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## Executive Summary and main recommendations

### Overarching reflections on the NEM Review Draft Report

This submission commends the NEM Review Panel's extensive work to consider the future of short, medium and long-term procurement of supply and essential system services in the National Electricity Market (NEM). At the same time, it argues the Panel's Draft Report remains too anchored in traditional 'spot market' thinking rather than starting from the customer and behind-the-meter (BTM) resources. With forecasts indicating that by 2050, the majority of homes and businesses will be largely self-sufficient through rooftop solar, batteries, flexible demand and electric vehicles (EVs), **Solar Citizens suggest that markets should be envisaged from the consumer level upwards, not from a legacy wholesale supply-side perspective.** This approach would reshape how bulk energy provision, shaping and firming (such as using hot water systems and EV charging to absorb abundant daytime solar generation) are facilitated.

This submission criticises the draft for insufficiently addressing demand-side resources, particularly hot water systems, which present an enormous flexible demand opportunity. Referencing UTS research, it highlights billions in potential savings through electrifying and making domestic hot water flexible—up to 22GW/45GWh/day, equivalent to over two-thirds of NEM peak demand by 2040 under the rapid electrification scenario. Expansion of demand-side thinking, including lessons from international 'demand flexibility' markets, is urged.

The submission further advocates for the expansion of the Wholesale Demand Response Mechanism (WDRM) to aggregations of small users and the use of non-static baselines for measuring demand reductions. At the moment, only large users with effectively flat/static baselines can participate in the WDRM. As Australia's system trends toward winter peaks (due to solar seasonality and heating electrification), Solar Citizens recommends the development of regionally targeted winter flexible demand procurement, as occurs in Great Britain and New Zealand.

**On vehicle-to-grid (V2G), the submission argues the Panel underestimates the scale of EVs as a future grid resource,** with potential to meet a large share of total NEM storage needs and offset major capital costs. V2G's transformative impact on grid flexibility and system security is highlighted and should be a core consideration in shaping market reforms.

### On the proposed market-based mechanisms

Solar Citizens welcomes the proposal to make the Electricity Services Entry Mechanism (ESEM) accessible to aggregators of distributed energy resources (DER), also known as Virtual Power Plant (VPP) providers. The move to trade derivatives in smaller, more accessible parcels (e.g. 100 kW rather than 1 MW) is applauded, as is the Panel's decision not to introduce distribution-level wholesale energy markets—given dynamic operating envelopes can manage network constraints without an additional layer of markets.

The **submission supports reforms to market price settings:** maintaining a high Market Price Cap (MPC) now duplicates the Capacity Investment Scheme's investment signal, exposes consumers to risk, and offers windfall profits to gentailers, and so should be revised.

**The proposed strategic reserve**—a new out-of-market reliability mechanism for rare, extreme conditions—is seen as a **positive, targeted layer of insurance** that avoids distorting normal market price signals while providing resilience against events such as renewable ‘droughts’.

However, **the Panel’s much emphasised concern about insufficient ‘visibility’ and ‘scheduling’ of DER is questioned.** Solar Citizens argues that with widespread data on DER uptake and output, major over-investment is unlikely and international system operator experience shows that forecasting and system integration can be improved through advanced modelling and telemetry, including the use of machine learning, not just through dispatch-mode requirements.

This submission recommends withdrawing the proposal for Ministers to lodge a rule change to mandate DER be scheduled or dispatchable for price formation and instead work with AEMO to explore means of enhancing its forecasting capabilities in a high-variable renewables, high-DER future.

Additionally, **the Panel is urged to consider measures for more certain coal-fired generator exits,** potentially through financial incentives/penalties and improved coordination, as suggested by the Institute for Energy Economics and Financial Analysis (IEEFA).

### On the panel’s observations

Solar Citizens challenges the review’s focus on network tariff reform as a distraction from the core issue: creating a competitive market for aggregated DER (ADER or virtual power plants (VPPs)) to provide distribution network support services. Instead of tariff adjustments, a fundamental redesign of the economic regulation of distribution networks is needed to unlock system and consumer value from non-network solutions.

The draft report’s observation supporting **an increase in the fixed component of network tariffs is regressive:** it would disadvantage low-consumption, low-income households, erode incentives for energy efficiency and DER uptake, and fail to align with international best practice, which favours dynamic, locational, cost-reflective pricing to drive flexible demand and efficiency.

The submission notes the absence of discussion about basic consumer protections for VPP participants, such as transparency around earnings split between consumers and aggregators. To empower consumers, standardised disclosure and consumer information (including through the Australian Energy Regulator (AER)’s Energy Made Easy website) should be instituted.

The Panel’s proposal to extend the National Energy Customer Framework (NECF) is discouraged; instead, **this submission proposes a new, technology-neutral energy code under the Australian Consumer Law (ACL)** to modernise and unify consumer protections in a rapidly evolving, decentralised energy system.

