22 March 2022
DRAFT FOR DISCUSSION

Congestion management Technical Working Group

Staff working paper – Preliminary assessment of options

1. Context

The purpose of this paper is to provide a starting point for the TWG's work to assess the various congestion management options against the assessment criteria. It is intended to be used to inform the working group as members fill the Mural worksheets as shared at the meeting on 22 March 2022.

The paper considers the following models:

Investment timeframes	Operational timeframes
1. CMM REZ adaptation	4. Vanilla CMM
2. Preferential dispatch model (investment timeframes)	5. Congestion relief market
3. Locational connection fees	6. Preferential dispatch model (operational timeframes)

With the exception of the CMM-REZ and vanilla CMM models, the paper relies on feedback provided as part of the previous TWG and public forum mural exercises. The ESB has provided some preliminary thoughts on the assessment of the CMM-REZ and vanilla CMM models, as these two models were not included in previous exercises.

As such, the material in the attached tables is not comprehensive and requires further work to systematically assess the core features of the models with respect to the assessment criteria. We do not expect every core feature to be relevant to every assessment criteria, however we would like to undertake a systematic process so we can be confident that ensure that all relevant matters have been identified.

The next step is to complete the task of assessing the models against the assessment criteria.

TWG members are invited to:

(a) Complete the task of populating the tables as part of the mural exercise and
(b) Provide feedback on the preliminary assessment as set out in the attached paper.

1 CMM REZ adaptation – preliminary assessment against criteria

	Feature	How the model addresses the core feature	Efficient market outcomes – investment	Appropriate allocation of risk	Manage access risk	Effective wholesale competition	Implementation considerations
1	Nature of incentive How does the model incentivise efficient investment decisions/disincentivise inefficient investment decisions?	Generators receive/do not receive a congestion rebate. Rebates available to incumbents, REZ generators, and in other locations where spare hosting capacity is available.	Generators incentivised to locate in places where capacity is available.	Above cap, party causing congestion is exposed to the marginal cost of congestion.	Rebate holders receive payment designed to broadly replicate RRP. Improved revenue confidence due to impact on ineligible generators investment decisions. However, non-firm.	Generators disincentivised from connecting in places where there is no spare hosting capacity (as determined by planning framework).	Settlement systems need to be able to distinguish between generator who are eligible/ineligible to receive rebates.
2	Identifying efficient connection locations How do we determine which parts of the network should be subject to incentives/disincentives to connect?	Locations where rebates are available are identified via an enhanced transmission planning framework.	Locational signal dependent on accurate forecasts.	Customers bear risk of inaccurate forecasts.			Requires enhanced transmission planning framework to decide where rebates are made available.
3	Approach to managing new connections How do we deal with different proponents seeking connection at different times?	Rebates are made available via some form of tender process – either a REZ tender, or a system-wide tender to allocate any remaining hosting capacity.		Market participants form view on value of rebates. Proceeds returned to consumers.			Requires establishment of a tender process.
4	Treatment of pre-existing generators What do we do about generators who are already there? How do we strike the	Incumbent generators receive rebates.			Incumbents benefit from grandfathered rights (subject to retirement decisions below).		

	Feature	How the model addresses the core feature	Efficient market outcomes – investment	Appropriate allocation of risk	Manage access risk	Effective wholesale competition	Implementation considerations
	right balance between new entrants and incumbents?						
5	Efficient retirement decisions How do we make sure that the framework encourages efficient retirement decisions for end-of-life generators?	After a pre-determined period, incumbent generators not taken into account for purposes of deciding where new rebates are available. Incumbents still receive rebate, however as new connecting generators may also receive rebates, the rebate revenue is shared among more rebate holders.	New entrants able to share in the rebates available to end-of-life generators.		After pre-determined period, congestion risk equivalent to status quo.		
6	Maximising hosting capacity of available transmission How do we maximise the potential hosting capacity of the network by encouraging investments that enhance hosting capacity?	Option for rebates to be made available above planned levels to parties that agree to fund measures that increase hosting capacity.	Framework encourages strategic investments to maximise hosting capacity – so long as rebates are perceived to be valuable.	Beneficiary pays for the investment.	Parties are able to benefit from their investment without risk of free riding.		Enhancements to the connections/planning framework to assess option to enhance hosting capacity.
7	Signals for congestion relief How do we create incentives for demand side and two way technologies to locate where they provide the most benefits to the system?	Demand side and two-way technologies benefit from lower prices in the presence of congestion. For batteries, this means they can access greater spreads by storing energy	*Will this benefit incentivise investment in REZs?*				

	Feature	How the model addresses the core feature	Efficient market outcomes – investment	Appropriate allocation of risk	Manage access risk	Effective wholesale competition	Implementation considerations
		until the congestion has passed.					
8	Integration with jurisdictional schemes How does the access scheme integrate with and support broader development plans (i.e. the ISP) and state based REZ schemes?	Generators connecting as part of a REZ scheme receive rebates. Rebates not available for generators wishing to connect within a REZ (but outside the REZ scheme) or generators connecting outside REZs.					

