Smarter Demand, Stronger Grid

Australia's Flex Opportunity

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About this report

This report was commissioned by the Energy Efficiency Council (ECC) and prepared by Dean Lombard at Energesis with support from the EEC.

The EEC is the peak body for Australia's energy management sector. A not-for-profit membership association, the EEC works to:

- Drive world-leading policy on efficiency, electrification and demand flexibility;
- Ensure Australia has the skilled workforce to deliver Australia's energy transition; and
- Support businesses and households to rapidly decarbonise.

1. Introduction

In October 2025 the Energy Efficiency Council (EEC) submitted a short paper *Demand-side participation in the NEM* to the review panel in response to the National Electricity Market (NEM) Wholesale Market Settings Review's draft report. The EEC's concern was that while the draft recommendations did not explicitly exclude demand-flexibility from wholesale market participation, primarily they were geared mainly towards solving the 'tenor gap' for large-scale renewables investments. For demand flexibility the recommendations' primary concern was to make these resources 'visible', via two market mechanisms: the Wholesale Demand Response Mechanism (WDRM) and the Voluntary Scheduled Resources (VSR) framework. The EEC suggested that relying on the WDRM and VSR framework to support wholesale market efficiency could be limited because many types of flexible resources would be unlikely to participate in those mechanisms. This is due to a range of issues including eligibility for the mechanisms, different incentives among types of market participant for activating demand response, insufficient customer value being available, and technical limitations of appliances.

This paper builds on that work by looking more deeply at the barriers and enablers to increasing demand flexibility in the NEM. This includes considering consumer preferences, characteristics of appliances, market mechanisms and other factors (in section 2); and policy recommendations to improve visibility and forecasting and facilitate greater inclusion of demand flexibility into the energy system, such as tweaks to market mechanisms and regulatory changes (in section 3 and section 4).

In preparing the 2025 paper and this one, the following were reviewed:

- relevant rule documents, submissions to rule changes and other relevant processes, and technical material and guidance documents for demand response mechanisms; and
- relevant research and policy papers including reports of demand response trials.

We also consulted widely with:

- market experts, researchers, and advocates;
- representatives of market participants and other energy businesses including retailers, aggregators, and distribution networks; and
- residential customers who have participated in demand response programs and virtual power plants (VPPs).

1.1 Putting energy consumers at the centre

Demand flexibility is a function of demand; examining the opportunities for, barriers to, and potential pathways for flexible demand requires understanding the demand side and how households and businesses use energy to meet their needs.

The National Electricity and Gas Objectives articulate that investment in, and operation of the electricity and gas systems are to serve the interests of energy consumers. Our experience representing energy consumers' interests, and the research and consultation we have undertaken in preparing this paper, make it clear that people and businesses fundamentally want the energy they need to do the things they need to do at an affordable price: heat and cool their premises, and

power the equipment they need for production, work and life. The consistent findings of customer surveys[1] that the affordability and reliability of energy supply are top priorities underline this.

This seems obvious, but is often overlooked when policymakers, advocates, energy businesses and market bodies start thinking about how demand management can support the grid and the market. Energy consumers by and large have no inherent interest in participating in the energy market[2].but they may be open to it if it helps them meet their energy needs. As one of the people we spoke to said: “Consumers want the stuff that they need, and if demand flexibility works for them in that context, they will buy in.”

In an increasingly volatile energy environment, more people and businesses are likely to invest in new energy equipment and services to help them meet their needs at lower cost. This provides a huge opportunity to capture the value of demand flexibility in a way that meets the needs of energy consumers. This will be successful if demand side participation can give energy users more value than they get from not participating.

1.2 The opportunity of demand flexibility

Flexible demand has long been a part of the energy system, with loads such as hot water systems timed to operate when demand is low and larger industrial loads being called upon to curtail energy use when demand is too high. But technological change and the rapid uptake of consumer energy resources (CER) in recent years have led to continual growth of the number and capacity of flexible resources.

Assuming continued strong uptake of consumer energy resources (CER) and steady electrification in households and businesses, there could be more than 20 GW [3] of flexible resources in the household, small and medium business, and larger commercial and industrial sectors by 2035 (see Table 1).

Even if only half of this is captured, it’s a huge opportunity to reduce costs to energy consumers by improving market efficiency, reducing wholesale prices and increasing network utilisation. The NERA modelling from which that estimate is drawn found cost savings to consumers could range from $8 – $18 billion by 2040 — including wholesale price reductions and transmission investment savings. These figures are likely conservative estimates, given that the modelling does not include distribution investment savings that could also flow from demand flexibility; and that the figures are based on the Australian Energy Market Operator (AEMO)’s 2020 ISP, with lower estimates of CER growth and orchestration.

As discussed above, energy users are likely to take up demand flexibility opportunities if they are accessible and deliver net positive value while enabling them to continue to meet their energy needs. This requires market and policy design that meets these customer needs, while also bringing sufficient value to the energy retailers, distribution businesses and third parties that facilitate it.

[1] Such as SECNewgate (2025) The Consumer Energy Report Card — Household Research Report, ECA

[2] Aside from a small number with a personal interest in the energy system or its environmental impact.

[3] Estimated based on available capacity in 2034–35 in Scenario 4 (high DER uptake) from Anstey, G. et al. (2022) Valuing Load Flexibility in the NEM, Report prepared for ARENA by NERA Economic Consulting

Unfortunately, our analysis of existing mechanisms to incentivise demand flexibility suggests that for many flexible technologies, particularly in households, incentives appear to be insufficient to encourage market participation (see Table 1).

Table 1: assessment of flexible loads' potential response and likelihood to participate through existing market mechanisms

Appliance	Likelihood of participation via existing mechanisms[4]	Potential dynamic response by 2035[5]
Residential		
Hot water	Low	1,941 MW
Pool pumps	Low	449 MW
Cooling	Low	1,650 MW
Heating	Low	1,059 MW
EV charging	Medium	8,474 MW
Battery storage	Medium	Up to 17,830 MW[6]
Small to medium businesses		
Heating, ventilation and cooling (HVAC)	Low – Medium	No data
Small business refrigeration	Low – Medium	No data
Small business EV charging (fleets)	Medium – High	No data
Large businesses		
Battery storage	Low	No data
Refrigeration and HVAC	High	700 MW[7]
Industrial equipment curtailment	Medium – High	>846 MW[8]

[4] Factors that can reduce likelihood to participate via mechanisms include difficulty meeting technical requirements, low standards compliance, limitations with communication protocols or controllability, low value to aggregator or orchestrator, risk or perceived risk to customer amenity, and sufficient or better value to customer from self-management.

[5] Available capacity in 2034–35 in Scenario 4 (high VRE) from Anstey, G. et al. (2022) Valuing Load Flexibility in the NEM, Report prepared for ARENA by NERA Economic Consulting.

[6] Installed capacity — responsive capacity will be lower.

[7] Smart commercial buildings (aircon, chillers, hot water).