### On making market reforms work for consumers

This submission argues that traditional state-based energy savings schemes (white certificates or energy efficiency obligations) are poorly aligned with the needs of a high-renewables grid. To optimise consumer and system benefits, these **schemes should evolve to incentivise the uptake of technologies able to be used as flexible demand.** Such reforms should include residential (e.g. hot water, split system air conditioning, smart pool pumps, thermal upgrades)

and commercial/industrial (heat pumps, EMIS, flexible refrigeration/ HVAC) equipment capable of measurement and verification and incorporate increased support for vulnerable households.

**Unlocking the full value of DER requires major technical and legislative enablers.** The submission advocates for the rapid introduction of Federal legislation to establish a national DER Technical Regulator to develop and enforce consistent, robust technical standards. Flexibility functionality for major household appliances should be mandated through the Greenhouse and Energy Minimum Standards (GEMS) regime. Open data access, standardised open communication protocols, and digital upgrades to AEMO's market systems are also deemed crucial—to support participation of DER in all market processes, enhancing competition and system resilience.

### Summary of Recommendations

All recommendations (priorities in *italics*) and Solar Citizens statements of support.

Solar Citizens is supportive of the following recommendations:

1. Recommendation 8A: The panel's direction towards trading of smaller sizes of aggregated DER and encourages AEMO to consider how the NEM dispatch engine (NEMDE) could be configured to manage bids below 1MW.
2. Recommendation 1D: Do not create distribution-level wholesale energy markets
3. Recommendation 5 and recommends the Panel provide stronger direction that maintaining a high MPC is duplicative and unnecessarily expose consumers to higher risks and potential super-profits for large generators
4. Recommendation 8D: A new longer-term out-of-market reserves service should be established to cover high-impact, low-likelihood events, with quantities to be procured at the discretion of jurisdictions, on advice from the Reliability Panel

In addition to the above, Solar Citizens recommends the following:

5. The Panel should remove Recommendation 2 “Energy ministers should require a broader range of price-responsive resources to be visible or dispatchable to participate in price formation” and instead, discuss other options for improving forecasting in a high DER system with AEMO.
6. The Panel should use a backcasting approach to consider the nature of the NEM in 2050 and test its recommendations from the perspective of the majority of generation, storage and flexible demand being behind-the-meter (BTM).
7. The Panel expand consideration of the demand side in its final recommendations.
8. The Panel support expanding participation in the WDRM to aggregations of small users and the use of non-static baselines to enhance demand side participation in the NEM.
9. The NEM review should consider a specific mechanism to procure flexible demand in winter, potentially on a region-by-region basis.
10. The Panel should explore the consequences of V2G for its proposals, especially in terms of the consequences for shaping and firming.

11. The Panel should consider how to deliver certainty around the exit of coal-fired generation, including by examining the mechanisms proposed by IEEFA.
12. The Panel should support extending flexible trading relationships to small customers (households and small businesses).
13. The Panel should support developing emergency procurement mechanisms for minimum demand periods, beyond the transitional non-market ancillary services framework.
14. The Panel should consider more deeply how Essential System Services (ESS) may change over the next decade or two.
15. The Panel should highlight the need for a first principles review of the economic regulation of distribution networks.
16. The Panel should remove its observations around increasing the fixed component of network tariffs.
17. The Panel should stress the importance of the AER providing information for consumers about VPPs and propose options for creating transparency around the revenue split between consumers and aggregators.
18. Rather than getting into the minutiae of multi-year retail contracts, the Panel should investigate the potential to develop an energy code under the Australian Consumer Law (ACL).
19. The Panel should propose a national deployment scheme for flexible demand for households and businesses as an evolution of state-based white certificate schemes.
20. The Panel should:
  - a. Provide commentary on the need for legislation to establish a technical regulator being introduced into Federal Parliament as soon as possible;
  - b. Investigate how to include flexibility requirements under the GEMS regime;
  - c. Urge prioritisation of work on data sharing and interoperability; and
  - d. Investigate how AEMO's market systems can be modernised and make the best use of machine learning.

## 1. Overarching reflections on the NEM Review Draft Report

### Viewing the energy transition from behind-the-meter would allow the Panel to be more consumer and future-focused

The NEM Review Panel has completed an extraordinary amount of work in six months and developed some largely reasonable directions for the evolution of the NEM. After reading the whole draft report one is left with the impression that with the proposed development of a new Electricity Services Entry Mechanism (ESEM) and an always-on market marking obligation will see the NEM through the transition from majority coal-fired generation to majority Variable Renewable Energy (VRE) generation smoothly without any major interruptions.

This may well be the case, but despite the acknowledgement in the draft report of the fundamental change to weather-dependent supply and an increased role for distributed energy resources (DER), the full extent of the big picture transformation that the energy and transport sectors are undergoing seems just out of view. The status quo, especially the spot market as the core of supply and therefore price setting and demand as a secondary consideration still dominates, despite some positive affirmations of the importance of the demand side.

For the Panel's final report, it would be great to read the story that Solar Citizens and the consumers it represents knows, starting behind-the-meter. Perhaps 70 per cent of homes and businesses will receive the majority of their supply via the solar on their roofs and stored in batteries (stationary and EV batteries) by 2050. A typical home with a 10kW solar system and an 18kWh battery in Sydney will be highly self-sufficient, with solar generation likely exceeding average daily electricity use in most conditions, and the battery providing overnight and backup coverage. On sunny days, the combination can supply almost all electricity needs for a standard household, though seasonal and weather variations will affect this self-sufficiency.

