

**ENERGY SECURITY BOARD
INTERIM FRAMEWORK FOR
RENEWABLE ENERGY ZONES**

Final recommendations
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Executive Summary

The purpose of this document is to outline the Energy Security Board's (ESB) recommendations for the implementation of an interim framework for Renewable Energy Zones (REZs). It sets out principles for how REZs could be planned and implemented in the near term, addressing the questions of how to establish and fund a REZ, and how to maintain it once it is established.

Government renewable programs and the development of State REZ schemes are accelerating the pace of the transition. The considerations set out in this document have informed our final principles, which are intended to provide the fundamental measures for REZ implementation, which may be complemented by the work of State governments.

The ESB considers that recommendations in the form of principles provide the right level of flexibility to enable jurisdictions to pursue REZ schemes in accordance with required timeframes, while also maintaining consistency across the National Electricity Market with respect to core aspects of the market design. The interim REZ framework is designed to align with key areas of market reform that will ultimately form part of the National Electricity Rules, including the transmission access regime and system security frameworks.

The ESB recommends a set of overarching principles for the development of REZs that is compatible with the efficient development of the power system as a whole, together with practical guidance on how these principles should be implemented. They address the following matters:

- **Planning.** Our recommended principles for REZ planning build on Step 1 of the interim REZ review. They are designed to maintain the cohesive development of the power system as a whole, while also recognising the role of government policy in driving power system outcomes.
- **Connections.** Where a REZ development involves the construction of new transmission lines, parties wishing to connect to a REZ should participate in a coordinated tender process. Parties wishing to become part of a REZ after the coordinated process has occurred should be subject to some form of access regime. The REZ scheme should also clearly specify what happens to any incumbent generators or pre-existing developments that are located in the REZ.
- **Funding and economic regulation.** Where shared transmission infrastructure within a REZ is funded by customers, and a tender process for that REZ produces surplus revenue, then that surplus revenue should be returned to customers in the form of a reduction in network charges. This is in contrast to the shared infrastructure being funded (in almost all cases) exclusively by consumers. In addition, if a REZ scheme involves investment in transmission assets that are larger or earlier than those that would be built under the integrated system plan, those additional costs should only be recovered from customers to the extent that they benefit from the investment.
- **Access.** We have identified challenges in applying an access regime that applies only within a REZ, particularly in a meshed network. As power generated outside the REZ will flow across REZ assets, it may be difficult to incentivise generators to participate in a REZ process, particularly if they are expected to make a contribution towards the cost of the REZ. We see value in a consistent set of arrangements that applies across the NEM. Our preference is that the medium term access model that is being developed as part of the Post 2025 market design project is adopted for REZs. However, this model is still under development and it may not be ready in time for some REZs. Where a REZ-specific access scheme is required, the ESB suggests a simple scheme that is able to be integrated into (or applied in conjunction with) the medium term access option.

The ESB will continue to collaborate with State governments to explore different REZ models and ensure that these parallel processes deliver a cohesive overall framework.

Interim REZ framework — Recommended principles

The ESB recommends that Ministers **adopt**:

- the principles set out in R.1-R.4 below, which address:
 - R.1 Planning
 - R.2 Connections
 - R.3 Funding and economic regulation, and
 - R.4 Access.
- the practical guidance for the implementation of each of the principles suggested by the ESB.

R.1 Planning

Recommended principle

Transmission network planning for regulated REZs should be consistent with rigorous cost benefit analysis conducted by an independent and suitably qualified body, transparently demonstrating the positive net benefits of the project in the context of a nationally coordinated approach to transmission infrastructure.

Planning should take account of the full range of essential services required by the power system.

Implementing the principle

1. When selecting REZs for development, Governments should have regard to the benefits of selecting REZs that are on the ISP optimal development path within 12 years.
2. If a REZ project is not on the ISP optimal development path, then it should be designed to meet the criteria set out in NER 5.22.3(b) in order to retain alignment between the ISP and policy driven investments.
3. There should be a transparent assessment of the impact any REZ scheme is likely to have on the efficient development and operation of the NEM on a whole of system basis.
4. REZs should be planned and developed in stages to promote flexibility in response to changing circumstances.
5. The REZ design and planning process should have regard to the system security needs that may arise from the particular REZ.

R.2 Connecting to a REZ

Recommended principle

A clear, upfront process should specify the connection process. The process for determining technical requirements relating to generator and storage performance should be consistent with National Electricity Rules. Connecting parties should pay the full cost relating to their connections, consistent with the principle of marginal cost pricing.

Implementing the principle

1. Where a REZ development involves the construction of new transmission lines, parties wishing to connect to a REZ should participate in a coordinated tender process.
2. The party responsible for conducting the tender process should:
 - a) select REZ participants on a basis that has regard to the NEO,

- b) ensure that the amount of capacity made available over time is consistent with efficient use of the REZ and the broader power system, having regard to different generator output profiles,
 - c) have regard to the benefits of a process that does not inefficiently distort the generation mix.
- 3. REZ participants should comply with the registration and connection requirements of the National Electricity Rules.
- 4. The REZ scheme should seek to deliver scale efficient connection and system security assets.
- 5. REZ schemes should clearly specify how the scheme applies to:
 - a) pre-existing generators who are already within a REZ.
 - b) parties who are well advanced in progressing developments within a REZ before the introduction of the REZ scheme.

R.3 Funding and economic regulation

Recommended principle

Consideration should be given to the appropriate recovery of efficient transmission infrastructure costs, ideally in a manner which least distorts the efficient outcomes.

A service provider which develops REZ transmission network infrastructure should be provided with a reasonable opportunity to recover at least the efficient costs the provider incurs (as determined by a suitably qualified and independent body) in the provision of the services and complying with any regulatory obligations, including a return on capital commensurate with the regulatory and commercial risks involved in the provision of the service.

A REZ network service provider should also be provided with effective incentives to promote economic efficiency with respect to services provided. The economic efficiency that should be promoted includes efficient investment in, and use of, the service.

Implementing the principle

1. Where shared transmission infrastructure within a REZ is funded by customers, and a tender process for that REZ generates surplus revenue, then that surplus revenue should be returned to customers in the form of a reduction in network charges.
2. If a REZ scheme involves investment in transmission assets that are larger or earlier than those that would be built under the actionable ISP framework, those additional costs should only be recovered from customers to the extent that they benefit from the investment.
3. The economic regulation arrangements associated with REZ infrastructure projects should only diverge from the National Electricity Rules to the extent necessary to give effect to government policy and any material departures should be transparent.
4. The economic regulation framework should include incentive arrangements to promote efficient investment and delivery of REZ infrastructure projects, as well as incentive arrangements to promote the efficient operation and use of those assets once commissioned.

5. Transmission assets that are funded in accordance with a REZ scheme should be defined in a way that clearly delineates them from assets funded in accordance with the National Electricity Rules economic regulation framework.

R.4 Access

Recommended principle

REZ participants should pay a price to access regulated REZ transmission infrastructure which reflects the marginal cost of congestion. To the extent that the marginal cost is negative, generators and storage should be paid. The framework should have regard to generator's ability to manage risk.

Implementing the principle

1. Any REZ-specific access model should be simple to implement and administer, with a view to being able to integrate with more comprehensive national arrangements if and when they are implemented. For instance, a REZ-specific access model could take the following forms:
 - a. a physical access scheme,
 - b. a separately administered post-settlement financial reimbursement arrangement, or
 - c. a combination of the above.
2. Any REZ-specific access regime should be designed in a way that does not affect power system dispatch.
3. In developing a REZ specific access scheme, governments should have regard to the benefits of consistency and adopting best practice among NEM jurisdictions.

1. Introduction

Key points

- This paper sets out the ESB’s recommended principles for an interim framework for the implementation of Renewable Energy Zones (REZ) together with practical guidance on how these principles could be implemented.
- A REZ framework promotes coordination by making it more attractive for generators to invest in certain parts of the network.
- The ESB’s recommendations set out principles for how REZs could be implemented, including how a REZ could be established, and how to maintain a REZ once it is established.
- The principles recommended in this paper establish an interim framework that is designed to fit with key reforms that are the subject of further detailed work, including the transmission and access work stream of the Post 2025 market design review.

