Clean Energy Council submission to the Australian Energy Market Commission's Approach Paper:

Distribution Market Model

Executive Summary

The Clean Energy Council (CEC) welcomes the opportunity to provide feedback on the Distribution Market Model Approach Paper by the Australian Energy Market Commission (AEMC).

The CEC is the peak body for the clean energy industry in Australia. We represent and work with hundreds of leading businesses operating in solar, wind, hydro, bioenergy, marine and geothermal energy, energy storage and energy efficiency along with more than 4,000 solar installers. We are committed to accelerating the transformation of Australia's energy system to one that is smarter and cleaner.

As noted in the Approach Paper, distributed energy resources can be used to help distribution network businesses meet their regulatory obligations to provide a safe, secure and reliable distribution network and the need to more actively manage distribution system operations is likely to increase in future. CEC welcomes the AEMC's acknowledgment that changes to the market design and regulatory framework may be needed to enable distribution network businesses to move from being asset owners and operators to being providers of market platforms that send signals to incentivise the efficient integration of distributed energy resources, or for other parties to take on this role.

While the CEC does not have a firm view on which specific organisation or company ought to be responsible for system operation of a distribution network and management of market-based platforms to procure services for efficient system operation, we would advocate the following principles should apply:

- The roles of asset ownership, maintenance and connection approval should be separated from the roles of system operation and market management,
- Contracts for system operation and market management should be allocated through a competitive process,
- A transparent performance benchmarking system should be established to enable comparison of the performance of system operators and market managers, and

- Ideally, the framework would apply to stand-alone networks as well as distribution networks that are part of the national interconnected electricity network.

In this submission we provide further detail on these issues and respond to the specific questions raised in the Approach Paper.

We would be very happy to discuss these issues in further detail with the AEMC. We look forward to contributing further to this review.

QUESTIONS FOR RESPONSE

1. **Do stakeholders agree with these definitions, or have any views on the project scope as a result of these definitions?**

The Approach Paper defines the term 'distributed energy resource' as an integrated system of smart energy equipment (co-located with consumer load) that is able to respond automatically to changes in prices or signals from wholesale markets or elsewhere in the supply chain. This is a reasonable definition for the purposes of the project.

2. **Do stakeholders support this project scope? Is there anything that has not been flagged for consideration that should be? Is there anything that should be excluded from the project scope?**

The project will examine whether changes to the National Electricity Law (NEL) and National Electricity Rules (NER) will be required to facilitate an increased amount of distributed energy resources and provide appropriate incentives for the ways in which these resources can be used. The project will not consider aspects of the National Energy Customer Framework (NECF) or the design of transmission-based markets.

CEC supports the review, and would prefer its scope to be broader than currently proposed. We would prefer the scope to be broadened to include the following:

- Stand-alone grids that are not connected to the national interconnected electricity market– even if they are not governed by all of the aspects of the NEL and NER that currently apply to distribution businesses.
- Storage on the grid.
- Issues affecting transmission, such as the potential to introduce more competition into the role of coordination of transmission systems and the process to allocate responsibility for that role.
- Combinations of 'smart' and 'passive' elements (e.g. connected AC, smart EV charging but passive solar inverter). In combination this can produce an overall interaction with the grid that is intelligent and controlled.

3. **Are there any other elements of a DNSP's role or current responsibilities that should be considered?**

The Approach Paper describes the role of a distribution business as "to convey, and control the conveyance of, electricity from transmission networks or embedded generators to end-use customers. They perform a number of functions to fulfil this role, including network planning, development, ownership and operation, although it is not necessary for a single entity to perform all of these functions". In addition, distribution businesses could also play a role in enabling peer-to-peer energy trading between customers, such as by designing appropriate tariffs for access to the network that enable more efficient utilisation of the grid.

4. Are there any aspects of the regulatory framework that are not set out in sections 2.3 or 2.4 but which should be considered through this project?

In addition to the aspects of the regulatory framework set out in sections 2.3 and 2.4, the framework for regulation of stand-alone power systems might also be relevant to this project. We understand that consumer protection aspects of stand-alone power systems are outside of the scope of this project. However, the potential role for distribution businesses in system operation of stand-alone power systems could be considered as part of this project.

5. Should the coordination of distribution systems with distributed energy resources be centralised under the direct control of one body? Or should it be devolved and performed in a tiered manner?

Network operation and management of market-based platforms to procure services to meet the required operating parameters efficiently would appear to be a natural monopoly service. To that extent, it seems logical to centralise the coordination of markets for grid services under the direct control of one body, for a given network. However, this in no way implies that coordination of all networks should be centralised under one body.

