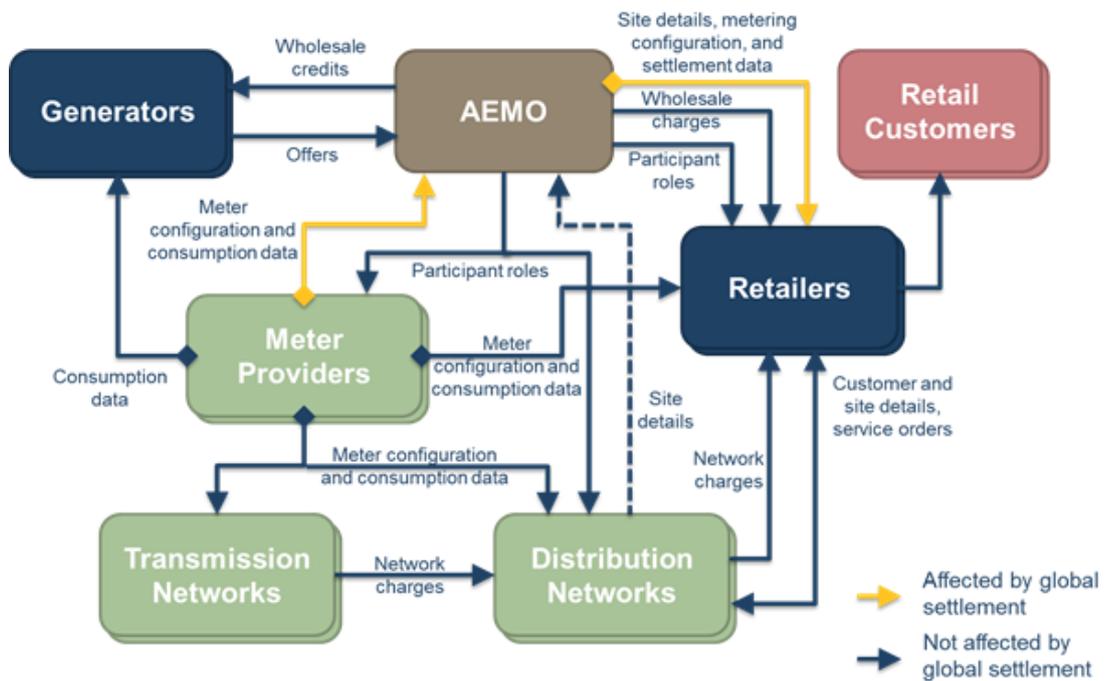
Settlement processes are dependent on metering data. Table 1.2 shows the data flows that underpin the current process of settlement by difference.

Table 1.2: Industry data flows under settlement by difference

MARKET ENTITY	DATA FLOWS IN RELATION TO EACH TNI
Metering data providers (MDPs)	<p>MDPs sends metering data in a rich data format (known as the Meter Data File Format (MDFF)) to:</p> <ul style="list-style-type: none"> financially responsible market participants (FRMPs, including local retailers, independent retailers, generators) relevant DNSP. <p>MDPs send metering data in a simplified data format (known as the Meter Data Management (MDM) file format) to AEMO.</p>
Local retailer	<p>Receives from MDP:</p> <ul style="list-style-type: none"> metering data for connection points where the local retailer is the FRMP, i.e. metering data relating to its customers, and metering between a transmission network and distribution network for which they are the local retailer metering data for connection points where the local retailer is not the FRMP, i.e. metering data relating to all other customers assigned to the TNI for the purpose of settlement statement reconciliation.
Independent retailers	<p>Receives from MDP:</p> <ul style="list-style-type: none"> metering data for connection points where the independent retailer is the FRMP, i.e. metering data relating to its customers.
AEMO	<p>Receives from MDP:</p> <ul style="list-style-type: none"> metering data relating to independent retailers' customers metering data for connection points between a transmission network and a distribution network generation data relating to generator supply and embedded generation. <p>Does not always receive consumption data relating to the connection points where the local retailer is the FRMP, although this is not prohibited in the National Electricity Rules (rules).</p>
Distribution network service providers	<p>Receives from MDP:</p> <ul style="list-style-type: none"> metering data for all connection points on its distribution network.
Generators	<p>Receives from MDP:</p> <ul style="list-style-type: none"> metering data for connection points where the generator is the FRMP.

Figure 1.3 depicts the high-level data flows required by market participants for settlement. It also shows the data flows that would be affected by a change to global settlement from settlement by differencing.

Figure 1.3: Data flows in the national electricity market



Source: AEMO, High level design, p. 13.

1.3 Rationale for the rule change request

In its rule change request, AEMO provides its rationale for the rule change. A number of key points raised in the rule change request are summarised below.

1.3.1 Allocation of UFE

AEMO notes that under settlement by difference, local retailers are fully exposed to commercial losses and to errors in the calculated technical losses.⁶ That is, the local retailer for each local area bears the cost and risk of all the UFE but it is unable to manage these costs, except for its own commercial losses. Consequently, UFE costs are passed through to the local retailer's customers, not to all customers in the local area. This makes retail electricity prices less efficient because they are not cost-reflective of customers' consumption or use of the network. It also means that retailers are not trading on the same terms in the NEM. According to AEMO, the current allocation of UFE to local retailers means there is no

⁶ AEMO, Rule change request, p. 5.

incentive for independent retailers to reduce commercial losses and metering inaccuracies because:

- independent retailers are only charged for loss-adjusted metered electricity, not UFE
- local retailers cannot identify or resolve these losses except in respect of their own customers.⁷

1.3.2 Wholesale market reconciliation

Under settlement by differencing, AEMO considers that it is unable to perform full settlement reconciliation because it only receives TNI supply data and consumption metering data relating to independent retailers' customers. AEMO would also need consumption metering data relating to local retailers' customers to fully reconcile the market.

AEMO claims that being unable to fully reconcile settlement means that errors and anomalies in settlement are not easily identified. This means settlement errors may be continued outside of the six month window within which market participants must raise billing disputes with AEMO.⁸ AEMO notes that this has resulted in disputes that have required resolution outside the NEM settlement process.⁹

1.3.3 Data access

AEMO notes that access to metering data is different for local retailers and independent retailers. Independent retailers receive metering data for their own customers within a local area. However, local retailers are able to access all metering data in their local area for the purpose of settlement statement reconciliation.¹⁰ AEMO considers that there should be 'transparency for all retailers in the allocation of energy values for settlement in the NEM'.¹¹

1.4 Solution proposed in the rule change request

The rule change request from AEMO proposes that a global settlement framework be implemented to address the identified issues with settlement by differencing. According to AEMO, there is an increasing need to implement global settlement now that independent retailers hold a significant market share.¹² As with the current settlement framework, global settlement would apply to the market customer (demand) side of the market and not the generator (supply) side.

Compared with settlement by differencing where the local retailer bears all UFE, global settlement would share UFE across all retailers. Retailers would still be responsible for their own customers' electricity consumption.

At a high level, AEMO's proposed global settlement methodology requires:

⁷ AEMO, Rule change request, p. 5.

⁸ NER, clause 3.15.18(b).

⁹ AEMO, Rule change request, p. 5.

¹⁰ AEMO, Rule change request, p. 5.

¹¹ AEMO, Rule change request, p. 7.

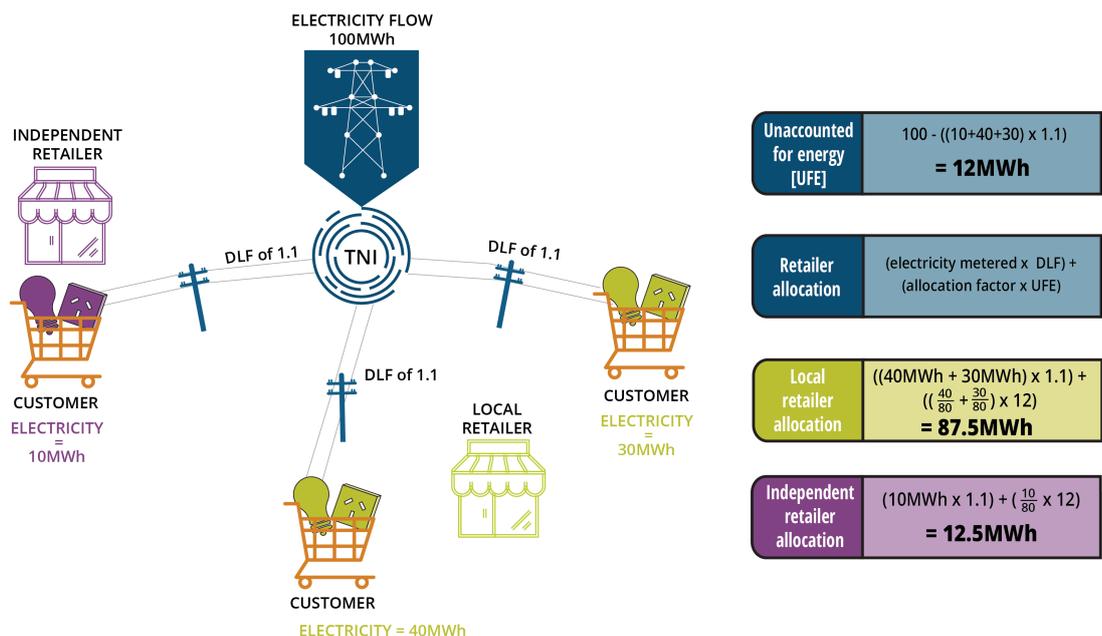
¹² AEMO, Rule change request, p. 7.

- measurement of total electricity supplied from the transmission system at the TNI and embedded generation (same measurement as for settlement by differencing)
- measurement of total electricity consumed by the metered loads referenced to that TNI, adjusted by the relevant DLF (same measurement as for settlement by differencing)
- calculation of the UFE amount by subtracting the total electricity consumed from the total electricity supplied (new calculation)
- allocation of UFE to all of the retailers operating at the TNI based on a pre-determined set of criteria. AEMO propose that UFE is allocated based on each retailer's proportion of total energy consumption (new calculation)
- calculation of each retailer's settlement amount as the sum of its loss-adjusted energy consumption and share of UFE (new calculation).

Under AEMO's proposal for global settlement, the UFE would be calculated and allocated within each TNI. Using the dark blue area in Figure 1.2 in section 1.2.2 above as an example, the UFE for TNI₁ would be calculated by subtracting the energy metered at NMI₁ to NMI₆, adjusted for distribution losses, from the metered energy at TNI₁. The resulting UFE for TNI₁ would be recovered from the retailers associated with NMI₁ to NMI₆.

Figure 1.4 below is a simplified example of global settlement. It shows two retailers serving customers from a TNI within a local area - the local retailer and an independent retailer. Both retailers are invoiced on the basis of the electricity metered at their customers' connection points, adjusted by the relevant DLF, plus their share of UFE.

Figure 1.4: Simplified example of global settlements



Source: Adapted from AEMO, High level design, p. 10.

The global settlement calculation would be subject to similar complexities as settlement by differencing, such as the number of retailers serving a TNI, variation in DLFs and treatment of calculated loads and unmetered declared loads.

1.5 Relevant background

This section provides an overview of how the structure of the electricity industry has evolved and current reforms.

1.5.1 Electricity industry structure

Prior to 1991, the electricity industry was under full government ownership and consumers paid regulated prices. Typically, generation and transmission were vertically integrated, and in some states distribution and retail were owned by local government.¹³ Given the overall importance of energy as an input into the wider economy, a more competitive electricity sector was viewed as crucial for improving economic growth and employment opportunities in the economy.¹⁴

Government reforms during the 1990s structurally separated the electricity supply industry into competing generators and retailers, and monopoly transmission and distribution network service providers. Transmission, generation, distribution and retail arms were either corporatised or privatised.¹⁵ This was in preparation for:

- the introduction of a uniform single wholesale electricity market across eastern and southern Australia
- customer choice in electricity supplier, initially for large customers (the first step in the transition to full retail contestability and the deregulation of retail pricing).¹⁶

Following these reforms and a staged transition, the NEM, commenced in December 1998.¹⁷ At this time, retail competition was only available to large electricity customers. Small customers were exclusively served by their incumbent 'local retailer' - the retailer appointed to supply all customers in a distribution network (also called a 'local area'). Jurisdictional regulations prohibited new firms from entering the retail market.¹⁸

Retail energy markets began to change in 2002 when Victoria and New South Wales introduced full retail contestability in both their electricity and gas retail markets. Following these developments, other NEM jurisdictions opened up their retail energy markets to competition.¹⁹ The introduction of full retail contestability and then, in most jurisdictions, retail price deregulation has led to the emergence of independent retailers that compete with

13 KPMG, *National Electricity Market - A case study in successful microeconomic reform*, 2013, p. 14. Available at www.aemc.gov.au. For example in New South Wales, the Sydney County Council acted as the electricity supply business for most of Sydney until 1991 - see Wilkenfeld, G and Spearritt, P, *Electrifying Sydney - 100 Years of EnergyAustralia*, Sydney, 2004, p. 8.

14 AEMC, *2017 Retail Energy Competition Review*, p. 38.

15 KPMG, *op. cit.*, p. 13.

16 *Ibid.*, p. 9

17 *Ibid.*, p. 32.

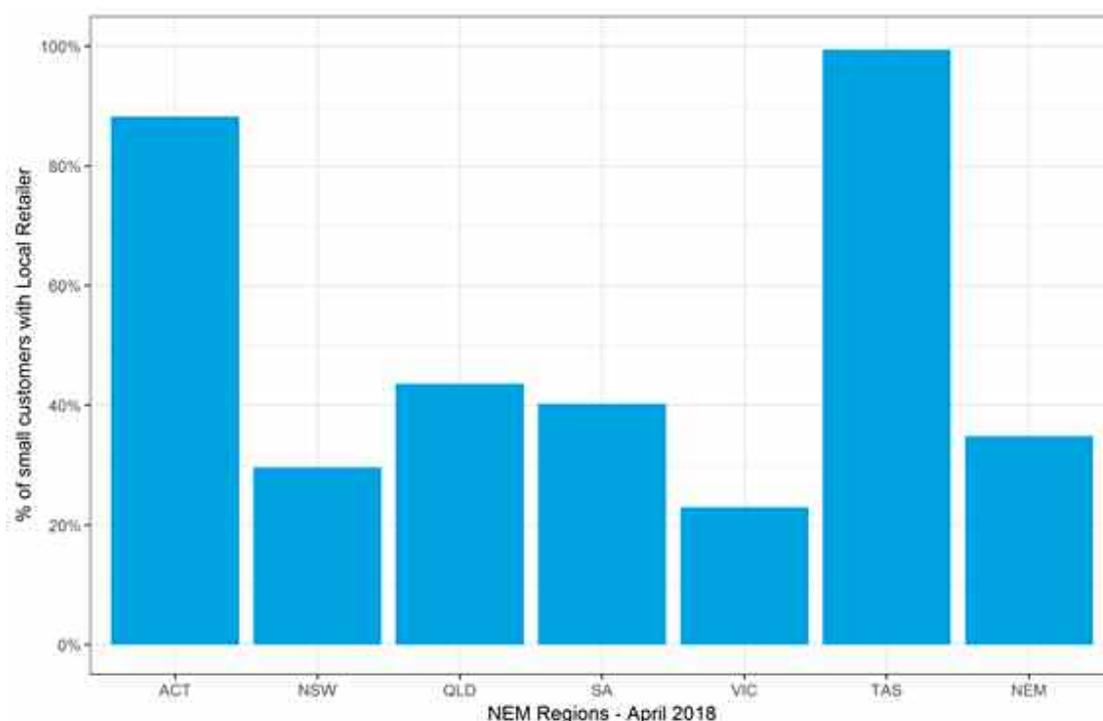
18 AEMC, *2017 Retail Energy Competition Review*, p. 12.

19 *Ibid.*

the local retailers.²⁰ Independent retailers include the new-entrant Tier 2 retailers and also the large incumbent retailers that were able to expand operations into other areas.

Figure 1.5 shows the proportion of small customers in each NEM region that, as at April 2018, were served by a local retailer as compared to those with an independent retailer. In the more populous states, more than half of small customers are served by independent retailers.

Figure 1.5: Proportion of small customers with the local retailer in each NEM region (April 2018)



Source: MSATS M71 Market Data

1.5.2 Energy sector transition

The NEM is currently undergoing a significant transition involving the adoption of generation technologies such as wind, solar and energy storage at the same time as the retirement of existing thermal generation. Work underway to manage the transition includes:

- setting the foundations for a competitive distribution market that would enable consumers to get the most value out of their rooftop solar panels, batteries and other distributed energy resources in the future²¹

²⁰ AEMC, *2017 Retail Energy Competition Review*, p. 130.

