



CEEM Specialised Training Program

El Restructuring in Australia

Performance of the NEM

Hugh Outhred

Centre for Energy and Environmental Markets

School of Electrical Engineering and Telecommunications

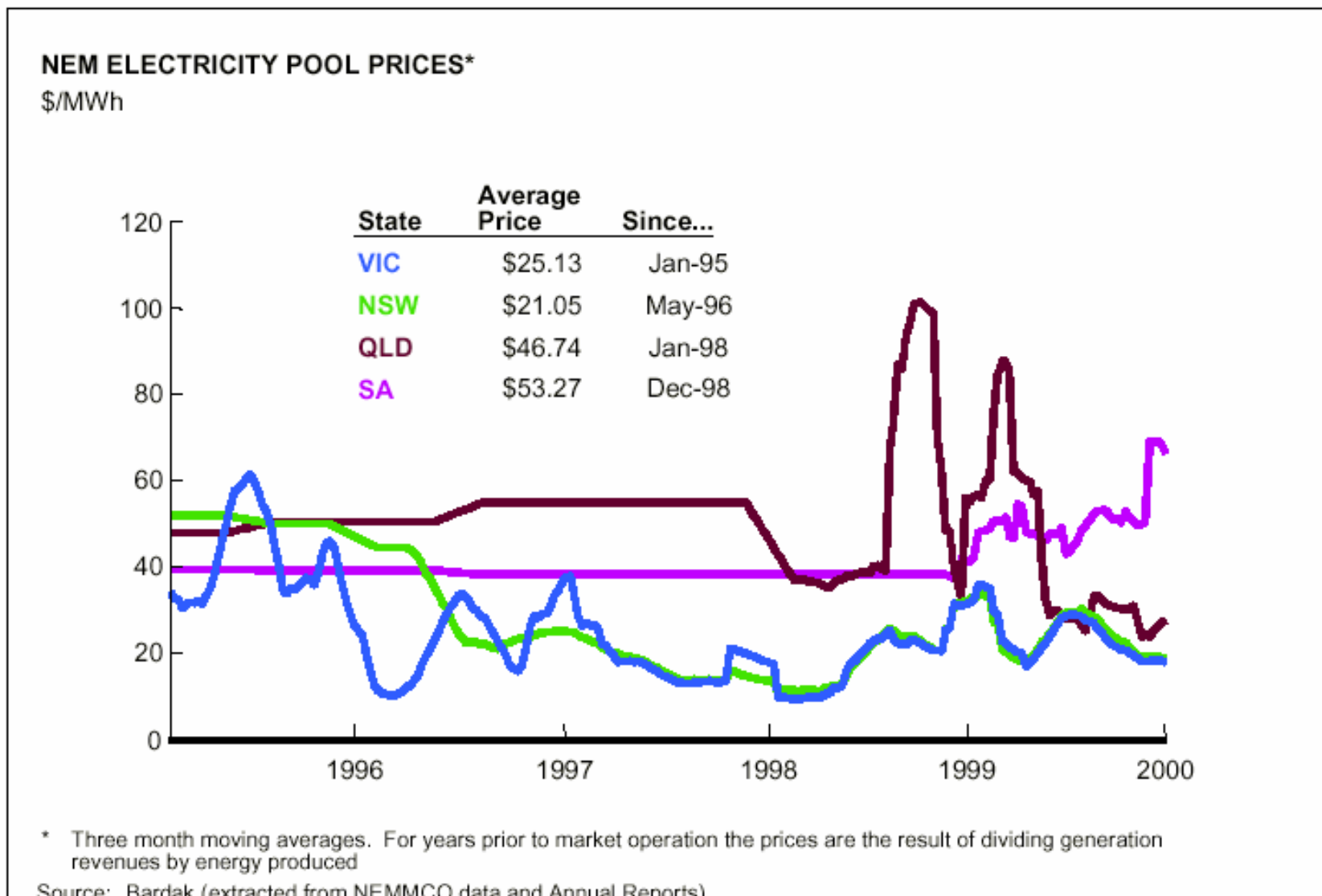
The University of New South Wales

h.outhred@unsw.edu.au

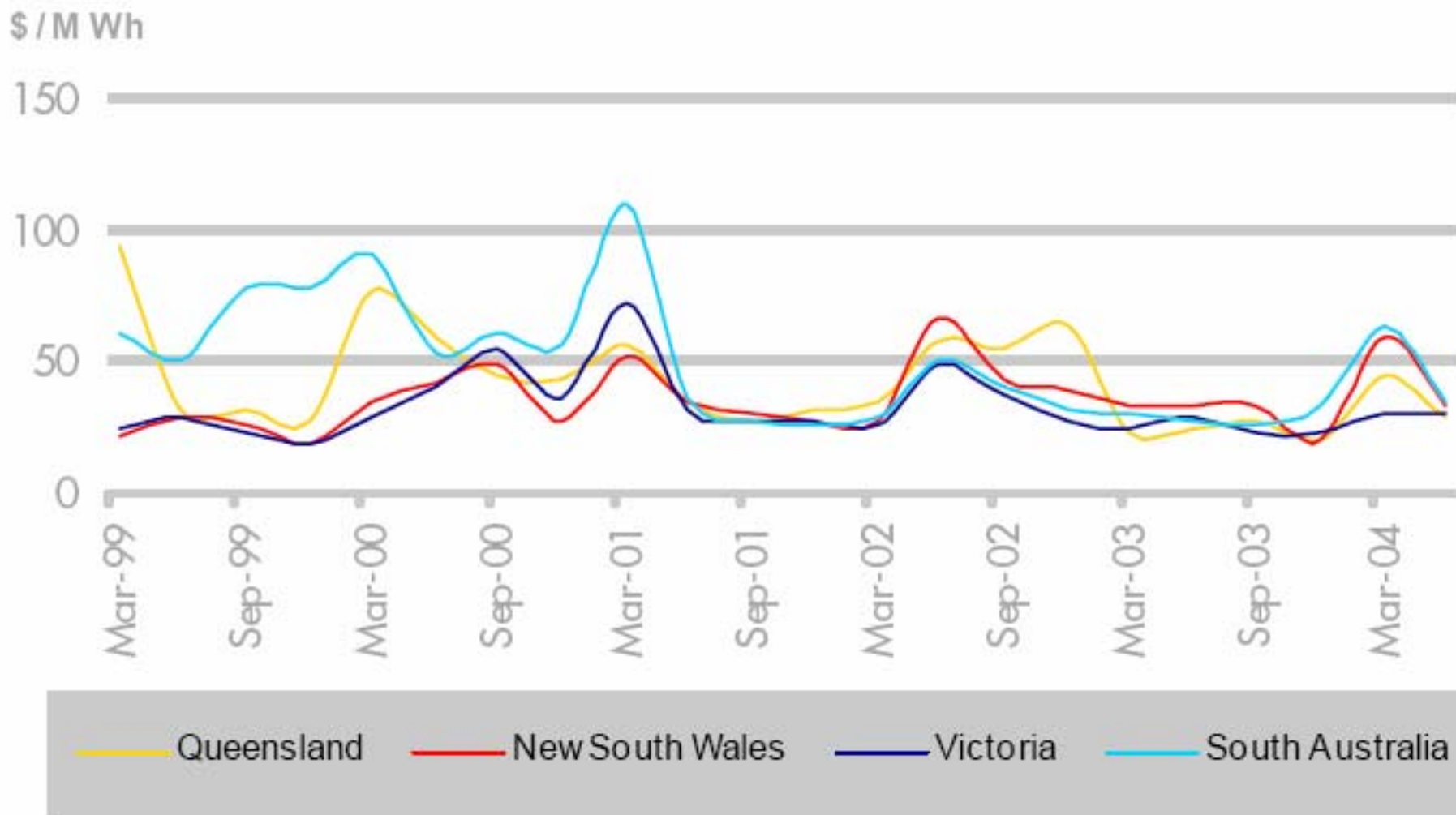
www.ceem.unsw.edu.au

Price history for NEM & its precursors

(Business Council of Australia, 2000)



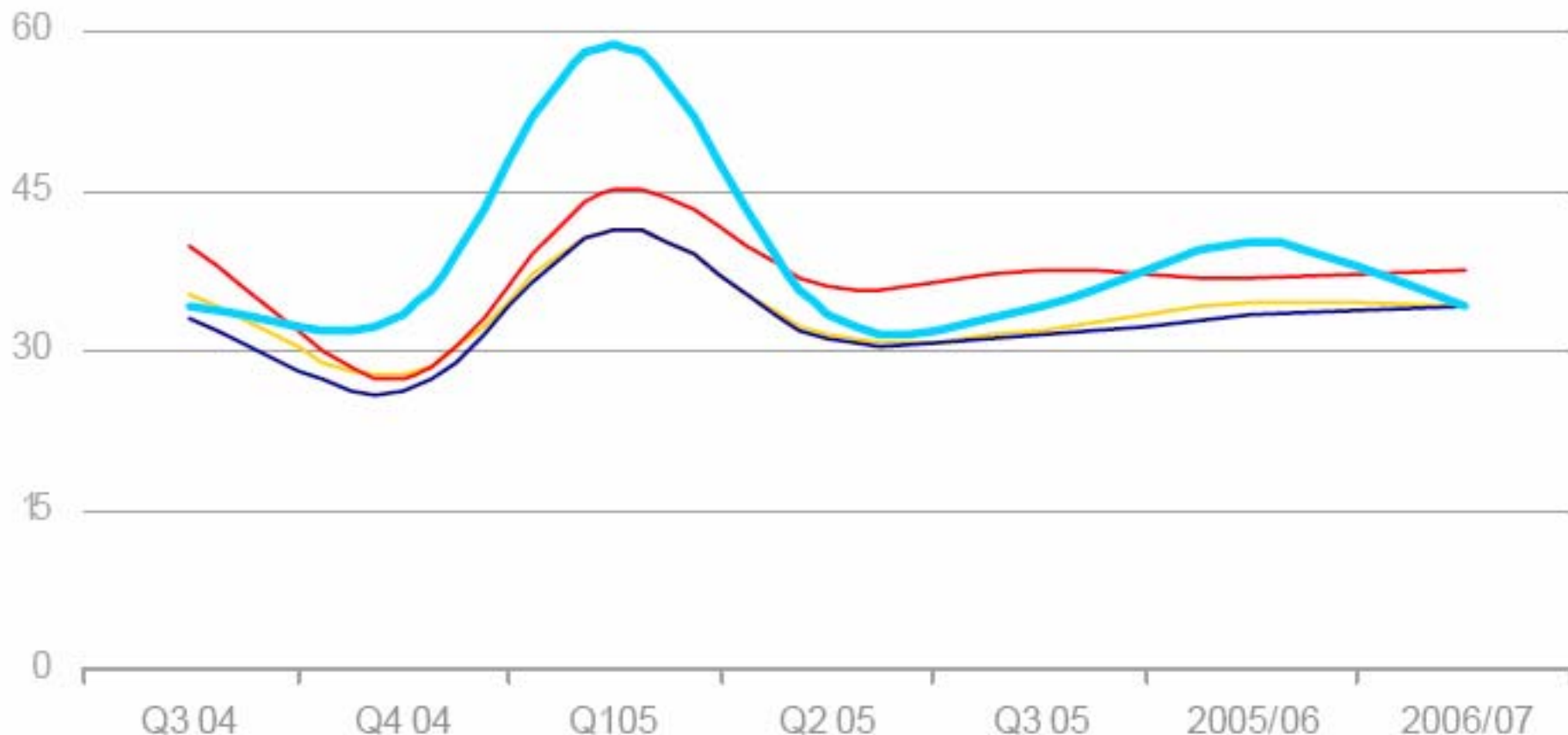
Smoothed NEM Regional Ref Prices (RRPs) since market inception (NECA 04Q2 Stats. 2004)



