

Energy Balance Calculation

SO Industry Workshops
April 2007

Greg Spence
Operations Planning Manager

TRANSPower



SYSTEM OPERATOR
TRANSPower NZ LTD

24-7
instant delivery



Energy Balance Calculation -Introduction

- Concept of energy balance
- Details on calculation and assumptions
- Discuss publication of results and use of appropriate margins
- Seek feedback on further actions



Energy Balance Calculation -Concepts

“To ensure sufficient assets are planned to be available to deliver PPO’s for system security”

- SO obligation to provide N-1 for transmission and generation
 - Realtime dependence on offers
 - Planning dependence on availability (POCP)
- Assessment conducted on a daily basis covering next 8 weeks
 - Notification by exception
 - Improve linkage to Standby Residual Check
- Seek feedback on proposed publication of information and further actions



Energy Balance Calculation -Detail

- Reserve Energy Requirement
 - Objective to restore N-1 condition within 30 mins of an event
 - Need to replace energy lost due to the contingency with alternate (standby) generation.
- Key elements
 - Installed capacity
 - Plant availability
 - Expected demand
 - Under frequency reserve requirement
 - Replacement (standby) generation



Energy Balance Calculation –Supply Detail

- Installed generation capacity
 - NI 5031 MW
 - does not include non-dispatched embedded plant and wind generation (diversity uncertain)
 - SI 3435 MW
- Plant availability as notified in POCP
 - Subtracted from installed capacity

Available Supply = Installed Capacity - Unavailable plant



Energy Balance Calculation –Demand Detail

- Expected system load
 - Equivalent day last year +4%
- Expected reserve requirement
 - SI 75MW Freq keeping + 120MW =195 MW gen capacity
 - NI 50MW Freq keeping + 200MW gen + 200MW I/L for 400MW risk SIR =250 MW gen capacity
 - Dispatch of replacement generation within 30 mins.
 - Contingent event of 380MW requires 380 MW replacement

Total Demand = System Load + Reserve + Replacement Generation

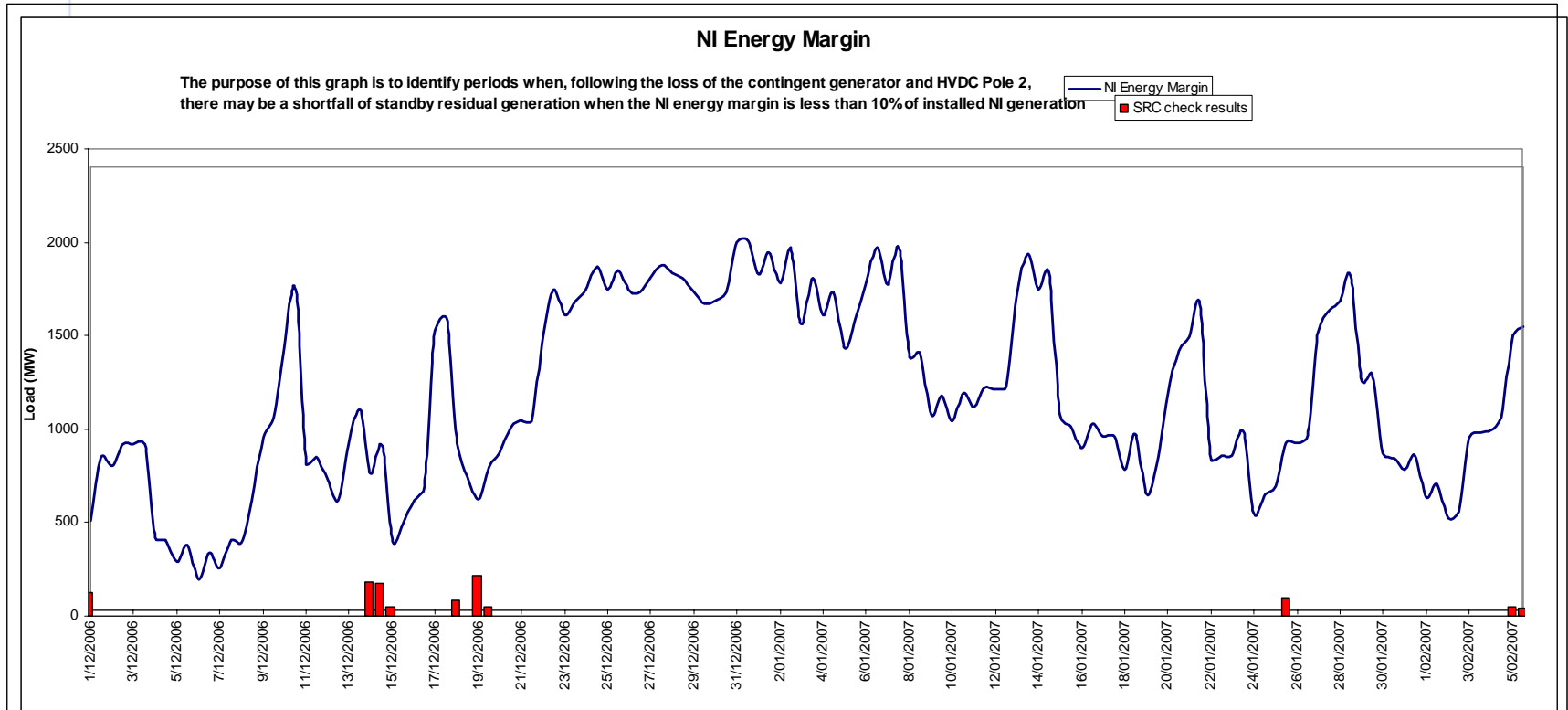
Energy Balance Calculation –Worked Example

