Technical Standards for Consumer Energy Resources (CER) Interoperability (T1) and Establishment of a national technical regulatory framework for CER (T2)

EEC Submission
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About the EEC

The Energy Efficiency Council (EEC) is the peak body for Australia's energy management sector.

We are a membership association for businesses, universities, governments, and NGOs that have come together to ensure Australia harnesses the power of efficiency, electrification, and demand management to deliver a prosperous, equitable, net zero Australia with:

- People living and working in healthy, comfortable buildings;
- Businesses thriving in a decarbonised global economy; and
- An energy system delivering affordable, reliable energy to everyone.

The EEC works on behalf of its members to drive world-leading government policy, support businesses to rapidly decarbonise, and to ensure we have the skilled professionals to drive Australia's energy transformation.

General comments

The EEC welcomes the opportunity to contribute to the technical workstream of the Consumer Energy Resources (CER) Roadmap, specifically on *Technical Standards for CER Interoperability* and the establishment of a *National Technical Regulatory Framework for CER*. Given the interconnected and cross-cutting nature of these topics, and the breadth of input from our membership, we have submitted a single, consolidated response.

Mandatory accreditation

It is essential to strengthen installer and device accreditation for CER as a part of the national framework. Critically, this must include ensuring installers receive continuing professional development (CPD) on specific technologies, rather than assuming state licensing arrangements provide any/adequate CPD to support the proliferation of CER in the market, and the inevitable evolution of innovation in these products.

Equally important is robust compliance and enforcement, with material consequences where serious or repeated non-compliance is identified. At the same time, education and support should be provided to help installers learn from errors. A solely punitive approach risks discouraging participation, particularly given this is a new and evolving field.

Successful programs, such as Solar Victoria's Solar Homes initiative, have demonstrated the value of combining compliance measures with strong industry support. This approach has been well regarded and has driven genuine improvements in best practice across the sector.

CER Standards and Minimum Energy Performance Standards (MEPS)

The EEC advocates for a holistic approach to CER standards and regulation for products covered under Australia's Greenhouse and Energy Minimum Standards (GEMS) Act. This approach recognises that a product's physical energy efficiency (its performance in the home) and its role as a CER within a renewables-driven future grid are two sides of the same coin: the overall energy performance of the product.

The GEMS framework has been one of Australia's most successful energy efficiency and emissions reduction measures, delivering significant achievements over its first decade (2011–12 to 2021–22), including $12–18 billion in reduced energy costs for households and businesses, 45–67 TWh in energy savings (roughly the annual electricity use of all homes in Tasmania, the Northern Territory, and South Australia combined), and 40–60 Mt CO_2 avoided – comparable to the annual emissions of Australia's entire manufacturing sector in 2021.[1]

However, Australia's energy system and technology landscape are rapidly evolving. The energy transition and push to net zero is fundamentally changing the way energy is produced, stored, and consumed.

Historically, GEMS regulation and Minimum Energy Performance Standards (MEPS) focused on ensuring products simply used less energy overall, but in recent years, when and how products use energy has become just as important. Technologies must be efficient not only in isolation, but in the context of the home or business in which they operate, *and* the wider needs of the grid.

Many consumer energy resources are already captured (or will soon be captured) under the GEMS framework for their energy performance. Integrating CER-related requirements into this same regime is the logical next step as it would:

- Reduce duplication for suppliers (one approval, one compliance process);
- Support the streamlining of consumer information;
- Lower regulatory costs for government; and
- Align with the modern evolution of MEPS to encompass both energy efficiency and energy flexibility.

We believe the GEMS Act should be amended to cover all relevant energy performance and demand response (DR) requirements for regulated products, including applicable CER standards.

Under a reformed framework, suppliers would have a single regulatory entry point for relevant products, covering MEPS, DR capability requirements, CER interoperability standards and labelling. Testing, certification, and compliance for a product would satisfy both efficiency and CER/DR requirements where applicable. This would mean:

- One application process;

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[1] Australian Government, Modelling of the GEMS regulation has been released, 2024.

- One product testing and certification process;
- One compliance and enforcement portal; and
- Shared data and reporting between regulators.

This suggested reform is not about making GEMS a "catch-all" for CER issues. Many critical aspects will remain outside GEMS' scope, including installation requirements (often state-based), and broader energy market and grid integration measures for CER. Similarly, some key products for CER, such as solar (which is on the supply side) are likely not to fall into GEMS scope at any point. However, other critical CER technologies like demand-responsive appliances, batteries, and EV chargers are or *could* be covered in the future.

The proposed reform is specifically focused on:

- Product energy performance and connected CER standards (e.g. interoperability);
- Streamlining energy performance product registration and certification; and
- Enhancing consumer outcomes (e.g. introducing holistic labelling that combines energy performance and CER capability information, and creating a single, authoritative source for consumers to find reliable energy performance information on products).

