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ESB's Transmission Access Reform Directions Paper

Neoen response

Response Date: 21 Dec 2022

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About Neoen

Neoen is one of the world's leading and fastest-growing independent producers of exclusively renewable energy. Our total capacity in operation or under construction is currently over 5.6 GW, and we are aiming for more than 10 GW by the end of 2025.

Neoen has over 2.5 GW of renewable assets in operation or under construction in Australia, spanning across Wind (1072 MW), Solar (918 MW) and Energy Storage (576 MW / 910MWh). This represents over 3.5 billion Australian dollars in investment. Neoen intends to reach 5GW in Australia by 2025.

Importantly, Neoen is a long-term owner and operator of assets. This means our focus necessarily extends beyond short-term fixes that merely improve project development prospects and includes consideration of the implications for new and existing renewable generation and storage throughout its full lifecycle.

Introduction

The new federal government has a policy proposed to actually get to the root of the problem – the lack of adequate transmission. Given these recent and major changes in circumstance, the impetus for access reform should be reassessed.

It's not that we disagree that there will continue to be challenges in the transition towards higher levels of variable renewable energy, or that things could be done better. Instead, as Australia's pre-eminent renewable energy developer, builder, owner and operator we can state with authority that the problems identified in the Paper have been overstated, and the cure proposed is worse than the disease.

While around 200 renewable projects have been completed since 2018, there is only one example of the supposed excessive congestion problem; where three large solar farms all built at the same time in SW-NSW. Since 2018 the expansion in timelines for development approval, environmental approval, and connection agreements has reduced the probability of coincident investment.

The ESB has misrepresented the issue to participants and governments:

1. The ESB is incorrect to say that investors are incentivised to build generators in congested areas. They would have to share some of the curtailment as one of the many constraint equations will affect them more than others. Also, they would experience a poor marginal loss factor (MLF). In an environment where the economics remain extremely challenging the impact of lower than anticipated performance can be devastating.
2. The rhetoric that there has been (or will be) overinvestment in transmission also bears no relation to reality. The opposite is true—we have underinvested in transmission. Transmission deployment through Rewiring the Nation and other minor augmentations are more potent solutions to congestion, creating significant net benefits to consumers.
3. The ESB's reinvention of the definition of "access" will result in delinking the physical access to transmission networks from the financial access to the energy market where generators

need to pay in order to be able to trade with customers. Instead, we should focus on the circumstances in which generators are not allowed to connect because they cause excessive harm.

Principles

Any reform of transmission access arrangements should be considered within overarching framework provided by the National Electricity Objective (NEO). We consider the below principles safeguard the NEO in the context of recent agreement to acknowledge emissions reduction goals and support the necessary investment in Australia's clean energy transition:

1. Reform should not stifle development of new generation, either from burdensome planning requirements that add delay, or economic disadvantages. This should be tested in consultation and is the most critical element.

2. Reform should be weighted fairly between incumbents and new entrants. Curtailment should be shared up to the efficient amount of congestion (the key benefit of open access).

3. Reform should not undermine bilateral trade, existing contracts, or long-term price predictability (as with locational marginal pricing - LMP).

4. Reform should reduce, not increase, risk during asset operation.

Issues with ESB's proposed models

While Neoen appreciates the ESB's approach of considering models proposed by stakeholders, we are disappointed that some of these models have been significantly changed, that may result in their omission from consideration.

Congestion Management Mechanism – dispatch timeframe

Neoen is deeply concerned that the ESB is still keeping congestion management mechanism (CMM) under consideration despite receiving significant and consistent push back from industry over the past few years. Notwithstanding the industry opposition, the ESB continues to pursue a reform with minimal benefits and significant cost and uncertainty for market participants.

The ESB notes that if the "implementation costs for the congestion relief market (CRM) are too high or other challenges arise with that model, the ESB will continue to develop the CMM in the background as a second choice". Without considering any type of cost benefit analysis for CMM, the ESB assumes that the CMM model will be a "costless" exercise and does not require a proper cost benefit analysis. Neoen does not support this approach by the ESB.