[8] 846 MW for metals, non-metals and food & beverage.

2. Understanding the demand side

Underlying demand varies throughout the day, driven by customers' energy needs and the energy requirements of appliances and equipment. On an annual scale, it varies by season (due to usage linked to temperature, such as space heating and cooling) and over the longer term, it changes in line with population growth and economic conditions. It's broadly predictable, and demand forecasts are used by the wholesale market to predict dispatch requirements, and energy networks to guide investment for future needs.

Customers may also make step changes in their ongoing energy usage by investing in energy efficient equipment or technology— such as businesses upgrading to more energy-efficient equipment, or households upgrading the thermal performance of their homes. These changes can have a material impact on overall demand in aggregate and may be less predictable for forecasters[9].

2.1 Demand flexibility and demand response

More granular and dynamic shifting of energy usage is often referred to as demand *response* but is better understood as demand *flexibility*. Demand flexibility is the coming together of energy appliances (commonly referred to as flexible resources) that can reduce or increase demand without materially impacting users' amenity, and an event or signal for these resources to respond to.

Timing and flexibility – a taxonomy

The EEC is currently developing a flexible demand taxonomy and has initially identified five distinct types of flexible demand — changes in demand in response to signals from a variety of sources, including energy retailers, distribution network operators and wholesale market pricing. The taxonomy is still in development but is used in this document to help to contextualise the below discussion of mechanisms and pathways which enable demand flexibility.

Type 1 Load shaping

A long-term change to the on-site consumption profile. A common example is shifting a regular load (such as a hot water system) to a specific time of day, resulting in a new underlying load profile. While historically this has been led by distribution networks, it is now often customer-led in response to time-variant tariffs or to self-consume rooftop solar. Energy efficiency upgrades and time-shifting solar generation using batteries are other forms of customer-led load shaping although the former result in more-or-less permanent changes to the shape of the load and are therefore not *flexible* load shaping.

Type 2 Dynamic load shifting

A continuous, dynamic response to the spot price. For example, consumers adjusting usage or charging and discharging batteries in response to spot price passthrough retail contracts.

Type 3 Price or event driven load management

An event-driven change in usage to reduce wholesale prices or manage network capacity. Customers respond to a signal to reduce their demand for a period of time (typically a few hours) when

[9] However, US utilities like Pacific Gas and Electric in California have used the CalTrack methods to model the aggregate impact of energy efficiency upgrades with high accuracy. See: https://docs.caltrack.org/en/latest/methods.html

wholesale prices are high, or the distribution network is congested. There may also be a signal to increase usage to support network stability if demand is too low.

Type 4 Emergency load management

A change in use during rare emergency events to protect the grid, most commonly responding to instructions from AEMO to reduce demand for up to several hours when there is insufficient generation capacity.

Type 5 Balancing services

Rapid changes in consumption or generation to provide support to the grid. Typically, short duration demand changes to support system stability, such as frequency control ancillary services (FCAS) managed by AEMO.

2.2 Characteristics of appliances and equipment

The potential of flexible appliances and equipment to support the electricity market depends on their specific characteristics and contexts. There are three broad categories of factors that influence their potential to provide flexibility services: customer preferences, technical issues and practical issues. These are set out below.

Customer preferences

Some appliances can deliver increased customer value through orchestration and control; others deliver more value (or similar value but with less complexity) through customer self-management. Customers' willingness to engage with third parties may therefore depend on how able (or unable) they are to self-manage their appliances to derive new value streams.

Many appliances are critical to customers' amenity or productivity, and customers will only take up flexible demand opportunities if meeting their primary needs can be guaranteed. This is equally the case for residential customers (e.g. battery charge state, heating and cooling performance, electric vehicle utility), small and medium businesses (e.g. refrigeration and heating, ventilation and cooling (HVAC) performance), and large commercial and industrial businesses (e.g. production requirements).

Technical issues

Requirements of market mechanisms

Market mechanisms have technical requirements that must be met, such as ramp rates, response timeframes, and baselining requirements. Many load types can't meet these requirements, so are ineligible. These requirements serve an important purpose, ensuring that a response is accurately measured and is delivered in a way that is consistent with system stability, avoiding additional costs through procurement of ancillary services. At the same time, excluding large numbers of flexible resources from market mechanisms reduces the material benefits that would otherwise flow to all energy consumers through reduced wholesale and system services costs, and improved forecasting. Technical requirements should be reviewed, and the review should include cost–benefit assessments of the trade-off between ancillary services expenditure and benefits delivered by increasing participation in flexible demand mechanisms.

Limitations of appliances

Demand response aggregators need to send and receive signals from responsive appliances to deliver flexibility while managing customer needs. But communication and control capabilities can vary widely between different appliances. This can be due to the absence of relevant standards, lack of appropriate standards adoption, deficiencies in standards, or noncompliance with standards. Significant barriers can be addressed by adoption of appropriate standards and better enforcement of standards compliance (we note that the national CER Roadmap[10] has a workstream addressing standards.) In doing so, interoperability issues need to be a focus — not just between devices, but also between market participants.

Practical issues

Some appliances can offer flexibility in a variety of ways, but others are limited. For example, some appliances are well suited to ongoing dynamic response: such as a battery, that can dispatch or charge without affecting energy services in the home. Others are best suited to occasional curtailment or one-off load shaping: such as a water heater, which must provide hot water at a safe minimum temperature and is therefore limited in how dynamic it can be in responding to signals to alter demand. These characteristics will determine what mechanisms or pathways are most suitable and will affect the availability of the response.

Our research and consultation yielded a wealth of information on considerations and constraints with specific appliances, many of which limit their suitability for specific mechanisms, or for flexible demand in general. Findings for some appliances are set out below.

Batteries

Customers with solar and batteries get considerable value with no effort by using default settings to store excess solar generation to displace grid consumption later in the day. This is often misaligned with energy system needs for solar soaking, but customers need a compelling reason for ceding control or managing more actively.

Customers on spot price passthrough tariffs are likely to get equal or better value from self-managing rather than responding through a market mechanism and sharing the value with a retailer or aggregator. This approach could, in many cases, be more aligned with energy market needs than an orchestrated battery because it may be more responsive and more immediate.

Solar soaker tariffs (such as the forthcoming Solar Sharer for households) enable customers without solar to get value from a battery set up to arbitrage.

Because batteries are generally in credit to the market, they could be orchestrated by a non-retailer aggregator (through a market mechanism) if enabled for small customers (via a change to the FTA Framework) as they would not be selling energy to customers.

As residential batteries are increasingly oversized (as is being seen through the Cheaper Home Batteries program) they are more likely to have enough capacity to meet household needs *and* be able to respond to market or network signals. This enables solar and battery customers to get more

[10]For more information see the Department of Climate Change, Energy, the Environment and Water's website: https://www.energy.gov.au/energy-and-climate-change-ministerial-council/working-groups/electricity-working-group/consumer-energy-resources-sub-working-group/national-cer-roadmap

value from orchestration than only self-managing, especially via an aggregator with incentives to aggressively pursue flexible demand opportunities.

