Submission to Central-West Orana REZ access scheme issues paper

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The Public Interest Advocacy Centre (PIAC) is an independent, non-profit legal centre based in Sydney.

Established in 1982, PIAC tackles barriers to justice and fairness experienced by people who are vulnerable or facing disadvantage. We ensure basic rights are enjoyed across the community through legal assistance and strategic litigation, public policy development, communication and training.

Energy and Water Consumers' Advocacy Program

The Energy and Water Consumers' Advocacy Program (EWCAP) represents the interests of low-income and other residential consumers of electricity, gas and water in New South Wales. The program develops policy and advocates in the interests of low-income and other residential consumers in the NSW energy and water markets. PIAC receives input from a community-based reference group whose members include:

- NSW Council of Social Service;
- Combined Pensioners and Superannuants Association of NSW;
- Ethnic Communities Council NSW;
- Salvation Army;
- Physical Disability Council NSW;
- St Vincent de Paul NSW;
- Good Shepherd Microfinance;
- Affiliated Residential Park Residents Association NSW;
- Tenants Union;
- Solar Citizens; and
- The Sydney Alliance.

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1. Context

Renewable Energy Zones (REZ) are an important tool to simultaneously meet increasingly urgent emissions reduction targets and to deliver lower energy prices. PIAC agrees with the problems with delivering a REZ under the current regulatory framework identified in the issues paper, namely that:

> The current NEM network access arrangements create challenges for coordination of investment in generation and new network infrastructure. This has become a major source of uncertainty and risk for connecting projects, pushing up costs for projects and electricity prices for consumers [because] … revenue uncertainty has increased as a result of higher congestion and MLF risk … projects have had their connection delayed or output significantly curtailed … [and] generation projects have no incentive to fund shared network improvements.[1]

The transmission investments necessary to deliver REZs are materially different to the regulated transmission investments that the current planning and regulatory frameworks were designed for. Instead of being designed and built to meet consumers' needs (such as growing demand and reliability requirements), the primary beneficiary and driver for REZ investments are connecting generators. It is evident that the current cost recovery framework is not fit for this type of transmission investment.

While the issues paper considers alternative access schemes, it does not fully consider the need to reform the risk allocation and cost recovery for REZ transmission investments. Developing and implementing mechanisms to allocate risks and recover costs is central to timely, right-sized investment while minimising the risks of over-build and under-build.

1.1 Principles for risk and cost

Risks are most efficiently allocated to parties who are able to manage them. It is not appropriate for consumers to bear the risks associated with new transmission investments to enable a REZ, alleviate physical constraints for generators or to underwrite financial compensation for curtailed generators.

Distinct from the allocation of risks, is the recovery of costs. While costs and risks are generally related, they are not necessarily the same. PIAC's principles for cost recovery are that:

- Costs are recovered on a beneficiary-pays basis, such that the primary beneficiaries of a given investment or mechanism should pay for that investment.
- Where there are multiple beneficiaries, the costs should be recovered proportionally to their share of the benefits.
- Where it is not practical and transparent to identify the beneficiaries, a causer-pays principle should be used.
- Cost recovery should also include the risk, to the extent it exists, of the underutilisation of assets and hence asset stranding. For example, it is appropriate that costs associated with

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1 NSW Department of Planning, Industry and Environment (DPIE), *Renewable Energy Zones – Access Scheme*, March 2021, 15.

other parties taking on more transmission investment are ultimately passed through to consumers as slightly higher wholesale costs.

