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Anna Collyer
Chair
Energy Security Board

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Dear Ms Collyer

Capacity mechanism – Project Initiation Paper

Origin Energy Limited (Origin) welcomes the opportunity to provide comments on the Energy Security Board's (ESB) Capacity mechanism Project Initiation Paper.

As the energy market evolves consideration of a capacity mechanism is an important policy initiative. If well designed, a capacity market can play a significant role in helping to manage the energy transition by complementing the existing reliability settings and enhancing new investment signals. It would also provide a more streamlined approach for supporting jurisdictional reliability objectives, minimising the risk of more ad-hoc interventions. The ESB's approach in seeking to clarify the scheme objectives and invite comments on possible core design options will help guide the detailed work to come, and better enable stakeholders to assess the merits of the reform.

Origin supports the intent to design a mechanism aimed at delivering timely entry of new dispatchable resources needed to complement growth in variable renewable energy (VRE) and to maintain reliability. This is important given the prospects of investors facing increasing uncertainty around future revenue potential for long-lived capital intensive dispatchable resources such as long duration storage.

While we agree avoiding the adverse impacts of premature generator exit should be a policy priority. It is unclear that a capacity market can be an effective or efficient means of *facilitating* orderly exit. Taken too far, such efforts could extend the life of ageing plant for longer than *necessary*, weakening new investment signals and potentially undermining jurisdictional emissions reduction objectives, the avoidance of which is a core design principle.

A capacity mechanism that incentivises timely new investment alongside the closure notification mechanism is therefore key to minimising any potential shortages in supply or essential system services (ESS) that could arise due to plant closure. Such a scheme would *complement* rather than *facilitate* orderly exit which is an important distinction, and a more sensible ambition. Additionally, ensuring existing generators are adequately compensated for all the services they provide will support their ongoing financial viability, noting work to value ESS is well progressed in this respect. Alternative options for supporting existing capacity if required to manage disorderly closure risk should also be considered, including a strategic reserve (that was proposed by jurisdictions) and operating reserves, which is yet to be fully defined.

A fundamental design choice is also whether the capacity mechanism is centralised or decentralised. It is important to acknowledge that both frameworks entrench a higher level of central decision making compared to the status quo. As a result, both approaches shift the risks of any poor central decision making (e.g. overly conservative reliability targets) to consumers, with the expectation that this is outweighed by preventing the negative impacts if the desired reliability objectives are not met.

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A centralised approach is preferable in that it strikes a more appropriate balance between risk to consumers and certainty of achieving the desired reliability outcomes. This is principally because such frameworks provide greater certainty around the level and timing of replacement capacity, as they can be designed to allocate longer-term contracts needed to support investment in new resources. In contrast, the same factors that make investment in marginal dispatchable resources challenging currently are likely to persist under a decentralised, variable (and potentially volatile) capacity certificate scheme. A centralised mechanism would also better enable jurisdictions to choose their level of participation, whereby a jurisdiction could opt to not hold capacity auctions if they deem them unnecessary to support reliability objectives.

If you wish to discuss any aspect of this submission further, please contact Shaun Cole at shaun.cole@originenergy.com.au or on 03 8665 7366.

Yours Sincerely,

Steve Reid
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Executive summary

Defining the overarching objective

- The need for, and options to incentivise timely investment through a capacity mechanism are relatively clear. However, designing a mechanism to also facilitate orderly exit is inherently challenging and may extend the life of the ageing thermal fleet longer than *necessary*, further weakening investment signals and potentially undermining jurisdictional emissions reduction objectives.
- Given the above risks, the overarching design objective and associated jurisdictional principles would likely be best achieved by establishing a capacity mechanism that provides strong signals for timely entry, *complemented* by a robust notice of closure mechanism.
- The simplest design choice that could be adopted to achieve this would be to limit participation in the capacity mechanism to new resources.
- If required, consideration should be given to the various options that could be used to value existing capacity that may be needed to support reliability, including a strategic reserve and operating reserves. A capacity mechanism is unlikely to be best suited for this purpose, and if contemplated it would be crucial to differentiate between new and existing capacity to maintain strong signals for new entrants.

High level design approach

- Under both centralised and decentralised frameworks, under / over-procurement risk is partially shifted to consumers and ultimately dependent on centrally determined parameters such as reliability targets.
- A centralised approach is preferable, as it strikes a better balance between risk to consumers and certainty of achieving desired reliability outcomes.
- A decentralised approach to forecasting is unlikely to provide a more efficient allocation of risk, given individual retailers face uncertainty around forecast retail load over longer time horizons. It would also increase reliance on retailers to achieve reliability outcomes, noting the current framework appropriately relies on a centralised view of aggregate system demand to assess resource adequacy.
- Centralised procurement frameworks provide a more direct, transparent and certain means of facilitating timely investment, given they can be designed to allocate longer-term contracts that are necessary to support investment in new resources, directly addressing the core objective.
- In contrast, a decentralised mechanism is unlikely to materially improve longer term investment signals or provide governments with sufficient certainty around the outlook for resource adequacy relative to the existing energy only market. There is also a risk that volatility in certificate prices could heighten investor uncertainty.

