

Demand Response a Retailers Perspective.

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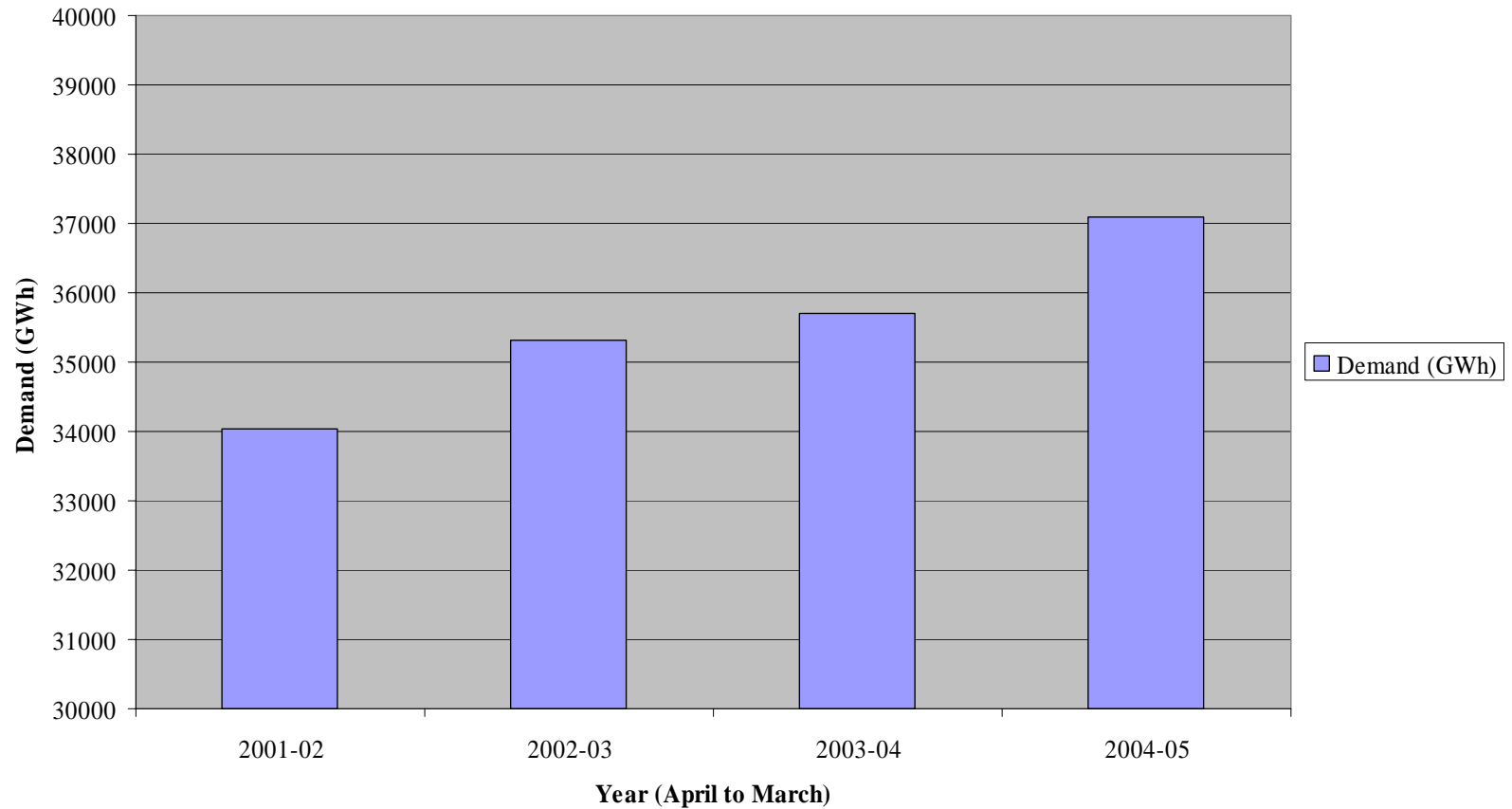
- There is no “Silver Bullet”
- What is happening with Supply & Demand
- Supply Side Responses
- Demand Side Response Options
- Critical Issues
- Conclusion

- There is no Silver Bullet!
- In any efficient market both the supply and demand side play a part in the price setting process.
- In the electricity market demand side participation is under-developed.
- The result is more frequent volatile price spikes when the system is constrained.
- Closer supply side and demand side alignment would assist in smoothing volatility.