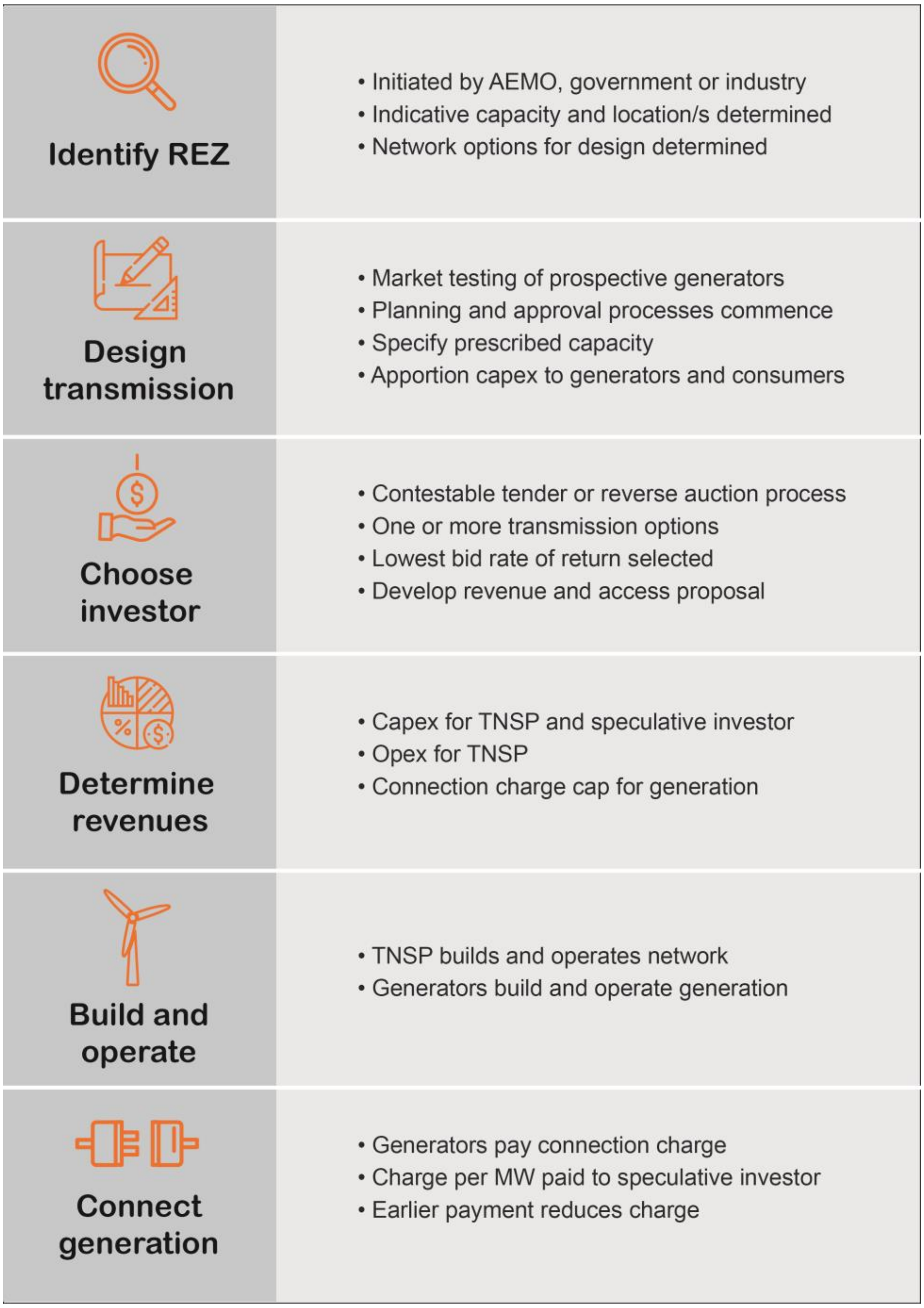
- Cross-subsidies should only be permitted where they are immaterially small or widely accepted by the payers of the cross subsidy.

An essential objective of any REZ framework must be that connecting parties should contribute to covering shared REZ transmission costs in return for access. To do otherwise would breach the beneficiary-pays principle and send inefficient price signals. In the course of testing this objective widely among energy stakeholders in recent years, PIAC has not been presented with any incontrovertible evidence or compelling reason for it not to apply. Rather than increase the cost for connecting generators, the economies of scale possible through a REZ means that connecting parties would typically pay less to connect within a REZ, while enjoying improved access, compared to connecting elsewhere in the NEM under the current open access arrangements.

1.2 PIAC model for sharing risk and cost for REZ investments

PIAC has developed a model for how the cost and risk of investment in new and existing transmission for REZs could be shared between consumers, generators, transmission network service providers, and other investors, potentially including government underwriting. The model is summarised below, and the process is illustrated in Figure 1. It is described in more detail in ATTACHMENT 1: PIAC model of risk- and cost-sharing for REZ investments.

Figure 1 Summary of the PIAC risk sharing mode for Renewable Energy Zones



Under PIAC's REZ model, risks and costs are shared between multiple parties based on the principles that beneficiaries should pay and risks should be allocated to those best placed to manage them.

The PIAC model separates the transmission investment into two portions: one, consistent with current cost recovery, is rolled into the Regulated Asset Base (RAB) of the incumbent TNSP and is recovered through regulated revenue; and a contestable portion, funded by a private contestable investor or Government, and is recovered through generator access charges. The connection charge would be pre-determined at fixed rate (such as $/MVA) that increases with time commensurate to the underutilisation risk the speculative investor bears – this is both transparent to all parties and incentivises early connection.

Cost sharing

The revenue from this investment, up to the prescribed 'efficient' capacity, is shared initially between:

- The incumbent transmission network service provider. This portion of the cost of investment would be recovered from consumers in a manner similar to how transmission network service providers currently recover shared network costs.
- The contestable transmission investor. This portion would be recovered from generators who pay a connection charge, which is proportional to the generator's capacity and how early they connected to connect to the REZ. At any given point in time, the cost for generators to connect to the share transmission assets in the REZ is fixed in terms of $/MVA. The rate paid by generators would increase with time according to the Rate of Return bid by the chosen contestable investor. Any costs recovered from generators in the first instance will only be passed on to consumers (via wholesale prices) if the investments prove to be efficient and prudent. This reduces the timing and scale risk consumers would otherwise bear, and aligns costs recovered from consumers with the level of efficient utilisation of the REZ.