Core design areas

- *Defining capacity*: Capacity payments should be linked to the provision of capacity during the annual peak demand period (and any associated trading intervals) as reported in AEMO's Electricity Statement of Opportunities (ESOO).
- *Certificate trading and procurement methods*: Under a centralised mechanism, an auction process that is triggered by a forecast reliability gap would provide an efficient approach to procuring capacity. To ensure strong signals for timely new entry under a market-wide framework, longer-term contracts should be made available to new resources (e.g. in the order of 7 years) and shorter duration contracts to existing participants (e.g. one year).
- *Market power mitigation*: It is not clear there are any market power issues that would need to be addressed. To the extent there are concerns, these appear to mostly relate to the decentralised design options proposed and can be avoided under a centralised framework.
- *Incentives and compliance*: A centralised framework simplifies demand side compliance, given it does not rely on strong incentives/penalties and a robust assessment process to facilitate capacity procurement. On the supply-side, a robust penalty framework for non-delivery would be required to ensure capacity procured through the mechanism is built and made available.

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1. The objective of a capacity mechanism

[1] The overarching objective as outlined by Energy Ministers is to '*develop the design for a capacity mechanism that ensures investment in an efficient mix of variable and firm capacity that meets reliability at the lowest cost*.'[1] The ESB states in the Initiation Paper that this can best be achieved by a mechanism that enables timely entry of new resources while also facilitating / complementing the orderly retirement of ageing thermal generation.

[2] While the need for, and the options to incentivise timely new investment are relatively clear, designing a scheme that can also effectively facilitate orderly exit is less obvious and requires careful thought. Taken too far, efforts aimed at prolonging the life of existing plant can dissuade new entry. The ESB will therefore need be mindful of the inherent tension between both core objectives and ensure any associated risks are mitigated by the scheme design. We discuss these issues in greater detail below.

1.1 Investment in new flexible dispatchable resources is required to support increased VRE penetration

[3] AEMO estimates over 60 GW of dispatchable firming capacity will be required by 2050, which includes approximately 45 GW of storage and 9 GW of gas-fired generation.[2] The need for flexible dispatchable resources is principally to overcome the timing mismatch between VRE output and demand. VRE is generally not well correlated with demand and patterns of generation can vary significantly both on a seasonal basis and over shorter time periods.[3] Interconnection also does not provide a one-for-one substitute for dispatchable resources. While interconnectors can assist with energy sharing, there is still a risk of coincident shortfalls in VRE across different regions.[4]

[4] A mix of flexible dispatchable resources that allows for rebalancing of renewables across multiple timeframes will be required to facilitate the least cost transition. This is likely to include utility-scale batteries, hydro storage, gas-fired generation, smart behind-the-meter batteries or virtual power stations (VPPs) and potentially vehicle to grid (V2G) services from electric vehicles (EVs).[5] AEMO notes the most pressing need over the next decade is for investment in long duration storage (of up to eight hours depth) to manage daily variations in the fast-growing solar and wind output.[6]

1.2 Market signals for new dispatchable resources may not be sufficient to ensure the level of investment needed to satisfy government expectations of reliability

[5] The NEM has a strong track record in facilitating reliable supply, with new generator entry historically following periods of elevated prices. Notwithstanding this, the economics of investing in long-lived capital intensive dispatchable resources has been challenging, particularly for marginal plant that is reliant on a small number of periods per year when capacity is scarce to recover fixed costs. Prospective investors in flexible dispatchable resources now face an even greater level of uncertainty around future revenue potential, largely due to the below factors.

- *Changing market dynamics will increase uncertainty*: VRE directly impacts market dynamics, with increased output driving a greater prevalence of negative spot prices across some NEM regions. In South Australia where renewables penetration is already around 50 per cent, spot

[1] ESB, 'Capacity mechanism – Project initiation paper', December 2021, pg. 3.
[2] AEMO, 'Draft 2022 Integrated System Plan', December 2021, pg. 46.
[3] Oxford Institute for Energy Studies, "Electricity Sector Transition in the National Electricity Market of Australia: Managing Reliability and Security in an Energy-only Market", November 2018, pg. 16.
[4] Ibid.
[5] AEMO, 'Draft 2022 Integrated System Plan', December 2021, pg. 46.
[6] Ibid.

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prices were negative 28 per cent of the time during Q4 2021, surpassing the previous quarterly high of 23 per cent.[7] Given the expected growth in VRE, it will likely become increasingly difficult for dispatchable resources to predict the duration and frequency of higher prices, which is crucial to the recovery of fixed costs and the overall investment case.

- *Outlook for NEM operating demand*: The rapid uptake of distributed solar PV continues to reduce minimum operational demand across the NEM, with solar PV accounting for 40 per cent of underlying demand on Sunday 17 October 2021 at 1pm.[8] SA operational demand in the middle of the day is also projected to potentially reach zero by late 2022.[9] Coupled with ongoing energy efficiency improvements and uncertainty around the longevity of major industrial loads (some of which are dependent on government subsidy), the future level of operating demand to be served by the centralised system is unclear. This dampens the business case for centralised dispatchable resources despite them being critical to reliability.