Ignoring costs, or worse assuming no costs will arise from CMM, is at odds with the vast majority of the sector's views on reform. More focus and consideration of implementation costs is vital. As noted in multiple stakeholder forums, the industry remains deeply concerned about the costs and complexity of adopting new reforms: in particular the legal costs from reopening long-dated hedging contracts to reflect the move away from regional reference prices (RRPs) to LMPs, and increased risks due to a potential reduction in contract market liquidity and imperfect hedging of LMPs.

Other indirect costs would include those borne by sellers or buyers unable to renegotiate contracts, as well as the delays in new project commitment during the time energy lawyers are predisposed in renegotiation of existing contracts.

Reduced certainty over future revenues means that CMM is likely to increase the weighted average cost of capital (WACC) for both prospective and existing generators and deter new investment.

We are suspicious that the ESB's pursuit of CMM may lead to biased cost-benefit analysis that would result in CMM being put forward as the preferred option instead of CRM. They have used an unsubstantiated estimate of $300m for implementation of CRM that was based on the initial estimate for LMP under COGATI.

We disagree with the ESB that CRM is equivalent to LMP (or that "all commodity markets use LMP"). If the ESB is unaware of the commercial differences between the designs, it should not be dismissing industry's concerns.

The CMM (LMP) should be completely removed from any consideration in this reform.

Congestion Relief Market – dispatch timeframe

Neoen supports the CRM in the form proposed by Edify. It shows great promise as a useful redispatch tool within constraints, and notably avoids the inaesthetic interconnector flows sometimes caused by constraints.

We are suspicious that the ESB's obsession with LMP will lead them to corrupting the implementation of CRM, and for this reason it is Neoen's strong recommendation that future development of this option be led by another entity.

The implementation of a CRM can be disconnected from the investment timeframe option and separately progressed except for Priority Access which requires a combined dispatch solution. We believe it is best not to rush the development of a necessarily complex CRM, and consider it preferable that there be an independent implementation process.

Priority Access Reform - investment timeframe

Priority access, or transmission queueing, is the riskier of the two options considered with respect to investment timeframes. It fails principles 1, 2, and 4.

It is too heavily weighted towards favouring incumbents at the expense of new entrants (and at this point it is important to note that Neoen is both an incumbent as well as a new entrant looking further to invest in the market). It creates significant post-investment risks whereby the new entrant bears all the impact of additional unpredicted congestion. This would increase the probability of insolvency in the NEM.

For example: A new entrant might forecast a 4% curtailment, but in operation the actual curtailment becomes higher. Because additional congestion is fully borne by the new entrant this would lead to very high curtailment for that plant, e.g., 20%.

Furthermore, priority access materially reduces the efficiency of dispatch at potentially enormous cost to consumers. Priority access would harm consumers without the presence of a CRM and widespread, effective participation in the CRM would be needed to prevent inefficient dispatch. Widespread participation in CRM is not guaranteed, so it is possible that overall dispatch efficiency is materially reduced even with CRM in place.

Neoen notes that the ESB is considering rounding of constraint coefficients to redistribute the congestion risk. Rounding the constraint coefficients to 1 or 2 decimal places will lead to increased curtailment as coefficients must be rounded up to avoid breaching safe limits. Rounding coefficients by 1 or 2 decimal places will also not achieve any desired outcome as these coefficients are often

subject to a change with new generator connection or constraint equation creation. A new generator could still have a better coefficient than incumbents.

Rounding up only the highest coefficients to 1.0 on a discretionary basis would help spread the pain of curtailment without quite as much inefficiency. We urge caution in placing too much emphasis on this solution, as it may create unfair risk for those who located efficiently, it reduces dispatch efficiency, and has limited ability to meet reform objectives by itself.

Congestion Fees – investment timeframe

Congestion fees are the less terrible but still a high-risk option. It may fail principles 1 and 2 depending on design.

