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20 June 2008

Dr John Tamblyn
Chairman
Australian Energy Market Commission
PO Box A2449
SYDNEY SOUTH NSW 1235
By email: submissions@aemc.gov.au

Dear Dr Tamblyn,

RE: NEMMCO SUBMISSION ON STAGE 2: ISSUES PAPER- REVIEW OF DEMAND-SIDE PARTICIPATION IN THE NATIONAL ELECTRICITY MARKET

Thank you for the opportunity to comment on the AEMC's Stage 2: Issues Paper for the Review of Demand-Side Participation in the National Electricity Market (**NEM**). NEMMCO supports the aims of this review in facilitating more efficient demand side participation in the NEM and provides representation to the AEMC's working group. NEMMCO also supports the AEMC prioritising low cost, high impact issues.

NEMMCO has comments upon the Issues Paper primarily in the areas of:

- Definitional matters;
- Wholesale and financial markets; and
- Reliability.

These comments are provided below.

NEMMCO appreciates your consideration of this submission. If you wish to discuss any of the matters identified please do not hesitate to contact Ben Skinner on (03) 9486 8769.

Yours sincerely,

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1. Definitional Issues

NEMMCO wishes to make several observations on matters of definition and objective in the review. These are important to assist in understanding the AEMC's scope and objectives for the review. Refer also to the diagram provided in Appendix 1 which allocates forms of DSP against markets.

1.1. Demand-side Participation (DSP)

The Terms of Reference provides a definition of DSP that may, with the understanding gained to this point in the review, require some alteration or clarification. The review defines DSP as:

> "DSP is the ability of consumers to make decisions regarding the quantity and timing of their energy consumption which reflects their value of the supply and delivery of electricity."

- This definition explicitly refers only to energy consumption. It would appear to unintentionally exclude small generators (that the paper has described as "embedded generators") that may export into a distribution network. The stage 1 and 2 papers discuss embedded generators at length, with the latter qualifying them as "…consumers…substituting their consumption of electricity from the network with their own generation"[1] which appears to exclude generators that export into a distribution network. NEMMCO recommends a definition that does not exclude small, exporting generators (see 1.4).

- "…reflects *their* value of the supply and delivery of electricity." (Emphasis added). NEMMCO interprets the intention of this definition in that demand interruption is considered to be appropriate only to the point at which the explicitly priced electricity supply savings exceed the value of electricity to that customer. Environmental benefits, unless explicitly priced, are externalities. NEMMCO supports this interpretation.

1.1.1. Use of similar terms

We observe the industry uses a range of terms in this field, including "Demand Management", "Active Demand-Response", "Demand-side Response" and "Energy Efficiency", none of which have a single, broadly accepted definition. The National Electricity Rules (NER) defines "Demand Management Incentive Scheme", which appears to include the same range of activities captured by this review. The Issues Paper also uses the term "demand management"[2] and it would be helpful to clarify if there is intended to

[1] Issues paper, Pg 19
[2] Issues paper, Pg 3 & 9

be a distinction between "demand management" and "demand-side participation".

Alternatively, the AEMC could categorise distinct activities against specific terms. NEMMCO observes several distinct activities occurring in this field:

- Customers optimising the timing of their own consumption;
- An "aggregator" or retailer optimising the timing of consumption of many customers and/or optimising the dispatch of many small generators
- The construction or connection of small generators;
- Overall energy consumption reduction through energy efficiency measures.

1.2. Impediment

The AEMC's definition of an "impediment" is consistent with NEMMCO's understanding of the objective of the Terms of Reference and the National Electricity Objective. An impediment is a barrier to "potentially efficient" DSP, not a barrier to DSP that could not be economically justified on the basis of explicitly priced benefits.

> "…legitimate requirements of the market…costs, obligations and incentives apply more or less to any participant and cannot be considered as an impediment to DSP."[3]

In this submission NEMMCO responds with the aim of removing any specific barriers: i.e. "levelling the playing field" rather than favouring DSP over other forms of participation.

1.3. Aggregator

The Issues Paper uses this undefined term. A clear definition of the scope of the role of the "aggregator" would be useful for this review[4]. The following represents NEMMCO's observation of current practices, noting that this is an emerging role, and practices may change over time.

At a high level, NEMMCO understands an aggregator to be a commercial entity who is contractually engaged by non-electricity industry businesses to assist the realisation of economic value from:

- Small generating units; and
- Controlling the demand profile of a customer's consumption.

[3] Issues Paper, Pg 6

[4] Given the emerging nature of the business model, NEMMCO does not recommend defining the role in the rules at this time.