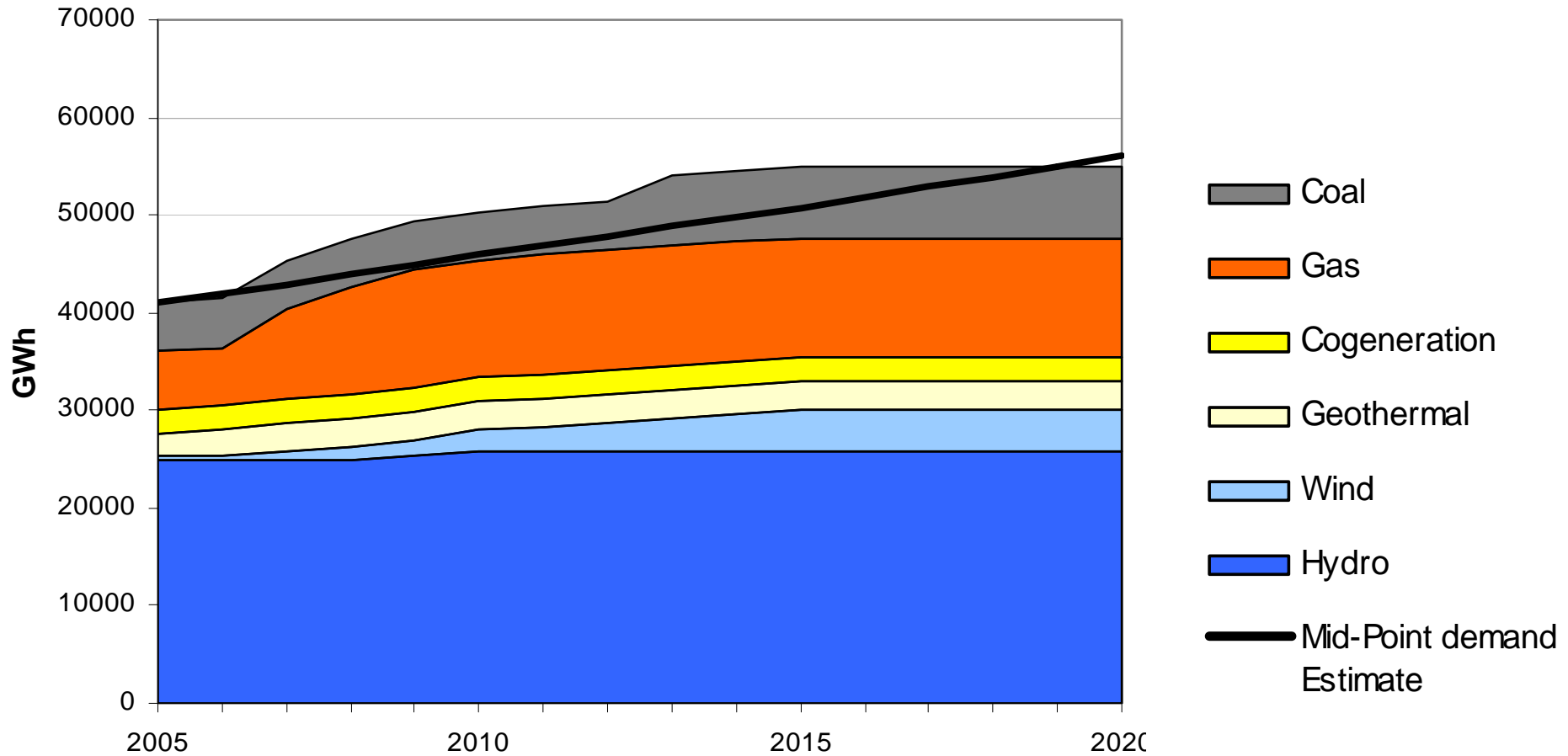
What is Happening with Supply & Demand?

