

# National Winter Group

## Report Summary for MED

19<sup>th</sup> April 2010



SYSTEM OPERATOR

# Objective & Background

- Voluntary industry group looking at the industries ability to meet peak demand over winter.
- 4<sup>th</sup> year for NWG.
- Group has 3 teams
  - Demand
  - Generation
  - Options
- The group outputs include this report which answers a number of question relating to our ability to meet demand under a number of circumstances.
- The report is distributed widely in the industry and amongst stakeholder.



# Demand

- A number of statistical models were used to derive different forecasts and a value was chosen from these.
- The prudent estimate of the peak demand is a forecast value that is unlikely to be exceeded in winter 2010.
- The prudent demand is 5029 MW for the North Island, up 8.6% on the actual peak winter demand in 2009.
- The prudent demand for the South Island is 2538 MW, up 15% on the equivalent peak demand in winter 2009. This reflects a return to service of the potline at Tiwai at the end of winter 2009.
- The prudent demand is a projection from past years with a 5% probability of being exceeded (P95)

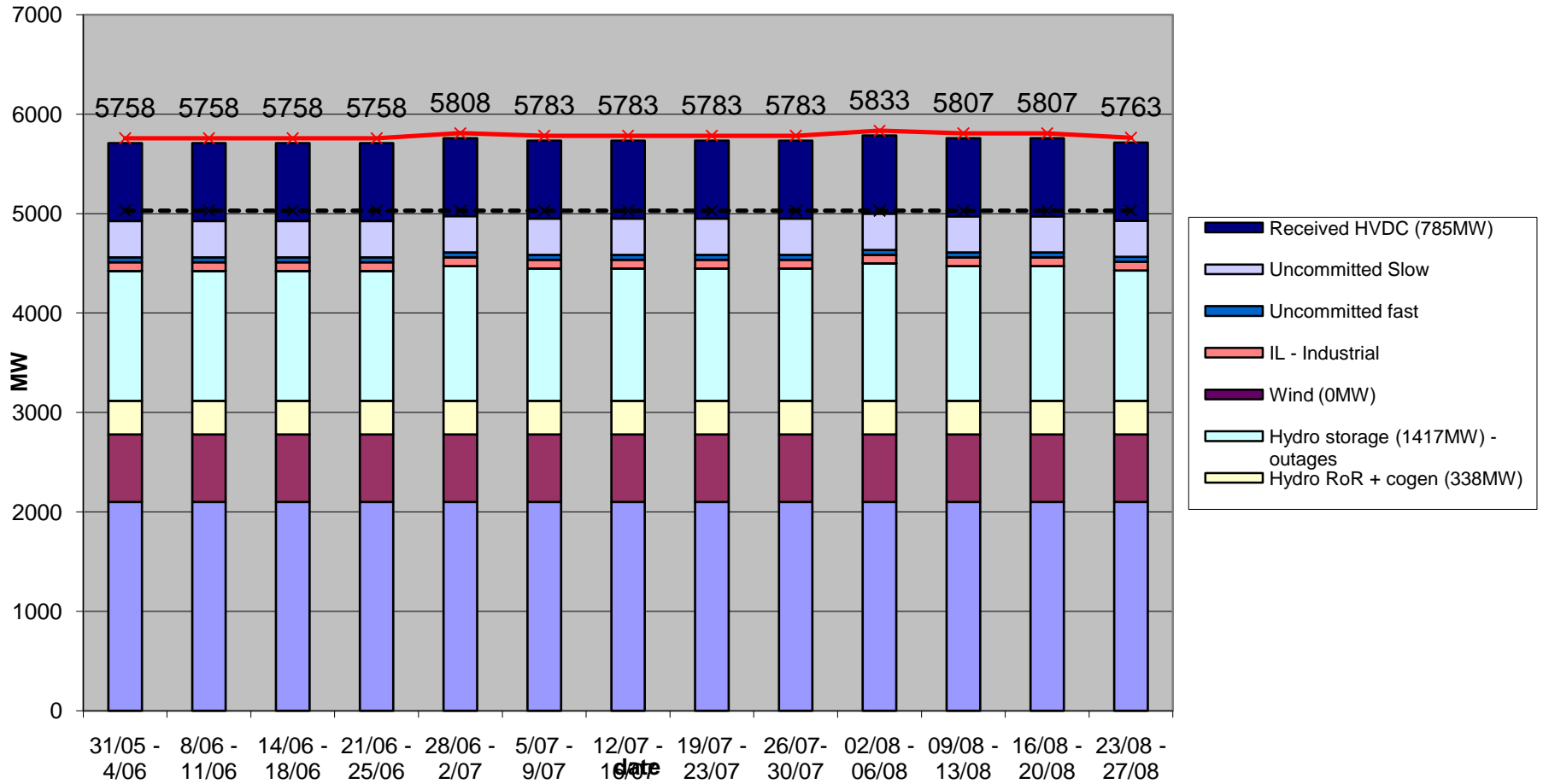


# Generation

- The group looks at generation for each week from June to August.
- Generation is broken into types, those involving a degree of seasonal variability are subject to analysis of historical performance at peak winter times .
- A P10 value is taken of this performance.
- Notified generation outages and transmission constraints including HVDC are considered.
- The Stratford Peaking plant, due to be commissioned later this year, have not been included in this analysis