The entity brings value in terms of:

- Expertise in the electricity industry;
- Lowering cost for the businesses through economy of scale;
- Repackaging of multiple products into a large, simpler offering;
- Improving overall reliability of the product by accumulating many small individual providers.

1.3.1. Target Markets

NEMMCO understands Aggregators aim to derive value from products offered into the following markets:

- The wholesale market;
- The retail market (e.g. by managing an end-user customer's profile, the customer may gain access to a more competitive retail offering);
- Network support services to a Network Service Provider;
- Reserve trader contracts to NEMMCO; and
- Ancillary service loads under contract to NEMMCO.

1.3.2. Small generator aggregation

Aggregators accumulate small generating facilities and control their dispatch into these markets. The aggregator may:

- Use the dispatch to offset the net import of a customer thereby providing demand-side services; or
- Arrange separate metering of the small generator, take financial responsibility for and sell the electricity into the NEM.

Such aggregators have approached NEMMCO and discussed potential market administrative improvements to assist their role. NEMMCO sees value in a range of options, which include proposing a new participant class (see 3.3.4) to reduce barriers to the aggregation of small generators and to facilitate the small generators' access to a competitive environment similar to retail competition.

1.3.3. Demand response aggregation

Aggregators can provide products into these markets by controlling the consumption of customers. We understand that an aggregator has no intention of being involved in the financial settlement of the consumption of electricity which distinguishes it from a retailer[5].

[5] who would normally be a registered Market Customer

Such a role does not require the direct involvement of NEMMCO[6] and a separate participant class does not seem necessary.

1.4. Embedded Generator

The issues paper uses the term “embedded generators” which is defined in the **NER** as being "a generating unit connected within a distribution network and not having direct access to the transmission network". Generating units within that definition currently exist in sizes up to 400MW, some of which are Market Scheduled Generating Units and operated by sophisticated participants. We do not believe this definition is the intent of the DSP review.
NEMMCO proposes an alternative definition based around generating unit size. Under NEMMCO's guidelines for registration as a Generator, a standing exemption is granted to any person who owns, controls or operates a generating system that:

- has a total nameplate rating at a connection point of less than 5 MW; or
- is not capable of exporting to a transmission system or distribution system in excess of 5 MW; or
- has no capability to synchronise or to operate electrically connected to a distribution system or transmission system.

We propose the AEMC replace the term "Embedded Generator" with "Small Generator", which is defined as above.

Alternatively, the AEMC could broaden the definition to include <u>any</u> person who is eligible under NEMMCO's guidelines for exemption from registration, which adds to the standing exemptions any generating system that has a nameplate rating of less than 30 MW and:

- exports less than 20 GWh in any twelve month period; or
- where extenuating circumstances apply.

This submission has interpreted the term “Embedded Generator” when used in the Issues Paper in line with this definition.

2. <u>Network Access and Connection Arrangements</u>

2.1. Connection standards

The issues paper has asked:

> “We are seeking your views about whether the existing minimum technical standards contained in the Schedules of Chapter 5 of the Rules reflect the minimum standards for connection. In addition, we are seeking your views about whether the minimum standards for connection are consistent across

[6] Except in the rare cases of a *scheduled load* or an *ancillary service load* that are already defined.

jurisdictions and reflect appropriate minimum requirements for connection of EG to the network."[7]

S5.2.1(b) removes the application of these minimum technical standards from a generator that is exempted or eligible for exemption from registration[8], subject to:

(being) connected or intended for use in a manner the Network Service Provider (**NSP**) considers is unlikely to cause a material degradation in the quality of supply to other Network Users.

NEMMCO thus observes that Schedule 5.2.1, subject to the NSP's consideration, is not relevant to these generating units. The NSP's consideration will instead be focussed upon the individual codes and connection approaches of that particular NSP than it will on consistency with the NER.

NEMMCO is not familiar with the technical challenges of connecting exempt generators, but observes that whilst this design intends to simplify their connection, it may in fact be complicating it through inconsistency. Proponents of small generators may prefer a national set of connection standards such as S5.2.

2.2. Minimum Metering Requirements

NEMMCO believes there is merit in clarifying the minimum metering requirements for small generators in the NER. Currently a small generator can be connected to the distribution network with a type 6 accumulation meter. The preferred option to facilitate market competition is to require, at least, a type 5 interval meter. This approach would maximise the opportunity for the generator to participate in the NEM and facilitate the transfer of the generator between financially responsible market participants (FRMP's). As a new meter capable of measuring export to the grid is usually required at the time of installation of a small generator, we do not believe such a minimum specification would add material cost.