²¹ See: AEMC, *Distribution market model*, August 2017 and AEMC, *Electricity Network Economic Regulatory Framework Review*, July 2017.

- developing market frameworks which allow continued take-up of new generating technologies while keeping the lights on.²²

Major reforms in place that support the transition include competition in metering and five minute settlement. The competition in metering reform would also support global settlement. In addition, there is an opportunity to develop the IT system capability for global settlement in alignment with the design and build activities required for the introduction of five minute settlement.

Competition in metering

As part of the reforms that emerged from the *Power of choice review*, the AEMC recommended that all future new meters installed should be advanced (or 'smart') meters.²³ These meters are remotely-read and able to measure both how much electricity is used and when it is used, in near real time. On 26 November 2015 the AEMC made the *National Electricity Amendment (Expanding Competition in Metering and Related Services)* rule.²⁴ From 1 December 2017, this rule has required retailers to deploy advanced meters for small customers where new and replacement meters are required or where consumers are seeking access to advanced metering services.²⁵ Advanced meters provide consumers with greater opportunities to access new products and services to help them manage their electricity bills.

Another benefit of advanced meters is that settlement data becomes more accurate as the advanced meter fleet grows and the accumulation meter fleet retires. Since the start of competition in metering, more than 81,000 advanced meters have been installed at small customer connection points in the NEM (excluding Victoria), bringing the total number of small customer advanced meters to greater than 438,000.²⁶ This is in addition to the 2.8 million interval meters that were installed as part of the Victorian smart meter roll out. Advanced meters are now installed at 37 per cent of both small and large customer connection points across the NEM.²⁷

Five minute settlement

On 28 November 2017 the AEMC made the *National Electricity Amendment (Five minute settlement rule) 2017* to align operational dispatch and financial settlement of the supply side of the wholesale electricity market at five minutes.²⁸ Market participants and AEMO are preparing for five minute settlement which will commence on 1 July 2021. Implementation of five minute settlement requires AEMO to update its systems and procedures, and NEM participants to:

22 See: www.aemc.gov.au/our-work/our-current-major-projects/system-security-and-reliability

23 For more information on the Power of choice reforms see: <https://www.aemc.gov.au/our-work/our-current-major-projects/power-choice>

24 The Expanding Competition in Metering and Related Services final rule and determination can be viewed at: <https://www.aemc.gov.au/rule-changes/expanding-competition-in-metering-and-related-serv>

25 Large customers already need to have remotely-read metering installations.

26 Data supplied by AEMO for the period 1 December 2017 to 1 May 2018.

27 Ibid

28 The Five minute settlement final rule and determination can be viewed at: <https://www.aemc.gov.au/rule-changes/five-minute-settlement>.

- review and where necessary update existing contract terms and conditions
- upgrade metering to provide five minute granularity data (where required)²⁹
- upgrade IT systems to store and process five minute granularity data.

1.5.3

Estimates of unaccounted for energy

Under the current settlement framework, AEMO is unable to perform a full reconciliation of all energy being settled because it does not always receive metering data relating to local retailers' customers. Therefore, it cannot estimate UFE in each local area or across the NEM. In the rule change request, AEMO highlighted information provided to it from the New Zealand Electricity Authority, which indicated that since a global settlement framework was adopted for the New Zealand electricity market in 2008, UFE has reduced to 0.8 per cent of total energy settled per annum. The New Zealand experience is described in Box 2.³⁰ UFE was not measured in New Zealand prior to the introduction of global settlement.

The AEMC has attempted to gather information about the size of UFE in Australia. Cost estimates for distribution areas ranged from \$0.003 to \$0.30 per MWh of generation. As a proportion of generation, UFE estimates range from 0.003 to 1.1 per cent. Note that these estimates are themselves based on approximations and therefore should be used cautiously.

The World Bank tracks annual 'electric transmission and distribution losses' as a percentage of generation output for most countries.³¹ Transmission and distribution losses are defined as 'losses in transmission between sources of supply and points of distribution and in the distribution to consumers, including pilferage'.³² This definition is broader than that of UFE (comprising commercial losses and unaccounted for technical losses) because it also includes technical losses. Therefore the level of the international data on electricity losses is only a guide to the level of UFE for those countries as the UFE will be less.

The data are collected from national energy agencies by the International Energy Agency (IEA), adjusted by the IEA to meet international definitions and published by the World Bank. The data set currently spans the period 1960 to 2014. It shows that in 2014 the world average for losses was 8.3 per cent of wholesale market volume and the reported result for Australia was 4.8 per cent. The 2014 results for countries with electricity markets broadly comparable to Australia's were:

- New Zealand, 6.5 per cent
- United Kingdom, 8.3 per cent
- Ireland, 7.9 per cent.

²⁹ Meters that are not communication enabled (which make up the majority of small customer meters outside of Victoria) currently have their consumption manually checked every few months. Where necessary, AEMO currently profiles this consumption for a 30 minute period. This profile will be changed to a five minute period, without the meter needing to be replaced for five minute settlement.

³⁰ AEMO, Rule change request, p. 9.

³¹ World Bank website at <https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS>, viewed 24 May 2018.

³² Ibid.

BOX 2: IMPLEMENTATION OF GLOBAL RECONCILIATION IN NEW ZEALAND

In the period 2001 to 2004, retailers estimated that UFE in the New Zealand electricity market was in the order of NZD \$10 million to \$30 million per month. These costs were being shouldered by incumbent retailers under the settlement by differencing regime. This drove the industry to collaborate on a design for 'global reconciliation' (similar to AEMO's proposed design for global settlement in the NEM).

The rule change took 18 months and tendering for the settlement system took another year. Global reconciliation began on 1 May 2008 although some parts of the market are still settled by difference due to the configuration of certain networks.

The New Zealand Electricity Authority began measuring UFE from the start of global reconciliation, and note that it has decreased over time. This is largely related to:

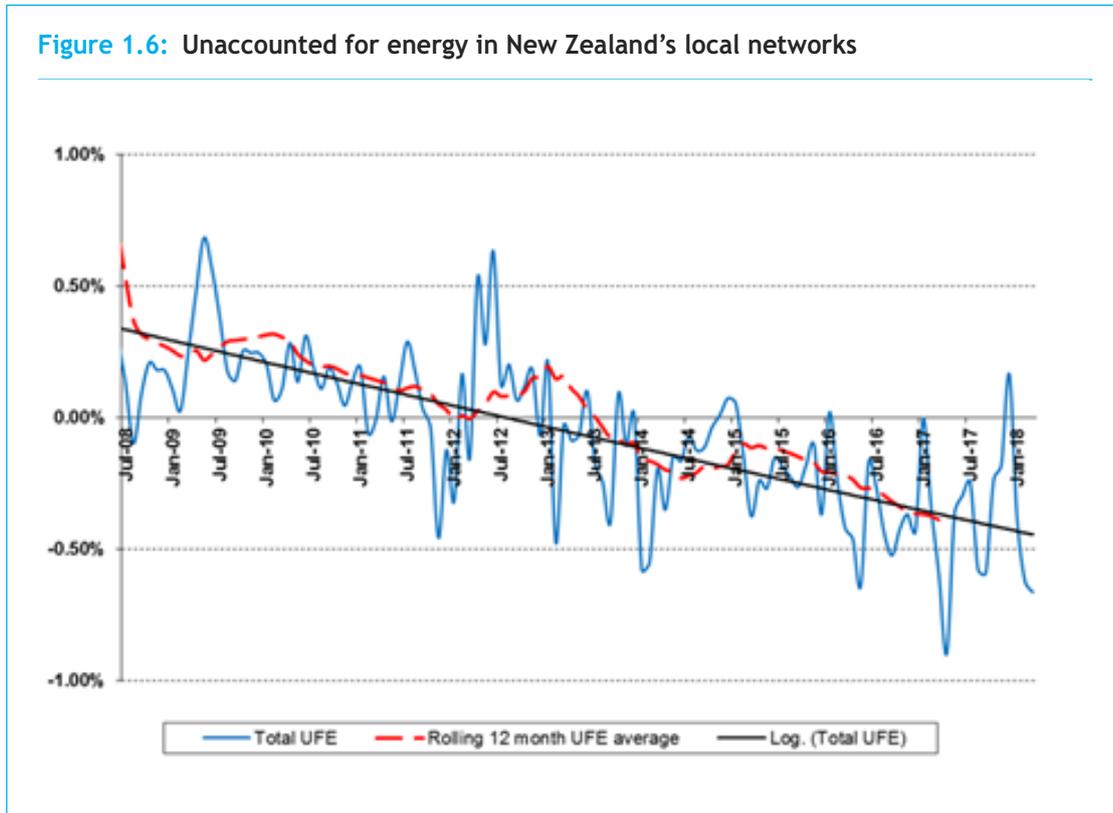
- revision of some DLFs
- more accurate settlement data as a result of the advanced metering infrastructure rollout. About 78% of meters are now interval meters, with some networks having 90% penetration while others are around 45-50%
- better data handling practices.

Figure 1.6 below shows:

- the absolute change in UFE as a proportion of total market load over time
- the rolling 12 month average change in UFE
- the decreasing trend in UFE.

This data is calculated for grid connected local networks that are reconciled using the global reconciliation methodology. Secondary networks are not included. It is also subject to wash-ups that may cause minor variations up to 14 months into history from the current time.

Figure 1.6: Unaccounted for energy in New Zealand’s local networks



Source: New Zealand Electricity Authority

1.6 The rule making process

On 7 June 2018, the Commission published a notice advising of its commencement of the rule making process and consultation in respect of the rule change request. A consultation paper identifying specific issues for consultation was also published. Submissions to the consultation paper closed on 5 July 2018.

The Commission received 18 submissions as part of the first round of consultation. The Commission has considered all issues raised by stakeholders in submissions in making this draft rule.

Issues raised in submissions are discussed and responded to throughout this draft rule determination. Issues that are not addressed in the body of this document are set out and addressed in Appendix A.

1.7 Consultation on draft rule determination

The Commission invites submissions on this draft rule determination, including the more preferable draft rule, by 5:00 pm AEST on the 25 October 2018.

Any person or body may request that the Commission hold a hearing in relation to the draft rule determination. Any request for a hearing must be made in writing and must be received by the Commission no later than 6 September 2018.

Submissions and requests for a hearing should quote project number ERC0240 and may be lodged online at www.aemc.gov.au.

2 DRAFT RULE DETERMINATION

The Commission's draft rule determination is to make a draft rule which is a more preferable draft rule. The draft rule introduces a 'global settlement' framework for settlement of the demand side of the wholesale electricity market. The draft rule also provides for a transition period to implement the changes necessary to introduce global settlement which aligns with the transition period for the implementation of five minute settlement, thereby reducing the costs of the change.

The Commission's reasons for making this draft determination are set out in section 2.1.

This chapter outlines:

- the key features of the draft rule
- the rule making test for changes to the NER
- the more preferable rule test
- the assessment framework for considering the rule change request
- the Commission's consideration of the more preferable draft rule against the national electricity objective (NEO).

Further information on the legal requirements for making this draft rule determination is set out in Appendix B.

2.1 The Commission's draft rule determination

The more preferable draft rule made by the Commission is attached to and published with this draft rule determination. If the Commission makes a final rule that reflects the draft rule, it will commence on Thursday, 1 July 2021. The key features of the draft rule are set out below.

Unaccounted for energy

- Provides for the calculation of UFE at each TNI for each transmission connection point that is not a market connection point in a local area.
- Provides for the UFE calculated for each transmission network connection point to be aggregated at the local area level and allocated across all market customers in that local area based on their 'accounted-for' energy.
- Introduces a requirement for AEMO to calculate and publish the UFE amounts it determines for each transmission network connection point that is not a market connection point for each trading interval in accordance with a procedure to be developed by AEMO.
- Introduces a requirement for AEMO to determine a threshold for UFE at each transmission network connection point that is not a market connection point.
- Introduces a requirement for AEMO to conduct a review of UFE volumes at a transmission network connection point if the UFE threshold is exceeded if requested by a Market Customer or large customer with a financial interest in the UFE allocated in respect of

that transmission network connection point. The draft rule also includes a requirement for parties to provide such information and assistance as AEMO reasonably requires in order to conduct this review. AEMO must publish the findings of its review on its website. AEMO may recover its reasonable costs in conducting a review.

- Introduces a requirement that only the local transmission network service provider may be appointed as metering coordinator in relation to a transmission connection point that is not a market connection point. As this is a regulatory obligation on the TNSP under the NER, this service would be a prescribed transmission service.

Billing for distribution services

- Provides that charges for distribution services based on metered energy for first tier customers and non-registered customers must be calculated by a DNSP from settlements ready data obtained from AEMO's metering database for customers with types 1-3 metering installations, and from either metering data in accordance with the Metrology Procedures or settlements ready data for customers with types 4, 4A, 5, 6 or 7 metering installations. The draft rule also removes the ability for a DNSP to bill a local retailer for distribution services used by non-registered customers.

Virtual transmission nodes

- Retains virtual transmission nodes (VTN) for the purposes of settlement.
- Introduces a requirement on DNSPs to assign each connection point on its distribution network to a single TNI unless it has been granted an exemption from AEMO, in which case that connection point must be assigned to a VTN.

Unmetered loads

- Requires AEMO to include in its metrology procedures guidance for the inclusion of non-market unmetered load in settlement including: the creation of NMIs for non-market unmetered load; the assignment of connection points relating to non-market unmetered load to a single TNI or VTN; the provision of data on the estimated consumption of non-market unmetered load to AEMO, and the methodology for calculating load and a load profile for non-market unmetered load.

Non-market generators

- Amends clause 2.2.5(a) from the commencement date of the rule, so that only a generating unit whose sent out generation is purchased in its entirety by a customer at the same connection point must be classified as a non-market generating unit. A generating unit that wants to sell its output to a market customer must become a registered participant, or operate via an intermediary who is a registered participant.

Transitional rules

- Retains the existing arrangements under clause 2.2.5(a) for those non-market generators whose sent out generation is currently purchased entirely by the local retailer, and provides that the local retailer will be the financially responsible market participant (FRMP) in relation to the connection point to which the non-market generator is connected.

- Introduces a requirement on AEMO to amend and publish its relevant procedures to take into account the draft rule by 1 December 2019. Including, for avoidance of doubt, to update the relevant procedures to oblige metering data providers (MDPs) to provide it with all metering data for first tier load.
- Introduces an obligation on DNSPs to assign each connection point on their distribution network to a single transmission connection point (or obtain an exemption) and notify AEMO of this by 1 March 2020.
- Introduces an obligation on AEMO to calculate and publish UFE volumes for all transmission connection points that are not market connection points in accordance with the new rules from 1 July 2020.
- Introduces a requirement on the relevant DNSP to provide AEMO the estimated volumes of their non-market unmetered load to AEMO by 1 March 2020 in accordance with the metrology procedures.

In order to implement global settlement, AEMO must also make a number of changes to its procedures, including the metrology procedures and the MSATS. Much of the detail of NEM settlements and the provision of metering data for settlements purposes is set out in these procedures rather than the National Electricity Rules (NER, or rules). The Commission therefore expects that AEMO will amend its procedures to implement global settlement, including by requiring MDPs to provide it with metering data for all first tier load. The draft rule therefore requires AEMO to amend its relevant procedures to take into account the amending rule.

Having regard to the issues raised in the rule change request and during consultation, the Commission is satisfied that the draft rule will, or is likely to, contribute to the achievement of the NEO for the following reasons:

- It is a more advanced settlement system which will improve the transparency and accuracy of the settlements process. Under global settlement, AEMO will have the metering data for the customers of all retailers, allowing it to fully reconcile energy within each distribution network. This will provide for timelier and more frequent identification of settlement errors, which will reduce the costs of resolving settlement disputes outside of the regular settlement process. These costs are currently substantial for the businesses involved.
- It will provide for more effective retail competition in the long run because costs and risks will be allocated in a manner which does not distort competition. Retailers will more appropriately incur the costs that they cause, providing for more cost-reflective prices across industry and subsequent improvements in allocative efficiency.
- Risk allocation will be improved, providing enhanced incentives for retailers and other market customers to reduce UFE as doing so will result in reduced costs for them. This is likely to result in UFE being smaller than if this UFE allocation did not occur, with associated productive and allocative efficiency benefits.

2.2 Rule making test

2.2.1 Achieving the NEO/NGO/NERO

Under the NEL the Commission may only make a rule if it is satisfied that the rule will, or is likely to, contribute to the achievement of the NEO.³³ This is the decision making framework that the Commission must apply.

The NEO is:³⁴

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, safety, reliability and security of supply of electricity; and
- (b) the reliability, safety and security of the national electricity system.