System coordination services could be offered by a number of organisations and companies that could compete for contracts to be monopoly service providers. Contracts for provision of system coordination services should be allocated on a competitive basis. There should be a system of benchmarking to enable comparison of the performance of system operators.

In principle, there is no reason to assume that the Australian Energy Market Operator (AEMO) should be a monopoly provider of coordination services for distribution networks or stand-alone grids.

While distribution businesses could act as system operator and manager of market-based platforms to procure services for the efficient operation of systems they own and maintain this may present some competition concerns. Separation of the roles of asset ownership and maintenance from system operation and market management could help to address certain anti-competitive aspects of the electricity distribution industry, such as the potential to misuse the power to grant, refuse or apply conditions to grid connection approval. This is especially the case if the conditions of grid approval relate to provision of services to the network.

An alternative model would allow distribution businesses to operate systems and manage markets in networks they do not own and maintain.

Companies that do not own and maintain any network assets could also offer services in system operation and energy market management. We agree with the AEMC's observation that there may be competition concerns "if DNSPs are able to provide both core, monopoly network services and services that can be provided efficiently on a contestable basis". Separating the ownership and maintenance of physical assets from the role of system

operation and market management would allow distribution businesses and other companies to specialise and compete in ways that address competition concerns.

6. Do stakeholders agree with the Commission's framework and these principles of good market design? Is there anything the Commission has missed, or is unnecessary?

The Commission's framework and principles of good market design appear are an appropriate basis for the market design aspect of the project.

The principle of promoting competition where feasible should be applied to the regulatory framework for system operation and management of market-based platforms to procure services for efficient system operation. Although this might be a natural monopoly service within a network there is no reason to assume that all networks should be coordinated by AEMO or another monopoly provider. Nor is there a reason to assume that system operation and management of market-based platforms should be undertaken by the company that owns and maintains the assets. In fact, competition principles would suggest that it would be desirable to separate the role of ownership and maintenance from the role of system operation and market management.

7. Are there any other issues the Commission should have regard to in considering possible market design options?

Yes.

It would be helpful for the AEMC to articulate as a matter of policy the principle that providers of grid services should be rewarded for the services they provide.

The importance of grid support services market will increase in future. Within a network, the system operator will likely be the only buyer. Distribution businesses could also be providers of some grid services (within the limitations of the AER Ring Fencing Guidelines). There are clearly risks to competition in a monopsony market and particularly where the sole purchaser can also be a supplier. Companies responsible for system operation and market management should be ring-fenced from the business of providing the services they procure.

The AEMC discussion paper on the regulatory implications of energy storage recommended that the technical requirements that apply to storage behind a customer's meter should be investigated to assess their appropriateness. It suggested that reviews should in future consider:

- the different requirements being applied to behind-the-meter storage by distributors,
- whether the technical requirements, including AS 4777, give network businesses too much control over what is connected to their networks, both in terms of:

  (i) specification of the equipment and technical performance; and

  (ii) remote control.

These issues should be revisited in the context of a new framework that could potentially separate the role of asset ownership and maintenance from the role of system operation and market management. There are also a number of practical issues that would need to be considered in the context of developing the proposed new framework, including the following questions:

- Would the proposal lead to duplication of administrative costs and, if so, how significant would the additional costs be?
- Who would be accountable if the decisions of the company responsible for ownership, maintenance and grid connection approval have an adverse impact on the ability of the company responsible for system operation and market management to meet performance standards?
- What are the projected economic costs and benefits of the proposal and would the economic benefits exceed the costs?

8. Do stakeholders agree with the Commission's assessment of the technical impacts of distributed energy resources set out above in sections 4.1 to 4.8?

No.

The assessment of the technical impacts of distributed energy resources is outdated and appears to be based on the inverter capabilities required by the 2005 version of the AS4777 inverter standard. For example, the Approach Paper states that, "distributed energy resources do not currently provide voltage or reactive power support, which can lead to voltage instability". This is both incorrect and is inconsistent with the definition of 'stability' which is the short term transient ability for the system to recover from an event or disruption. The voltage issues described in the paper relate to *management of voltage levels* within the pre-defined standard limits as load and generation change over time, this is not the *stability* of the voltage.