1.1 Context

In March 2020, Energy Ministers asked the ESB to develop arrangements to support the development of REZs as an interim measure ahead of longer-term access reforms. The ESB conducted this project in accordance with a two-step process:

1. Rule changes that require the jurisdictional planner to develop a detailed and staged development plan for each priority REZ identified in the ISP, and
2. The development of a policy framework for the staged development of REZs within a REZ development plan.

The ESB has previously completed Step 1 of this process. Energy Ministers have recently approved the ESB’s recommended REZ planning rules¹ which came into effect on 13 May 2021. This paper sets out the ESB’s recommendations with respect to Step 2. It proposes an interim framework for how to plan, fund, establish, and maintain access to shared transmission infrastructure within a REZ.

This project has been conducted in the context of a range of other inter-related pieces of work. Several state governments have proposed ambitious plans to develop Renewable Energy Zones (REZ) in order to deliver large amounts of new renewable generation capacity to the power system. For instance:

- NSW is implementing its legislated Electricity Infrastructure Roadmap, which involves the development of five REZs
- Victoria is consulting on a REZ development plan involving six proposed REZs backed by a \$540 million REZ fund, and
- Queensland has identified three REZ corridors and has established a \$500 million renewable energy fund.²

As individual jurisdictions progress the planning and development of REZs, there is value in establishing a set of principles so that the outcomes of the REZ development processes are aligned with the efficient

1 <https://energyministers.gov.au/publications/energy-security-board-renewable-energy-zones-planning-consultation>

2 For further information, see: <https://energy.nsw.gov.au/government-and-regulation/electricity-infrastructure-roadmap>, <https://www.energy.vic.gov.au/renewable-energy/renewable-energy-zones>, <https://www.dnrme.qld.gov.au/energy/initiatives/queensland-renewable-energy-zones>

development of the broader power system. In preparing these recommendations, the ESB has worked closely with State governments.

The recommendations take the form of a set of principles that can be applied to a range of REZ delivery models. The interim framework will assist parties wishing to develop a REZ by providing guidance for resolving key market design issues that have presented a barrier to coordination in the past. It does not attempt to prescribe a particular model of REZ development. The ESB recommends that Ministers adopt the REZ Stage 2 recommended principles.

REZs form part of a broader integrated power system. To maintain the integrity of the system, it is important that REZs are developed in a way that has regard to certain core elements of the national framework. The appropriate interim framework for REZs therefore comprises a combination of principles and Rules. The recommended principles set out in this document are designed to fit with key aspects of the National Electricity Rules.

In parallel, the ESB is currently conducting a series of reforms to ensure the national electricity market (NEM) is compatible with the large-scale changes that are taking place to the power system. The recommended principles outlined in this paper are designed to fit with key reforms that are the subject of further detailed work, including:

- The REZ Planning Rules developed during Stage 1 of the ESB's interim REZ review, and
- The transmission and access work stream of the Post 2025 market design review, and
- The system security requirements of the National Electricity Rules, as amended by the package of reforms outlined in the essential system services work stream of the Post 2025 market design review.

These related reforms either have been, or will be, the subject of Rule changes. For instance, the REZ Planning Rules have recently been approved by Ministers in accordance with s90F of the National Electricity Law. The ESB also envisages that the medium term access reforms will be the subject of a rule change, however this is subject to the outcomes of the Post 2025 market design process.

The ESB's recommended principles will help jurisdictions looking to resolve urgent issues in the short term to do so in a way that builds towards long term improvements to the national framework. In particular, the principles and practical guidance for access, discussed in Chapter 5, will enable jurisdictions to develop REZs in a way that is able to integrate with the system-wide reforms contemplated as part of the Post 2025 market design review.

1.2 Background

Stakeholders have concerns about efficient and effective connection to, and use of, the grid. Grid connection is difficult in many areas and technical issues, mostly associated with low system strength, affect the timeliness and cost of connection. Once connected, high levels of congestion and significant reductions in marginal loss factors are problematic.

These issues have arisen as many new generators seek access to the grid. Under the current regime, generators' access to the grid is determined by individual decisions, with no coordination and limited transparency regarding the impact. These challenges are the consequence of the current access regime and a lack of coordination between transmission system augmentation and generation investment.

The current regime requires AEMO and TNSPs to connect new generators, even if transmission capacity is limited and the effect of further generation in the area is to constrain pre-existing generators (unless there are system security concerns created from the connection of these new generators). In areas of the grid where there have been large numbers of new connections there have been issues with increased costs and delays to connections, falling loss factors and increasing constraints on generators. These impacts are not manageable by individual investors and the increased cost and risk of connections is not in the long-term interest of customers.

While the current access arrangements may have been adequate in the past with only incremental investment occurring, they are not fit for the future transformational change to the system. In order to deliver additional supply at least cost, a mechanism is required to coordinate the transmission, generation and storage investments. Orderly renewables development will help to reduce risk associated with network congestion, low marginal loss factors and technical difficulties. Orderly development and reduced connection uncertainties would be of benefit both to investors and, in the long run, to customers.

The ESB's actionable Integrated System Plan (ISP) Rules³ help to coordinate power system development by driving transmission investment in line with a whole of system plan. While these reforms drive coordinated transmission investment, transmission is only one piece of the puzzle. For the whole of system plan envisaged in the ISP to be given effect, generation, storage and demand side solutions should also locate in places that correspond to the least cost development of the power system. However, these new resources do not have a corresponding incentive to locate in places that are optimal from a whole-of-system perspective.

A REZ framework promotes coordination by making it more attractive for generators to invest in certain parts of the network. Generators would be incentivised to participate in a REZ using a set of "carrots" which could include scale efficient connection assets, a simpler connection process and some form of access rights within the REZ.

REZs provide a partial solution that applies to specific geographic locations within the power system. Outside the REZs, the problems associated with open access would remain. Due to the way electricity flows across the grid, issues outside the REZ are felt inside the REZ. This can be addressed through solutions which apply across the whole system, of which REZs are part.

1.3 Overarching objectives

In conducting its functions, the ESB is guided by the National Electricity Objective (NEO). The NEO is "to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:

- Price, quality, safety and reliability and security of supply of electricity
- The reliability, safety and security of the national electricity system."

The ESB considers that the NEO gives rise to the high level objectives for REZ frameworks set out in Table 1.

³ <https://energyministers.gov.au/actionable-isp>

Table 1 Overarching objectives for REZ frameworks

Issue	Objective
Facilitate competition	Arrangements should facilitate cost efficiencies through effective competition where feasible, and where effective competition is not feasible, through effective regulation.
Promote efficiency	Arrangements should promote signals for efficient investment and operations. While price signals are preferred, there may be other signals that can also be provided such as the provision of greater market information to participants.
Accountability	Risk and cost allocation, and the accountability for investment and operational decisions, should rest with those parties best placed to manage them.
Simplicity	Regulatory and administrative costs should be minimised where possible. Simplicity is favoured over complexity. Opportunity costs relating to implementing solutions that take some time to implement should be considered.
Consistency	Arrangements, where possible, should be operable with the market and regulatory frameworks outside of REZs, both within the region and in other NEM jurisdictions.

The ESB recommends the adoption of a set of overarching principles for REZs that is compatible with the efficient development of the power system as a whole. The principles are addressed in the following chapters:

- REZ planning (Chapter 2)
- Connecting to a REZ (Chapter 3)
- REZ funding and economic regulation (Chapter 4)
- Access within a REZ (Chapter 5).

The ESB has prepared high level principles, together with practical guidance that demonstrate how the principles could be met.

2. REZ planning

Recommended principle

Transmission network planning for regulated REZs should be consistent with rigorous cost benefit analysis conducted by an independent and suitably qualified body, transparently demonstrating the positive net benefits of the project in the context of a nationally coordinated approach to transmission infrastructure. Planning should take account of the full range of essential services required by the power system.

Implementing the principle

- When selecting REZs for development, Governments should have regard to the benefits of selecting REZs that are on the ISP optimal development path within 12 years.
- If a REZ is not on the ISP optimal development path, then the REZ scheme should be designed to meet the criteria set out in NER 5.22.3(b) in order to retain alignment between ISP outcomes and policy-driven investments in the NEM.
- There should be a transparent assessment of the impact any REZ scheme is likely to have on the efficient development and operation of the NEM on a whole of system basis.
- REZs should be planned and developed in stages to promote flexibility in response to changing circumstances.
- The REZ design and planning process should have regard to the system security needs that may arise from the particular REZ.

