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Chloe Hicks
Director, Energy Infrastructure and Zones
Department of Planning, Industry & Environment
12 Darcy St
Parramatta NSW 2150

Lodged via email: rez@planning.nsw.gov.au

Re Central-West Orana REZ

Dear Chloe,

Neoen welcomes the opportunity to respond to DPIE's consultation regarding access rights for the Central-West Orana Renewable Energy Zone.

About Neoen

Neoen is one of the world's leading independent producers of renewable energy. Neoen is a responsible company with a long-term vision that translates into a strategy seeking strong, sustainable growth. We have approximately 2 GW of projects in Australia that are either in operation, under construction or committed, including: Hornsdale Wind Farm (309 MW in SA); Parkes, Griffith, Dubbo, and Coleambally Solar Farms (combined 255 MW in NSW); Bulgana Green Power Hub (hybrid wind/battery system) and Numurkah Solar Farm (combined 314 MW in VIC); Western Downs Green Power Hub (400MW solar in QLD under construction) and the Degrussa Hybrid Power System (10.6 MW in WA). Neoen is also the owner of Hornsdale Power Reserve (150 MW battery system) in SA and the Victorian Big Battery (300MW battery system) under construction in Victoria.

Maximising value for electricity consumers

The evaluation criteria focus on the developers' benefits and the administrative burden, which is appropriate, but they must also lead to an overarching benefit for the consumer. The goals of the Energy Infrastructure Roadmap already highlight maximising consumer benefit, but it may not be clear to those outside the electricity industry that the evaluation criteria should be read with maximising electricity consumer benefits in mind.

Further, over-optimisation of any one criterion could lead to adverse outcomes at the customer level if, for instance, new generators that could substantially contribute to overall consumer benefits find it too challenging to finance once committed generators are established, or if committed generators gain unreasonable levels of rights that are underwritten by consumers.

REZ optimisation

As identified by the DPIE, the maximisation of customer value depends upon a high level of utilisation of the REZ infrastructure. The lowest cost solution is certain to include a level of curtailment and losses less attractive to generators than the best locations elsewhere in the network. Given the lack of such ideal connections, and the added cost of the REZ, generators will have to anticipate this congestion and plan accordingly. We agree with the approach to somewhat oversubscribe connections to the REZ.

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Neoen expects the optimal outcome is likely to be made up of wind capacity slightly larger than the REZ capacity, with a smaller solar capacity to fill in the gaps. This results in a much higher utilisation than a solar heavy design. We attach a spreadsheet for the department to experiment with various capacities. In general, it is not effective to develop REZs solely for solar generation as solar resource is high quality throughout NSW and solar can connect in other ways.