Annual average RRP flat contract prices

(NECA. 04Q2 Stats. 2004)

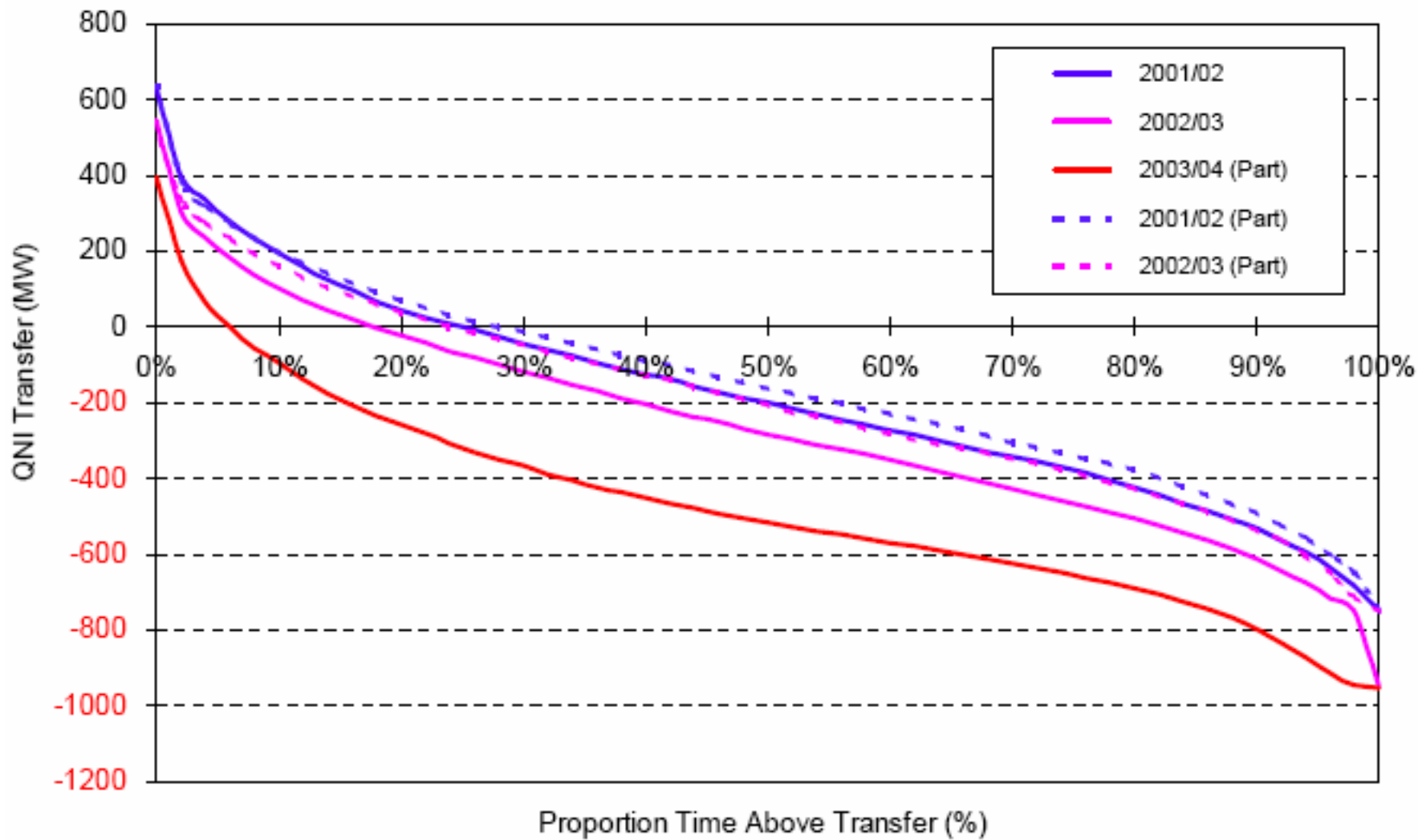
\$ / M Wh



— Queensland — New South Wales — Victoria — South Australia

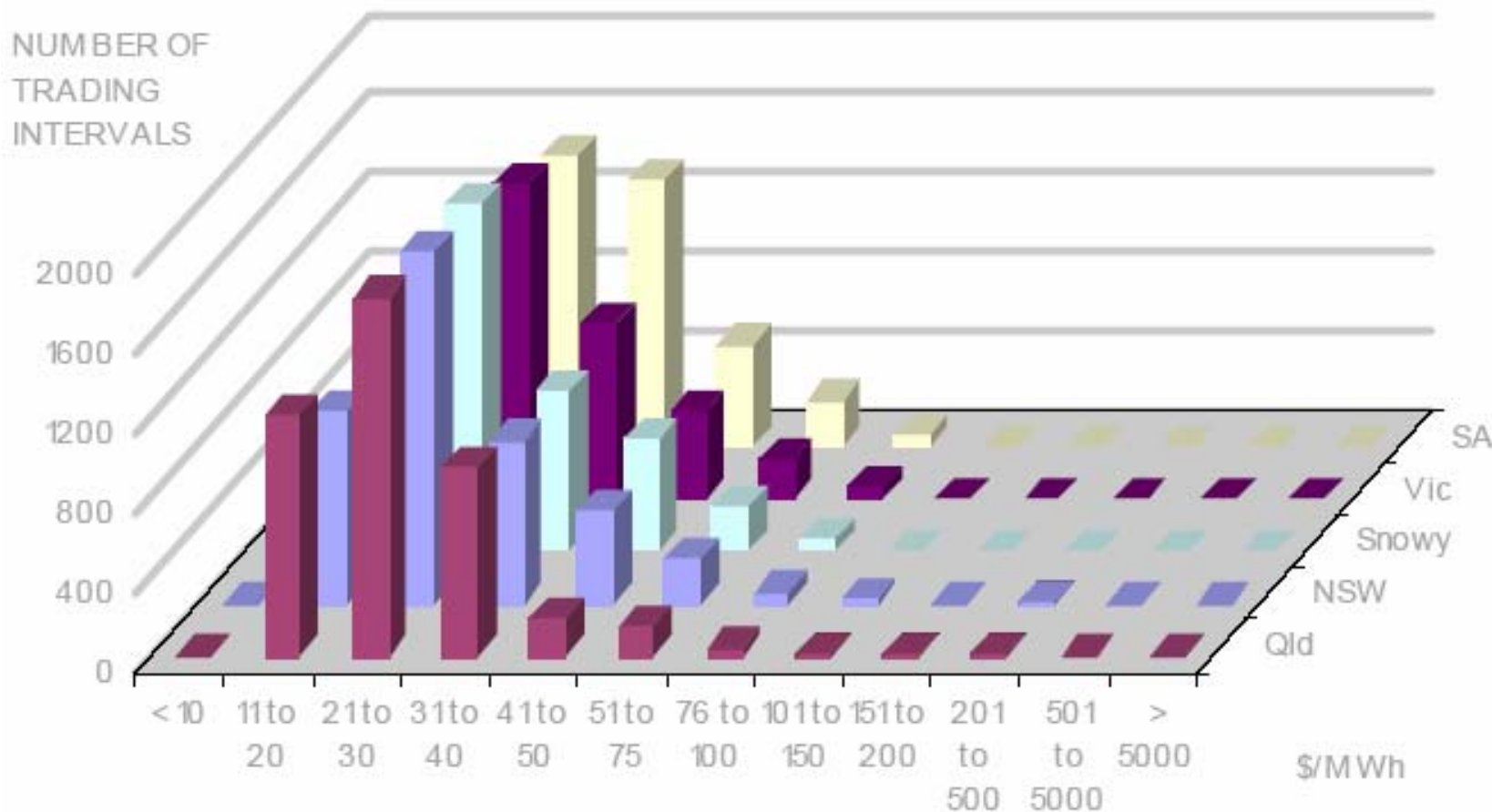
Trends in utilisation of QNI

Figure A.2 - Historical Cumulative QNI Transfer Distribution Curves



Histogram of NEM RRPs, March-June 04

(NECA, 04Q2 Stats, 2004)



