UNSW SYDNEY

UNSW Collaboration on
Energy and Environmental Markets

UNSW Submission to AEMC Pricing Review: electricity pricing for a consumer-driven future

The UNSW Collaboration on Energy and Environmental Markets (CEEM) welcomes the opportunity to comment on the review initiated by the Australian Energy Market Commission (AEMC) on the future of electricity products and services, and the prices consumers pay for these.

Executive Summary

UNSW CEEM undertakes interdisciplinary research into the design, analysis and performance monitoring of energy and environmental markets and their associated policy frameworks. This includes bringing together expertise in Distributed / Consumer Energy Resources (DER/CER) and a commitment to open-source software to support research, tools, and policy insights for energy markets.

This submission first provides some commentary on the draft Consumer Preference Principles and Archetypes. Based on a discussion held with the AEMC review team on 10 December 2024, the submission then focuses on the question of *"How far can we push the retail model to consider network volatility?"* and underlying questions that relate to: 1) the extent to which network volatility and be, and needs to be, addressed through pricing signals for consumers; and 2) whether it is feasible for retailers to pass through complex network pricing signals that actually drive changed consumer behaviour.

Based on an independent assessment by UNSW CEEM, the following key issues are put forward in the submission:

1. A sixth consumer preference principle of "fairness" should be added to the draft framework.
2. There is a strong argument that technical constraints within the distribution network – for example, voltage issues – should be addressed by technical control mechanisms.
3. If pricing mechanisms are used, the extent to which the expanding benefit of retailer-driven demand flexibility is passed through to the consumers actually delivering this response continues to be unresolved.
4. A key risk of using network price signals to change behaviour is that high prices may be pushed onto consumers with low engagement in their electricity provision and/or who cannot easily respond, leading to greater inequity.
5. It appears that the natural solution for voltage management in the distribution network would be through direct arrangements with the Distribution Network Service Provider (DNSP).

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The UNSW Collaboration on Energy and Environmental Markets (CEEM) welcomes the opportunity to comment on the review initiated by the Australian Energy Market Commission (AEMC) on the future of electricity products and services, and the prices consumers pay for these. UNSW CEEM has delivered more than two decades of research on Australia's National Energy Market, with a strength in Distributed/Consumer Energy Resources (DER/CER) and a commitment to open-source software to support research, tools, and policy insights for energy markets.

We first respond to the question "***What are your views on our proposed Consumer Preference Principles?"*** The five preferences in the terms of reference are important ones which we broadly support, but we suggest some minor modifications and considerations:

- The principle of "availability" should extend to include customers' ability to export to the network (to some agreed extent).
- Consumers' preference for simplicity in energy pricing has been widely documented, so "simple engagement" is an important principle. This extends beyond availability of information to include their ability to easily respond to strong price signals.
- It is also important to acknowledge the potential tension between "simple engagement" and the availability of large numbers of very different products and offers, which have been widely reported to confuse and overwhelm many consumers[1]; a diverse market does not necessarily result in "meaningful options" for consumers.

Further, we suggest the addition of a sixth principle, "fairness". Research has shown that fairness of pricing is important to customers and is a pre-requisite for trust in the energy system. But 64% of energy consumers disagree with the statement "the price of electricity is fair and reasonable"[2]. While the meaning of 'fairness' is contested, it is widely understood to require moving beyond a narrow focus on cost-reflectivity to include "fairness of opportunity and process (who is able to engage and how this is facilitated) as well as fairness of treatment and outcomes – fairness of compensation for providing flexibility in terms of both the value offered relative to the effort required, and the distribution of benefits across different households and between different stakeholders."[3]

We turn, briefly, to the question "***What are your views on our proposed Consumer Archetypes?"*** The four archetypes are reasonably comprehensive in describing different levels of consumer engagement with the retail energy market and associated technologies. However, a single 'market engagement' axis, which treats all energy users as individual consumers is a narrow lens. Analysis which considers a broader range of interactions and influences, including those within and between households and businesses (such as the work of the Monash Emerging Technologies Research Lab[4]) is needed to capture the diversity of how, when and why households and businesses use energy, and the different ways they might participate in the future energy system. There is also more work to be done on how these consumers can be assisted to maximise their benefits from such participation through bespoke advice from trusted market players, and how their participation can be aggregated to deliver necessary network services.

The remainder of this submission is structured around a discussion with the AEMC team leading the Pricing Review on 10 December 2024. In particular, it seeks to address the question, "***How far can we push the retail model to consider network volatility?".*** Within this, underlying questions relate to: 1) the extent to which network volatility needs to be addressed through pricing; and 2) whether it is feasible for retailers to pass through complex network pricing signals. UNSW CEEM acknowledges that many of the questions in the consultation paper were not covered in this discussion and would be happy and interested to engage on these topics in the future.

