



Your ref: ERC0352, RRC0051

14 September 2023

Ms Rachel Thomas
Project Lead, AEMC
Submitted online at: www.aemc.gov.au

Dear Ms Thomas

Submission: Integrating price-responsive resources into the NEM

CS Energy welcomes the opportunity to provide a submission to the Australian Energy Market Commission's (**AEMC's**) *Consultation Paper – Integrating Price-Responsive resources into the NEM (Consultation Paper)*.

About CS Energy

CS Energy is a proudly Queensland-owned and based energy company that provides power to some of our state's biggest industries and employers. We employ almost 500 people who live and work in the Queensland communities where we operate. CS Energy owns and operates the Kogan Creek and Callide B coal-fired power stations and has a 50% share in the Callide C station (which it also operates). CS Energy sells electricity into the National Electricity Market (**NEM**) from these power stations, as well as electricity generated by Gladstone Power Station for which CS Energy holds the trading rights.

CS Energy also provides retail electricity services to large commercial and industrial customers throughout Queensland and has a retail joint venture with Alinta Energy to support household and small business customers in South-East Queensland.

CS Energy is creating a more diverse portfolio of energy sources as we transition to a new energy future and is committed to supporting regional Queensland through the development of clean energy hubs at our existing power system sites as part of the Queensland Energy and Jobs Plan (**QEJP**).

Key recommendations

The NEM is inarguably transforming and will continue to do so as it transitions to a market with more distributed renewable energy resources including Consumer Energy Resources (**CERs**). The ability to effectively and efficiently manage power system security and reliability against this evolving landscape is paramount, and CS Energy supports the need to develop market and regulatory frameworks that harness the potential of price-responsive

■ **Brisbane Office**
PO Box 2227
Fortitude Valley BC Qld 4006
Phone 07 3854 7777
Fax 07 3854 7300

□ **Callide Power Station**
PO Box 392
Biloela Qld 4715
Phone 07 4992 9329
Fax 07 4992 9328

□ **Kogan Creek Power Station**
PO Box 41
Brigalow Qld 4412
Phone 07 4665 2500
Fax 07 4665 2599

distributed resources to manage system security and reliability. Further, we support CER frameworks that enable innovation and enhanced competition in consumer service offerings, which lower costs for all consumers in the long run.

The Consultation Paper examines the potential issues of limited integration of price-responsive resources into the NEM scheduling process and the probable benefits of integrating these resources. Key price-responsive resources identified by the AEMC include aggregated controllable CERs through virtual power plants (**VPPs**), commercial or industrial load (with components of controllable demand) and new types of large loads (such as hydrogen electrolysers). CERs include household distributed energy resources (**DERs**) such as rooftop solar PV, batteries, EVs, flexible hot water systems and pool pumps.

Before providing specific comments regarding this consultation paper, CS Energy would like to provide broader feedback in relation to the overall process of reviewing market and regulatory frameworks pertaining to DERs/CERs.

While the proposed reform initiatives for DERs/CERs, including this Consultation Paper, stemmed from the Energy Security Board's workstream that had a holistic view, subsequent progression of individual initiatives also needs to continuously reflect this broader context and be as integrated as possible. CS Energy is concerned that the disparate consultation processes for individual initiatives undertaken by the AEMC may lead to a series of ad-hoc incremental layers over current mechanisms, the complexity of which will risk efficient and effective outcomes for consumers.

In CS Energy's view, the AEMC could consider the following:

- Apply a more holistic approach to the development of market and regulatory frameworks pertaining to DERs/CERs, such that the interaction between existing and potential frameworks (and technical standards) are fully examined;
- Re-evaluate the timing of the processes to allow for the appropriate sequencing of work that will properly inform the development of potential mechanisms. It is crucial to allow for the prerequisite work (such as technical work) be completed prior to considering the merits of new mechanisms; and
- Examine ways in which stakeholders can assess the proposed mechanisms holistically rather than through disparate processes. This could be achieved by the AEMC establishing a stakeholder strategic working group or similar that provides an umbrella assessment of the mechanisms pertaining to DERs/CERs.