3. Wholesale Markets and Financial Contracting

Chapter 5 of the Issues Paper opens many questions regarding potential barriers to DSP in the NEM's wholesale market, for example entry cost and suitability of market signals. Contrary to some perceptions, the NEM was initially intended to facilitate the entry of DSP and we suspect it has become a significant player. In fact, the design presents such low technical hurdles to its entry (compared to, say, large generation) that it has become difficult to quantify its true size.

[7] Issues Paper, Pg 21
[8] As noted previously, we believe exemption would be granted to all those small generators the AEMC is considering in this review.

When considering the matters in this chapter, the AEMC should classify whether each perceived "barrier" to DSP, is an:

- Inhibitor to participation within the current market design; or an
- Expected outcome of this energy-only, real-time priced market design which does not internalise participant constraints.

NEMMCO discusses some of the former below, however these are relatively minor barriers and their removal, whilst low cost, are unlikely to have a high impact. Regarding the latter, resolution is neither simple nor low cost, and will impact other participants.

3.1. Wholesale market pricing arrangements

NEMMCO prices the NEM by balancing observed demand against presented supply offers and demand-side bids (if any) every 5 minutes, subject to network and other physical constraints. The dispatch price is therefore an accurate representation of the market conditions at a reference node at a moment in time.

Most participants in the supply and demand-side are unable to move from shutdown to operating or vice versa with 5 minutes' notice, and most have significant start-up costs. In the NEM real-time spot price design, participants are expected to self-manage these commitment issues by anticipating high prices and investing in their own operating period. Commitment errors are also at the participant's own risk.

To assist this decision making, NEMMCO provides a group of market forecasts. The most important of these for this kind of decision making is "pre-dispatch" [9], which provides forecasts of 16-40 hours ahead which includes forecast regional prices and sensitivities[10]. These forecasts are however non-firm, and decisions based on them may prove, with hindsight, to be sub-optimal. For example, a participant's own commitment decision will have some effect on the final price.

Scheduled participants are required to iteratively re-bid their commitment and pricing intentions, thus keeping the forecast up to date. NEMMCO forecasts the other key input: unscheduled demand and supply.

There is one complication to this approach: the *fast-start inflexibility profile* (FSIP). This allows fast-starting Scheduled Generators or Scheduled Loads to receive a start instruction when a dispatch price exceeds their offer or bid, to remain at zero dispatch for up to 30 minutes and then to remain dispatched above a nominated level for up to 1 hour (including the start time). Again it is non-

[9] The Pre-dispatch forecast horizon is more relevant to these issues than the PASA forecast as suggested in pg 26 of the Issues Paper.
[10] For more information see NEMMCO's Operating Procedure "Pre-dispatch" http://www.nemmco.com.au/powersystemops/3704.html

firm, in that the realised price achieved in the period after start-up may be less than the offer/bid.

Some overseas markets have forms of centralised commitment or day-ahead lock-ins of prices and dispatch volumes. These are major design departures from the NEM. They require significant balancing services to manage the unforeseen variations in supply and demand that occur after the lock-in time. The cost of balancing services are additional to the price of energy. (See also 3.2.2.1 General Transparency of the Demand-side).

NEMMCO observes that the NEM design rewards flexibility, in that participants who minimise their commitment times and costs are less exposed to error. This, in turn, is of benefit to overall market efficiency.

Within the supply-side of the market, NEMMCO is aware of generators with recall times as short as 1 minute and as long as 24 hours. NEMMCO believes that a similar spectrum of demand-side response exists. Thus the operational barriers described in section 5.1.1 of the issues paper are not peculiar to DSP and may therefore fall outside of the definition of an impediment under section 1.2.1.

NEMMCO agrees that operating the sophisticated decision making typical of a large generator may not be justified for some demand-side participants and that they may still be able to participate indirectly through their arrangements with retailers. A retailer who takes on that decision making should be able to benefit through its reduction in exposure to high prices and share that benefit with its customer. We also note the emergence of the aggregator (see 1.3) as a specialist in this area capable of providing value to their customers and the NEM.

3.2. Forecast accuracy

3.2.1. Improvements underway

Maintaining and improving forecasting accuracy is a key performance target of NEMMCO. Examples include:

- The Australian Wind Energy Forecasting Project (AWEFS) will model actual windfarm production in pre-dispatch timeframe and is expected to considerably improve pre-dispatch forecasts in South Australia from late 2008.
- Sub-regional demand forecasting models will be implemented over a period of 2 to 3 years which will improve the operation of constraints with sub-regional demand-terms.
- NEMMCO is increasing its capabilities in the area of longer-term demand forecasting as used by the MTPASA and Statement of Opportunities.