The amount apportioned to generators is funded, contestably, by a contestable investor. This amount could be determined by the regulator or by government, and be based on a combination of:

- The value of access to the REZ for connecting generators, taking into account the relative costs and risks incurred with equivalent investments being made under the current access arrangements at the time;
- The market benefits to consumers of the REZ being built;
- Where the REZ is part of an interconnector or other major transmission investment, the portion attributable to new generator connections; and
- Other policy objectives.

Risk sharing

Under the PIAC model, contestable transmission investors voluntarily take on underutilisation risk for their portion of investment costs, and receive an uplift in their rate of return for doing so.

The incumbent TNSP is protected from the risk of asset stranding and their costs are recovered from consumers under normal arrangements. Therefore, they are not forced to take on any new or further risks beyond what they already accept delivering regulated transmission investments. If they wish to, the TNSP (or their shareholders) are still able to bid for the contestable investment.

Generators are also protected from the risk of REZ underutilisation and timing misalignment between different generation projects. In lieu of bearing these risks, generators effectively pay a time-based premium and are incentivised to reduce this risk by connecting, or at least committing to connect, earlier. At the same time, they are not forced to connect earlier than they are prepared to.

The PIAC model also reflects that consumers have little or no ability to manage the risk of underutilisation or asset stranding in REZs and are not direct beneficiaries of generator connection assets. Consumer exposure to underutilisation risk is capped at a fixed, limited portion of the investment value, potentially linked to the modelled market benefits of the REZ transmission. The contestable investment still represents value for consumers because it prevents inefficient transmission investment and a less competitive wholesale market from being fully socialised to consumers.

Recommendation

PIAC recommends the NSW Government adopt PIAC's model for risk and cost sharing to allocate risk for the shared network investment for a REZ to parties that can best manage this risk and recover costs on a beneficiary-pays basis. The model is described in more detail in ATTACHMENT 1: PIAC model of risk- and cost-sharing for REZ investments.

2. CWO REZ access scheme objectives

PIAC supports the objectives and benefits. In particular, PIAC supports the explicit reference in the proposed objectives to promote efficient utilisation of REZ infrastructure and to keep downward pressure on energy prices for all consumers.

While the new, low-cost renewable generation in the REZ will help meet energy needs at a low cost, the network investment necessary to connect these projects and efficiently deliver their generation to load centres could, if poorly planned and managed, place significant affordability pressures on consumers. As noted in Section 1, implementing frameworks that appropriately allocate risks and recover costs for REZ investments will play an important part in mitigating this.

Responses to consultation questions

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?*

Prospective generators would value connecting in a REZ (as opposed to elsewhere in the NEM under the current open access regime) because:

- It provides greater certainty of the timing and cost of the connection process
- By design, a REZ would be located and built to optimise the ability to deliver generation to major load centres, hence the mitigates the risk of downstream congestion curtailing generation output and the risk of significant variations in Marginal Loss Factor
- The access regime and within the REZ would mitigate the risk of local congestion within the REZ curtailing generation output

Question 2: *What, if any, additional benefits should the CWO REZ Access Scheme deliver to provide value to connecting generation and storage projects?*

As noted in Section 1, the access regimes considered in this paper do not consider the need to reform the risk allocation and cost recovery for REZ transmission investments. Developing and implementing mechanisms to allocate risks and recover costs is central to timely, right-sized investment while minimising the risks of over-build and under-build. PIAC has developed a model for how the cost and risk of investment in new and existing transmission for REZs could be shared between consumers, generators, transmission network service providers, and other investors, potentially including government underwriting.

Recommendation

PIAC recommends the NSW Government adopt PIAC's model for risk and cost sharing to allocate risk for the shared network investment for a REZ to parties that can best manage this risk and recover costs on a beneficiary-pays basis. The model is described in more detail in ATTACHMENT 1: PIAC model of risk- and cost-sharing for REZ investments.

3. Evaluation criteria

Responses to consultation questions

Question 3: *Do you agree with the proposed evaluation criteria? What, if any, additional criteria should be considered?*

PIAC considers the proposed evaluation criteria are mostly appropriate however, we note that they are generally very investor-focussed and there is no explicit reference to consumer interests or outcomes. This omission is particularly problematic given the stated objectives and benefits of the REZ access scheme include keeping downward pressure on energy prices.

Recommendation

PIAC recommends the NSW Government include evaluation criteria that explicitly refer to meeting consumers' long-term interests – in particular with respect to the allocation of risks and recovery of costs from consumers.

PIAC supports the criteria of being able to coexist with national reforms and minimising derogations from the National Electricity Laws and Rules where possible. While consistency with current and proposed national frameworks are preferable, however, they must not prevent implementing sound reforms in NSW to deliver REZs in the interests of consumers.

PIAC is deeply concerned about the slow pace, disjointedness, ineffectiveness and lack of ambition of the proposed REZ and transmission access reforms being proposed through the national reform processes. We are not convinced these processes will deliver the necessary platform for accelerated, orderly connection of new generation projects or adequately protect consumers from the risk of over-investment in transmission networks.