We believe the connection fee itself cannot be accurately calculated and is not an appropriate mechanism to block inefficient investment. Pricing is not a good tool to solve a volume problem, and forecasts are guaranteed to be wrong.

Given the disconnect between investment fundamentals and regulatory bodies it is currently unclear how a central body can accurately estimate the appropriate fee. If the central body consistently overestimates the fee, this will reduce new supply causing a feedback loop where the congestion cost keeps rising, but new entrants cannot reasonably afford to build.

If the responsible body predicts low future prices and thus charges a low connection fee to an inefficient new entrant, the new entrant may still connect and cause economic harm to their neighbours, based on their own forecast of higher prices. This would not solve the problem of economic harm to efficient incumbents.

The ESB is relying on some perilous options to set the fee based on:

- an estimate of the value of access to the RRP; or
- an estimate of the total cost of congestion caused by the connecting generator; or
- an estimate of the long run incremental cost of future transmission investment as a result of the generator connection.

It may become complicated to develop a fee structure suitable for all technologies. Moreover, the different fee methodologies and continual updating of the valuation process will likely catch generation investment unaware.

The model disadvantages newer entrants relative to incumbents insofar as incumbents were not required to pay a fee when they connected. This will create a two-speed access regime that will lead to inefficient market outcomes in the form of higher costs to electricity consumers and windfall gains to incumbents.

The connection fees will be collected from a small pool of generation, but the wholesale price impact of the required increase in price to cover the fees affects the whole market.

New generator cost = 100% * $5 (cost of whole connection fee – needs to be recouped)

Consumer wholesale disbenefit = 100% * $5 (equilibrium price of NEM must rise to incentivise new build)

Consumer benefit = 10% * $5 (saving on a small part of the network)

Net benefit to consumers = -90% *$5

The option to charge connection fees only in some circumstances is much better. It should only be assessed and applied to the rare cases when someone wants to make a grossly inefficient investment (see Box 1).

Compared to Priority Access, Congestion Fees (or alternatives such as those we suggest below) are not reliant on the CRM to maintain dispatch efficiency which gives the benefit of independent implementation. This means that if the CRM fails a cost-benefit analysis we do not need another alternative in the dispatch timeframe.

Enhanced Information – investment timeframe

Given the lack of exploration into enhanced information model (EI) we feel it is premature to say that it is insufficient on its own. Furthermore, the ESB is not correct that we already have EI and it doesn't work.

Current congestion reporting is periodical and always backward looking. Neoen is therefore in agreement that AEMO's constraint reports alone are not an adequate tool for investors to assess congestion impacts.

While we believe EI is a material enough improvement alone, and does not need other intrusive mechanism/models, we have outlined other options below in recognition that many of our peers believe stronger controls are needed.

What Enhanced Information should do!

Neoen believes that the EI model should have following tools that will make it effective to discourage inefficient investment decisions. Here we propose two bookends to the curtailment modelling exercise. – one very high level one and one detailed one. We agree with the TWG that static hosting capacity does not practically exist. "Solar headroom" or "Wind headroom" is better, but this responsibility can be removed from the TNSP with item 2.

Headroom Heatmap

The first solution we propose is a heatmap of the NEM showing average headroom at every connection point. This could effectively build on the existing National Map platform connection capacity layer—and we note some TNSPs already provide some useful data, as can be seen below in South Australia.

The heatmap could be enhanced by listing the active connection enquiries at each connection point (or adjacent to the connection point in the case of new proposed substations) and should only be a short-term forecast—it should not include ISP generation assumptions as these are scenarios and not based on investment fundamentals.

This will allow developers to quickly eliminate locations that are too congested e.g., if average headroom is near or below zero. Average headroom information is too crude for proper plant design, but it allows the quick elimination of locations and provides an easily accessible graphical format for everyone.