2. Preferential dispatch model (investment timeframes) – preliminary assessment against criteria

	Feature	How the model addresses the core feature	Efficient market outcomes – investment	Appropriate allocation of risk	Manage access risk	Effective wholesale competition	Implementation considerations
1	Nature of incentive How does the model incentivise efficient investment decisions/disincentivise inefficient investment decisions?	Congested generators with tied bids are dispatched in order of marginal cost (subject to ramp rates, min. gen requirements) and then queue order.	Generators incentivised to locate in places where capacity is available. Risk of uncoordinated network upgrades for individual projects choosing to pay Tx charges	Party causing congestion less likely to be dispatched during congestion.	Parties with strong positions in queue face reduced risk.		Requires establishment of a queue, administratively determined assessment of marginal costs.
2	Identifying efficient connection locations How do we determine which parts of the network should be subject to incentives/disincentives to connect?	Market participants form view on what level of congestion they are likely to be exposed to.					
3	Approach to managing new connections How do we deal with different proponents seeking connection at different times?	Queuing mechanism determines preferential dispatch order.					
4	Treatment of pre-existing generators What do we do about generators who are already there? How do we strike the right balance between new entrants and incumbents?	Incumbent generators are treated as equal first in the connection queue.			Incumbents benefit from grandfathered rights (subject to retirement decisions below).		
5	Efficient retirement decisions	*For discussion*	Achieves dynamic efficiency by enabling		After pre-determined period,		

	Feature	How the model addresses the core feature	Efficient market outcomes – investment	Appropriate allocation of risk	Manage access risk	Effective wholesale competition	Implementation considerations
	How do we make sure that the framework encourages efficient retirement decisions for end-of-life generators?		new entrants to share in the rebates available to end-of-life generators.		congestion risk equivalent to status quo.		
6	Maximising hosting capacity of available transmission How do we maximise the potential hosting capacity of the network by encouraging investments that enhance hosting capacity?	Opportunity for generators to improve their position in the queue by agreeing to fund measures that increase hosting capacity.	Framework encourages strategic investments to maximise hosting capacity – so long as rebates are perceived to be valuable.	Beneficiary pays for the investment.	Parties are able to benefit from their investment without risk of free riding.		Requires enhanced transmission planning/connections framework to assess changes to queue order
7	Signals for congestion relief How do we create incentives for demand side and two way technologies to locate where they provide the most benefits to the system?	Opportunity for generators to improve their position in the queue by agreeing to fund storage.	*Will this benefit incentivise investment in REZs?*				
8	Integration with jurisdictional schemes How does the access scheme integrate with and support broader development plans (i.e. the ISP) and state based REZ schemes?	Queue applies both inside and outside of REZs.					

3. Locational connection fees – preliminary assessment against criteria

	Feature	How the model addresses the core feature	Efficient market outcomes – investment	Appropriate allocation of risk	Manage access risk	Effective wholesale competition	Implementation considerations
1	Nature of incentive How does the model incentivise efficient investment decisions/disincentivise inefficient investment decisions?	New connecting generators are required to do low harm to pre-existing generators.	Strong locational signals. Potential for inefficient Tx if "do low harm" requires investment in physical assets that are rarely used.	Encourages new entrants to internalise some of the impact of the investment decision on existing generators	Provides certainty on upfront cost to investors	Has the potential to stifle investment given lumpiness of Tx investment.	Significant complexity in upfront assessment to determine harm by AEMO/TNSP/REZ coordinators. Relies on a good knowledge of the future – some network issues such as oscillations don't appear until they are in service.
2	Identifying efficient connection locations How do we determine which parts of the network should be subject to incentives/disincentives to connect?	Do low harm assessment conducted during connection process determines connection cost.					
3	Approach to managing new connections How do we deal with different proponents seeking connection at different times?	Queuing mechanism determines order in which "harm" is assessed.					
4	Treatment of pre-existing generators What do we do about generators who are already there? How do we strike the right balance between new entrants and incumbents?	Incumbent generators have already connected and hence do not pay connection fees.		Low risk to existing generators given there is a do low harm assessment.		Lumpy Tx means that new entrants face risk of being the "straw that broke the camel's back" & hence facing Tx upgrade costs.	
5	Efficient retirement decisions	*For discussion*					