Recommendation

PIAC recommends the NSW Government prioritise delivering the interests and needs of NSW consumers and markets in developing regulatory and access regime for REZs over maintaining national consistency.

4. Access scheme design

Responses to consultation questions

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?

PIAC supports Option 1 (limited physical connection model) and considers it is preferable to Options 2A or 2B (financial compensation model) for delivering REZs.

PIAC supports creating a framework that puts designing and delivering optimised levels of physical access first and then allows financial or contract arrangements as a secondary consideration or overlay. This has a number of benefits:

- It reflects the need for investing in physical infrastructure to ensure low cost renewable projects are enabled, and generation is able to be optimally dispatched and delivered.
- It provides a more direct and traceable link from connecting more generation projects to consumer outcomes (in terms of both cost and emissions impacts). This helps clarify the decision making framework for delivering a REZ by making clear which projects are most effective in meeting consumers' interests. It also aids communicating the benefits and success of these investments to consumers and stakeholders.
- In contrast, a framework based on financial rights introduces significant complexity and risks to both consumers and generators. These include the risks resulting from the misalignment of financial incentives for individual parties with whole-of-market and whole-of-system outcomes. There are also risks introduced because of the inherently different lifespans of the physical infrastructure to be built and the financial agreements that trigger or underpin their investment.[2] This difference means the physical assets greatly outlast any financial instrument guaranteeing access and dispatch, potentially leaving inefficient and long-lasting legacy outcomes that may hamper future reforms and investments.

The design of the REZ (its location and connection to the broader power system as well as the design of network infrastructure within the REZ itself) should mitigate the risk of excess congestion and curtailment. It is important this does not mean there will be no curtailment at all. More curtailment in line with increased generation capacity is efficient and prudent, as there are diminishing returns from increasing network capacity to avoid congestion. As battery technology becomes more cost effective over time, batteries will provide additional 'capacity' to help reduce curtailment of surplus energy and network constraints.

These features of REZs, along with caps on generators connecting within a REZ and clearer connection process for connecting within the REZ, will provide sufficient certainty to investors.

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2 Financial agreements typically last for up to 10 years yet the physical infrastructure have asset lives of up to 25 years for generation assets and up to 30 or 40 years for network assets.

PIAC disagrees with the Issues Paper's characterisation on that Option 1 risks underutilisation of REZ capacity relative to Options 2A and 2B. Any risk of underutilisation is not inherent to any Option being considered, and depends on design choices made under the option along with external factors.[3]

As noted in our response to Question 18, designing, implementing and monitoring any system for financial transmission rights involves significant costs and risks including inefficient investment decisions and opportunities for gaming the system. Instead, the risk of underutilisation is more clearly and effectively mitigated through:

- Linking the 'firm' capacity for individual generators with an efficient level of REZ-wide curtailment, accepting that it would not be efficient for all connected generators to be able to dispatch at their maximum power concurrently, while
- Seeking, and allowing for the, different output profiles of a blend of different generation technologies (such as wind vs solar or even fixed vs tracking solar), and
- Incentivising storage and/or load to connect within 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?*

While the issues paper considers alternative access schemes, it does not fully consider the need to also reform the risk allocation and cost recovery for REZ investments. Developing and implementing mechanisms to allocate risks and recover costs is central to delivering the right incentives and responsibilities for timely, right-sized investment while minimising the risk of over-build and excessive costs.

Risks are most efficiently allocated to parties who are able to manage them and costs are most fairly recovered from beneficiaries. Considering these principles, consumers must not solely bear the risk or costs for the shared transmission infrastructure for REZs.

PIAC has developed a model for how the cost and risk of investment in new and existing transmission for Renewable Energy Zones (REZ) could be shared between consumers, generators, transmission network service providers, and other investors. The model is described in detail in ATTACHMENT 1: PIAC model of risk- and cost-sharing for REZ investments.

Under the PIAC model, generators make a contribution to costs, and in turn are protected from risks such as REZ oversubscription or underutilisation and timing misalignment or competitive tension between different generation projects. By paying less if they connect to the REZ earlier, generators are incentivised to reduce the cost, that otherwise would accrue to consumers or other investors, of managing this risk.

At the same time, the PIAC model reflects that consumers have no ability to manage the risk of underutilisation or asset stranding in REZs and are not direct beneficiaries of generator connection assets. Consumer exposure to underutilisation risk is capped at a fixed, limited

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[3] NSW Department of Planning, Industry and Environment (DPIE), *Renewable Energy Zones – Access Scheme*, March 2021, 6.

portion of the investment value, preferably linked to the projected market benefits associated with the REZ. The contestable investment approach represents value for consumers because it prevents them paying for forecast error or inefficiency of transmission investment. Consumers effectively only incur the cost of REZ transmission infrastructure indirectly through wholesale energy costs to the extent both the network and generation investment proves prudent and efficient.