**North Island**  
**Maximum generation Stack for June - August 2010**  
**Min NWG 10: 5758MW**



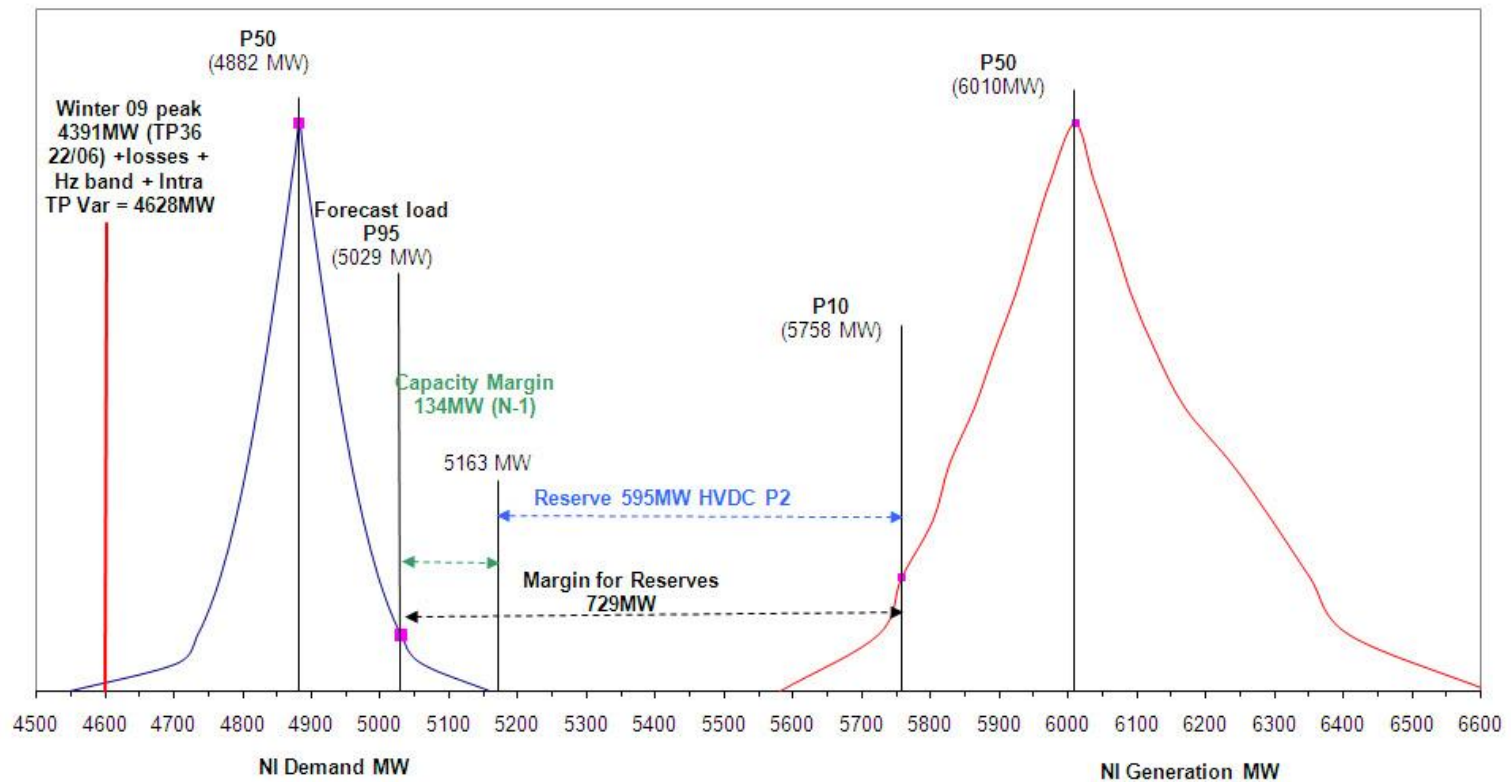
# Bringing supply and demand together

- Supply (P10) and demand (P95) are mated together on the twin peaks graph.
- An allocation for reserves equivalent to the risk is deducted leaving a capacity margin.
- The margin for 2010 is 134 MW (2009 = 82 MW)
- This all assumes we get full commitment of all thermal plant. This assumption contains some risk.