The NEM will, I would suggest, not be the main game, within two decades and we should re-think supply, storage and flexible demand on this basis, **starting from behind-the-meter, not from the spot market, which will become less and less relevant.**<sup>1</sup> Such an approach would refocus attention on:

- How to facilitate sharing of bulk energy, firming and shaping from households and businesses with DER (generation, storage and flexible demand) to those without DER or with insufficient DER to meet their needs at particularly times
- How to provide bulk energy, firming and shaping from the broader grid, especially when it is needed in winter and on still or low-irradiance days
- How to make the most of flexible demand (especially hot water systems and EV charging) to soak up abundant solar generation during the day,
- How to electrify in a way that reduces overall costs of the system, and
- How to use aggregated DER (ADER, also known as Virtual Power Plants or VPPs) to provide network support services (or non-network solutions) to avoid expenditure on expensive distribution network augmentation or replacement.

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<sup>1</sup> Kuiper, G. (2023, April 25). [Dead duck curve: Rooftop solar saturation can be big win for consumers and grid](#). RenewEconomy.

Flipping the perspective from the market to the consumer BTM would help future-proof the NEM and ensure that the thinking that developed the NEM does not continue to dominate. If we want a low cost transition, markets will be important but not the starting point for supply, storage or flexible demand.

Recommendation:

**Solar Citizens recommends the Panel uses a backcasting approach to consider the nature of the NEM in 2050 and test its recommendations from the perspective of the majority of generation, storage and flexible demand being BTM.**

## 2. Reflections on the demand-side

### Insufficient attention to unlocking the lowest hanging fruit

The fact that the words ‘hot water systems’ are entirely missing from the NEM wholesale market settings review Draft Report means that the largest current opportunity to shape demand (moving electricity to the time of day it is needed) has seemingly gone under the Panel’s radar.

UTS research<sup>2</sup> on the electrification of domestic hot water in Australia found the following savings across four scenarios with different levels of take up of electric heat pump and flexible hot water:

1. Highly flexible – Savings of AUD\$6.7 billion from reduced gas and electricity use by 2040; plus \$14.3 billion in avoided grid storage costs.
2. Highly efficient – Savings of AUD\$4.7 billion from reduced gas and electricity use by 2040; plus \$10.1 billion in avoided grid storage costs.
3. Rapid electrification – Savings of AUD\$4.7 billion from reduced gas and electricity use by 2040; plus \$13.1 billion in avoided grid storage costs.
4. BAU – No savings in energy use; AUD\$5.4 billion in avoided grid storage costs.

Under the rapid electrification scenario, flexible domestic hot water would total 22GW/45GWh/day of flexible demand—equivalent to more than two-thirds of peak demand in the NEM.

It’s confusing to read the Panel’s observations about matters such as multi-year retail contracts when the potential of hot water goes unacknowledged.

**The cheapest way through the transition is through smart, efficient electrification** and the NEM review should consider recommendations and observations to support this outcome, including those in the IEEFA Briefing Note on ‘Australia needs more efficient, smarter home hot water systems’ included as Attachment A.

Recommendation:

**Solar Citizens recommends expanding consideration of the demand side in its final recommendations.**

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<sup>2</sup> Roche, D., Dwyer, S., Rispler, J., Chatterjee, A., Fane, S., & White, S. (2023). [Domestic hot water and flexibility: Report prepared for ARENA](#) by Institute for Sustainable Futures, University of Technology Sydney.

## Need to open the Wholesale Demand Response Mechanism (WDRM) to small consumers

The IPRR and WDRM are designed for different purposes. The IPRR provides incentives for retailers to voluntarily facilitate consumer participation, whereas aggregators can participate in the WDRM through separate contracts with large C&I consumers. As such, the two mechanisms support different participation models and reflect different incentive structures, and it is important to both extend WDRM to small users, and separately to allow aggregation of small user loads in the IPRR.

Currently, the WDRM enables third-party aggregators to bid demand reductions directly into the wholesale market, but access is confined to large users, excluding small consumers. Expanding WDRM participation to small users, along with the development and application of suitable, aggregation-friendly baselines, is essential for realising greater demand-side participation and capturing the full system benefits distributed across the NEM.

Small users make up the majority of energy customers and collectively possess significant flexible demand potential, which, if aggregated and bid into the market, can deliver enhanced reliability, market competition, and consumer value. **The most obvious way the Panel could support the unlocking of the demand side is through supporting the expansion of the WDRM to aggregated household and small consumer demand.** The WDRM enables third-party aggregators to bid demand reductions directly into the wholesale market, but it is currently only accessible to large users using static baselines (see Attachment B for more details).