Qld

NSW

Snowy

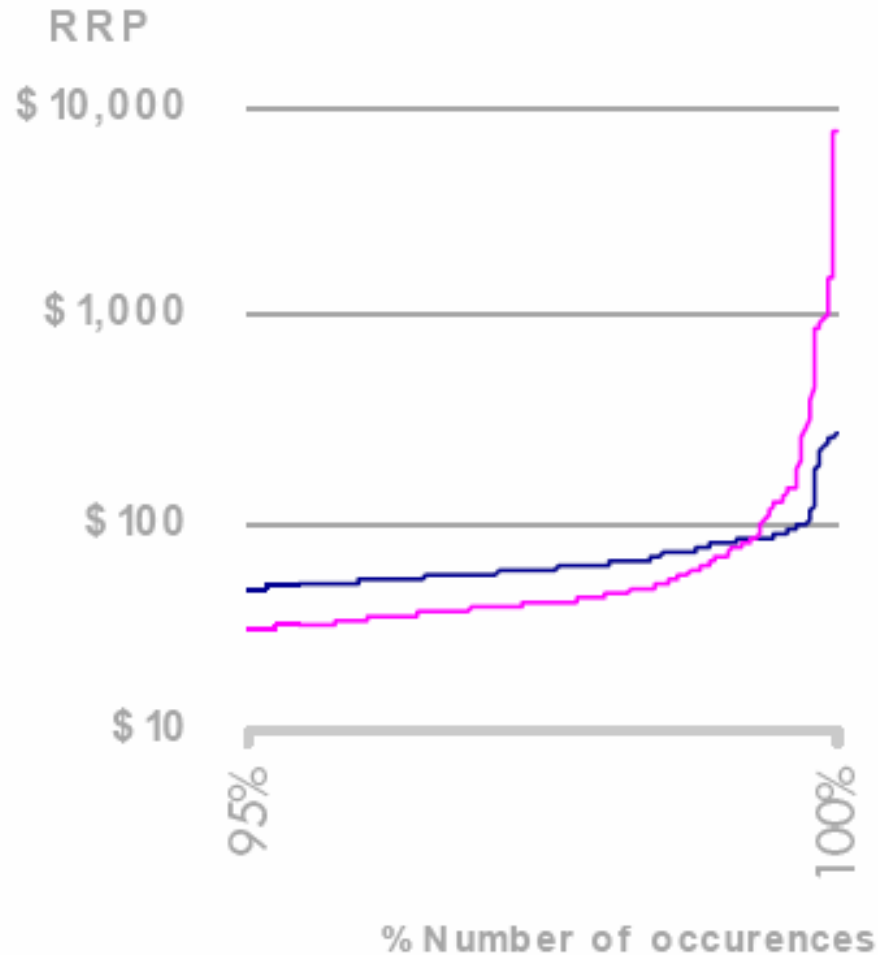
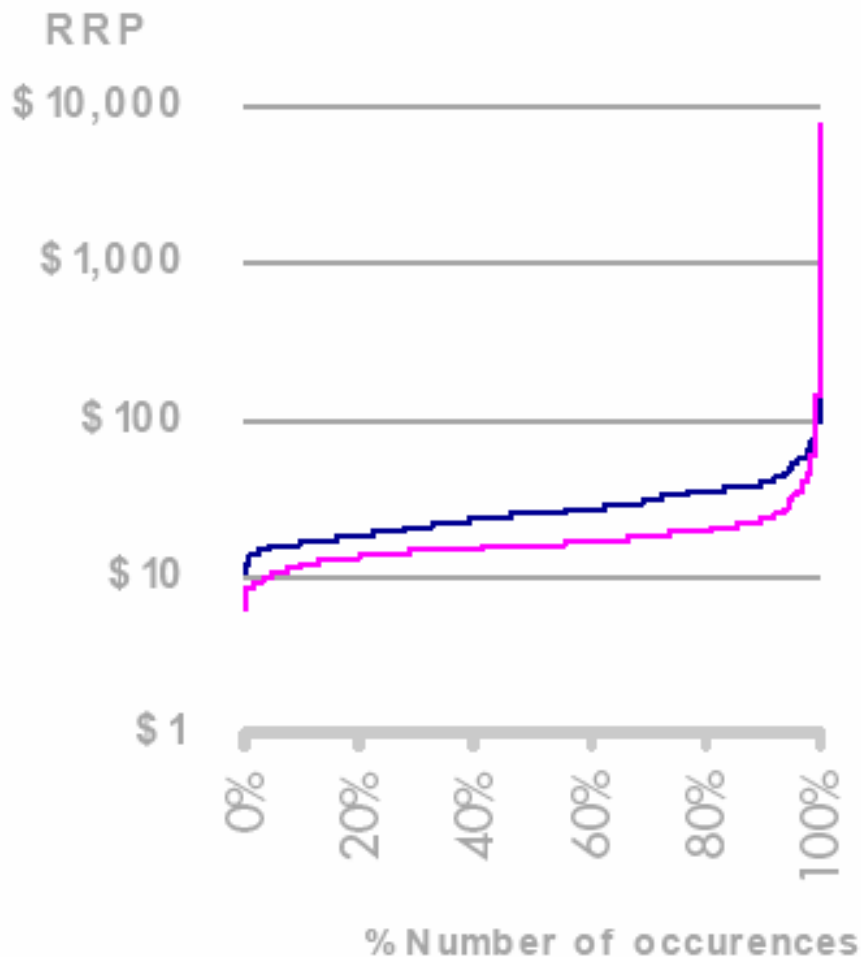
Vic

SA



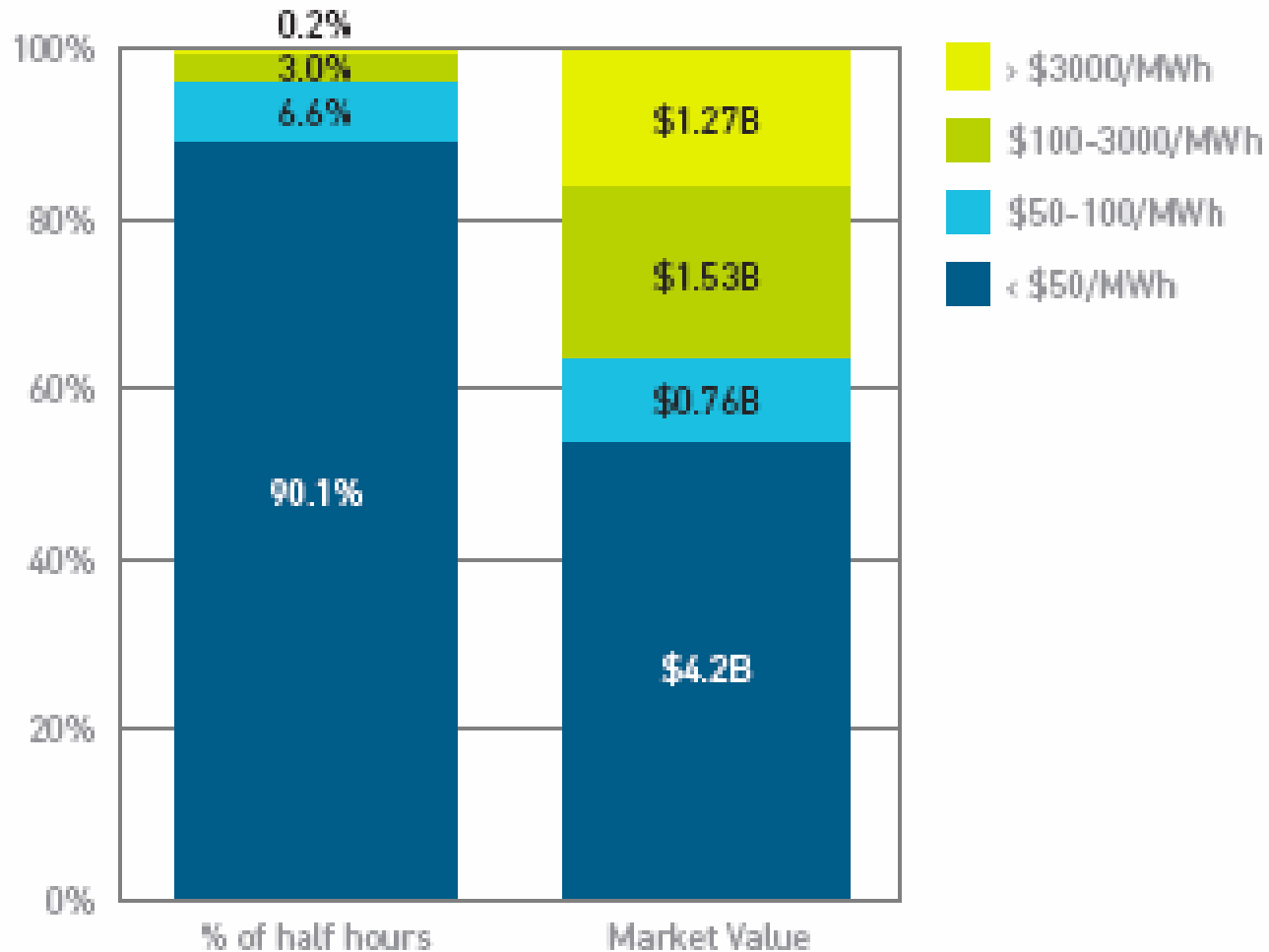
Qld RRP duration curve, March-June 04

(NECA, 04Q2 Stats, 2004)