Question 6: *How could the characteristics of either Option 1, 2A or 2B be adjusted to improve them in a manner that achieves the access scheme's objectives?*

As described in our response to Question 5, the access scheme would be improved by reforming the risk allocation and cost recovery for REZ investments. PIAC has developed a model for how the cost and risk of investment in new and existing transmission for Renewable Energy Zones (REZ) could be shared between consumers, generators, transmission network service providers, and other investors. The model is described in ATTACHMENT 1: PIAC model of risk- and cost-sharing for REZ investments.

In order to maximise the benefits to emissions reduction and price while minimising the risk of underutilisation, it is essential REZs contain an efficient mix and level of generation. Along with storage this will help ensure maximum utilisation of REZ capacity and bring down the cost per project to connect within the REZ while preventing inefficient levels of congestion.

Variable renewable generators such as wind and solar will dispatch at different times depending on a number of factors including the availability of wind or sun, respectively. The REZ should mitigate the risk of inefficient levels of congestion and curtailment – which does not mean there will be no curtailment at all. It would be inefficient to cap connection to a REZ based on the sum of generators' nameplate capacity alone. Instead, it is essential to link the 'firm' capacity for individual generators with an efficient level of REZ-wide curtailment while seeking the diversity of output profiles from a blend of generation technologies as well as incentivising storage and/or load within the REZ.

Storage (and loads) within a REZ can help increase the capacity of generation able to connect to the REZ network by alleviating or preventing network congestion that would otherwise curtail generation. The treatment of storage within any REZ access scheme must reflect this and encourage the efficient connection and operation of storage. See responses to Questions 24, 25, 26 and 27 regarding integrating storage.

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?*

No comment.

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?*

Relying purely on nameplate capacity of connecting generators risks underutilising the REZ as different generation types (such as wind and solar) will rarely generate at maximum capacity at the same time. A POE value is one way to address this by determining the typical dispatch profile of each prospective generator based on factors including resource availability. Another option may be to apply a POE value to all generators of the same type within a REZ rather than calculating POE values for each individual generator.

It is also essential that some amount of congestion within the REZ (and hence curtailment of REZ generators) is considered efficient and accepted. Seeking to prevent any and all curtailment would be risk overbuilding the network and underutilising the capacity – ultimately failing to meet the objectives and delivering maximum benefit to NSW consumers.

Also see response to Question 6.

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?*

No comment.

Question 10: *Is there a minimum term (in years) for which access rights would need to apply to benefit project finance?*

No comment.

4.1 Option 1 – limited physical connection model

Responses to consultation questions

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 or capped to optimise REZ Shared Network utilisation without introducing too much constraint risk?*

See response to Question 4 and Question 6.

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?*

The following advice relates both to determining the efficient amount of curtailment in a fully subscribed REZ and allocating capacity of uncurtailed generation.

Renewable energy resources are temporally and geographically varied. Wind turbine output is influenced by forces ranging from seconds to seasons in duration and across a scale of small microclimates to global weather systems, such that it is uncommon for all wind turbines in a wind farm to be generating the same instantaneous output. Solar output can rapidly reduce and increase due to cloud cover, and fixed solar arrays spend little time at full capacity. Hence:

- Allocating capacity based on non-granular temporal information, such as mean daily or monthly generation profiles, will materially underestimate the frequency and magnitude of surplus generation. This risks inefficiently over-allocating REZ capacity. Granular time series information, such as 5- or 30-minute interval data, is required to effectively mitigate this risk.
- Allocating capacity based on non-diversified information, such as assuming the modelled output from a single wind turbine represents that of a whole wind farm or that of a single wind farm can be scaled to represent the aggregate output from all wind farms in a REZ, will materially overestimate the frequency and magnitude of surplus generation This risks inefficiently under-allocating REZ capacity. Diversified time series information, at the level of individual wind generation units and 1-10MW arrays of like-configured solar panels, is required to effectively mitigate this risk.

4.2 Option 2A and 2B – financial compensation models

As noted in our response to Question 4, PIAC does not support the financial compensation models Options 2A or 2B. We consider a model linked to providing some degree of physical capacity, such as Option 1, to be more effective in delivering the necessary certainty to connecting generators as well as being more practical to set up and operate.

Responses to consultation questions

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?*

No comment.

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?*

No comment.

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 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?*

No comment.

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?*

No comment.

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?*

No comment.

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?*

There remain fundamental issues with the complexity of setting up and administering any scheme for financial transmission rights. This means more time and effort is necessary upfront to design the scheme, along with more time and effort to ensure generators understand its working and that regulators or administrators can effectively oversee the scheme's operation to ensure it works as intended.

If this does not occur, it risks a) inefficient investment and operational decisions being made by generators and b) creating opportunities for gaming the system. Both are counter to achieving the intent of a REZ and the interests of consumers.

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?*

No comment.

4.3 Other models considered but not progressed

Responses to consultation questions

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?*

PIAC supports the NSW Government not considering the Limited NEM Bidding and REZ Locational Marginal Pricing models any further.