Since 9 October 2016 all inverters have been required to meet the 2015 version of the inverter standard, known as *AS4777.2:2015 Grid connection of energy systems via inverters – Inverter requirements*. The updated inverter standard includes requirements such as reactive power capability, new voltage and frequency set-points and limits to be compatible with requirements of network businesses. The updated standards also require inverters to have Demand Response Mode (DRM) capabilities, which allow a remote operator to alter the inverter system to operate in a certain way, such as disconnecting from the grid, preventing generation of power or increasing power generation. This means that distributed energy resources utilising smart inverters have the capability to provide services to the network. If distributed energy resources with AS4777.2:2015-compliant inverters are not supplying reactive power or other grid services it is not due to lack of capability. Rather, it is due to the absence of markets or other incentives for provision of grid services. Already some

distribution businesses are mandating grid services (such as provision of reactive power) as a condition for connection to the distribution network.

The Approach Paper also refers to safety issues that could result from islanding prior to a reclosing event, even though for many years anti-islanding has been a requirement for all local embedded generation and inverters installed in Australia which would disconnect any generation source immediately upon loss of mains and prior to reclosing occurring. The reclosing would thus occur in the absence of generation running, overcoming the issues noted in the paper.

These issues were also considered by the Essential Services Commission of Victoria in its draft report on the network value of distributed generation, which is available at: http://www.esc.vic.gov.au/document/energy/36400-distributed-generation-inquiry-draft-report-network-value/

9. Do stakeholders agree with the Commission's preliminary assessment of these opportunities and possible solutions to address the technical impacts of distributed energy resources?

The Commission's interpretation that markets that manage local supply and demand would resolve the technical issues at hand may not be accurate. It may be best to look at these matters individually. For example, local supply-demand balance can manage voltage levels locally and power flows exceeding thermal limits but may not assist with power factor correction. Further, the management of harmonics and flicker (defined as power quality issues) can be dealt with through filtering with smart inverters and batteries, irrespective of the supply-demand balance. It is worth considering these aspects individually:

1) Supply-demand balance to manage voltage levels and operation within thermal constraints. This could be managed through markets that facilitate local network pricing or local peer to peer energy trading (for example).
2) Power factor correction and Power quality rectification (e.g. harmonics or flicker) can be managed through new market signals that place a value on these characteristics. Smart inverters and storage systems can easily be adapted to provide these services should such signals exist.
3) Services to the broader power system such as responding to rates of change of frequency (inertia) or the Frequency Control Ancillary Services Markets would require aggregation in the distribution network and on-selling to these new or existing markets.

Smart inverters with the capabilities required by the 2015 version of AS4777 enable distributed energy resources to provide grid support services. What is needed now is a regulatory framework that makes explicit what capabilities can be demanded by distribution businesses as a condition of grid connection and which services should be paid for through a grid services market.

The CEC supported the new version of AS4777 because we support the evolution of a smart grid and smart inverters are an important step in the development of new market-based solutions. However, the fact that AS4777 now mandates certain capabilities for new distributed energy resources should not be taken to imply that distribution businesses are now free to demand the grid services enabled by the new inverter capabilities. CEC supports the development of new market platforms for grid services. We are concerned that in the absence of a regulatory framework for grid services distribution businesses will be in a position to demand those services as a condition of grid connection approval. Separation of the roles of asset ownership, maintenance and connection approval from the roles of system operation and market management would assist in resolving some of the anti-competitive conditions that currently exist.

The CEC also notes that the lack of clear and consistent grid connection standards applied by DNSPs will be an inhibiting factor to the efficient participation in any distributed energy market. Work conducted by the Energeia for the CEC during 2016 found that the current absence of a national approach to these standards leads to significant inefficiencies to the tune of around $36 million per annum[1]. While this matter requires addressing to facilitate an efficient distributed energy market a mandated approach through a central body such as AEMO will be necessary to reveal the full benefits of consistent standards.

10. Do stakeholders have any initial views on who should be responsible for managing these opportunities, or implementing possible solutions to the technical impacts?

While the CEC does not have a firm view on which specific organisation or company ought to be responsible for system operation and market management of distribution networks, we would advocate the following principles should apply:

- The roles of asset ownership, maintenance and connection approval should be separated from the roles of system operation and market management,
- Contracts for system operation and market management should be allocated through a competitive process,
- A transparent performance benchmarking system should be established to enable comparison of the performance of system operators and market managers, and
- The framework should apply to stand-alone networks as well as distribution networks that are part of the national interconnected electricity network.

[1] http://fpdi.cleanenergycouncil.org.au/reports/grid-connection-standards-scoping-study.html