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[1] Energy Consumers Australia, Forethought (2019), Future Energy Vision Consumer Expectations Research - Household Findings Report
[2] Energy Consumers Australia (December 2024), Consumer Energy Report Card
[3] Roberts (2023), Engaging households in electricity flexibility - insights from the UK
[4] Emerging Technologies Research Lab (Monash University)2023, Digital Energy Futures: Future Living Energy Scenarios 2030/2050.

Network volatility can be highly temporal and locational. It is largely driven by either too much local generation (often solar surplus) and/or too little load leading to voltage rise and reverse flows through part of the distribution network, or too much local demand with little or no solar leading to voltage drop and potentially network overloads. **is a strong argument that a technical impact – for example, voltage issues – should be addressed by technical control.** This includes the focus of current work related to Dynamic Operating Envelopes (DOEs) as well as other network driven voltage regulation equipment at the distribution network. Pricing signals carry the risk of being "too rubbery" given it is never certain that people will respond, whether by choice or sometimes a lack of capability e.g. a lack of visibility, smart metering or inverters that can respond to pricing.

Nonetheless, there have been some good examples where network pricing has been successfully implemented to directly target demand, although this is only effective where customers have the inclination and, importantly, the ability to respond (e.g. behind the meter batteries). We have seen most success in the passing through of network price signals where the network contracts directly with consumers or a third-party aggregator is involved.

Two projects with retail partners that have been undertaken by UNSW investigated the control of electric water heating in both South Australia (SA)[5] and New South Wales (NSW)[6]. The issue of network volatility was particularly relevant in the SA trial. In these trials, the retail partner sought to control thousands of electric water heating systems, generally shifting them to daytime from overnight to soak up surplus solar generation from rooftop solar. **In SA, we estimated that households could receive $60-$70 in financial benefit per year through the difference of wholesale electricity prices overnight and during the day (tested over 2023-24) when shifting approximately 50% of their water heating load. In NSW, the benefit was in the order of $20-$30 per annum because both the shifted amount of hot water load and wholesale price difference was less.** We expect the benefit to increase alongside further uptake of rooftop solar and the move towards electrification.

However, **the key issue that emerges is if and how much of this expanding benefit is passed through to consumers**. If retailers extend this type of asset control – from hundreds, to thousands, to tens of thousands – the financial gain to those businesses could be significant. If the retailers do not pass through the financial benefits, consumers will not see the value of shifting their load. We would like to see more retail products offering cheaper (or even free) pricing in peak solar periods to encourage consumer-driven demand flexibility. There are many Distribution Network Service Providers (DNSPs) that have already offered time of use network tariffs with zero or negative pricing during solar generation periods.

This is an issue we would like to see further investigated by the AEMC, as the incidence of solar curtailment increases and will be extended to rooftop systems through the emergency backstop mechanism. Control and scheduling of flexible loads can also be used to manage distribution network voltages as shown in our recent trials. Therefore, encouraging consumers to shift loads into daytime through effective incentives and tariffs will further help networks, reduce rooftop solar and battery curtailment due to high voltages and may make some of the controversial new network measures such as enhanced voltage management and emergency backstop measures redundant.

We understand that there are some proponents for a model whereby network services are procured via a marketplace. This reflects the view that the ancillary services market (e.g. frequency control ancillary services (FCAS)) is successful. However, FCAS is more fungible than what would likely be a voltage control marketplace. In this regard, it is notable that FCAS type arrangements are not used within the NEM to manage transmission level network support and control ancillary services provision[7]. Given voltage is highly localised and temporal, it is unclear how it would be priced. The highly localised

[5] PLUS ES South Australia Demand Flexibility Trial
[6] SolarShift: Turning electric water heaters into megawatt batteries

[7] AEMO, 2024 Network Support and Control Ancillary Services (NSCAS) Report, December.

nature of voltage would likely also make it difficult to generate sufficient competition for a marketplace to operate effectively e.g. it would be very difficult to hedge.

Thus, it appears to us that the natural solution for managing voltage would be through a direct arrangement with the DNSPs. With this approach, there would be a natural role for an aggregator across multiple points of connection in a local area.

Finally, while much of the discussion appears to be focused on using price signals for behaviour change, it is important to note that tariffs are also used to recover costs. The distribution of these costs are not equal, for good reason. **The risk of using price signals to change behaviour is that high prices may be pushed onto consumers who cannot easily change their behaviour, leading to greater inequity.** Most consumers would not be aware of network constraints existing or emerging in their local area and would not be factoring that into financial decisions. In other words, there is a risk of a "postcode lottery" whereby some consumers are offered attractive new revenue streams or are penalised with greater costs depending on their location on the network and/or their ability to respond to price signals. This issue highlights the need for including the "fairness" principle we have proposed above and must be considered throughout the development of any new forms of network pricing.

Thank you for the opportunity to provide this submission. We would be pleased to discuss or clarify any of the comments or recommendations with the AEMC.

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