The identification and development of REZs is key to the redesign of the transmission system to access new sources of renewable energy. Choices regarding the location, scale and timing of REZs reverberate across the whole power system and have important implications for the quantity and cost of investment required to deliver the energy transition.

At the same time, REZ planning needs to consider more than just economic and technical factors. While many transmission investments can have visual amenity impacts, the development of a REZ can also have impacts on land use, as well as an economic impact on affected communities. Social licence, and the ability to obtain the required permits, is critical. These issues can have just as big an impact on developer costs as network connection issues. The ESB suggests that REZ planning activities are conducted by an independent and suitably qualified body, such as the local TNSP, AEMO or a State government transmission planning body.

The REZ Planning Rules⁴ support the design of REZs in a way that has regard to the needs of communities and developers, and also aligns with the optimal development path for the power system as set out in the ISP. The Stage 2 REZ recommendations complement, but are not dependent on, the Stage 1 REZ planning rules. If a State were to adopt the Stage 1 REZ planning rules, and take no further action on planning, then the ESB's Stage 2 planning recommendations set out in this chapter would be met.

⁴ See <https://energyministers.gov.au/publications/energy-security-board-renewable-energy-zones-planning-consultation>.

The effect of the REZ planning Rules are to enhance the existing actionable ISP planning process. The REZ design reports improve the quality of the inputs to the ISP by establishing a framework that enables the jurisdictional planning body to consult renewable energy developers and local communities at an earlier stage in the planning process than is currently the case. The REZ planning Rules promote alignment between the ISP and government policy by enabling social licence considerations to be taken into account as part of the REZ design process.

However, REZ design reports are only required at AEMO's discretion. AEMO has the ability to nominate a REZ as an actionable ISP project irrespective of whether a REZ design report has been completed. For instance, AEMO could decide to skip the REZ design report in the case where a State government REZ scheme has already conducted the equivalent planning activities. The ESB's recommended principles with respect to REZ planning are designed to maintain the cohesive development of the power system as a whole, while also recognising the role of government policy in driving power system outcomes.

2.1 Stakeholder feedback

The ESB consulted on the REZ planning framework as part of its Stage 1 process. On balance, there was broad support for the proposal for jurisdictional planning bodies to prepare REZ design reports. Most parties considered that the REZ planning rules should be long term, not interim. There was support from community representatives who consider that current transmission planning framework does not include sufficient community consultation at the right stage in the process.

In the Stage 2 consultation paper, network representatives asked the ESB to provide more clarity on the delineation between the role of the REZ coordinator and the role of the jurisdictional planning body. The ESB envisages that the role of the REZ co-ordinator is focussed on co-ordinating generators — in particular, who connects to the REZ as foundational generator, and how subsequent connections are managed within the REZ. The role of the jurisdictional planning body is focussed on planning the transmission elements of a REZ. It will be important for these parties to work closely together to ensure a coordinated result.

Given the lead time for new transmission investment is significantly longer than for wind and solar developments, it is likely that in many cases the decision to invest in the shared transmission elements of a REZ stage will occur before the REZ coordinator conducts any tender process. There would be a need for the JPB and REZ coordinator to work closely on certain matters. For instance, the REZ coordinators' work to establish a REZ could be informed by advice from the JPB regarding the likely system security and/or connection assets required to connect different proposals.

In the REZ consultation paper, the ESB consulted on whether the timing and scale of staged REZ developments should be contingent on outcomes during earlier stages. Four respondents, including the Energy Users Association of Australia and Australian Energy Council, thought that subsequent stages of a REZ should not proceed if previous stages were undersubscribed. Seven respondents, including several network representatives, thought that there should not be a link.

2.2 ESB guidance for implementing the principles

2.2.1 REZ developments should align with the ISP

AEMO's ISP provides a 20-year outlook for the transmission needs of the NEM. It identifies and prioritises an optimised least cost portfolio of investments to maintain the reliability and affordability of the energy system as it transitions to lower emissions and more distributed generation.

As an *integrated* system plan, changes to the plan in one respect can have significant flow on consequences throughout the rest of the plan. For example, interconnector investment is in large part justified on the basis of trading energy between areas. If energy is produced in increased quantities locally, for example due to a REZ development that was not in the ISP, then interconnector which would otherwise have been justified may no longer be. This in turn affects the business case of very many other investments throughout the NEM. By aligning with the ISP, REZ developments will avoid potentially costly ramifications from a whole of system perspective.

The ISP assesses a broad range of candidate REZs, taking into account regional renewable energy targets and other policies, the quality of renewable resources and their ability to access transmission network capacity. This provides an opportunity for governments to make sure the national plan takes account of a wide range of policy objectives.

The ESB suggests that when selecting REZs for development, governments should have regard to the benefits of selecting REZs that are on the ISP optimal development path within 12 years.

The ISP is a rigorously consulted upon plan that is carefully calibrated to deliver power system needs at least cost. Hence, REZ developments that depart from the least cost plan outlined in the ISP may result in increased costs overall.

2.2.2 REZ scheme should meet actionable ISP public policy criteria

The actionable ISP rules establish a framework that allows the ISP to incorporate and reflect government policy where specified criteria are met. However, there may be a lag between when the policy is made, and when it is reflected in the ISP. The ESB's recommended principle is designed to ensure that policy-driven REZ investments are able to subsequently be reflected in the ISP, so that the plan for efficient development of the power system can adapt in response to changing circumstances. This will ensure that the ISP optimal development path is able to adapt in cases where a new policy-driven REZ has the effect of displacing other proposed investments.

AEMO may consider a current environmental or energy policy where the policy has been sufficiently developed to enable AEMO to identify the impacts of it on the power system and at least one of the following is satisfied:

- (1) a commitment has been made in an international agreement to implement that policy;
- (2) that policy has been enacted in legislation;
- (3) there is a regulatory obligation in relation to that policy;
- (4) there is material funding allocated to that policy in a budget of the relevant participating jurisdiction; or
- (5) the MCE has advised AEMO to incorporate the policy.⁵

If AEMO considers that one of the criteria is met, then it may adjust the ISP modelling to ensure that the public policy is delivered as part of the optimal development path.

The ESB suggests that if a REZ is not on the ISP optimal development path, then the REZ scheme should be designed to meet the criteria set out in NER 5.22.3(b). This will help to avoid uncoordinated

⁵ NER 5.22.3(b)

developments by retaining alignment between future ISP outcomes and policy-driven investments, to minimise the costs of transmission investments that are passed on to consumers.

2.2.3 Transparent assessment

As outlined above, developments that depart from the ISP optimal development path may result in increased costs from a whole of system perspective.

Further, as an interconnected power system, the NEM has “zero sum” characteristics. Electricity supply must always equal electricity demand, and if new sources of supply emerge then other resources must be displaced absent an increase in demand. Unless provision is made for energy exports (e.g. green hydrogen) or complementary developments in energy-intensive industry, there is a risk that REZ schemes in one state could reduce the viability of REZ developments elsewhere in the NEM.

The ESB suggests that there should be a transparent assessment of the impact any REZ scheme is likely to have on the efficient development and operation of the NEM on a whole of system basis (R.1.3). The Rules already include a mechanism to trigger an assessment of this nature. State governments may request that the AEMO prepares a sensitivity showing the impacts of energy or environmental policies as part of the ISP process.⁶

2.2.4 Staged development of REZs

Many of the REZs identified in the ISP rely upon development of the broader national grid as the interconnector augmentations proposed in the ISP both provide benefits of trade across the NEM and allow the connection of additional renewable generation. This reduces some of the financial risks in developing generators within a REZ, but not all.

