



## **Clean Energy Council submission to the Energy Security Board Data Strategy Consultation Paper**

The Clean Energy Council (CEC) welcomes the opportunity to provide feedback on the Energy Security Board (ESB) Data Strategy Consultation Paper.

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 welcomes the ESB's recognition of the need for a paradigm shift in energy data policy to optimise data management for the long-term interests of consumers.

We strongly support the ESB's intention to investigate overvoltage problems on distribution networks. We urge the ESB to make this a high priority for 2021. For years, rooftop solar has been unfairly blamed for voltage problems on distribution networks. Most, if not all, state and territory regulators appear to have failed to fulfil their regulatory responsibilities with respect to voltage management on the low voltage (LV) networks. The CEC recommends the ESB should review the regulatory system with a view to enabling the Australian Energy Regulator (AER) to take a more active role in the regulation of voltage management, particularly in jurisdictions where the state regulator has struggled to fulfil that role. Estimating the costs of overvoltage for consumers and developing a strategy to address overvoltage should be prioritised as a matter of urgency.

We strongly support the proposal for LV network reporting. Many distribution network service providers (DNSPs) report that they do not have the capability to report on voltages on their LV networks. We understand that the National Broadband Network (NBN) has extensive data on voltage on networks which it has offered to make available to assist with LV visibility. We urge the ESB to facilitate arrangements with the NBN to enable publication of voltage data, provide metrics of network performance and, ultimately, enable regulators to fulfil their obligations for regulation of voltage management.

A significant gap in the regulatory framework is the absence of any public consultation when DNSPs change their grid connection rules. In 2021 there is very likely to be a need for the AER to review the grid connection rules of DNSPs to enable the implementation of proposed innovations, including the introduction of requirements for:

- The new standard for inverters, AS/NZS 4777.2:202x,
- Power quality settings, also known as Volt-Watt and Volt-var settings,
- Capacity limits behind the meter, which includes methodological questions such as whether inverter capacities for solar PV, batteries and electric vehicles are additive for the purposes of the capacity limit,
- Export limits,
- Dynamic operating envelopes,

- Emergency control measures such as remote disconnection and reconnection of DER,
- Multiple element smart meters,
- Wiring according to regulatory guidelines,
- Internet capability,
- Appointment of a 'Relevant Agent',
- Verification of compliance with new testing procedures for short duration under voltage ride through,
- Battery ramp rates,
- Verification of firmware,
- SCADA (supervisory control and data acquisition), and
- Three phase balancing.

It is crucial that social license for new grid connection requirements is established. There should be a public consultation process prior to AER approval of revisions to grid connection rules for embedded generation on the LV network. The consultation process should consider the costs, benefits and risks of proposed changes; consumer impacts and equity considerations; and impacts on industry.

We support the recommendations regarding retail transparency and understanding consumers and demand. In this submission we have responded in detail to the questions regarding network integration of distributed energy resources (DER).

We would be happy to discuss these issues in further detail with representatives of the ESB. We look forward to contributing further to this important area for policy development.

## RESPONSES TO QUESTIONS FOR STAKEHOLDERS

### Question 1: Data gaps and priorities

***Are there key data gaps that we have not identified? Do stakeholders have views on which data issues take priority? Will some of these data issues be resolved by existing processes?***

We agree with the ESB's assessment that the lack of visibility of voltage data for the LV network is a major barrier to DER integration and addressing this barrier should be a high priority. A useful piece of analysis to guide an LV network visibility strategy would be an assessment of the options and their likely costs, benefits and risks. The Consultation Paper outlines a range of options for obtaining non-network LV data, which include meter data, utilities data and data from DER. What is missing is an assessment of the barriers to implementation and relative costs and benefits of accessing meter data, implementing the [DER Visibility and Monitoring Best Practice Guide](#) or purchasing and publishing utilities data.

### Question 2: Regulatory reforms

***Do stakeholders support the proposed reforms and guidelines, noting they require detailed design and would go be developed and undergo further consultation through usual processes?***

The CEC supports the objectives and direction of the proposed reforms and guidelines, noting that they require detailed design and further consultation.