Demand has been Growing

Approximate National Annual Demand



And Continues to Grow, so does Supply?

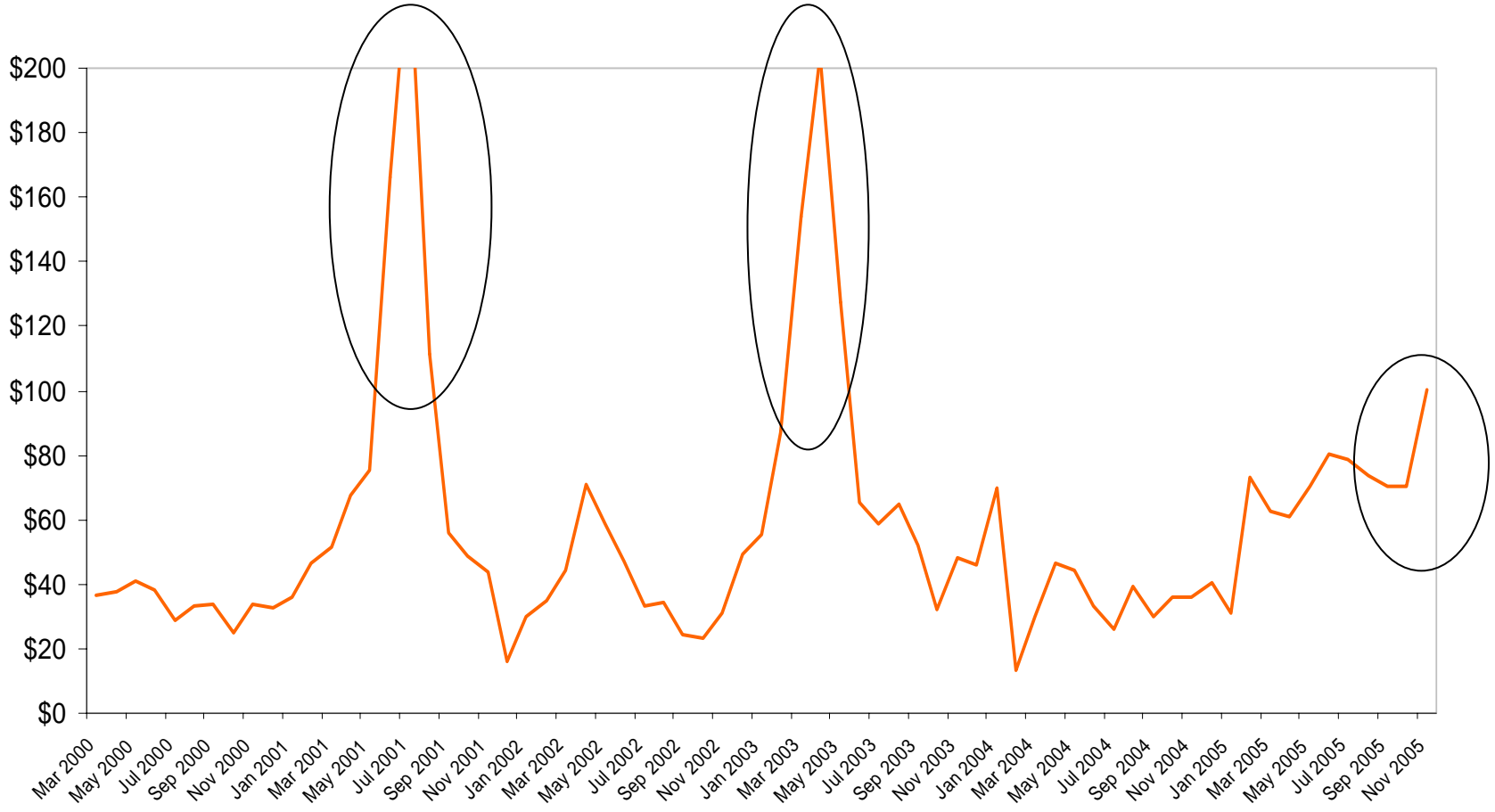


Demand growth of $\approx 2\%$ per annum, consistent with Electricity Commission modelling