- *Investment in government sponsored projects*: Substantial investment in interconnection and other major projects (e.g. Snowy 2.0 and 'Battery of the Nation') are being progressed/considered. While increased interconnection is vital in managing a system with greater levels of VRE, it can also dissuade investment in dispatchable plant with an interconnector essentially serving as a competitor to native generation within NEM regions.

[6] The above factors are particularly crucial in the context of long duration storage such as pumped hydro. These facilities face significant capital costs and highly uncertain revenue streams, with their viability principally dependent on market volatility and arbitrage opportunities. In the absence of a suitable capacity mechanism, the entry of these (and other dispatchable resources) will likely continue to be driven by a combination of jurisdictional initiatives and Commonwealth interventions.

1.3 Facilitating or complementing the 'orderly exit' of ageing thermal generation

[7] In seeking to address this objective it is important to determine what would constitute 'orderly exit'. In our view this is most effectively achieved by focusing on the desired policy outcomes. Essentially the goal should be the avoidance of premature plant closure that results in adverse impacts such as prolonged periods of extreme price shocks; and / or the shortage of ESS and supply (including capacity). These circumstances could arise in the absence of timely new entry to replace exiting generation and if existing plant are forced to retire due to financial distress, despite being required for system security and reliability. This could notionally occur in circumstances where services are not adequately defined and / or valued.

<u>Appropriate valuation of security and reliability services is critical in supporting orderly exit</u>

[8] It is widely agreed there is a need to value ESS in the NEM that have historically been provided for free as by-product of energy generation from synchronous plant. Good progress is being made in this respect, though work is ongoing to define the required services and how they should be valued/procured.

[9] While valuation of ESS will go some way to reducing the risk of premature closure, it is conceivable the NEM may also undervalue the provision of capacity, which could lead to disorderly closure of ageing thermal plant that derive less revenue from energy provision over time. The circumstances underpinning the development of Spain's capacity mechanism are

[7] AEMO,' Quarterly Energy Dynamics Q4 2021', January 2022, pg. 16.
[8] Ibid, pg. 8.
[9] AEMO, "Minimum operational demand thresholds in South Australia", May 2020, pg.18.

relevant in this respect. The mechanism is ultimately intended to facilitate Spain's transition toward a decarbonised power market. However, it is also considered necessary to support around 26 GW of combined cycle gas turbine (CCGT) plant that have struggled to cover fixed costs over the last 3-5 years due to chronic oversupply, but are considered necessary to balance renewables and meet peak-net load in the near term.[10]

[10] If the ESB determines existing plant is not being adequately remunerated for provision of capacity in line with the resource adequacy needs of the system, it would prove challenging to address this through a capacity mechanism, as discussed below. There is also a range of key design choices that would need to be considered that allow for differentiation between new and existing capacity. These include the allocation of longer-term contracts for new capacity and separate auctions with specific targets for new and existing resources.

[11] The merits of seeking to facilitate orderly exit through a capacity mechanism should therefore be weighed against alternate options for valuing existing capacity that may be required to support reliability of supply and/or manage disorderly closure risk. Some of these options include:

- bilateral engagement between governments and individual plant operators where necessary to support a demonstrated reliability/security need arising from the closure of a large thermal plant;
- development of a strategic reserve that could be used to reserve capacity that may be required in the system during high-risk periods; and
- development of operating reserves – while yet to be fully defined, there may be a role for an operating reserve in supporting reliability of supply in operational timeframes by more explicitly valuing the provision of capacity.

Seeking to facilitate orderly exit through a capacity mechanism is challenging

[12] There are inherent trade-offs associated with seeking to facilitate orderly exit through the provision of capacity payments. Disorderly exit of large thermal plant may be driven by unexpected and material changes in market conditions and/or capital expenditure requirements that are unlikely to be overcome by access to capacity payments. In this circumstance, a market-wide capacity mechanism could give rise to windfall gains for existing generators that were likely to be operating regardless of the additional revenue stream with no material change in the timing of plant exit. There may also be no associated improvement in the availability of those facilities prior to closure. This is because the existing wholesale market framework provides strong signals for plant to make capacity available (to access high prices or defend financial contracts) during the high demand 'at risk' periods that would be covered by the mechanism.

[13] There is also a risk that capacity payments could overcompensate existing participants and potentially extend the life of the ageing thermal fleet longer than *necessary*. This could weaken signals for timely investment in flexible dispatchable resources required to support the changing needs of the system. Extending the operating life of more emissions intensive plant may also conflict with one of the ESB's key assessment criteria, which is that the mechanism must be compatible with the emissions reduction targets set out by state and federal governments.