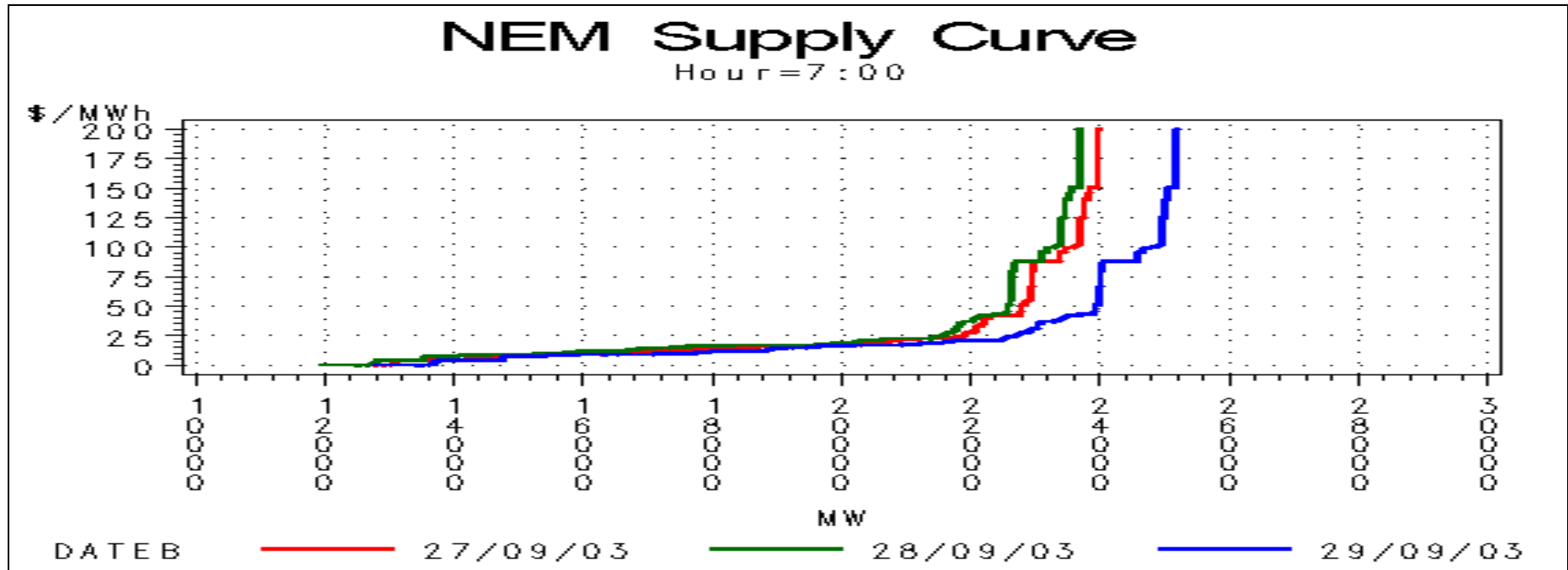


Distribution of NEM spot prices & revenues

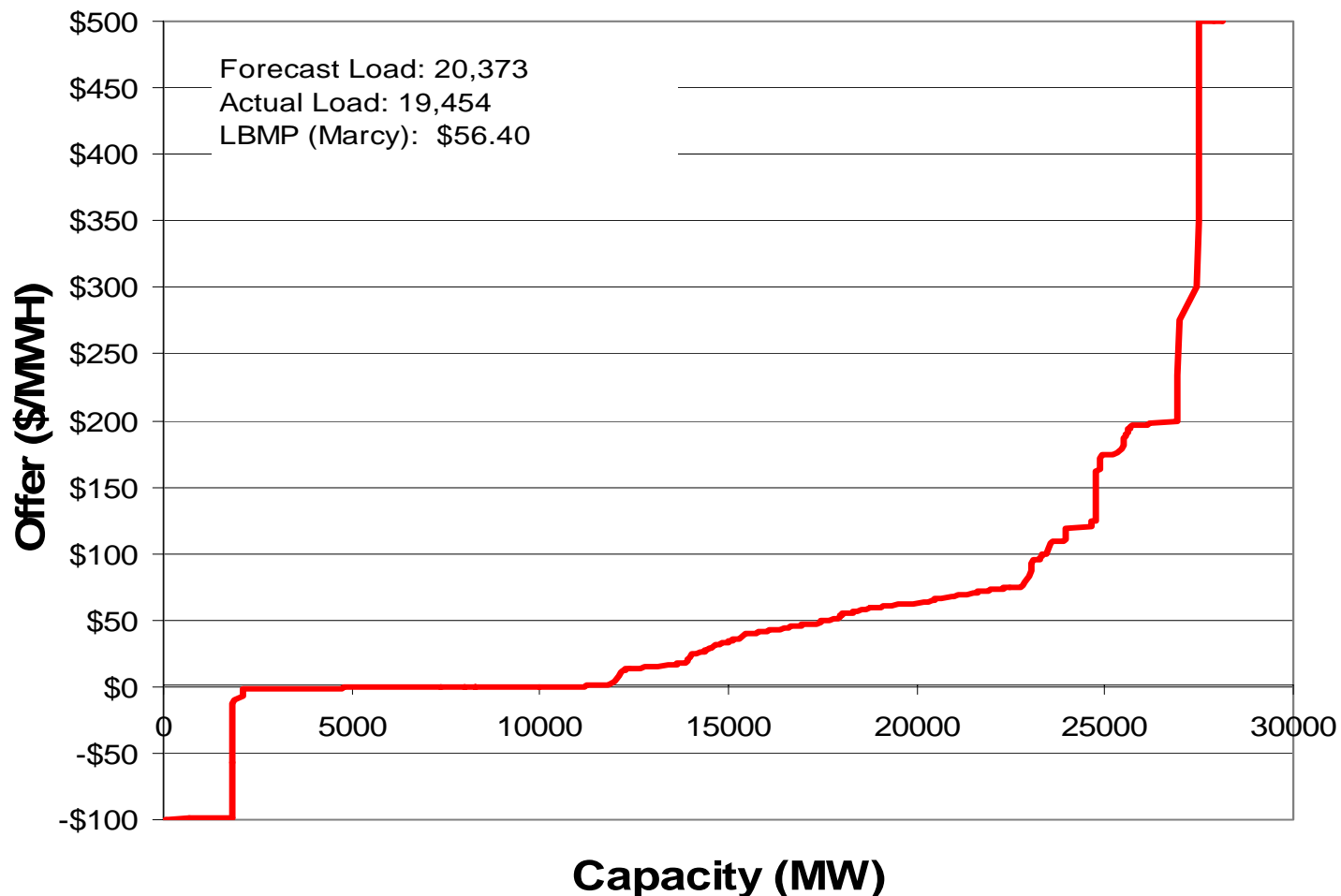
(Federal Govt: *Securing Australia's Energy Future*, 2004)



NEM Supply curve at 7am on 27, 28 & 29 September 2003 (Saturday-Monday) (T Baker, Delta)



Supply curve, New York ISO day-ahead market, 7/2/00 (T Flaim, 2003)





Price-demand
plots for NEM
regions
NSW (top) & SA
(bottom)
Jan-Mar 2004
(\$/MWh vs MW)
(NECA, 04Q1 Stats, 2004)

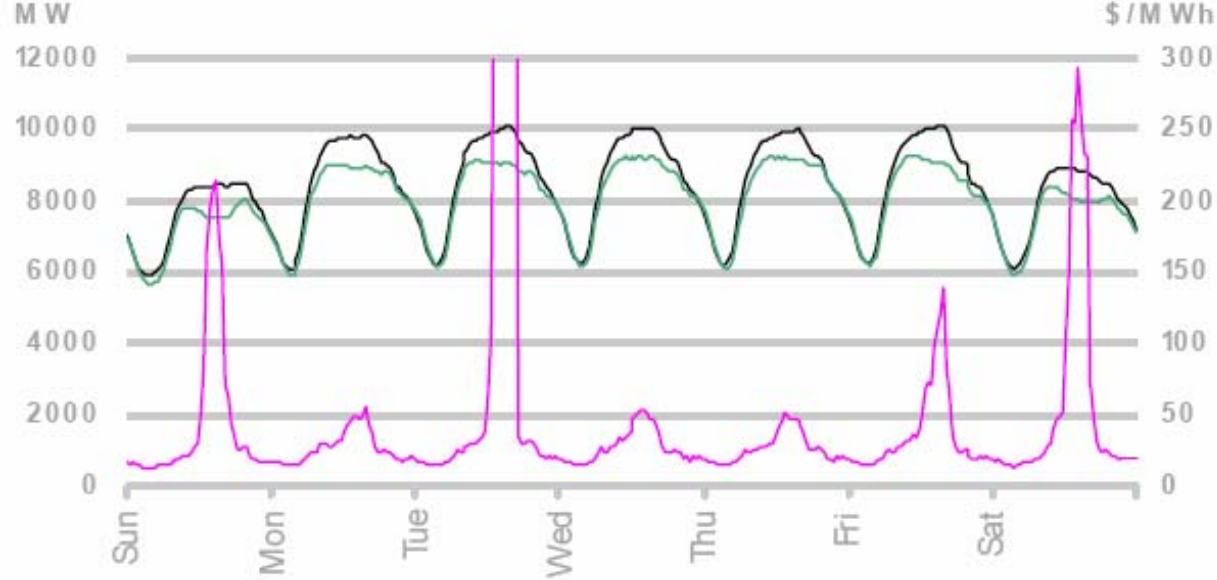




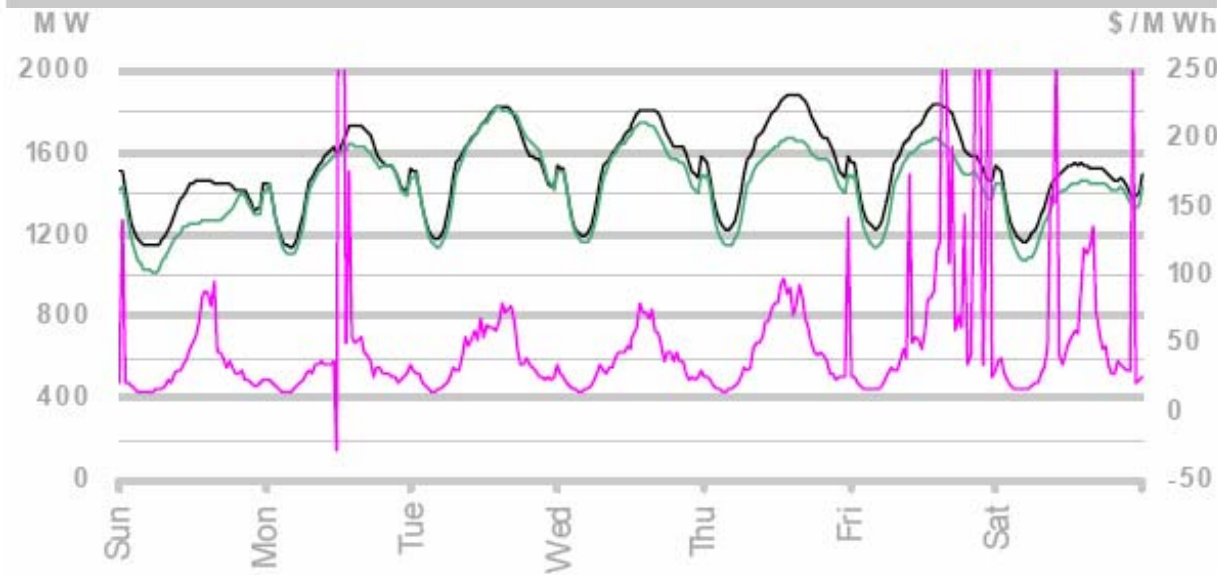
Weekly average demand and spot price for Jan-Mar 2004 with average demand for Sep-Dec 2003

NSW (top) & SA (bottom)

(NECA, 04Q1 Stats 2004)



