CEC submission to NEM Wholesale review

Objectives

1. Energy costs kept as low as possible for end use customers…
   - …while ensuring the power system stays reliable and secure…
   - …and continues to reduce emission intensity of electricity production.
2. To enable (1), a long-term investment pipeline delivering new capacity at the right time and in the right place, to maintain supply
3. To enable (2), a market which:
   - is open to all new participants
   - functions with minimal intervention
   - allows for recovery of operating as well as capital costs
   - operates the system effectively in the short term
   - sends clear long term investment signals aligned with long term system needs

Problem statement – Managing Long term uncertainty driven by a changing power system

- A critical issue for the clean energy sector is managing long term uncertainty
- In the short term, risks can be at managed through existing mechanisms
- In the longer term, investors and developers of clean energy projects are faced with significant uncertainty that is hard to hedge
  - Most buy-side counterparties (retailer and corporates) do not want to enter contracts beyond a 3 year time horison, while project developers need long term
  - Investors increasingly want long term stable returns, less merchant exposure
- Uncertainty is driven by changing power system needs
  - Hedging is traditionally based around understood system needs like managing peak demand
  - But underlying system needs are rapidly changing: intra day, seasonal shortfalls, dunkelflaute
- Its therefore critical to clearly define these changing system needs, in order to define the new services and markets needed to meet them.
- The rest of this submission explores the range of options that might be used to manage this long term uncertainty by meeting future system needs

Principles for market design

- Stronger long-term investment signals are needed
  - Investors need long term certainty to drive in the new capacity needed to maintain a reliable, low cost supply of energy .
  - This need for long term certainty is where targeted intervention is most needed
- Markets should be self sustaining, so government intervention can be minimized
  - Where they have intervened, Governments should set a clear pathway for exit
  - Market frameworks, once established, should not be materially altered
- Effects of any intervention must be carefully managed
  - Unintended effects must be limited, particularly wholesale price suppression.
  - Impacts on incumbents must be considered, given incumbents are also building new capacity
- Markets should internalise the value of meeting system needs
  - Retailers / consumers should see all value reflected in market prices – reliability / system security etc
  - Market frameworks should enable full value of CER to be captured
- A liquid and diverse contract market is central to supporting efficient investment
  - Derivate markets work in the short term but hard to strike long term contracts – tenor is a key issue
  - Derivate markets also need to deliver new products to hedge changing system risk
- Networks are key to an effective market but boundaries are critical
  - Regulation should define the lines between the competitive and regulated sectors
  - Networks should operate on the basis of competitive neutrality, supporting open access

Parallel mechanism options

Model	Strengths	Weaknesses
Government ownership	If a direct player, govt may seek to reduce regulatory intervention in market design	Highly distortionary for private investment
Traditional capacity market	Clear, bankable and long term signals, can deliver needed capacity types	Complex and costly to implement, bakes in government intervention, distorts energy market, doesn't deliver energy when / where its needed
Strategic reserve / out of market contract	Well understood, strong investment signals, implementable, can deliver needed capacity types.	Opaque mechanism, subject to government intervention, not sustainable
CFDs / underwriting	Well understood, moderate investment signal	Not highly bankable, distorts energy market, doesn't deliver needed capacity types
Waiting room model	Integrated with development processes, strong investment signal, can be coordinated with coal exit, delivers needed capacity type	Opaque, not well understood, picking winners
Co-optimised service (operating reserve / short term capacity)	Well understood, integrates well with energy market, very little govt/regulatory intervention	Not bankable, doesn't send long term investment signals, may need multiple services
Certificate / credit scheme	Well understood, send strong long term investment signals, low levels of govt/regulatory intervention	Politically challenging, can distort energy market, may negatively impact incumbents.

Energy only or capacity markets

- A key debate since NEM start has been energy only markets (EOM) vs capacity markets (CM)
- Uncertainty regarding coal closure and changing system needs affects ability of the EOM to drive investment.
  - Currently, relatively weak signals for investment in energy rich capacity, focus is on peakers / BESS
  - Derivative markets evolving to provide some firming products, but unclear whether there will be sufficient bulk load following and overnight coverage products
  - Emerging issue of seasonal shortfalls and dunkelflaute do not yet appear to be covered in derivates.
- Centralised capacity markets could be used to address this:
  - Some form of capacity market could be used to send strong signals for long term investment in new firming / energy rich capacity. For example, targeted to deliver given MW volumes in a given year
  - However, capacity markets include significant government involvement and are complex to implement
  - Traditional capacity markets also drive investment in MW *capacity*, rather than *energy*. This is a blunt tool and not really suited to what the system needs – ie, investment in specific types of capacity to manage changing system needs. These changing system needs increasingly require delivery of specific volumes of *energy* at specific times.
  - If a capacity market were to be considered, it should focus on new generation only, and should select for the long term investments needed to meet long term system needs
- Other parallel mechanisms can also be used, to deliver *capacity* and *energy* when and where it is needed
  - Some of these mechanisms, explored in the next slides, target specific elements of traditional capacity market design
  - These mechanisms should be open, stable and transparent, with fixed end dates ***or*** integrate seamlessly into the energy market