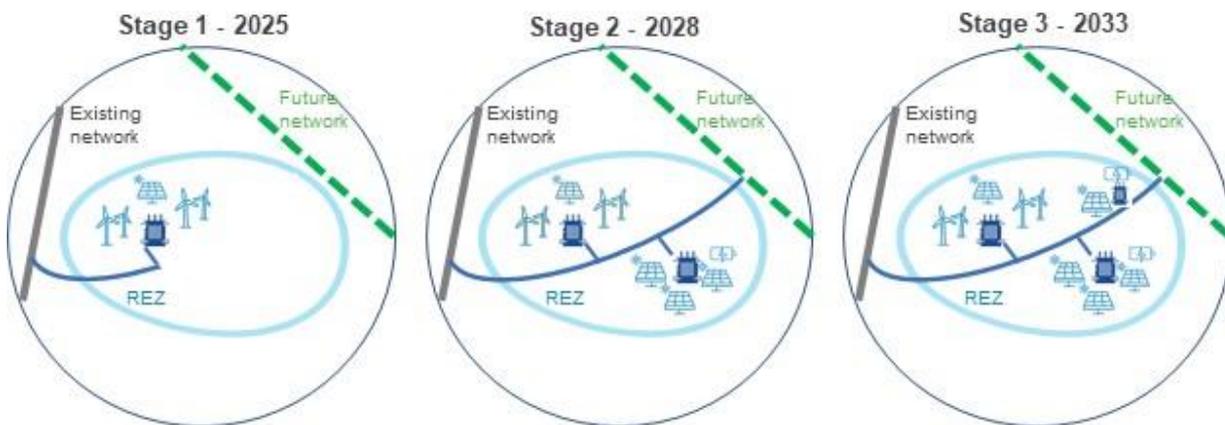
Under a staged approach to REZ development, the planning framework should set out a cohesive, long term plan for the development of the REZ that leverages and contributes to the broader development of the power system. This holistic plan could be broken down into a sequence of projects which are able to be delivered over an extended period (e.g. a decade).

Staging can help to reduce costs by leveraging planned power system developments beyond the REZ. For instance, a REZ may be designed to take advantage of a future interconnector upgrade which does not occur until after the first part of the REZ is established.

The planning framework needs to take into account not only the transfer capability of the planned network expansion, but also power system security issues and hence effective and efficient hosting capacity released in each stage. This would provide that each stage could be configured and include additional plant that would provide scale efficiencies to parties connecting to that stage of the REZ.

⁶ NER 5.22.6(b)(3)

Figure 1 Depiction of a staged REZ development



A staged approach to REZ planning can also mitigate the risk of asset stranding. Rather than constructing an entire REZ as one project, the development could be split up into more flexible stages that can be deferred or brought forward, depending on circumstances. These circumstances should be identified as clearly as possible, so that investors can account for possible changes in the plan in their business case.

REZ schemes could further protect against the risk of asset stranding by linking the success or otherwise of preceding REZ stages to the development of subsequent REZ stages. This approach shares parallels with the approach applied to gas transmission investment. It would not change who funds the REZ, but it would mitigate the stranded asset risk borne by customers.

If a tender process associated with a REZ stage fails to generate anticipated revenues, then future stages of the REZ would be reassessed and potentially modified or ceased. This approach would protect against further expansion of an underutilised REZ, but it would not prevent underutilisation within the REZ stages that do proceed.

This could be achieved by using the results of the tender process to recalibrate planning inputs and assumptions (for instance, the ISP and RIT-T modelling), which could impact whether the next REZ stage progresses.

2.2.5 Process should have regard to system security

The ESB considers that maintaining system security is one of the most critical challenges that we face in the NEM. As the power system transitions to a lower emissions generation mix, the generation mix is changing from: a small number of large, synchronous units to a larger number of smaller, non-synchronous, dispersed units. Many system services that were previously provided for free as a by-product of power generation may not be available to continue to maintain secure operation of the power system.

In the event that governments establish a State-based REZ design and planning process, it will be important that the process includes a framework to assess and respond to the system security implications for the broader system that may be created from identifying and developing REZs.

3. Connecting to a REZ

Recommended principle

The connection process should be clearly specified in advance. The process for determining technical requirements relating to generator and storage performance should be consistent with the National Electricity Rules. Connecting parties should pay in full for any cost that arise exclusively as a result of their connection, consistent with the existing Rules and the principle of marginal cost pricing.

Implementing the principle

- Where a REZ development involves the construction of new transmission lines, parties wishing to connect to a REZ should participate in a coordinated tender process.
- If the foundational REZ generators are selected using a tender process, then the party responsible for conducting the tender (the REZ coordinator) should:
 - select REZ participants on a basis that has regard to the NEO,
 - ensure that the amount of capacity made available over time is consistent with efficient use of the REZ and the broader power system, having regard to different generator output profiles,
 - have regard to the benefits of a process that does not inefficiently distort the generation mix.
- REZ participants should comply with the registration and connection requirements of the National Electricity Rules.
- The REZ scheme should seek to deliver scale efficient connection and system security assets.
- REZ schemes should clearly specify how the scheme applies to:
 - pre-existing generators who are already within a REZ.
 - parties who are well advanced in progressing developments within a REZ before the introduction of the REZ scheme.
-

International experience suggests that focussing renewable energy development around zones can offer a way to efficiently and effectively connect renewable energy to the grid.

However, each REZ scheme is bespoke, reflecting the unique characteristics of the relevant market design and power system. What each of these policies share is that they involve strategic choices to facilitate large-scale renewable generation at a jurisdictional and policy level. This top-down commitment provided investment certainty required for parties to participate in a coordinated development.

There are a range of factors that will influence the design of a REZ scheme. These include whether the relevant REZ is being established in a greenfields or brownfields environment, and whether the network configuration is radial or meshed. Given the potential for REZs to be developed in diverse contexts, the ESB's recommended principles for connections to a REZ are designed to accommodate a variety of approaches.

3.1 Stakeholder feedback

The ESB's REZ consultation paper outlined a REZ development model whereby generators participate in an auction or tender process in order to compete for the right to participate in a REZ. Most respondents were comfortable with the concept of a REZ coordinator with responsibility for deciding which generators become part of the REZ. The Australian Energy Council considered the proposal for a REZ coordinator to be unnecessarily interventionist.

The ESB's proposal that the REZ coordinator should be nominated by the relevant State government was widely accepted. Most respondents thought that a government entity was best placed to become the REZ coordinator, with a smattering of support for the Jurisdictional Planning Body, AEMO, the Clean Energy Regulator or Clean Energy Finance Corporation, or a panel comprising the AER, AEMO and the TNSP.

A number of respondents noted that further detail is required to make an informed view on how the tender process will work. Several respondents noted that there is potential for a tender to make the connections process harder rather than easier. Some respondents thought that the REZ or the REZ coordinator should be limited to coordinating connection assets. This approach could be applied via the Scale Efficient Network Extensions framework⁷ (supplemented by the AEMC's Dedicated Connection Assets Rule change⁸).

A range of views were expressed regarding the qualification criteria to apply to prospective REZ participants. Some respondents expressed support for a bid bond approach. Other proposed criteria included access to land, demonstrated path to financial close. Of the respondents that addressed the issue, respondents were evenly split on the question of whether the REZ coordinator should seek to select a suite of projects that reflects the generation mix forecast in the ISP.

Several generators suggested that grandfathering should apply to pre-existing generators that are affected by a REZ development. Neoen suggested that generators that connect to the new transmission assets associated with the REZ should be subject to the REZ framework, and those that connect to the existing network should not. Several DNSPs suggested that it was necessary to consider what would happen to distribution-connected generators within a REZ.

3.2 ESB guidance for implementing the recommended principle

3.2.1 REZ tender process (if applicable)

The ESB suggests that where a REZ development involves the construction of new transmission lines, parties wishing to connect to a REZ should participate in a coordinated tender process (R.2(1)).

In formulating this principle, the ESB envisaged a role for a body that has responsibility for coordinating the connection of generators to the REZ (the REZ coordinator). Given the benefits of a coordinated approach that takes into account social licence, the ESB considers that the decision with respect to the REZ coordinator best lies with State governments.

A key function of the REZ coordinator would be to undergo some form of selection process to decide which generators initially connect to the REZ. This selection process could be used to allocate access rights within the REZ to REZ participants (see Chapter 5). Depending on which access model is adopted, the REZ coordinator could also be responsible for managing the terms on which subsequent generators connect to the REZ.