Recommendation:

**Solar Citizens recommends expanding participation in the WDRM to aggregations of small users and the use of non-static baselines to enhance demand side participation in the NEM.**

## Consider a winter flexible demand procurement

As the NEM moves towards winter peaking, largely as a result of lower solar irradiance in winter and electrification of heating, especially in Victoria, it is worth considering a winter flexible demand procurement mechanism similar to those successfully operating in New Zealand and Great Britain, where these programs have demonstrated significant value in managing peak winter electricity demand while reducing system costs and emissions.

Britain's Demand Flexibility Service (DFS) saved over 3,900 MWh during winter 2024-25 at a cost of just £1.2 million while reducing carbon emissions by more than 620 tonnes. Similarly, New Zealand's experience during its 2024 winter electricity crisis highlighted the critical importance of demand response mechanisms, with initiatives like the Tiwai Point smelter's 50MW demand reduction helping to manage system stress during periods of fuel shortage and high wholesale prices.

Recommendation:

**Solar Citizens recommends the NEM review considers a specific mechanism to procure flexible demand in winter, potentially on a region-by-region basis.**

## Elevate consideration of Vehicle-to-Grid (V2G)

Despite compelling evidence that Australia's EV fleet will become the largest and lowest-cost storage resource in the energy transition, the Panel has relegated vehicle-to-grid (V2G) to the periphery of its considerations, treating it as another 'consumer energy resource' rather than recognising V2G potential to provide up to four times the total NEM storage requirements by 2050. This oversight represents a strategic blind spot, as **modelling shows that flexible bidirectional charging from just 10% of Australia's future EV fleet capacity could provide 37% of total NEM storage needs, potentially offsetting around \$94 billion of large-scale battery storage investment.**<sup>3</sup>

The review's approach reflects an outdated 'hub-and-spoke' electricity market thinking that fails to grasp how DER and V2G fundamentally challenges traditional concepts of supply and demand. While the panel states that CERs are 'hidden participants' whose behaviours impact system security and wholesale prices, it has not adequately addressed how V2G represents a quantum leap beyond conventional demand response. Unlike static home batteries, V2G-enabled vehicles offer mobile, dispatchable storage that can respond within seconds to grid contingencies and provide system security services equivalent to traditional power stations, with 600,000 EVs potentially matching the output of NSW's Eraring power station at full capacity.

Furthermore, consumers do not make rational purchasing decisions about EVs (or any vehicle) requiring a return on investment the way they do with batteries. Given households and businesses purchase vehicles for the purposes of transport, the energy market services will be able to be provided at very low or negligible marginal cost.

Recommendation:

**Solar Citizens recommends the Panel explore the consequences of V2G for its proposals, especially in terms of the consequences for shaping and firming.**

## 3. On the proposed market-based mechanisms

### Welcome the Electricity Services Entry Mechanism (ESEM) being open to aggregated DER

The draft report states under Recommendation 8A, 'The ESEM should be open to all providers of a given service, including aggregators of consumer energy resources (CER) and distributed energy resources (DER), and demand response providers, provided these resources are able to be scheduled for dispatch by the Australian Energy Market Operator (AEMO)' which is most welcome.

Also valuable to Solar Citizens and to enhancing competition is the Panel's direction that derivatives 'should be able to be traded in smaller parcels to reflect the smaller nature of individual generators (e.g. 100 kW rather than 1 MW)'. It is hoped that AEMO's dispatch engine is also able to evolve to manage comparable bid sizes.

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<sup>3</sup> enX. (2024). [Network tariffs for V2G: Exploring how network tariffs can incentivise vehicle-to-grid operation and reduce grid pressures](#) [PDF]. Australian Renewable Energy Agency.

Likewise, the Panel has rejected the complexity of distribution-level markets which is sensible given the lack of evidence that these are necessary, especially given dynamic operating envelopes can ensure any trading of DER exports is conducted within the dynamic technical limits of distribution networks.

Recommendation:

**Solar Citizens supports Recommendation 8A: The panel’s direction towards trading of smaller sizes of aggregated DER and encourages AEMO to consider how the NEM dispatch engine (NEMDE) could be configured to manage bids below 1MW.**

Recommendation:

**Solar Citizens supports Recommendation 1D: Do not create distribution-level wholesale energy markets.**

### Welcome reform of the market price settings

Recommendation 5 is that ‘*The Reliability Panel should consider adjusting the form of the market price settings over time*’. Historically, the high market price cap (MPC)—now at \$20,300/MWh—has not delivered the intended new investment signal, with high price events too infrequent and brief to reliably underpin returns on new capacity.

With the Capacity Investment Scheme (CIS) now providing a separate investment signal, the role of a high MPC as a reliability incentive is diminished. Maintaining it at its current level risks exposing consumers to unnecessary financial risk and super-profits accruing to existing gentailers, rather than supporting genuine reliability or new investment.

Recommendation:

**Solar Citizens supports Recommendation 5 and recommends the Panel provide stronger direction that maintaining a high MPC is duplicative and unnecessarily exposes consumers to higher risks and potential super-profits for large generators.**

### Welcome the proposed strategic reserve

By establishing an out-of-market reserve, the strategic reserve will provide an additional layer of insurance to cover high-impact, low-likelihood events—such as prolonged renewables droughts or extreme weather—that the current market design alone cannot efficiently address.