3.2.2. Transparency of DSP

Generator facilities of a size greater than 30MW are, in general, required to become Scheduled or Semi-scheduled. As a result they are obligated to bid into the market and provide various forecasts to NEMMCO. Their operation is subsequently published.

Rules and facilities exist to allow the demand-side to also become Scheduled. The NER does not however apply an obligation on smaller generators or DSP of any size except where required for the maintenance of system security[11]. There are very few currently registered Scheduled demand-side participants[12]. Non-scheduled DSP is forecast by NEMMCO within the general demand. NEMMCO has no way of forecasting demand response in the pre-dispatch timeframe, and actual response appears as a demand forecasting error.

Becoming Scheduled incurs individual cost (see section 3.3), whilst the benefits are a common good: through improvements to market forecasts. Thus it will not develop further without an obligation.

There are some parallels to the growth of windfarms and the emergence of the Semi-scheduled registration class. Initially windfarms were exempted from being scheduled and their small magnitude meant the resulting demand-forecast error was immaterial. They subsequently grew to a point where their impact on demand forecast accuracy and power system security became material and therefore some mandated participation was required. However, the Scheduled Generator obligations did not suit their technology and specific rules were created to accommodate them. To our knowledge, unscheduled DSP is not yet causing material error, but may do so in time. It may also be that rather than becoming a Scheduled Load, another form of information provision may better suit their participation.

Interestingly, an obligation to provide information to NEMMCO would present both a new barrier to DSP participation in terms of cost, but also reduce a barrier by improving forecasts.

3.2.2.1. General transparency of the demand-side

NEMMCO observes that whilst effectively all supply forecasting is provided by participants, demand forecasting is performed centrally by the market operator on behalf of effectively all customers. This design should be contrasted with some net electricity pools and Australian gas balancing markets where retailers supply a forecast of their own customers' demands and are financially exposed to the balancing cost of managing

[11] NER 3.8.2(e)
[12] All of which are large Pumped storage schemes

subsequent deviation. These arrangements are common where there is an ex-ante "lock-in" of energy prices well before the dispatch timeframe.

NEMMCO recognises that re-arranging the source of demand forecast would represent a radical change.

3.3. Cost of participating in wholesale market

NEMMCO is keen to assist in the promotion of developments in the Rules that efficiently facilitates innovation of products from aggregators and Market Participants. The issues paper has noted a number of possible costs that may present a barrier to DSP participating in the wholesale market.

3.3.1. Costs of non-scheduled DSP

As noted in section 3.2.2, the great majority of DSP, including small generators, have chosen to remain non-scheduled. For these operations, there are effectively no direct costs of participation in the wholesale market: they are not required to register, provide any real-time metering, bid or register performance standards. General metering and prudential costs are the same or lower than for customers without DSP.

NEMMCO concurs that the indirect costs of monitoring the wholesale market may be high for a small DSP operation. In that regard we however point to the valuable role that sophisticated retailers and aggregators can play as discussed in sections 1.3 and 3.1. Similarly these parties are aggregating DSP into a lower-risk total product that may be of value to the financial markets.

3.3.2. Costs of Ancillary Services Load

Loads that have a DSP function and wish to participate in the ancillary service markets may become registered under clause 2.3.5. This clause provides flexibility for NEMMCO to tailor the minimum controls and data requirements that the specific load must provide to adequately supply the ancillary service.
An Ancillary Services Load must be registered by a Market Customer. There are no additional registration fees incurred by an existing market customer as a result of registering an Ancillary Services Load.
NEMMCO observes that the mandated involvement of a retailer may be seen as a barrier to some providers and is not necessary for the technical provision of an ancillary service.

3.3.3. Costs of Scheduled Load

Under 2.3.4(d) a Market Customer may request NEMMCO classify any of its Market Loads as a Scheduled Load. This results in no additional registration or prudential costs for the Market Customer. It is however required to comply with 2.3.4(e) and chapter 3 that places obligations regarding the provision of real-time data, bids and compliance with dispatch instructions equivalent to that of a Scheduled Generator. For large DSP operations, such as Aluminium Potlines, this burden is reasonable, however for small operations it seems unrealistic.

Where aggregators have accumulated many small instances of DSP, it would be more appropriate to have arrangements that do not require specific metering and bids for each instance. For example a form of aggregated, notional, Scheduled Load. It may also be worthwhile allowing the function to be provided by others than the load's retailer.

As noted in section 3.2.2, these difficulties are unlikely to have slowed growth in DSP per se as loads and small generators are not obligated to become Scheduled. However they will need to be addressed if an obligation is proposed.