[14] These issues are evident in the context of the UK capacity market, where the entire nuclear fleet received £153 million in 2018-19, and £136 million in 2019-20 just for being online, as they likely

[10] Timera Energy, '5 factors that will drive Spanish capacity pricing', webpage, viewed 3 February 2022.

would have been anyway.[11] In the first T-4 auction, close to a third of existing plant also did not place an exit bid (i.e. a price beneath which they would not be able to offer the capacity and so would drop out of the auction), indicating they were indifferent to the outcome.[12] The mechanism has also seemingly failed to adequately account for externalities such as emissions and flexibility, given it has heavily incentivised the proliferation of new diesel generators and resulted in substantial payments to coal plant.[13]

[15] To address these concerns UK policy makers are considering moving away from the current single 'pay as clear' auction format. Options under review include a split format, where existing capacity and new / refurbished capacity is procured through separate auctions with individual procurement targets assigned to each; and a single auction with multiple clearing prices for different types of capacity (i.e. new build vs. existing, or low carbon vs. higher carbon).[14]

[16] The Initiation Paper also suggests a capacity mechanism in its own right would improve the level of information available to the market about the imminent exit of generation. Given the existing notice of closure framework already requires generators to provide AEMO (and by extension the market) with notice of its closure date (and any revisions to that date), it is unclear how a capacity mechanism would provide any additional insights.

<u>Timely new investment and a robust closure notification framework is key to managing plant retirement</u>

[17] Given the above factors, the overarching design objective and associated jurisdictional principles would likely be best achieved by establishing a capacity mechanism that provides strong signals for timely entry, complemented by a robust notice of closure mechanism. In this context, orderly exit could be regarded as retiring plant satisfying the 42-month notice of closure requirement and not seeking an exemption to close early. This includes circumstances where a generator brings forward a previously announced closure date, but still satisfies the 42-month notice requirement. Orderly exit occurs so long as there is sufficient time for a market response and there are strong signals for new resources to enter the market.

[18] The simplest design choice that could be adopted to facilitate timely entry and complement orderly exit would be to limit participation in the capacity mechanism to new build. Under this approach, longer term capacity contracts (e.g. spanning 7-15 years in duration) could be allocated to new firm dispatchable resources through a competitive auction process in advance of an identified reliability shortfall. Such a framework would provide the revenue certainty needed to justify timely investment in long lived assets as ageing thermal resources progressively retire and ensure there is no duplication of costs to secure reliability, therefore minimising overall costs for consumers.

[19] A potential trade-off associated with limiting access to new plant is that it would introduce an additional revenue stream for new capacity providers that is not available to incumbents. In Origin's view, the volume and type of capacity that would be delivered through such an approach is unlikely to materially impact bid stack dynamics. Flexible dispatchable resources are likely to remain the marginal plant in the NEM and sit at the top of the bid stack. The risk of the mechanism accelerating the closure of ageing thermal plant that generally sit lower down the bid stack is therefore likely to be limited. These risks could also be managed by ensuring the duration of

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[11] Institute for Public Policy research, "Incapacitated – why the capacity market for electricity generation is not working, and how to reform it", March 2016, pg. 3.
[12] Ibid.
[13] Ibid.
[14] Department for Business, Energy & Industrial Strategy, 'Capacity Market: Improving delivery assurance and early action to align with net zero – Call for Evidence', July 2021, pg. 33-37.

contracts available to new entrants are no longer than required to support new entry, after which plant become fully reliant on the energy-only market for revenue.

[20] The above approach should ultimately ensure the market has visibility of expected closure timeframes and signals for investment are sufficient to support timely entry. To the extent there is any residual risk of disorderly closure, this could likely be effectively managed through the alternate approaches identified above, including strategic reserves, bilateral engagement with jurisdictions and potentially operating reserves.

2. High-level design approach

[21] A fundamental design choice is whether the capacity mechanism is centralised or decentralised. In considering this, it is important to acknowledge that both options entrench a higher level of central decision making compared to the status quo. As a result, both approaches shift the risks of any poor central decision making (e.g. overly conservative reliability targets) to consumers.

[22] A primary rationale for considering a capacity mechanism is to provide governments and policy makers with greater certainty around the future level of resource adequacy. While this changes the risk allocation for consumers, the expectation is this is outweighed by avoiding the adverse impacts that could arise if the desired level of reliability is not achieved. As discussed below, a centralised approach is preferable in that it strikes a more appropriate balance between risk to consumers and certainty of achieving the desired reliability outcomes.

2.1 A centralised approach to forecasting is key to supporting the reform objective

[23] Origin does not consider a decentralised approach to forecasting would provide for a more efficient allocation of risk. Under both approaches under/over-procurement risk is partially shifted to consumers (albeit through retailers in the context of a decentralised framework). The level of risk allocated to consumers will also ultimately be linked to the target level of reliability established by governments/policy makers, and other centrally determined parameters such as procurement time frames; eligibility; and penalty provisions.

[24] Retailers also do not have perfect foresight with respect to forecasting future demand, particularly given uncertainty around the nature and timing of contracting with commercial and industrial (C&I) customers. As previously noted by the ESB, customers are generally unwilling to enter into contracts with durations beyond around two years. A retailer's C&I load is therefore highly variable, with customers churning regularly. In this circumstance it is likely the market operator would have a better view of aggregate system demand against which resource adequacy should be assessed. This was acknowledged by FTI Consulting, who noted that '*In principle, if retailers are in aggregate better at assessing and managing risk, devolving the procurement to retailers rather than the [system operator] SO improves efficiency… However, the SO will have more information on the system needs in aggregate.*'[15] It is also consistent with the existing approach to assessing and managing resource adequacy, noting intervention mechanisms such as the Reliability and Emergency Reserve Trader (RERT) are triggered based on AEMO's centralised view of forecast supply/demand requirements.