To enable this legislative integration, we see two main options available:

1. Expand GEMS Regulator's scope
    - The existing GEMS Regulator takes on responsibility for administering CER standards for applicable products (current and future regulated products).
2. Create or empower a broader energy regulation body
    - Transfer GEMS, MEPS and labelling responsibilities into a body with wider CER oversight (this could be a reformed existing body, or a new technical regulator).
    - This body could also become responsible for cyber security standards and regulation for these products.

In November 2019, the COAG Energy Council agreed to the recommendations in the *Regulation Impact Statement for Decision: 'Smart' Demand Response Capabilities for Selected Appliances*. These recommendations called for introducing DR capability requirements through the AS/NZS 4755 suite of standards for relevant products.[2] However, this has not yet occurred.

[2] Recommendation 38: The Commonwealth Government update the GEMS Act to allow for mandatory demand response capability.

This intent should be reflected in the CER Roadmap process to ensure that future regulation of whole-of-product energy performance (including both MEPS and CER requirements) is coordinated under a single regulator, avoiding unnecessary regulatory complexity and cost for industry and consumers.

What we heard from members

Managing complexity

A coordinated national approach to CER is desirable, however, highly prescriptive requirements across a broad range of asset classes could create significant cost and complexity for industry and consumers alike.

Not all functionalities may be necessary for every device at a site. In some cases, a single asset with the required functionality may be sufficient to achieve desired outcomes. Multiple devices independently making decisions could create coordination challenges, potentially reducing system efficiency and complicating implementation.

If Australian requirements diverge substantially from international standards, there is a risk of limiting product options, potentially increasing costs for consumers. The current list of proposed requirements is extensive and may be particularly challenging for certain device types.

Careful consideration of cost, complexity, and practical coordination is critical to ensure the framework is effective, scalable, and supports consumer outcomes without imposing unnecessary burdens on industry.

Proprietary communications

Establishing a standardised approach for interaction between various CER (including solar, batteries, electric vehicle chargers, and other smart appliances) will facilitate the optimisation and deployment of Home Energy Management Systems (HEMS). Greater adoption of these systems will help consumers maximise the benefits of CER and optimise their energy use for comfort and cost savings.

At the same time, HEMS can support the grid by reducing peak demand and enabling more effective demand management, which is increasingly important in a renewables-dominated energy system. Robust product standards, combined with a common Technical Regulatory Framework, will enable a wider range of coordinated offerings in the marketplace, ensuring CER can be efficiently managed for the benefit of both consumers and the grid.

However, a key risk arises when devices use proprietary communication protocols that limit interoperability and competition. For example, a solar inverter that can only communicate with its own HEMS system restricts consumer choice and reduces market competition.

Many modern appliances, such as air conditioners, operate on proprietary protocols but typically provide external interfaces at both high and low levels. Low-level interfaces, such as the Demand Response Enabling Device (DRED) AS 4755.3.1 standard, enable demand management, while high-level interfaces, such as Modbus protocols, are widely used across sectors to control appliances.

Solar inverters are a particular concern as many operate on proprietary protocols that do not appear to be open, limiting interoperability and the ability of consumers to benefit from coordinated energy management solutions.

While concerns about OEM lock-in make sense, the EEC also heard the alternate view that consumers routinely make choices between closed ecosystems when they see value (e.g., Apple versus Android), and the market is evolving rapidly with high competition. The risk of vendor dominance may therefore be lower than anticipated by policy makers. Where concerns do arise, other regulatory levers, such as the ACCC, can address these issues. Interoperability requirements should not be relied upon as the *primary* mechanism to manage potential vendor dominance.

Cyber security

The EEC heard concerns about applying cybersecurity standards, such as the IEC 62351 series (designed for generators, transmission, and distribution networks), to home appliances including air conditioners, water heaters, and pool pumps. While robust cybersecurity is critical, applying these infrastructure-level requirements to home appliances would create significant barriers, and manufacturers are unlikely to develop or supply products if standards designed for the energy grid and power stations were applied to devices like air conditioners or dishwashers.

Member advice highlighted AS ETSI EN 303 645 (an international standard recently adopted in Australia) as better suited to consumer devices. This standard also underpins smart device cyber rules under Home Affairs legislation for IoT devices.

A forthcoming standard (AS 4755.2) will enable demand control of air conditioners via Wi-Fi rather than current hard-wired arrangements. However, if cybersecurity requirements for this standard were aligned with those used for generators, it would impose substantial upfront and ongoing costs without a clear path to cost recovery. For context, the same Wi-Fi module used by end users to control appliances through their smartphones is already required to meet AS ETSI EN 303 645 cybersecurity rules.