# NWGG 2010 Twin Peaks

North Island Demand and Generation Balance at Peak Winter 2010  
 15th Mar 2010 update. P1 at 190MW rec'd P2 at 595MW rec'd



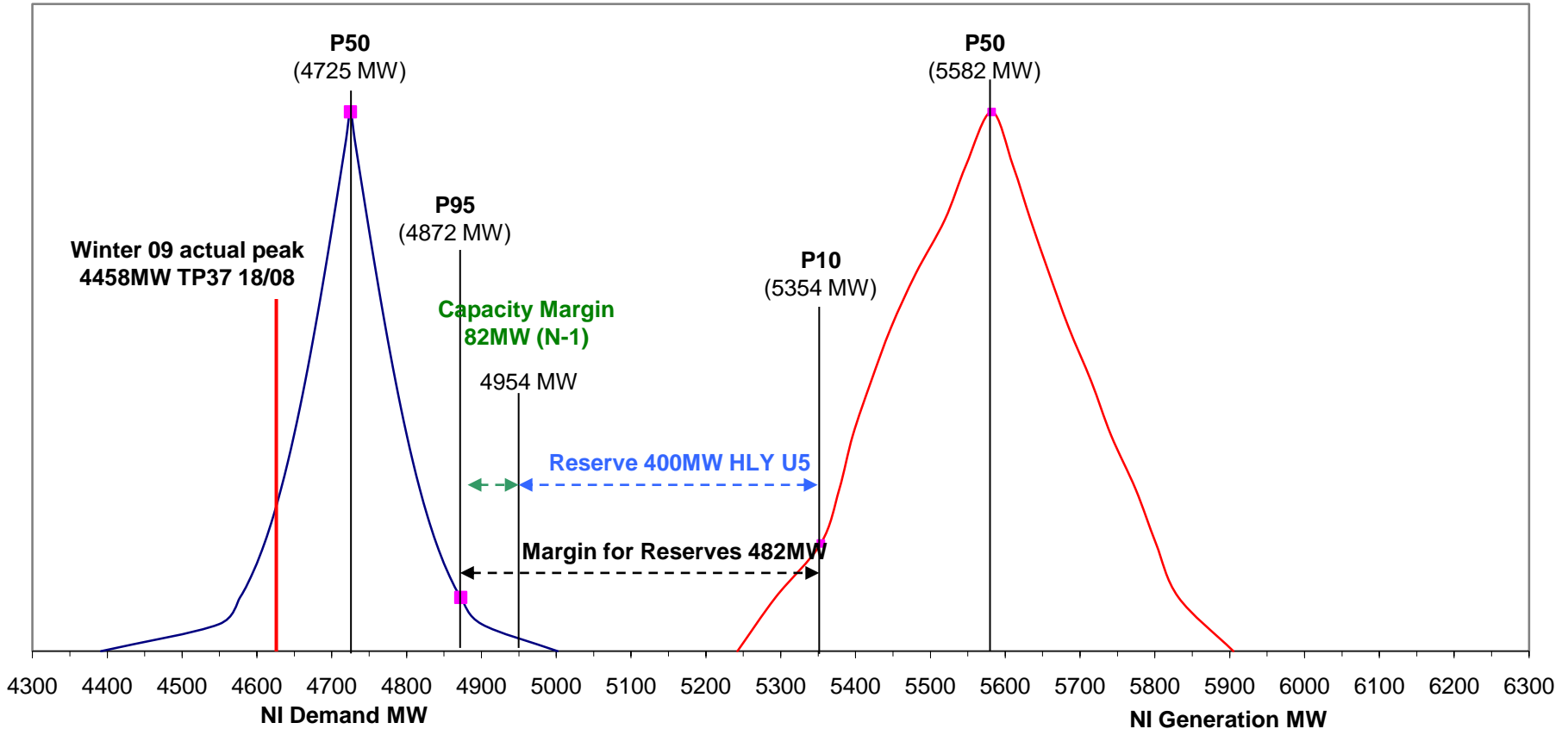
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# NWG 2009 Twin Peaks

North Island Demand and Generation Balance at Peak Winter 2009  
08 May 09 update - with HVDC Pole 1 at 200 MW, Winstone IL offers removed  
and NPL at 0MW