### Question 3: Leadership and Coordination

***Is a Data Leadership and Coordination group the right approach to drive change? Are there alternatives within existing arrangements? Should it be limited to the core agencies or have a wider representation (for example the ACCC, representatives of Energy Ministers or consumers)?***

It has been proposed that the Data Leadership and Coordination Group should be composed of the ESB, the Australian Energy Market Commission (AEMC), AER, Australian Energy Market Operator (AEMO) and Energy Consumers Australia (ECA). This structure ignores the role of state regulators. Failing to take on the problem of federal structures and governance would risk perpetuating the governance problems at the heart of many of the issues the ESB is seeking to address. For example, the AER is not the primary regulator of voltage management on LV networks. Table 1 (on the following page) describes the governance arrangements for regulation of voltage management. In Australia, voltage management on LV networks is regulated by the Independent Competition and Regulatory Commission (ICRC), the Independent Pricing and Regulatory Tribunal (IPART) the Utilities Commission, the Queensland Competition Authority (QCA), the Essential Services Commission of South Australia (ESCoSA), the Office of the Tasmanian Economic Regulator (OTTER), the Essential Services Commission (ESC) and the Economic Regulatory Authority (ERA). While it might be inconvenient or unwieldy to include every jurisdictional regulator in a governance structure, omitting them from the conversation could seriously undermine the effectiveness of the proposed initiative.

***Is a collaborating group, with identified terms of reference and public deliverables to Energy Ministers, sufficient? Or is a more formal governance arrangement necessary?***

The governance arrangement needs to recognise the role of state and territory regulators. A more formal consultation process with state and territory regulators would be more productive than relying on reports to Energy Ministers being passed on to the relevant state and territory regulators.

***Is the DUG likely to be necessary and/or effective? What else is required to ensure wider stakeholder needs are met?***

Representatives of the DER industry should be included in the Data Users Group. It is unclear from the table in Recommendation 24 whether that will be the case. We urge the ESB to clarify that the Data Users Group will include DER industry representatives.

**Table 1 – Regulation of voltage management on LV networks**

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

**Question 4: Data visibility**

***Should the DataLAC and DUG be tasked with curating/managing a list of relevant data sets and activities? What could be done to ensure that this is helpful rather than a burden?***

A budget allocation toward managing and updating relevant data sets would help to ensure that this is helpful rather than a burden. If the system relies on volunteer labour it will be difficult to sustain in the long run.

**Question 5: Data access and supporting resources**

***How do we ensure that systems and analytical capabilities are available to support better data access? Who is best placed to support this capability?***

***For access to outcomes from high-value AEMO datasets, does AEMO need specific obligations or support to ensure resourcing or prioritisation are not barriers?***

The suggestion to ring-fence resources into a separate data service provider is worthy of serious consideration. It is understandable that agencies such as AEMO need to prioritise their internal responsibilities over requests from other agencies. Removing AEMO from its role as gatekeeper of data would free up AEMO to undertake its core responsibilities while also enabling use of data for analysis to improve the energy system.

**Question 6: Data impact and resourcing analytics**

***How do we ensure that key research and analytical needs can be met, to maximise consumer outcomes?***

Needs for research and analysis to maximise consumer outcomes will be met only if government recognises its value and resources it accordingly.

***Who is the best party to support analytical services and build capability? Is this best undertaken internally by all parties or is some central or third-party expert capability advised?***

The ESB could be the most appropriate organisation to undertake this role or to supervise the experts contracted to undertake the role. Consideration would need to be given to the longevity of the ESB and how the role would be undertaken in the long term if the ESB is terminated. The ESB could at least play the lead role in the establishment of the responsible organisation.

#### **Question 8: Standards governance**

***With the introduction of the proposed DER Standards Governance arrangements, DEIP processes and the new CDR standards body, many standards needs will be actively progressed. Will these arrangements likely support most ongoing needs for data standards? Are there gaps or wider issues which need to be considered?***

The CEC supports the proposal to establish a DER Standards Governance Committee under the National Electricity Rules (NER). There are inadequate resources dedicated to the setting of DER standards and consequently the pace of change is slower than is needed given the rapid deployment of DER.