⁷ <https://www.aemc.gov.au/rule-changes/scale-efficient-network-extensions>

⁸ Insert ref <https://www.aemc.gov.au/rule-changes/connection-dedicated-connection-assets>

Where foundational REZ generators are selected using a tender process, the ESB suggests that the party responsible for conducting tender process should:

- select REZ participants on a basis that has regard to the NEO,
- ensure that the amount of capacity made available over time is consistent with efficient use of the REZ and the broader power system, having regard to different generator output profiles, have regard to the benefits of a process that does not inefficiently distort the generation mix(R.2(2)).

If they wish, State governments could further enhance the benefits of a coordinated process by streamlining the environmental and planning approval process for certain REZs.

Select REZ participants on a basis that has regard to the National Electricity Objective

The ESB suggests that among other things, the REZ coordinator should select REZ participants on a basis that has regard to the National Electricity Objective. For instance, the REZ coordinator could be required to select the suite of projects that promotes the long-term interests of customers, having regard to the combined costs and benefits of the generation, storage and network elements of the project.

In formulating this principle, the ESB considered that the REZ coordinator would, for example, establish a set of transparent criteria that they use to select successful tenderers. There are a range of factors that governments could take into account, such as measures to encourage investment, employment, and skills development.

Allocate capacity consistent with efficient use of the REZ and broader power system

An example of effecting this principle includes specifying a “cap” that defines the quantity of access rights to be made available for a REZ or stage of a REZ. Generators could participate in an auction or tender process to compete for the right to connect to a REZ as part of that capped capacity. The cap would then need to be maintained through some form of access right to the REZ’s transmission network. This would provide REZ investors with improved investment certainty. Market participants would still be able to connect to the REZ after the initial tender process, however they would need to do so in accordance with the relevant access regime. The ESB’s recommended principles with respect to REZ access schemes are discussed in Chapter 5. The quantity of access rights made available as part of the tender process should align with the efficient hosting capacity of the REZ.

The efficient usage of the REZ should be assessed in the context of the broader power system. A certain level of transmission congestion is efficient in a high VRE power system. This is because a high VRE power system tends to have tidal power system flows that vary in accordance with the availability of wind and solar energy. Hence, it may be efficient for the REZ to be congested during periods of high VRE availability, so that the REZ can generate more power during periods of intermediate VRE availability. Hence, an efficient cap on the quantity of firm access rights is likely to be an amount that exceeds the basic network transfer capability of the REZ.

If pursuing this approach, the methodology used to determine the cap should also recognise that the hosting capacity of the REZ will vary depending on the nature of the generators that connect to it and changing power system conditions. The hosting capacity of a REZ is higher if generators within the REZ have diverse output profiles compared to a set of generators who all seek to produce simultaneously.

In effecting this principle, it would also be necessary to resolve the treatment of storage within a REZ. Storage differs from generation in that it has the ability to reduce congestion, so long as it receives the

right market signals. Hence, there is a question as to whether the hosting capacity of the REZ should include storage, and the treatment of storage within an access regime. Under some access models, storage providers could potentially find it more profitable to connect on a non-firm basis. This issue is discussed further in the ESB's Post 2025 options paper.⁹

Avoid distorting the generation mix

The mix of generation technologies associated with the REZ will affect the extent to which the REZ aligns with the optimal development path set out in the ISP, since REZs are selected based on the quality of their wind and/or solar resources.

Any tender process established as part of a REZ scheme should be designed in a way that does not inefficiently distort the generation mix in favour of a particular technology. For instance, international experience has shown that if a REZ scheme offers financial incentives that do not reflect the market value of electricity generated, and selects tenderers on a least cost basis, then it can deliver inefficient outcomes (e.g. solar generators in a wet and windy location).¹⁰ The ESB suggests that REZ schemes should seek to avoid such outcomes.

3.2.2 Compliance with registration and connection requirements

In order to ensure that the co-ordinated process results in successful, high quality REZ developments, the REZ coordinator could establish certain minimum requirements that developers must meet in order to be eligible to participate in a REZ tender process.

The ESB's focus is to ensure the secure, reliable and efficient development of the power system. To this end, the ESB suggests that, as a minimum requirement, REZ participants should comply with the registration and connection requirements of the National Electricity Rules (R.2(3)).

While they do not form part of the ESB's recommended principles, the ESB notes that governments could seek to apply a range of other criteria. For instance, in order to participate in a REZ auction, project developers could be required to meet specified qualification criteria with respect to:

- geographic location – to provide clarity to potential project developers
- project finance - to ensure only genuine projects are awarded REZ participant status.
- community acceptance - to ensure that the REZ participants do not experience problems during the environmental and planning approvals process.

The REZ coordinator might also choose to require REZ generators to comply with certain requirements deemed necessary to achieve social licence (for instance, no developments within two kilometres of a dwelling). If so, the ESB considers that the REZ coordinator would need to work with the relevant authorities to ensure that the criteria are appropriately specified. It would be necessary to strike a balance between simplifying the connections process, by ensuring that successful projects are appropriately specified, while not imposing requirements that unduly add to the cost of participating in a REZ.

⁹ ESB, Post 2025 Market Design Options Paper, April 2021. See <https://esb-post2025-market-design.aemc.gov.au/>

¹⁰ International Renewable Energy Agency, Renewable energy auctions - status and trends beyond price, 2019.

3.2.3 Scale efficient connection and system security assets

At present, each generator connects on a piecemeal basis and funds its own dedicated transmission line, substation and (in some cases) system security assets. The current uncoordinated approach to generator connections leaves potential for cost savings which can be harnessed via the REZ framework.

The National Electricity Rules already provides for scale efficient network connections,¹¹ which are intended to achieve a similar outcome. However, this framework has been almost unused to date because it relies on cooperation between commercial rivals, each of whom are trying to coordinate complex projects with many moving parts. The current Rules framework also makes it simpler and more profitable for transmission networks to manage generator connections on a case-by-case basis rather than to seek a scale efficient solution given that they are a natural monopoly.

Scale efficient connection and system security assets should be planned as part of the REZ design process (with scope for refinements as the technical characteristics of the participating generators become known). For instance, rather than each generator building their own substation, generators could share substations with multiple bays. This approach would achieve substantial cost savings and also reduce the community impact of the REZ.

System security needs could be met on a centralised basis as part of the infrastructure associated with the REZ. This arrangement would align with framework set out in the AEMC's system strength investigation¹² and forthcoming rule determination.

The ESB suggests that the REZ scheme be designed in a way that seeks to deliver scale efficient connection and system security assets (R.2(4)).

In order to give effect to this principle, the REZ coordinator could work with developers and the relevant TNSP to develop plans for scale efficient connection assets and any associated system security infrastructure, having regard to the plans for shared transmission infrastructure set out in the REZ design report.

3.2.4 Treatment of pre-existing developments

REZ schemes should clarify what happens to pre-existing generators who are already within a REZ and parties who are well advanced in progressing developments within a REZ ahead of the proposed REZ regime being in place.

It may or may not be appropriate to treat an upgraded asset as part of the REZ scheme, depending on the scale and nature of the upgrade. The normal NEM access regime (as reformed) could apply to generators that have reached a clearly specified stage of development – for instance, committed project status – and the REZ access scheme could apply to developments that are less advanced.

The approach should seek to avoid disrupting genuine projects that are being developed under the current access regime, while also ensuring that it does not incentivise gaming behaviour, such as the premature submission of connection applications in order to gain preferential treatment.

¹¹ Information relating to the SENE framework is available on the AEMC's website at <https://www.aemc.gov.au/rule-changes/scale-efficient-network-extensions>

¹² See here: <https://www.aemc.gov.au/rule-changes/efficient-management-system-strength-power-system>

4. Funding and economic regulation

Recommended principles

Consideration should be given to the appropriate recovery of efficient transmission¹³ infrastructure costs, ideally in a manner which least distorts the efficient outcomes.

A service provider which develops REZ transmission network infrastructure should be provided with a reasonable opportunity to recover at least the efficient costs the provider incurs (as determined by a suitably qualified and independent body) in the provision of the services and complying with any regulatory obligations, including a return on capital commensurate with the regulatory and commercial risks involved in the provision of the service.

A REZ network service provider should also be provided with effective incentives to promote economic efficiency with respect to services provided. The economic efficiency that should be promoted includes efficient investment in, and use of, the service.