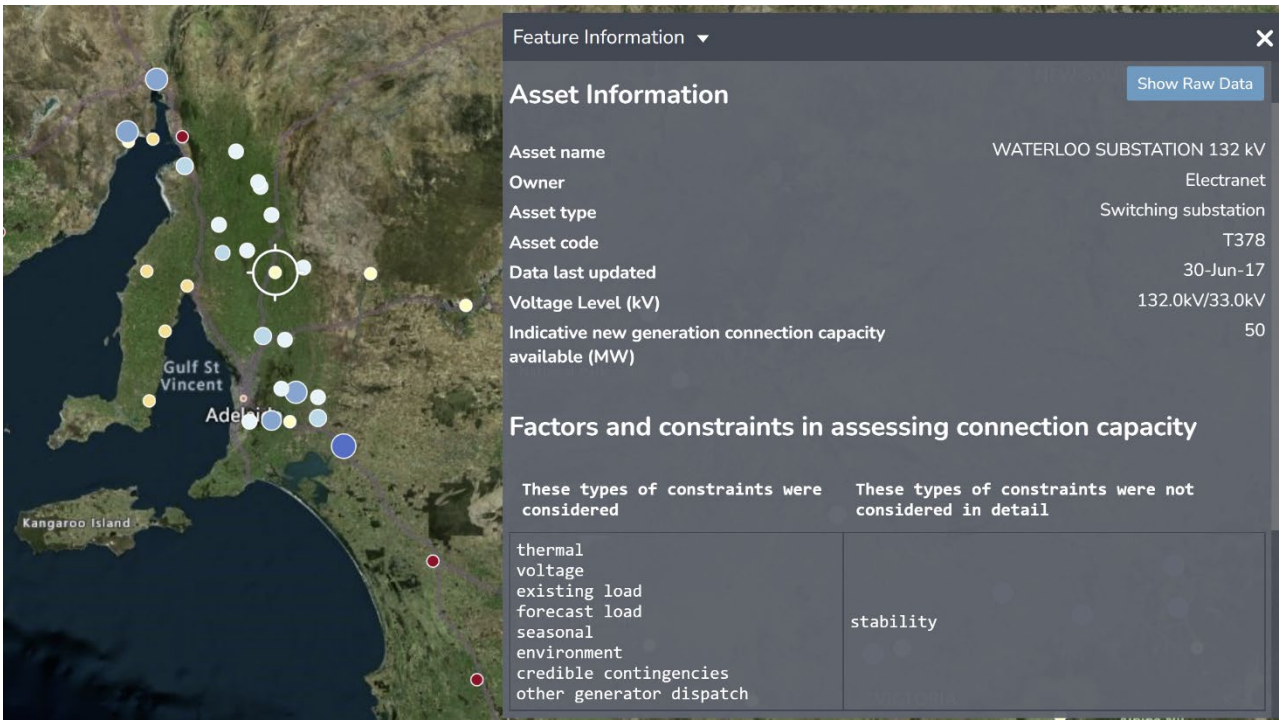

Figure 1 – National Map Connection Capacity

Headroom timeseries

The second supporting tool proposed is comprehensive headroom timeseries data for each connection point for a representative year. Ideally this would be available via the above map, which should be a single point of truth as presently information can be difficult to source and is inconsistent in quality and quantity across TNSPs—creating a higher risk for new entrants to the market.

This will allow developers to determine the efficient size of plant more quickly.