5. Scheme design issues

Responses to consultation questions

Question 21: *How valuable is the ability to trade access rights, and in what circumstances would this be useful?*

The ability to trade access rights on an operational timeframe (i.e.: trading rights between generators within a REZ to dispatch at certain times as opposed to trading rights to connect to the REZ in the first place) should form an important part in providing REZ generators flexibility to self-manage their exposure to congestion. As the penetration of variable renewable generation increases, tradeable rights such as this would provide a framework to inform curtailment in a more dynamic and responsive way that generators can.

See response to Question 6.

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?*

See response to Question 21.

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?*

No comment.

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 proponents, as with generator proponents, would see value in firm access rights, particularly to support the NSW policy objective of REZs replacing retiring dispatchable thermal generation. However, unlike generation project, storage projects can help increase the capacity of generation able to connect to a REZ. The framework for allocating rights and recovering costs from storage projects within a REZ must reflect this.

Also see response to Question 25, 26 and 27.

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?*

See response to Question 24, 26 and 27.

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?*

Storage (and load) within a REZ can help increase the capacity of generation able to connect to the REZ network by alleviating or preventing network congestion that would otherwise curtail generation. This could be accelerated by an appropriate incentive scheme or provisions within any access rights framework that allow storage facilities to share some of the benefits of avoided curtailment.

For instance, storage facilities could be exempt or receive a discounted fee to connect in expectation of the increased effective REZ generation capacity it would enable.

Question 27: *If an incentive mechanism for storage is implemented how should the costs of this arrangement be recovered?*

As noted previously, PIAC considers costs are most fairly recovered on a beneficiary-pays basis.

Therefore, costs for an incentive scheme should be recovered from generators who would otherwise be curtailed (or prevented from connecting to a REZ) without the storage facility. As with any incentive mechanism for load discussed in Question 31, costs should be split across generators according to the extent to which they benefit – either based on their generation capacity if the incentive is paid to storage on investment timescales (e.g.: as an up-front payment) or based on their generation output if the incentive is paid to storage on dispatch timescales.

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?*

No comment.

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?*

As with storage, load within a REZ help increase the capacity of generation able to connect to the REZ network by alleviating or preventing network congestion that would otherwise curtail generation. See response to Question 26.

Additionally, there may be opportunities for the NSW Government to achieve non-energy policy objectives, such as regional development, by encouraging load to connect within a REZ. Options to identify such opportunities could be explored as part of early REZ scoping and community engagement. However, in keeping with the beneficiary-pays basis to ensure fair and efficient cost-recovery, costs for meeting non-energy policy objectives are more appropriately recovered through means other than energy bills.

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?*

See response to Question 26 and Question 29.

Question 31: *If an incentive mechanism for load is implemented how should the costs of this arrangement be recovered?*

As noted previously, PIAC considers costs are most fairly recovered on a beneficiary-pays basis.

To the extent that load within a REZ can help alleviate congestion and improve REZ generators' ability to dispatch, the costs for such incentives should be recovered from these generators. As with any incentive mechanism for load discussed in Question 27, costs should be split across generators according to the extent to which they benefit – either based on their generation capacity if the incentive is paid to loads on investment timescales (e.g.: as an up-front payment) or based on their generation output if the incentive is paid to loads on dispatch timescales.

If load within the REZ is incentivised to meet non-energy policy objectives, such as regional development, these costs are more appropriately recovered through means other than energy bills.

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?*

No comment.

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?*

See response to Question 32.

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?*

No comment.

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?*

No comment.

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?*

It is essential for providing certainty for generation investors that the overall capacity in a REZ is capped. It is essential for efficiency and lowest overall LCOE that the cap includes an optimal level of curtailment to ensure the transmission system is well utilised and minimise wholesale volatility.

REZs will be designed with consideration of any impacts on power flows, constraints and MLFs from connecting generators. Therefore a REZ will, by design, have a lower risk of MLF volatility than generators connecting outside a REZ under the status quo.

We note the Issues Paper's proposed framework does not strictly cap generator connections at the REZ export capacity. Rather, it requires additional generators to fund any necessary augmentation to maintain earlier generators' ability to dispatch as they have already paid to connect and expect a degree of 'firmness'. If potential impacts on constraints and losses are included in this assessment for necessary augmentation, this approach would reduce generators' risk exposure to MLF variations due to later generator connections.

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?*

No comment.

6. Other coordination initiatives

Responses to consultation questions

Question 38: *Would a process to coordinate connection assets for multiple projects be of interest? If so, what coordination initiatives would be of interest?*

See response to Question 40.

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?*

See response to Question 40.

Question 40: *What opportunities exist for the NSW Government to improve connection processes in the CWO REZ? What improvements would deliver greatest value?*

Impacts on the local communities where a renewable generation project is seeking to connect can be a determining factor in whether or not a project proceeds. This will likely be exacerbated in the case of REZs where, rather than a single generation project, a REZ will involve a number of renewable projects and significant network upgrades. This can have substantial impacts due to:

- the long-term impact on visual amenity and/or land use from multiple renewable generation projects connecting; and
- the impact on local communities, roads and other infrastructure from the necessary construction of several generation projects and network augmentations over a relatively short amount of time.

