



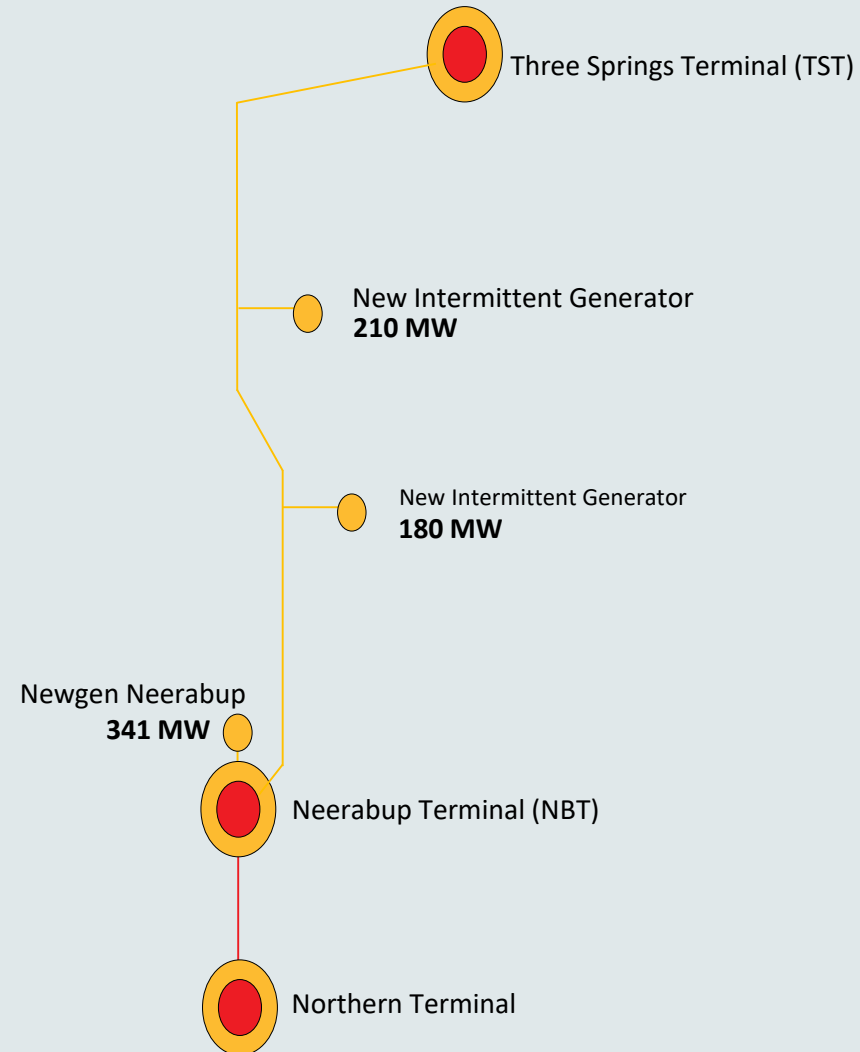
MAC Meeting

29 July 2019

Feedback on action 10/2019

Review: Scenario

- Connection of two new intermittent generators on the single 330 kV line between Neerabup Terminal (NBT) and Three Springs Terminal (TST) in first half of 2020
- A network fault on NT-NBT-TST 330 kV line will trip both generators
 - This will become the largest SWIS generation contingency
 - Will occur when the combined output of both generators is in excess of the output of the largest single generator
- In certain outage conditions, a network fault between Northern Terminal and NBT will also trip Newgen Neerabup
 - Up to 730 MW generation could be lost.



Action 10/2019

AEMO to conduct further modelling to assess how often the connection of multiple generators on a single North Country line will increase the size of the largest contingency beyond the output of any single generator.

- Methodology
 - Forecasts provided by the two wind generators were utilised to estimate the amount of generation on the single line.
 - The sum of the output of these generators (less an allowance for load that may trip off at the same time) was compared to the actual largest generator contingency at the time.
 - A comparison was made between the size of the largest generator and the size of the line contingency.
 - This analysis was done over a 6 year period and also for individual years.