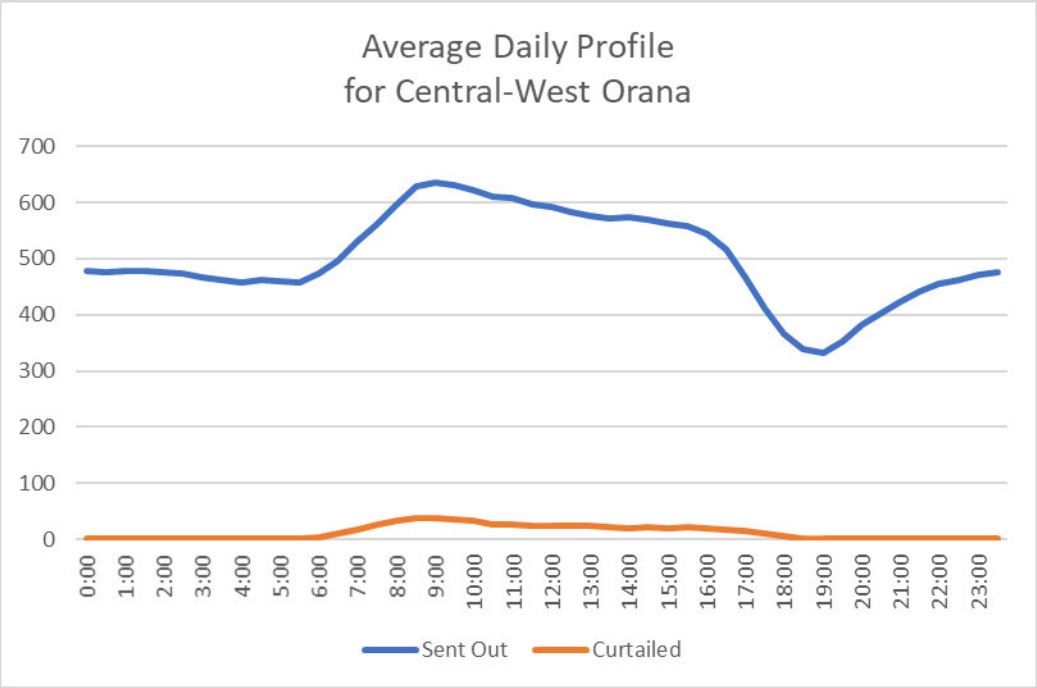

Figure 1: A daily profile for a 1050MW wind and 450MW solar Renewable Energy Zone with a 1000MW connection to the NEM results in an average of only 2.39% curtailment overall. Other daily profiles can be generated using the NSW REZ utilisation spreadsheet attached to this submission.

Solar Capacity (MW) \ Wind Capacity (MW)	900	950	1000	1050	1100	1150
350	REZ utilisation below 50% target					3.21%
400					2.70%	3.58%
450				2.39%	3.11%	3.99%
500			2.25%	2.83%	3.55%	4.43%
550			2.71%	3.29%	4.02%	4.89%
600		2.74%	3.20%	3.79%	4.52%	5.39%
650	2.80%	3.25%	3.72%	4.32%	5.05%	5.91%

Figure 2: Percentage curtailment (spilled REZ electricity) for a 1000MW connection REZ in Central-West Orana for various solar and wind installed capacities.

Batteries are not a cost-effective solution within a REZ, as the amount of curtailment should be too low to be economically recovered. If the curtailment levels are high enough to justify a battery it signifies that too much capacity was committed to the REZ in the first place. A better pre-emptive solution would be to commit less capacity to the REZ in the first place or build larger transmission. In addition, given that a wind heavy REZ delivers the most consumer benefits, the opportunity for the battery to discharge will be less frequent as high wind periods can last much longer than 8 hours. In the reasonably common circumstance where high winds last 5 days or more, a battery may only have only one opportunity to charge and discharge in a week of trading.

SIPS batteries - outside, but supporting the REZ

Batteries with SIPS (System Integrity Protection Schemes) are often a cost-effective solution to maximise the value from transmission lines once built. A SIPS battery serves to increase maximum flow through these power lines during critical time periods. These SIPS batteries will need to be installed outside of the REZ, and ideally, electrically closer to major state electricity loads than the REZ it serves.

Our experiences in South Australia (HPR) and Victoria (VBB) have proven the cost of a battery SIPS contract to provide a continency for a power line, interconnector or REZ can be substantially less than a network or thermal generation alternative.

SIPS services from batteries should be considered in the overall REZ design, as an optimised SIPS battery and powerline solution is likely to have a higher return on investment than a powerline alone, providing electricity consumers with substantially lower overall electricity costs.

Open access

Neoen believes that open access remains the ideal state for the future NEM as it allows consumers continuous and immediate benefits from improvements in technology. That said, the department has identified an addition that could be welcome in enabling investment – a blocking mechanism for projects that add limited or no consumer benefit.

The major downside of open access is the potential for oversubscription. Oversubscription is the uneconomic and inefficient curtailment of all projects (even those with high consumer benefit) resulting from irrational developer exuberance during an investment boom. More recently in Australia we have witnessed tightening financing requirements, which to some extent is already limiting oversubscription, but the oversubscription risk still remains for projects in an open access network. It would be good if new projects that create significant congestion without creating significant consumer benefits could be blocked while other projects, that create significant additional consumer value can connect.