In terms of specific feedback regarding the Consultation Paper:

- CS Energy is not convinced of the need of a new mechanism to integrate price-responsive resources as insufficient evidence has been provided to suggest that a lack of visibility of price-responsive resources contributes to AEMO's demand forecasting errors. It would be useful to first have transparency in the accuracy of AEMO's operational demand forecasts and the extent to which is attributable to price-responsive resources. CS Energy would also like to understand the potential to improve forecasts by leveraging the static data on price-responsive resources to which AEMO has access.
- Irrespective of forecasting, CS Energy does not consider there is sufficient evidence that the 'Scheduled Lite' mechanism would be effective and yield a net benefit for industry participants, customers and the market. There is likely to be little incentive for

retailers and aggregators to partake in ‘Scheduled Lite’ as existing mechanisms (such as behind-the-meter arrangements) can provide a similar level of benefits at lower costs. Specifically, retailers and aggregators would incur additional costs and compliance arrangements.

(1) Problem identification and definition

The Australian Energy Market Operator (**AEMO**) argued in its rule proposal that the variable nature of price-responsive resources, coupled with the lack of visibility and integration into the NEM scheduling process affect the accuracy of AEMO’s demand forecasting processes.

AEMO noted that inaccurate demand forecasts would lead to inefficient dispatch and spot prices, increased need for Frequency Control Ancillary Services (**FCAS**) to maintain power system security and greater use of the Reliability and Emergency Trader (**RETR**) to address Lack of Reserve (**LOR**) conditions. This in turn would lead to higher costs for consumers and inefficient investments in generation, storage and networks over the long run. AEMO asserted that without better visibility of the intention of price-responsive resources, its forecasts can contain significant untenable errors. To address these potential issues, AEMO proposed a ‘Scheduled Lite’ mechanism to integrate price-responsive resources into the NEM scheduling process.¹

CS Energy considers that more work needs to be undertaken to establish the extent to which a lack of visibility of price-responsive resources contributes to AEMO’s forecasting errors. The lack of visibility of price-responsive resources may be a more substantial issue in future due to greater uptake of these resources, however, at this stage, most of these resources are passive with only a small number of responsive resources aggregated into VPPs in the market (approximately 400 MW as reported by AEMO).²

CS Energy notes that AEMO already has access to information regarding the behaviour of passive resources through the Demand Side Participant (**DSP**) Information Portal, Australian Solar Energy Forecasting System for rooftop systems (**ASEFS2**) and DER register:

- The DSP portal enables the provision of data from financially responsible participants to AEMO to inform the load forecasts within a power system with high DER penetration;
- The ASEFS2 model incorporates weather conditions when modelling rooftop PV as an input in AEMO’s demand forecasts; and
- The DER Register provides information regarding the number of DER devices installed, manufacturer and rated capacity, which informs AEMO’s forecasting, planning and power system models. It is understood that work is currently underway to enhance its data quality to improve data entry, validation and compliance arrangements.³

In addition to these DER related frameworks, CS Energy notes that there are other reforms initiated to improve AEMO’s forecasting methodology. These include the Short-term Projected Assessment of System Adequacy (**ST PASA**) Replacement Project, which aims to better model the effects of emerging technologies, such as VPPs, DERs and battery storage.⁴

¹ AEMO, [Rule change request – Scheduled Lite Mechanism in the NEM](#), January 2023.

² AEMC, [Integrating price-responsive resources into the NEM \(Consultation Paper\)](#), accessed September 2023.

³ AEMO, [Rule change request – Scheduled Lite Mechanism in the NEM](#), January 2023.

⁴ AEMO, [ST PASA Replacement project](#), accessed September 2023.

Given these current data sources, AEMO has not reasonably justified why it requires more dynamic visibility of price-responsive resources. There is limited transparency regarding AEMO's assessment of the accuracy of its demand forecasts. The only relevant publication is AEMO's Forecasting Accuracy Report, but this report focuses only on medium-term demand forecasts.⁵ Further, declared LORs are based AEMO's short-term demand forecasts, and it appears that there is no post-declaration evaluation process to assess the accuracy of these forecasts (for example, by comparing forecasts against actual demand data and using these data to identify potential demand patterns).

Prior to the consideration of new frameworks, CS Energy considers it important to have some visibility of AEMO's demand forecast accuracy and non-regulatory options being explored for improvement. Given the demand-side resources being targeted in this consultation process are, by definition, price responsive, AEMO should be able to leverage its static data on these resources in applying forecasting improvement options such as forecasting techniques by using machine learning algorithms to make better use of existing data sets.⁶

In summary, CS Energy considers that for this consultation to progress, there is a need to:

- Firmly establish whether a lack of visibility of price-responsive resources contributes to AEMO's forecasting errors; and
- If inaccuracies in AEMO's demand forecasts are attributable to a lack of visibility of price-responsive resources, then examine whether reforms underway and improvement to existing frameworks and processes would deliver the necessary forecast improvements prior to considering a new mechanism.