Growing penetration of backup batteries and thermal batteries among commercial and industrial (C&I) customers provides further opportunity for demand flexibility. Many C&I sites already have diesel generators which enable businesses to switch to back up power and provide support to the grid. It is expected that these backup generators will progressively be replaced by batteries to provide a less emissions intensive response.

Batteries generally act very predictably, which should enable them to be forecastable without active visibility through a market mechanism.

Hot water systems

Hot water systems are much better suited for load shaping — increasing demand during solar generation hours and reducing demand during peak times — than dynamic shifting. While this still leaves some scope for flexible demand during atypical circumstances, it's unlikely to deliver much value to customers. Health and safety requirements for minimum temperatures and customer needs for on-demand hot water further limit the potential for dynamic response.

Because load shaping with hot water is so useful for increasing network utilisation and raising minimum demand, incentivising load shaping behaviour is likely to be led by DNSPs rather than market signals.

As electric hot water services are increasingly delivered by heat pump hot water systems – which use much less electricity than resistive systems – their impact on the grid, and therefore their load shaping value, will decrease.

Electric vehicle (EV) charging

Stakeholders told us there is still limited insight into EV charging behaviour. More actual charging data is needed to understand the flexible demand opportunities from this technology.

Forecasting is difficult due to considerable variance in behaviour; and further complicated because, being mobile, EVs' demand can unexpectedly shift around and between networks and retailers.

While customers are generally interested in aligning EV charging with low-price periods (with Solar Sharer a clear opportunity), they are overwhelmingly concerned with their transport needs. Because a vehicle may need to be used unexpectedly, customers are less inclined to give control to a third party.

There is likely to be more opportunity here with fleets, as usage is generally more predictable.

Pool pumps

Like hot water systems, pool pumps are much better suited to load shaping to support network utilisation. However, because daily usage is not required there may be some opportunity for dynamic response.

Heating and cooling

Reverse-cycle air conditioners have significant flexible demand potential (likely more than 1 GW by 2035).[11] But real-world experience has found orchestration compromised by limitations in the relevant standard, including lack of nuance in controllability (reducing power by increments of 25%, rather than granular control over thermostat setting), no two-way communication (thus no feedback loop), and the inability for customers to override control. These all affect customer amenity and have adversely impacted social licence for air-conditioner flexible demand programs. Some international standards address these issues.

Refrigeration

The thermal inertia of cold storage offers a considerable flexible demand opportunity. This is unlikely to work well for small businesses with limited volume and less value available relative to overall energy costs. But trials indicate larger businesses with more extensive refrigeration can respond more effectively.[12]

2.3 Incentives to use flexible demand

This section examines the different market participants and their incentives to leverage flexible demand. Different market participants have different incentives for using their demand-side assets flexibly influenced partly by the various market mechanisms and off-market pathways available to them. Excluding highly engaged consumers (like large industrial facilities) who participate in the market directly, market participants like retailers are the main interface between consumers and the energy market, and are therefore critical in determining when, why, and to what extent consumers (their customers) will use their resources flexibly.

Retailers

Different types of retailers face different incentives when managing their market interactions. Crucial context here is the interaction between the spot market and the myriad financial instruments electricity retailers use to manage their customer portfolios. While the wholesale market is dispatched every five minutes and settles every half hour, most electricity is traded outside the market. Thus, market prices are often not the main incentive to respond, as retailers' net exposure to prices is determined by their contractual arrangements with third parties:

- **'Gentailers':** retailers with generation portfolios are exposed to the extent that their demand volumes exceed their available generation and other hedges. In this context, flexible demand assets can help them to balance their generation shortfall. When their spot exposure is limited, they may be less responsive to price signals but still use flexible resources, effectively, as a part of their generation portfolio. Notably, a gentailer may be a net generator some of the time and a net load at other times — with a very different spot price response in each position.
- **Fully hedged retailers:** with exposure limited by their hedged position, these retailers focus on managing hedge shortfalls when they occur — noting that they may also have contracts to incentivise flexible demand with consumers as part of their hedge portfolio.

[11] Anstey, G. et al. (2022) Valuing Load Flexibility in the NEM, Report prepared for ARENA by NERA Economic Consulting

[12] Enel X, Lessons Learnt Report 2: Commercial Refrigeration Flexible Demand Project, 2024

Retailers with load-following hedges may have less need for encouraging the use of flexible resources outside of sharp price spikes.

- **Under-hedged retailers:** retailers with limited hedges have a stronger incentive to use flexible demand to manage hedge shortfalls. Retailers offering spot-price passthrough contracts to customers may have no incentive to encourage flexible demand from customers because their customers are carrying the risk of high prices. However, they may well have an incentive to facilitate customer demand response to help them manage that risk.

Aggregators and demand response service providers

For non-retailer aggregators and demand response service providers (DRSPs), high spot prices pose limited risk but considerable opportunity. As incentivising customers to use their resources flexibly for a financial return is their core business, they are likely to be much more responsive to high prices than retailers.

Distribution networks

Distribution Network Service Providers (DNSPs) are not exposed to spot market price signals, but need to manage network capacity or stability constraints caused by very high or very low demand. They are incentivised to use flexible demand to maintain reliability and power quality targets in extreme conditions, or where they have chosen to use it as an alternative to capital or operational expenditure to manage constraints. Significantly, while these constraints often correlate with market price signals, there are also many circumstances in which they do not. In addition, regulations governing networks have tended to skew DNSPs' incentives towards network expansion rather than using their existing assets more optimally through demand side actions such as load shaping or dynamic load shifting.

Customers

Large and small customers have an incentive to use their resources flexibly if they are on a spot-exposed or time-variant tariff, or if they receive signals from a retailer, DRSP or DNSP program; and the value of the acting materially exceeds the cost of not responding. Their ability to respond depends on the clarity of the signal, the capabilities of their energy resources, and the flexibility of their energy usage.

The complementarity of incentives

Clearly some of these market participants have incentives to more aggressively pursue flexible demand opportunities than others, and measures that increase their capability will drive a higher level of demand flexibility from customers. But this is not inherently problematic.[13] Different market participants fulfil different roles, are suited to different types of customers, and have different capabilities to respond. Our concern is not that incentives should be equally high across the board, but that barriers to participants with higher incentives should be minimised.

[13] With the debatable exception of gentailers, which are internally conflicted between seeking lower and higher wholesale prices.

2.4 Flexible demand pathways

This section examines the market mechanisms, off-market mechanisms and other options that activate flexible demand. It also looks at ways to improve existing market mechanisms to capture a greater diversity of flexible resources.

Market mechanisms

Market mechanisms in this paper refer to mechanisms that allow flexible demand asset owners and operators to participate directly in the wholesale electricity market, and other related markets (for example, the FCAS market). Flexible resources participating in market mechanisms are visible to AEMO, and enabling more resources to participate would address the concerns of market bodies and commentators set out above.