Implementing the principles

- Where shared transmission infrastructure within a REZ is funded by customers, and a tender process for that REZ generates surplus revenue, then that surplus revenue should be returned to customers in the form of a reduction in network charges.
- If a REZ scheme involves investment in transmission assets that are larger or earlier than those that would be built under the actionable ISP framework, those additional costs should only be recovered from customers to the extent that they benefit from the investment.
- The economic regulation arrangements associated with REZ infrastructure projects should only diverge from the National Electricity Rules to the extent necessary to give effect to government policy and any material departures should be transparent.
- The economic regulation framework should include incentive arrangements to promote efficient investment and delivery of REZ infrastructure projects, as well as incentive arrangements to promote the efficient operation and use of those assets once commissioned.
- Transmission assets that are funded in accordance with a REZ scheme should be defined in a way that clearly delineates them from assets funded in accordance with the National Electricity Rules economic regulation framework.

Under the National Electricity Rules, if a transmission investment associated with a REZ is classified as an actionable ISP project and it passes the RIT-T, it can proceed on a regulated basis funded by customers. If a government wishes to promote a particular REZ which would not otherwise form part of the optimal development path in an ISP, the government may make a contribution that can be taken into account in determining whether the REZ satisfies the RIT-T.

Victoria and New South Wales have introduced legislation that enables alternative funding/investment frameworks to apply to transmission, and other States may make a similar decision. This section recommends overarching principles to apply to these alternative funding/investment frameworks in order to avoid unnecessary distortions to the national framework and minimise the costs to consumers.

¹³ In the event that a REZ scheme also incorporates distribution network assets, then these principles should also apply to distribution.

4.1 Stakeholder feedback

Customer representatives have challenged the notion that they should bear all the costs of transmission investment, particularly where the purpose of the investment is to connect new generation.^{14,15}

The REZ consultation paper consulted on an alternative funding model developed by the Public Interest Advisory Centre (PIAC). This model supports shared funding of REZ assets between customers, generators, and potentially other parties including merchant investors and governments. The Energy Users Association of Australia, PIAC, RWE, Infigen and Neoen expressed support for further consideration of the PIAC model for REZ development. The ESB notes that transmission funding and transmission access are closely intertwined, and the transmission and access stream of the post 2025 market design review is also considering issues relevant to the PIAC model.

Most respondents supported the proposal that surplus tender proceeds should be returned to customers, although some generators queried whether there was likely to be a surplus. A couple of generators suggested that the surplus auction proceeds could be put into a fund for the ongoing operation and maintenance of the relevant REZ assets.

4.2 ESB guidance for implementing the recommended principle

4.2.1 Auction revenue to be returned to customers

The ESB suggests that where shared transmission infrastructure within a REZ is funded by customers, and a tender process for that REZ generates surplus revenue, then that surplus revenue¹⁶ should be returned to customers in the form of a reduction in network charges (R.3.1).

This requirement would have the effect that generators would contribute to the cost of the REZ's shared transmission infrastructure, as opposed to the infrastructure being funded (in almost all cases) exclusively by consumers. The tender process would incentivise generators to submit offers that reflect the value that they place on being part of the REZ. If they submit a lower amount, there is a risk that they will be outbid.

From a customer's perspective, this approach is a substantial improvement on the status quo because customers currently bear all the costs of prescribed transmission services. However, it would not provide certainty regarding the proportion or quantum of costs to be paid for by generators. If the REZ tender process yielded lower than expected revenues, then customers would receive a smaller reduction on their network charges.

¹⁴ Energy Users Association of Australia, Submission to ESB consultation on the draft REZ Planning Rules, September 2020. Available at: <https://energyministers.gov.au/sites/prod.energycouncil/files/publications/documents/EUAA%20Response%20to%20Consultation%20Paper%20and%20Draft%20Rules%20%E2%80%93%20Interim%20REZ%20framework%20.pdf>

¹⁵ Major Energy Users, Submission to ESB consultation on the draft REZ Planning Rules, September 2020. Available at: <https://energyministers.gov.au/sites/prod.energycouncil/files/publications/documents/MEU%20Response%20to%20Consultation%20Paper%20and%20Draft%20Rules%20%E2%80%93%20Interim%20REZ%20framework%20.pdf>

¹⁶ In this context, "surplus" revenue means tender revenue in excess of the efficient costs of the REZ coordinator in conducting the tender. The ESB notes that some costs are already borne by generators under the current regulatory framework, such as connection costs and the costs of system strength remediation. Generators should continue to fund these costs.

4.2.2 Recovery of costs of early investment

Governments may value a range of benefits that are not currently captured by either the ISP or the RIT-T. These benefits may include boosting local economies or delivering additional employment opportunities in rural communities. As a result, governments may see benefits in REZ investments that are bigger, earlier, or in a different location to the investment that would proceed under a framework that is solely focussed on meeting the narrow scope of the National Electricity Objective.

These wider economic benefits should be captured in a broader cost-benefit test that guides the respective contributions of tax payers and electricity consumers according to the benefits they receive.

The ESB suggests that if a REZ scheme involves investment in transmission assets that are larger or earlier than those that would be built under the actionable ISP framework, those additional costs should only be recovered from customers to the extent that they benefit from the investment (R.3.2). In the interim, the costs should be allocated elsewhere. The ESB notes that in practice, the actionable ISP framework includes a mechanism that enables government policy to be reflected in the ISP.

Governments may decide to adopt contestable provision of transmission assets to deliver the transmission elements of REZ developments at least cost. The ESB suggests that the principle that “costs should only be recovered from customers to the extent that they benefit from the investment” should also apply to contestably provided transmission investments. Furthermore, the same principles that apply to the economic regulation of primary TNSPs should also apply to such assets.

The ESB notes that the AEMC is currently consulting on changes to the Rules which would enable a generator, or a group of generators, to fund dedicated network assets and have these assets subject to a special access regime. The current Rules provide a framework for coordinating and sharing connections between generators as dedicated connection assets (DCAs)¹⁷. To date sharing of these assets has been restricted by the existing framework. The AEMC published a draft rule in November 2020¹⁸ establishing a framework promotes sharing and efficient investment in transmission infrastructure by providing an incentive for a generator, or a group of generators to fund a shared asset. This new framework offers an opportunity to commercially develop a limited but similar scheme to a REZ. These arrangements could form the radial parts of REZs or could be stand-alone radial REZs.

4.2.3 Departures from Rules should be transparent

As outlined above, government policy is subject to a range of drivers that go beyond the scope of the National Electricity Objective. In light of these differences, some governments have exercised their prerogative to create a new investment test that better meets their policy objectives.

To avoid unnecessary divergence in the NEM framework, the ESB suggests that economic regulation arrangements associated with REZ infrastructure projects should only diverge from the National Electricity Rules to the extent necessary to give effect to government policy and any material departures should be transparent (R.3.3). Where a regulatory arrangement is not directly related to the public policy objective then the alternative arrangements should seek consistency so far as possible.

¹⁷ DCAs are privately owned and operated power lines that facilitate the connection of a generator/large load customer to the Primary TNSP's transmission network. Under the existing Rules, DCAs of a considerable length, i.e. large DCAs – power lines with a length of 30km or more – are subject to a special 3rd party access regime.

¹⁸ AEMC, *Connection to dedicated connection assets, Draft determination*, November 2020. See <https://www.aemc.gov.au/rule-changes/connection-dedicated-connection-assets>

4.2.4 Framework should include incentive arrangements

The economic regulation framework set out in the Rules includes a range of mechanisms that are designed to promote efficient investment and operation by network businesses. For instance:

- The service target performance incentive scheme¹⁹ provides incentives to TNSPs to improve or maintain a high level of service for the benefit of market participants and consumers.
- The efficiency benefit sharing scheme²⁰ and capital expenditure sharing scheme²¹ provide networks with continuous positive incentives to make both operating expenditure and capital expenditure efficiency gains, to share with consumers.

As per the above principle, the REZ scheme incentive arrangements should align with those set out in the National Electricity Rules. Where the economic regulation framework that applies to REZs departs from the framework set out in the NER, the ESB suggests that arrangements should include incentives on the relevant parties to promote efficient investment and delivery of REZ infrastructure projects, as well as incentive arrangements to promote the efficient operation and use of those assets once commissioned (R.3.4).