2.2.2 Making a more preferable rule

Under s. 91A of the NEL, the Commission may make a rule that is different (including materially different) to a proposed rule (a more preferable rule) if it is satisfied that, having regard to the issue or issues raised in the rule change request, the more preferable rule will or is likely to better contribute to the achievement of the NEO.

Having regard to the issues raised in the rule change request and during consultation, the Commission is satisfied that the more preferable draft rule will, or is likely to, better contribute to the achievement of the NEO for the following reasons:

- UFE is calculated for each TNI in a local area, and then aggregated at the local area level and allocated across all market customers in that local area based on their 'accounted-for' energy. This is different from AEMO's proposal in the rule change request, which proposed that UFE be calculated for each TNI and allocated across all market customers at that TNI. In comparison, the Commission's draft rule avoids potential cross-subsidies and localised distortions, without diluting components of UFE that could be specific to a particular network area. It also more harmoniously accommodates the continued use of VTNs. The draft rule still requires AEMO to calculate UFE for each TNI to improve the transparency and accuracy of settlements.
- The local retailer concept is retained in the rules. It is possible to implement global settlement without having to remove it. Retaining this concept, albeit for a reduced number of applications, simplifies the implementation of global settlement with respect to the treatment of non-type 7 unmetered loads.
- The option for VTN's to be used to average transmission network loss factors over an adjacent group of transmission network connection points is retained. The policy objectives of VTNs are separate to those of global settlements and there will still be situations under global settlements where using VTNs to average transmission loss

³³ Section 88 of the NEL.

³⁴ Section 7 of the NEL.

factors will be an efficient course of action. The more preferable draft rule allows for these practices to continue as they do now.

- The draft rule specifies that the Local Network Service Provider (LNSP) be nominated as the metering coordinator for metering installations at points that connect a distribution network with a transmission network. The relevant LNSP for these metering installations is the Transmission Network Service Provider (TNSP). Currently, the local retailer for the associated distribution network is responsible for the metering. The rule change request did not specify a change to these arrangements. Under global settlement, local retailers have a reduced financial interest in the energy metered at each of these points, hence it is more appropriate for responsibility for the metering to be allocated directly to the TNSP. Having the TNSP as the metering coordinating is beneficial in comparison to the status quo as it would provide continuity in the provision of metering services, assisting with the implementation of five minute settlement.

2.3 Assessment framework

In assessing the rule change request against the NEO the Commission has considered the following principles:

- **Prices that reflect the cost of supply and value of its use** - the extent to which the proposed changes would improve the accuracy of the settlement outcomes, and whether this is likely to promote more efficient use of electricity services. To promote efficient outcomes in the electricity market, retail charges should accurately reflect the quantity of electricity consumed and prices should not include inefficient cross-subsidies. An increased ability for AEMO to reconcile settlement errors, and increased incentives on retailers to identify sources of commercial losses, are likely to improve the accuracy of the settlement outcomes.
- **Price and quantity risk allocation** - the potential of the proposed rule to provide more efficient risk allocation and greater incentives to identify sources of commercial losses. Risks should be allocated to the parties who have incentives and ability to efficiently manage them. Metering errors and unidentified sources of commercial losses lead to UFE within a distribution network. Currently these risks are allocated to the local retailer who is generally unable to manage these risks.
- **Regulatory and administrative burden** - the effect on market participants' regulatory and administrative burden that may arise if the proposed rule were to be implemented. Through this rule change process, the Commission seeks to understand the magnitude and distribution of the costs. The costs associated with the proposed changes would involve once-off costs to transition, as well as on-going costs associated with the new framework.

3 KEY FEATURES AND BENEFITS OF GLOBAL SETTLEMENT

This chapter discusses the issues identified in the rule change request and AEMO's proposal for global settlement in more detail. It sets out the Commission's consideration of the case for identifying UFE and allocating UFE to entities other than the local retailer of each local area. It concludes with an evaluation of the likelihood of the global settlement changes producing a net benefit.

3.1 Issue

Chapter 1 described the existing process of settlement by differencing, which has been in place since the start of the NEM. The process of settlements by differencing results in the local retailer for an area bearing the cost and risk of all residual electricity losses, including unaccounted for technical losses, other retailers' commercial losses and accumulation meter profiling errors. In the early days of the NEM, local retailers generally had very high proportions of market share, so this settlement process for the most part resulted in cost and risk being appropriately allocated.

Over time, the introduction of full retail contestability and then, in most jurisdictions, retail price deregulation has led to the emergence of independent retailers that compete with the local retailers. Across the NEM, more than half of small customers are now served by independent retailers, as opposed to local retailers (Figure 1.5 in Chapter 1). In some network regions, the market share of the local retailer is less than 15 per cent.

In this changing market dynamic, it is debatable whether settlement by differencing is still the most accurate and efficient settlement process for the NEM.

3.2 AEMO's view

In its rule change request, AEMO identified three issues with settlement by differencing that would be remedied by moving to global settlements. These were also set out in section 1.3.

First, the local retailer for each local area³⁵ bears the cost and risk of all the UFE but it is unable to manage these costs, except for its own commercial losses. Consequently, UFE costs are passed through to the local retailer's customers, not to all customers in the local area. This makes retail electricity prices less efficient because they are relatively less cost-reflective of customers' consumption or use of the network.

AEMO submitted that the current allocation of UFE to local retailers means there is no incentive for independent retailers to reduce commercial losses and metering inaccuracies. Conversely, global settlement and the allocation of UFE to all retailers would provide an incentive for both local and independent retailers to reduce commercial losses and therefore costs to consumers.

³⁵ The term local area is defined in the NER as the geographical area allocated to a Network Service Provider by the authority responsible for administering the jurisdictional electricity legislation in the relevant participating jurisdiction.

Second, under settlement by differencing, AEMO is unable to perform full settlement reconciliation because it only receives TNI supply data and consumption metering data relating to independent retailers' customers. AEMO claims that this means errors and anomalies in settlement can be difficult to identify. Settlement errors may continue beyond the six month window within which market participants must raise billing disputes with AEMO, resulting in subsequent legal proceedings between affected market participants that may be costly. AEMO considered that global settlement would allow for settlement anomalies to be more easily identified, reducing the likelihood of settlement errors needing dispute resolution or legal proceedings, with associated cost savings for market participants.

Third, AEMO noted that access to metering data is different for local retailers and independent retailers. Independent retailers receive metering data for their own customers, whereas local retailers are able to access all metering data in their local area for the purpose of settlement statement reconciliation. AEMO considered that global settlement would be more equitable in this respect as all retailers would only have access to the metering data of their own customers.

Regarding costs, AEMO considered that the only material cost of the change would be in AEMO making changes to market systems and data formats. It considers that the implementation cost would be moderate and only incremental to the five minute settlement implementation costs, assuming that the IT system capability for global settlement was developed in alignment with the design and build activities for five minute settlement. In subsequent correspondence with Commission staff, AEMO has estimated that implementing global settlement for its own systems would cost less than \$5 million, if it is included in the five minute settlement implementation.

3.3 Stakeholder views

In submissions on the consultation paper, there was close to universal in-principle support for a global settlement framework. It was widely viewed as a change that would 'level the playing field'.³⁶

Stakeholders generally agreed that there would be benefits from AEMO being able to undertake a full reconciliation of the wholesale market, but some questioned whether all of AEMO's proposed changes are necessary for AEMO to be able to do this. Flow Power and Red/Lumo submitted that AEMO should seek to improve its own processes for settlement reconciliation before more substantial rule changes are considered.³⁷ Red/Lumo said that AEMO could amend its procedures to enable it to collect all the metering data it requires to perform a full reconciliation. Red/Lumo claimed that AEMO's current procedures require all type 1-4 metering installation data to be provided to AEMO by the MDP however for types 5 and 6 metering installations, only metering data from the customers of independent retailers is required to be provided. This could be amended by a change to AEMO's procedures.

³⁶ Consultation paper submissions: AGL Energy, p. i; Australian Energy Council, pp. 1-2; EnergyAustralia, pp. 1-2; Origin Energy, p. 1.

³⁷ Consultation paper submissions: Flow Power, p. 2; Red and Lumo, pp. 1-2.

Red/Lumo also submitted that AEMO should calculate UFE to understand the impacts on competition before a rule change is undertaken.

There were differing views on whether a global settlement framework would provide improved incentives for market participants to reduce UFE. Broadly, submitters fell into two camps:

1. Global settlement would encourage all retailers to take responsibility for identifying and reducing sources of UFE. This was the position that AEMO presented in its rule change request. In its submission, AEMO explained that calculating UFE will likely highlight a number of material anomalies – such as the misallocation of NMIs to the correct TNI, poor estimation of technical loss factors, unresolved issues with VTNs,³⁸ and registration errors – allowing for them to be rectified.³⁹ A further benefit identified by AGL Energy was an improved ability for local retailers to balance their wholesale and retail positions, if UFE is allocated more widely.⁴⁰
2. Incentives to reduce UFE would be unchanged or reduced under global settlement. These stakeholders thought that spreading UFE more widely than local retailers could reduce incentives to reduce it, as the losses would become diluted and go unnoticed.⁴¹ In support of this view, ERM Power submitted that unmetered loads and net system load profile (NSLP) profiling errors are out of the control of independent retailers. It thought that DNSPs are instead best-placed to monitor losses.⁴² Red/Lumo questioned AEMO's claim that there is currently a lack of incentives on independent retailers. It noted that the rules already contain requirements for meters that have malfunctioned to be replaced.⁴³

Those opposed to the wider allocation of UFE thought that doing so may have a negative impact on retail competition by increasing costs for smaller independent retailers.⁴⁴

Momentum Energy observed that the benefits of incumbency and the economies of scale which exist within the retail energy market have long been recognised by policy makers. It submitted that additional imposts on challenger retailers should be minimised at this time, to avoid a return to significant retail market concentration.⁴⁵ Red/Lumo considered that AEMO's proposal is likely to reduce competition and increase barriers to entry in the retail market, as smaller independent retailers do not have the equivalent financial backing as local retailers. Energy Consumers Australia was of a similar view, submitting that independent retailers could be expected to pass on additional costs into their retail prices, and this could lead to an increase in the prices charged by all retailers.⁴⁶

38 Virtual transmission nodes, or VTNs, are a mechanism that allows for transmission network loss factors to be averaged over an adjacent group of transmission network connection points. The applications of VTNs and their treatment under global settlement are discussed in Chapter 5.

39 AEMO, consultation paper submission, p. 2.

40 AGL Energy, consultation paper submission, p. 7.

41 Consultation paper submissions: ERM Power, pp. 1-2; Flow Power, p. 1.

42 ERM Power, consultation paper submission, p. 2.

43 Red Energy and Lumo Energy, consultation paper submission, p. 3.

44 Consultation paper submissions: Energy Consumers Australia, p. 3; Flow Power, p.; Momentum, pp. 1-2; Red Energy and Lumo Energy, p. 2.

45 Momentum Energy, consultation paper submission, p. 2.

46 Energy Consumers Australia, consultation paper submission, p. 3.

In contrast, the Australian Energy Council argued that the inequitable treatment of different retailers harms the vibrancy of competition. It suggested that there would be a long-term benefit to consumers from addressing the inequitable treatment.⁴⁷

No comments were received on the issue of equitability of local retailers having access to independent retailers' metering data.

Little additional information was provided by submitters on the costs of making the change. AGL Energy and Origin Energy expressed an expectation that implementing global settlement would involve no significant costs to them above those associated with implementing five minute settlement.⁴⁸ In contrast, EnergyAustralia, Flow Power and ERM Power speculated that there could be significant costs involved in making the change.⁴⁹ Ausgrid estimated that it may cost in the order of \$500,000 for its MDP to implement the necessary changes.

A number of stakeholders requested that the Commission undertake further analysis to quantify the costs of the change, including the costs to be incurred by AEMO, however these stakeholders did not provide any information on the likely costs to themselves.⁵⁰

3.4

Analysis

The submissions received so far have highlighted to the Commission that its assessment of AEMO's rule change request involves discreet decisions regarding:

- identifying UFE
- allocating UFE to entities other than the local retailer of each local area.

The rest of this section presents the Commission's consideration on each of these points, followed by an evaluation of the likelihood of the changes producing a net benefit.

The case for identifying UFE

There appears to be the potential for material market-wide benefits from simply identifying UFE by AEMO undertaking a full reconciliation of the market. This would directly capture the proposed benefits flowing from errors and anomalies in settlement being identified more easily and, therefore, more quickly. AEMO identified potential benefits from avoiding off-market settlements, dispute resolution and legal proceedings stemming from such errors.

The Commission sought information on the likely savings from local retailers and AEMO and, based on the case studies and data provided, believes that material savings are possible by AEMO undertaking full reconciliation of the market. Indeed, in aggregate the Big 3 retailers (Origin Energy, AGL Energy and EnergyAustralia) described settlement disputes in the order of \$5 million in each year. The costs incurred by these businesses to recover the disputed amounts are estimated by the Commission, based on the information provided, to be in the order of \$1 million a year. It is understood that these costs, which are incomplete as other entities are also involved in the disputes, could largely be avoided by the identification of

47 Australian Energy Council, consultation paper submission, p. 2.

48 AGL Energy, consultation paper submission, p. 7; Origin Energy, personal communication, 19 July 2018.

49 Consultation paper submissions: EnergyAustralia, p. 2; Flow Power, p.2; ERM Power, p. 1.

50 E.g. consultation paper submissions: EnergyAustralia; Red Energy and Lumo Energy.

UFE. A reduction in transaction costs would be expected to improve the productive efficiency of the businesses that would have otherwise incurred these costs.

AEMO proposed in its rule change request that UFE be calculated for each TNI. The Commission agrees that this appears to be the appropriate level for this calculation since, as identified by AEMO, it would be consistent with the current settlement framework; it would provide for relatively less complicated system changes for AEMO and market participants. AEMO also referenced the existing high level of confidence in the accuracy of metered energy at the TNI level, and its established efficacy in similar markets overseas that have adopted global settlement.

Calculating UFE at the TNI level would also focus industry efforts to reduce it. For example, issues such as the misallocation of NMIs to TNIs, large undetected commercial losses, and the poor estimation of technical loss factors, would either require UFE to be calculated at the TNI level, or be significantly harder to identify if it was calculated at a higher level. Origin Energy indicated support for TNI level calculations for this reason, submitting that local area-level calculations would “have the potential to hide millions of dollars due to the sheer volume of energy involved”.⁵¹

The additional data required by AEMO to undertake full reconciliation and calculate UFE is the metering data for the customers of the local retailer in each local area. The costs of the data being provided appear to be relatively minor. In its High Level Design, AEMO described two options by which it could receive the metering data for all connection points.⁵² These are described in Box 3 below. The first is an extension of the existing process. It would not require any change to the MSATS methodology, and changes to MDP processes and systems are expected by AEMO to be minimal. The second option would require changes to MSATS, however these changes are already required to implement five minute settlement.

BOX 3: DATA FILE FORMATS OPTIONS FOR GLOBAL SETTLEMENT

Under settlement by differencing, as specified in AEMO’s Metrology Procedures, MDPs provide metering data to the local retailer, LNSP and the energy retailer or generator at the connection point. It is in a rich data format, known as the Meter Data File Format (MDFF). AEMO, on the other hand, receives a simplified metering data file in an aggregated net format (known as the Meter Data Management file format (MDM)) for connection points for which the FRMP is an independent retailer. The difference between the MDFF and MDM is that the MDFF can contain a range of different energy values (e.g. peak and off-peak consumption, and peak and off-peak generation), whereas the MDM is a net figure (i.e. total consumption minus total generation).

AEMO’s two options for it to receive the metering data for all connection points are:

⁵¹ Origin Energy, consultation paper submission, p. 2.

⁵² AEMO, High level design, p. 14.

1. AEMO to receive MDM files 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. This would avoid AEMO having to change its MSATS methodology for receiving and processing metering data, but would require changes to MDP processes and systems.
2. AEMO to use MDFF format instead of MDM format. 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 would simplify the method of delivery of data for MDPs, and also remove the need for MDPs to create a separate MDM file to support the settlement process. AEMO's MSATS will have to be changed to allow for the receipt and processing of data delivered in the MDFF data format.

The Commission notes that no changes to the rules are required to enable AEMO to receive this data.

The one complicating factor for calculating UFE at the TNI level is the use of VTNs. Calculating UFE at the TNI requires knowledge of which NMIs are connected to each TNI, since UFE is the difference between the energy metered at the TNI and aggregate of all the energy from NMIs that are assigned to it. Usually the 'mapping' of NMI-to-TNI is identified in MSATS standing data; LNSPs are required to provide the TNI for each NMI.⁵³ However, where a NMI has been assigned to a VTN, it is the VTN that appears in MSATS instead of the physical TNI. As such, the use of VTNs may place a limit on the ability of AEMO to calculate UFE at the TNI level.