Therefore, there can be a role for the NSW Government to assist in early engagement of affected communities to ensure their perspectives and priorities are factored into the design and delivery of the REZ. There would also be opportunities for NSW Government to assist local communities to realise short- and long-term benefits of the REZ such as identifying opportunities to support local jobs creation.

Question 41: *What, if any, additional connection challenges could be created under the CWO REZ Access Scheme? How could these be mitigated?*

See response to Question 40.

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?*

See response to Question 40.

ATTACHMENT 1: PIAC model of risk- and cost-sharing for REZ investments

This description of the PIAC model of risk- and cost-sharing for REZ investments is adapted from material developed for the AEMC's Coordination of Generation and Transmission Investment (COGATI) review[4] and the ESB's Post-2025 reform process.[5]

Overview of concept

PIAC has developed a framework that helps address the issues facing REZ delivery. The model provides a transparent, principled and predictable framework for how the cost and risk of REZ transmission investments could be shared between consumers, generators, transmission network service providers, and other investors, potentially including government underwriting. It has been developed and refined over three years of engagement with a wide range of key stakeholders including market institutions, consumer advocates, incumbent and prospective generators, network service providers, investors and governments.

PIAC's framework is based on the following cost recovery principles

- Costs are recovered on a beneficiary-pays basis, such that the primary beneficiaries of a given investment or mechanism should pay for that investment.
- Where there are multiple beneficiaries, the costs should be recovered proportionally to their share of the benefits.
- Where it is not practical and transparent to identify the beneficiaries, a causer-pays principle should be used.
- Cost recovery should also include the risk, to the extent it exists, of the underutilisation of assets and hence asset stranding. For example, it is appropriate that costs associated with other parties taking on more transmission investment are ultimately passed through to consumers as slightly higher wholesale costs.
- Cross-subsidies should only be permitted where they are immaterially small or widely accepted by the payers of the cross subsidy.

Risk is most efficiently borne by those parties best placed to manage it. Therefore, it is not appropriate for consumers to bear the risk of REZ underutilisation. Other parties should carry this risk through measures such as funding additional transmission investment to alleviate physical constraints or by underwriting financial instruments to cover the financial impacts of curtailment.

A fundamental aspect of the PIAC model is that REZ transmission capex is recovered from both generators and consumers, rather than just consumers. This is achieved by separating transmission investment into two portions: one, consistent with current cost recovery, is rolled into the RAB of the incumbent TNSP and is recovered through regulated revenue; and a contestable portion, funded by a contestable investor or Government, and is recovered through generator access charges. The connection charge would be pre-determined at fixed rate (such as $/MVA) that increases with time commensurate to the underutilisation risk the speculative investor bears – this is both transparent to all parties and incentivises early connection.

4 AEMC, *Renewable Energy Zones discussion paper*, October 2019, 46-49.
5 PIAC, *Submission to the Post-2025 Market Design Consultation Paper*, October 2020, 24-36.

Both the portions have elements that are approved by the regulator or some other administrative body and based on a range of factors.

The process for planning, delivering and connecting a REZ is summarised in Figure 2 below as well as in the AEMC's REZ discussion paper.[6]

Figure 2 Summary of the PIAC risk sharing mode for Renewable Energy Zones

Identify REZ	• Initiated by AEMO, government or industry • Indicative capacity and location/s determined • Network options for design determined
Design transmission	• Market testing of prospective generators • Planning and approval processes commence • Specify prescribed capacity • Apportion capex to generators and consumers
Choose investor	• Contestable tender or reverse auction process • One or more transmission options • Lowest bid rate of return selected • Develop revenue and access proposal
Determine revenues	• Capex for TNSP and speculative investor • Opex for TNSP • Connection charge cap for generation
Build and operate	• TNSP builds and operates network • Generators build and operate generation
Connect generation	• Generators pay connection charge • Charge per MW paid to speculative investor • Earlier payment reduces charge

6 AEMC, *Renewable Energy Zones Discussion Paper*, Oct 2019, 46-51.

Value proposition of the model for different parties

For connecting generators

Under the PIAC model, generators are protected from the risk of REZ underutilisation and timing misalignment between different generation projects. In lieu of bearing these risks, generators pay a time-based premium to the contestable investor, who bears the timing risk. Generators are incentivised to reduce this risk by connecting, or at least committing to connect, earlier. At the same time, they are not forced to connect earlier than they are prepared to. Hence it provides a framework for generators to connect over time as they are ready while fairly and transparently recovering costs from them.

The model provides a mechanism for sharing investment in transmission infrastructure between different projects and enabling multiple generators to access wholesale market revenue. This will often be at lower overall cost than current arrangements where either no transmission investment is built or the network is only built in a piecemeal fashion and economies of scale and scope are missed.