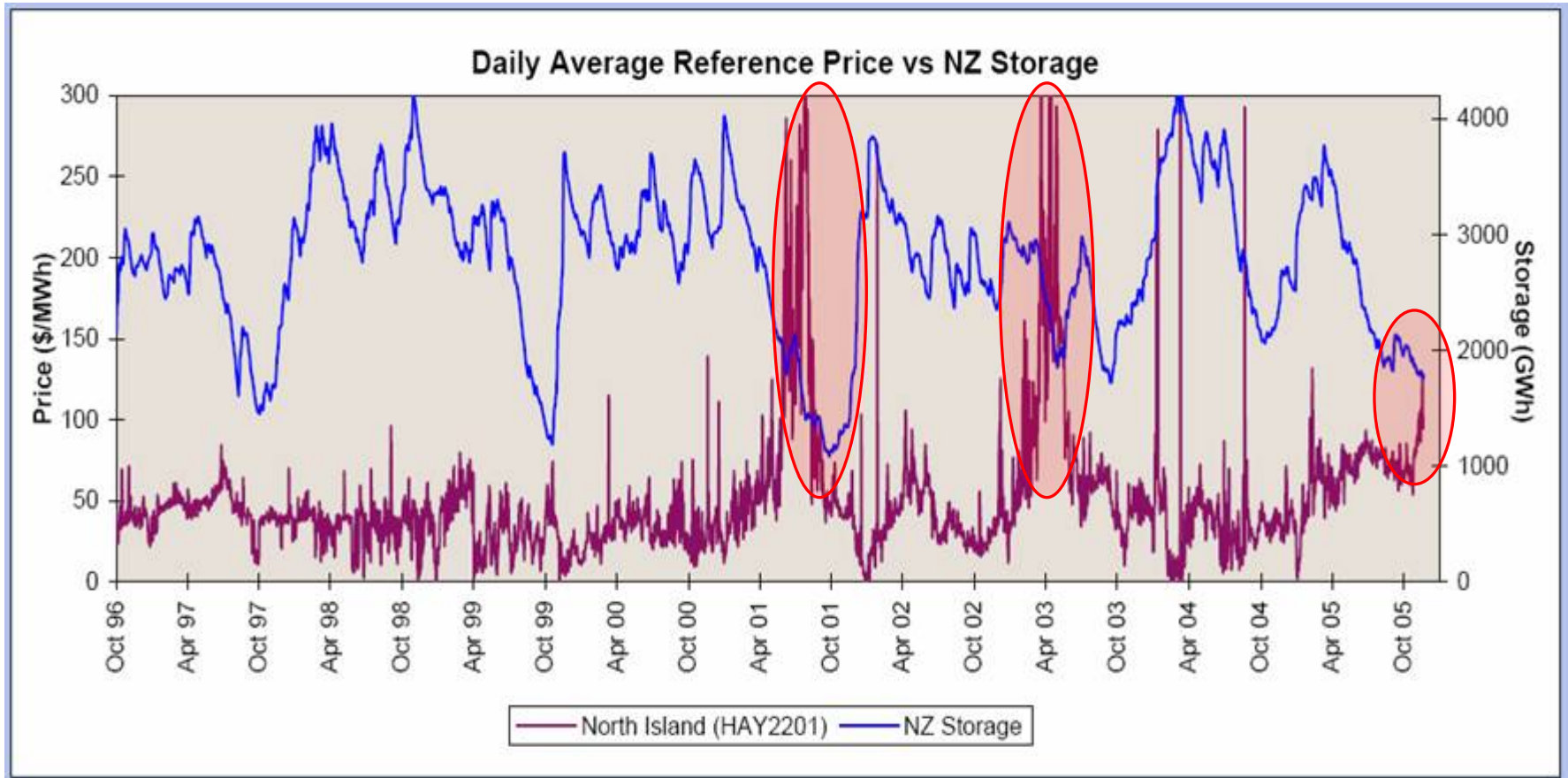
What happens to Prices?

