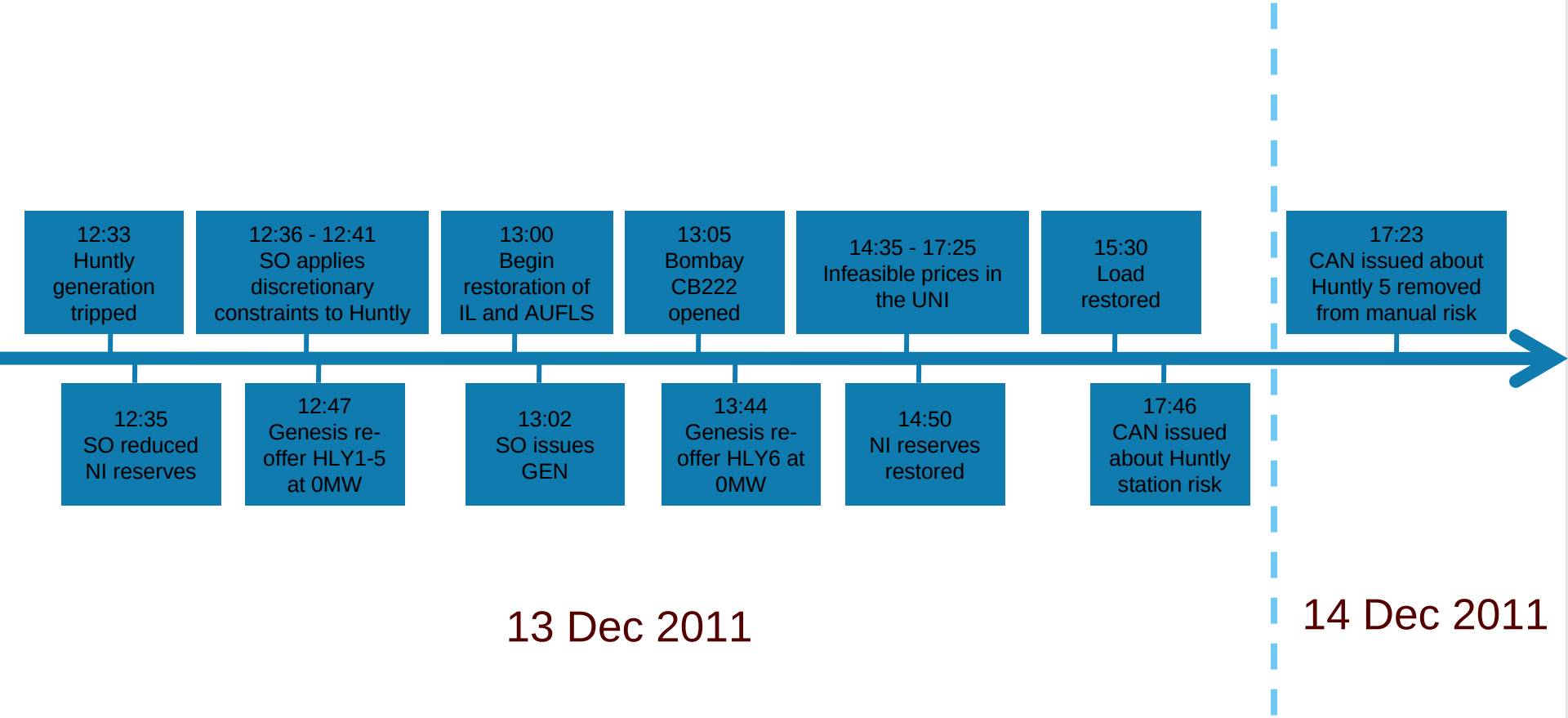
Market Performance review of 13 and 14 December 2011

Overview

- Approximately 850MW of Huntly generation tripped and 560MW (17%) of North Island load was shed.
- Significant disturbance event to power system and spot electricity market.
- Important that market signals align participants' economic incentives with the recovery of the system and these incentives provide appropriate investment signals for last resort plant.
- Market Performance review focuses on operation of the wholesale electricity market during this time.