3.3.4. Proposal to create a new class of Financially Responsible Market Participant

NEMMCO has been approached by aggregators who have observed a potential barrier to their development of arrangements that allow the participation of small generators located within a customer's premises. In these cases, the aggregator wishes to become the Financially Responsible participant on behalf of the small generator but not on behalf of the customer's load. Adequate metering is provided to ensure that this can occur.

The current rules however require that for a generator to be settled on market with NEMMCO, it must be registered as a Market Generator Unit at each individual instance. This creates an administrative burden. Market Customers, by comparison, are able to classify and transfer financial responsibility for market loads through the Metering Settlement and Transfer Solution (MSATS). It also increases the cost of small generators switching between different aggregators. Ideally, small generators should have access to competition in this area in the same way that end-use consumers do through Full Retail Competition.

NEMMCO has considered the following options:

- Allowing Market Customers to classify negative loads and Generating Units as Market Loads; and

- Allowing Market Generators the same flexibility to classify Market Generating Units as applies to Market Loads.

At this time NEMMCO prefers the second of these options. Any new approach as defined in the rules and built into MSATS should be as flexible as possible by permitting different metering configurations. NEMMCO is interested to learn if the AEMC considers this proposal consistent with the direction of its findings in this review.

3.4. DSP reward

Section 5.3 of the Issues Paper discusses whether DSP is insufficiently compensated. It is worth itemising the potential economic benefits that DSP can provide and considering whether each is eligible for an income stream commensurate with the benefit they provide.

For example:

1. **Network Investment Deferral** can be compensated through Network Support Agreements (NSA's) and UOS tariff structures;
2. **Wholesale Energy Market** value can be compensated by arrangements with aggregators, retailers or directly with NEMMCO to benefit from market prices;
3. **Power System Security** value can be provided and compensated through the ancillary services markets;
4. **Reliability** Benefits can be compensated through Reserve Trader contracts.

This listing of the various forms of DSP reward against the forms of provision have been presented diagrammatically in appendix 1.

The Issues Paper notes that a low VoLL may inhibit economic return from the wholesale market but notes that altering VoLL's level would have broad impacts. NEMMCO concurs and notes that where reliability is inadequate-perhaps due to the impact of VoLL-that reserve trader will operate and DSP is eligible to provide that service.

The issues paper has enquired as to interest in an uplift payment for DSP such as that proposed by the Parer review. NEMMCO concurs that such proposals would be a significant market change and would need thorough consideration as to whether they were consistent with the National Electricity Objective and did not introduce unintended incentives.

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4. Reliability

4.1. Reserve Trader/Reliability and Emergency Reserve Trader (RERM)

Following the recommendations of the Comprehensive Reliability Review (CRR), significant rule changes are being implemented to replace the Reserve Trader with the RERM. Some features of this, such as new guidelines and longer and more flexible tendering, may partly address concerns regarding uncertainties for DSP providers.

With respect to the concerns in the Issues Paper that the historical activation of the Reserve Trader have not resulted in enablement payments thereby under-rewarding DSP providers, NEMMCO notes that the tendering allows providers to offer both availability and enablement payments. The former can be structured to ensure a provider recovers all fixed costs of participation.

4.2. Standing Reserve Proposal

NEMMCO notes the discussion in the Issues Paper that the standing reserve proposal considered by the Reliability Panel's CRR may be more attractive to DSP providers than the sporadically operated Reserve Trader and RERT. NEMMCO has no preference, but notes that the Reliability Panel considered this matter in detail in its Comprehensive Reliability Review.

4.3. Potential for distortions caused by Reserve Trader

The Issues Paper has concluded with a question as to whether the Reserve Trader/RERT is/will distort the underlying energy market and DSP's participation in it. In response, NEMMCO notes that:

- Reserve Trader plant is activated in concert with Intervention Pricing to ensure that its operation does not inadvertently suppress market prices.

- Under 8A Part 7 derogation for 3.12(f) and the proposed new rule 3.20.3(h) NEMMCO may not enter reserve contracts with providers it considers likely to have been dispatched by other means. Whilst it does not guarantee there will be no "double dipping"[13] it intends to create a clear separation of providers to the reserve trader from other markets.

[13] See Section 2.2 of NEMMCO's submission to NEM Reliability Settings: Information, Safety Net and Directions Rule at www.aemc.gov.au

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Appendix 1: Matrix of forms of DSP against potential Markets

NEMMCO found it useful, in considering this review, to attempt to subclassify the different forms of DSP, and also to subclassify their various uses. This diagram below is provided as an example of that form of approach. The subcategories listed are indicative only and may not be exhaustive.