Ultimately, applying infrastructure-level cybersecurity requirements to home appliances is unnecessary, largely unworkable, and would significantly increase costs. Such an approach could also slow the adoption of new technologies. Standards should instead align with established IoT cybersecurity frameworks appropriate for consumer devices.

Water heaters

The EEC has heard arguments both for and against introducing stricter requirements or standards for DR capability in residential hot water heating. We acknowledge merit in both perspectives and recommend further exploration of these issues by government in close consultation with the hot water heating industry.

Some in industry argue that, given household usage patterns and factors such as noise, access to solar, and the need for legionella control, there is limited flexibility in when DR could be effectively applied to this product. While households may be willing to reduce heating or cooling use or run the dishwasher at a different time to lower bills and support broader demand management, they are far less likely to accept interventions that risk running out of hot water. Those holding this view contend that simple timers are sufficient, and that more complex DR measures for hot water systems are unlikely to deliver benefits commensurate with their additional cost and complexity.

Alternatively, others contend that because hot water systems are among the most energy-intensive appliances in households, ensuring their energy use is optimised is critical. From this perspective, there are significant opportunities to improve demand flexibility and efficiency through stronger product standards, supported by complementary regulatory measures. Proponents argue that, with appropriate technical standards and interoperability requirements, hot water systems could be scheduled to operate when renewable generation is abundant or when grid demand is lower, reducing costs for households and easing pressure on the energy system. They suggest that the CER Roadmap provides an important opportunity to explore how these benefits can be realised through a more coordinated approach to regulation and market design.

In terms DR for hot water systems, we understand that broadly speaking, there are two main types of DR technologies for water heating:

- **1-way DR** works by a third-party aggregator sending a signal or command to a water heater, through a relay in the meter box or a smart meter, in order to turn the appliance on or off.
- **2-way DR** works by a third-party aggregator sending a signal to the water heater via a Home Energy Management System (HEMS) or other device provided by the appliance manufacturer.

This device can send a signal back to the aggregator, informing the aggregator of various aspects of the appliance, including its 'charge state' (the amount of hot water available to the consumer), legionella cycle, etc. This signal can, in certain circumstances, override the aggregator's command to ensure public health requirements are met and hot water supply is maintained. Critically, 2-way demand response allows the aggregator to understand the potential load that the water heater can consume during a DR event.

While acknowledging that 1-way DR has a lower up-front capital cost for homeowners and is a relatively simple technology, an EEC member told us that their preference is for 2-way DR for the following reasons:

- **Safety:** 1-way DR can disrupt heating cycles required to prevent legionella growth (per AS 3498:2020), putting homeowners at risk. Unlike 1-way DR, 2-way DR systems with on-board controllers can detect events and ensure sanitisation cycles are maintained.
- **Consumer amenity:** 1-way DR risks running households out of hot water, as the system cannot report charge state or account for use patterns (UNSW SolarShift study, 2025). This can lead to consumer complaints, unnecessary plumber callouts, and reduced social licence for DR. By contrast, 2-way DR allows appliances to report charge state, ensuring amenity is protected during events.
- **Increased consumer costs:** Anecdotal reports indicate some consumers have faced higher bills under 1-way DR. For example, solar thermal water heater users had off-peak boosting shifted from overnight to daytime, reducing heating cycles and hot water supply. Many were forced onto more expensive off-peak 2 or continuous tariffs, leading to higher consumption at higher rates.
- **Visibility:** 1-way DR does not inform consumers whether their water heater is connected or charged. This limits consumer choice to participate voluntarily and have the option to opt out of DR events during periods of high hot water demand.
- **Durability:** 1-way DR can allow unlimited switchings, creating a risk of overuse by aggregators responding to wholesale price fluctuations. Frequent switching increases thermal cycling, potentially shortening the lifespan of components. By contrast, 2-way DR enables manufacturers to set limits on switchings, helping preserve durability.
- **Disconnection:** With 1-way DR, disconnection can occur easily and remain undetected, as there is no feedback confirming the connection status. This creates a risk of devices being bypassed or disabled without notice. 2-way DR overcomes this by providing visibility of disconnections, allowing corrective action to be taken.

The EEC understands that the topic of DR for water heating has been the subject of considerable debate within Standards Australia's EL-054 Committee (Remote Demand Management of Electrical Products) for several years. The current state of play as we understand it is as follows:

- *AS4755.3.3:2014 (Demand response capabilities and supporting technologies for electrical products, Part 3.3: Interaction of demand response enabling devices and electrical products - Operational instructions and connections for electric storage and electric-boosted storage water heaters)*, which incorporated 1-way DR, was published by Standards Australia in 2014.
- *AS/NZS 4755.2 (Demand response framework and requirements for communication between remote agents and electrical products)*, which incorporated 2-way DR was released by Standards Australia for public comment in 2019.
- Standards Australia became aware that elements of these standards were potentially subject to patent rights held by Australian manufacturer Rheem.
- 4755.3.3 was subsequently removed from circulation by Standards Australia in July 2024.[3] The reason given was that *"while Standards Australia and Rheem have engaged in lengthy negotiations, a "Patent Statement and Licensing Declaration" has not been provided on terms satisfactory to both parties."*[4]

This is a matter that may need revisiting should a decision be taken to implement more rigorous standards for CER in hot water systems.

