



Clean Energy Council submission to the Australian Energy Market Commission consultation paper: Distributed energy resources integration

The Clean Energy Council (CEC) welcomes the opportunity to provide feedback on the Australian Energy Market Commission (AEMC) consultation paper, 'Distributed Energy Resources – Updating Regulatory Arrangements'.

The Clean Energy Council is the peak body for the clean energy industry in Australia. We represent and work with Australia's leading renewable energy and energy storage businesses, as well as rooftop solar installers, to further the development of clean energy in Australia. We are committed to accelerating the transformation of Australia's energy system to one that is smarter and cleaner.

The CEC supports the proposal to recognise the role of distribution network service providers (DNSPs) in provision of 'export services' and 'hosting capacity'. We also support the establishment of a framework for investment by DNSPs in DER integration. The investment framework should not be limited to consideration of costs and benefits for DNSPs. Nor should it be limited to costs and benefits for solar customers. It should consider the societal benefits and costs for all Australians. The framework should take account of the benefits to all customers from the reduction in wholesale electricity prices arising from increased exports of zero marginal cost electricity generation. It should also take account of the societal benefits of reduced greenhouse gas emissions.

The CEC also supports the focus on aligning network incentives. There is currently no targeted incentive for DNSPs to invest to improve hosting capacity and no penalty for not doing so. A more clearly structured and targeted incentive/penalty framework would drive more efficient investment in hosting capacity.

We strongly support the proposal to prevent the imposition of static zero export limitation by DNSPs.

Many questions arise from the consultation paper, especially in relation to the proposal for export charging. We have expanded on the reforms the CEC supports and the questions arising from the consultation paper in the body of this submission. We would be happy to discuss these issues in further detail with representatives of the AEMC.

1. Proposed reforms supported by the CEC

The CEC strongly supports the proposal to prevent the imposition of static zero export limitation by DNSPs. We also support the proposals to recognise the role of DNSPs in provision of 'export services' and 'hosting capacity' and the establishment of a framework for investment by DNSPs in DER integration.

a. Recognition of the role of DNSPs in provision of 'export services' and 'hosting capacity'

There is a well-established expectation that DNSPs will provide 'export services' and 'hosting capacity' for DER. It may therefore clarify matters for network planners and others if this expectation is codified in the National Electricity Rules (NER).

There is certainly a need to clarify the framework for investment by DNSPs in DER hosting capacity. If recognition of export services as part of the network services provided by DNSPs to customers is necessary to clarify how and to what extent DNSPs can and should invest in hosting capacity, then it would be appropriate to make this change.

b. Establishment of a framework for investment by DNSPs in DER integration

The Australian Energy Regulator (AER) is already developing a framework to guide investment in DER integration by DNSPs. This is a sensible move and is widely supported.

The investment framework should not be limited to consideration of costs and benefits for DNSPs. Nor should it be limited to costs and benefits for solar customers. It should consider the societal benefits and costs for all Australians. The framework should take account of the benefits to all customers from the reduction in wholesale electricity prices arising from increased exports of zero marginal cost electricity generation. It should also take account of the societal benefits of reduced greenhouse gas emissions.

The CEC also supports the focus on aligning network incentives. There is currently no targeted incentive for DNSPs to invest to improve hosting capacity and no penalty for not doing so. A more clearly structured and targeted incentive/penalty framework would drive more efficient investment in hosting capacity.

2. Questions and concerns arising from the consultation paper

Many questions arise from the consultation paper. They include:

- What will be the customer impact of this reform, especially when combined with changes to feed-in tariffs? Will the AEMC test consumer behaviour to understand how customers are likely to respond to these pricing changes?
- How will the issues in governance of voltage management in the National Electricity Market (NEM) be addressed and will they be addressed before this reform is approved?
- How will the benefits of reduced greenhouse gas emissions be considered?
- Will export charges be time-varying?
- Will export charges be location-specific?
- Will dynamically controlled DER be subject to a different export pricing regime?
- How feasible would it be for customers to negotiate additional export capacity and at what costs, given that this opportunity already exists and is not utilised?