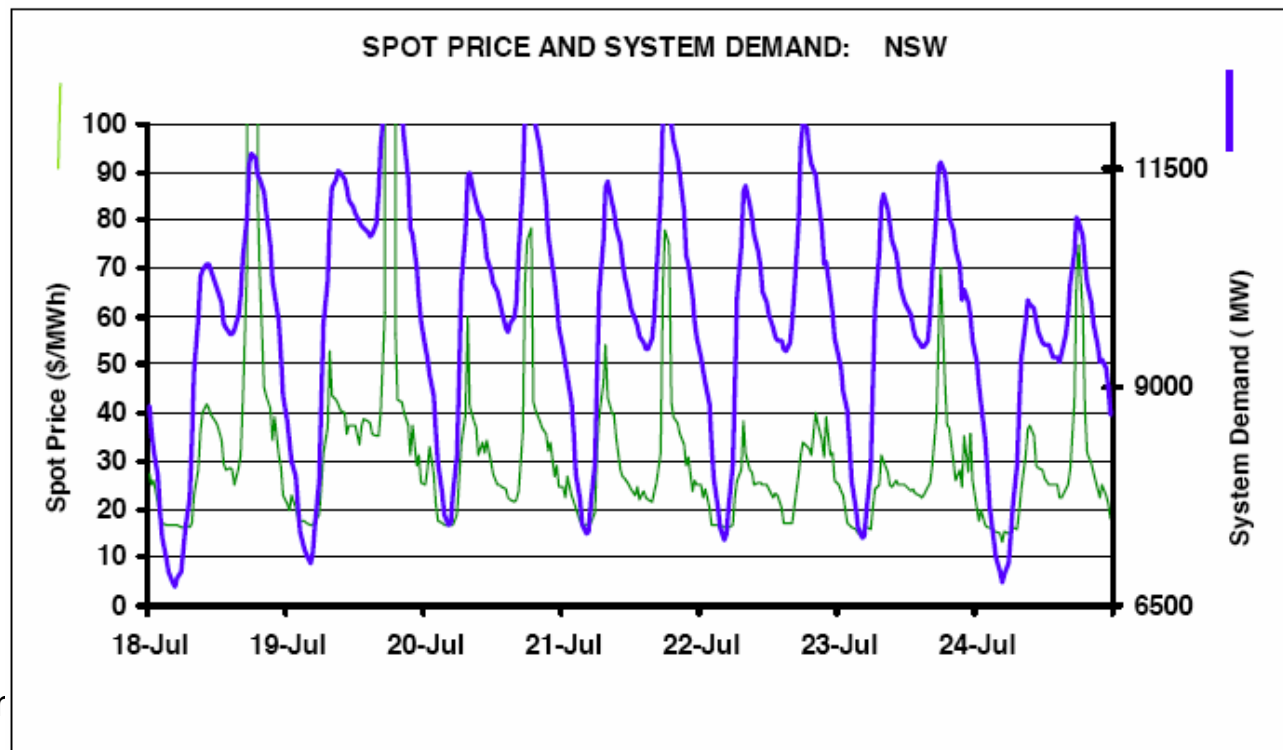
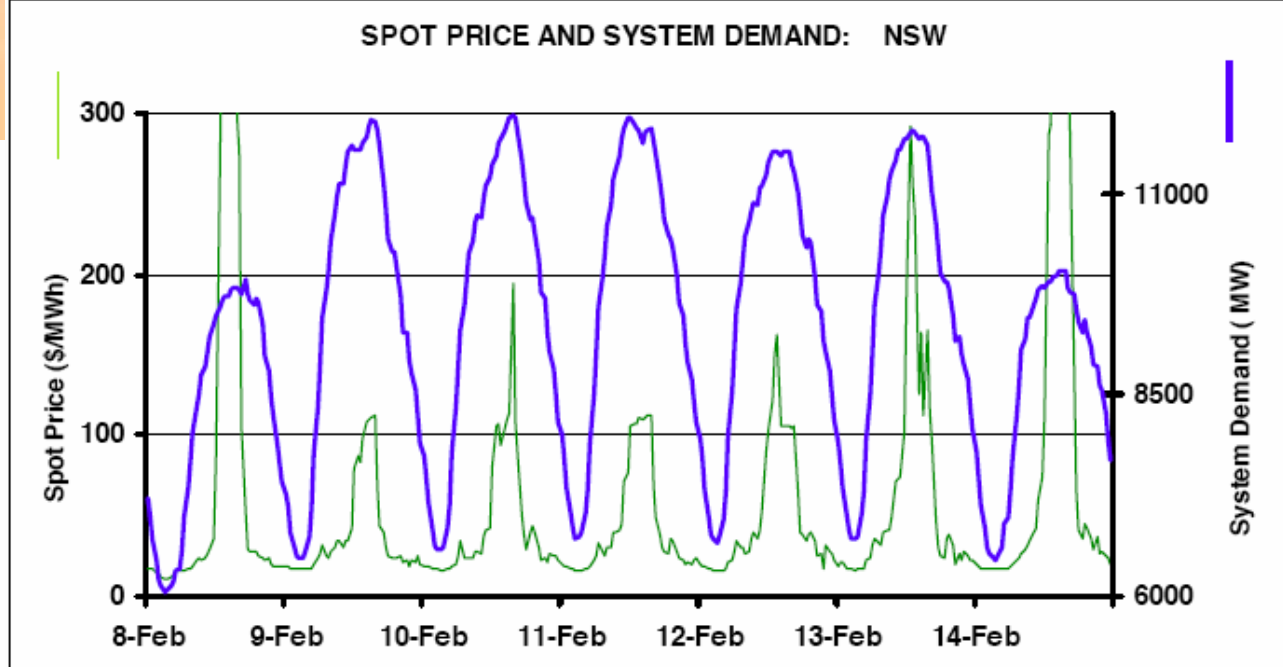
— Average demand — Average demand December 2003 — Average spot price



— Average demand — Average demand December 2003 — Average spot price

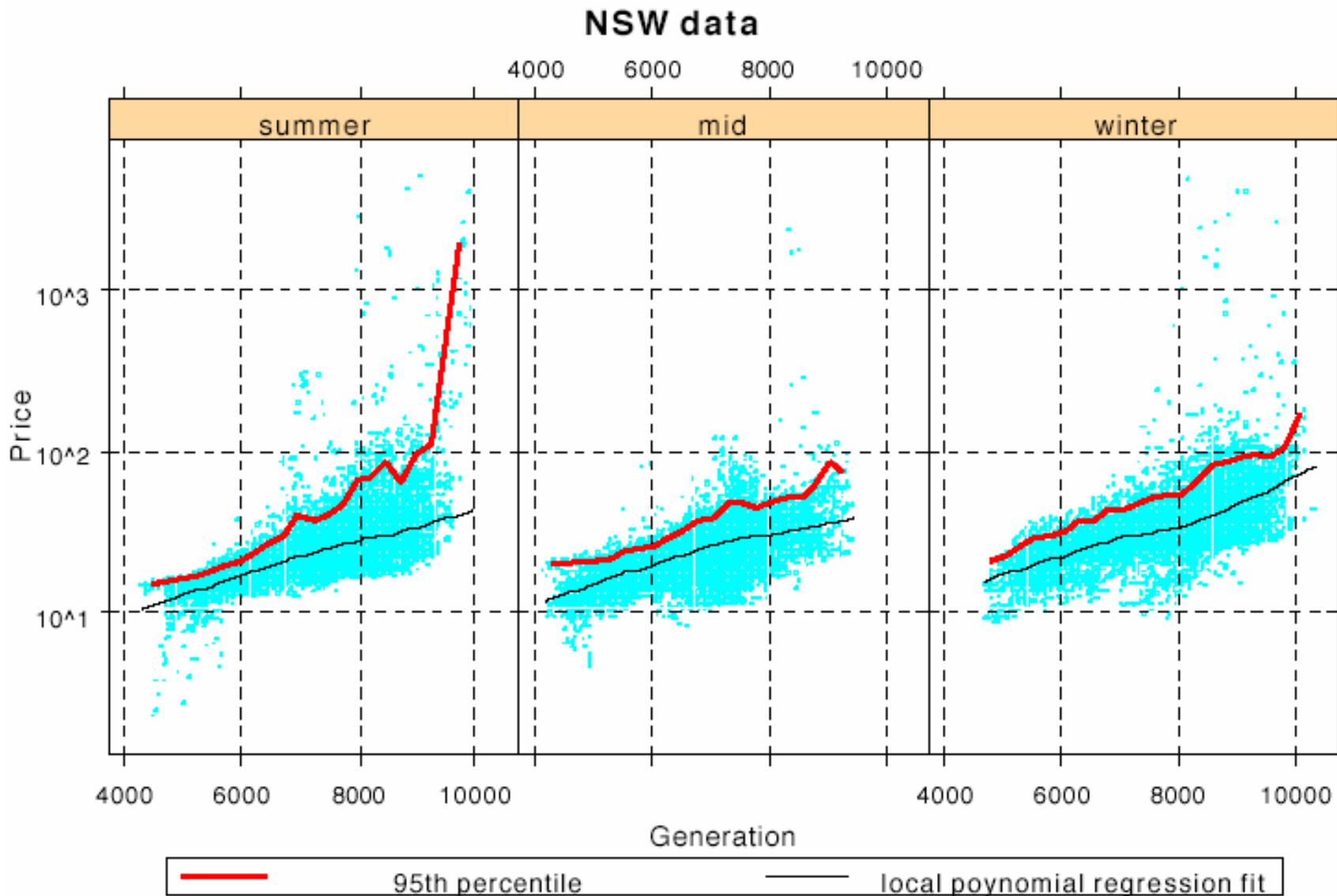


NEM NSW region demand & price, summer & winter 2004 (NEMMCO, 2004)



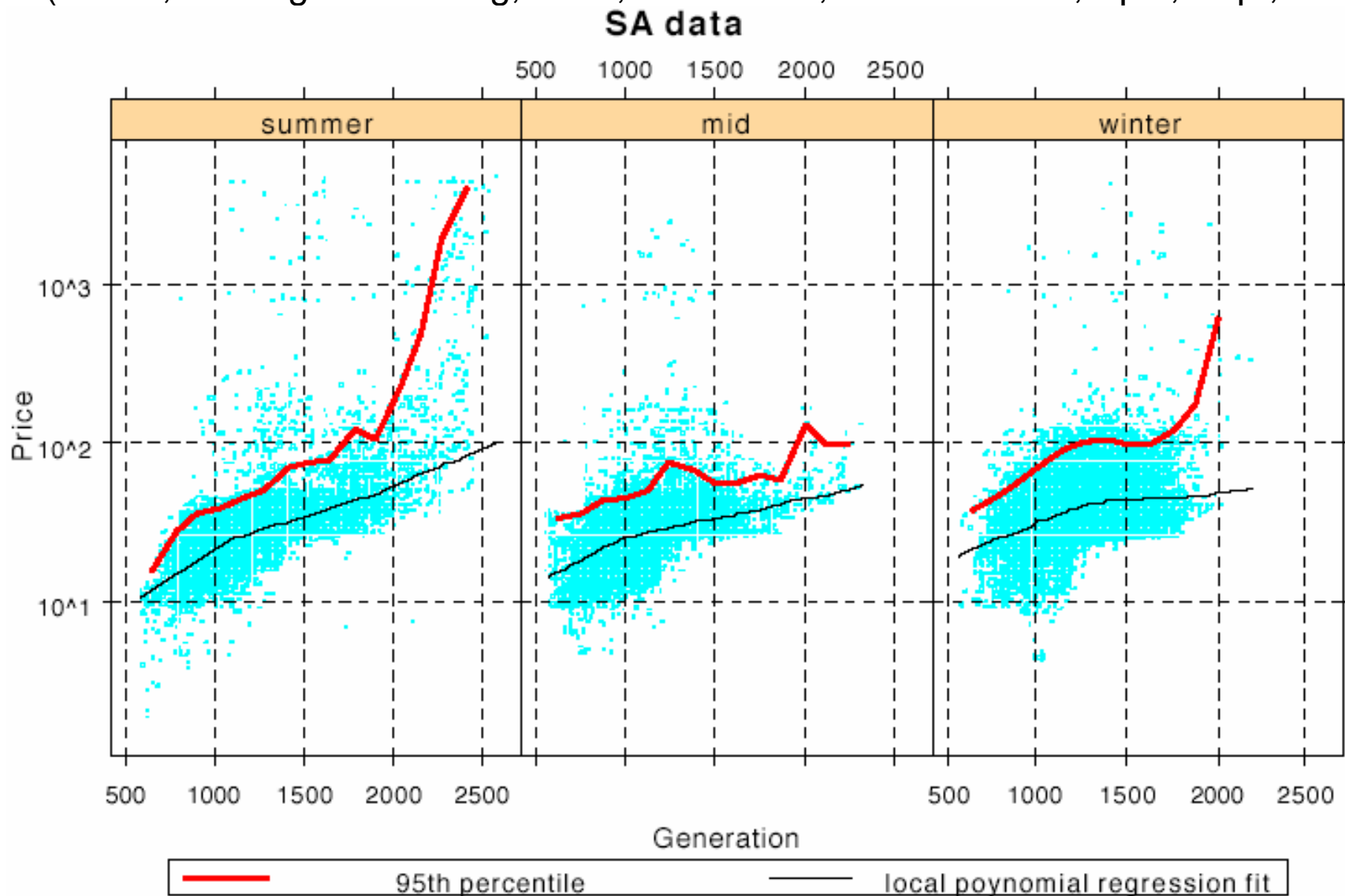
Analysis of two years of NEM spot price data