(2) Proposed 'Scheduled Lite' mechanism

The voluntary 'Scheduled Lite' mechanism proposed to integrate price-responsive resources into the NEM dispatch and scheduling process considers two models:

- *Visibility mode*- participants would be incentivised to provide 'indicative bids' for their price-responsive resources to AEMO, thereby allowing AEMO to produce an adjusted demand curve to inform dispatch; and
- *Dispatch mode*- participants (with a minimum aggregation larger than 5MW) will integrate their price-responsive resources into the NEM scheduling processes by providing bids for their generation or load to AEMO and follow dispatch targets.

Establishing this new mechanism requires substantial changes to the National Electricity Rules (**NER**) and its associated processes, including:

- Establishing a 'Light Scheduling Unit' (**LSU**) classification;
- Creating a new 'LSU guideline', which covers operational requirements such as data, telemetry, communication, financial and compliance requirements;

⁵ AEMO, [Forecasting Accuracy Reporting](#), accessed September 2023.

⁶ Román-Portabales, A.; López-Nores, M.; Pazos-Arias, J.J., [Systematic Review of Electricity Demand Forecast Using ANN-Based Machine Learning Algorithms](#).

- Creating a new 'Zonal Aggregation Guideline', which covers the threshold aggregation amount to participate in the dispatch mode (proposed to be set at 5MW);
- Creating a new incentive payment arrangement for visibility mode; and
- Modifying the rules to enable price-responsive resources (in dispatch mode) to participate in the NEM dispatch process.

(3) Net benefits of 'Scheduled Lite'

Given the scale of changes proposed and potential implementation costs, CS Energy considers it is critical to establish the need of such a mechanism as outlined above. Furthermore, there is a need to undertake a more comprehensive cost-benefit analysis to establish whether the benefits outweigh the costs for such a mechanism. This analysis should consider not only AEMO's implementation costs but also costs to industry and consumers.

Any assessment of whether an additional complex framework such as the 'Scheduled Lite' mechanism provides real consumer/market benefit and choice needs to consider the efficacy of existing frameworks. Price-responsive resources currently have access to similar schemes, such as the Wholesale Demand Response Mechanism (**WDRM**) and the Small Generation Aggregator (**SGA**) framework, albeit the participation in these schemes has been limited to date. Research from Oakley Greenwood suggests that this is likely due to economic forces at work as technologies underpinning price-responsive resources are nascent (and likely still costly).⁷ Adding complex layers to these existing frameworks would likely present a barrier to participation.

The economic viability of price-responsive resources and market complexity will likely remain key barriers in the short-term to medium-term. Hence, in CS Energy's view, the uptake of a voluntary complex scheme such as 'Scheduled Lite' is unlikely to be widespread. Moreover, we consider that current market dynamics could further restrict participation in 'Scheduled Lite'. At this stage, price-responsive resources can be grouped into three classes:

- Small capacity resources—which consist of individual households, small businesses and small aggregation of CERs. These resources would be managed by retailers or small aggregators with a capacity likely less than 5MW across a single zone, and therefore not eligible to partake in 'Scheduled Lite' (under current proposed design). These resources are primarily managed through behind-the-meter arrangements and where applicable, the SGA framework;
- Medium capacity resources—which include VPPs (larger aggregation), larger commercial and small industrial customers. These resources would either be aggregated or connected through a single National Meter Identifier (**NMI**) and managed by retailers or aggregators. The capacity of these resources would likely be above 5MW but less than 30MW. Trading entities for these aggregated resources currently have access to the SGA framework, should they wish to participate in the NEM and have access to spot prices. The price-responsiveness of non-aggregated resources is likely managed via behind-the-meter arrangements as part of the retailer's portfolio;

⁷ AEC, [Response to AEMC's Consultation Paper - Unlocking CER Benefits Through Flexible Trading](#), accessed September 2023.

- Large capacity resources—which would be made up of large commercial and industrial customers. These resources are unlikely to be aggregated and have a capacity above 30MW. If the trading entities for these resources are interested in accessing the NEM, they would have participated through existing mechanisms such as scheduled load and the WDRM.

In short, there is likely limited incentive for retailers (and aggregators) to partake in ‘Scheduled Lite’ as existing frameworks (as identified above) would have provided a similar level of benefits at lower costs. ‘Scheduled Lite’ would only apply to medium capacity resources and in which participation would likely impose substantial additional costs, including the development of systems to coordinate, monitor and operate geographical dispersed units and further compliance arrangements to enable conformance with AEMO’s dispatch instruction.