	Feature	How the model addresses the core feature	Efficient market outcomes – investment	Appropriate allocation of risk	Manage access risk	Effective wholesale competition	Implementation considerations
	How do we make sure that the framework encourages efficient retirement decisions for end-of-life generators?						
6	Maximising hosting capacity of available transmission How do we maximise the potential hosting capacity of the network by encouraging investments that enhance hosting capacity?	New connections can negotiate with TNSPs to fund measures that mitigate their impact on existing generators in return for a lower connection fee.	Encourages new entrants to engage with network company and look for innovations that (1) avoid impacting others (2) efficiently invest in network without charging customers				
7	Signals for congestion relief How do we create incentives for demand side and two way technologies to locate where they provide the most benefits to the system?	Parties that help to alleviate congestion could receive waiver (or negative) connection fee. Requires measures to ensure that parties behave as intended in operational timeframes.					
8	Integration with jurisdictional schemes How does the access scheme integrate with and support broader development plans (i.e. the ISP) and state based REZ schemes?	REZ schemes implemented in accordance with jurisdictional scheme. Locational connection fees apply to generators wishing to connect within a REZ (but outside the REZ scheme) or generators connecting outside REZs.					Model can be implemented alongside the NSW Access Reform

4. Vanilla CMM - preliminary assessment against criteria

Feature	How the model addresses the core feature	Efficient market outcomes - dispatch	Appropriate allocation of risk	Manage access risk	Effective wholesale competition	Implementation considerations
Efficient dispatch outcomes How do we make sure that we dispatch the cheapest available combination of resources to securely meet demand?	When congestion occurs, market participants are subject to a congestion charge that reflect the marginal cost of congestion at their location.	Gives rise to efficient outcomes in dispatch	Parties have incentives to bid their marginal cost.		Removes need for market design heuristics such as race to the floor bidding, clamping. Parties have incentives to bid their marginal cost.	Requires changes to settlements but not dispatch. Impact on dispatch occurs due to impact on participants' incentives.
Signals for congestion relief How do we create incentives for demand side and two way technologies to help to alleviate congestion?	When congestion occurs, two way and demand side participants are able to access lower prices (equivalent to a negative congestion charge).	Provides signals for congestion relief				
Allocating the value arising from regional pricing How do we allocate the value arising from the use of regional pricing?	Depends on rebate allocation metric. Options include: status quo (winner takes all), pro rata access sharing, inferred economic dispatch, or potentially based on a queue.			Impact on investor risk depends on allocation metric. Range of options available.		

5. Congestion relief market - preliminary assessment against criteria

	Feature	How the model addresses the core feature	Efficient market outcomes - dispatch	Appropriate allocation of risk	Manage access risk	Effective wholesale competition	Implementation considerations
	Efficient dispatch outcomes How do we make sure that we dispatch the cheapest available combination of resources to securely meet demand?	When congestion occurs, market participants can buy/sell congestion relief.	Attempts to achieve efficient dispatch by providing a price signal for batteries to relieve congestion				Further work required to ensure dispatch can solve. Requires changes to dispatch.
	Signals for congestion relief How do we create incentives for demand side and two way technologies to help to alleviate congestion?	Storage, demand response providers, and parties that benefit from disorderly bidding have the opportunity to sell congestion relief to curtailed generators.	Seeks to make explicit, the ability for storage to provide congestion relief, as signalled through their participation factors in constraint equations.				
	Allocating the value arising from regional pricing How do we allocate the value arising from the use of regional pricing? [Note: issue overlaps with investment timeframes]	Initial dispatch run establishes buyers and sellers of congestion relief: retains status quo allocation of value (including winner takes all).					

6. Preferential dispatch model (operational timeframes) - preliminary assessment against criteria

	Feature	How the model addresses the core feature	Efficient market outcomes - dispatch	Appropriate allocation of risk	Manage access risk	Effective wholesale competition	Implementation considerations
	Efficient dispatch outcomes How do we make sure that we dispatch the cheapest available combination of resources to securely meet demand?	When congestion occurs, market participants with tied bids are dispatched in order of marginal cost (subject to ramp rates, min. gen requirements) and then queue order.					Requires changes to dispatch.
	Signals for congestion relief How do we create incentives for demand side and two way technologies to help to alleviate congestion?	*To be discussed – model assumes energy storage has marginal cost of zero.* *Option to incorporate CRM?*					
	Allocating the value arising from regional pricing How do we allocate the value arising from the use of regional pricing? [Note: issue overlaps with investment timeframes]	Dispatched generators receive RRP. Dispatch determined in accordance with amended tie breaker rules.					