4.2.5 Assets funded via the REZ scheme should be clearly defined

When different economic regulation frameworks are juxtaposed on a single power system, it is important that assets are classified in a way that clearly distinguishes which assets are subject to which framework. Otherwise, there is a risk that customers could end paying twice – via the REZ scheme, and via the AER’s revenue determination for the network service provider. Another potential outcome is that network operators could be paid twice – by generators as part of their connection charges, and by customers in accordance with the economic regulation arrangements established by the REZ scheme.

This issue is particularly relevant at the boundaries between different types of transmission assets. For instance, the ESB notes that the Rules establish a class of assets called Identified User Shared Assets, which are assets within the substation that form part of the shared network but are funded by generators.²²

To avoid over or under recovery, the ESB suggests that assets that are funded in accordance with a REZ scheme are defined in a way that clearly delineates them from assets funded in accordance with the Rules. The simplest way to achieve this would be to ensure that at some level the service classifications that apply to a REZ scheme align with the service classifications in the Rules, even if the regulatory treatment of those services is different.

19 <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/service-target-performance-incentive-scheme-version-5-september-2015-amendment>

20 <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/efficiency-benefit-sharing-scheme-ebss-%E2%80%93-november-2013>

21 <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/expenditure-incentives-guideline-2013/final-decision>

22 <https://www.aemc.gov.au/sites/default/files/content/2a07fd2a-99e0-4c6c-b612-4e24e8253b6c/Information-sheet-Final-determination.pdf>

5. Access within a REZ

Recommended principle

REZ participants should pay a price to access regulated REZ transmission infrastructure which reflects the marginal cost of congestion. To the extent that the marginal cost is negative, generators and storage should be paid. The framework should have regard to generator's ability to manage risk.

Implementing the principle

- Any REZ-specific access model should be simple to implement and administer, with a view to being able to integrate with more comprehensive national arrangements if and when they are implemented. For instance, the REZ-specific access model could take the following forms :
 - a physical access regime,
 - a separately administered post-settlement financial reimbursement arrangement, or
 - a combination of the above.
- Any REZ-specific access regime should be designed in a way that does not affect NEM central dispatch.
- In developing a REZ specific access scheme, governments should have regard to the benefits of consistency and adopting best practice among NEM jurisdictions.

A key objective of a REZ scheme is to coordinate investment. REZs can help to give investors confidence in light of the numerous challenges currently facing new generation developments. Many (but not all) renewable energy investors agree that the current open access regime does not give investors confidence. The current open access arrangements result in a “free for all” where sound investment decisions can be undermined by subsequent generator entry, which limits the original generator's ability to access the market. While this may be appropriate in a normal competitive market, it can become dysfunctional in the context of the NEM, which is a physical machine as well as a market.

To address this issue, the REZ consultation paper proposed that successful participants in the REZ tender process would acquire a package of access rights. These rights would limit the extent to which REZ generators may be constrained over time due to subsequent generation entry within the REZ causing worsening congestion or loss factors. Other generators would be able to connect to the REZ after the initial tender process, however they would need to do so in accordance with the REZ access regime.

The REZ consultation paper described four options for access within a REZ:

1. Connection access protection model
2. Financial access protection model
3. REZ as a region; and
4. Early allocation of financial transmission rights.

In parallel, the NSW government has recently published an issues paper on the Central-West Orana REZ scheme.²³ Some models set out in the NSW issues paper involve a degree of alignment with Options 1 and 2 in the ESB REZ consultation paper, with some differences. The NSW models are specified at a greater level of detail than the high level options put forward by the ESB.

²³ NSW Department of Planning, Industry and Environment, Renewable Energy Zones – Access Scheme Issues Paper, March 2021.

Both the ESB's REZ access options and those put forward by the NSW government are designed to protect the access of REZ generators between their connection point and the point where the REZ connects to the main transmission network (the REZ reference node). They do not resolve issues arising between the REZ reference node and the regional reference node. Hence, when applied on a stand-alone basis, REZs provide only a partial solution to the problems associated with an open access regime.

5.1 Stakeholder feedback

Most respondents supported a simple approach to access. No respondents expressed support for the ESB's "REZ as a region" or "Early FTR allocation" options. Respondents were evenly split between the physical option (connection access protection model) and the financial option (financial access protection model), with many supporting no REZ access regime at all.

Respondents that favoured no REZ access regime typically thought that the problems created by a REZ access regime would be bigger than the problem it solves. The ESB does not agree with this view, for reasons outlined in the Post 2025 options paper.

The Australian Energy Council's submission highlighted the shortcomings of an access model that applies to only a sub-set of an interconnected power system.

Stakeholders were evenly split on the question of whether it would be necessary to restrict connections outside of REZs. Some renewable energy investors expressed the view that reform is required in order to create incentives for investors to participate in a REZ tender process, however others were unconvinced.

With respect to the financial access protection model, the consultation paper also sought feedback on whether subsequent connecting generators be required to provide compensation that reflects the regional reference price. Of the seven respondents that answered the question, all but one supported a more cost reflective compensation mechanism.

Several respondents suggested that a model where storage did not receive access rights, and instead charged for free during periods of congestion, would not incentivise storage to connect in congested parts of the grid.

5.2 Further ESB analysis of options

The ESB has conducted further analysis of the options outlined in the consultation paper and has also considered views put forward in submissions. The ESB does not propose to pursue further the "REZ as a region" or "Early FTR allocation" models both for technical reasons and due to lack of stakeholder support. Consistent with a number of submissions, the ESB supports a simple approach to any REZ-specific access scheme.

Following further analysis, the ESB has identified a new problem (referred to as "volume leakage") that limits the financial access protection model's potential benefits for storage.

Where REZ and non-REZ generators (i.e generators located outside the REZ) share a constraint, the dispatch of a non-firm REZ generator might actually impact the dispatch of a non-REZ generator rather than a firm REZ generator. As a result of this volume leakage, a model which implicitly assumes that it is the firm REZ generator that is affected will over-penalise the non-firm generator. This is not necessarily a problem: it just gives firm REZ generators an upside windfall and strengthens the disincentive to connect to REZ network assets outside the tender process.

However, volume leakage is more serious when it applies to a storage load. In this case, it might act to disadvantage REZ generators, due to the volume leakage working in reverse. For instance, 100MW of storage load might allow non-REZ generators to increase their dispatch by 100MW, but does not help REZ generators. If the arrangement is that REZ generators reward the storage load (as is the case for the financial access option), these generators pay for something that they don't benefit from, and so suffer a "windfall loss".

As a consequence, the ESB has formed the view that storage should not be allowed to charge for free when there is REZ congestion under a REZ-specific financial access model.²⁴ This means that it would be necessary to move to a whole of system solution – such as the congestion management model – in order to create a framework that remunerate storage and demand response for alleviating transmission congestion.

A further option that potentially addresses some of the shortcomings of options put forward in the REZ consultation paper is a hybrid model. A well designed hybrid model could combine the simplicity of a physical model with the efficiency benefits of a financial scheme. A possible approach is that any non-firm REZ entrant must propose a do no harm solution to the REZ coordinator (potentially making use of TNSP and/or AEMO advice) and the REZ coordinator would evaluate and approve (or reject) this proposal. Potential do no harm solutions might include connection assets, new shared network assets, financial compensation, or a combination of these. This would allow more efficient and effective solutions to be contemplated.

5.3 ESB guidance for implementing the recommended principle

5.3.1 Ability to integrate with the medium term access model

Overall, the ESB considers that the shortcomings of a REZ-specific access regime are sufficiently serious that it would be preferable to move directly to a whole of system solution, where it is possible to do so and still meet government policy objectives.

As outlined in the REZ consultation paper, electricity flows consistent with the laws of physics, so generators outside of the REZ physically utilise the REZ infrastructure and non-REZ infrastructure required for a REZ generator to get to load. This means it is problematic to physically honour the access rights of a REZ generator without disrupting the access rights of REZ generators elsewhere – in short, NEM wide access reform is required.

Access options that apply within REZs, but not outside the REZ, provide a partial solution to the problem of network congestion. However, the access of generators within the REZ will also be affected by events outside the REZ. While REZ generators would have rights that give them precedence over subsequent connecting generators within the REZ, they may still face constraints between the REZ reference node, their regional reference node and other regions.