Certificate / credit mechanisms

- Certificate / credit schemes are proven market mechanisms that can effectively drive in new capacity
  - Open and transparent, sending clear long term price signals
  - Developers have substantial experience with operation and compliance
  - Allow for efficient cost allocation – ie, exposes consumers to price signals
- Such mechanisms can be tailored to deliver specific system needs
  - Mechanisms should deliver MWh *energy* when and where it is needed, not just MW *capacity* investment
  - Certificate / credit schemes could be designed to deliver energy in this way
  - For example, a certificate based scheme focussed on delivery of energy reserves could be designed to target delivery of specific energy volumes at specific locations, at particular points in time
  - Could also be targeted towards specific technologies
- Some complexities and issues with these kinds of schemes:
  - effectiveness can be reduced when more additional requirements introduced – you can easily end up with the same issues as a traditional capacity market mechanism
  - reduce energy only market efficiency, by creating separate revenue streams
  - complex to allocate certificate obligations to retailers, if the energy need is in the long term. How to forecast a retailers share of certificates 10 years out?
  - Government may function as certificate ‘market maker’ – buying certificates and onselling to retailers later

CFDs and underwriting

- Mechanisms like the CIS and Generation LTESAs are intended to operate in parallel and minimise distortion of the energy only market
- However, concerns remain regarding the long term impact on market outcomes and investment
- While the CEC has worked closely with various governments to support the development of various contracting mechanisms, we note the following issues:
  - Overdesign can have negative consequences. As we have seen with the CIS, initial design choices such as the ‘LOR3 requirement’ had the potential to undermine the scheme. Similar problems have arisen in regards to prohibitions on related party contracts
  - Energy market interactions can have a spillover effect on incumbent generators. For example, there is real concern as to the impact of the CIS on forward prices around 2030 and what this will mean for incumbent generators
  - The complexity of the merit criteria and auction processes can reduce overall efficiency of the investment market. IE – are developers looking to design the best, lowest cost projects, or those that most effectively meet eligibility and merit criteria.

Energy only market reform

- The CEC has consistently supported ongoing energy only market reform, especially to the absolute and relative settings of the market price cap (MPC) and cumulative price threshold (CPT)
- Noting the AEMC and Reliability Panel have increased the absolute and relative values of the MPC and CPT through the late 2020s, we consider this reform process should continue.
- In particular, the level of the CPT relative to the MPC should be reassessed. A higher CPT value will incentivise technologies with a greater capability to deliver sustained energy supply
- Increases to the reliability price settings of the energy only market will reduce the need for, and use of, parallel mechanisms. This will ultimately help reduce costs for end use customers.

Contract markets in a time of changing system needs

- Key changes in the generation mix are driving changes in the supply / demand balance and market outcomes:
  - Solar PV drives greater diurnal spread in demand
  - …but, solar PV output at peak demand times can ‘peak shave’
  - Wind generation is stochastic and supports reliability, particularly overnight…
  - …but also exposes the power system to dunkelflaute
- The results:
  - Solar PV drives increased negative pricing and intra-day price spreads
  - Wind drives periods of extended reliance on thermal generation in winter, increasing winter average prices
- BESS and other energy storage are natural physical hedges…but these changing physical drivers also impact contract markets

Contract markets in a time of changing system needs

- A liquid and diverse contract market is critical to supporting a stable and investment pipeline, by making projects bankable
- Currently, we understand contract markets do not extend beyond 3 years and are likely to drive investment in peaking units / 2 hr BESS
- While contract markets are evolving to meet new needs, this may not occur as quickly, or pre-emptively, as the system needs
  - Contracts are emerging to cover 4-6 hour daily diurnal spread…
  - …but less so for overnight coverage
  - We are not aware of contracts emerging to cover dunkelflaute
- There is also a need for longer tenor contracts, to reduce investor uncertainty. However, retailers and other buyers are unlikely to be willing, or able, to take these contracts.