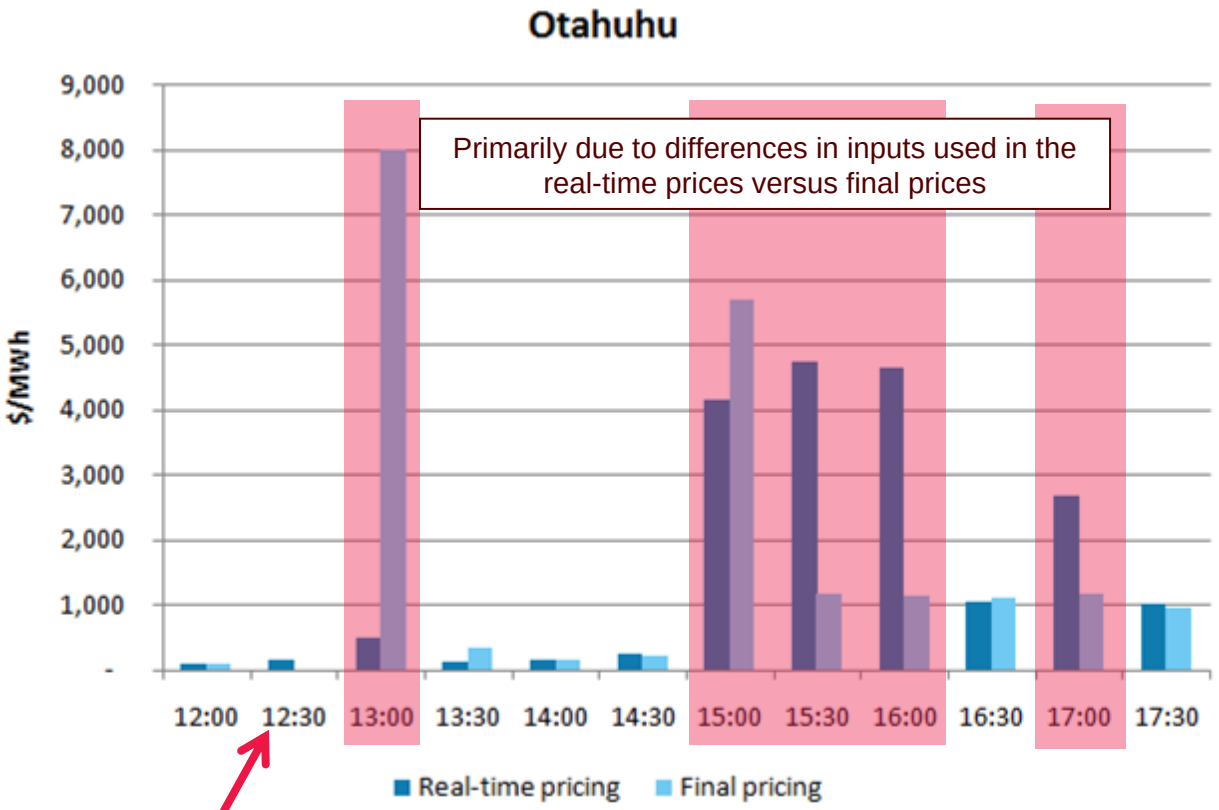
Timeline of events



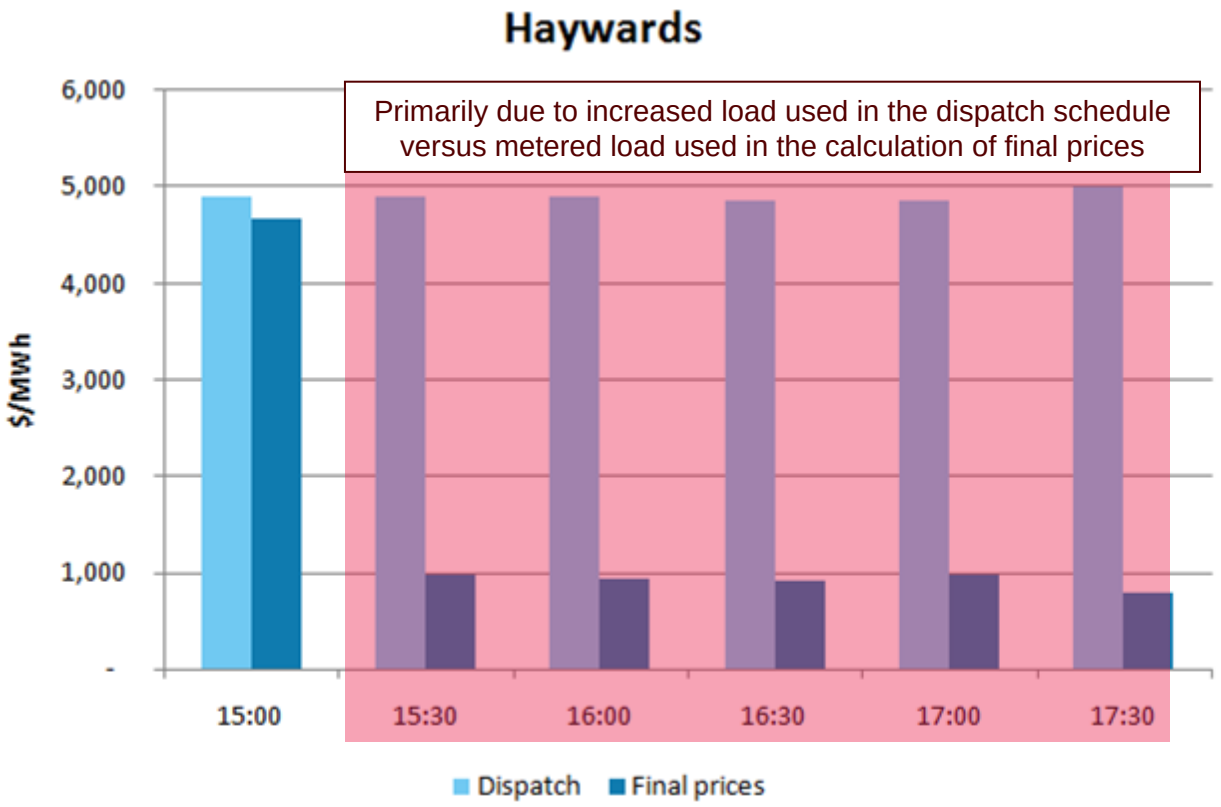
Outline of Market Performance review

- Price divergence issues
- Price robustness following resolution of “infeasible prices”
- Impact of reducing North Island reserves
- Impact of Huntly station risk requirement
- Availability of information from WITS

Real-time price divergence - Otahuhu



Dispatch price divergence



Price divergence - summary

- Significant divergence in dispatch and real-time prices as compared to final prices following Huntly trip.
- Financial impact to some participants responding to real-time prices was in the order of several hundred of thousands of dollars.