a. Customer impacts of this reform, when combined with changes to feed-in tariffs

The CEC has, for many years, advocated time-varying electricity tariffs for imports and exports. As more solar generation is connected the wholesale electricity price will continue to fall during daylight hours and we would expect this to be reflected in the amount paid for exports. For example, in Western

Australia payments for energy exported to the grid is time-varying, with a payment of 10 cents per kilowatt-hour (c/kWh) between 3pm and 9pm and 3 c/kWh at other times. By 2025 we anticipate that feed-in tariffs during daylight hours could approach zero. We are already experiencing negative wholesale electricity prices in some parts of the market during periods of high PV generation.

The consultation paper seems to assume that customers will continue to want to export energy to the grid, even when there is a charge to do so. However, that could change as the value of energy during daylight hours continues to decrease.

We recommend the AEMC undertake analysis that places the customer at the centre and considers the customer's likely response to changes in the value of exported energy. There is a strong possibility that the proposed reforms will hasten moves toward maximising self-consumption, instead of exports. It would be helpful to understand this from a customer perspective, taking account of trends in electricity prices and tariff reform. We therefore urge the AEMC to commission independent behavioural research to understand how customers are likely to respond to these pricing changes. The behavioural research should consider not just 'early adopters', but a broad cohort of customers.

b. Governance of voltage management

Voltage management on low voltage (LV) networks is a key component of the provision of 'export services' and 'hosting capacity'. The rule changes are essentially proposing a national, pricing-based approach to voltage management which would be overlaid on a state and territory regulatory approach. It is unclear how the division of regulatory responsibilities would work in practice, with regulation of voltage management remaining at the level of state and territory regulators while the AEMC overlays a pricing-based approach for changes at the margin.

There is a regulatory requirement for DNSPs to manage voltage within standards. A report commissioned by the Energy Security Board (ESB)¹ and undertaken by University of New South Wales², found that "even in the absence of solar PV, there is a significant level of high voltage across all DNSPs in all NEM states" and "many sites experience higher voltages during the night when solar PV is not operational". The ESB notes that this "appears to point to a material level of technical non-compliance, but this may depend on how the data is viewed and how the respective standards are applied in each jurisdiction".

Better understanding of the problems with regulation of voltage management and potential solutions is needed prior to establishing regulatory obligations on DNSPs to provide hosting capacity and export services.

Table 1 (on the following page) summarises the governance of regulation of voltage management in Australian states and territories. We have searched the web sites of all the regulators in search of a report on their approach to regulation of voltage management. There appear to be remarkably few references to regulation of voltage management. Refer to Attachment 1 for further details. A notable exception is Victoria's Essential Services Commission (ESC), which requires DNSPs to report on how the information from smart meters is being used to enhance the management and operation of the distribution system. The ESC's reporting framework requires:

- Reporting for all feeders,
- Feeder segmentation according to 'voltage control' sections, referencing the distributor's zone substation On-Line Tap Changer as the key voltage regulation device,
- Time bands of 10am-4pm, 4pm-10pm, 10pm-4am and 4am-10am,
- Seasonal bands of Dec-Feb, Mar-May, Jun-Aug and Sept-Nov, and
- An explanation of the methodology used for data sampling.

¹ Energy Security Board, May 2020, *ESB cover note on the UNSW Voltage Report*, available [here](#)

² Bruce, A., Heslop, S., Heywood, P., MacGill, I., Passey, R., Stringer, N. and Yidiz, B., May 2020, *Voltage Analysis of the LV Distribution Network in the Australian National Electricity Market*, available [here](#)

The ESC's reporting framework appears to be the most comprehensive in Australia. Outside of Victoria, some states regulators (e.g. the Office of the Tasmanian Economic Regulator) record the number of customer complaints due to voltage issues. See Table 4 (attached) for further details.