Wholesale Price Volatility March 00-Nov 05

Prices are more volatile as supply gets constrained

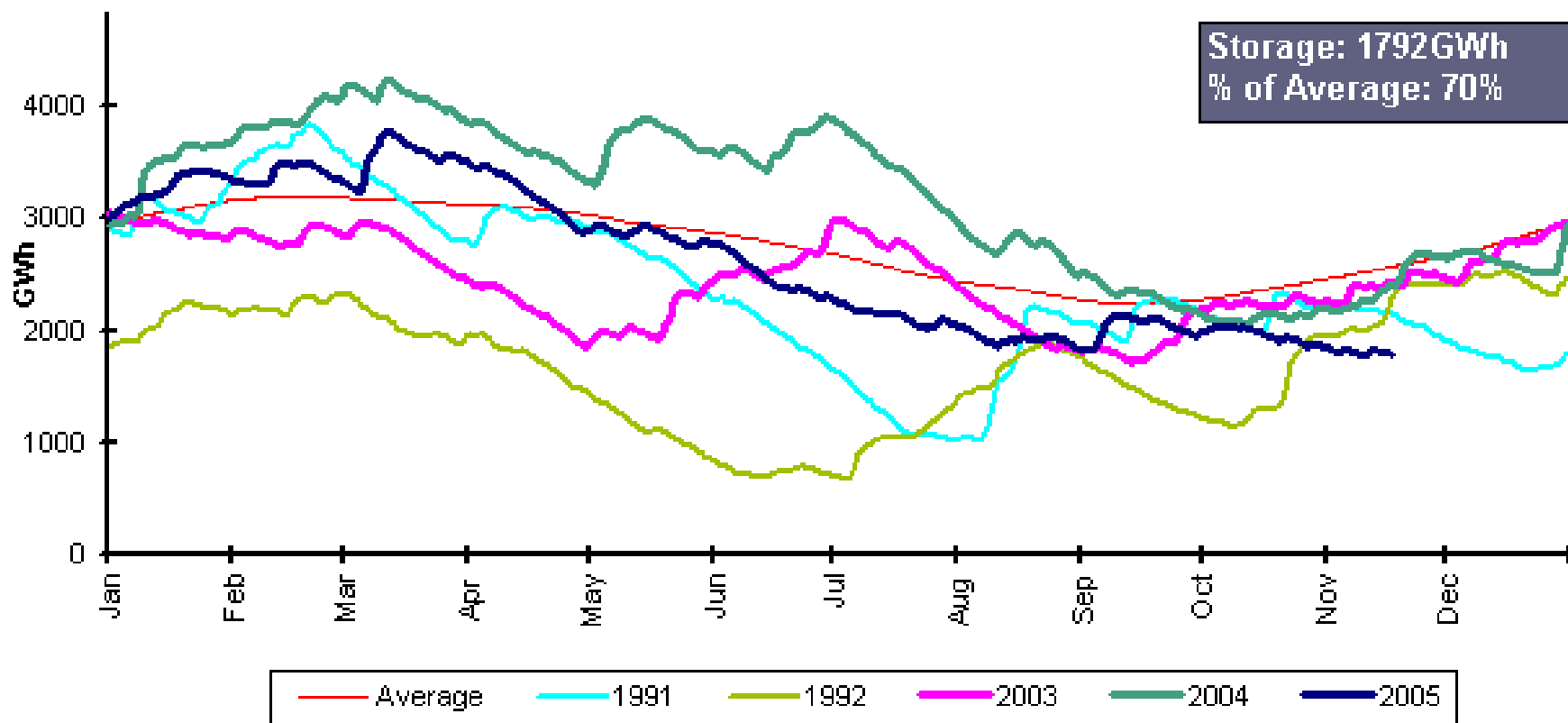


Price volatility and Hydro Storage Correlate



Growing Demand increases the problem!