For contestable investors

Contestable transmission investors voluntarily take on underutilisation risk for their portion of investment costs, and receive a commensurate uplift in their rate of return for doing so.

The PIAC model also offers an opportunity for investors seeking to help meet climate change and decarbonisation portfolio targets to invest. A survey of Australian investors by the Investor Group on Climate Change found that two of the most significant perceived barriers to green investment in Australia are the lack of opportunities to invest with an appropriate rate of return and policy/regulatory uncertainty.[7]

Implementing the PIAC model allows contestable investors to accelerate the uptake of renewable generation and decarbonise the Australian economy whilst earning a return commensurate to the risk they incur. The PIAC model also provides certainty for both contestable investors and generators through its transparent process to understand the levels and types of risks they would incur and greater certainty of their return for it.

For the incumbent TNSP

The incumbent TNSP is protected from the risk of asset stranding as their costs are recovered from consumers under normal arrangements. Operational, maintenance and future asset replacement costs are recovered by the TNSP in the manner they do today. They are therefore not forced to take on any new or additional risks beyond what they already accept delivering regulated transmission investments.

The incumbent TNSP (or their shareholders) are still free to bid for the contestable investment if they choose to.

For consumers

Central to the PIAC model is that consumers have little or no ability to manage the risk of underutilisation or asset stranding in REZs and are not direct beneficiaries of generator

7 Investor Group on Climate Change, *Scaling Up: Investing for low carbon solutions*, August 2018, 14.

connection assets. The contestable investment represents value for consumers because it prevents inefficient transmission investment and less prudent generation costs being socialised to consumers.

Consumer exposure to the risk of underutilisation is capped at a fixed, limited portion of the investment value. This reduces their liability (relative to current arrangements) under the 'worst case' where REZ utilisation is low.

If the generation and transmission investments that are enabled though the contestable investment prove to be efficient and prudent, then consumers will benefit and accordingly these costs will be passed through to them through the wholesale market.

Identifying and planning a REZ

Under PIAC's model feasible prospective renewable energy zones, including transmission network options, are identified through the existing ISP process by AEMO, industry or government.

A detailed design stage, incorporating a RIT-T or equivalent process, determines the optimal attributes for a given REZ, and selects one or more network design options that is best suited to support efficient investment and market outcomes. This stage would include market testing with prospective generators, investigating planning approvals, and estimating capex for different network options. A variety of sources of information should be considered to minimise the risk associated with the contestable investment.

A key attribute determined in the detailed design stage is a prescribed 'efficient' capacity level, expressed as the firm or maximum physical capacity of new generation supported by the REZ. It will reflect a number of factors, including:

- The level and certainty of current generation market interest in and near the proposed REZ, as well as the current state of the generation investment market more broadly.
- The potential future investor interest in and around the REZ, considering the nature of the energy resource, planning opportunities and constraints, government energy and planning policy, and anticipated energy market conditions.

Investment and return

A contestable process, such as a tender or reverse auction, would be conducted to choose an investor to fund the contestable portion of the capital spend associated with the REZ. The successful bidder will be chosen on the basis of the lowest rate of return offered. This portion is ultimately recovered from connecting generators via connection charges. The remaining capex, and all opex is rolled into the RAB of the incumbent TNSP and recovered from consumers as with normal regulated revenue such as TOUS charges.

The AER would approve all revenue up to the 'efficient' capacity, including the cap on generator connection charges, before the REZ is built.

The TNSP builds and operates the new and augmented transmission network assets required for the REZ. Assets may be built in stages to limit costs and finance.

New generators that connect to the REZ pay a connection charge to the contestable investor which includes a time-based premium. This can be paid at any time between when the REZ revenue is determined and the generator is connected. Committing to connect earlier reduces the timing risk borne by the contestable investor and hence reduces the connection charge the generator must pay.

For feasibility and ease of implementation, the model should use current arrangements as far as practicable. These include:

- the generator connection process and charge structure;
- mechanisms to allocate some TUOS charges to consumers; and
- some extant regulatory processes and governance measures.

If a contestable transmission investor considers that interest in a REZ may be more than the prescribed ‘efficient’ capacity level determined, then the investor may fund this additional capacity and negotiate with generators to connect using this capacity as unregulated revenue. They could apply higher returns for this portion to compensate for the additional risk of investing in capacity without guaranteed cost-recovery.

Apportioning costs between generators and consumers

The amount to be recovered from generators is funded by a contestable investor. This apportioning could be determined by the regulator or by government, and be based on some combination of:

- The value of access to the REZ for connecting generators, compared to the costs and risks incurred with the same investments under the access arrangements for connecting outside the REZ at the time;
- The difference between the capital cost of the REZ transmission and the predicted market benefits to consumers of the REZ being built,
- Where the REZ is part of an interconnector or other transmission investment, the portion attributable to direct generator benefits (rather than direct consumer benefits). If there is a clear primary purpose for the investment, any portion of the investment with dual benefit could be attributed to that purpose; and
- Other policy objectives.