National Energy Balance Calculation

NI Load Estimate	3000	SI Load Estimate	4000
NI Maximum Reserve Generation Requirement	650	SI Maximum Reserve Generation Requirement	195
NI Energy Required	<u>3650</u>	SI Energy Required	<u>4195</u>
NI Generator Availability (POCP)	4000	SI Generator Availability (POCP)	5500
NI HVDC import (SI Surplus Generation) - lesser of E27 and B31	964	SI available for HVDC North	1305
NI Energy Available	<u>4964</u>		
NI Energy Margin	1314		
Max HVDC MW North availability	964		

Energy Balance Calculation –Results Interpretation

Correlation of availability with issue of SRC notices Dec06-Feb 07



Energy Balance Calculation –Results Interpretation

Energy Availability margins for June 19 2006

National Energy Balance

Supply Surplus -availability Loss of OTC

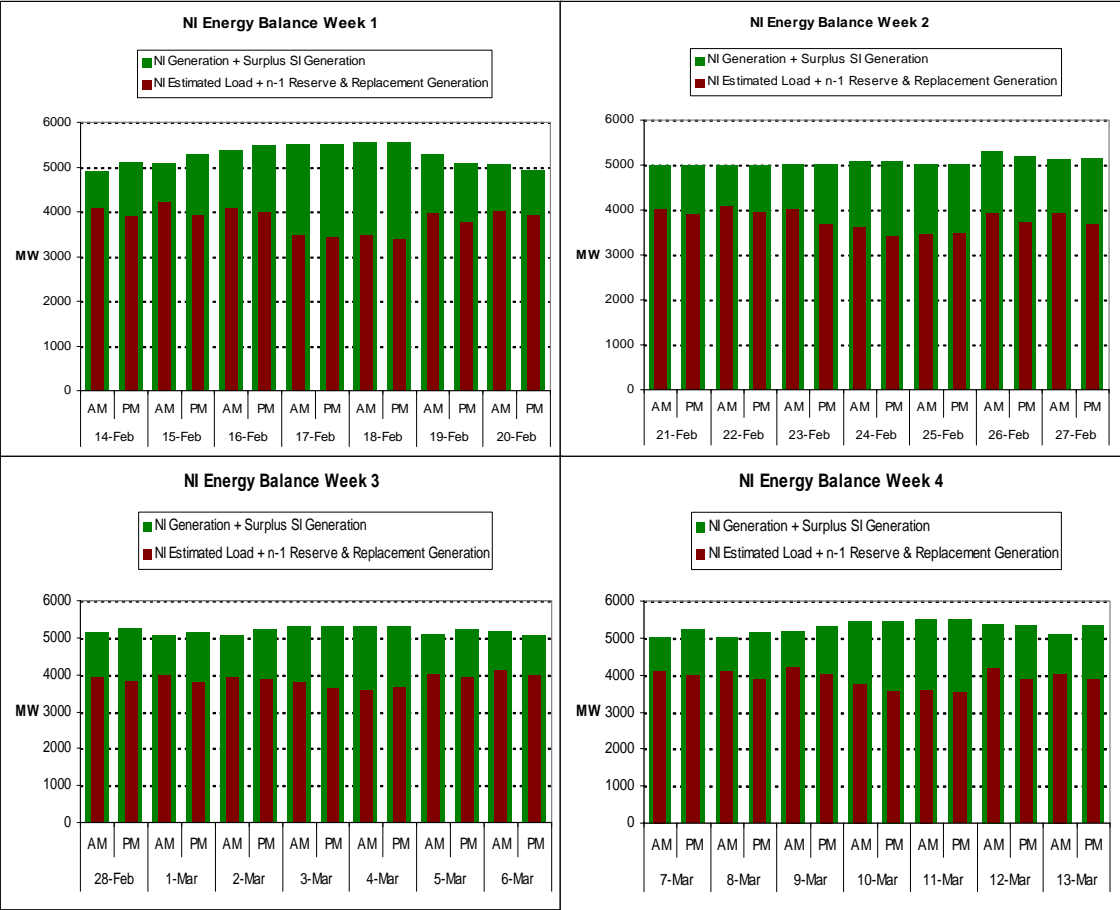
As at June 5th	AM	830
	PM	518
As at June 12th	AM	825
	PM	513
As at June 19th	AM	770
	PM	459

Uncertain correlation between availability and offers



Energy Balance Calculation –Worked Example

Daily Results notification –next 4 weeks



Energy Balance Calculation –Feedback and further work

- Develop POCP prototype
 - Online assessment for participants
- Seek feedback on further actions and development
- Improve linkage between availability and offers