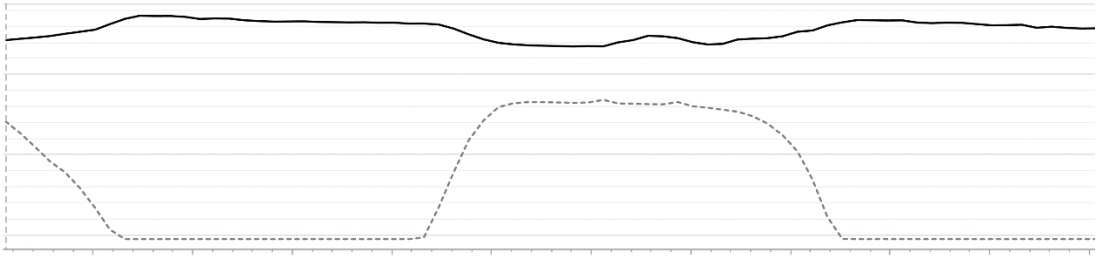

Figure 2 - Headroom timeseries

The headroom profile in this example indicates that there is low headroom during the day in the subset of data. It would not make sense to put a large solar farm here if these conditions are consistent across the year of timeseries data.

Timeseries data is necessary because headroom can often have large variances. Optimisation to the efficient level of congestion requires timeseries data.

Note that developers already do modelling to determine these quantities of congestion. EI simply makes a first pass faster, or more obvious to inexperienced developers. It should not be expected to replace proper congestion modelling and connection due diligence.

Planned REZ generation should be added as committed in the model to protect REZ schemes. This would create harmony between state REZ schemes and the wider network and prevent generators outside a REZ imposing too much congestion on those yet to join a REZ.

We note that this may result in suboptimal outcomes where a generator outside a REZ is more efficient than what it displaces within a REZ. State governments should keep an open mind to optimisation and avoid a geographical lens over an electrical one.

Box 1: What is an efficient amount of congestion?

It is generally agreed that some small amount of network curtailment is efficient. Where generators are guaranteed unfettered grid access consumers pay unnecessarily for excessive transmission infrastructure, or curtailment compensation.

Neoen's own modelling shows that significant overbuild of renewable capacity improves transmission utilisation remarkably with only minimal curtailment. A generic example is a 100 MW connection point hosting a 100 MW wind farm and a 100 MW solar farm. Such a combination may have aggregate curtailment of only 6% despite doubling the capacity of generation. It would also greatly improve line utilisation to around 55% compared to 33% for the wind profile used or 25% for the solar.
However, if the curtailment falls only on one of the generators it will bear 10-15% curtailment putting it at a severe economic disadvantage with competitors.

Thus, we need to assess two metrics – aggregate curtailment and individual curtailment.

Accounting for total system cost (transmission & generation) we conclude that the efficient aggregate curtailment is between 3% and 5%. This is consistent with the NSW government's proposal to limit intra-REZ curtailment to 4%.

Individual curtailment would need to be allowed to reach higher levels than the aggregate curtailment to obtain efficient levels of total curtailment. Because the impacts are dependent on build order, technology, and location these impacts would need to be studied in each circumstance to properly optimise the efficient level of curtailment.

It is worth noting that above the efficient amount of generation, curtailment rapidly grows with additional generation deployed. Our research partner ANU has studied historical curtailment outcomes, and this shows that there is a linear distribution of individual curtailment up until around 6%. From there individual curtailment has an inflection point, quickly growing to inefficient levels of 10-20%.

The principles of what constitutes efficient congestion and how to fairly spread its cost need to be consulted upon with industry if it is the ultimate goal of this workstream.

Complementary Solutions

Neoen believes that EI model without a connection fee or priority access model but with better information provision and regulatory enforcement is the best solution to drive efficient investment decisions.

However, given the mixed views on this point we wish to present volume based solutions rather than price based ones.

Neoen and the CEC previously proposed a "traffic light" planning approach. The "red light" would be a blocking mechanism applied to grossly inefficient investments. This could be through a state or

federal planning body, or upon request to a special purpose tribunal. A blocking mechanism is broadly equivalent to a high congestion fee.

However, many investors were wary about a simplistic blocking approach, concerned that it could choke up approvals for regular projects, and did not give scope to remediate the problem.

These concerns are justified, and instead we recommend a remediation approach in the first instance. We believe the remediation options as outlined by the ESB (as well as others) should replace congestion fees. Developers could shrink project size, contribute to network augmentation, co-locate storage, or be obliged to participate in a CRM in order to mitigate excessive curtailment. See diagram below.