(NECA, Bidding & rebidding, 2002; 0401-0302; “mid” = March, April, Sept, Oct)



Analysis of two years of NEM spot price data

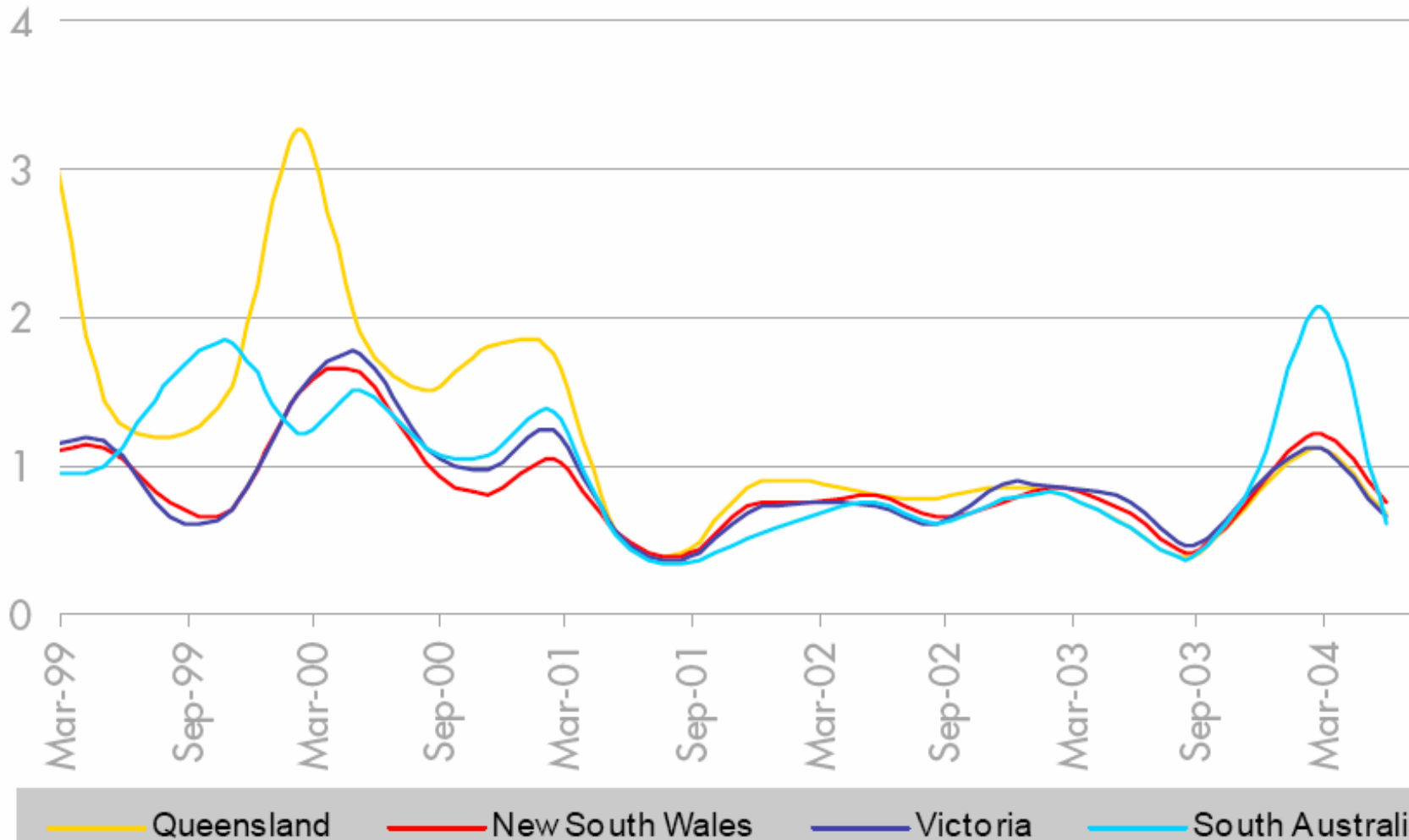
(NECA, Bidding & rebidding, 2002; 0401-0302; "mid" = March, April, Sept, Oct)



Quarterly RRP volatility index since market inception

(NECA, 04Q2 Stats, 2004)

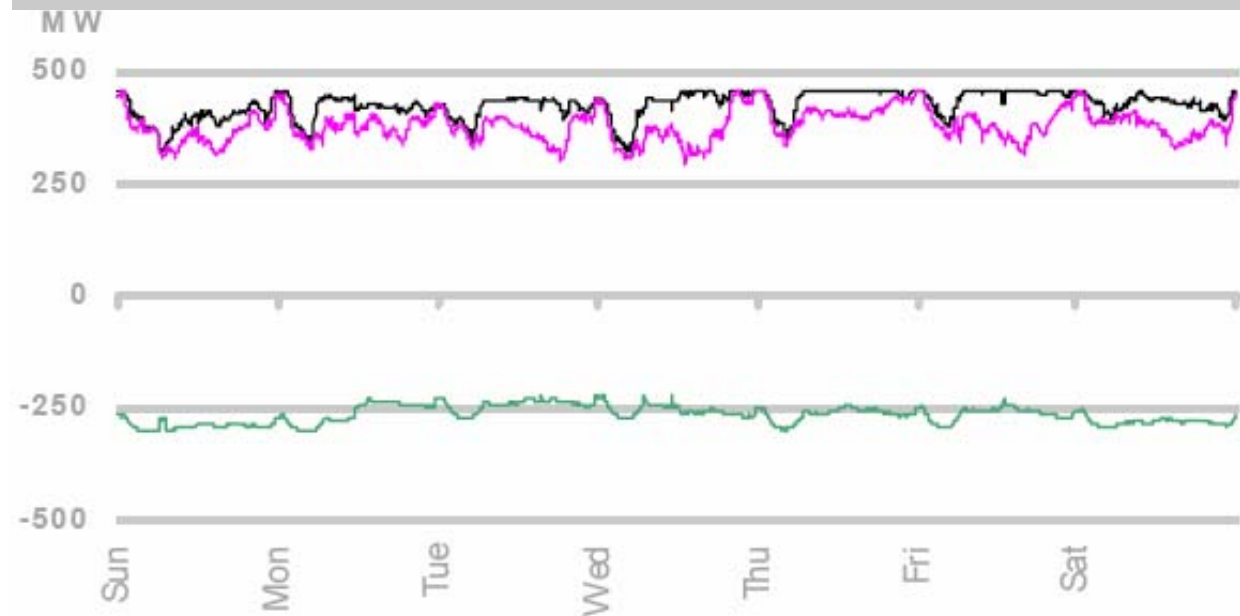
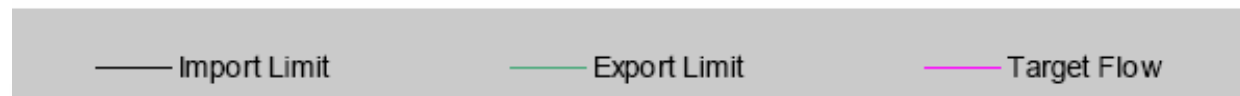
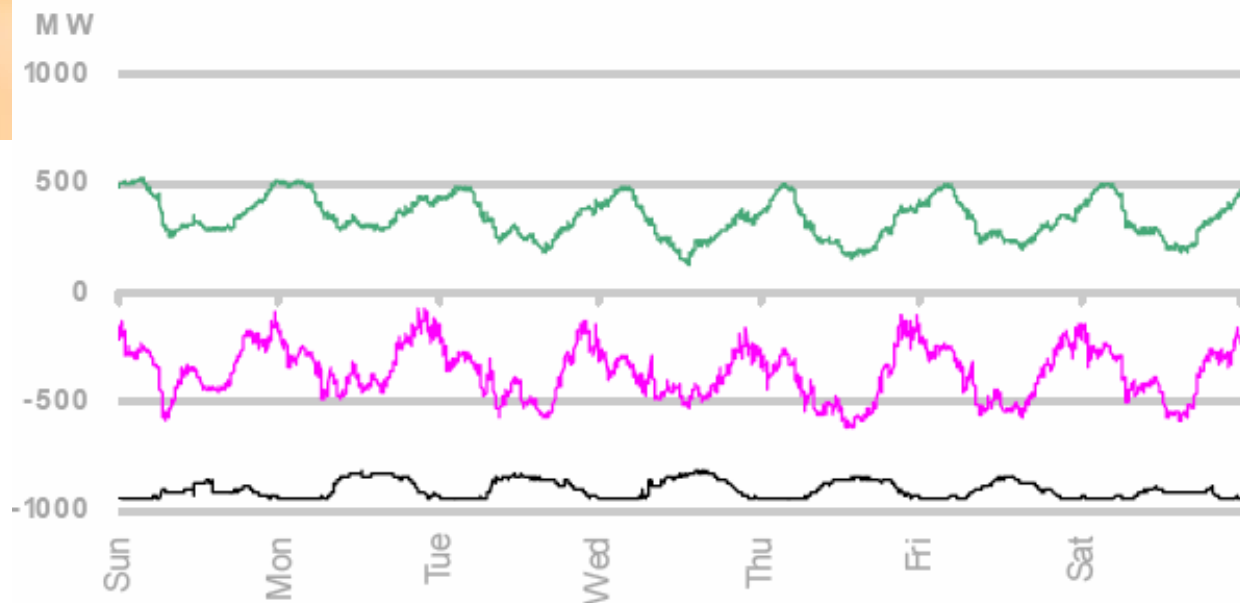
(width of the central 75% of the RRP distribution divided by the median price)





Interconnector flows & limits averaged over a week for Jan-Mar 2004

NSW to Qld (top)
&
Vic to SA
Heywood (bottom)
(NECA 04Q1 Stats 2004)