Contract markets in a time of changing system needs

- Two ways to manage contract market illiquidity (there may be others)
  - Government as primary counterparty: CIS / LTESA / traditional CFDs
  - Regulated market maker: Market Liquidity Obligation (MLO)
- An MLO might be used to support near term liquidity:
  - An MLO should not be prescriptive – ie, should not mandate price points
  - Multiple design choices should be considered – ie, auction type, automatic inclusion by generation share
- MLO doesn't resolve issues beyond the 3 year forward window. Other mechanisms may be needed to support longer contracts
  - Government as counterparty, with contracts onsold to retailers closer to realtime? See slide on certificate schemes
  - Agencies like ARENA / CEFC could also play a role in supporting derivate market innovation and development of longer tenor contracts

Controlled coal exit

- New capacity must be brought into the system ahead of coal closure. This is necessary to address government concerns regarding reliability and price shocks.
- Coal generation exit should be controlled in order to maintain wholesale price predictability and support stable investment
- Parallel mechanisms for coal exit should be ***separate*** but ***coordinated*** with mechanisms to drive in new capacity
- Mechanisms should be time limited, with clear exit dates for coal units.
- Co-ordination means linking and aligning new mechanism contract milestone dates with coal exit dates. Ie – COD for a CIS aligned with (or in advance of) a regulated exit date of a coal unit

Networks and regulation

- Networks have a key role to play in the transition, with reform to planning processes and economic regulation expedited to ensure network businesses can earn adequate returns on critical new investment
- However, policy makers should uphold and bolster the original design principles of the NEM:
  - Open access should remain paramount. Networks should be required to allow all generators to connect to the power system.
  - Incentive regulation should drive network businesses to be indifferent between capital or operational expenditure, supporting non-network solutions wherever this is consistent with minimising costs for consumers and meeting the national electricity objective
  - Transparent and strong ringfencing of related entities is critical, to ensure equitable and lowest cost access to the network for all participants
- Network businesses are increasingly procurers of key services: inertia, system strength and reliability support.
  - Standardisation and / or regulation of these procurement activities will foster competition and deliver lowest cost solutions.

Essential system services

- Proactive identification of system needs and development of service definitions are critical:
  - AEMO must identify system needs and develop underpinning technical frameworks
  - AEMC must clearly define the new service markets to meet these system needs
  - AER must support competitive sector service innovation through balanced regulation and enforcement
- The Panel should support and guide other agencies as they progress ESS work programs:
  - The AEMC and Reliability Panel are progressing valuable work programs and should be guided as they continue – eg, inertia service markets and SRAS
  - These new service markets should be designed with an eye to the most critical looming issue – retirement of synchronous generation
  - AEMO should be encouraged to deliver a System Transition Plan and statements of system need that proactively and clearly define exactly what, when and where investments are needed
  - AEMO should also accelerate work to develop technical and operational standards for grid forming inverters. These should be codified in the NER.
- The CEC also welcomes the opportunity to work with the Panel to identify and begin the process of designing critical new ESS.
- The CEC considers it is particularly important to develop new ESS / parallel mechanisms to address the issue of minimum system load and the related potential for BESS directions.

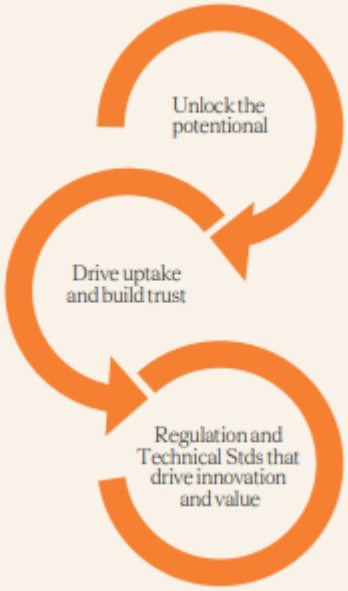
Consumer Energy Resources

- Rooftop solar is entrenched in the Australian energy system - There is more rooftop solar capacity (25GW) than coal-based capacity
- According to AEMO, in Q4 2025, rooftop solar made up 18% of generation output in the NEM and there have been over 4m installations at a run rate of around 300,000pa over the last 4 years.
- Household and businesses have invested $25b in rooftop solar and have saved on average $1,500pa on their bills. This equates to total savings of $150b over the next 25 years
- The full value and benefit that rooftop solar generation can deliver to the system can be achieved through time-shifting the excess supply during daylight hours to the times when it is needed most.
- Pairing solar with storage solutions like batteries will help to stabilise energy prices, keep the grid reliable, and reduce the need for large-scale infrastructure investments
- When connected to virtual power plants (VPPs), solar+storage can be managed together to smooth out energy supply and reduce overall costs
- CEC analysis shows that time shifting energy across the distribution network can generate to NEM system-wide benefits of $2.37 billion (see page 14, powering-homes-empowering-people-cer-roadmap.pdf)