We recommend consideration of a hybrid model that combines advisory and determining roles, taking advantages of the strengths of the key institutions. In this model, the DER Standards Governance Committee would recommend technical standards and the AEMC would make a final determination. The AEMC would not reconsider technical aspects of the proposed standard, only issues of economics, consumer impacts, equity considerations and impacts on businesses.

The scope of the DER Standards Governance Committee should include all matters relevant to DER integration. This should include governance of DER technical standards, governance of DNSP regulation and governance of compliance and enforcement more broadly. An important role for the DER Standards Governance Committee will be to ensure that rules and standards are transparent and accessible and that the processes to develop them are transparent and accountable.

'DER integration' involves more than new standards for inverters. Equally important, is the governance of rules and regulations for DNSPs and governance of compliance and enforcement across devices, DNSPs, installers and across jurisdictions. For example, communications infrastructure is critical for enabling DER integration and there are a variety of potential communication technologies that could be used for that purpose. Decisions will be required to select the appropriate communication technology. Decisions are needed on the required level of communication performance (e.g. reliability of curtailment, latency etc) which will affect technology choices. There does not appear to be a framework for investment in communications infrastructure and we understand that this is not part of DNSPs' regulatory proposals for the period to 2025. There is a danger that DNSPs and jurisdictions could set different requirements, creating 'rail gauge' issues. This could be an area where guidance from the ESB would add significant value. It would be helpful for the ESB to consider an overarching approach to governance of the communications infrastructure and related protocols.

#### **Question 16: Access to meter data**

***Can you provide wider discussion on the benefits or challenges in access to meter data for research and analysis? Can you provide alternative ways to capture similar insights?***

Data at the National Meter Identifier (NMI) level is unique to the relevant home or business and it is reasonable that NMI data should be subject to privacy safeguards. Researchers will not always want or need data at the NMI level. Aggregate data covering all customers serviced by a transformer or a feeder would be sufficient for many purposes and aggregate data need not be subject to privacy safeguards. To assist the provision of useful aggregate data at the transformer and feeder level it would be useful to develop a database of transformer-level and feeder-level aggregated data. This might require development of set of Transformer Identifiers and Feeder Identifiers and a database of which NMIs are

associated with which Transformer Identifiers and Feeder Identifiers. Data at the Transformer and Feeder level should be made easily available to researchers.

#### **Question 20: Overvoltage**

##### ***Is there further evidence or other studies of existing voltage levels and related consumer impacts that should be considered before undertaking further investigations?***

The CEC strongly supports the ESB's intention to investigate overvoltage problems on distribution networks. The work already undertaken with the University of New South Wales (UNSW) has found significant levels of high voltage across all networks in the National Electricity Market (NEM). For years, rooftop solar has been unfairly blamed for voltage problems on distribution networks. We welcome the confirmation that, "In the vast majority of cases this was an underlying issue, likely due to the historic load of air conditioning and the transition from 240V to 230V, and was not driven by DER."

In addition to the work commissioned by the ESB, there is widespread anecdotal evidence of voltage management problems on the LV network. The CEC regularly receives feedback from solar installers who are unable to commission new DER systems due to overvoltage on the LV network.

We welcome the ESB's recognition that high voltage levels can create significant costs for consumers, including:

- Reducing the life of many types of equipment and appliances,
- Losses in solar generation constrained off, and
- Increasing total energy demand (and carbon emissions).

If these costs can be quantified it would enable better understanding of the costs and benefits of monitoring the LV network and rectifying problems of overvoltage. This is an important area and should be a priority for reform.

Most state and territory regulators appear to have failed to fulfil their regulatory responsibilities with respect to voltage management on the LV networks. The failure to properly regulate voltage management is very costly. As the ESB has noted, improved voltage management could reduce energy demand by as much as three percent and even a reduction of only one per cent would save consumers around half a billion dollars.