The Commission's position is that DNSPs using VTNs should provide the NMI-to-physical TNI mapping to AEMO for customers assigned to a VTN, and for AEMO to accommodate this extra data in MSATS. With this information, AEMO would still be able to undertake a full reconciliation and calculate UFE at the TNI level, despite the use of VTNs, thereby allowing for the potential benefits described above to be realised. This issue is covered in Chapter 5.

A further consideration is the treatment of non-type 7 unmetered loads that currently do not enter AEMO's settlement systems. Under a global settlement framework it is necessary to account for the energy allocated to unmetered loads so that it can be factored into the calculation of UFE, otherwise it will itself be displayed as UFE. A process for this to occur is outlined in Chapter 5. It involves a requirement for AEMO to include in its metrology procedures a process for unmetered loads to be allocated a NMI so that they can be processed through MSATS. They will need to be allocated a load profile, potentially a very simple one, and also allocated to a TNI (or VTN).

The case for allocating UFE to entities other than the local retailer

The magnitude of the benefits from allocating UFE more broadly than just to the local retailer will depend on the volume of UFE that currently exists in the market and the extent to which

⁵³ NER, clause 3.6.3.

it could be reduced by moving to global settlements. Unfortunately, currently neither of these things are known with certainty. However, it is likely that UFE levels are currently positive (i.e. a net *charge* for local retailers).

Below, the Commission's analysis is structured in two parts:

- whether UFE should be allocated more widely
- if UFE is to be allocated more widely, at what level it should be allocated and what basis should be used for the allocation.

Should UFE be allocated more widely than the local retailer?

The arguments put forward by AEMO and stakeholders for allocating UFE more broadly are that it would:

- provide for more cost-reflective retail prices
- improve the ability of local retailers to manage risk by balancing their retail and wholesale market positions
- improve incentives to reduce UFE.

The largest potential benefits from global settlement are likely to arise from reducing UFE. The incentives faced by market participants to contribute towards this outcome are therefore particularly important. Some submitters were of the view that the incentives to reduce UFE would be unchanged or reduced under global settlement. However, the Commission has identified a series of ways in which UFE could be reduced through improved incentives.

Allocating UFE more broadly than the local retailer is likely to:

- Remove the existing disincentive for independent retailers to identify commercial losses.⁵⁴
- Encourage all retailers to replace type 6 accumulation meters with interval meters, in order to reduce UFE caused by NSLP profiling errors and access additional revenue protection measures inherent in advanced metering technology.
- Encourage all retailers to engage in processes to improve the visibility of unmetered loads. This would include local retailers becoming involved in regions where they are currently not the local retailer.
- Lead to more scrutiny of DLF calculations, potentially leading to them becoming more accurate over time.

In these ways, the Commission considers that allocating UFE more widely than the local retailer would provide improved incentives for all retailers, and this is likely to result in UFE being smaller than if this UFE allocation did not occur. Some of the reduction would effectively represent a saving for the market (e.g. commercial losses), while some other proportion will still exist (e.g. in more accurate DLFs), but be allocated differently. The potential savings for the market from reduced UFE represent increases in productive

⁵⁴ While Red/Lumo (consultation paper submission, p. 3) correctly identified that the NER contains existing provisions for metering installation malfunctions to be addressed under clauses 7.8.10 and 11.86.7, these requirements only commence once the malfunction has been identified. It is conceivable that independent retailers may not dedicate as much effort as local retailers to identifying these losses as doing so would likely increase their own costs, and reduce the costs incurred by their competitor, the local retailer.

efficiency. These are also likely to be productive efficiency gains from providing businesses with a greater incentive to minimise costs that they directly contribute to, but do not currently face due to settlement by difference. If businesses more appropriately incur the costs they cause, you will more likely get cost-reflective prices across industry, improving allocative efficiency.

Further, the Commission agrees with submitters and AEMO that there is a strong 'levelling the playing field' argument associated with global settlement that also has implications for market efficiency. The allocation of UFE solely to local retailers likely causes allocative inefficiency whereby the retail prices of all retailers are inefficiently high or low, since they would be relatively less cost-reflective of customers' consumption or use of the network. This could be a very minor effect, obscured by the fact that some retailers are local retailers in some parts of the NEM, and independent in others. In any case, over time this has the potential to create structural distortions to retail prices and the market share of particular retailers. This issue becomes more severe as the market share of local retailers is reduced – a trend that is being observed in every region of the NEM where retail competition is present.

Similar logic applies to the local retailer risk management issue. To the extent that UFE allocations to local retailers complicate the process of balancing retail and wholesale positions, local retailers face greater risk, which would be expected to bring higher costs relative to global settlements. This also has the potential to create structural distortions to retail prices and the market share of particular retailers. It becomes more severe as local retailer market share is reduced since UFE will come to be larger relative to the retail position that is being hedged.

Despite the identified improved incentives for retailers under global settlement, the Commission acknowledges that there are limits to what retailers can do to reduce UFE and there are also important roles for both DNSPs and AEMO. To facilitate a collaborative approach to reducing UFE, the draft rule introduces provisions into the rules for AEMO to conduct a review of UFE volumes at a TNI in instances where a high level of UFE is identified – an idea suggested by Origin Energy in its submission.⁵⁵

The Commission's draft rule requires AEMO to consult on and define a UFE materiality threshold for each transmission connection point which is not a market connection point (i.e. the connection points where a distribution network connects to a transmission network). It is expected that AEMO's consultation will cover the metric and level to be used for the threshold. If this threshold is exceeded any market customer⁵⁶ that has a financial interest in the TNI where the exceedance occurs can request that AEMO undertake a review into the likely causes of UFE. The draft rule states that TNSPs, DNSPs, market customers and generators must provide information and assistance that AEMO may reasonably require to complete the review and identify the likely sources of UFE at the TNI, or TNIs, to which the request relates. The potential involvement of market customers and generators is necessary

⁵⁵ Origin Energy, consultation paper submission, p. 3.

⁵⁶ A large customer is an energy user whose annual electricity consumption exceeds the threshold of a small customer. These thresholds are set on a jurisdictional basis. The current thresholds are: 160 MWh in South Australia; 150 MWh in Tasmania; 100 MWh in ACT, New South Wales and Queensland; and, 40 MWh in Victoria.

to identify registration errors, and other issues that the other parties may not be able to identify on their own.

How should UFE be allocated?

If UFE is going to be allocated more broadly, the key choices that need to be made are the basis for the allocation, and the area over which the UFE is allocated.

On the basis for allocation, the Commission considers that using 'accounted-for' energy is most logical. The Commission noted several different options in its consultation paper, including allocation based on peak load, allocation to DNSPs and allocation through intra-regional settlement residues. Stakeholders generally supported the Commission's analysis on these options – that each would be inferior to using 'accounted-for' energy, as was proposed in AEMO's rule change request. Allocation based on peak load would be more complex to implement than AEMO's proposal for not much, if any, additional gain from the allocation of UFE.⁵⁷ The DNSP allocation option, although a simple method of allocating UFE, is judged to be inferior to retailer allocation as it would be less explicit. Explicit allocation to retailers is more appropriate given that retailers are able to take actions to reduce UFE. The allocation of UFE through the intra-regional settlements residue is inferior for the same reason.

The options for the geographic area at which UFE could be allocated are: the TNI, local area (i.e. DNSP network), and NEM region. AEMO proposed that UFE should be allocated as locally as possible, at the TNI. However, the Commission is of the view that allocation at a higher level (i.e. less granular) would be actually be more desirable. The Commission considers that there are a range of inefficient cross-subsidies that could occur under the TNI option, and there could be localised distortions from high penetrations of embedded generation. More detail on these is provided in Box 4. These issues suggest that a less granular level would be more appropriate for *allocating* UFE (as opposed to *identifying* it, which is specified to occur at the TNI resolution).

BOX 4: POTENTIAL ISSUES ARISING IF UFE IS ALLOCATED AT THE TNI LEVEL

The Commission has identified a number of cross-subsidies that may arise if UFE was to be allocated at the TNI level. These are:

- A DNSP's DLF values are generally not unique to a particular TNI but rather apply for a given class of customer across the DNSP's network. For example, a residential customer in the central business district may be assigned the same DLF as a residential customer in a semi-rural area. The averaging of DLFs within a local area has the effect of transferring UFE between TNIs, which will result errors in the calculation of the UFE for each TNI. This would create cross-subsidies between the retailers on the different TNIs (e.g. city versus semi-rural), if it was allocated at this level.

⁵⁷ This is because the proportions of allocated UFE would most likely be similar across retailers, but higher during peak times. This being the case, the incentives provided to retailers could be similar to the less complicated implementation.

- Any errors in the assignment of NMIs to physical TNIs, whether temporary or permanent, will cause UFE to be transferred between TNIs within the local area. This will cause a cross-subsidy between the local retailer and the FRMP(s) for the NMIs that have been misallocated. The cross-subsidy would be proportional to the quantity of load that was incorrectly allocated.
- Energy from type 6 accumulation metering installations is allocated to trading intervals using the NSLP, and the NSLPs are calculated on a local area basis, rather than on a TNI basis. This could also result in energy being transferred between TNIs to the extent that different TNIs have above or below average numbers of accumulation meters. Similarly, energy could be transferred between TNIs when the loads on one TNI have profiles that differ significantly from the NSLP. This transferred energy would represent a cross-subsidy between the retailers on the different TNIs if the UFE were to be calculated and allocated on a TNI level.

Allocating UFE at the local area would still be relatively granular, yet avoids the potential cross-subsidies and localised distortions noted above. Although less granular, it would still have the benefit of capturing factors that may be contributing to UFE levels that are specific to a local area, and to the DNSP that serves this area. For example:

- DLFs are calculated separately for each local area. In particular, some DLF methodologies can result in non-technical losses being socialised through DLFs, whereas others do not.⁵⁸
- NSLP profiling errors are specific to the DNSP region.
- UFE may be influenced by legacy metering decisions by DNSPs, which could result in different compositions of accumulation meters (contributing to NSLP profiling errors), and levels of commercial losses.
- Different methodologies for dealing with unmetered loads, e.g. a relatively conservative approach that overestimates the actual usage of unmetered loads could produce negative UFE.

A further benefit of local area allocation is that it accommodates the continued use of VTNs.

The final allocation option is to allocate UFE across each NEM region. The Commission considers that it would be less desirable as it would dilute the components of UFE that could be specific to a particular network region. It is also not necessary to allocate UFE in this way to accommodate the continued use of VTNs, as local area allocation is sufficient for this. For these reasons, the Commission considers that the local area is the most appropriate resolution for allocating UFE. This will provide the most efficient incentives for retailers to address UFE.

The Commission notes that most retailers will be facing charges for UFE for the first time on the commencement of the rule. The Commission therefore supports a 'soft start', as proposed

⁵⁸ Some methodologies, such as those used by the Victorian DNSPs, effectively assume that all historical UFE is an unaccounted for technical loss. In this way, commercial losses, NSLP errors, and other non-technical issues, can end up being recovered through DLFs, but with a one year lag (as DLFs are calculated on an annual basis).

by AEMO, allowing for UFE to be understood and potentially reduced, before it is allocated. This is discussed in Chapter 7.

Is global settlement likely to produce a net benefit?

As discussed above, the Commission considers that the largest potential benefits of global settlement relate to a reduction in UFE and the avoided costs of settlement disputes. As mentioned, the current volume of UFE is unknown, as is the extent to which it could be reduced through actions undertaken by retailers, DNSPs and AEMO. Nonetheless, international experience from New Zealand suggests that a reduction of between 0.1 and 0.3 per cent in total energy may be possible. A fraction of this is expected to be eliminated entirely, producing a saving of, perhaps, a few million dollars a year.⁵⁹ Add to this the Commission's estimate of the avoided costs of settlement disputes – conceivably in the low millions of dollars a year when the costs to all entities are included – and the potential annual benefit from these two sources could be in the range of \$3m to \$5m. These numbers are indicative only, based on the assumptions noted here.

There are also other possible benefits that could be material but are harder to quantify. These include savings for local retailers from being able to manage risk more effectively, the faster roll-out of interval meters, and more cost-reflective retail prices, avoiding potential structural distortions to retail prices and the market share of particular retailers.

The costs that have been identified by AEMO include AEMO's estimate of "less than \$5m" to implement changes to AEMO's systems, as well as unquantified costs that would be incurred by MDPs, retailers and DNSPs. AEMO identified some of the system and procedure changes that would be required in its High Level Design document.⁶⁰

The system change and data handling costs for AEMO and MDPs depend largely on the file format to be used by AEMO. However, the Commission considers that the changes involved in either scenario would be relatively minor. Contrary to the views provided by some submitters, it would appear that the volume of metering data that MDPs would need to transmit would actually *decrease* under global settlement. There are two main reasons for this:

1. In some cases, MDPs already send, and AEMO already receives, metering data for customers of local retailers.⁶¹
2. Under global settlement, MDPs would no longer provide local retailers with the metering data for the customers of independent retailers.

Consider the following indicative example: there are one million customers and the local retailer has a 30 per cent market share. Assuming AEMO's first data format option, the MDP would transmit 2.4m metering data profiles under settlement by difference (700,000 to independent retailers, 700,000 to AEMO, 1 million to the local retailer). Under global

⁵⁹ A rough estimate of NEM wholesale settlements is \$10b in a year. Assuming that wholesale charges are 30% of retail prices and network charges are 50%, the total value associated with wholesale energy and network charges could be ~\$27b a year. A 0.1% reduction would be \$27m a year. A fraction of this could be characterised as a net saving to the market from a move to global settlement. For argument's sake, this portion is assumed to be 10% of total UFE.

⁶⁰ AEMO, High Level Design, pp. 15-16.

⁶¹ AEMO, High Level Design, p. 14; Red Energy and Lumo Energy, p. 1.

settlement, this would be reduced to 2m (400,000 to independent retailers, 700,000 to AEMO, 300,000 to the local retailer).

Alternately, if AEMO is to adopt its second option (using the MDFF file format), it is likely that there would be a net decrease in the metering data transmitted by MDPs, since the MDM file format would cease. On this basis, the Commission expects that the changes required by MDPs to implement global settlement, over and above changes that are otherwise required for the delivery of five minute settlement, will likely be relatively minor, and therefore cost less than the \$500,000 suggested by Ausgrid. Other stakeholders also thought that these costs would be minor.⁶² AEMO's system changes to accommodate the MDFF file format are expected to be relatively small as they would be integrated with the five minute settlement changes.

There were mixed views on the likely implementation costs that would be incurred by retailers. On balance, the Commission expects that these will be modest on the basis that the affected systems are already subject to changes to implement five minute settlement. It is notable that AGL Energy and Origin Energy, which possess some of the largest and most complex IT systems in the market, thought that there will be no significant costs to them to implement the change. To the extent that there are incremental changes, such as the additional bill line item identified by Flow Power, the Commission expects that these costs will also be modest. The two and half year implementation period provides the opportunity for these changes to be packaged with updates that would have occurred irrespective of this rule change.

DNSPs are expected to incur costs to implement the Commission's chosen courses of action regarding unmetered loads (Chapter 4) and VTNs (Chapter 5). Both of these are expected to be largely one-off costs to provide information that is not currently provided to AEMO. In the case of unmetered loads, new or augmented systems for inventory management potentially need to be created. The Commission considers that the new provisions should be implemented in such a way by AEMO that these costs should be in the low \$100,000s per DNSP. There are 12 DNSPs in total, suggesting aggregate implementation costs around \$2.5 million. The costs to DNSPs from providing the 'mapping' data for VTN customers is more minor, and the draft rule contains a mechanism for an exemption when a net benefit is unlikely. Hence, an indicative, total cost for DNSPs is \$3 million.

By this analysis, it seems likely that implementing global settlement would be in the long term interest of consumers. The one-off implementation costs would appear to be less than \$10 million, even when AEMO's estimate of \$5 million is taken at full value. No significant on-going costs have been identified, in part because the change in the volume data transmitted due to global settlement is expected to be a decrease. In comparison, the quantifiable benefits have been indicatively estimated as being in the range of \$3m to \$5m a year. Further, unquantified benefits are expected to arise from retail prices being more cost-reflective, contributing to the dynamic efficiency of the market over time. In aggregate, it is likely that the benefits will be greater than the costs associated with global settlement,

⁶² AGL Energy, consultation paper submission, p. 7.

providing for efficiency benefits from which consumers of electricity will ultimately benefit over the long term.