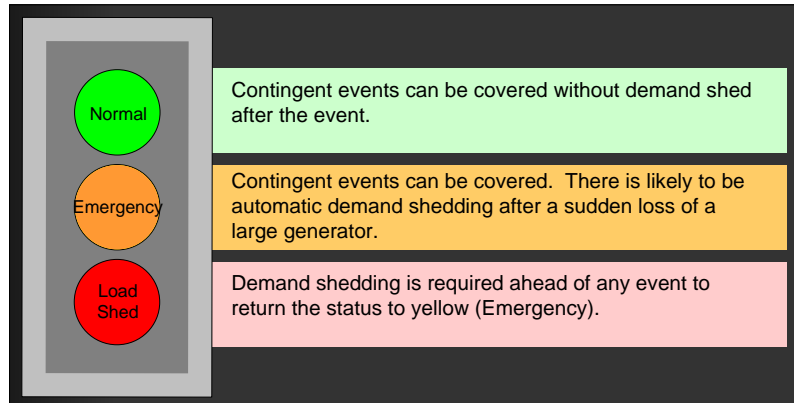


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The results of the analysis are summarised in the four key questions and answers. The answers reflect the ability continue to operate the power system in one of three states



- **Normal secure state** – Power system status green. There will be no disconnection of consumers even if there is a sudden loss of a large generator or HVDC Pole during the critical winter evening peak demand periods.
- **Emergency secure state** – Power system status orange. There will be the automatic disconnection of a significant number of consumers,<sup>[1]</sup> **only if** there is a sudden loss of a large generator or the HVDC Pole at the time of winter peak evening demand.
- **Load shedding required** – Power system status red. Disconnection of consumers will be required for some critical winter peak periods to maintain the power system in an emergency secure state even without the loss of any generation or the HVDC.<sup>[2]</sup> There is still a risk that further demand will be shed automatically.

<sup>[1]</sup> This assumes that Automatic Under Frequency Load Shedding (AUFLS) operates. AUFLS is a critical safety mechanism to preserve the integrity of the power system by disconnecting one or two 16% blocks of consumer demand in this case across the North Island.

<sup>[2]</sup> It is important that the power system is in a secure state at all times (even if demand must be shed to get back to the emergency secure state).



# NWVG report '10

**Question 1:** *Can the forecast peak winter demand on the power system for winter 2010 be met?*

**Answer:** There is a high confidence that should all the generation available be committed to run that the power system will be in its normal secure state (status green) at peak winter demand. Should there be a failure or inability to commit all available thermal units then the system may be operated in the Emergency Secure State (status Orange).



# NWG report '10

**Question 2:** *Can the forecast peak winter demand on the power system be met if generation, equivalent to one of the large gas fired combined cycle generating units, is unavailable for a sustained period for some reason?*

**Answer:** There is a medium level of confidence the power system will be able to be operated in its normal secure state (status green) at peak winter demand if a large generating unit is unavailable and while all other generation with firm fuel supplies remain available.



# NWG report '10

**Question 3:** If there is already a sustained outage of a large combined cycle generating unit, can we still meet peak winter demand if a second such generating station stops running?

**Answer:** Even with all other generation in service it would be necessary to disconnect some consumers at peak times to maintain the power system in an emergency secure state. This question relates to a particularly onerous situation where the equivalent of two large combined cycle gas stations are not running.

Historically the NZ power system has never been able to meet this scenario at times of system peak.

If this situation arose the power system would be operated in an emergency secure state (status orange) for significant period at times of peak winter demand. The Power System would on a few occasions move into the load shedding required state (status red) when the disconnection of some consumers would be required at peak times to return the system to the emergency secure state.



# NWVG report '10

**Question 4:** How does the capacity margin (n-1) for the NI between prudent peak demand forecast<sup>1</sup> and prudent generation availability forecast<sup>2</sup> for winter 2010 compare with the forecast for 2009?

**Answer:** The capacity margin for 2010 has increased compared with the 2009 forecast. The forecast margin for winter 2009 was 82MW, the forecast margin for 2010 is 134MW.

Some of this increase is due to the commissioning of new controllable generation plant – notably the Nga Awa Purua geothermal station (130MW) earlier this year.

*1: The prudent peak demand forecast has a 5% probability of being exceeded*

*2: The actual generation over the demand peak has a 10% chance of being lower than the prudent forecast*



# NWVG report '10

- **Question 5**: In the past how often has the power system been at, or near, to the maximum peak winter demand?
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- **Answer**: Historically the power system is within 1% (ie 70 MW) of the peak winter demand for about 2 to 3 hours in a typical winter. The power system is within 5% (325 MW or close to the output of a large generating unit) for about 60 to 80 hours over a typical winter.



# Parties contributing

- Contact
- EC
- Genesis
- MEUG
- Meridian
- MRP
- Orion
- Rio Tinto
- Todd Energy
- Transpower
- Trustpower
- Unison
- Vector