Although there are multiple market mechanisms available, this paper focuses on the wholesale demand response mechanism (WDRM) and the forthcoming voluntary scheduled resources (VSR) mechanism, both of which could be extended to encourage more flexible resources to enter the market and participate in dispatch.

Other mechanisms include the Reliability and Emergency Reserve Trader (RERT) function which is offered by AEMO to market participants to encourage their customers help support the grid when an emergency event occurs (an example of Type 4 - Emergency load management) and FCAS which is used by AEMO to maintain grid stability (an example of Type 5 – Balancing Services)

Wholesale Demand Response Mechanism (WDRM)

The WDRM allows large customers to bid load reduction (compared to a baseline) directly into the wholesale spot market, potentially displacing higher priced generators. Participation has been low since the WDRM commenced in 2021, but AEMC analysis demonstrates a positive cost benefit in addition to a $265.5 million benefit to electricity consumers over the last four years via lower wholesale prices — not factored into the cost–benefit analysis because it "is considered a wealth transfer from producers to consumers rather than an efficiency".[14] Submissions to the review of the WDRM in 2025, as well as the consultation we undertook in preparing this paper, indicate considerable scope to increase participation in the WDRM if barriers are removed.

The WDRM is currently only available to large commercial and industrial customers[15] and excludes smaller businesses and households due to the complexity of baselining and settling smaller loads, and the lack of appropriate consumer protections for households. The AEMC acknowledges that "some [small] customers may be suited to a WDRM-type mechanism",[16] and we consider that some small customer loads (such as refrigeration, hot water, pool pumps, and small business HVAC and EV fleet charging) are clearly suitable in aggregate with baselining that accounts for solar generation and the impact of weather.

[14] AEMC, Review of the Wholesale Demand Response Mechanism, Final report, 23 October 2025: p. 7

[15] Under the National Energy Retail Law (NERL), those consuming more than 100MWh per year

[16] AEMC, Review of the Wholesale Demand Response Mechanism, Final report, 23 October 2025: p. 15

A strength of the WDRM is its accessibility to demand response service providers (DRSPs) that are not energy retailers. As noted above, these businesses generally have a much stronger incentive than most retailers to aggressively pursue flexible demand opportunities.

By virtue of its design, the WDRM is well suited to facilitating a material response from highly predictable loads in response to event-driven high wholesale prices (Type 3: price-driven load management in the taxonomy). It is not suitable for continuous dynamic price response, or for loads with moderate or lower predictability. Thus, it meets some demand flexibility needs — including from some loads that would be unsuitable for participating in the forthcoming VSR framework — and is complementary to other measures.

Energy market stakeholders have a range of views on the merits of the WDRM, broadly aligned with their flexible demand incentives and opportunities. In our consultation, we heard from some that the low uptake suggests the WDRM is unnecessary, and that participating loads could be equally effective responding via contracts with their retailers, arrangements with third parties that facilitate price-responsiveness, or in dispatch mode via the forthcoming VSR framework. being developed following the Integrating Price Responsive Resources (IPRR) rule change.

From others, we heard that the WDRM offers a unique opportunity that complements these other pathways, and that most WDRM resources would be unlikely to participate without it due to the nature of their loads and business requirements. The AEMC reached a similar conclusion in its review of the mechanism.[17] But there are a number of barriers to entry — such as stringent technical requirements that can prove onerous, the exclusion of sites with solar or with multiple connection points, and the requirement for each load in an aggregation to individually meet predictability of load criteria (rather than the aggregation as a whole) —and addressing these could increase participation. Analysis by Oakley Greenwood has indicated that up to 80 per cent of large industrial loads are excluded due to the stringency of baselining methodologies.[18]

Improving the WDRM

The WDRM has a distinct role as one of several flexible demand pathways. It will always be complementary to other mechanisms but offers some unique opportunities for predictable loads that can be curtailed. Given the diversity in customers' capacity and market participants' incentives to respond to flexible demand opportunities, improvements to aspects of the WDRM that pose barriers to the inclusion of suitable loads will increase its effectiveness. Improvements include changing requirements in relation to:

- **Telemetry and other technical requirements:** Technical requirements such as response timeframes and ramp rates exclude many load types that could otherwise respond. Technical requirements are needed to avoid adverse impacts on system stability that would require ancillary services to mitigate. But there is a trade-off between the costs of ancillary services and the benefits of increased WDRM participation. Technical requirements should be reassessed to determine any net benefit in adjusting them to enable more participation.
- **Baselining:** Many loads and sites are excluded because baselining methodologies can't accommodate them. Typically, the challenge is separating the responsive load from variability in the site's overall load. Accommodating sites with multiple connection

[17] AEMC, Review of the Wholesale Demand Response Mechanism, Final report, 23 October 2025

[18] AEMO, National Electricity Market Baseline Eligibility Compliance and Metrics Policy: *Final Report and Determination*, 20 May 2021

points is already being explored. In addition to developing baselines for a wider range of load types, further work should be done to accommodate sites with solar generation (especially in the light of increased penetration of solar in commercial and industrial sites) and in embedded networks. Incorporating automatic low load exclusion days in baselining for sites with variable energy usage is also needed to give access to loads that have periods of downtime for business purposes.

- **Aggregations:** Aggregations of smaller loads are currently required to be baselined on a per-unit basis with each unit fully meeting predictability and response criteria. Enabling aggregations to meet criteria in total rather than per unit could increase participation.
- **Small customers:** Aggregations of small customers offer an additional opportunity. Significantly, small customers who want to obtain value from using their resources flexibly will find a way, and if they can't access a market mechanism their response may be invisible to the market operator. We recognise the complexity of settlement across multiple retailers and the lack of appropriate consumer protections as challenges. But many other challenges have been overcome by policy and rule reform in the recent past – including those involving market settlement complexity and CER integration.[19] A roadmap to develop the capability to address these challenges within five years is needed to include suitable small customer loads in the mechanism.

Voluntary Scheduled Resources (VSR) framework

The VSR framework — still being developed as an outcome of the *Integrating Price-Responsive Resources (IPRR)* rule change concluded in 2024, for commencement in 2027[20] — will allow flexible resources to volunteer to be scheduled for dispatch in the wholesale market as generators or curtailable loads. This voluntary framework is also known as "dispatch mode". According to the AEMC, this means "AEMO will not need to forecast their actions in the spot market, therefore reducing demand forecast errors and their consequential inefficiencies."[21]

A voluntary scheduled resource can be a single resource or an aggregation of multiple resources, operated by the financially responsible market participant (FRMP) — usually an electricity retailer — for the connection point(s) for the VSR. VSRs can be sub-metered separately from other loads (under the new Flexible Trading Arrangements (FTA)), enabling some large customers to have their flexible loads managed by a different retailer (or other market participant) than their primary retailer. However, small customers can only have a single FRMP under the FTA rules, so can only participate through their energy retailer.

