

NZGB Briefing (NZ Generation Balance)

John Prattley

TRANSPOWER



SYSTEM OPERATOR

Agenda

- Background on the NZ Generation Balance tool (NZGB).
- Demonstrate New Zealand Generation Balance tool functionality.
- Summary.

Development of a generation balance tool

- Generation is becoming increasingly strained.
- System Operator identified the need for a tool to provide a 'heads up' of when there could be insufficient generation available to meet NI demand and reserve requirements.
- An EXCEL based tool was developed.
- A web based tool was required, which led to the development of the NZGB (New Zealand Generation Balance) tool.

Objectives of the NZGB tool

- Communicate to industry participants of any potential North Island energy shortfalls over the next 200 days.
- Provide industry participants with a means of assessing the potential impact of their planned outages on the North Island generation balance.
- To enable industry participants to select optimum outage periods which least impact on the North Island generation balance.

Generation balance tool – Data inputs

The Generation Balance tool uses the following raw data:

- The North Island and South Island daily peak AM and PM 30 minute metered generation (MW) from PTPIX. By using these values system losses are included in the estimated load calculation.
- The equivalent HVDC transfer (MW).
- The generation and transmission outages posted in POCP.
- The following are excluded from the generation totals:
 - Wind (over 320 MW)
 - Embedded generation (approx 230 MW)
 - Dispatched generation which is not included in POCP (approx 245 MW)

Load estimate

- The North Island and South Island values are corrected to take account of HVDC transfer between the islands. i.e. NI + HVDC transfer, SI – HVDC transfer.
- The highest values for the previous month 1 year ago are calculated for weekday AM & PM, Saturday AM & PM, Sunday AM & PM.
- A load growth of 2.0% is added.

Because we are interested in the worst case, we:

- Assume the worst case load in each island.
- Use the peak value and apply this to the entire month.
- AM is 06:00 to 11:30 hours and PM is 16:00 to 20:00 hours.

Constrained Generation

The tool runs back any generation that will be constrained by a transmission circuit outage. At present this applies to:

- ABY-TIM 1, ABY-TKA 1 which impacts on TKA & TKB.
- ARA-WRK 1 which removes ARA.
- BEN T2 & BEN T5 which impact on Benmore.
- KAW-MAT 1 & KAW-MAT 2 which impact on MAT & ANI.
- MTI-WPA 1 which removes WPA.
- MTI-WKM 1 MTI-WKM 2 which impacts on MTI & WPA.
- OHB & OHC bus outages which impact on OHB & OHC.
- WKM-PPI-WRK 1 which removes PPI.

South Island Reserves

- There is an allowance of:
 - 75 MW South Island frequency keeping reserves.
 - 120 MW South Island instantaneous generation reserves to cover for the loss of the largest South Island generator.

North Island Reserves

- There is an allowance of:
 - 50 MW North Island frequency keeping reserves.

HVDC Losses

- An allowance for HVDC transfer losses is made as follows:
- 0 to 200 MW transfer = 5.5 MW
- 201 to 400 MW transfer = 17.8 MW
- 401 to 700 MW transfer = 50.6 MW

North Island Risk

- From POCP the tool determines which of the 3 largest North Island generators are available and ranks them (by MW available) together with the Pole 2 share of the Estimated Energy Transfer North value.
- A deduction of 200 MW is made from this risk to allow for interruptible load.
- The ranking listing is currently HVDC, HLY 5, OTC, TCC.
- The generator values used in the ranking are obtained from the Generator Rating table.