For example: consider a 100 MW-limited line already hosting a 100 MW solar farm. A new solar farm on the same line would create little additional benefit to consumers (i.e. generation delivered to the load), and mostly displace existing generation. An inefficient asset such as this should be blocked. On the other hand, a new wind farm connection to the line would create significant congestion during the day (but less than a solar farm), and the overall benefit to consumers is far larger. In this case the wind farm should be allowed to connect, and the existing solar farm would have to suffer the congestion.

Over time the efficient amount of congestion will evolve with changes in technology and the wider market dynamics. Open access accommodates this evolution in ways that long term access rights destroy.

The answer however is not short-term rights. This simply creates an additional risk that a new project will gazump an existing generator's connection or force the existing generator to pay an excessive amount to retain their access rights.

Given our support for open access, option 1 is Neoen's preferred REZ access arrangement. Oversubscription allows for high utilisation, and deliberate design of technology ratios (with iteration), is potentially more efficient than the auction of rights under option 2 where early winners may crowd out the ideal mix. The lack of compensation under option 1 means a low administrative burden, and low risk for consumers.

Given the inability to hedge wider NEM congestion the value of the option 2 rights is reduced, suggesting a low auction value. If they are financially firm but collect limited sale revenue consumers could be on the hook for excessive compensation. It is important to note that the costliest constraints for renewable generators (and consumers) have been system strength constraints which could theoretically have depleted auction proceeds in a very short amount of time due to their high impact and that they were a surprise to generators.

The risk associated with Tier 2 rights would likely drive projects to acquire a large proportion of installed capacity in Tier 1 rights, if this proportion is too high the REZ will have low utilisation, whereas if the maximum proportion is too restrictive it may be challenging to finance a project. Unlike in option 1, developers will not know the final technology mix and will have to model a downside scenario featuring a higher proportion of the technology they wish to build.

Option 1 guarantees that generators pay a modest cost through congestion, but also provides a protection against inefficient entrants, providing comfort to generators that commit funds and resources to REZ construction in a timely and coordinated way.

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Reject LMP

Locational Marginal Pricing (LMP) in the NEM is not a mechanism that would drive efficient investment in new generation or enhance the bankability of projects that create high value for electricity consumers. Although this concept has been raised throughout the AEMC's COGATI process, there is significant empirical evidence to suggest LMP would increase consumer costs while substantially increasing complexity in our already complex energy market. Models that have been promoted to support LMP have significant flaws, and we see an overwhelming lack of support for this proposal from the industry.

Support for Inter-state Transmission Upgrades

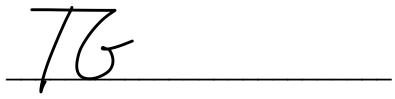
NSW consumers will be the major beneficiaries of the Actionable ISP Projects, particularly Energy Connect, VNI West, and QNI medium. These projects will improve reliability and deliver significantly cheaper energy to NSW from other regions with reduced specific cost recovery from NSW consumers.

These projects most likely represent the best return on investment to NSW electricity consumers, and as such we continue to support and promote intra-State and Federal collaboration, as was done with the QNI minor upgrade. The timely commissioning of these assets provides insurance against unexpected generator closures or natural disasters and provides a consistent improvement in wholesale prices that is consistently underestimated in cost-based economic modelling.

Neoen also believes that SIPS batteries can enhance the transmission network and secure additional utilisation out of the network. In the context of CWO this would mean a larger hosting capacity on the same transmission line, without an increase in generator curtailment.

We look forward to engaging with the department and working towards your grand vision for the state of NSW. Feel free to contact us for further information.