- **Shrink project size** – the easiest and cheapest way to reduce excessive congestion.
- **CRM participation contract** – allows a proponent to build if they believe modelled congestion is overblown, but with capped risk in the case where a new constraint is created after construction.
- **Transmission contribution** – Neoen has already done this with Powerlink in QLD. This could be extremely cost effective in some circumstances, or quite the opposite too.
- **Co-located storage** – generally the most expensive solution, although popular and may be viable in some applications.

Another way to strengthen EI could be through an obligation to conduct a wider region curtailment study. This would require generators to measure the impact of congestion from their new plant on existing generation.

The flow chart in the next page illustrates steps that a new generator will have to go through if there is not enough headroom at the connecting location.

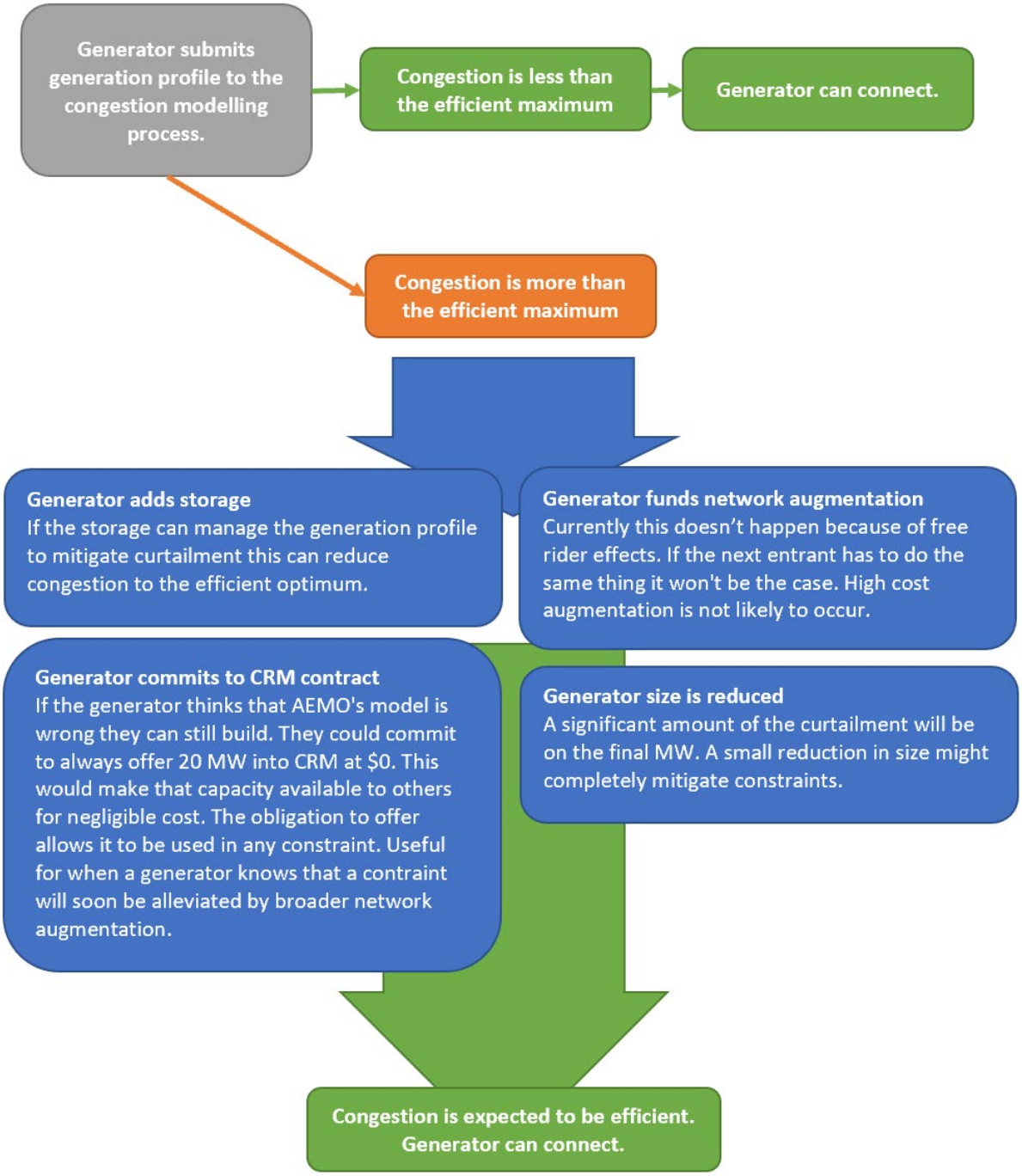

Figure 3: Example Flowchart

The below table summarises the several options of implementing EI with their degree or risks for new investment and effectiveness in blocking inefficient investment.

Model	Risk	Effectiveness
No other restrictive mechanism Does not introduce new hurdles for investors. Does not explicitly block inefficient investments.	None	Medium
Remediation requirement Care needed not to create new hurdles for investors. Directly solves any excessive curtailment through a physical solution. Solution is presumably least cost as identified by the proponent.	Low	High
Blocking mechanism Care needed not to create new hurdles for investors. May block more than just the worst projects.	High	High
Connection fees Care needed not to create new hurdles for investors. May create net disbenefits to consumers if widely applied to new entrants. May not explicitly block inefficient investments if the connection fee is mispriced.	High	Medium
Priority access (& CRM) Creates hurdles to all new investment. Contingent upon effective implementation and participation within CRM. Effectively blocks inefficient investment.	Very High	High

Conclusion

Neoen's position on the Transmission Access Reform Directions Paper can be summarized as follows:

- Any reform of transmission access arrangements should be considered against the principles of promoting efficient and effective investment, and the current solutions proposed by the ESB fundamentally fail these tests.