This mechanism enhances system resilience and reliability without distorting price signals in the regular energy market, as strategic reserves are only triggered under clearly defined, extraordinary conditions. The reserve will also allow for the flexible procurement of resources which cannot otherwise recover their costs from infrequent market events, ensuring consumers are protected from rare but severe shortfalls and supporting a cost-effective energy transition for the NEM.

Recommendation:

**Solar Citizens supports Recommendation 8D: A new longer-term out-of-market reserves service should be established to cover high-impact, low-likelihood events, with quantities to be procured at the discretion of jurisdictions, on advice from the Reliability Panel.**

### Questionable assumptions about visibility and scheduling

The Panel states that ‘Without reform to make these resources more ‘scheduled’ and observable to the market operator and market participants, the market may not be able to function without significant over-investment.’ And 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 dispatchable’.

Traditional market thinking is doing a lot of work here, including in opposition to the main thrust of the draft report. The draft report is primarily focused on putting in place market-based mechanisms to replace aging fossil generation.

The overarching concern is that the NEM will have insufficient generation, especially at times of low solar or wind generation. At the same time, the draft report suggests that invisible DER will lead to over-investment. It seems unlikely that both propositions can hold simultaneously, especially when figures on rooftop solar generation, BTM battery storage uptake, heat pump purchases, etc are widely available. Investors are unlikely to attempt to compete with DER in people’s homes and businesses.

The second part of the argument is around AEMO’s ability to forecast the bulk supply, shaping and firming from distributed energy resources. The argument goes that AEMO’s forecasting and efficiency are lacking because DER is invisible. The draft report quotes an IES report to AEMO estimating the increased costs due to invisibility at \$1.5 billion (for visibility alone) to \$1.8 billion (for dispatchability) NPV by 2050, the majority is driven by a reduction in forecast error.<sup>4</sup> The costs are across regulation FCAS (57%), generation (13%), emissions (23%) and RERT. What is strange is that these numbers are relatively low and so driven by FCAS costs which are inherently uncertain out to 2050.

The IES report does not model potential reductions in required network investment (both transmission and distribution) due to DER-driven peak demand reductions. Demand-side participation is evaluated based only on rare, high-price events, without consideration of broadening the WDRM to small customers (discussed below). The improvement of AEMO’s demand forecasting under all cases relies heavily on ‘assumed’ progressive accuracy gains, rather than empirical or benchmarked evidence from international experience about what’s needed to improve forecasting in systems with large capacity of DER.

Other leading system operators in high-DER jurisdictions illustrate how forecasting can improve without necessarily relying on the despatch mode requirements envisaged under the Integrated Price Responsive Resources (IPRR) rule.

For instance:

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<sup>4</sup> IES (2024), Benefit analysis of improved integration of unscheduled price-responsive resources into the NEM, final report to AEMO, pp 7–9

- Facing rapid DER growth, the California ISO (CAISO) has invested in advanced load modelling techniques, use of smart meter data, and probabilistic approaches to better capture distributed PV, battery and EV behaviour.
- The UK National Grid ESO employs both improved statistical/machine learning methods and real-time flexibility platforms for VPPs and aggregators, significantly reducing balancing costs as distributed and flexible resources expand.
- Electric Reliability Council of Texas (ERCOT) has enhanced forecasting accuracy through mandatory telemetry and participatory programs for aggregators in the ancillary services markets.

Recommendation:

**Solar Citizens recommends the Panel remove Recommendation 2 ‘Energy ministers should require a broader range of price-responsive resources to be visible or dispatchable to participate in price formation’ and instead, discuss with AEMO other options for improving forecasting in a high DER system.**

### Need for greater regulator attention to coal-fired generator exits

The Panel recommends that the Medium-Term Projected Assessment of System Adequacy’s (MT PASA) be extended to 5 years and made public to provide more clarity around generation availability. However, this does little to increase certainty around the exits of coal-fired generators given there are no penalties for early or late closure. Solar Citizens supports IEEFA’s previously proposed mechanisms to give clarity around closures including:

- ‘Align coal exit dates between state government plans, federal government plans and announcements to AEMO, and set them with more certainty. Then, incoming generation schedules (including CIS auctions, for example) can be aligned to coal exit schedules.
- Implement financial bonds from owners of coal-fired power plants, which are forfeited if they close with insufficient notice, to provide more certainty around exit dates.
- Introduce regular monitoring on progress in the ability to close the next coal generator in a given state by bringing on new supply (and taking demand-side measures), and introduce a requirement that once the next exiting coal-fired power plant is replaced, it is required to close.
- Undertake financial and engineering audits of coal power plants to provide information on how much longer they could reasonably run for, and the costs associated.’<sup>5</sup>

Recommendation:

**Solar Citizens recommends the Panel consider how to deliver certainty around the exit of coal-fired generation, including by examining the mechanisms proposed by IEEFA.**

### Need for flexible trading relationships for small consumers

The Flexible Trading Relationships (FTR) rule change, which is both parallel to and intersecting with other reforms, introduces the concept of ‘secondary settlement points’ at a customer’s

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<sup>5</sup> IEEFA (2025). [NEM review: Submission to the Department of Climate Change, Energy, the Environment and Water](#)

premises. This mechanism allows for the physical and financial separation of different types of electrical loads—typically distinguishing between flexible (remotely controllable or schedulable, such as batteries or smart appliances) and inflexible (regular household or business usage) loads within a single site.