Yours sincerely,



Tom Geiser,
Senior Market Manager,
Neoen Australia

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Questions

Question	Response
Question 1: If the CWO REZ Access Scheme delivers on the proposed objectives and benefits, how would connecting projects value connecting under this Scheme rather than elsewhere under current NEM network access arrangements? Should proposed benefits be given weightings, and if so, what should these be?	Reduced downside risk from overinvestment in local generation.
Question 2: What, if any, additional benefits should the CWO REZ Access Scheme deliver to provide value to connecting generation and storage projects?	
Question 3: Do you agree with the proposed evaluation criteria? What, if any, additional criteria should be considered?	The wider social benefits of the scheme, including but not limited to consumer prices.
Question 4: Which of the shortlisted models presented is preferred? Which best balances the need to deliver value to investors with the need to maximise utilisation of the REZ, and together achieve the access scheme's objectives? In particular, does the 'non–firm' connection right, under Option 1 provide sufficient certainty to investors to be of value? If it does not, is this outweighed by the increased utilisation of the REZ that would result under such non–firm connection rights?	Option 1 is preferred because it most resembles the open access regime. Although it does not have perfect certainty (and no scheme can), the other options will likely result in underutilisation of the REZ.
Question 5: Are there other access models that you consider would be superior to the shortlisted models in this paper? If so, what are these models, and what are their strengths in comparison to the shortlisted models?	Open access is the ideal access regime for a high renewables grid that can allow for high utilisation (i.e. consumer benefits). Rather than increasing complexity for the connection of good projects, we prefer a mechanism to block projects that would produce excessive congestion.
Question 6: How could the characteristics of either Option 1, 2A or 2B be adjusted to improve them in a manner that achieves the	

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access scheme's objectives?	
Question 7: Characteristics such as more granular access rights (for example, rights defined in five– minute intervals) and tradeable rights can provide flexibility to access right holders, but also make the access scheme more complex. How should the trade–off between flexibility for access right holders and simplicity of the access scheme be assessed? Which better achieves the access scheme's objectives?	Let proponents work out to deal with the rights themselves.
Question 8: If not nameplate capacity, what is the appropriate level of capacity that should be used to determine requirements for access rights coverage that would better achieve the scheme's objectives? If a Probability of Exceedance (POE) value is used, what process should be used to verify this?	The scheme will have to iterate to find the best combination of capacity to maximise utilisation. Proponents can change POE relative to nameplate by changing DC:AC ratio or blade:generator ratio. This should be encouraged to further optimise line utilisation.
Question 9: How should the allocation of access rights to hybrid (storage plus generation) assets be approached? What 'shape' of access rights would suit a hybrid asset? How could projects which use some of their maximum capacity 'behind the meter' be accounted for in determining the appropriate level of capacity for access rights coverage?	Don't provide battery capacity with rights, it will reduce utilisation.
Question 10: Is there a minimum term (in years) for which access rights would need to apply to benefit project finance?	If the rights are potentially repurchased at the end of term (leading to duplicate capacity) the term will have to be similar to the life of the asset. If the rights temporarily block inefficient investment until an effective REZ portfolio is built out the term can be much shorter.
Question 11: Under Option 1, connected generation capacity could be capped above the capacity of the REZ Shared Network. How should generation and storage capacity be set	Generators should expect some constraint risk for an efficient use of REZ infrastructure.

or capped to optimise REZ Shared Network utilisation without introducing too much constraint risk?	Capping above shared network capacity, and weighting towards wind generation significantly improves utilisation and thus consumer benefits. Storage is not an effective constraint management tool in a mainly wind REZ because periods of modest curtailment can be prolonged. Storage should not be allowed to claim capacity rights as it will reduce utilisation compared to solar or wind capacity.
Question 12: How could network capacity be allocated between different generation types? Should it, for example, be based on a particular, pre–defined generation profile ("shape") for different types of generation technologies?	Iteratively model combinations to maximise consumer benefits. Neoen expects this will be mainly wind with slight over capacity and some solar to fill in gaps.
Question 13: How would 24–hour access rights impact the value and efficiency of a financial compensation model? If access rights were defined as flat, 24–hour, access rights, would access right holders be incentivised to firm up their generation to make efficient use of the access rights (either technically, or commercially with sharing arrangements)? If not, what adjustments would need to be made to the access scheme design to incentivise this?	24h access rights would encourage fuller use of the rights by combining generation types.
Question 14: Would currently available information, including solar and wind forecasts for corresponding Tier 1 generators, be sufficient for Tier 2 access right holders to make a reasonable assessment of the risk of being constrained off? Or would additional data need to be available to achieve this?	A project with only Tier 2 rights is unfinanceable. They will not join once Tier 1 rights are exhausted.
Question 15: With reference to Appendix B, to what extent should curtailment (and therefore the compensation mechanism) take bid price or market settlement price into account? In	Bid price should only be taken into account for the calculation of volume. E.g., if a generator bid above the RRP for a portion of their available generation that is economically curtailed, not technically curtailed.