A further consideration is that, in reaching the conclusion that a move to a global settlements framework is likely to be in the long term interests of consumers, the Commission considers that the relevant counterfactual is not necessarily the status quo. As with markets around the world where retail competition is maturing, a move to global settlements is likely to be required at some point in the future if it is not undertaken at this time. The further development of retail competition across the NEM is likely to continue to decrease the proportion of customers served by local retailers. This will exacerbate the problem of local retailers bearing the costs and risks of UFE and is likely to eventually necessitate a move to a global settlements framework. Importantly, if this occurs at a later date it is likely to result in higher costs when the systems changes are not made in synergy with the five minute settlement rule change.

3.5 Conclusion

Having considered AEMO's proposal in detail, the Commission is of the view that there would be benefits to the market from AEMO calculating the volume of UFE that exists in the market, and for this UFE to be allocated to all retailers, not just local retailers. However, in contrast to AEMO's proposal, the Commission considers that implementing global settlement in such a way that UFE is calculated by AEMO for each TNI, but allocated to retailers based on their 'accounted-for' energy across each local area, will best contribute to the NEO. The Commission's analysis suggests that implementing global settlement in this way will provide for a net benefit and, therefore, be in the long term interest of consumers.

4 UNMETERED LOADS

This chapter explores the potential frameworks for the treatment of non-type 7, unmetered loads under a global settlements framework.

4.1 Issue

There are many standalone loads that connect to the NEM, which do not have a meter. These standalone loads are generally unmetered due to very low consumption levels making them not cost effective to meter. For example, it would be impractical to meter every individual streetlight.

Unmetered loads that are reliable, predictable and able to be calculated can be classified as a type 7 metering installation.⁶³ The defining characteristic of type 7 loads is that the metering data produced is by a calculation rather than being physically metered. To maintain the integrity of energy settlement in the NEM the calculation is required to be sufficiently accurate to enable each load to be settled in the market for each trading interval. For example, across all jurisdictions street lights, and in New South Wales and South Australia, traffic lights are classified as type 7 metering installations. Each category of type 7 metering installation is registered with AEMO and the calculated load is processed through MSATS. These loads are also fully contestable, so any retailer can service these loads.

Where an unmetered load does not fall into an established type 7 metering installation category, they are settled non-market through a negotiated agreement between the customer (referred to as a *franchise customer* in the NEM), the LNSP and the local retailer. The LNSP and the local retailer are remunerated for the energy and network charges associated with these loads by the franchise customers. Franchise customers have typically been local councils and telecommunications companies.

Examples of off-market or non-market unmetered loads include, but are not limited to:

- sports ground flood lights
- public BBQs
- cable TV hubs
- NBN cabinets
- public telephones
- public sprinklers/irrigation
- parking ticket machines
- bus shelters
- CCTV cameras
- parking sensors.

Currently, as non-market unmetered loads do not enter NEM settlements, and are served by the local retailer, they are part of UFE. This is currently not a problem in terms of UFE

⁶³ See Box 4.1 for more information

allocation (other than the lack of transparency it creates), because UFE is charged to the local retailer and the local retailer charges franchise customers for the non-market unmetered load. However, under global settlements, non-market unmetered loads need to be accounted for in settlements and thereby removed from UFE to avoid all retailers being charged for load that the local retailer is being paid for.

4.2 AEMO's view

In the rule change request, AEMO identified that non-market unmetered loads need to be identified and removed from the UFE calculation to avoid double counting.⁶⁴ AEMO proposed two possible solutions for the management of non-market unmetered loads:

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

4.3 Stakeholder views

Of the 18 submissions on the global settlements consultation paper, eight submissions commented on the treatment of unmetered loads.

DNSPs suggested that while each unmetered device consumes a small amount of energy, in aggregate the volume of energy is material. AusNet Services submitted unmetered devices consume close to \$5 million in network revenue per year.⁶⁵ Ausgrid noted it had 170,000 non-market unmetered devices connected to its network.⁶⁶ Energy Networks Australia suggested one of its members had 8,000 franchise customer connections with varied fuse limits and a combined consumption of 10 GWh, and another distributor had similar figures of 10,000 connections with a combined consumption of 11 GWh.⁶⁷ The most detailed breakdown of non-market unmetered connections was provided by South Australian Power Networks in discussions with Commission staff. This is presented in Table 4.1 below.

64 AEMO, High level design, p. 12.

65 AusNet Services, consultation paper submission, p. 2.

66 Ausgrid, consultation paper submission, p. 4.

67 Energy Networks Australia, Consultation paper submission, p. 1.

Table 4.1: Unmetered load in South Australia

LOAD	APPROX. GWH CONSUMPTION	PROPORTION OF UNMETERED DEMAND	PROPORTION OF NON-MARKET UNMETERED DEMAND	PROPORTION OF TOTAL SOUTH AUSTRALIAN DEMAND
Street lights (Type 7)	102.9	80.7%	-	0.94%
Traffic lights (Type 7)	3.4	2.7%	-	0.03%
Flood lights	8.5	6.7%	40.2%	0.08%
Cable TV	5.2	4.1%	24.5%	0.05%
NBN cabinets	4.6	3.6%	21.7%	0.04%
Sprinkler/irrigation	0.7	0.6%	3.5%	0.01%
Phone cabinets	0.7	0.5%	3.2%	0.01%
Telstra CMUX	0.5	0.4%	2.6%	0.00%
Bus Shelters	0.3	0.3%	1.6%	0.00%
Parking Tickets	0.2	0.1%	0.9%	0.00%
Other	0.2	0.2%	1%	0.00%
Total unmetered supply	127.5	100%	-	1.16%
Total non-market unmetered supply	21.2	-	100%	0.19%
Total SA supply	11,000	-	-	100%

Source: South Australian Power Networks, private correspondence received 6 August 2018.

As Table 4.1 illustrates, non-market unmetered load contributes to 0.19 per cent of total electricity demand in South Australia, of which telecommunications infrastructure make up almost 0.1 per cent.

Most DNSPs noted that there would be some significant practical issues and high costs associated with implementing AEMO's first option of making all non-market unmetered loads,

type 7 metering installations.⁶⁸ For example, Ausgrid labelled this approach as tedious, noting it would not provide an efficient or cost effective outcome. Further, Ausgrid noted that because many of these loads are from older legacy equipment which is no longer manufactured, this approach would require this equipment to be removed, tested and reinstalled, which would dramatically increase costs.⁶⁹ Jemena said that the benefit of expanding type 7 to include all unmetered loads would not exceed the regulatory and administrative burden it would impose.⁷⁰

The two retailers that commented on unmetered loads considered that the most accurate option should be prioritised. AGL Energy noted that although it would be a significant task to gather an accurate inventory of unmetered loads, and establish profiles, it would be a valuable exercise to understand energy demand in the NEM.⁷¹ AGL Energy also suggested AEMO's second option would not be accurate and should only be considered a last resort.⁷² Similarly ERM Power noted that any errors in estimating calculations would be placed on all participants via UFE, and suggested careful consideration be placed on the methodology and that methodology be reviewed and tested.⁷³

Ausgrid, AusNet Services and Energy Networks Australia suggested establishing a new metering class for non-market unmetered loads (e.g. 7A).⁷⁴ Ausgrid suggested the new metering type would involve the Metering Coordinator and the customer agreeing on the proposed load and inventory table, and this data processed by the MDP and delivered for settlement.⁷⁵ AusNet Services proposed a new metering type could be used with intelligent street lighting and smart city enablers to prevent the requirement of a NEM compliant meter being installed at each site.⁷⁶ Similarly, the ENA suggested a new metering type be introduced for small loads that would waive the requirement for full NEM compliant meters being installed.⁷⁷

TasNetworks suggested they already have a process to submit non-market unmetered loads to the AEMO.⁷⁸ However, this appears to be predominantly for type 7 metering devices.

4.4

Analysis

4.4.1

Measurement of non-market unmetered loads

This section explores the options for measuring non-market unmetered loads under global settlements, including assessing AEMO's two proposed options.

68 Consultation paper submissions: Ausgrid, pp2-3; AusNet Services, p. 2; Jemena Electricity Networks, p.2.

69 Ausgrid, consultation paper submission, p. 3.

70 Jemena Electricity Networks, consultation paper submission, p. 2.

71 AGL Energy, consultation paper submission, p.2.

72 Ibid., p. 4.

73 ERM Power, Consultation paper submission, p. 3.

74 Consultation paper submissions: Ausgrid, pp. 2-3; AusNet Services, p.2; Energy Networks Australia, p.2.

75 Ausgrid, consultation paper submission, pp. 2-3.

76 AusNet Services, consultation paper submission, p. 2.

77 Energy Networks Australia, consultation paper submission, p. 2.

78 TasNetworks, consultation paper submission, p. 2.

AEMO's option 1 - register unmetered loads as a type 7 metering installation

This option may provide a relatively accurate solution for the measurement of unmetered loads that have predictable usage patterns because each type of load would have a relatively accurate estimate and calculation methodology developed. Once the load, inventory and calculation methods are established, this option would also be relatively easy to maintain with a straightforward process for adding new assets. Box 5 below explains some of the background to type 7 metering installation.

BOX 5: TYPE 7 METERING INSTALLATIONS

There are two established examples of type 7 metering installations:

1. Street lighting – Street lighting has defined on and off times for each day of a calendar year, based on sunrise and sunset. The luminaires used in street lighting undergo formal testing to determine the load values that can be used to calculate type 7 metering data. The distribution network service provider maintains inventory tables of each installed luminaire type. Using these critical data inputs, a simple algorithm can be used to calculate the interval metering data for each calendar day.
2. Traffic lights – The majority of traffic lights operate constantly, based on a predictable, short cycle. Once the load value for a traffic light can be determined through formal testing, and the number of traffic lights of that type are known, interval metering data can be calculated. In some cases traffic lighting is dimmed to a specific level, based on the sunrise and sunset timings, and the load value once dimmed can be determined through formal testing. As a result, dimmed traffic lighting can use one load value for the hours of daylight and another for the remainder of the 24 hours within a given day, and interval metering data can be calculated accordingly.

The process for establishing a new type 7 device is as follows:

1. The device must meet the following criteria stipulated in item 5(b) of table S7.4.3.1 of Schedule 7.4. of Chapter 7 of the NER:
 - a. load pattern is predictable
 - b. for the purpose of energy settlements the load pattern can be reasonably calculated by a relevant method set out in the metrology procedure
 - c. it would not be cost effective to meter the connection point taking into account the small magnitude of load, the connection arrangements and the geographical and physical location.
2. The registering party must then work with AEMO to ensure the device meets the relevant specifications. The registering party must provide AEMO with a load measurement test conducted by a National Association of Testing Authorities (NATA) accredited laboratory or an overseas equivalent.
3. If the device meets all relevant criteria, the proposal, accompanied by the load measurement test results, are then subject to public consultation.

4. If the new load does not meet any objections, and AEMO is satisfied it meets the requirements in the metrology procedures, it will approve the load and add it to the load table.

Further detail on the calculations for type 7 devices is available in the Metrology Procedures Part B section 12.

While this approach delivers a relatively accurate estimate of unmetered loads, it does have some significant practical challenges.

First, some of these loads would not be suitable to comply with type 7 requirements and would likely fail some of the requirements in the National Measurement Act. For example, if the load pattern is not predictable and varies constantly each day, the calculations for the calculated type 7 estimates could extend beyond acceptable margins of error.

Second, each of these loads would need to be assessed and undergo approval testing by the National Association of Testing Authorities (NATA) to assess the load size and consumption profile of the device. This could be burdensome and difficult to implement, due to the large variety of small devices that are distributed across distribution networks. Further, as highlighted by Ausgrid in their submission, there are many historic legacy devices (such as bus shelters and old public barbecues) that are no longer manufactured. These devices would need to be removed, tested sufficiently and then reinstalled, which may increase costs associated with this approach considerably.

AEMO's option 2 - Parties agree on an estimate of unmetered load

This option adopts a similar approach to the existing arrangements where the franchise customer, DNSP and FRMP negotiate an agreement about the approximate size and value of the unmetered load. Under this approach the load associated with the NMI would be processed through MSATS and subtracted from UFE, in a similar approach to type 7 loads. This would require a NMI to be allocated for each unique combination of franchise customer, DNSP, FRMP and TNI/VTN⁷⁹.

Discussions with stakeholders suggest that most devices that have been installed in the past few years undergo some form of NATA testing, where the maximum consumption level is identified and generally used as the load size for calculating the value of the load charged to the franchise customer. This may overestimate the quantity of energy consumed by unmetered devices. Further, each DNSP may have a different approach for estimating the size of the unmetered load from the same device. To implement this approach effectively, AEMO would therefore need to update the metrology procedures and the unmetered load guidelines to establish more detail on the process for estimates.

The unmetered load would also need to be assigned a profile. As noted above, according to stakeholders DNSPs generally assume the unmetered device is consuming the maximum load

⁷⁹ TNI and VTN allocation would adopt the same policy as discussed in chapter 5.

at all times to be conservative. While a conservative estimate for planning infrastructure decisions, this assumption may lead to overestimates that would be included in settlements. Under this option, AEMO in consultation with stakeholders would therefore need to set out options for profiling. These could include:

- a flat profile set at an appropriate level
- the relevant NSLP/Manually Read Interval Meter data profile
- an equipment-specific profile supported by NATA testing and evidence.

This approach, while less accurate than option 1, would provide a relatively less complicated approach to deal with unmetered load. AEMO would produce guidelines for estimating load, and verify the size and profile of the load with the franchise customer, DNSP and retailers to ensure the estimate is approximately correct and consistent across the NEM.

Establishing a new type of metering installation

Several of the consultation paper submissions suggested that a new metering installation type be established to support non-market unmetered loads that do not meet the requirements of type 7. This new metering type could be more dynamic in how it accounts for energy usage, for example using smaller meters that do not have a physical display or using supervisory control and data acquisition (SCADA) or another form of energy metering that does not comply with the current rules.

The development of this new metering type, while worth considering as a solution to broader questions relating to the metering of small loads in the medium term, would be a disproportionately complex and costly change simply to accommodate non-market, unmetered loads under global settlement.

4.5 Conclusions

Non-market unmetered loads need to be removed from UFE under a global settlements framework.

Ideally, it would be most accurate to make all non-market unmetered loads type 7 metering installations. However, this is not possible because not all types of unmetered loads meet the predictability requirements to be type 7 loads. Furthermore, it would be administratively burdensome, impractical, and the costs associated with such a change would likely outweigh the benefits. The option suggested by the DNSPs of creating a new metering type (e.g. 7A), while potentially worth pursuing in the medium term, is a relatively costly and complicated solution.

The Commission therefore considers that AEMO's option 2 is the most viable option. This option provides a simple and straightforward means to account for unmetered loads through settlement. For those loads that have an element of predictability, the Commission suggests AEMO should work with participants to assist with the development of additional type 7 categories where appropriate. The Commission also notes that future considerations should be made on the development of an additional metrology category.

4.6 Implementation

To implement the Commissions draft rule in relation to the treatment of non-market unmetered loads, several changes will need to be made to the current arrangements.

- First, AEMO will need to develop and update the metrology procedure and unmetered load guidelines.
- Second, DNSPs, MDPs and other relevant parties will need to work with AEMO to ensure the estimates of unmetered loads are calculated in accordance with the metrology procedures and guidelines. This would involve allocating non-market unmetered loads to a specific NMI, ensuring load and profile estimates are in accordance with AEMO's procedures and that the unmetered inventory tables are accurate.
- Finally, once established, MDPs will need to provide the estimated data to AEMO for settlement.

The draft rule therefore introduces a requirement on AEMO to include in its metrology procedures guidance for the inclusion of non-market unmetered load in settlement including: the creation of NMIs for non-market unmetered load; the assignment of connection points relating to unmetered non-market load to a single TNI or VTN; and the methodology for calculating load and a load profile for non-market unmetered load.

There will be an important balance between flexibility and prescription in the guidance that AEMO provides. While improvements can be made to the accuracy of the current arrangements and this will be important for settlements, the small magnitude of these loads means AEMO will need to carefully balance whether such improvements are outweighed by the costs of calculating estimates.

An examination of the implementation timing is presented in Chapter 7.

5 VIRTUAL TRANSMISSION NODES

As discussed in Chapter 3, the Commission considers that implementing global settlement in such a way that UFE is calculated by AEMO for each TNI, but allocated to retailers based on their 'accounted-for' energy across each local area, will, or is likely to, contribute to the NEO. This chapter considers how VTNs should be treated under global settlement.

5.1 Issue

In the NEM, connection points to the transmission network are identified by Transmission Node Identifier Codes, or TNIs. This acronym is also commonly used to refer to the connection points themselves, e.g. "Ausgrid currently has...57 TNIs through the network".