Further, it is important to note that retailers manage their load as part of a portfolio. The proposed design of ‘Scheduled Lite’ implies that retailers would need to register a component of their portfolio separately to participate. This would lead to duplication in compliance processes and increased costs for consumers. Given that price-responsive resources are already reflected in a retailer’s bid (as part of a portfolio), a more sensible approach may be to explore amending AEMO’s information requirements for these bids to provide more data regarding price-responsive resources (if it assists in improving AEMO’s forecasting).

In CS Energy’s opinion, there is currently limited incentive for market participants to partake in ‘Scheduled Lite’ and as such, it is crucial that any cost-benefit analysis does not assume perfect uptake rather considers sensitivity analyses of different levels of participation. Most of the costs of ‘Scheduled Lite’ would be upfront and fixed, while the benefits of this proposed mechanism are sensitive to the levels of uptake.

Price-responsive resources also currently receive benefits from providing services for contingency FCAS, network support for distribution network service providers (**DNSPs**), the RERT scheme and network support and control ancillary services (**NSCAS**). It is unclear whether the proposed ‘Scheduled Lite’ mechanism would provide additional benefits to customers or would just displace the benefits accrued under existing processes. When assessing the net benefit of the proposed ‘Scheduled Lite’ mechanism, we consider that it is important to incorporate only the potential additional benefits specifically derived from this mechanism.

(4) Effectiveness of ‘Scheduled Lite’

As noted, developing mechanisms via disparate rule changes not only has the potential consequence of not properly assessing interactions between different frameworks, but it also does not allow for the appropriate sequencing of work that will properly inform the development of new mechanisms.

The effectiveness and uptake of the proposed ‘Scheduled Lite’ mechanism would be underpinned by several ongoing reviews, including:

- The *unlocking CER benefits through flexible trading* rule change, which is evaluating the separation of price-responsive resources (such as rooftop solar PV) from a customer’s passive load (demand from lights, fridges etc.) to allow them to be separately identified and measured;

- The *review into the CER technical standards*, which aims to improve compliance of technical standards for CER devices, thereby enabling greater uptake of CERs; and
- The *dynamic operating envelopes (DOEs) and flexible export limits (FELs) review*, which proposes to allow DNSPs to dynamically vary the network connection export (and import) limits of CERs, instead of adopting static limits, thereby better managing network congestion and potentially increasing the penetration of CERs.

Although these reviews are yet to be finalised, they may contribute significantly to the efficacy of the ‘Scheduled Lite’ mechanism. For example, price-responsive resources are only able to participate in the NEM scheduling and dispatch process if they are separately identified and metered from passive load. Moreover, participants would need to adhere to the FELs when partaking in the dispatch mode of the ‘Scheduled Lite’ mechanism.

This makes it challenging to appropriately assess the effectiveness of the ‘Scheduled Lite’ mechanism and accentuates the need for the appropriate sequencing of work prior to considering the merits new mechanisms. As noted, we recommend the AEMC re-evaluates the timing of the processes related DERs/CERs reforms to allow for the appropriate sequencing of work that will properly inform the development of potential frameworks and consultation processes.

(5) Implementation challenges and other considerations

While CS Energy understands the broad intent regarding the design of the ‘Scheduled Lite’ mechanism, we note that the reality of implementation is very different and likely will have substantial challenges. For example, the AEMC’s consultant (NERA Economic Consulting) noted that it may be challenging to determine the appropriate dispatch due to the nodal nature of the NEM dispatch engine (**NEMDE**) if aggregators were to submit bids across many nodes. Moreover, the proposed ‘Scheduled Lite’ design aggregates resources across a single zone and there may be instances where the zone definition leads to different outcomes relative to the node definition of NEMDE. It is unclear, at this stage, how these challenges would be addressed if this proposed mechanism is implemented.⁸

Further, it is unclear how technical standards and compliance obligations would apply to aggregators who participate in ‘Scheduled Lite’, given that CERs would be switching in and out of an aggregator’s portfolio. For example, it is unclear whether the registration of the participant would be invalidated if the aggregated capacity falls under the minimum threshold of 5 MW due to CERs leaving the portfolio, and whether re-registration would need to occur should its capacity once again exceed 5 MW.

If you would like to discuss this submission, please contact Wei Fang Lim, Market Regulatory Manger, at wlim@csenergy.com.au or on 0455 363 114.

Yours sincerely



Dr Alison Demaria
Head of Policy and Regulation

⁸ NERA Economic Consulting, [Summary and Assessment of International Price Responsive Resources Mechanisms](#), accessed September 2023.