Table 1 – Governance of voltage management

Jurisdiction	Regulator	Regulatory head of power
Australian Capital Territory (ACT)	Independent Competition and Regulatory Commission (ICRC)	Independent Competition and Regulatory Commission Act 1997 and Utilities Act 2000
New South Wales (NSW)	Independent Pricing and Regulatory Tribunal (IPART)	Independent Pricing and Regulatory Tribunal Act 1992 No 39 & Electricity Supply Act 1995, National Electricity (New South Wales) Act 1997 No 20 and National Electricity (NSW) Law, Electricity Safety Act 1945
Northern Territory (NT)	Utilities Commission	Electricity Reform Act 2000 and Utilities Commission Act 2000
Queensland	Queensland Competition Authority (QCA)	Electricity Act 1994 and Electricity Regulation 2006
South Australia (SA)	Essential Services Commission of South Australia (ESCoSA)	Essential Services Commission Act 2002 and Electricity Act 1996
Tasmania	Office of the Tasmanian Economic Regulator (OTTER)	Electricity Supply Industry Act 1995 and Tasmanian Electricity Code 2015
Victoria	Essential Services Commission (ESC)	Electricity Safety Act 1998, Electricity Safety (General) Regulations 2019 and Electricity Distribution Code 2020
Western Australia (WA)	Economic Regulatory Authority (ERA)	Electricity Act 1945, Electricity Industry Act 2004 and Electricity Networks Access Code 2004

Voltage management underpins provision of hosting capacity and export services. The governance of regulation of voltage management and hosting capacity should be clarified before obligations to provide export services are placed on DNSPs and a pricing-based approach for voltage management is introduced.

The AEMC should consider bringing regulation of voltage on the low voltage network into the NER. Governance of voltage management is currently highly fragmented and is the responsibility of state and territory regulators. Given that voltage management is an important component of enabling export services, it seems less than optimal to regulate export services through the NER while leaving the regulation of voltage management in the hands of state and territory regulators.

Networks should first be required to meet their regulatory obligations regarding voltage management. Once that has been achieved, a net market benefit test would be a useful approach to guiding investment. In the absence of an explicit price of emissions, the net market benefit test should place a value on avoided greenhouse gas emissions.

c. How will the benefits of reduced greenhouse gas emissions be considered?

The assessment framework for considering the costs and benefits of the proposed rule change is too narrow and only considers whether “prices signal to consumers the costs of providing network services”. Solar PV is a source of zero emissions, zero marginal cost electricity. Export of zero marginal cost electricity reduces wholesale electricity prices and if the savings are passed on by electricity retailers, this can reduce electricity prices for all customers.

Solar generation has wider environmental benefits when it displaces fossil fuel generation. The cost benefit analysis should consider abatement of greenhouse gas emissions. It should not limit climate

change considerations to “robustness to climate change mitigation and adaptation risks”. The analysis should consider the benefits to society and the electricity system broadly. The economic analysis should not be narrowed down to the costs incurred by DNSPs. While costs to DNSPs are an important consideration, they should not be the only consideration or the dominant consideration.

d. Will export charges be time-varying?

A flat per kWh charge (or even an up-front or annual connection charge) would be simple to implement but would not provide the right signal to influence behaviour. A time-varying export charge would be more likely to influence customer behaviour to reduce exports when the network is congested. Behavioural research into customers’ likely response should consider the issues of simplicity versus effectiveness.

e. Will export charges be location specific?

Voltage management is inherently location specific. Export charges should be location specific if the aim is to align causation of voltage management challenges with the costs of voltage management response. If export charges are not location-specific, the AEMC should explain how issues of equity and efficiency will be addressed and how cross-subsidies between solar customers will be addressed.

f. Will dynamically controlled DER be subject to a different export pricing regime?

There is a significant amount of work being undertaken by industry and DNSPs to enable dynamic control for DER. Dynamic control is expected to make an important contribution to addressing the issues of voltage management on the low voltage distribution network.

Will dynamically controlled DER be subject to the same export charging regime as other DER? It would be unfair to charge dynamically controlled DER for exports if it is not contributing to the problems being addressed by the access and pricing rule change proposal.