One instance in which TNIs are used in the regulatory framework is in the specification of technical losses on the transmission network. These are accounted for through Marginal Loss Factors (MLFs). MLFs represent electrical losses between a TNI and the regional reference node for the region in which the TNI is located. AEMO is required to calculate MLFs on an annual basis.⁸⁰

Clause 3.6.2(b)(3) of the rules allows, with the agreement of the AER, for transmission network loss factors to be averaged over an adjacent group of transmission network connection points, or TNIs. If averaging is used, the relevant transmission network connection points will be collectively defined as a VTN. The MLF for the VTN is calculated as the volume weighted average of the transmission loss factors of the constituent TNIs. AEMO's *Forward-Looking Transmission Loss Factors Methodology* explains the specific method that is used.⁸¹

One application of VTNs is to simplify the settlement process in situations where it is impractical to assign specific loads to a physical TNI. For example, in the case of the supply to customers being regularly switched between physical TNIs for operational reasons. The VTN in South Australia is used for a different purpose; it exists as part of the implementation of the state's 'country equalisation' policy. The instances in which VTNs are currently used in the NEM are shown in Table 5.1 below.

Table 5.1: Regional use of VTNs

REGION	VTN CODES	PURPOSE
New South Wales	NEV1, NEV2, NEV3	In New South Wales, VTNs apply only in the Ausgrid distribution area. They are used to simplify the application of MLFs for geographically dispersed Type 7 calculated and unmetered loads. Each VTN is used for (a) traffic lights; and (b) a legacy lighting program for 50 to 60 business customers.

⁸⁰ NER, clause 3.6.2. In the rules, MLFs are referred to as intra-regional loss factors.

⁸¹ AEMO, *Forward-Looking Transmission Loss Factors*, 8 February 2017, p. 18.

REGION	VTN CODES	PURPOSE
ACT	AAVT	The VTN applies to all ACT customers except for embedded generation, large customers and interstate transfers. It simplifies the application of MLFs by removing the need to map individual connection points to one of 12 TNIs. This is a practical solution given that the network covers a small geographical area and there is little variation in the MLFs of the constituent physical TNIs.
South Australia	SJP1	Under South Australia's 'country equalisation' policy, ⁸² the AER must "ensure that the prices charged to small customers for network services in relation to distribution services in the State are not subject to variation on the basis of location" ⁸³ when making a distribution determination or approving a pricing proposal. As part of this, the South Australian legislation requires the AER to determine any transmission loss factor using a single VTN for all small customers that has been calculated by the transmission network service provider. ⁸⁴
Tasmania	TVN1, TVN2	The VTNs apply to all customers in Hobart and Launceston except for large customers. They simplify the application of MLFs by removing the need to map individual connection points to TNIs, which may be changed regularly for operational reasons.

Under clause 3.15.3 of the rules, the entity that is financially responsible for a VTN is the market participant which is the local retailer for all the market connection points assigned to that VTN. The current process used to settle the customers assigned to VTNs is as follows:

- Each independent retailer who is responsible for one or more NMIs assigned to a VTN is *charged* on the basis of the DLF-adjusted, metered energy for the NMI, scaled by the MLF of the VTN.
- The local retailer for the VTN is *charged* on the basis of the total metered energy for each of the TNIs that constitute the VTN, in each case scaled by the MLF of the TNI.
- The local retailer for the VTN is *credited* on the basis of the total DLF-adjusted energy consumed for all NMIs associated with the VTN that are served by independent retailers, scaled by the MLF of the VTN.

AEMO's proposed rule deletes references to VTNs from the settlements process in chapter 3 of the NER. The issue that this creates is that the process described above, and VTNs currently in use, would cease to exist under the NER. By implication, an alternative process

82 Electricity Pricing Order, see The South Australian Government Gazette, 5 December 2002, p. 4458.

83 National Electricity (South Australia) Act 1996, section 18(5)(a).

84 Ibid., section 18(5)(c).

(which could be an existing process) would be required to deal with the energy that is currently settled through the use of VTNs.

5.2 AEMO’s view

AEMO’s rule change request proposes to remove the local retailer role from the NER on the basis that the global settlement concept does not differentiate between retailers. This is reflected in the proposed rule, which removes the direct financial responsibility for VTNs from local retailers. Instead, under AEMO’s proposal, global settlements would operate at the TNI level, with all NMIs assigned to a physical connection point. There would be no spot market transactions or FRMP for a VTN.

After the rule change request was received, the Commission requested that AEMO develop options for the treatment of VTNs under global settlement for the purpose of consultation. These are set out in Table 2.

The options have different cost implications for AEMO and DNSPs. Depending on the option which is chosen, DNSPs may incur:

- a once-off cost associated with ‘mapping’ existing VTN customer meters to a TNI so that costs could be attributed to each NMI
- increased on-going costs to assign all customer meters to a TNI.

Table 5.2: Potential options for the treatment of VTNs under global settlement

OPTION	EFFECTS
<p>1. Retain VTNs and:</p> <ul style="list-style-type: none"> • settle at the TNI level • allow the energy associated with VTN NMIs to become UFE and be allocated to the physical TNIs that make up the VTN. 	<ul style="list-style-type: none"> • No change to VTN policy arrangements. • UFE would be calculated and allocated for each TNI. • The metered energy for VTN NMIs would be part of UFE. The UFE would be apportioned across the non-VTN NMIs connected to the physical TNIs that make up the VTN. This distortion would lead to customer prices not being cost-reflective.
<p>2. Remove VTNs and:</p> <ul style="list-style-type: none"> • maintain settlement at the TNI level • require the physical TNI to be used instead of the VTN. 	<ul style="list-style-type: none"> • AEMO’s proposed UFE methodology could be implemented, with the UFE being calculated and allocated for each TNI. • DNSPs would need to attribute each VTN NMI to a physical TNI (once-off cost). • Jurisdictions may wish to retain the existing arrangements in regard to VTNs.
<p>3. Retain VTNs and:</p> <ul style="list-style-type: none"> • maintain settlement at the TNI level 	<ul style="list-style-type: none"> • No change to VTN policy arrangements. • The proposed UFE methodology could be implemented, with the UFE being calculated for

OPTION	EFFECTS
<ul style="list-style-type: none"> enable this option by updating AEMO's systems to split the TNI field in MSATS into two so that one field is the physical TNI (location) and the other is the MLF (or VTN MLF). 	<p>each TNI.</p> <ul style="list-style-type: none"> AEMO's retail and wholesale systems would need to be changed to allow a separate MLF code to be stored and used. DNSPs would need to attribute each VTN NMI to a physical TNI (once-off cost).
<p>4. Retain VTNs and:</p> <ul style="list-style-type: none"> maintain settlement at the TNI level enable this option by updating AEMO's systems to create additional VTN codes in MSATS for each combination of VTN and TNI. Does not require an additional field. 	<ul style="list-style-type: none"> No change to VTN policy arrangements. The proposed UFE methodology could be implemented, with the UFE being calculated for each TNI. Requires AEMO to create additional "dummy" VTNs and link them to physical TNIs using a look-up table. Would involve a significant update of MSATS standing data. DNSPs would need to attribute each VTN NMI to a "dummy" VTN, reflecting the physical TNI (once-off cost).
<p>5. Retain VTNs and:</p> <ul style="list-style-type: none"> calculate UFE at the local area level. 	<ul style="list-style-type: none"> No change to VTN policy arrangements. UFE would be calculated and allocated for each local area Requires lesser changes to AEMO's and DNSPs' systems than other options. This option provides a more level playing field than 'settlement by differencing', however it is less cost reflective than options 2, 3, and 4 where settlement occurs at the TNI level.

5.3 Stakeholder views

AGL Energy, Ausgrid, ENA, PLUS ES, TasNetworks and the South Australian Government all supported the continued use of VTNs.⁸⁵

AGL Energy considered that there should be minimal changes to the arrangements for VTNs and therefore supported option 3 (in Table 5.2).⁸⁶ The ENA indicated that among its members, strongest support was shown for options 4 and 5.⁸⁷

⁸⁵ Consultation paper submissions: AGL Energy, p. 5; Ausgrid, p. 4; Energy Networks Australia, p. 2; PLUS ES, p. 2; South Australian Government, p. 1; TasNetworks, p.2.

⁸⁶ AGL Energy, consultation paper submission, p. 5.

⁸⁷ Energy Networks Australia, consultation paper submission, p. 2.

Ausgrid, PLUS ES and TasNetworks provided further information on how VTNs are currently used and the implications of their potential removal. Ausgrid submitted that VTNs are an effective method for managing aggregated Type 7 NMIs where more precise allocation would be difficult or expensive for customers.⁸⁸ PLUS ES, a provider of metering data services to Ausgrid for its type 6 and 7 metering installations, considered that there would need to be some form of aggregation as it is not practical to have, for example, a remotely located bus shelter with one light attracting its own NMI.⁸⁹

TasNetworks advised that it uses two VTNs for all customers, excluding transmission-connected customers, in Hobart and Launceston. These customers are, respectively, served by seven and six transmission substations.⁹⁰ TasNetworks explained that the network switches associated with changes to Hydro Tasmania's generation profile, planned network outages or network faults can result in tens of thousands of customers changing TNI. It noted that it would be difficult to keep MSATS up to date since:

- there is currently no facility to make automated, bulk updates to MSATS
- there are presently no links between TasNetworks systems that contain customer information and those that facilitate network control. This is because such links have not been required due to the use of VTNs.

TasNetworks considered that a bespoke solution would likely require significant up-front capital expenditure and ongoing operational expenditure to support. Therefore, TasNetworks' preference is for a derogation to keep the existing VTN arrangements in place, or for AEMO's option 5 to be used.

The South Australian Government noted that the use of VTNs is mandated in the NEL. Section 18 further requires the AER to use a single VTN for all small customers in South Australia in its pricing decisions. These requirements were put in place in line with South Australia's 'country equalisation scheme'.⁹¹

5.4 Analysis and conclusion

Submitters provided a range of examples in which VTNs provide a cost effective solution to technical or policy challenges that would likely be difficult or costly to address by other means. It is notable that while the policy objectives of VTNs are separate to those of global settlements, there will still be situations under global settlements where using VTNs to average transmission loss factors will be an efficient course of action. For these reasons, the Commission considers that VTNs should be retained as a feature of the regulatory framework under global settlement.

As discussed in Chapter 3, the Commission's draft rule involves allocating UFE to retailers based on their 'accounted-for' energy across each local area. This is most consistent with Option 5 in Table 5.2 – there is no change to the VTN policy arrangements and UFE is

⁸⁸ Ausgrid, consultation paper submission, pp. 3-4.

⁸⁹ PLUS ES, consultation paper submission, p. 2.

⁹⁰ TasNetworks, consultation paper submission, p.2.

⁹¹ South Australian Government, consultation paper submission, p. 2.

allocated at the local area level. The Commission considers that this option most easily accommodates the continued use of VTNs into the future. This option is more preferable than option 1 because it allows for the energy associated with the VTN NMIs to be properly accounted for in settlement, rather than being allocated to all retailers as UFE.

The other central component of the Commission's draft rule is a requirement for AEMO to calculate the volume of UFE for each TNI. In Chapter 3, the Commission found that there would likely be material benefits from AEMO doing this calculation and providing this information to the market. To accurately calculate UFE, AEMO will need to know which TNI every customer allocated to a VTN is physically connected to. This information will assist in the identification of sources of UFE, potentially resulting in UFE being reduced over time. Hence, the draft rule contains a requirement on DNSPs using VTNs to provide this information, the NMI-to-TNI 'mapping' for VTN customers, to AEMO. Consistent with c. 3.6.3 of the rules, the mapping exercise should take into account normal network configurations and predominant load flows.

AEMO has indicated that it will need to make system changes to MSATS to accommodate this extra information; options 3 and 4 above are two possibilities for how this can be done. The Commission considers that it would be most appropriate for this detail to be determined by AEMO in its relevant procedures during the implementation process rather than being specified in the rules. The Commission expects AEMO to determine the most effective option during the implementation process and for this to be specified in the relevant procedure.

While the Commission expects there to be material benefits from AEMO being able to accurately calculate UFE levels for each TNI, it also acknowledges that it may not always be practical or cost-effective for DNSPs to provide the NMI-to-TNI 'mapping'. For example, TasNetworks explained that it regularly switches tens of thousands of Hobart and Launceston customers between TNIs. To provide flexibility in situations such as this, the draft rule offers DNSPs the ability to request an exemption from providing this information.

Under the draft rule, AEMO may exempt a DNSP from the requirement to provide the NMI-to-TNI 'mapping' where (in AEMO's reasonable opinion) the exemption is not inconsistent with the NEO. AEMO may take into account:

- the effort and costs that would be incurred by the DNSP to comply with the requirement
- the volume of energy associated with the VTN relative to the total energy in the local area in which the VTN is being used
- the amount of UFE in the local area in which the VTN is being used
- the level of retail competition in the local area in which the VTN is being used
- any other conditions AEMO considers appropriate.

AEMO may revoke an exemption if there has been a material change in circumstances and in AEMO's reasonable opinion the exemption is no longer justified. The Commission considers that this process will enable AEMO to strike a reasonable balance between collecting information that will have a material impact on the accuracy of its UFE calculations for each TNI, without creating a disproportionate administrative burden for the affected DNSPs.

In instances where AEMO has granted an exemption from providing the NMI-to-TNI 'mapping', AEMO is required to calculate and publish UFE volumes for the VTN rather than individually for its constituent physical TNIs.

6 OTHER DESIGN CONSIDERATIONS

This chapter explores some additional design elements that need to be considered for the implementation of global settlements, including the treatment of:

- non-market generators
- embedded networks
- metering at transmission connection points.

6.1 Non-market generators

Clause 2.2.5(a) of the rules states that a generating unit 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.⁹² Further, cl. 2.2.5(c) specifies that 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 under the rules as a result of a direction issued by AEMO. Instead, non-market generators receive income via bilateral agreements with either the local retailer or a customer at the same connection point. An example of a non-market generator is a sugar mill that sells electricity to the local retailer, in a relationship akin to a power purchase agreement.

Non-market generators can be non-scheduled, semi scheduled or scheduled, however all of the currently installed non-market generators are non-scheduled. The table below shows the 17 non-market generators currently registered in the NEM.

Table 6.1: Non-market generators currently registered in the NEM

PARTICIPANT	STATION NAME	REGION	FUEL SOURCE	MAX CAPA CITY (MW)
AGL Hydro Partnership	Rubicon Mountain Streams Station	VIC	Hydro	13
CS Energy Limited	Callide Power Station	QLD	Black coal	30
EDL Group Operations Pty Ltd	Berwick Power Plant	VIC	Landfill Methane gas	7
Landfill Operations Pty Ltd	Melbourne Regional Landfill	VIC	Landfill Methane gas	8.88
LMS Energy Pty Ltd	Eastern Creek 2 Gas Utilisation Facility	NSW	Landfill Methane gas	10

⁹² AEMO's interpretation of these clauses is set out in section 3.6. of AEMO, *Guide to Generator Exemptions & Classification of Generating Units*, 20 March 2018.

PARTICIPANT	STATION NAME	REGION	FUEL SOURCE	MAX CAPA CITY (MW)
Mackay Sugar Limited	Racecourse Mill Power	QLD	Bagasse (sugar cane)	48
Pacific Hydro Challicum Hills Pty Ltd	Challicum Hills Wind Farm	VIC	Wind	53
Pacific Hydro Portland Wind Farm Pty Ltd	Portland Wind Farm	VIC	Wind	148
Pioneer Sugar Mills Pty Ltd	Pioneer Sugar Mill (unit 1)	QLD	Bagasse (sugar cane)	68
	Pioneer Sugar Mill (unit 2)			
Snowy Hydro Limited	Jindabyne Pump At Guthega	VIC	Hydro	70
Synergen Power Pty Limited	Snuggery Power Station	SA	Diesel	21
Tasmanian Irrigation Pty Ltd	Midlands Power Station	TAS	Hydro	7
Wilmar Sugar Pty Ltd	Victoria Mill (unit 3)	QLD	Bagasse (sugar cane)	24
	Victoria Mill (unit 4)			

Source: AEMO, *NEM Registration and Exemption List*, accessed August 2018.

The key point of difference between market and non-market generators is their exposure to the NEM wholesale market. As non-market generators have all their sent out generation purchased by either the local retailer, or a customer at the same connection point, there is no exposure to the spot price, nor are they required to pay market fees or meet prudential requirements. In contrast, market generators are exposed to the spot market and must sell all their energy into the spot market (and pay for any energy they consume at the same connection point through the spot market).