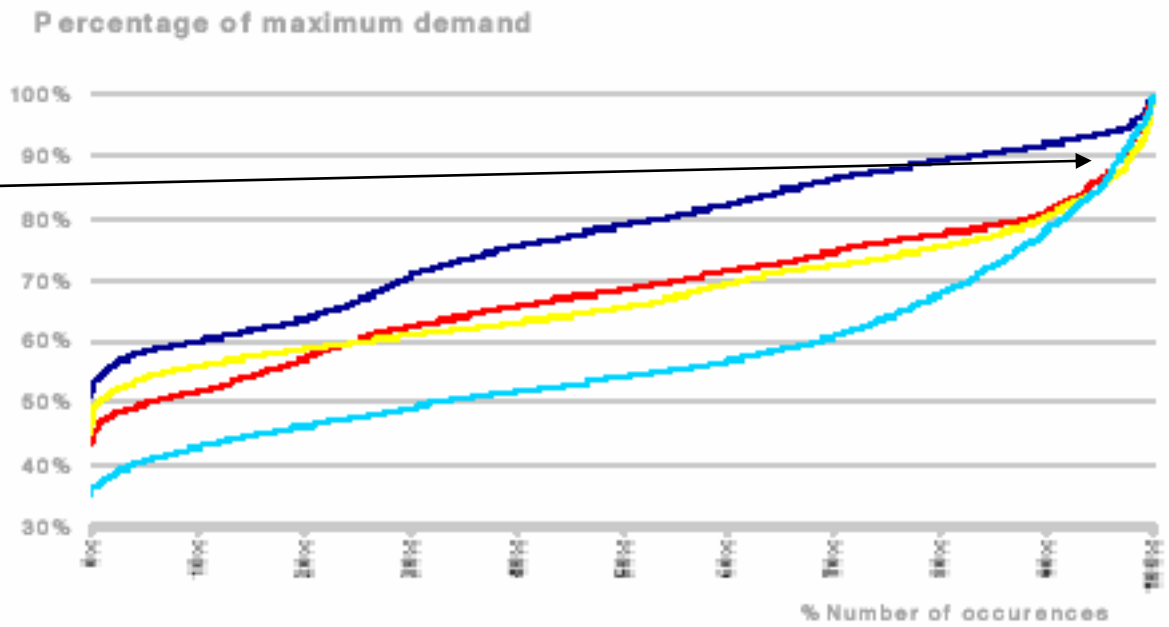




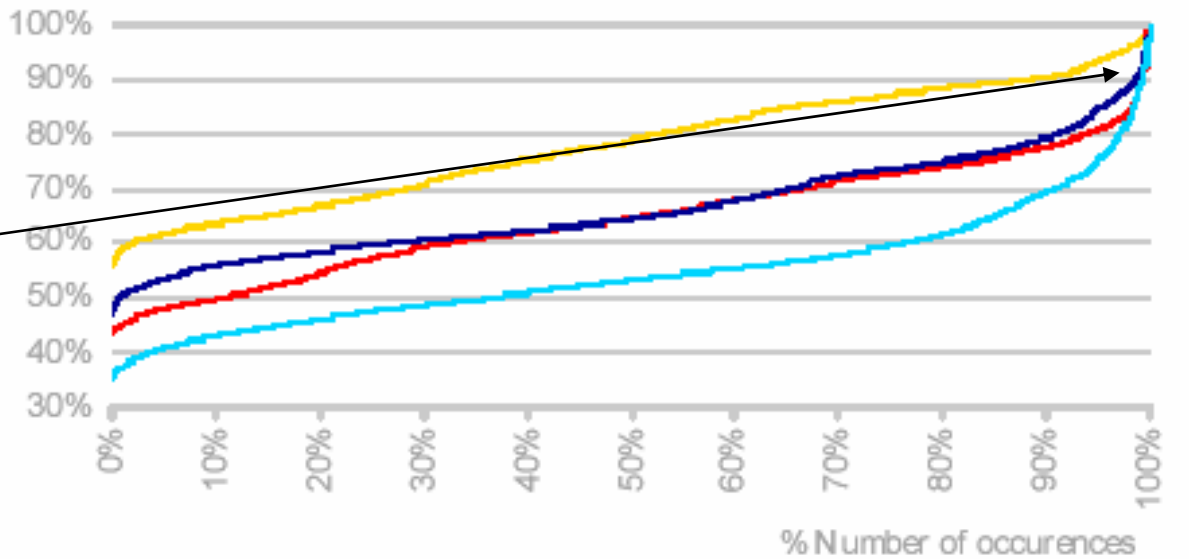
In 2001 NSW load >90% peak for ~5% of time

NEM load duration curves, January-March 2001 & 2003 (NECA quarterly Market Statistics)