By using secondary settlement points, customers will be able, in principle, to allocate their flexible resources to participate independently in wholesale and ancillary services markets, such as through the Integrated Price Responsive Resources (IPRR) rule, and potentially contract with different market participants for each segment of their load.

However, under the present rules, only commercial and industrial (C&I) customers can assign their secondary settlement points to different Financially Responsible Market Participants (FRMPs), such as independent aggregators or alternative retailers. Small customers—including residential and small business consumers—are still required to keep all secondary settlement points tied to their primary retailer.

This restriction means that third-party aggregators cannot directly contract with small consumers for flexible load participation; instead, all participation must be mediated via the incumbent retailer. As a result, competitive opportunities for innovative flexible demand and aggregation services are significantly curtailed, and small customers cannot access the same direct revenue opportunities as large C&I users.

Expanding the scope of the FTR rule to include households and small businesses would remedy this market access disparity. Enabling small consumers to contract directly with third-party aggregators—without being locked into a single retailer—would facilitate greater competition, service innovation, and more efficient system-wide utilisation of DER. For example, households could enter into a separate contract for EV charging or bidirectional charging (V2G) to their main household contract, earning additional revenue and avoiding the risk of the retailer managing household needs to suit their best interests, rather than the consumer’s best interests.

Enabling such flexibility for small customers would likely necessitate updates to consumer protection regulations to ensure adequate safeguards and fair market operation as new trading relationships are established, but there are processes underway to consider changes to consumer protections under the national CER roadmap, so this should be possible. Without this change, the IPRR risks the replication of existing market dynamics.

Recommendation:

**Solar Citizens recommends extending flexible trading relationships to small customers (households and small businesses).**

### [Introduce emergency procurement mechanisms for minimum demand periods](#)

As noted in Solar Citizens’ previous submission, emergency procurement mechanisms for minimum demand periods are essential in electricity markets with high levels of distributed solar and renewables, as traditional supply-demand balances are challenged by excess

generation during daylight hours.<sup>6</sup> These mechanisms enable system operators to contract flexible resources—such as controlled load turn-up—to absorb surplus generation and maintain grid stability when operational demand drops too low. By coordinating and compensating these resources on a short-term or emergency basis, the grid can avoid disruptive actions such as solar curtailment or feeder disconnections, supporting both security of supply and efficient renewable integration.

Recommendation:

**Solar Citizens recommends developing emergency procurement mechanisms for minimum demand periods, beyond the transitional non-market ancillary services framework.**

### Need to consider how Essential System Services (ESS) may change

The draft report states ‘The rise of these hidden participants risks undermining the operational integrity of the system if not properly integrated. The presence of hidden, flexible resources creates a risk of uncoordinated withdrawal or injection of power during critical periods, making it more difficult for AEMO to maintain frequency, system strength and other essential system services.’ However, the Panel does not deeply interrogate how Essential System Services (ESS)—such as frequency control, inertia, and system strength—must be redefined, delivered, and managed as the NEM moves toward majority inverter-based assets.

**The Panel’s stated conception of ESS is still largely inherited from an era dominated by synchronous generation**, which inherently supplied critical services like inertia and fault current. Inverter-based resources are fundamentally different: they decouple generation from the grid’s electromagnetic dynamics and do not naturally provide inertia or robust system strength. Virtual inertia and fast-frequency response from grid-forming inverters are now recognised as capable of not only emulating, but surpassing, the stabilising services of old synchronous generators.

A deep contemplation is needed on how to accelerate regulatory reform, moving away from legacy synchronous benchmarks to dynamic ESS definitions and innovative, technology-neutral procurement. For example, in Britain, National Grid ESO introduced a Dynamic Containment service to replace legacy frequency response categories built around synchronous inertia. Instead of specifying technology parameters, it set strict real-time performance metrics (sub-second response, high accuracy) and allowed batteries, demand-side resources and hybrid systems to compete equally. This reform has enabled rapid scaling of battery participation, reduced system balancing costs, and improved frequency stability beyond what legacy synchronous benchmarks provided.<sup>7</sup>

Recommendation:

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<sup>6</sup> Solar Citizens. (2025, February 6). Submission to the National Electricity Market (NEM) review. Solar Citizens. [https://assets.nationbuilder.com/solarcitizens/pages/4697/attachments/original/1738884602/Solar\\_Citizens\\_submission\\_NEM\\_review\\_FINAL\\_6Feb.pdf?1738884602](https://assets.nationbuilder.com/solarcitizens/pages/4697/attachments/original/1738884602/Solar_Citizens_submission_NEM_review_FINAL_6Feb.pdf?1738884602)

<sup>7</sup> Cao, X. (2024). Battery energy storage systems providing dynamic containment service in Great Britain. *Energy*, 278, 129514. Available at: <https://orbit.dtu.dk/files/379155496/1-s2.0-S0142061524005106-main.pdf>

Solar Citizens recommends the Panel consider more deeply how Essential System Services (ESS) may change over the next decade or two.