[25] As discussed above, the notice of closure framework, coupled with the propensity for plant operators to engage with AEMO and jurisdictions ahead of any plant closure, should also ensure

[15] FTI Consulting, *'Resource Adequacy Mechanisms in the National Electricity Market'*, 16 July 2020, pg. 116.

there is adequate visibility around the outlook for thermal plant closure. This would further reduce any potential efficiency gains associated with decentralised forecasting.

2.2 Centralised procurement frameworks provide a more direct, transparent and certain means of facilitating timely investment

[26] As noted by the ESB, a centralised capacity mechanism would provide AEMO and jurisdictions with the greatest level of assurance that reliability will be adequate over a forward period.[16] This is largely because centralised frameworks provide greater certainty around the level and timing of replacement capacity, as they can be designed to allocate longer-term contracts that are necessary to support investment in new resources, directly addressing the core objective. This design aspect is reflected across most centralised capacity market frameworks internationally, with ISO-NE, Ireland and the UK providing 7-, 10- and 15-year contracts respectively for new build. A centralised mechanism could also be designed to satisfy the specific reliability and technology preferences of a given jurisdiction, particularly where the mechanisms limited to new investment only. It would effectively allow jurisdictions to choose their level of participation, which would include opting to not hold capacity auctions if a jurisdiction deems them unnecessary to support reliability objectives.

[27] In contrast, a decentralised approach to procurement would provide a relatively indirect (and consequently uncertain) means of facilitating new investment. Decentralised procurement relies on incentivising retailers/customers to procure physical capacity certificates sufficient to cover some target level of demand (e.g. a proportion of a centrally determined demand target or actual retail load). The scarcity value of certificates is then expected to support new investment by driving those parties to enter longer-term arrangements for certificate procurement.

[28] This is largely analogous to the existing NEM framework, where spot price exposure incentivises retailers to enter into forward contracts to manage their risk. This notionally then provides the revenue certainty required to support new investment and ensure generation capacity is available when required. The same factors that make investment in marginal dispatchable plant challenging in a transitioning market are therefore likely to persist under a decentralised framework. In particular, a retailer's willingness to enter into longer-term capacity contracts to support investment will be weakened by uncertainty around forecast retail load and the value of capacity, as discussed below.

- *Uncertainty of future retail load*: The level of a retailer's procurement liability in future years will be dependent on factors such as the uncertain nature and timing of its contracting with C&I customers. There is also significant uncertainty around the longevity of major industrial loads and the outlook for grid demand more broadly.

- *Uncertain capacity value*: A physical trading requirement would rely on signalling scarcity through the value of defined certificates. Comparisons have been made to the Large-scale Renewable Energy Target (LRET) in this respect. However, it is important to note the success of the LRET was primarily due to the mechanism providing a clear and firm long-term target for new investment, in an environment of declining renewables costs. In contrast, under a decentralised capacity framework, the forward capacity target would vary annually, and there is only likely to be value in reliability certificates during years where the supply/demand balance is forecast to be tight, with the price of certificates expected to reduce when new entry occurs.

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[16] ESB, 'Capacity mechanism – Project initiation paper', December 2021, pg. 20.

Examples of market participants paying a shortfall charge under the LRET also highlights the risk that willingness to enter into long-term arrangements to procure certificates (and therefore underwrite investment) are likely to be weak if there is an expectation certificate prices will be lower in future periods. A merchant investor looking to capture the scarcity value of certificates (should that signal arise) would also not have the requisite revenue certainty to support new investment.

[29] Given the above factors, it is unlikely a decentralised mechanism would materially improve longer term investment signals or provide governments with sufficient certainty around the outlook for resource adequacy relative to the existing energy only market. The ability for retailers to efficiently manage the cost of capacity certificates would also likely be materially reduced in circumstances where there is no opportunity for inter-regional trade (i.e. due to some regions opting out of the mechanism) and/or the level of local generation capacity within a region is limited. This could ultimately lead to increased price uncertainty and higher costs for consumers.

International experience highlights the challenge of driving investment under decentralised frameworks

[30] The challenges associated with facilitating new investment under decentralised frameworks are also evident across the decentralised and hybrid international markets referenced by ESB, as outlined in Table 1 below.