Attachment 1 – Governance of regulation of voltage management

Table 2 – Jurisdictional regulations for voltage management

Jurisdiction	Regulations/Legislations
ACT	<ul style="list-style-type: none"> Independent Competition and Regulatory Commission Act 1997-Section 4A 4 B provides general information about distribution but provides no information about voltage management. Utilities Act 2000 – this document has details about distribution but nothing about voltage management.
NSW	<ul style="list-style-type: none"> Independent Pricing and Regulatory Tribunal Act 1992 No 39-no information about voltage management Electricity Supply Act 1995-p9 107 has a line on the top of the page stating that “standards for the voltages to be maintained at the terminals of consumers of electricity” and contains information throughout the document about distribution National Electricity (New South Wales) Act 1997 No 20 – no information about voltage management but in general has details about distribution National Electricity (NSW) Law- no information about voltage management and but has information about distribution throughout the document Electricity Safety Act 1945-no information about voltage management
NT	<ul style="list-style-type: none"> Electricity Reform Act 2000-pg 60 has some information about voltage a bit and document in general has details about distribution Utilities Commission Act 2000- no information about voltage management
Queensland	<ul style="list-style-type: none"> Electricity Act 1994-In general document has information about voltage and distribution in great details Electricity Regulation 2006 -In general document has information about voltage and distribution in great details
SA	<ul style="list-style-type: none"> Essential Services Commission Act 2002-no information about voltage management Electricity Act 1996-has information about voltage on page 4 and distribution throughout the document
Tasmania	<ul style="list-style-type: none"> Electricity Supply Industry Act 1995-3A has information about both voltage management and distribution throughout the document in details Tasmanian Electricity Code 2015- distribution-has information about both voltage management and distribution throughout the document in details
Victoria	<ul style="list-style-type: none"> Electricity Safety Act 1998-has detailed information about voltage management and distribution throughout document. Electricity Safety (General) Regulations 2019- has detailed information about voltage management and distribution throughout document Electricity Distribution Code 2020- has detailed information about voltage management and distribution throughout document
WA	<ul style="list-style-type: none"> Electricity Industry Act 2004-has some information about voltage management on page 3 and distribution throughout the document Electricity Networks Access Code 2004-has detailed information about voltage and distribution throughout the document

Table 3 – Ministers responsible for regulation of voltage management

Jurisdiction	Responsibility
ACT	Attorney-General - Justice and Community Safety Directorate Minister for City Services - Transport Canberra and City Services Directorate Treasurer - Chief Minister, Treasury and Economic Development Directorate Minister for the Environment and Heritage - Environment, Planning and Sustainable Development Directorate Minister for Climate Change and Sustainability - Environment, Planning and Sustainable Development Directorate
NSW	Minister for Energy and Environment
NT	Minister for Renewables, Energy and Essential Services is responsible for provisions about supply and service provision under licence
Queensland	Minister for Natural Resources, Mines and Energy
SA	Minister for Energy and Mining
Tasmania	Minister for Energy
Victoria	Minister for Energy, Environment and Climate Change
WA	Minister for Energy

Table 4 – Reporting by jurisdictional regulators regarding voltage management

Jurisdiction	Compliance Reports
ACT	link -Reports on investigations into pricing including FiT but nothing on voltage management
NSW	link - Few compliance reports from 2012 to 2019 available. Detailed information about network management including voltage.
NT	link and link -Power System Performance Review reports have some details about voltage management
Queensland	link - Few compliance reporting but nothing much on voltage management
SA	link and link - Few compliance reporting but nothing much on voltage management
Tasmania	link , link and link - Detailed information available about voltage compliance under performance reports and Network Reliability Review
Victoria	link - Distributor audit reports have general compliance information but not necessarily voltage management
WA	link and link -There are some methodology reporting under electricity access which has some details about low-voltage management (e.g Western Power Network) https://www.erawa.com.au/cproot/21282/2/AA4-Access-Arrangement---Amended-for-Pricing-Corrections-clean-PDF---June-2020.PDF https://www.erawa.com.au/cproot/20193/2/ERA-Approved---Appendix-C.2---Distribution-Low-Voltage-Connection-Scheme.pdf