Strengths of the VSR framework are its inclusion of small customers (who cannot participate in the WDRM), and its dispatchability as a volume of energy added or removed — thus not requiring baselining methodologies and enabling aggregations to comply with technical requirements as a unit rather than individually. It's expected to be well suited to behind-the-meter batteries aggregated as

[19] For example, preserving retail competition and managing market settlements in distributor-led stand-alone power systems (SAPS) in the 'Updating the regulatory frameworks for distributor-led stand-alone power systems' market review in 2020.

[20] AEMO is currently proposing an implementation reset and suggesting a staged delivery to implement functionality under the VSR framework progressively. Under the proposal, Stage 1 "Initial Operation" would commence in 2027, with Stage 3, "Full Enablement" not implemented until mid-late 2019. Consultation is scheduled for mid-May to mid-June 2026, and a rule change would be required to finalise AEMO's proposal.

[21] AEMC, Integrating price-responsive resources into the NEM, Rule determination, 19 December 2024: p. iv

virtual power plants (VPPs). More generally, the VSR framework will suit dynamic two-way response (demand increases and decreases) to price signals.

In our consultation we encountered a range of views on the merits of the VSR framework, with the significant caveat that because it is not yet in operation and the implementation details are still being developed, it's too early to make a decisive judgement. Many stakeholders acknowledged that the mechanism seems fit for purpose but maintained that retailers and aggregators can deliver a response just as well without it, responding directly to prices in line with their own and their customers' price exposure. In particular, we heard that customers on price-following retail tariffs are likely to get as good or a better outcome responding directly to the price rather than being scheduled as part of a VSR. Some stakeholders considered that the main benefit was visibility of flexible resources to AEMO, and that an approach focused on visibility rather than dispatchability would be sufficient. But some considered that visibility without firm dispatch was not useful.

We heard from others that while only a subset of flexible resources is likely to suit the VSR framework, it would be useful; and enabling dispatch of flexible resources as scheduled loads would benefit energy consumers through lower costs and prices. These respondents considered it would be particularly suited to unpredictable flexible loads, and well suited to virtual power plants (VPPs) and other aggregations of small resources.

Our research and consultation also suggest that many small customer loads (residential and small business) may be unlikely to participate as VSRs due to technical issues or a mismatch with customer needs. For example:

- Communication limitations with some appliances — such as lack of nuanced control and two-way communication with reverse cycle air conditioners, and differences in communication protocols with different brands of batteries and inverters.
- Greater customer value through self-management of batteries to time-shift solar generation (noting low customer uptake to date of VPPs despite incentives).
- Perceived risk of allowing electric vehicles to be orchestrated — people may unexpectedly need to use a vehicle so need to be in control of its state of charge.

Improving the VSR framework

Our assessment of the evolving VSR framework and stakeholder feedback to the relevant AEMC and AEMO processes, along with our direct consultation with stakeholders, suggests that the mechanism has the potential to play a useful role in a suite of flexible demand pathways. Recognising that the implementation details are still being developed, we recommend focussing on a few key issues – some of which also involve consideration of adjustments to the Flexible Trading Arrangements (FTA) in its role as an enabler of the VSR framework:

- **Access by third parties:** In its current design the VSR framework is likely to be largely accessed by retailers. Considering the different incentives for retailers and DRSPs, measures to lower barriers for DRSPs will provide more optionality for customers and facilitate more flexible demand – and visibility of flexible resources – to the market. Relevant issues raised in submissions to the FTA rule change, but which the AEMC decided against in its final determination, include whether there should be some requirements governing contractual relationships between the primary FRMP (a retailer) and a secondary FRMP (another retailer or a DRSP), and whether small customers could

have a secondary FRMP. These decisions should be re-examined — noting that the AEMC has said it will "continue to work with parties to look at options to trial multiple FRMPs for small customers and is open to a rule change request on this option once other reforms have progressed".[22]

- **Optionality for small customers:** related to the above — with the current design, only retailers can channel small customers' flexible resources through the VSR framework due to the FTA only allowing them one FRMP. But some small customers' flexibility could be ideally suited to non-retailer aggregators. Batteries are the obvious example as they will generally be in credit to the market if operated well (consuming when prices are low and exporting when prices are high). A third party operating them may therefore not need to be a retailer because they won't be selling energy to customers. But more significantly, as we move toward energy-as-a-service models, home energy management systems (HEMS — automated management of all flexible loads in a house to maintain amenity while responding to price signals to maximise value) are likely to emerge as a mainstream service and are well suited to be part of an aggregated VSR. While smaller, innovative retailers are likely to move into this space, it is also well suited to aggregators not just because they have a stronger incentive to aggressively respond to price signals, but also because customers are likely to prefer to keep their HEMS if they switch retailers. Trialling multiple FRMPs for small consumers with a focus on batteries and HEMS will help identify the issues that need to be addressed in the VSR, FTA, and consumer protections frameworks to inform future changes; and enabling more small customer loads into the VSR framework will increase visibility for the market operator.
- **A nuanced approach to visibility:** Since explicit visibility to AEMO for forecasting and market operation is a key purpose of the VSR framework, the most suitable flexible resources should be prioritised in implementation and incentive scheme development. Aggregated batteries, well suited to the mechanism, is an obvious focus; along with other resources that emerge during the current development process as likely to participate. Consideration should be given to requiring VSR participation of batteries subsidised with public funds — but only with appropriate guardrails to protect customer value.
- **Alignment with the needs of distribution networks:** Submissions to the IPRR rule change, stakeholder feedback during the development of the VSR guidelines, and our own consultation have all highlighted a critical visibility issue between voluntary scheduled resource providers (VSRPs) and distribution network service providers (DNSP)s. VSR guidelines currently include an information sharing protocol between the two to ensure VSR bids align with the dynamic operating envelopes (DOEs) used to manage network congestion, but the VSR information is only required at the aggregate level. More granular data — at the individual connection level — would allow DOEs to be less conservative and thus enable more value from CER for all customers.