Table 1: Decentralised capacity markets – recent observations from international markets

Market	Key observations
France	▪ A lack of long-term price signals for new investment was highlighted by the European Commission in its initial assessment of the French capacity market framework when proposed.[17] In particular, the Commission noted '*long-term investments by new entrants may require some degree of price predictability over a certain number of years, which one-year certificates are unlikely to provide*.'[18] As a result, the final design of the French market was augmented to include a mechanism for allocating seven-year contracts to new entrants with a view to supporting financing of those projects.[19] In the Commissions view, this length of contract offers satisfactory security for long-term investments, on the one hand, while preventing the risk of technology 'lock in' that could be brought about by longer contacts.[20] ▪ Concerns around the boom/bust dynamic of certificate pricing that predicated the need for a centralised contracting approach for new plant have also come to fruition, with auction prices reducing from €18,000/MW in December 2018 to €0/MW in May 2019, in part due to low demand from liable entities and additional supply being made available on interconnectors.[21]
California Independent System Operator (CAISO)	▪ The California Public Utilities Commission (CPUC) undertook a review of its decentralised resource adequacy framework in 2019/20 and determined that: - there is value in having multi-year contracts to ensure resources needed for reliability are procured in an orderly fashion;[22] and - a central procurement system, at least for some parts of the local resource adequacy requirement, was most likely to provide cost efficiency, market certainty, reliability, administrative efficiency, and customer protection.'[23] ▪ A hybrid framework was ultimately adopted that allows a central buyer (the distributor) to procure resource adequacy needs over a three year forward period within the Pacific Gas

[17] European Commission, 'Commission Decision on State Aid Scheme – SA.39621 2015/C (ex 2015/NN)', 8 November 2016.
[18] Ibid, pg. 14.
[19] Ibid, pg. 36.
[20] Ibid, pg. 41.
[21] Montel, 'French energy regulator mulls capacity market reform', 25 September 2019, online article, accessed 7 June 2021.
[22] CPUC, 'Decision refining the resource adequacy program – Proposed Decision', 21 February 2019, pg. 16.
[23] Ibid, pg. 6.

	and Electric Company (PG&E) and Southern California Edison (SCE) distribution areas.[24] The CPUC stopped short of recommending a fully centralised market framework, in large part due to concerns that if CAISO were to serve as the central procure, such an approach would open California's capacity market and environmental goals to federal oversight.[25]
PJM	▪ As noted by the ESB, PJM operate a capacity market whereby demand is centrally forecast and procured through a central auction. However, load serving entities (LSEs) have the option to opt-out of the mechanism under the Fixed Resource Requirement (FRR) and meet their own capacity obligation through separate arrangements (e.g. physical generation and contracting). The FRR option has been in place since 2007 and reportedly only been adopted by two large utilities, Duke Energy and AEP. This is seemingly due to the FRR being a five-year commitment for LSEs that choose that path, and potentially a high-cost option relative to paying a proportion of PJMs capacity charge.[26]

2.3 Regulatory burden would be heightened under a decentralised framework

[31] There will be a greater cost and compliance burden associated with a decentralised procurement framework, given the need to establish additional obligations on the demand-side to ensure the appropriate level of load is covered. As noted in the Initiation Paper, the decentralised options proposed would need to be supported by penalty frameworks to incentivise capacity procurement by retailers/customers and assessment processes to test compliance (whether ex-ante, or ex-post). This compares with a centralised approach, where AEMO could procure the required level of capacity through an auction process and retailers would simply be allocated a proportionate share of the cost under a new fee.

[32] The ESB notes a decentralised framework may also necessitate some form of mechanism to support the trading of capacity certificates. Where measures are considered that would require existing resources to supply capacity to support liquidity, this would further increase the level of regulatory burden for the supply-side. It could also create additional costs/risks for market participants in the event: vertically integrated suppliers are unable to use capacity certificates to meet their own liability; or the ability of resources to manage unplanned outages and maintenance risk is not adequately accounted for when setting the level of the requirement.

Table 2: Summary assessment – high-level design options

Principles	Decentralised (Options 1a and 1b)	Centralised (Option 2)
Achieving the optimal level of reliability	▪ Incentives for retailers to underwrite new investment to support a proportion of maximum demand are likely to remain weak, given uncertainty around C&I customer demand and the broader outlook for NEM demand. **[×]** ▪ An inability to secure physical supply may impede retailers' ability to compete for C&I customers. **[×]** ▪ An investor looking to capture the scarcity value of contracts backed by physical generation capacity (should that signal	▪ The mechanism could be designed to directly support the investment needs of the NEM through the provision of longer-term contracts to new flexible dispatchable resources. **[✓]** ▪ Procurement volumes would be transparently set and aligned with government/consumer expectations for reliability. **[✓]** ▪ Central procurement approach would support merchant generator investments and facilitate further competition with incumbent generators. **[✓]**

[24] CPUC, 'CPUC adopts central procurement framework for local resource adequacy', press release, 17 September 2020, pg. 1.
[25] John, St Jeff., Wood Mackenzie (formerly Greentech Media), 'California's Complicated Path to Changing Its Resource Adequacy Rules', online article, 4 March 2019.
[26] John, St Jeff., Wood Mackenzie (formerly Greentech Media), 'How FERC's New Ruling Is Upending the Country's Biggest Capacity Market, online article, 3 July 2018.