Gaps in standards for Energy Management Systems

The EEC's members did not find significant points of disagreement with the gaps identified in Table 8 of the paper. However, clarification is needed on the observation that gaps exist in *R-3 Modulate power in response to external signal*, and *R-7 Remote provision of price signals* for energy management systems (EMS).

The EEC understands that for both of these requirements, the OpenADR protocol (currently in version 3 but mainly referred to in the paper as IEC 62746-10-1 ED1 (version 2.0b)) could at least partially fill the gaps identified for EMS. Many of the EEC's members are also members of the OpenADR Alliance and support its use where possible.

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[3] Standards Australia, Standards Australia announces removal of standard from circulation, 19 July 2024.
[4] Ibid.

For R-3, OpenADR supports dispatch signals, load control, and price-based modulation. An EMS that is both OpenADR and CSIP-AUS compatible, could conceivably act as the 'virtual end node' to translate an OpenADR signal from the grid to instructions for device-level actions.

For R-7, OpenADR is being used in Japan and other jurisdictions for demand flexibility and CER control, linked to price. While the paper rightly notes that Australia's electricity market structure is distinct, (primarily the absence of vertically-integrated utilities), the EEC understands OpenADR could be adapted to Australian market conditions, provided an EMS could connect to multiple 'virtual top nodes' (i.e., a retailer, DNSP, and third-party aggregator).

National Technical Regulation

The EEC supports the overall direction of the proposed national technical regulatory framework for CER, particularly the potential for harmonisation across jurisdictions, distribution network service providers (DNSPs), and standards interpretation. This kind of alignment represents a significant opportunity to reduce complexity and increase clarity for industry stakeholders. However, our members also discussed some important considerations and risks:

- **Fragmentation:** While harmonisation is seen as positive and desirable, there is a risk that requirements could become fragmented if regulators mandate specific obligations, and state regulators or DNSPs then add additional or modified requirements. Clear coordination will be critical to avoid this outcome.
- **Scope of CER devices:** The initial scope of CER devices captured is very broad. The EEC heard it may be best to take an evidence-based approach to requirements, ensuring that devices included have a clear impact on the network. For example, rooftop solar and batteries may justify expansion of SRES-related requirements, but other CER types may require further assessment before obligations are applied. The scope should also be limited to devices that interact directly with the network; inverters or power converters not forming part of a CER system and already covered by the ACCC should be excluded.
- **National Installed Device Register (Function #4):** The proposed National Installed Device Register could be very challenging to implement. It would impose obligations on OEMs, installers, aggregators, and other parties across the value chain, making compliance difficult. If not implemented effectively, the register risks producing data of limited utility. An EEC member suggested it may be prudent to prioritise Functions 1–3 and 5 initially, and defer Function 4 until a scalable, practical model can be established. Aggregators, in particular, would face

impracticable obligations if required to update device settings continuously for market participation.

- **Regulatory burden and testing:** The framework should be scaled and tested to ensure it meets the intended objectives of remaining responsive, promoting innovation, and providing practical compliance pathways. The regulatory burden of some proposed functions is significant, and careful consideration is needed to balance compliance requirements with industry capacity.
- **Incentives for compliance:** Experience with the SRES scheme indicates that tying obligations to incentives can improve compliance. For example, solar DER register data has historically been more complete than battery data, due to the SRES incentive. It may therefore be worthwhile to consider incentives as part of the regulatory approach, rather than relying solely on education, upskilling, and eventual enforcement.

Overall, the framework represents a positive step, but careful attention to scope, implementation feasibility, and the balance of incentives and obligations will be critical to its success.

Conclusion

The EEC strongly supports the objectives and intent of the CER Roadmap process. Technical standards and the framework for their management are critical to ensuring that both consumers and the grid benefit from the opportunities presented by CER. However, this is a complex and rapidly evolving area, and any interventions must be flexible enough to adapt to ongoing innovation. They should focus on areas where the cost and benefit are clear, take into account Australia's relatively small market and the global standards context, and prioritise outcomes that deliver maximum value to both consumers and the grid, particularly given the significant public investment supporting CER deployment nationwide.

Should you wish to discuss the matters raised in this submission further, please contact our Senior Advisor, Rachael Wilkinson at Rachael.Wilkinson@eec.org.au.

Sincerely,

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