AEMO's design for global settlement removed the role of the local retailer from the settlements process. It proposed that the arrangement for non-market generators be extended from the local retailer to all market customers, as long as the generation does not exceed the sum of the market customer's market loads within the local area. As discussed in chapter 2, the Commission's draft rule does not remove the local retailer from the NER. However, even if the role of the local retailer remains, as non-market generators are not currently processed through MSATS, any generation they export from their connection point will need to be treated appropriately to ensure that their generation is not counted as UFE.

6.1.1 AEMO's view

AEMO suggested two options for the treatment of non-market generation that would otherwise have been purchased by the local retailer:

- Option 1 - Require non-market generators to reclassify as market generators if their output exceeds the load at the same connection point. This is the current policy for energy purchased from non-market generators by customers other than the local retailer. This would most likely require a transitional arrangement for existing non-market generation purchased by the local retailer. The transitional arrangement could look like option 2.
- Option 2 - Extend the current local retailer arrangement to all retailers, by allowing the output of non-market generators to be purchased by (and assigned in MSATS to) any market customer as long as the sent out generation purchased from all non-market generators units in the local area will not exceed the sum of the market customer's market loads within the same local area.

6.1.2 Stakeholder views

Of the 19 submissions to the consultation paper, four submissions commented on the treatment of non-market generators. AGL Energy suggested that if the non-market generators are appropriately metered, there should be no impact on UFE, and therefore no specific action would be required.⁹³ Energy Queensland suggested that if global settlements were to be adopted, non-market arrangements should be extended to all market customers.⁹⁴ Energy Consumers Australia stated that the treatment of distributed energy resources should be considered as part of the overall issues for orchestrating and considering the value streams from DER.⁹⁵

In their submission to the consultation paper, AEMO reiterated the two options suggested in the rule change proposal. They also noted that the implications of these options extend beyond global settlement, and therefore the option with the least impact to the participation of distributed generation should be adopted. AEMO suggested that option 2 is the most appropriate transition arrangement for the implementation of global settlement.⁹⁶

6.1.3 Analysis

Both of the options proposed by AEMO would only affect non-market generators that export electricity to the grid. Non-market generators that sell all their output to a customer at the same connection point would not be affected by these changes as there is no electricity exported beyond the connection point under normal conditions.

The Commission's consideration of the two options identified by AEMO is set out below.

⁹³ AGL Energy, consultation paper submission, p. 7.

⁹⁴ Energy Queensland, consultation paper submission, p. 2.

⁹⁵ Energy Consumers Australia, consultation paper submission, p. 4.

⁹⁶ AEMO, consultation paper submission, p. 3.

Option 1 - Require reclassification if output exceeds load at same connection point

As the non-market generator classification provides an avenue for these generators to sell energy under reduced regulatory obligations under the rules, this option would likely add a considerable compliance and regulatory burden to existing non-market generators that are net exporting from their connection point. As market generators, these units, that in most cases are relatively small generators, would be required to pay AEMO's fees and settle through the wholesale market. A benefit of this approach would be their generation would become contestable and they could contract their output with any counterparty, not just the local retailer. However, this option is already available to non-market generators if they reclassify as market generators.

The Commission does not support this option as it would impose a regulatory burden on non-market generators that is not justified for the purpose of implementing global settlement when less disruptive options are available.

Option 2 - Extend non-market generator classification to apply to any market customer whose non-market generation does not exceed its load in a local area

This option would allow non-market generators to maintain similar arrangements to their current situation, while also allowing non-market generators to contract with any retailer with sufficient load in the network area. This could have some positive impacts for retail competition as it would allow retailers with growing market share in a particular network region to vertically integrate the generation to cover part of its load. However, this option would also involve some additional monitoring by AEMO to ensure each retailer's load exceeds its non-market generation for each local area.

The Commission supports AEMO's suggestion in option 2 that sent-out generation from non-market generators should be explicitly recognised in MSATS. The output of non-market generators that are net-exporters from their connection point needs to be accounted for by AEMO so that it does not become part of UFE. However, the Commission does not support the proposed change to extend the current arrangement to all market customers. As the energy exported by non-market generators would need to be settled through MSATS under global settlement, the distinction between market and non-market generators becomes less. In this context, the rationale for non-market generators that are net exporters being exempt from paying market fees and facing other regulatory obligations is also reduced. Hence, it would not be justified to expand this arrangement to all market customers.

Under global settlement, the convenience that was created by a non-market generator dealing directly with the local retailer falls away, since the metering data from the sent out generation needs to be processed through MSATS. The Commission considers that it is no longer desirable for the non-market generator classification to be open to generating units who sell the entirety of their sent out generation to the local retailer. Under such an arrangement, some participants would be afforded a reduced regulatory responsibility, without a commensurate benefit for the market. The draft rule therefore amends clause 2.2.5(a) to remove this option for new entrants, but grandfathers the existing arrangements for existing non-market generators that sell all their sent out generation to the local retailer.

6.1.4

Conclusion

The Commissions position is for:

- Existing non-market generators that export electricity beyond their connection point to be explicitly settled through MSATS. The local retailer will be assigned indefinitely as the FRMP and be allocated all spot market revenues for the energy sent-out by the non-market generators.
- The provisions for registering as a non-market generator to be changed from the commencement date of the rule, so that a generating unit can only be registered as a non-market generating unit if the entirety of its sent-out generation is purchased by a customer located at the same connection point. A generating unit that wants to sell its output to a market customer must become a registered participant (e.g. market generator, or market small generator aggregator), or operate via an intermediary who is a registered participant.
- Existing non-market generators that sell all their sent out generation to the local retailer currently will continue to be eligible for the non-market generator classification through transitional provisions in the draft rule.

This approach allows the existing non-market generators to continue operating as they currently do under settlement by difference. As the local retailer will now be the FRMP for any connection points to which that generator is connected, and will be paid for any sent out generation which exceeds load at a relevant connection point, there will be visibility of the generator's output in MSATS and it will not be reflected as UFE.

6.2

Embedded networks

Embedded networks are private electricity networks which serve multiple customers and are connected to another distribution or transmission system through a parent connection point. A party other than the registered LNSP owns and operates the private electricity network that customers connect to.

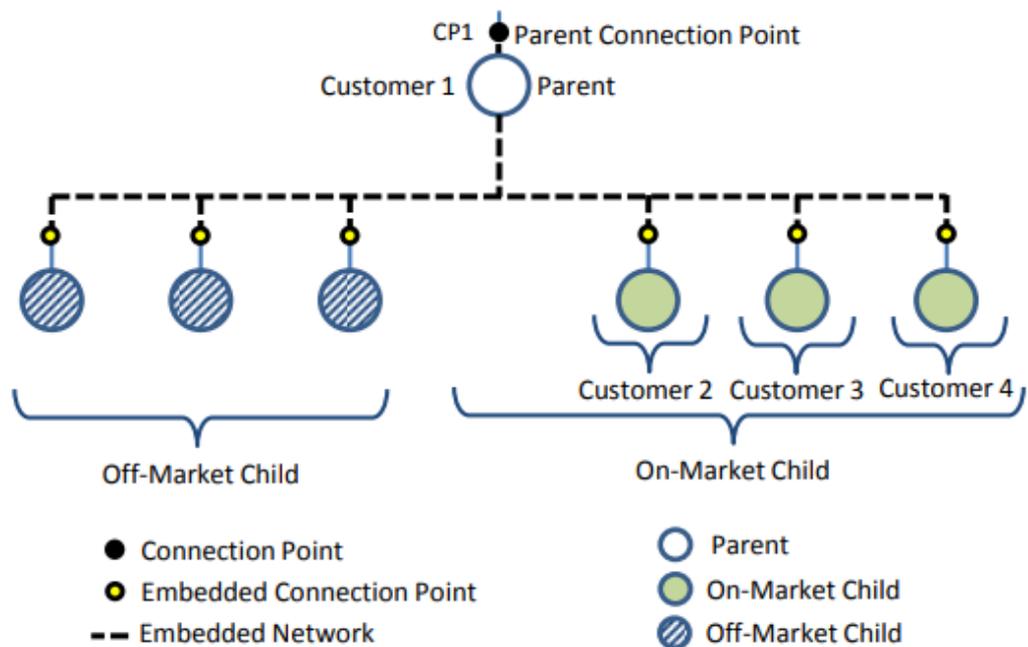
Common examples of embedded networks include shopping centres, retirement villages, apartment complexes and caravan parks. Embedded networks may occur as new developments or retrofits of existing buildings. Within embedded networks, customers can either be on-market or off-market. On-market customers are supplied by authorised retailers and their metering services (including installation, maintenance and meter reading) are provided by accredited providers. These customers' metering data is provided to AEMO and they are settled through MSATs. Off-market customers are supplied by exempt retailers, their metering services are not required to be provided by accredited providers and they are not visible to the market.

For the purposes of settlements, within an embedded network an additional settlement by differencing calculation is undertaken for on-market child connection points prior to settlements occurring. This involves MSATS netting off on-market child customers' load from the parent connection point load. The parent connection point retailer therefore pays for the total load of the embedded network minus any on-market child customers' load. An example

of an embedded network configuration with four stylised customers, four retailers and load is provided in Figure 6.1 below. The extra step in settlements at the parent connection point is also set out in Figure 6.1.

As displayed in Figure 6.1, the off-market child connection points are not visible within settlements. They are therefore accounted for via the parent connection point. In this example, 32,000 kWh is allocated to the parent connection point (Customer 1), calculated through the additional settlement by differencing calculation. The 32,000 kWh consists of the consumption by all of the off-market child connection points, and any other loads that the might be located within the embedded network (e.g. lighting, water chillers).

Figure 6.1: Embedded network configuration and settlements example



CUSTOMER	RETAILER	METERED LOAD (KWH)	SETTLEMENT LOAD (KWH)
Customer 1	Retailer A	50,000	= 50,000 – 5,000 – 6,000 – 7,000 = 32,000
Customer 2	Retailer B	5,000	5,000
Customer 3	Retailer C	6,000	6,000
Customer 4	Retailer D	7,000	7,000

Note: "Settlement load" is the energy volume used for settlement. It has not yet been adjusted for technical losses (i.e. DLF).

The retailers at both the parent and on-market child connection points do not currently pay UFE unless they are the local retailer.

6.2.1 **AEMO's view**

AEMO states in its rule change request that global settlements cannot be applied to embedded networks. This is because 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.

6.2.2 **Stakeholder views**

AGL Energy supported AEMO's proposal for embedded networks to continue to be settled under a settlement by differencing approach.⁹⁷ EnergyAustralia stressed the importance that care be taken in developing this rule change to preserve the ability of MDPs to be able to send on-market data to the retailer at the parent connection point.⁹⁸

6.2.3 **Analysis**

The proposed introduction of global settlements raises two questions for application to embedded networks:

1. Can embedded networks be settled under a global settlements framework or do they need to continue to utilise settlements by difference within the embedded network?
2. Should the retailers with on-market customers within embedded networks have that load included in their UFE allocation?

Currently, AEMO has no visibility of metering data for off-market child connection points. It is not practical to change this, because the metering services of off-market customers are not required to be provided by accredited providers. Therefore in regards to the first question, the Commission considers that settlements within embedded networks need to continue under the existing arrangements. That is, a separate settlements by difference calculation occurring within the embedded network to net off on-market child customer load against the parent connection point load. After this step has occurred, global settlements can then apply at the parent connection point and on-market child connection points.

Under this arrangement UFE, will be allocated to the retailer(s) at on-market child connection points, because these loads are included in MSATS. The parent connection point retailer will be allocated UFE on the basis of the parent connection point load after the on-market child connection point load has been netted off. The Commission considers that this will provide efficient incentives to all parties within embedded networks regarding UFE. Retailers of on-market child customers will be incentivised to resolve UFE for that connection point because they will be paying UFE. Parent connection point retailers, and through them, embedded network service providers (e.g. shopping centre owners) will be incentivised to reduce UFE within the embedded network because they will be paying UFE.

⁹⁷ AGL Energy, consultation paper submission, p. 5.

⁹⁸ EnergyAustralia, consultation paper submission, p. 3.

6.2.4 Conclusion

The Commission's view is that under global settlements, embedded networks continue to be settled using settlements by difference within the network. This is because the current requirements for off-market meters are not suitable for global settlements. Additionally, the Commission's position is that UFE be allocated directly to the retailers of on-market customers, while the parent retailers will be allocated UFE for off-market customers.

6.3 Transmission connection point metering

The rules assign responsibility for metering at the transmission connection point to the connection point's FRMP. Under these obligations, the FRMP either must contract the Transmission Network Service Provider (TNSP) to act as Metering Coordinator (MC), or the FRMP must act as MC.

For the metering between the transmission and distribution networks, the FRMP is the local retailer of the DNSP area. For example, AGL Energy is the FRMP for connection points between the Victorian transmission network and Jemena's distribution network area, where the TNSP (AusNet Services) is contracted by AGL Energy to perform the role of MC.

In its submission to the consultation paper, AEMO considered that because global settlement will remove the role of local retailer, local retailers' roles as the FRMP for the connection point will be disestablished. This role will need to be filled in order for an MC to be appointed for the connection points at the intersection of the transmission and distribution networks.

6.3.1 AEMO's view

AEMO did not raise the issue in its original rule change request, however in its consultation paper submission, AEMO proposed two potential solutions:

1. The LNSP for the connection point is nominated as the metering coordinator in the NER.
2. AEMO is tasked under the NER to appoint the metering coordinator. AEMO has a minor role in appointment of MDPs for interconnector metering installations in the NEM. AEMO's role could be extended to include nomination of the metering coordinator at these additional connection points.

AEMO also noted that the Commission will need to consider the method for the TNSPs recovery of costs if option 1 is adopted. For option 2 to be viable, the restrictions on parties that can be appointed as metering coordinator for these connection points would need to be relaxed.

6.3.2 Stakeholder views

Due to the issue not being raised in the rule change request, only AusNet Services commented on it. AusNet did not express a preference for option one or two. It noted though that as the implementation date for five minute settlement and global settlements is likely to be aligned, any changes to responsibility for appointing TNSP metering could risk a successful implementation of 5 minute settlements, unless those changes are made well in advance of 1

July 2021. AusNet suggests that if any changes were to occur for the responsibility of appointing TNSP metering, they should be made by 1 Dec 2019.⁹⁹

6.3.3

Analysis

If AEMO were to appoint the metering coordinator at the transmission connection points, it would allow for additional competition between metering coordinators. However, if the TNSP were to nominate the metering coordinator, there would be several benefits including:

- It provides continuity in provision of metering services, as TNSPs are operating as the metering coordinator for each of the affected connection points today.
- For the implementation of the five minute settlement rule change TNSPs will already be developing, and possibly implementing a program to convert these current metering installations to be capable of five-minute recording, collection and processing. Confidence in the ongoing management of these installations and the associated services is important.
- The meter connection point is often inside TNSPs infrastructure (e.g. substation), so anyone other than the TNSPs MDP would need to request permission to access the area.
- There is precedent in the NER for nomination of the LNSP as an exclusive provider of services for interconnector connection points, which are critical to settlement.

6.3.4

Conclusion

The Commission considers that the TNSP at the connection point should be the metering coordinator. To give effect to this, the draft rule specifies that the LNSP be nominated as the metering coordinator for metering installations at points that connect a distribution network with a transmission network. The relevant LNSP for these metering installations is the TNSP.

⁹⁹ AusNet Services, consultation paper submission, p. 1.

7 IMPLEMENTATION PROCESS

This chapter considers the process through which the global settlement changes outlined in Chapters 3 to 6 should be implemented.

7.1 Issue

Under the NEL, the Commission must make a rule as soon as practicable after publishing its final rule determination. However, the Commission can make a rule that does not come into effect straight away. Therefore, the Commission can determine that the commencement date for a rule to implement global settlement can be at some point in the future in order to allow for a suitable transition period (i.e. 1 July 2021 to align with the implementation of five minute settlement).

The main implementation process issues for the implementation of global settlement are:

- the commencement date
- whether the changes should be implemented in a progressive manner (e.g. one geographic region at a time)
- if transitional arrangements should be included in the rule.

7.2 AEMO's view

AEMO proposed that the IT system capability for global settlement should be developed in alignment with the design and build activities already underway for the introduction of five minute settlement on 1 July 2021.

It noted that the process and system changes required to support global settlement are similar to those required for five minute settlement and "considerable synergies" could be found by aligning the processes.¹⁰⁰ Implementation activities, transition and market readiness for both projects would follow the same structure and format.¹⁰¹

AEMO did not propose a commencement date for global settlements.