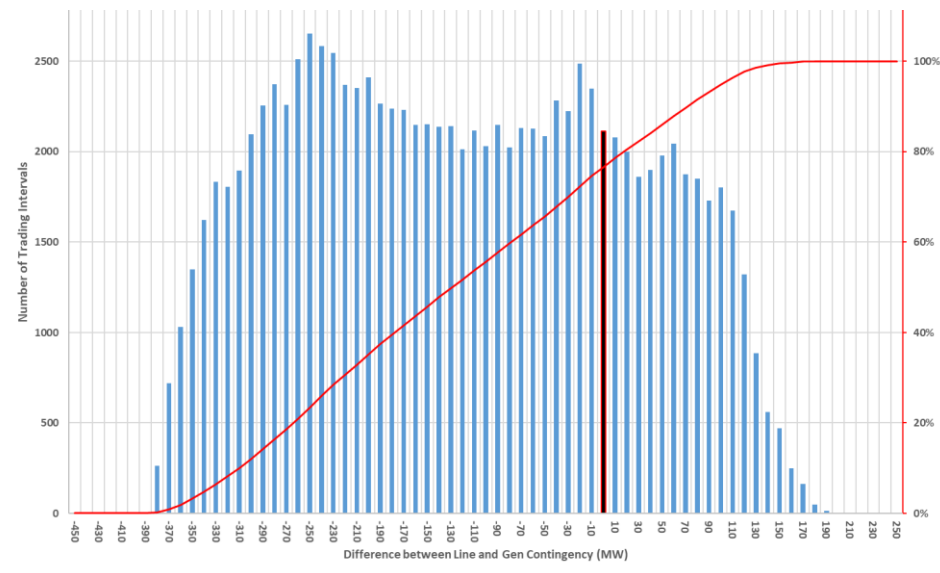
Findings

Impacts on outputs:

- Amount of load reduced when line trips
- Reduction in largest generator contingency size when wind farms commissioned
- Actual wind farm outputs

- The line contingency will be the largest contingency for 20-40% of the time
- The exceedance will be greater than 100 MW for 3-30% of the time.
- The average increase in contingency size for peak hours is 18-86 MW and for off-peak hours is 24-89 MW. Not significantly different.

In this example, the line contingency is greater than the largest generator contingency for 23% of the time, with the exceedance being greater than 100 MW for 5% of the time.



AEMO will be able to manage the technical implications of this.

Summary of issue:

- Power system security can be maintained
 - AEMO is investigating operationalising this.
 - Options include:
 - Obtaining additional Spinning Reserve
 - Constraining the size of the contingency to avoid a High Risk state (economic outcomes not considered)
- There will be market implications
 - Likely increase in SR requirements and hence higher SR cost
 - Full runway methodology doesn't account for a Transmission constraint being the largest contingency
 - Potential additional constrained off costs that will be paid to the generators contributing to the SR contingency (causer paid)

Options

Option	Rule Change	Pros	Cons
1. Manage within existing framework (adjust SR to a level required considering the largest contingency or constrain down to avoid HR state)	No	<ul style="list-style-type: none"> Less work is required No process or system changes Likely to be addressed by reform 	<ul style="list-style-type: none"> Market issues not addressed. The extra cost (at least 2 years) is pushed to the market players who didn't have any role in this issue and can't change the situation.
2a. Amend full runway methodology to take account of transmission contingencies	Yes	The cost is pushed to the parties who created the demand for extra Spinning Reserve (Causer Pay)	<ul style="list-style-type: none"> Extra work is required in putting together a Rule Change. System changes are required to capture these situation and settle the market accordingly Not all market inefficiencies are resolved if done without 2b.
2b. Remove constrained off payments for these generators when constrained due to impact on Spinning Reserve	Yes	Causers are not paid	<ul style="list-style-type: none"> Extra work required to put together a Rule Change. Not all market inefficiencies are resolved if done without 2a.
3. Amend AEMO powers to constrain generators to prevent a transmission contingency exceeding the size of the largest single generator.	Yes	<ul style="list-style-type: none"> Costs will not be shifted to other players. Spinning reserve costs not increased. 	<ul style="list-style-type: none"> Market inefficiencies. The cost of energy will increase as these are low cost generators Constrained Off payments may apply

Way Forward

- What does MAC consider the best approach?