particular, what would be the downside to limiting compensation to only the bids from Tier 1 access right holders that are below the market settlement price?	Any proposed competition between access right holders' bid price will simply encourage race to the floor bidding, which while harmless, is also pointless. The preferred path encourages rational bids and compensates fairly.
Question 16: In what ways could the proposed models and compensation mechanism design result in changes to the bidding strategies of Tier 1 and Tier 2 access right holders? Would this be expected to have a material impact on the NSW market?	Compensating at market price and for actual dispatched volumes should not create perverse incentives. Note that batteries that bid cheaper than T1 right holders will deplete their charge and lose their revenue.
Question 17: There could be circumstances in which the revenue earnt by Tier 2 access right holders will not equal the revenue lost by the Tier 1 access right holders through subsequent curtailment. This includes instances of intra–REZ constraints, and when MLFs for Tier 2 generators are systematically lower than for Tier 1 generators. What are the other circumstances, if any, in which potential "compensation inadequacy" may occur? How material is this risk for Tier 1 access right holders in comparison to the open–access regime?	It is likely revenues will not be equal as most constraints have unequal constraint coefficients for individual generators. This is further complicated by the fact that some of the generators in the constraint may lie outside the REZ. Calculating compensation will sometimes be incredibly complicated.
Question 18: Does this Issues Paper identify the key risks associated with the Financial Compensation Models? Can the risks be sufficiently managed through the design features of the models and the proposed compensation mechanism referred to in this Issues Paper?	
Question 19: How would the implementation of the financial compensation models impact existing contracts, such as PPAs? Could the compensation mechanism be appropriately accounted for in the design of new contract structures?	For T1 right holders there is no major departure. For T2 right holders, the compensation mechanism may put off potential offtakers as it increases uncertainty in the final production and value.

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Question 20: The NSW Government is not proposing to progress the Limited NEM Bidding and REZ Locational Marginal Pricing models further at this time. Are there elements unique to these two models which should be considered for integration into the models that have been shortlisted?	No. It is good to thoroughly reject LMP. The NSW govt should push back against the ESB railroading a model they themselves do not understand the commercial implications of.
Question 21: How valuable is the ability to trade access rights, and in what circumstances would this be useful?	There will be few individual investments and in illiquid assets. Trade of rights also implies they are bankable, encouraging speculative hoarding. The initial transaction of rights is the only important one.
Question 22: To what extent would flexibility to trade access rights increase the value of access rights for their holders? How flexible and unrestricted would access rights trading need to be to provide value?	
Question 23: Would the introduction of a central access rights trading platform be of benefit to access right holders? If so, why? If beneficial, then which party would be best placed to design, maintain and operate this trading platform?	
Question 24: For generation projects connecting to the REZ, how important is it that storage is required to purchase access rights (i.e. that total connecting storage capacity is limited)? If storage was not to be required to purchase access rights, how high is the risk of storage competing with (i.e. curtailing) generation dispatch?	Storage with T1 rights could outcompete generators during high price periods, reducing the value of production, without increasing the value to consumers.
Question 25: Would proponents of storage projects value firm access rights? In the financial compensation models, how would	