7.3 Stakeholder views

There was considerable stakeholder support for aligning the implementation of global settlement with five minute settlement.¹⁰² Generally, submitters saw alignment as the most sensible option that would keep costs to a minimum. The Australian Energy Council thought that aligning the implementation process could cause unnecessary complications, but still indicated support for concurrent implementation to avoid greater costs.¹⁰³

¹⁰⁰ AEMO, Rule change proposal, p. 3; AEMO, High level design, p. 15.

¹⁰¹ AEMO, High level design, p. 15.

¹⁰² Consultation paper submissions: Ausgrid, pp. 4-5; Australian Energy Council, p. 1; ERM Power, p. 4; Jemena, p. 1; Origin Energy, p. 1; PLUS ES, p. 3; TasNetworks, p. 3.

¹⁰³ Australian Energy Council, p. 1.

AGL Energy noted that while the system development of global settlement and five minute settlement will be concurrent, the two changes do not necessarily need to commence at the same time. AGL Energy also suggested that global settlement reporting on UFE volumes could commence ahead of changes to settlements, noting that this could encourage action to minimise high levels of UFE.¹⁰⁴ AEMO proposed this as well, suggesting that settlement calculations under a global framework be performed for a period of time alongside the existing settlement processes. It considered that this would allow participants to understand the impact and work to resolve any major discrepancies.¹⁰⁵

One dissenting view came from Energy Queensland. It urged caution in aligning the changes on the basis that businesses may have already committed to project plans and resource allocation for the five minute settlement rule.¹⁰⁶

On the question of staging implementation by geographic area, three submitters indicated that they do not support this approach.¹⁰⁷ ERM Power thought that this approach would be costly and complex to implement.¹⁰⁸ AGL Energy considered there would be no need for staging as the changes will have already been tested and many retailers operate in multiple jurisdictions.¹⁰⁹

7.4 Analysis and conclusion

AEMO and other submitters considered that the implementation of global settlement should be aligned with the design and build activities for five minute settlement. The key milestones specified in the five minute settlement final rule are:

- clause 11.103.2(a): AEMO must have consulted and amended its relevant procedures, methodologies and guidelines by 1 December 2019
- five minute settlement will commence on Thursday, 1 July 2021.

It is expected that a test environment for five minute bidding and five minute settlement will be provided by AEMO for a period in the order of one year ahead of the commencement date.¹¹⁰

The Commission notes that considerable synergies have been identified by AEMO on account of the global settlement changes relating to the same IT systems and processes that are to be amended in the course of implementing five minute settlement. Indeed, the Commission's final rule on five minute settlement specifies that AEMO must review and where necessary amend a total of 16 documents, including the Metrology Procedures and MSATS Procedures.¹¹¹

104 AGL Energy, consultation paper submission, p. 6.

105 AEMO, consultation paper submission, p. 2.

106 Energy Queensland, consultation paper submission, p. 2.

107 Consultation paper submissions: AGL Energy, p. 6; ERM Power, p. 4; PLUS ES, p. 3.

108 Ibid.

109 Ibid.

110 AEMO, Slides presented at the 24 May 2018 five minute settlement information session.

111 Ibid., p. 39.

Stakeholders have also identified that concurrent implementation would minimise their implementation costs. The Commission understands from discussions with retailers that a sizable proportion of their implementation costs arise from mobilising teams and employing new staff. Hence, synergies are possible from implementing global settlement at the same time. Conversely, a delayed implementation would increase costs because some mobilisation costs would be incurred a second time.

It was also suggested that global settlement should be implemented at the same time to take advantage of the heightened industry focus around the five minute settlement implementation. The feedback also suggested that businesses processes are sufficiently flexible to accommodate the implementation of global settlement, despite the five minute settlement implementation project having already commenced.

For these reasons, the Commission considers that it would be beneficial for the design and build activities, as well as the commencement date, for the global settlement rule to be aligned with the commencement of the five minute settlement rule.

The draft rule therefore specifies that global settlement will commence on 1 July 2021, which coincides with the start date of five minute settlement. This implementation period – just over two and a half years – is sufficient to accommodate the necessary system change projects that some submitters identified. The design and testing work prior to this date will also be aligned, including the requirement for AEMO to have updated its procedures by 1 December 2019.

It is expected that this implementation timeframe, a relatively long timeframe for a change of this scale, will allow for AEMO to calculate and publish UFE data at the TNI resolution for around 12 months in advance of the rule commencing. To facilitate this 'soft start', the draft rule includes transitional provisions for AEMO to be provided, from 1 July 2020, with NMI-to-TNI 'mapping' data from DNSPs using VTNs, and data on the estimated consumption of unmetered loads. As noted in Chapters 4 and 5, AEMO will require this data to accurately calculate the volume of UFE for each TNI. AEMO will also require additional metering data for customers that are currently served by local retailers. This can be achieved through an amendment to AEMO's Metrology Procedures, to be completed by 1 December 2019.

8 ABBREVIATIONS

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AEST	Australian Eastern Standard Time
COAG	Council of Australian Governments
Commission	See AEMC
DLF	Distribution loss factor
DNSP	Distribution Network Service Provider
FRMP	Financially Responsible Market Participant
IEA	International Energy Agency
IT	Information Technology
LNSP	Local Network Service Provider
MCE	Ministerial Council on Energy
MDFF	Meter Data File Format
MDM	Meter Data Management
MDP	Metering Data Provider
MLF	Marginal loss factor
MSATS	Market Settlement and Transfer Solution
NATA	National Association of Testing Authorities
NEL	National Electricity Law
NEM	National electricity market
NEO	National electricity objective
NERL	National Energy Retail Law
NER	National Electricity Rules
NMI	National Metering Identifier
NSLP	Net system load profile
ROLR	Retailer of last resort
SCADA	Supervisory control and data acquisition
TNI	Transmission node identifier
TNSP	Transmission Network Service Provider
UFE	Unaccounted for energy
VTN	Virtual transmission nodes

A SUMMARY OF OTHER ISSUES RAISED IN SUBMISSIONS

This appendix sets out the issues raised in the first round of consultation on this rule change request and the AEMC’s response to each issue. If an issue raised in a submission has been discussed in the main body of this document, it has not been included in this table.

Table A.1: Summary of other issues raised in consultation paper submissions

STAKEHOLDER	ISSUE	AEMC RESPONSE
AEMO, p. 2.	The effect of increasing penetration of distributed resources on loss calculations requires further consideration in the broader and ongoing review of distributed resources. This issue needs to be considered beyond the global settlements proposal.	While this issue may require further consideration, it is not directly related to the Global settlements rule change request, and is out of scope for this rule change.
AGL Energy, p. 4.	Unregistered generation such as rooftop solar needs to be metered appropriately to ensure the accurate accounting of supply and UFE.	The Commission recognises the importance of unregistered generation being properly accounted for. There are currently incentives in place for unregistered generators to be metered appropriately, such as receiving feed-in tariffs. Any further obligation on metering would be outside the scope of this rule change.
Ausgrid, p.6.	With increasing penetration of advanced metering, it is worth considering whether samples of smart meter data could be used by AEMO for the NSLP calculation.	Any changes to the methodology to develop the NSLP would fall outside the scope of this rule change request.
EnergyAustralia, p. 3.	A retailer of last resort (ROLR) event requires historical consumption data for automatically transferred customers. Often, the ROLR and the local retailer are the same retailer so when a ROLR event occurs, the retailer has access to historical consumption data. If ROLRs no longer receive this data in advance of an event, there could be	The Commission notes that the majority of the ROLR provisions are established in the National Energy Retail Law (NERL). The rule change request was made under the NEL and the Commission does not consider it is necessary or

STAKEHOLDER	ISSUE	AEMC RESPONSE
	<p>financial contagion if ROLRs are unable to appropriately hedge their financial risk, as well as delays in setting up customers on appropriate contracts. This is currently an issue in cases where the designated ROLR differs from the local retailer, but would become a broader issue under this proposed change. A possible solution is to ensure that historical meter data is provided by AEMO within 24 hours of a ROLR event occurring, with an indication from AEMO regarding the aggregate size of the load being transferred to be provided within 12 hours.</p>	<p>consequential to also make a rule under the National Energy Retail Rules amending the ROLR provisions.</p> <p>Under s 144 of the NERL, AEMO is responsible for making the ROLR Procedures. These Procedures are part of the MSATS Procedures. The NEM ROLR Processes in MSTAS Procedures would seem to be the appropriate place to put in a time limit for the transfer of historical metering data.</p>
<p>Energy Consumers Australia, p. 2</p>	<p>The current arrangement and global settlement proposal fail to incentivise management of the level of technical losses. It suggested that an alternative approach involving a Distribution System Operator could address this issue, hence it may be premature to move to global settlement now.</p>	<p>The matter of incentives to minimise distribution network technical losses was not identified in AEMO’s rule change request. Therefore, measures to reduce technical losses are outside of the scope of this process. Rather, the Commission’s draft rule improves incentives for technical losses to be accurately reflected via DLFs, and for UFE to be more accurately allocated to market customers in order to improve incentives to reduce UFE. The Commission considers that implementing global settlement does not preclude the establishment of a Distribution System Operator arrangement at a later time.</p>
<p>Energy Queensland, p.1.</p>	<p>We do not support providing individual metering data at a NMI level for types 5-7 metering installations to the MDFF NEM 12 and NEM 13 formats used in settlement. In the event that the rule change is successful, we would support continuation of the existing settlement</p>	<p>The file format that AEMO will require to implement global settlement will be decided upon in its reassessment of its procedures as a result of the rule if made.</p>

STAKEHOLDER	ISSUE	AEMC RESPONSE
	process where data is aggregated to the TNI level.	
ERM Power, p. 5.	AEMO has a revision policy whereby a percentage threshold exists for a special revision (5%). This will be less likely to be triggered under a global settlements approach. However, the rule should be changed to allow for a request of special revision if any individual retailer's acquisition would be impacted by greater than 5%.	This is an issue for AEMO to consider in its reassessment of its procedures as a result of the rule if made.
Flow Power, p. 1.	The ratio of independent retailers to local retailers varies between regions and states. If the global settlement rule is adopted, it will result in customers paying a different rate per unit of consumption from one region to another – even from the same power source.	The Commission's draft rule specifies that UFE will be allocated based on a market customer's 'accounted-for' energy at the local area level. Hence, the UFE allocated to independent retailers is unrelated to the market share of the local retailer. To the extent that this causes difference from one region to another, this would be due to the UFE being more accurately allocated, which is likely to increase the cost-reflectivity of prices. The Commission considers this to be a benefit of the change as it will result in an increase in allocative efficiency.
Origin Energy pp. 1-2.	Data errors contribute to UFE, and resolving these errors has been problematic. Origin suggests that incentives (and/or a specific requirement) is added to the Rules for DNSPs to maintain the integrity of the data they hold, and expeditiously address any data errors - including those identified by retailers. This will ultimately lead to lower amounts of UFE, and thus see UFE costs reduced	The draft rule provides for AEMO to undertake reviews where UFE exceeds a defined threshold within a TNI. This will provide a process to resolve data errors such as those noted by Origin Energy.

STAKEHOLDER	ISSUE	AEMC RESPONSE
	<p>across all retailers. For example, Origin has observed some TNIs with far more UFE than can be explained by factors such as theft, and conversely found some TNIs where UFE was negative compared to published loss factors. We hypothesised that these anomalies were likely NMI-to-TNI allocation errors in the standing data maintained by the DNSPs.</p>	
<p>PLUS ES, pp. 4-5.</p>	<p>PLUS ES would need to understand the intention of services AEMO would support with 100 per cent data being provided to determine what savings there may be to gain as an MDP. PLUS ES has a large Valued Added Services market it services. With AEMO holding a Central Repository of all data, what provisions will be in place around VAS services directly from AEMO which will impact the PLUS ES business.</p>	<p>The provision of competitive metering services is not one of AEMO's statutory functions under the NEL. Further, metering service providers need to be accredited and registered with AEMO, and AEMO is not able to accredit and register itself.</p>
<p>Red Energy and Lumo Energy p. 2.</p>	<p>AEMO also settles many gas markets by difference; however this rule change only focuses on AEMO wanting to rectify anomalies in electricity settlements.</p>	<p>The rule change request received by AEMO sought amendments to the National Electricity Rules. It is out of scope of this rule change to consider changes to the National Gas Rules.</p>
<p>South Australian Government, p. 2.</p>	<p>The Division notes that AEMO's rule change request proposes deletion of certain references to 'local retailers' in the National Electricity Rules. In making these changes it will be important that no unintended consequences flow for the customer protections under the National Energy Customer Framework, and in particular the obligations of local area retailers under the National Energy Retail Law (South Australia) Act 2011 to provide connections to customers where there is no existing connection.</p>	<p>In its more preferable draft rule, the Commission has not removed reference to the local retailer in the National Electricity Rules.</p>

B LEGAL REQUIREMENTS UNDER THE NEL

This appendix sets out the relevant legal requirements under the NEL for the AEMC to make this draft rule determination.

B.1 Draft rule determination

In accordance with s. 99 of the NEL the Commission has made this draft rule determination in relation to the rule proposed by AEMO.

The Commission's reasons for making this draft rule determination are set out in sections 2.2 to 2.5 of this draft rule determination, and in more detail in Chapters 3 to 6.

A copy of the more preferable draft rule is attached to and published with this draft rule determination. Its key features are described in section 2.1.

B.2 Power to make the rule

The Commission is satisfied that the more preferable draft rule falls within the subject matter about which the Commission may make rules. The more preferable draft rule falls within s. 34 of the NEL as it relates to:

- the operation of the NEM
- the activities of persons (including Registered Participants) participating in the NEM or involved in the operation of the national electricity system.

Further, the more preferable draft rule falls within the matters set out in Schedule 1 to the NEL as it relates to:

- the payment of money for settlement of transactions or electricity purchased or supplied through the wholesale exchange operated and administered by AEMO
- the regulation of persons providing metering services relating to the metering of electricity.

B.3 Commission's considerations

In assessing the rule change request the Commission considered:

- its powers under the NEL to make the rule
- the rule change request
- submissions received during first round consultation
- the Commission's analysis as to the ways in which the proposed rule will or is likely to, contribute to the NEO.

There is no relevant Ministerial Council on Energy (MCE) statement of policy principles for this rule change request.¹¹²

The Commission may only make a rule that has effect with respect to an adoptive jurisdiction if satisfied that the proposed rule is compatible with the proper performance of AEMO's declared network functions.¹¹³ The more preferable draft rule is compatible with AEMO's declared network functions because it leaves those functions unchanged.

B.4 Civil penalties

The Commission cannot create new civil penalty provisions. However, it may recommend to the COAG Energy Council that new or existing provisions of the NER/NGR/NERR be classified as civil penalty provisions.

The final rule does not amend any clauses that are currently classified as civil penalty provisions under the NEL or National Electricity (South Australia) Regulations. The Commission does not propose to recommend to the COAG Energy Council that any of the proposed amendments made by the final rule be classified as civil penalty provisions.

B.5 Conduct provisions

The Commission cannot create new conduct provisions. However, it may recommend to the COAG Energy Council that new or existing provisions of the NER be classified as conduct provisions.

The draft rule does not amend any rules that are currently classified as conduct provisions under the NEL or National Electricity (South Australia) Regulations. The Commission does not propose to recommend to the COAG Energy Council that any of the proposed amendments made by the draft rule be classified as conduct provisions.

B.6 Northern Territory consideration

From 1 July 2016, the NER, as amended from time to time, apply in the Northern Territory, subject to derogations set out in Regulations made under Northern Territory legislation adopting the NEL. Under those Regulations, only certain parts of the NER have been adopted in the Northern Territory.

The draft rule amends clause 6.20.1 of Part J of Chapter 6 of the NER. Part J of Chapter 6 will apply in the Northern Territory from 1 July 2019 unless the Northern Territory modifies the application of that clause in the Northern Territory before that date.

The draft rule amends provisions in Chapter 7 of the NER. From 1 July 2019 the Northern Territory's Chapter 7A will apply in substitution for Chapter 7. The Commission has therefore considered the reference to the national electricity system in the NEO to be a reference to

¹¹² Under s. 33 of the NEL the AEMC must have regard to any relevant MCE statement of policy principles in making a rule. The MCE is referenced in the AEMC's governing legislation and is a legally enduring body comprising the Federal, State and Territory Ministers responsible for energy. On 1 July 2011, the MCE was amalgamated with the Ministerial Council on Mineral and Petroleum Resources. The amalgamated council is now called the COAG Energy Council.

¹¹³ Section 91(8) of the NEL.

the interconnected national electricity system and not the local distribution systems in the Northern Territory.

As the more preferable draft rule either does not currently apply in the Northern Territory or, for the new Chapter 10 definitions, applies to parts of the NER that have not yet been adopted in the Northern Territory, the Commission has not assessed the proposed rule against additional elements required by Northern Territory legislation.