As the power system evolves and more REZs are implemented, congestion outside the REZ can be expected to become more common and impact on dispatch outcomes of generators within the REZ. The ESB considers that a stand-alone REZ model, without additional reform, will not be fit for the future.

As outlined in the Post 2025 Options paper, the ESB is considering how to build on the REZ model in order to provide a stepping-stone towards the long-term, whole of system access solution. The ESB has

²⁴ In principle, it would be possible to do a "what if" calculation to fully understand the impact of non-firm REZ dispatch (whether generator or load) on firm REZ generators. However, this could become very complicated.

developed three models (and two further variations) which attempt to mitigate the shortcomings of a localised access solution and also address stakeholder concerns that have been raised with the long-term solution of locational marginal prices and financial transmission rights.

These models, and their performance against the ESB’s objectives for access reform, are described in Chapter 5 and Appendix 4 of the Post 2025 options paper. Table 2 describes how the various models could be designed to integrate with a REZ scheme.

Table 2 Applying the medium term access models to REZs

No	Option	REZ adaptation
1	Congestion management model	N/A - see options 2 and 5. All generators receive congestion rebates, irrespective of whether they participate in a REZ tender process.
2	Congestion management model with REZ adaptations	Generators are incentivised to participate in REZ tender processes through the selective availability of congestion rebates. Congestion rebates are made available to (1) REZ generators that successfully participate in a tender process and (2) incumbent generators. New entrant generators that wish to connect in a REZ outside the tender process, and new entrants that wish to connect outside a REZ, do not receive congestion rebates.
3	Connection fees	Generators that successfully participate in a REZ tender process are exempt from the need to pay a connection fee. Instead, the tender process places a market value on the connection. New entrant generators that wish to connect in a REZ outside the tender process, and new entrants that wish to connect outside a REZ, pay a connection fee that reflects their impact on the impact on the network.
4	Generator transmission use of system charges	REZ generators receive a lower G-TUOS charge. This could reflect the fact that their location decision aligns with the efficient development of the power system. Alternatively, REZ generators could receive a discount that recognises the value of their contribution during the tender process.
5	Hybrid connection fees/ congestion management model	Generators that participate in a REZ tender process are exempt from the need to pay a connection fee. Instead, the tender process places a market value on the connection. New entrant generators that wish to connect in a REZ outside the tender process, and new entrants that wish to connect outside a REZ, pay a connection fee that reflects their impact on the impact on the network. All generators receive congestion rebates, irrespective of whether they participate in a REZ tender process.

Given the issues with the stand-alone REZ access model, ideally, REZ schemes should apply the medium term access model developed in accordance with the ESB’s Post 2025 consultation.

As these options are the subject of an in-train consultation process, the ESB is unable to provide a final view on which medium term option it will adopt. However, our initial analysis suggests that the Option 2 (congestion management model with REZ adaptations) and Option 5 (hybrid connection fee/congestion management model) may best meet the ESB’s access objectives.

These two options provide for efficient congestion management in operational timeframes, and efficient signals for storage. The key difference between them is the nature of the locational signal provided to generators. In both cases, a centralised framework is used to select the REZs. However, Option 2 uses market signals to determine the cost of locating outside the REZ scheme, whereas Option 5 relies on an administratively determined process.

Variations in the access regime that applies across an interconnected power system can give rise to distortions and complexity, particularly in the case of meshed network configurations. Ideally, the ESB would prefer that state-based REZ schemes adopt the medium term access model, so that a single consistent regime may apply across the NEM.

However, we recognise that this approach may not be workable, depending on the timeframes associated with the relevant state-based scheme. In particular, the NSW government's process with respect to Central-West Orana REZ is progressing on a timeframe that may preclude the use of a whole of system access solution.²⁵

For the purposes of the interim REZ recommendations, the ESB suggests that any REZ-specific access model should be simple to implement and administer, with a view to being able to integrate with more comprehensive national arrangements if and when they are implemented. For instance, a REZ-specific access model could take the following forms:

- a physical access scheme
- a separately administered post-settlement financial reimbursement arrangement, or
- a combination of the above.

Ideally the REZ-specific access scheme would be designed to be superseded by the medium term access model using the framework described in Table 2.

Alternatively, the REZ-specific access scheme could be designed to prevail within the REZ for the duration of the scheme. The risk of access degradation for REZ generators will still need to be resolved because this risk arises due to the lack of an appropriate access regime outside the REZ.

In the case of a physical access option that relies on the connections regime, the REZ-specific access regime could continue to apply inside the REZ for the duration of the scheme. This would be a different connections regime to the one that applies elsewhere in the NEM. As discussed in Chapter 3.2.2, the ESB suggests that the connection standards that apply to generators within a REZ should be at least as rigorous as those that apply elsewhere in the NEM.

In the case of a financial access option, the ESB's preliminary view is that this option could be applied in conjunction with the medium term access regime, so long as the REZ scheme is given effect via a separately administered post-settlement reimbursement arrangement.²⁶

The most complex scenario is the application of a financial REZ scheme in the context of a medium term access model that incorporates the congestion management model. The ESB will continue to work closely with relevant State governments to ensure that frameworks are compatible.

5.3.2 Scheme should not affect NEM central dispatch

An alternative form of access regime is one that is given effect in operational timeframes via the dispatch mechanism. This model has not been proposed to date by either the ESB or NSW.

²⁵ The ESB's anticipated timeframes are discussed in Chapter 6.

²⁶ As the REZ scheme applies after the settlement process, the relationship between generators within the REZ may be maintained. Subsequent connecting generators would continue to compensate foundational REZ generators in accordance with the terms of the REZ access scheme, irrespective changes to the NEM access regime.

The ESB does not support this form of access regime due to the potential for inefficient operational outcomes and the additional complexity it creates for control room operators. For example, this type of scheme might force non-firm generators to shut down suddenly, which might damage the plant or lead to a long start-up process to rejoin dispatch. Furthermore, because of loop flow effects, it may not always be the case that a non-firm generator subject to dispatch constraints does no harm to firm generators.

Any REZ-specific access regime should be designed in a way that does not affect NEM central dispatch.

5.3.3 Scheme should seek consistency between jurisdictions

Finally, the ESB recommends that if there are multiple REZ-specific access regimes, it would be preferable to seek consistency and adopt best practice among NEM jurisdictions. The intent of this guidance is to limit the number of bespoke access regimes to the minimum required to deliver government policy. This is to promote clarity and simplicity for new entrants seeking to connect to the transmission network.

6. Next steps

The Post 2025 options paper describes how the ESB is developing a medium term access solution that can build on the REZ framework to provide a stepping-stone towards a long-term, whole of system access solution.

The medium term access solution will be designed to provide a strong foundation for REZ schemes by creating incentives for generators to participate in REZ tender processes, and addressing the challenges of access degradation between the REZ reference node and the regional reference node.

Whilst further work is required to thoroughly scope the prospective projects, the ESB's preliminary estimate of timeframes associated with the development of the medium term access option is as follows:

- Decision regarding key design features of medium term access option – mid 2021
- Finalise Rule change process – mid 2022 (depending on timing of Ministers' decision)
- Complete implementation – mid 2024.

This timeline may vary depending on which option is ultimately adopted. For instance, the congestion management model could potentially be relatively quick to design, but take more time to implement.

Throughout the reform process the ESB will continue to collaborate with State governments to explore different REZ models and ensure that these parallel processes deliver a cohesive overall framework.

A Abbreviations and Technical Terms

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
CBA	Cost Benefit Analysis
COGATI	Coordination of Generation and Transmission Investment
DCA	Dedicated Connection Assets
DNA	Designated Network Assets
ECA	Energy Consumers Australia
ESB	Energy Security Board
FTR	Financial Transmission Right
JPB	Jurisdictional Planning Body
LMP	Locational Marginal Prices
NEL	National Electricity Law
NEM	National Electricity Market
NER	National Electricity Rules
NSCAS	Network Support and Control Ancillary Services
NTNDP	National Transmission Network Develop Plan
PIAC	Public Interest Advisory Centre
REZ	Renewable Energy Zone
RIT-T	Regulatory Investment Test for Transmission
SENE	Scale Efficient Network Extension
TNSP	Transmission Network Service Providers
TUOS	Transmission Use of Service

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