#### 4. On the panel's observations

##### The discussion about network tariffs is a distraction from the main game

Focusing on network tariffs is a deeply misplaced priority and a distraction from the real task at hand: creating a truly level playing field for ADER to deliver distribution network support services. As laid out in the EEC report (Appendix B), reforming the economic regulation frameworks that inherently favour traditional, capital-intensive 'poles and wires' approaches so that ADER can compete on equal terms with incumbent network solutions—would unlock enormous consumer and system value, reduce costs, and foster competition and innovation.

**International best practice shows that network revenue regulation in the NEM needs fundamental redesign.** Tariff-focused tweaks are, at best, a sideshow—and at worst, a deliberate stalling tactic that delays needed transformation and keeps consumers from realising the benefits of a modern, distributed energy system.

Recommendation:

**Solar Citizens recommends the Panel highlights the need for a first principles review of the economic regulation of distribution networks.**

##### The regressive observation on increasing the fixed component of network tariffs

The panel's observations about increasing the fixed component of network tariffs are problematic, as they risk undermining both equity and the efficient integration of distributed energy resources in the energy system. The Review suggests there is merit in shifting towards more fixed-price network tariff structures, claiming these can be translated into simpler retail offers and a fairer allocation of costs.

However, this view overlooks substantial evidence that higher fixed charges disproportionately impact low-income and low-consumption households—effectively creating a regressive 'poor tax' and exacerbating existing energy inequities. Fixed charges mean lower-income consumers, who already pay a much larger share of their income on energy, face even higher financial burdens, while the wealthiest and highest users benefit.

Additionally, by favouring high fixed charges, the panel's stance would weaken key price signals necessary for incentivising investment in energy efficiency and flexible demand. Removing or dulling volumetric and time-varying signals penalises efficient households and discourages uptake of solar and storage. This undermines policy goals for decarbonisation and limits the system-wide benefits of DER—such as lower network costs, avoided investment and greater resilience.

International best practice, most notably in Great Britain, instead focuses on dynamic, locational, and cost-reflective pricing to incentivise consumers to flex, rather than relying on high unavoidable fixed charges. Adopting such approaches in Australia—by aligning tariffs with

actual cost drivers and supporting procurement of non-network solutions—would better reward consumer action and accelerate the clean energy transition.

Recommendation:

**Solar Citizens recommends the Panel remove its observations around increasing the fixed component of network tariffs.**

### Discussion about basic consumer protections for VPP participants is missing

Discussion about basic consumer protections for participants in Virtual Power Plants (VPPs) is conspicuously missing from the draft report, despite considerable discussion about scheduling aggregated DER (VPPs). Section 62 of the National Energy Retail Law (NERL) requires the Australian Energy Regulator (AER) to operate an energy price comparator site to support informed consumer decisions, and mandate standardised retail pricing information guidelines to protect consumers. However, the AER does not provide comparisons of VPP offers on the ‘Energy Made Easy’ site.

In addition, there is a clear need for transparency about what consumers earn compared to VPP aggregators. Energeia research suggests that, on average, only around 50% of the earnings generated by VPP operations are passed on to consumers, usually via sign-up bonuses, annual credits, and per-event payments, while aggregators retain the rest in the form of wholesale market savings and Frequency Control Ancillary Services (FCAS) revenue.<sup>8</sup>

Without transparent information about these income flows, consumers cannot objectively compare VPP offers. Clear and standardised disclosure about both consumer and aggregator earnings would empower households to make informed choices, negotiate contracts more confidently, enhance competition and hold operators accountable.

Recommendation:

**Solar Citizens recommends the Panel stresses the importance of the AER providing information for consumers about VPPs and proposes options for creating transparency around the revenue split between consumers and aggregators.**

### Don’t extend the NECF, create an energy code under the ACL

Extending the National Energy Customer Framework (NECF) is not the best path forward for consumer protection or innovation in the modern energy sector; instead, a purpose-built energy code under the Australian Consumer Law (ACL) should be established. The current NECF was designed for a less dynamic, more centralised energy system and has proven both administratively complex and insufficiently responsive to the rapid changes in distributed energy resources, flexible demand, and new business models now emerging in the Australian market.

The framework imposes rigid requirements and fragmented jurisdictional overlays, often creating barriers for smaller providers, aggregators, and new entrants, as well as limiting

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<sup>8</sup> Energeia Pty Ltd. (2024, March 19). [The state of the art in virtual power plants \(VPP\): Power session webinar.](#)

meaningful consumer choice and participation. By contrast, embedding a comprehensive energy code within the ACL would centralise core consumer protections, ensuring a consistent national approach while enabling flexible, technology-neutral regulation that can be updated in line with rapid industry evolution.

This approach would also address existing gaps for consumers engaging with nontraditional providers (like aggregators), while streamlining dispute resolution and redress. Creating an ACL-based energy code would simplify obligations, reduce compliance costs for innovators, and offer robust, enforceable rights for all energy customers—not just those served by legacy retailers—better aligning with the future, customer-centric energy system Australia is building.