##### ***Which body in the energy sector would be most appropriate and effective to lead this work?***

The ESB is the most appropriate organisation to lead a review of regulation of voltage management. The CEC recommends the ESB should review the failed regulatory system with a view to transitioning the role of regulation of voltage management to the AER.

##### ***Given the role of jurisdictional regulators in network performance, how are these bodies best engaged?***

Voltage management on LV networks is a key component of the provision of 'export services' and 'hosting capacity'. The AEMC is currently considering rule changes for DER access and pricing that could result in 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. The report commissioned by the ESB<sup>1</sup> and undertaken by UNSW<sup>2</sup>, found that "even in the absence of solar PV,

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

<sup>2</sup> 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](#)

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”.

We have searched the web sites of every one of the jurisdictional regulators listed in Table 1 (on page 4, above) 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.

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.

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 ESB 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 sub-optimal to regulate export services through the NER while leaving the regulation of voltage management in the hands of state and territory regulators.

#### **Question 21: Analytical capabilities to support DER integration**

***Is the proposed collaboration to acceleration network analytics, datasets and tools workable? What barriers or concerns does it raise? Could most networks engage in this process? Who should lead this work and what is required to maximise its success?***

DNSPs are unlikely to have the capacity and capability to undertake the work to build new tools and analytical capabilities needed to support LV visibility and DER integration using shared data from networks and non-network stakeholders. Their track record shows that even if one or several DNSPs have the capability and will to accelerate the network analytics and datasets, it is almost certain that not every DNSP will be able to do so.

#### **Question 22: LV reporting**

***What additional benefits, barriers or concerns does the proposal for LV network reporting requirement raise? Can you provide further evidence of benefits or costs to inform further consideration of this proposal?***

The CEC strongly supports the proposal for LV network reporting. Lack of visibility of the LV network is a significant barrier to DER integration. Transparency around hosting capacity and the rationale for export limits is a key concern. We agree with the ESB’s assessment that Annual Planning Reports and ‘network opportunity maps’ only provide high level information and that the information of most relevance to DER stakeholders is the local network ‘DER hosting capacity’. We would strongly support

a regulatory obligation on networks to improve transparency regarding hosting capacity, export limits, other constraints on DER and related data such as smart meter penetration.

Many DNSPs report that they do not have the capability to report on voltages on their LV networks. Fortunately, the NBN has extensive data on voltage on networks which it has offered to make available to assist with LV visibility. We urge the ESB to facilitate arrangements with the NBN to enable publication of voltage data, provide metrics of network performance and, ultimately, enable regulators to fulfil their obligations for regulation of voltage management.

As noted in the Consultation Paper, a significant gap in the regulatory framework is the absence of any public consultation when DNSPs change their requirements for grid connection approval. In 2021 there is very likely to be a need for the AER to review the grid connection rules of DNSPs to enable the implementation of proposed innovations, including the introduction of requirements for:

- The new standard for inverters, AS/NZS 4777.2:202x,
- Power quality settings, also known as Volt-Watt and Volt-var settings,
- Capacity limits behind the meter, which includes methodological questions such as whether inverter capacities for solar PV, batteries and electric vehicles are additive for the purposes of the capacity limit,
- Export limits,
- Dynamic operating envelopes,
- Emergency control measures such as remote disconnection and reconnection of DER,
- Multiple element smart meters,
- Wiring according to regulatory guidelines,
- Internet capability,
- Appointment of a 'Relevant Agent',
- Verification of compliance with new testing procedures for short duration under voltage ride through,
- Battery ramp rates,
- Verification of firmware,
- SCADA (supervisory control and data acquisition), and
- Three phase balancing.

It is crucial that social license for these innovations is established. A public consultation process should be undertaken prior to AER approval of revisions to grid connection rules for embedded generation on the LV network. The consultation process should consider the costs, benefits and risks of the proposed changes; consumer impacts and equity considerations; and industry impacts.