Off-market mechanisms

Outside explicit demand response mechanisms built into the energy market, there are several other ways that flexible demand can be activated that are outside of the market (or 'off-market') but still

[22] AEMC, Unlocking CER benefits through flexible trading, Rule determination, 15 August 2024: p. v

have an impact on it. Most of these off-market mechanisms do not provide any visibility of flexible resources' behaviour to AEMO or other market participants.[23] Off-market mechanisms include:

- **Retailer and DNSP demand response programs**: Retailers or DNSPs send a message asking customers to reduce their usage for a period and pay customers (perhaps through a bill credit) who reduce their demand by the required amount. During our consultation we spoke with several residential customers who have participated in these programs. They all had a positive experience, but some were disappointed that they were called upon so infrequently and all were surprised how easy it was to meet the demand reduction targets. Some met the target without taking any action because the natural variability of their usage was enough.
- **Retailer virtual power plants (VPPs):** Retailers use aggregated customer batteries to respond to price signals. For gentailers, VPPs are essentially part of their generation portfolio and are used to reduce their exposure to spot prices. Under-hedged retailers use them more aggressively to manage hedge shortfalls, and spot-price passthrough retailers use them as a tool for customers to manage their own price exposure. Residential customers we spoke to had mixed experiences with these VPPs — all had benefited financially, but some were frustrated that their battery was undercharged when they wanted to use it. Only one of these VPPs — from a price passthrough retailer — gave the customer the ability to set a minimum charge state for their battery, and this was the most satisfied customer we spoke to.
- **Retailer or DRSP contracts:** These can be market- or system-oriented: for example, retailers contracting directly with third parties with control of appliances (such as a hot water system or electric vehicle charger provider) to reduce or increase demand when needed to manage hedge or generation shortfalls, or to offset negative prices or high solar exports; or a DRSP contracting with customers (this could be through a VPP) to deliver ancillary services or RERT services under direction from AEMO
- **Price passthrough tariffs:** Retailers offering dynamic tariffs based on the spot price, giving customers the opportunity to increase or reduce demand in response to the price – consuming more when prices are low or negative, and consuming less (or exporting more) when prices are high. These retailers typically provide real time price information and, in many cases, other tools to help customers manage their price exposure.

In considering these pathways as part of the broader flexible demand landscape, it's necessary to consider the different incentives and objectives for activating a response. For most retailers, addressing generation and hedge shortfalls to manage spot price exposure is paramount. For DNSPs the focus is to manage network congestion and maintain availability and power quality targets. DRSPs' business model is to obtain maximum value from a flexible demand response.

Customers self-managing

In general, customers will deliver flexible demand when it's simple to do so and helps them meet their basic energy needs (for affordability and availability). This may involve activation through market mechanisms, but often not. Examples of customers self-managing include:

[23] For more on the 'visibility' issue, see Section 3.

- Customers with solar PV will often shift flexible usage into the solar generation period to take advantage of their generation. This significantly lowers their overall energy costs and may deliver an energy system benefit by shifting demand away from peak periods and reducing solar exports during low demand periods.
- Customers with solar and batteries use their batteries to time-shift their solar generation into the peak demand period. This lowers their energy costs even more and may deliver additional system benefits by further reducing solar exports during low demand periods and energy demand in peak periods.
- Customers on time-variant and spot price passthrough tariffs are incentivised to shift demand in response to average or actual (respectively) wholesale prices, lowering their energy costs and potentially delivering system benefits by reducing demand during high demand periods and increasing it during low demand periods.

But in all these cases, customers' rational response to drivers of demand flexibility may not align with market or system needs. For example:

- Many households with solar PV are relatively high energy users with above-average peak demand[24], limiting potential peak demand reduction benefits of self-management.
- As solar systems become larger, buildings more thermally efficient and electric appliances more energy efficient, solar customers shifting usage into the solar generation period has a limited impact on solar exports.
- Customers using batteries to time-shift excess solar generation for later use get a clear economic benefit for little effort, but the battery charge period is likely to start and end well ahead of the optimal time for soaking solar surplus.
- Customers may have flexible resources set up to align with a time-of-use tariff, but there will be times when set tariff time periods will be misaligned with market price movements and/or network congestion or minimum demand.
- Customers dynamically flexing demand in line with dynamic spot price passthrough tariffs may still be responding to signals that are misaligned with network needs.
- Customers' primary needs for the amenity or value produced by their appliances and equipment may still lead them to ignore signals or override controls when their need is more valuable than the potential economic benefit of responding.

Most of these issues can be addressed by third party signals or controls that still deliver the customer benefit while adjusting to maximise available system benefit — this is a compelling reason to design flexible demand market mechanisms in a way that reduces barriers to small customer participation. But the example of amenity and productivity needs demonstrates that the theoretical full potential of demand flexibility can never be fully realised. Ensuring there are demand flexibility pathways that are accessible, deliver value to customers, and prioritise customer needs, provides the greatest opportunity to leverage as much demand flexibility potential as is consistent with customers' amenity and productivity needs.

[24] For example, analysis is Victorian solar vs non-solar customers in BD Infrastructure Victorian Distribution Network Service Providers Tariff Workshop 3: Summary report, April 2024: p. 29.

3. From visibility to predictability

Over the last five years, concerns about the impacts of unscheduled flexible resources on the efficiency of the energy market have been raised by energy market bodies including the Energy Security Board (ESB)[25], Australian Energy Market Operator (AEMO)[26], and Australian Energy Market Commission (AEMC).[27]

More recently, the *National Electricity Market wholesale market settings review* (NEM Review) identified visibility of flexible resources as a critical issue in the evolving energy system, noting that:

> *"In the spot market, increasing variability and volatility in supply and demand impede price formation without resources being visible. Forecasting and efficiency will improve if more market resources become visible and participate in dispatch."*[28]

The growth of CER has led to an increase in variability of demand and unscheduled supply, which poses a challenge to market operation. Because an increasing cohort of demand-flexible resources are unscheduled (effectively 'invisible'), AEMO is less able to predict when sudden changes in demand are likely to take place, affecting system stability and resulting in price volatility.

The NEM Review concluded that increasing dispatchability and visibility of price-responsive resources would improve forecasting and dispatch efficiency, reduce price volatility, reduce reliance on reliability interventions and support the integration of renewables.[29]

This was broadly supported in our consultation, but with a degree of nuance. Interviewees agreed that visibility of flexible resources is important to inform forecasting and enables dispatchability. However, some interviewees believe the impact of non-visibility can be mitigated by forecasts that better account for the behaviour of invisible resources – as forecasts already do for other sources of variable demand.

In short, while there is merit in trying to make more flexible demand resources visible, equally, there would be value in better understanding the types of flexible demand that are unlikely to participate in dispatch mode, and accounting for their likely behaviour in forecasts without having explicit visibility, which is much more feasible with modern technologies and forecasting techniques.

Visibility exists on a spectrum

Flexible resources participating through market mechanisms are explicitly visible and dispatchable. Ensuring these mechanisms can capture a broad range of flexible resources thus increases visibility and is a clear rationale for expanding entry and eligibility requirements and addressing technical barriers where there is a net benefit.