- We are concerned that access reform will be used as a trojan horse to push through LMP. Despite strong opposition to this concept across the sector, the ESB appears unable to move beyond LMP as a solution. For this reason, we recommend the ESB is no longer appropriately placed to lead this workstream.
- Radical reform would create a lawyers' picnic where all existing contracts would need to be renegotiated. Neoen's clients' lawyers recognise that renegotiation comes at considerable risk to customers. Likewise, radical reforms impede the bilateral deals necessary to finance the energy transformation.
- Reduced certainty over future revenues means that a CMM is likely to increase the weighted average cost of capital for both prospective and existing generators and deter new efficient investment. The CMM should be completely removed from any consideration in this reform.
- Neoen supports the CRM in the form proposed by Edify. The implementation of a CRM can be disconnected from the investment timeframe option. The development of an effective CRM should not be rushed, and it is critical that there be an independent implementation process.
- Priority access, or transmission queueing, is too heavily weighted towards favouring incumbents at the expense of new entrants It creates significant post-investment risks whereby the new

entrant bears all the impact of additional unpredicted congestion. This would increase the probability of insolvency in the NEM.

- Congestion fees may be less problematic; however, we consider the connection fee itself cannot be accurately calculated and is not an appropriate mechanism to block inefficient investment. Pricing is not a good tool to solve a volume problem, and forecasts are guaranteed to be wrong.
- Enhanced information, if supported by the appropriate tools, could effectively address the problem by centralising relevant information and clearly assisting developers to determine the efficient size of plant for any given location.
- Neoen believes that an enhanced information model could be supported by a remediation approach in the first instance, replacing the proposed congestion fee approach. Where congestion exceeding the determined efficient level is identified developers could shrink project size, contribute to network augmentation, co-locate storage, or be obliged to participate in a CRM in order to mitigate excessive curtailment.

Neoen is available at your convenience to discuss these topics further. Please reach out to Tom Geiser (tom.geiser@neoen.com) or Hassan Ali (hassan.ali@neoen.com) for any queries.

Yours sincerely,

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