	arise) would still have no long-term revenue certainty to support new investment. [×]	
Appropriate allocation of risk	▪ Some under / over-procurement risk transferred to retailers / consumers. Risks / costs would depend on centrally determined targets and obligations. [?]	▪ Some under / over-procurement risk transferred to retailers / consumers. Risks / costs would depend on centrally determined targets and obligations. [?]
Technology neutrality	▪ To the extent the mechanism does not improve long term investment signals, incentives to invest in technologies that best support the needs of the NEM are likely to be reduced. [×]	▪ The mechanism could be designed to directly incentivise investment in resources necessary to complement increased VRE penetration, accounting for any relevant externalities such as emissions and dispatchability. [✓]
Minimise regulatory burden	▪ Regulatory intervention would be required to set key parameters, including procurement targets / obligations; procurement time frames; eligibility; and penalty provisions. [?] ▪ Additional regulatory burden associated with establishing demand-side obligations to drive capacity certificate procurement, and potentially supply-side liquidity obligations. [×] ▪ Risk of ongoing intervention is high, given governments would be reliant on market settings and obligations on retailers facilitating (but not guaranteeing) the required level of investment. [×]	▪ Regulatory intervention would be required to set key parameters, including procurement targets / obligations; procurement time frames; eligibility; and penalty provisions. [?] ▪ Investor sentiment would be strengthened by the transparent and uniform framework for delivering resource capacity in line with government expectations, reducing the risk of ongoing interventions. [✓]
Emissions reduction	▪ To the extent the mechanism does not improve long term investment signals and indirectly extends the life of ageing thermal plant, it may not be compatible with emissions reduction targets set out by state governments. [?]	▪ As noted above with respect to technology neutrality, the mechanism could be designed to directly incentivise investment in resources necessary to complement increased VRE penetration, accounting for any relevant externalities such as emissions reduction targets. [✓]

3. Core design areas

[33] Origin's initial views on the core design areas identified in the Initiation Paper are provided below. As noted by the ESB, many of these areas involve complex decisions that will require more detailed consideration as the capacity mechanism design process progresses.

3.1 Defining capacity

Capacity payments should be linked to the provision of capacity during 'at risk' peak demand periods

[34] An 'at risk' period should represent the annual peak demand period (and any associated trading intervals) as reported in AEMO's ESOO. Consistent with the ESOO, this would likely represent early evening trading intervals in Q1 for the mainland NEM regions. If the peak demand period changes over time, this could be reflected in a revised definition of the capacity product in future procurement periods as required.

[35] Greater penetration of VRE will introduce additional weather-related uncertainties in the system that could test resource adequacy outside of the historical high-demand periods (e.g. due to wind and solar resources being unavailable). However, we do not agree there is a need to account for

these types of scenarios through the capacity product definition. Where the capacity market framework is designed to broadly complement the existing energy only market framework and its strong operational signals, this should facilitate investment in the right mix of dispatchable technologies that can address those risks.

A forward-looking approach to derating variable capacity would be appropriate

[36] A robust methodology would need to be established to determine the firmness of a resource's output during 'at risk' periods and by extension, the amount of capacity it could technically supply into the capacity market. While this may be relatively straight forward in the context of dispatchable thermal plant, determining the firmness of variable resources is inherently more challenging given uncertainty around resource availability.

[37] Origin is broadly supportive of applying a forward-looking approach to derating wind and solar capacity that accounts for the impact of different future generation mixes on the timing of at-risk periods. This is preferable to relying on historical data, which could underestimate the potential contribution of wind / solar facilities to supply as the level of VRE penetration increases and by extension, heighten the risk of over-procurement. The ESB should draw on experience from other international markets such as the UK and PJM to consider how a forward-looking approach could be applied.

[38] Consistent with the above, a simulation-based approach to derating battery storage capacity would likely provide for a more accurate representation of the contribution of those types of facilities to peak demand.

3.2 Forecasting methodology and determination of capacity certificate demand

[39] As discussed in Section 2 above, Origin considers a centralised approach to forecasting demand and procuring capacity would best support the overarching objective, given the approach is more conducive to facilitating timely investment and has a lower level of regulatory burden. A centralised approach is also likely to provide AEMO and jurisdictions the greatest confidence that reliability is ensured; and greater price certainty for market participants and consumers over time, minimising the price shocks that can be associated with large plant exit.

3.3 Certificate trading and procurement methods

A capacity auction would best support a centralised approach to procurement

[40] Under a centralised capacity mechanism, an auction process would provide the most efficient and competitive approach to procuring capacity. However, there are some key design choices that would need to be considered to maintain strong signals for timely entry and minimise potential costs/risks for consumers under a market-wide framework, as noted below.

- *Duration of capacity contracts*: The duration of contracts allocated through the auction must provide prospective investors with the certainty required to support new build. As previously noted, many key markets make longer-term contracts available to new capacity providers, typically in the order of 7 years. Contract durations under the proposed capacity mechanism would likely need to span similar timeframes, noting short-term contracts are unlikely to provide the requisite level of certainty for investors. Providing shorter duration contracts to existing participants (i.e. one year) would be consistent with supporting the orderly closure objective while mitigating the associated risks.