### **Question 23: LV visibility through metering**

The metering reforms implemented under the *Power of Choice* framework have failed to deliver. We agree with the ESB's observation that metering data "is currently being under-utilized due to commercial barriers and out-of-date requirements". We support the recommendation that the upcoming AEMC review should consider metering data access rights for networks, network connection points and voltage reporting. Integration of DER would be facilitated if all distribution networks have the same access to data from smart meters that is currently available to distribution networks in Victoria. The AEMC review should clarify minimum standards for meters and who can access the data – especially the voltage data. Voltage data should be made more accessible without undermining commercial services for data.

Data on voltage management and hosting capacity of the network should be widely available to support the efficient deployment of solar, batteries, virtual power plants etc. Under the current metering arrangements, the data from smart meters is not being used well to inform investment and operating

decisions. A notable exception is Victoria, where the Essential Services Commission (ESC) has a comprehensive reporting framework for its regulation of voltage management. The Victorian framework for reporting on voltage management includes:

- 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.

The ESB could also consider making use of the [DER Visibility and Monitoring Best Practice Guide](#), which was developed by industry with the support of industry associations. Its key benefits are:

- Enhanced visibility for DNSPs, AEMO and others,
- Harmonised data set available to energy market planners and regulators to manage the transition to a two-way energy market,
- Facilitates the effective transition to dynamic export and a two-way market, and
- Provides value to consumers through the provision of real time granular data and insights.

Recently, the South Australian government has mandated that all new smart meters must be multi-element meters. The rationale for this regulation is unclear. The AEMC review of metering should consider the merits of the South Australian requirement for multi-element meters.

#### **Question 24: DER identification and DERR**

The CEC has been working in collaboration with the Australasian Fire and Emergency Services Authorities Council (AFAC), especially in relation to its draft Guidelines for Incidents involving PV Array and Battery Energy Storage Systems. We have also been working with individual fire agencies, most notably the South Australia (SA) Metropolitan Fire Service.

AFAC has identified a need to obtain access to the data on PV arrays and battery energy storage systems which is available through the centralised DER Register managed by AEMO. This seems like an entirely appropriate use of the data in the DER Register and the CEC has indicated our support for this approach to AFAC and others. We understand that various legal considerations have been an impediment to AFAC accessing data from the DER Register, despite the fact that Section 8.5 of the [AEMC, Register of distributed energy resources, Rule determination, 13 September 2018](#), states:

*"The final rule allows AEMO to provide DER register information to an emergency services agency if requested for the purposes of that agency's response to an emergency or for planning in relation to emergency responses. As discussed above, the Commission considers that the provisions of [Section 54 of the National Electricity Law](#) are adequate to deal with the provision of this protected information by AEMO to an emergency services agency."*

This is a very clear example of the need for reforms to enable access to data by agencies who have a clear need for it.

The DER Register should also capture data on export constraints and other limitations specified in DNSPs' connection agreements. This would assist with forecasting the behaviour of DER and would be valuable for policy makers (e.g. in the transition to dynamic operating envelopes).

There would also be value in capturing data on EV chargers in the DER Register.

**Question 25: Visible and manageable DER**

In South Australia it is a condition of grid connection approval that inverters must be capable of connecting to the internet. The Victorian Government has indicated that it will adopt a similar requirement in 2021. It is unclear at this stage whether jurisdictions or DNSPs will, in future, require that all inverters must be connected to the internet (not just capable of being connected). The governance arrangements for communication systems in relation to electricity supply remain unclear. A key policy question for DNSPs and regulators is whether it will be sufficient to rely upon the customer's wifi for future communication requirements. It is unclear whether that is a decision for each DNSP or whether an organisation such as the ESB, AER or the AEMC have a role to play.

**Question 26: Data for EVs**

Regulation and visibility of EV chargers should be considered. There are many unresolved policy questions. For example, should EV chargers be included on AEMO's DER Register? Should this apply only to vehicle-to-grid chargers or to all EV chargers? Should this apply only to three phase or fast chargers or should it apply to all EV chargers?

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

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