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[25] ESB, Consumer Energy Resources (CER) Implementation plan (previously known as the Distributed Energy Resources (DER) Implementation Plan), 2021. Available at: https://www.energy.gov.au/sites/default/files/2021-12/Attachment%20A%20-%20DER%20Implementation%20Plan%20-%20Three%20Year%20Horizon%20-%20December%202021.pdf

[26] AEMO, Electricity Rule Change Proposal; *Scheduled Lite*, January 2023

[27] AEMC, Integrating price-responsive resources into the NEM, Rule determination, 19 December 2024

[28] Nelson, T., Conboy, P., Hancock, A., Hirschhorn, P., 2025, National Electricity Market wholesale market settings review: Final Report, Department of Climate Change, Energy, the Environment and Water, Canberra, December: p. 46

[29] Nelson, T., Conboy, P., Hancock, A., Hirschhorn, P., 2025, National Electricity Market wholesale market settings review: Final Report, Department of Climate Change, Energy, the Environment and Water, Canberra, December: p. 95

The NEM Review was very responsive to stakeholder input on the suitability of the WDRM and VSR framework for different types of loads, aggregations, and price-transparent contracts. The recommendations for some aggregators and loads to participate in these mechanisms (thus giving explicit visibility and dispatchability) and others to report flexible capacity or load intentions, recognises the importance of balancing complexity and accessibility for enablers of demand flexibility.

In line with Recommendation 2A of the NEM Review Report, Energy Ministers have tasked AEMO, in consultation with industry and consumer representatives, to develop a Market Visibility Framework (MVF). The MVF is described by AEMO as "a set of rules, data requirements and visibility and participation pathways that establishes clear obligations for how different types of resources provide information to AEMO to inform market operation and price formation."

AEMO released an "Approach Paper" [30] on 4 May 2026 detailing its proposed approach to developing the MVF, including scope and key issues to be addressed, along with proposed consultation milestones and engagement with stakeholders. The Approach Paper sets out an indicative timetable for co-designing the MVF between May and October 2026, with a recommendation to energy ministers on the detailed design of the MVF expected in December 2026.

Forecasting is always improving

Increasingly variable demand and supply is a clear challenge for forecasting. But much of the variability is a response to conditions such as weather, insolation, and wholesale price. Many interviewees considered that historical NMI data, available to AEMO, could capture the underlying variability of CER and flexible demand in relation to these factors and inform a more sophisticated forecasting methodology. DNSPs, also very focused on improving forecasting and with considerable visibility of CER (especially solar and batteries, which act in a generally predictable manner when unmanaged) in their networks, could work with AEMO to inform these forecasts.

A DSOO should improve flexible demand forecasts

In September 2025 the Australian Government announced the establishment of a demand side statement of opportunities (DSOO) as part of its Net Zero Plan with the aim of elevating demand-side resources within system planning and policy development. The plan states that the DSOO is intended "to inform the market where there are opportunities to use energy more efficiently, helping to make our demand growth more manageable".[31]

Development of the DSOO is currently being led by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) in collaboration with AEMO and state and territory governments. While the aims and audience of the DSOO are being finalised, the EEC understands that one of its aims will be to improve forecasting. Ideally, system planners will be able to use the information collected through the DSOO as part of their inputs and assumptions that inform the Integrated System Plan.

[30] Available on AEMO's website: https://www.aemo.com.au/consultations/current-and-closed-consultations/market-visibility-framework-consultation

[31] Commonwealth of Australia 2025, Australia's Net Zero Plan, p7 available at https://www.dcceew.gov.au/climate-change/emissions-reduction/net-zero#toc_1

The scope of the DSOO is also still under development but it is expected that distributed demand-flexible resources in households and businesses will be in scope – if not initially, then in future iterations of the DSOO. This would ideally include resources such as:

- Distributed batteries and bidirectional EV chargers, capable of responding rapidly to price signals (Type 2 – Dynamic load shifting)
- Electric storage water heaters capable of shifting to daytime operation to 'soak' up excess solar (Type 1 – Load shaping)
- Commercial batteries, able to provide rapid changes in consumption or generation to support the grid (Type 5 – Balancing services) and/or enable a switch to back-up power to reduce grid demand when prices are high or there is an emergency (Type 4 – Emergency load management and/or Type 3 – Price driven load management).
- Curtailable equipment able to reduce demand on the grid when prices are high or there is an emergency (Type 4 – Emergency load management and/or Type 3 – Price driven load management).

4. A framework to enable greater demand flexibility

With such a diversity of participants, drivers and incentives, customer types, load types, and appliance and equipment characteristics, multiple pathways are needed to fully capture the potential contribution of flexible demand in the evolving energy system. No single mechanism or pathway is likely to be the most important or effective. A suite of measures is needed – a demand flexibility framework – that articulates the diversity of needs and opportunities and enables them to work together harmoniously.

A demand flexibility framework must meet a range of needs:

- **For electricity users**: simplicity, so they can meet their primary energy needs and take up flexible demand opportunities as it suits them and in a way that works for them.
- **For AEMO:** predictability (through explicit visibility or forecastable response), to drive dispatch efficiency and support the supply–demand balance.
- **For DNSPs**: visibility, so they can manage dynamic operating envelopes and inform their emerging role as a distribution system operator (DSO).
- **For electricity retailers and service providers**: technology and participant neutrality to allow for technical and industry innovation, participation by different sized businesses, and participation driven by different incentives.

The framework must clearly articulate what it needs to deliver and include a roadmap to getting all the pieces in place. All the needed reforms — the forthcoming *Expanding eligibility under the WDRM* rule change process and any further adjustments to the WDRM, the ongoing development of the VSR framework, and future reforms focused on facilitating demand flexibility — need to be considered holistically within this framework.

4.1 Elements of a demand flexibility framework

The demand flexibility framework needs to explicitly acknowledge that a mix of on- and off-market pathways are required — and that these pathways interact with each other. Key elements of a demand flexibility framework should include:

- **The WDRM** to maximise the potential of predictable, “baselineable” loads capable of a material response to prolonged high prices — including large loads and aggregations of smaller loads. Reforms to baselining and customer protections will allow load types currently excluded or facing barriers to participate, including sites with solar and batteries and small customers with suitable loads. Review of the costs and benefits of trade-offs between response times, ramp rates and ancillary services could bring in some loads with slower response times. See section 2.3 for more information on improving the WDRM.
- **The VSR framework** for large loads outside the WDRM (or that don’t meet its requirements) and aggregations of smaller, dynamically responsive resources. This is likely to suit aggregations of behind-the-meter batteries, and VPPs with a mix of batteries and other flexible resources. This pathway could be particularly well suited in

the near future to businesses offering home energy management services (HEMS). Please see section 2.3 for more information on improving the VSR framework.