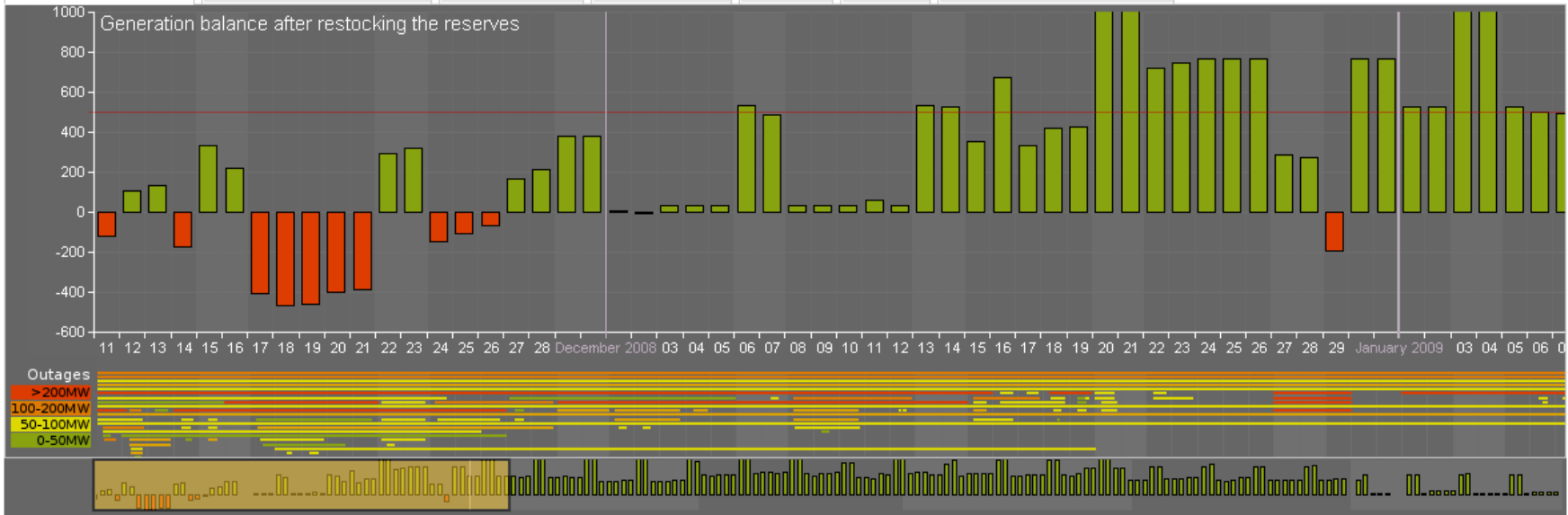
Calculation

Generation Balance

	Calculation	AM Period
A	South Island load estimate	2340
B	Available SI generation	3081
C	South Island reserves	120MW Reserves + 75MW Frequency Keeping 195
D	Available South Island generation for North Island	$D = B - (A + C)$ 545
E	Available HVDC transfer capacity	Before transmission loss 700
F	Estimated energy transfer north	$F = \text{MINIMUM}(D, E) - \text{HVDC loss}$ 494
G	North Island load estimate	4298
H	Available NI generation	4622
I	Highest ranked NI reserve risk	494
J	Required North Island reserves	$J = (I + 50) - 200$ 344
K	Generation balance after a N-1 contingency	$K = (F + H) - (G + J)$ 473
L	Allowance to restock the NI reserves	417
M	Gas available	Yes
N	Generation balance after restocking the reserves	$N = (F + H - (G + J + L))$ 56

Dashboard

- Generation balance
- Generation balance N-1
- NI Generation
- SI Generation
- NI Load
- SI Load
- Available HVDC Transfer



Administrator comments

No current comments from Administrator

Alerts

39572 : OTC
957 - OTC 25/10 - 15/12
 Otahuhu CC (OTC) outage imposes significant reduction in generation
 Loss: 365.0MW

Circuit constraints

47946 : ABY_TIM_1
2647909 27/11 - 27/11
 Circuit outage reduces TKB maximum output to 0MW

47945 : ABY_TKA_1

Watchlist

49218 : TKB3
47454 - TKB3 12/11 - 12/11
 continuous outage. 12/11 09:00 - 12/11 18:00
 Status: Confirmed
 Loss: 80.0MW

Generation balance website

The Generation Balance tool is available at the following website:

- <http://www.nzgb.redspider.co.nz/>
- Login: ****
- Password: ****
- Will send login details upon request.

Status of Generation Balance tool

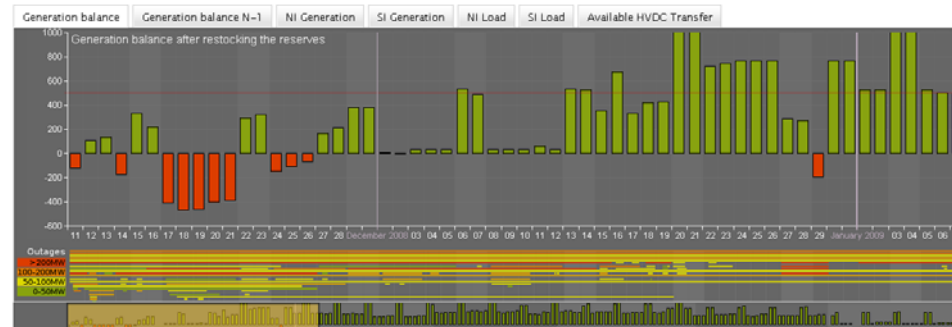
- Beta testing phase
- We welcome feedback
 - Improved functionality
 - Add additional features
- Access to tool and feedback to
 - Email Hasmita.Chhima@Transpower.co.nz
 - Try it out and send us your feedback

Stage 2

- Correction of faults found to date, which include
 - Occasionally not updating with load data.
 - Investigating why some generators outages are not being detected.
 - Formatting errors in the generator notes section.
- Adding of a help feature.
- Production of the North Island Energy Balance report that appears in the Weekly System report.
- Adding the ability for the administrator to adjust loads to major load changes, such as a potline outage.

Summary

- Further development and feedback
- NZGB
 - Automates existing process
 - Contact Hasmita.Chhima@transpower.co.nz



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