Current Hydro Storage



Prices are Reflecting Hydro Storage



The Supply Side Response

Huntly - 40MW Gas Turbine (300 Gwh)



Huntly – Cooling Tower



Generation Investment – E3P (3000 Gwh)



385MW CCGT

Commissioned
December 2006

What are the Demand Side Options?

- Energy Efficiency
- Demand Reduction
- Demand Response Pricing

Goals of Demand Response

- Improve system reliability – by reducing demand at time of constraint.
- Reduce price volatility – by reducing demand at peak price times (and smoothes volatility).
- Increase economic efficiency of the total system could be very valuable in New Zealand if valuable fuel is preserved.
- Reduce average prices to consumers – by reducing the impact of high price spikes and moving demand to lower price periods.

Braithwaite & Eakin (2002)

Demand Response Two Broad Options

- Option 1 Demand Reduction – a payment to the customer for reducing demand at peak times.
- Option 2 Demand Response Pricing – The customer pays a price for consumption that reflects system constraints at the time of consumption.

- Demand Repurchase Programme
 - The customers retailer offers to buy back demand for a volume / price / time profile.
 - If the customer agrees they pledge to reduce consumption against a pre-determined base line.
- Demand Exchange Schemes
 - Operated by a third party willing buyers and willing sellers trade demand.
 - The trades need to be verified against a pre-determined base line.

- **Base Line Issues (Are they Real Savings?)**
 - Setting the base line is difficult – if it is over-inflated customers may be rewarded for ‘normal’ consumption.
 - Or, customers may sign up when they know their consumption will be dropping.
 - Conversely, customers experiencing growth may not join.
- **Economic Issues**
 - The trade off between the value of Demand Response compared with the value of production for the customer.
 - The customer cannot sell what they have not bought – therefore unlimited volume contracts are not suitable. This raises risk issues.

- Customers face the price of congestion.
- Higher prices at times of congestion, lower prices at other times.
- Wholesale and Retail markets are connected.
- Whilst economically efficient, this is not always practical.

Pricing Methods for Demand Response

- Real Time Pricing ('RTP')
- Time of Use Pricing ('TOU')
- Critical Peak Pricing ('CPP')
- Demand Charges

- Provides efficient connection of wholesale and retail markets.
- The price paid could be very volatile and have a significant impact on a customers business.
- However, RTP may form a part of customers profile. Say 80% fixed price, 20% spot.
- Requires the customer to understand the risks.

- Provides a forward set of price and time blocks that reflect the generalised peak and off peak periods.
- But the peaks do not necessarily coincide with actual congestion events.
- However, customers are insulated from unexpected volatility.

Critical Peak Pricing (CPP)

- This is a blend of TOU and RTP pricing.
- Customers have TOU prices for all periods and,
 - A CPP that is triggered at times of congestion.
 - The CPP is known ahead of time and may be limited to a number of time periods.
- The price of the Critical Peak is critical in modifying behaviour.

- Both Demand Reduction and Pricing based methods require:
 - Advanced Interval metering
 - Information technology that captures time and consumption data
 - Information exchange with customers about system congestion and pricing.

- Demand Response ‘free-ride’
 - A small reduction in demand may cause a large reduction of spot price
 - Lower prices caused by demand response benefit all customers – including those who did not reduce demand
 - The cost of achieving the reduction (lost utility and cost of metering) borne by only some consumers (or their retailers)

Advanced Metering System

A comprehensive utility information and control system supported by two-way remote communications with customer premises equipment

Advanced Metering – what do we mean?

- Measurements
 - Energy (1/2 hour interval), demand, voltage
- Supply and status monitoring
 - outage times, tampering, meter faults etc
- Remote control/switching
 - Service disconn/reconn, **and** load control
 - Individual and group addressing capability
- Interface to other customer equipment
- Remote communications to data hub

- Demand Response is a valid and underutilised part of the response to a market based electricity system.
- Pricing Based methods have been shown to be more effective than demand reduction programmes with less distortions.
- Pricing based programmes are more effective when the price signal is higher.
- Increased sophistication of technology makes these responses more viable.