storage operations differ under Tier 1 versus Tier 2 access rights? How could an access scheme provide sufficiently flexibility for storage to connect in future as technology costs come down and the market evolves?	
Question 26: Would prevailing market signals provide sufficient and appropriate incentive for storage to operate in a manner that is aligned with the needs of the REZ? If not, then what REZ– specific types of incentive mechanisms should be considered to incentivise load and storage to consume electricity when the REZ Shared Network is congested?	Further incentives for storage in REZs is not an effective use of funds.
Question 27: If an incentive mechanism for storage is implemented how should the costs of this arrangement be recovered?	
Question 28: How should the treatment of storage under the CWO REZ Access Scheme account for differences between long–duration storage and fast–firming technologies?	If there are not additional incentives, and storage is not allowed T1 rights then they will be treated equally in dispatch.
Question 29: How should load be integrated into REZs and what types of incentives (if any) would be needed to attract load to connect to the REZ Shared Network?	Load should enjoy a good MLF if located in the REZ. Large industrial loads would also be offered preferential contracts by REZ generators if it will help with congestion in the area. Unfortunately, access to workers, customers and supply chains are more important locational factors for large loads than electricity price.
Question 30: Would additional incentives be necessary, beyond market–based commercial incentives, to encourage storage/load to increase their electricity use during periods of REZ network congestion?	Potentially yes. This resembles an industry incentive rather than an electricity market one though.

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Question 31: If an incentive mechanism for load is implemented how should the costs of this arrangement be recovered?	Commerce and industrial support mechanisms should not be recovered through electricity bills. This is something for govt budget.
Question 32: How should the potential impact of changes in distribution load and embedded generation on the CWO REZ hosting/export capacity be incorporated into the REZ Access Scheme design and implementation?	Change in load profiles should be projected and communicated to developers
Question 33: Should non–scheduled generation and exempt generators be required to hold access rights under the CWO REZ Access Scheme, and/ or should the total capacity of non–scheduled generation or generation from exempt generators permitted to connect be capped? Is there an alternative approach to the treatment of non– scheduled generation or generation from exempt generators which should be considered?	One of these options is necessary to prevent deliberate skirting of scheduling to get access to the REZ. Zero export arrangements would be consistent with other constrained distribution networks. Not restricting exports undermines the access scheme.
Question 34: If 'use it or lose it' provisions were introduced, how should the utilisation requirements be set/measured? What exemptions or concessions should be considered?	Construction milestones: MW installed. Concessions should be allowed for connection delays. If a project cannot commence construction after a prolonged period, it should make room for others.
Question 35: If an access right holder was required to return some or all of its access rights under the 'use it or lose it' provisions, how should these provisions be structured?	Remove the blocking mechanism to allow for the missing capacity by technology to be built.
Question 36: What impact do you consider capping of connection in a REZ, and the proposed access scheme models, will have on reducing the risk of volatile MLFs? Are additional measures warranted? If so, what measures?	The MLFs will mainly be limited by the curtailment rather than the capping of connection. Reducing the cap to improve MLFs will not be economical.
Question 37: What are your views on the appropriateness of the principles for	

managing the interface between the CWO REZ Access Scheme and common DCAs/DNAs? How could consistency between the CWO REZ Access Scheme and access policies on DCAs and DNAs best be achieved?	
Question 38: Would a process to coordinate connection assets for multiple projects be of interest? If so, what coordination initiatives would be of interest?	Minimising cut-ins and number of substations will provide some savings.
Question 39: Given the unique nature of connecting to coordinated REZs, such as the CWO REZ, the barriers to coordination of connection assets may be reduced. What further barriers to coordination will still need to be overcome, and how could this be achieved?	Coordination of wide area studies and retuning of generators is likely to become very problematic. At the moment this is not done efficiently other parts of the network since AEMO have wide area PSCAD models, but it is the responsibility of the connecting Generator to re-tune their own plant and then "propose" to AEMO. For the REZ, it could make sense to provide a mechanism whereby the "fine tuning" of plants in a coordinated fashion is a requirement for the TNSP/AEMO to undertake and then "prescribe" the final model/operating parameters.
Question 40: What opportunities exist for the NSW Government to improve connection processes in the CWO REZ? What improvements would deliver greatest value?	
Question 41: What, if any, additional connection challenges could be created under the CWO REZ Access Scheme? How could these be mitigated?	Iteration of grid modelling is likely to be painful.
Question 42: What value could be delivered to generation and storage projects through centralised approaches to connection and system services, and what are the trade-offs? For example, would projects be willing to forego optionality around aspects of their project through requirements like minimum	

equipment standards, to reduce costs and the risk of potential delays to commissioning?	