- Price divergences increase price uncertainty and reduce the incentives of existing and future participants to respond to real-time price signals.

Infeasibility price resolution

- SPD used for scheduling, pricing and dispatch in the NZ spot electricity market.
- SPD attempts to supply load and reserves with available resources whilst satisfying all specified constraints.
- If SPD cannot do this, the solution is termed infeasible.
- If the calculation of final prices is infeasible an infeasibility resolution process is invoked to restore feasibility.

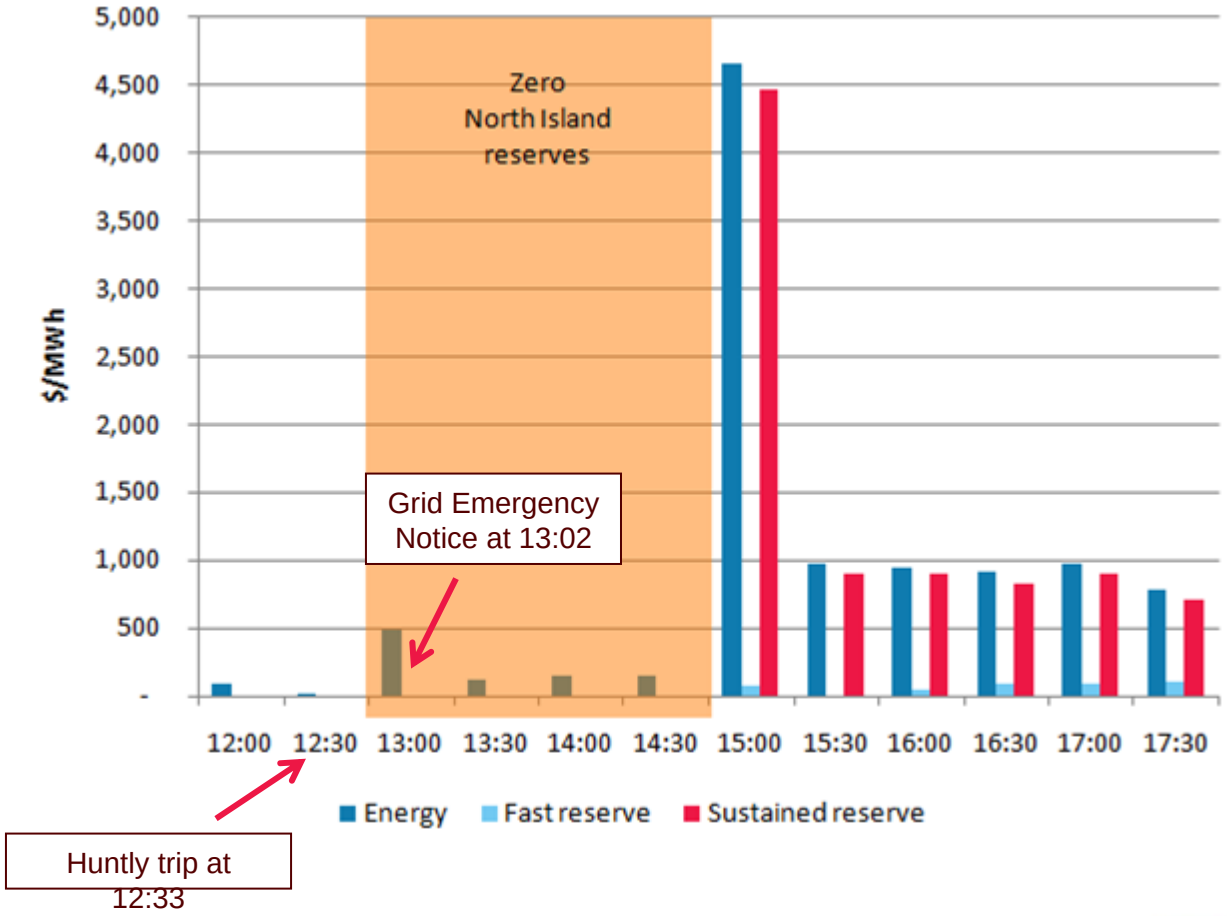
Infeasibility price resolution - summary