Recommendation:

**Solar Citizens recommends that rather than getting into the minutiae of multi-year retail contracts, the Panel investigates the potential to develop an energy code under the Australian Consumer Law (ACL).**

## 5. On making market reforms work for consumers

### The need for deployment mechanisms for flexible demand

White certificate or energy savings obligation schemes have historically been used by state governments to drive efficiency by requiring energy retailers to achieve specific energy savings, verified through tradable certificates. However, most current schemes are poorly aligned with the needs of a modern, renewables-rich grid.

In particular, these schemes remain focused on total energy savings rather than providing incentives for flexible demand technologies that can shift or reduce load in response to network or market conditions. Most existing schemes still use deemed savings (preset assumptions about the effects of upgrades) rather than metered, time-based measurement of actual demand response, and treat all kilowatt-hours as equal, regardless of whether reductions happen at times helpful for the system—such as during evening peaks or absorbing midday solar surpluses.

The report for the Energy Efficiency Council (in Attachment B) recommends evolving white certificate schemes to subsidise appliances and upgrades that can provide flexible demand (such as heat pump hot water systems and smart appliances with open communication standards), implementing robust measurement and verification using smart meter data, and integrating time-of-use savings into scheme design. Ideally such a deployment scheme would be national to be administratively efficient for OEMs, industry and governments, and therefore consumers.

At a minimum this could include the following residential flexible demand:

- hot water systems (including solar and heat pump) with in-built flexibility
- flexible split system (heat pump) air conditioning
- high efficiency pool pumps with in-built flexibility, and
- thermal performance (e.g. insulation and glazing) improvements.

And the following commercial and industrial flexible demand:

- heat pump hot water with in-built flexibility
- industrial heat pumps
- energy management information systems (EMIS)
- efficiency and flexibility improvements or line upgrades at industrial sites (e.g. chemical plants, manufacturing plants, mills)
- efficient and flexible refrigeration and cooling systems (thermal storage) at retail and commercial sites
- replacement or modification of HVAC systems so that they can be used flexibly, and
- changes in the way energy is used in schools or hospitals that enable flexibility.

In addition, it would be appropriate to consider sub-targets or increased rebates for vulnerable cohorts (low-income, elderly, or medically vulnerable groups) to improve equity.

Recommendation:

**Solar Citizens recommends the Panel proposes a national deployment scheme for flexible demand for households and businesses as an evolution of state-based white certificate schemes.**

### The need for technical enablers

The EEC report also calls for comprehensive reforms to unlock the full potential of DER, focusing on legislative, technical, data, and market system upgrades.

**Establish a DER Technical Regulator:** Legislation should create a dedicated regulator tasked with setting, implementing, and enforcing consistent technical standards for all DER types as soon as possible. Consolidating technical standards and energy efficiency roles under a single authority would end policy inertia, address interoperability barriers, and harmonise standards nationally, aligning them with global best practice and ensuring consumer protection.

**Mandate Appliance Flexibility via GEMS:** The report recommends that standards, such as those under the Greenhouse and Energy Minimum Standards (GEMS) regime, require major household appliances to include flexibility capabilities—such as smart controls and open communication protocols. This would allow appliances to respond to price or network signals, improving network operation, reducing costs and emissions and future-proofing the appliance fleet as electrification expands.

**Enable Open Data Access and Communication:** The EEC report stresses the need for open data and communication protocols, including open-source software and real-time access to network and smart meter data (with consumer permission). Standardised data formats and protocols would improve interoperability, enable third-party services, support innovative business models, and help resolve network constraints—facilitating efficient DER market participation and planning.

**Modernise Market Systems:** Finally, the report highlights that AEMO’s market systems must be upgraded from outdated, manual processes to low-cost, digital platforms. Digitalising registration, bidding, and settlement processes, as well as implementing automated real-time dispatch and forecasting tools, is necessary for enabling widespread DER participation, reducing administrative barriers, and ensuring system security.

Recommendation:

**Solar Citizens recommends the Panel provide commentary on the need for legislation to establish a technical regulator being introduced into Federal Parliament as soon as possible; investigate how to include flexibility requirements under the GEMS regime; urge prioritisation of work on data sharing and interoperability and investigate how AEMO's market systems can be modernised and make the best use of machine learning.**

## Conclusion

While there are many recommended changes included in this submission, their aim collectively is to support the decentralisation and democratisation of electricity supply, demand and storage and mitigate the risk of replicating existing market dynamics. The NEM review needs to think far enough into the future to make recommendations to support new participants and intermediaries offering innovative services that meet consumers' needs and preferences.

The NEM in 2035 will be largely decarbonised, integrated with electrified transport and digitised. The scope and nature of the Panel's final report needs to envisage a very different future to the present.

Solar Citizens thanks the Panel for the opportunity to make a submission, and we look forward to further engagement and consultation opportunities in the near future. Please don't hesitate to reach out should you have any questions about the content of this submission or wish to discuss the above recommendations.



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