- *Auction format / pricing*: Single auction formats that provide a common clearing price for all eligible participants risk over-paying existing capacity, given those participants can potentially receive the new entrant price regardless of whether they required that level of revenue for service provision. As noted above, the UK is currently assessing the merit of alternate auction formats that provide a clearer differentiation between existing and new capacity with a view to better incentivising investment in new low emissions plant. The ESB should consider the outcomes / learnings of this process to ensure the capacity mechanism design is appropriately targeted.

<u>Establishing a procurement trigger would reduce overall costs for consumers</u>

[41] Consistent with the design of the existing retailer reliability obligation (RRO) mechanism, establishing a procurement trigger in the order of 3-5 years ahead of an identified capacity shortfall would ensure any capacity mechanism only binds during ‘at risk’ periods (in a given region). This would assist with minimising the associated costs for retailers, and by extension consumers, during periods when supply and demand are adequately balanced.

[42] A triggered approach is also well aligned with the principle that the capacity mechanism should complement the existing market framework, given market participants would be reliant on spot market signals to ensure resource adequacy during non-binding periods. Where market signals are sufficient to support investment, the mechanism would not need to be triggered.

3.4 Transmission constraints

<u>Derating generation / interconnector capacity would provide a simple and direct approach to accounting for transmission constraints</u>

[43] Transmission constraints (including for interconnectors) would need to be appropriately accounted for to ensure available supply during ‘at risk’ periods is not overestimated. This is consistent with AEMO’s current approach to forecasting reliability during at risk periods, which considers network capability.

[44] While the complexity of different approaches will likely need to be considered in further detail, we consider the most effective approach to accounting for transmission constraints would be to derate generation and interconnector capacity on a prorated basis to reflect the impact of any likely constraints during at risk periods. Given the level of network planning undertaken by AEMO, it should be possible to transparently report information on the risk of constraints in given locations as the network evolves. Derating generation and/or interconnector capacity on a prorated basis would then ensure developers bear the congestion risk associated with their investment decisions.

<u>The contribution of interconnectors to supply within a given region will need to be accounted for</u>

[45] Origin agrees consideration would need to be given to the treatment of interconnection under any design approach, particularly given that in some NEM regions, the level of local firm capacity during ‘at risk’ periods may not be sufficient to cover demand. In the context of operating a centralised auction process, clearing the auction simultaneously across the NEM would also assist with optimising capacity procurement across all regions, accounting for interconnector constraints.

3.5 Market power mitigation

[46] The ESB’s concerns around the potential impact of market power appear to mostly relate to ensuring access to capacity certificates on a competitive basis under a decentralised framework. which again may be an additional complexity associated with that design option. It is important to note the *Competition and Consumer Act* (CCA) prohibits firms with a substantial degree of market

power from engaging in the type of conduct that could limit liquidity in the certificate trading market. As discussed under Section 3.3 above, establishing an exchange would also ensure all retailers are able to access certificates and provide policy makers and regulators with visibility over the level of trading and pricing outcomes.

[47] Origin would be wary of any measures that would compel resources to make capacity available (either through a trading exchange or auction process), at the expense of prudent risk management. This includes circumstances where an integrated entity requires certificates to meet its own demand, or a generator limits the creation of certificates to account for outage risk.

Managing potential impacts on the real-time market

[48] The Initiation Paper notes there may also be a need to recalibrate the existing reliability settings (such as the market price cap) to prevent generators (or demand response providers) being paid '*twice for their capacity'*.[27] This risk can be mitigated by ensuring the capacity mechanism is designed to complement the current framework. It should not result in the need to significantly alter the reliability settings. That is, the capacity market should enable participants to recover any 'missing money'/capacity revenue that is at risk of not being recouped given the NEM's pure energy only design. As discussed above, there is a range of auction design choices that could be considered to achieve this in the event a market-wide capacity framework is adopted, which would be preferable to weakening existing spot market signals.

[49] Consideration should also be given to capping the value of capacity at the level of 'missing money', which is effectively the extent to which capacity providers are unable to recover long run costs. Under a decentralised market framework, the cap could be applied as a shortfall charge for failing to acquire the required volume of certificates, which serves the dual purpose of incentivising compliance and capping the retailer's liability.

3.6 Incentives and compliance

Demand side incentives and compliance would be minimised under a centralised approach

[50] Origin considers a centralised capacity framework greatly simplifies demand side compliance, given it does not rely on strong incentives/penalties and a robust assessment process to facilitate capacity procurement. It also avoids the potential distortions that could arise under decentralised capacity frameworks that require retailers to procure a prescribed volume of certificates in advance of an 'at risk period' (e.g. at T-4 as proposed under Option 1b). Under this scenario, an individual retailer could incur significant procurement costs at T-4 based on its proportionate share of load at the time, even though it's contracted load at T may be significantly reduced due to customer churn.

Supply side incentives and compliance

[51] A robust penalty framework for non-delivery should be established to ensure capacity procured through the mechanism is built and made available as required. This would overcome some of the issues observed internationally where: capacity contracts awarded through an auction have been cancelled prior to the delivery period due to a project failing to obtain financial backing; and/or capacity is not made available during contracted periods due to weak penalty rates.

[27] ESB, 'Capacity mechanism – Project initiation paper', December 2021, pg. 25.