- Trading period 27 (13:00) had numerous infeasibilities.
- Analysis indicates current infeasibility resolution process is path dependent.
- Order in which infeasibilities are resolved affects calculated final prices.
- Reduces the robustness of pricing process.

Impact of reducing NI reserves

- Reserve providers responded to Huntly trip but reserve offers still in the market system.
- Reserve providers would have difficulty meeting any new reserve dispatch instruction following Huntly trip.
- To prevent dispatching of North Island reserves, the SO reduced the North Island reserve requirement (RAF).
- Impact of this is a reduction in the North Island energy and reserve prices.

Price impact of zero reserve



Reducing NI reserves - summary

- Reduced energy and reserve prices provides incentives for loads to begin consumption and for reserve providers and generators to reduce supply.
- These signals are not consistent with the SO Grid Emergency Notice requests for additional energy and reserve offers – misalignment of economic incentives and system requirements.
- Suppressing the energy and reserve prices reduces the incentives for providers of last resort resources.

Huntly station risk

- Following reconnection of Huntly, SO issued CAN indicating Huntly station treated as a single risk.
- This requirement:
  - Increased North Island reserve requirements
  - Reduced ability of North Island market to co-optimise energy and reserve costs
- Resulted in increased reserve prices and reduced energy prices.

Real-time information availability

- Authority experienced reduced timely availability of real-time prices from Wholesale Information Trading System (WITS) on 13 December 2011.
- Authority understands that another major user also experienced issues with availability of real-time prices.
- This is currently being investigated by NZX.

Conclusions

- 13 and 14 December 2011 provide valuable lessons in understanding the current issues in the spot market and guide future development.
- Price divergence – affects participants ability to efficiently respond to forecast and real-time signals.
- Price robustness – reduces authoritativeness of the pricing process.
- Price suppression – reduces incentives to last resort energy and reserve providers.
- Manual Huntly station risk increased reserve costs but best SO could achieve with current market system.
- Provision of timely real-time market information important under stressed system conditions.

Recommendations (i)

- Investigate use of five-minute prices in the calculation of final prices to reduce price divergence.
- Investigate the provision of prices for forward looking schedules using a range of demand forecasts.
- For infeasibility resolution:
  - Investigate the use of economic constraint softening to reduce the need for an infeasibility resolution process.
  - Investigate a model-based approach to resolving infeasibility prices.

Recommendations (ii)

- Investigate a reduction of the reserve supply rather than the reserve demand in CE or ECE events to signal a high economic value of energy and reserves during this time.
- Consideration of a co-optimised energy and reserve model with multiple risks. Other benefits could be use during asset commissioning.
- Following NZX investigation consider additional requirements on wholesale information trading system provider.

Recommendations (iii)

- Investigate whether current functional split between pricing manager and system operator is optimal to deliver an efficient pricing process.
- Some of the recommendations are currently on the Authority 2012/13 work plan (economic softening of constraints and consideration of final prices based on real-time prices).
- Other recommendations will be considered further by the appropriate Authority work streams with industry input.