Consumer Energy Resources

- The success has been driven by consumers understanding the value of rooftop solar to themselves and having the agency to get the most out of their investments supported by:
  - A stable and enduring policy framework in the Small-Scale Renewable Energy Scheme (SRES) that has provided consumers with confidence to investment
  - An economic environment where consumers made rational decisions to switch from accessing grid supply electricity to generate their own electricity at a lower on-going cost
- The CEC has used the learnings from the success of rooftop solar to develop a comprehensive Consumer Energy Resources Roadmap, Powering Homes: Empowering Consumers
- The Roadmap focuses on how to better engage and educate consumers of the individual and system-wide benefits of CER. It is clear while CER is a new and emerging sector and much needs to be done to better connect these assets to the system to extract the value, without consumer consent and acceptance, the supply side reform program will not alone drive the benefits. Like the success of rooftop solar, making solar generation more flexible will require consumer participation.

The building blocks to unlocking CER value



Educate consumers on the products and services best suited for their energy needs and objectives.

Provide consumers with control over their energy use and comfort levels, and save money by transparently and fairly rewarding them for utilising their devices to provide wider system services

Develop the right policy, regulatory and technical standards environment that incentives market participants to develop and offer products and services that support consumers manage their energy demand

CER: Consumer led reform principles

- **The right CER policy responses should aim to achieve principles that drive, support and encourage consumer engagement**

Enhance customer choice and participation

Value to customer for services provided

Reduce/No impact on energy costs for non-participants

Build social license and trust

Consumer Energy Resources: Actions to unlock value streams for consumers

- **Education**: The electricity market is complex, the risk of making a bad decision can leave consumers feeling that doing nothing is the safest thing to do. What is needed is authoritative information from sources that customers trust. Information that addresses the questions customers may have about managing their electricity bills without undue or ineffective capital expenditure, having to undertake changes in their lifestyle that outweigh the saving they produce on their bill. Education that meets these criteria can assist customers in cutting through the complexity of the electricity market and the technologies available in the market
- **Targets**: Targets set as part of government policy can provide a strong signal to consumers and the CER industry that the take-up and use of CER is an important part of achieving the country's decarbonisation goal
- **Incentives**: Energy efficiency, demand management and CER technologies all cost money – in fact, some have quite high upfront costs that may result in consumers not being able to afford to make a technology investment decision that would be in their medium to long term interests. Incentives must ensure the total cost of an incentive is not larger than the savings it creates in the electricity grid. Further, creating the right market arrangements can result in actions from other parties that serve to enhance the incentives. For example, ensuring that price signals exist in the market can provide a value proposition that can be used by CER product or service providers. Access to the wholesale market prices signals and network price signals for voltage management or peak demand congestion reduction – while potentially very difficult for individual consumers to respond to – can allow CER aggregators to monetise the likely future value of CER flexibility and offer attractive arrangements such as monthly or seasonal cash payments to consumers with controllable CER
- **Consumer protection**: Consumer protection plays an important role in facilitating the adoption of new technologies. Measures such as model contracts, product performance standards, certification of products and installers and warranties all play important roles in reducing the risk a consumer may face in purchasing CER. The speed at which consumer complaints are resolved is also an important factor. As well as mitigating the impact of any problems for customers, strong consumer protection also serves as a demonstration of the maturity and security of the market to potential customers.

Consumer Energy Resources: Actions to unlock value streams for consumers

- **Unlocking and maximising network capacity**: What is needed are mechanisms whereby the value that CER can provide to the local network can be recognised, acted upon and rewarded in accordance with the value provided. This will require initiatives in areas that are disparate yet complementary in their impact as:
    - Providing more easily accessed and more easily used information on where the network has capacity to accommodate additional CER and where the ability to control CER's export and import of electricity can reduce the network's costs
    - Creating pricing arrangements and price signals that CER users can access that will reflect the impact of the use of their CER systems in ways that reduce or increase the costs the local network will incur in its current operation or in meeting customer energy requirements in the future
    - Setting technical standards regarding the functionality and performance of CER systems that reduce the potential for CER systems to cause problems in the electricity supply system but without reducing their ability to help reduce the customer's energy bill
    - Developing market mechanisms that will reduce the need for and guard rails that will strictly define and limit the conditions under which the output of CER can be curtailed by the local electricity distribution business. Most fundamentally this will only be allowed when all available market mechanisms have been exhausted and the alternative to that curtailment is a major disruption to electricity supply in and beyond the local area
    - Clear communication of all these measures to ensure customers and their agents understand:
        - The potential value to be derived from the use of CER to reduce costs in the local network as well as the benefits the customer can derive from these actions
        - The conditions under which the output of their CER systems can be curtailed and the likely frequency and durations of these conditions in the local area and the loss of CER production that would result