- **The FTA framework** as a mechanism to enable many different types of flexible demand. Demand response providers can use FTA to activate separately metered flexible loads within or outside the VSR framework.
    - Having an inflexible load with a retailer and a flexible one with a DRSP could meet both participants' needs and simplify baselining.
    - If multiple FRMPs were to be permitted for small customers (subject to appropriate consumer protections), customers could retain their HEMS when changing retailers, supporting a more mature HEMS market.
- Ensuring that **demand response used for essential system services** — such as the Reliability and Emergency Reserve Trader scheme (RERT) and Frequency Control Ancillary Services (FCAS) is available within the broader flexible demand framework, as far as is consistent with the specific requirements of those schemes (for example, the requirement that RERT resources must not be available to the National Electricity Market through any other contract or arrangement in the trading intervals which the reserve is required).
- **Measures to facilitate and integrate off-market demand flexibility** that operates outside market mechanisms, including:
    - Giving the necessary visibility and predictability to AEMO and DNSPs. Ensuring there is appropriate access to meter data, the Distributed Energy Resource (DER) register, and the capacity and location of fleets of aggregated resources and customers on price-exposed tariffs will enable better forecasting of the behaviour of flexible resources that are not orchestrated through market mechanisms. DNSPs have insights into demand flexibility in their own networks that could inform AEMO's forecasting.
    - Pricing reforms that better signal the value of demand flexibility. For flexible resources responding to market and network needs via price signals, end-user pricing that reflects the value of energy and its impact on the local network is required to avoid inequitable cross-subsidies between participating and non-participating customers, and to prevent 'gaming' (such as scheduling high-demand resources to operate during peak demand periods in order to attract a reward for response – a concern of some stakeholders). It also gives customers opportunities to self-manage flexible appliances to the extent that it suits their needs, and be rewarded proportionately for the market or system benefit they provide. The relationship between pricing and demand flexibility should be explicitly addressed in the *Electricity pricing for a consumer-driven future* review currently being undertaken by the AEMC — to ensure that its final recommendations support this framework.
    - Developing a co-optimised approach to the Integrated System Plan and other strategic planning and policy development tools. For example, the DSOO should identify the **technical potential** of the full range of demand side resources (i.e., not constrained by historical trends or government policy) which could then serve as the upper limits of demand-side action for the ISP model, and become an input for exploratory research into demand side opportunities.

- Ensuring **appropriate consumer protections** apply. Customers self-managing flexible resources through vendor-supplied or third-party control interfaces, or contracting with

service providers or appliance vendors to manage flexible appliances on their behalf, could be exposed to financial harm or energy availability shortfalls if controllers do not operate as expected. Reforms to the customer protection framework to incorporate new energy technologies and services (part of the National CER Roadmap) need to extend to this part of the market.

Moving toward a two-sided market

Much of the dialogue around the WDRM, VSR and FTA frameworks is that they are steps toward a two-sided electricity market. Many people we spoke with while developing this paper considered a true two-sided market — where energy sellers and energy buyers both bid into the market — the only way to truly activate the demand side. This would not obviate the off-market trading — forward contracts, hedges, etc. — that are an integral part of the electricity landscape; but would go a long way toward more efficiently balancing demand and supply on an equal footing.

A forward-looking demand flexibility framework should enable a staged transition to a fully two-sided electricity market.

Flexibility as a network asset

Beyond the wholesale market, there is also a clear role for flexibility in managing distribution networks — significantly, in developing non-network alternatives to increased investment in capacity, and in increasing network utilisation, to lower network costs for all users. Market mechanisms need to interface with distribution network signals (as is being explored to a limited extent in the development of VSR framework), and measures to increase demand flexibility need to consider the value of flexibility to networks as well as the market.

4.2 Recommendations

To enable the development and implementation of the demand flexibility framework described above, we recommend these next steps in the short term:

1) Reframe the purpose of the Market Visibility Framework

To optimise the potential of flexible demand to minimise energy system costs for energy consumers, as part of the work on the Market Visibility Framework (MVF), AEMO should contextualise the MVF within the broader energy system, reframing it as:

> "*a framework for increasing both the visibility of flexible resources and the forecastability of demand flexibility that is not explicitly visible, in order to enable participation in dispatch where suitable and in network support where needed, and to improve market efficiency, with the aim of both reducing energy system costs and reducing energy costs of end-users*."

This framework should improve the visibility and predictability of flexible resources to enable the market to settle at lower prices, and networks to increase utilisation.

This should include flexible resources being able to be dispatched when suitable, but also more sophisticated forecasting methods that can better predict the responses of demand-flexible appliances and equipment with changes in price, temperature, and other relevant variables.

2) Use the DSOO to develop a co-optimised approach to system planning

Now in development, the demand side statement of opportunities (DSOO), when implemented, should identify expected and potential demand side capacity to inform future Integrated System Plans and policy and enable exploratory research on demand-side opportunities.

3) Ensure demand flexibility is considered as part of the AEMC Network Regulation Review

The AEMC Network Regulation Review should explore regulatory changes[32] that better enable flexible demand to deliver network support services and incentivise improved network utilisation, in a way that enables appropriate interactions with existing and emerging market mechanisms and off-market pathways for flexible demand.

4) Prioritise key actions in the CER Roadmap

The CER Roadmap includes a number of workstreams directly related to issues raised in this paper and elements of these recommendations including the following, which should be prioritised:

- Standards compliance and alignment — improving compliance with standards and alignment between related standards will improve the useful flexibility and controllability of appliances.

[32] Including those set out in a report written in July 2025 by independent expert Dr Gabrielle Kuiper and Dr Dylan McConnell from UNSW Sydney for the Energy Efficiency Council: *NEM Reform Unlocking the demand side in future energy markets*.

- Consumer protections reform — enhancing consumer protections to incorporate new energy products and services is critically needed to enable greater household participation in flexible demand: for example, by enabling households and small businesses to engage more fully with DRSPs and in the WDRM.
- Tariff reform — tariffs that reflect the positive and negative value of energy to the market and the network underpin demand flexibility by aligning incentives, maximising value and sharing costs equitably.
- Roles and responsibilities (in markets and energy system operation) for DNSPs – to support the distribution system operator (DSO) role, enable better cooperation of DNSPs with participants under the VSR framework, and integrate network and market incentives for demand flexibility.

5) Increase participation through changes to the WDRM, VSR Framework and FTA Framework

Wholesale Demand Response Mechanism

Measures to allow greater participation of types of sites and loads include:

- A review of technical requirements (such as response timeframes and ramp rates) with respect to additional costs of ancillary services to determine the extent to which requirements can be eased to enable greater participation without reducing net benefit.
- Further development of baselining methodologies to accommodate a wider range of load types, and including:
    - sites with periodic downtime (such as by incorporating automatic low load exclusion days, as successfully used in other jurisdictions)
    - sites with solar generation
    - sites in embedded networks
- Enabling aggregations of smaller loads to meet participation criteria in total rather than per unit.
- Developing a roadmap to address the challenges of including aggregations of suitable small customer loads within five years.

VSR framework and FTA framework

Measures to allow greater participation of customer, service and market participant types; and integration of market and network needs include:

- Undertaking trials of having multiple FRMPs (financially responsible market participants) for households and other small customers under the FTA.
- In line with the revised timeline for the VSR implementation, undertaking trials for enabling non-retailer aggregators to participate with small customer batteries and home energy management systems.
- In line with developing consumer protections for customers of new energy products and services, prioritise determining and implementing appropriate protections for customers with batteries participating as part of an aggregated VSR.
- In finalising the framework implementation, ensure there are clear requirements for granular data exchange between VSR providers and DNSPs to enable dynamic operating envelopes to be less conservative and thus enable more value from CER for all customers.

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