In 2003 NSW load >90% peak for <2% of time

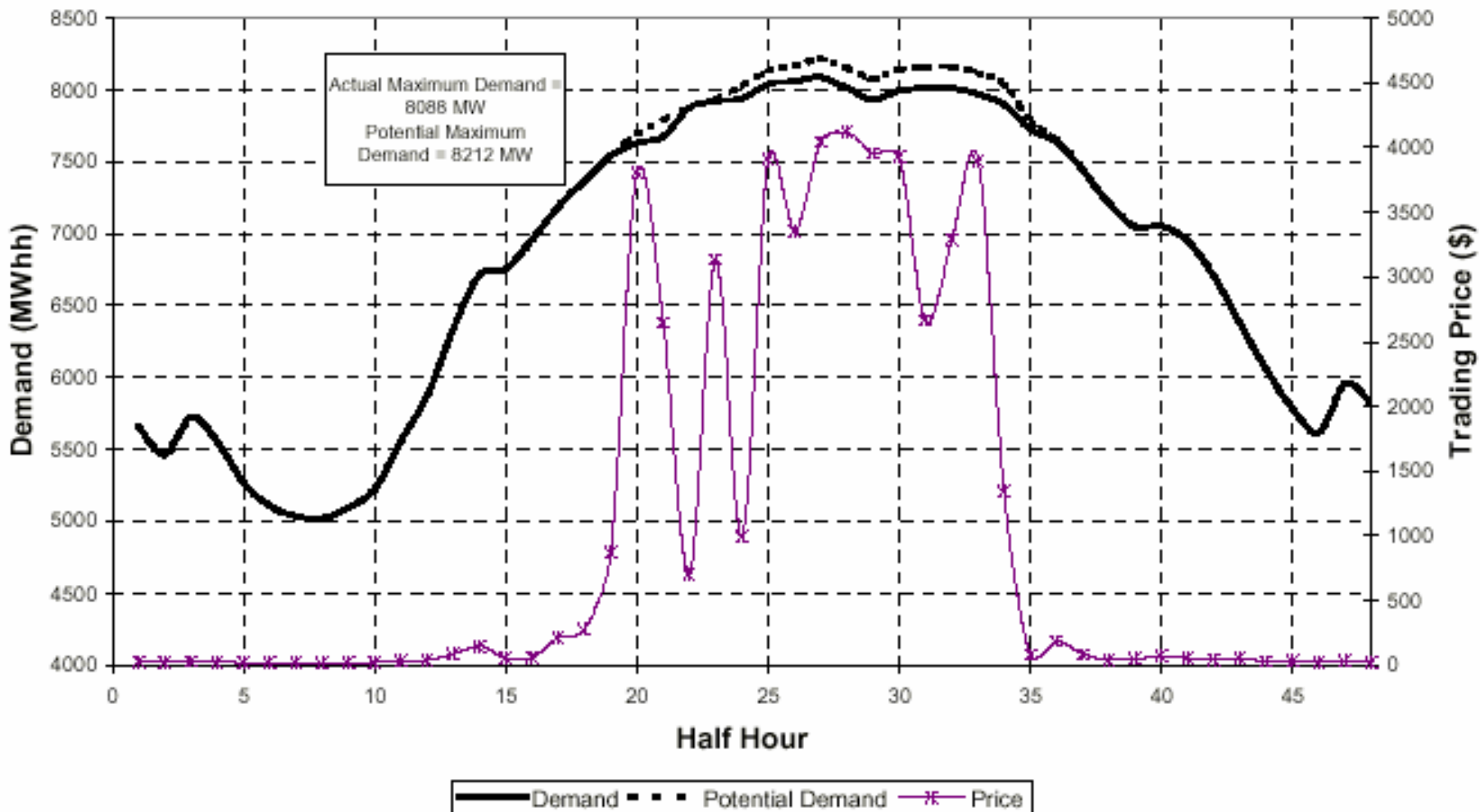


— Queensland — New South Wales — Victoria — South Australia



— Queensland — New South Wales — Victoria — South Australia

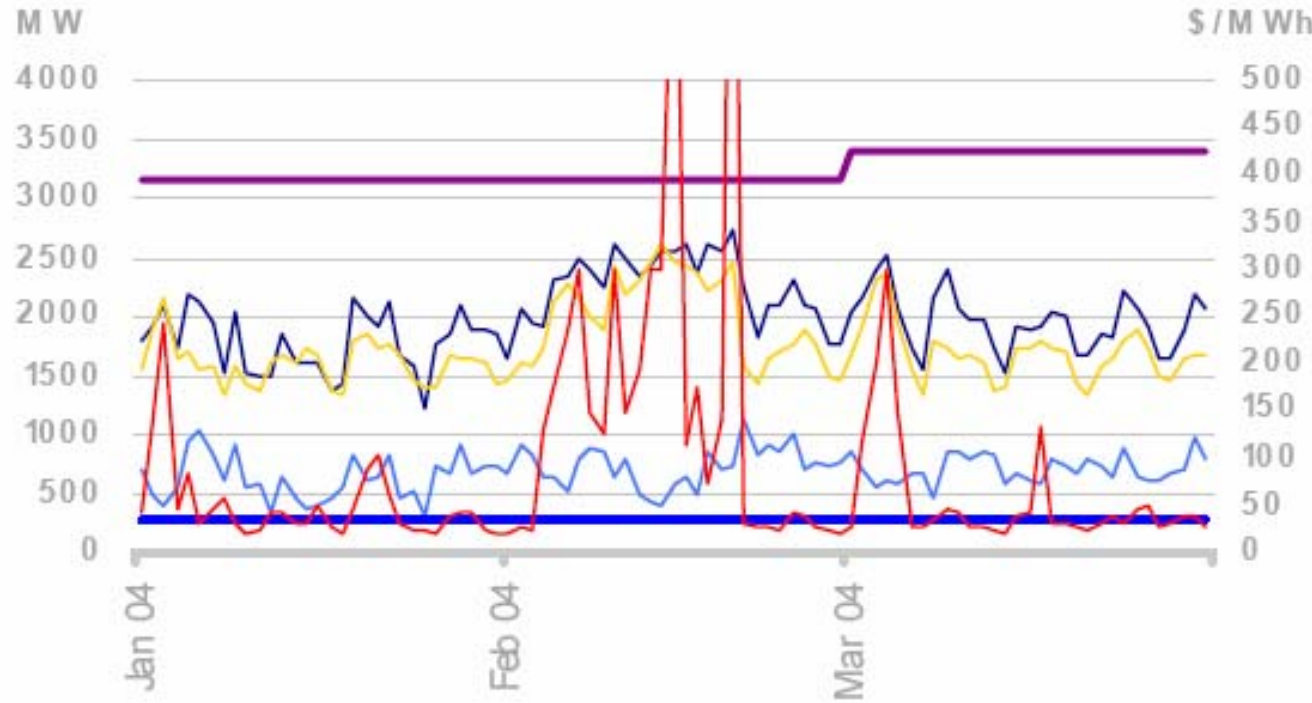
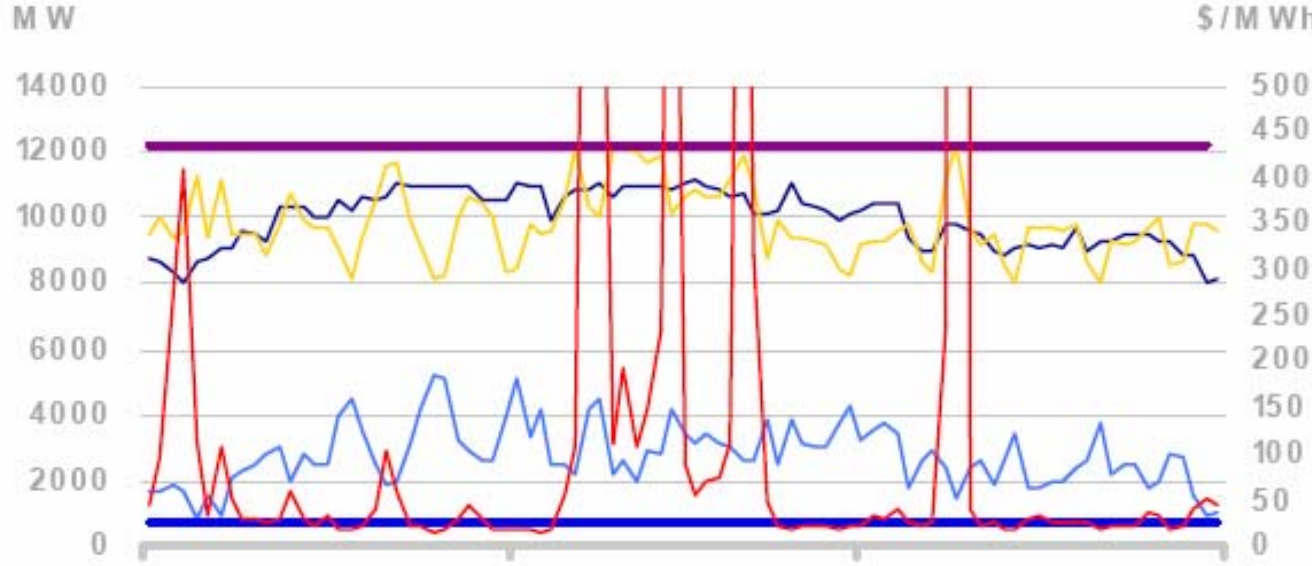
Evidence of demand side response: NEM Victorian region, 8/2/01 (NECA, 2001)





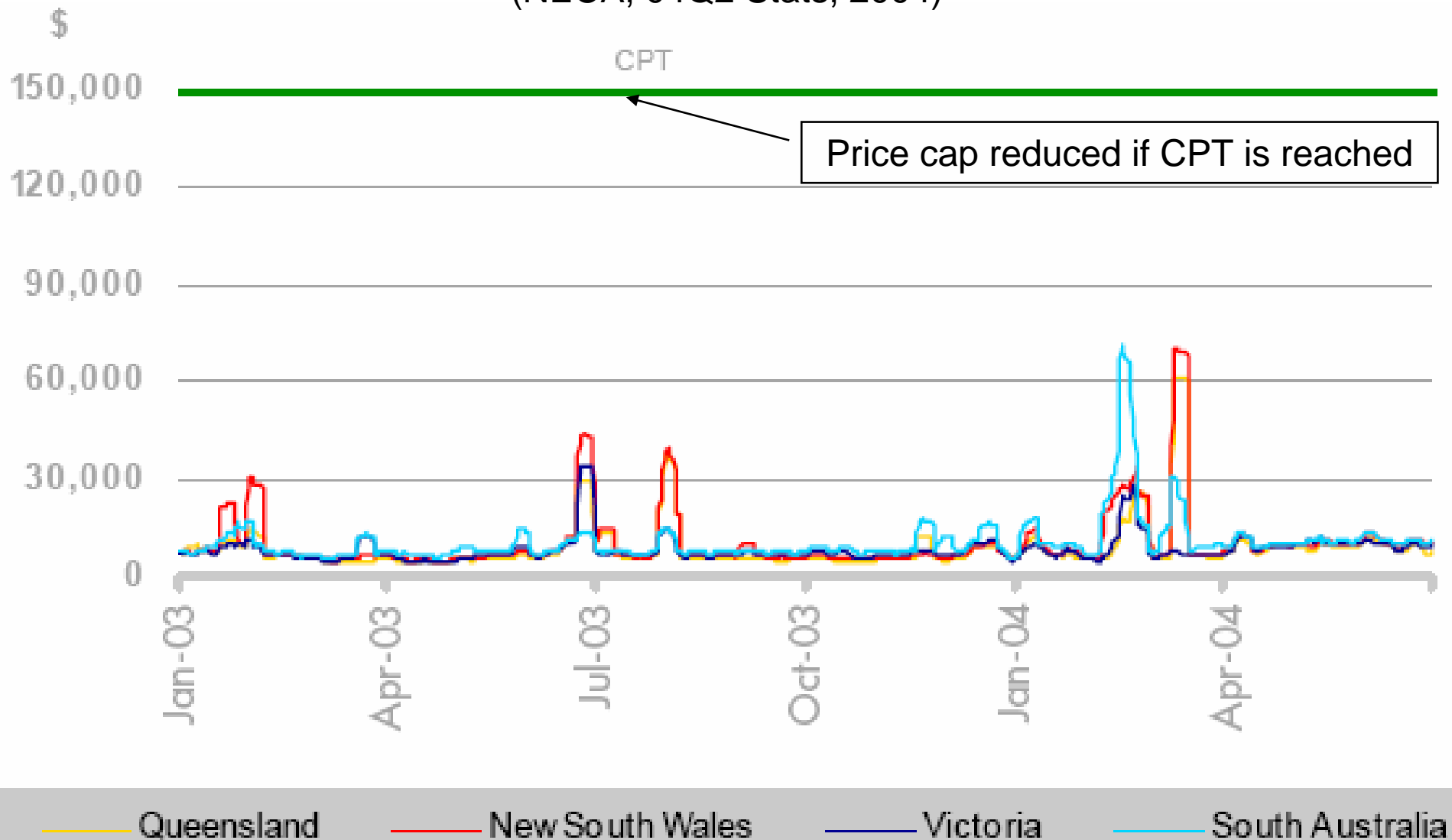
Installed capacity,
Gen. capacity,
Maximum demand,
Actual reserve,
LRC reserve &
Spot price

NSW (top) &
SA (bottom)
Jan-Mar 2004
(NECA 04Q1 Stats 2004)





Running weekly accumulation of (336) RRP & cumulative price threshold (CPT) (NECA, 04Q2 Stats, 2004)

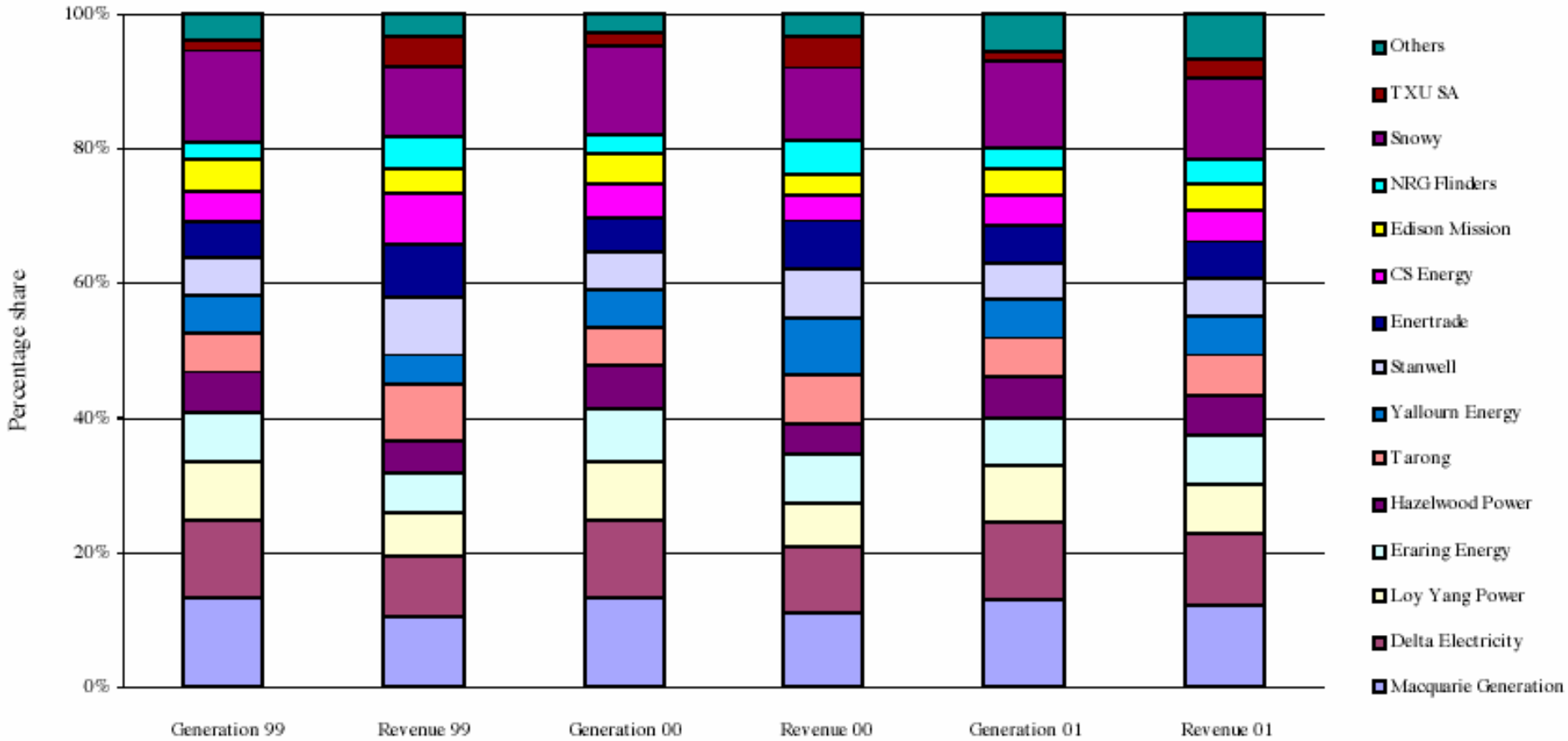


BCA concerns about market power

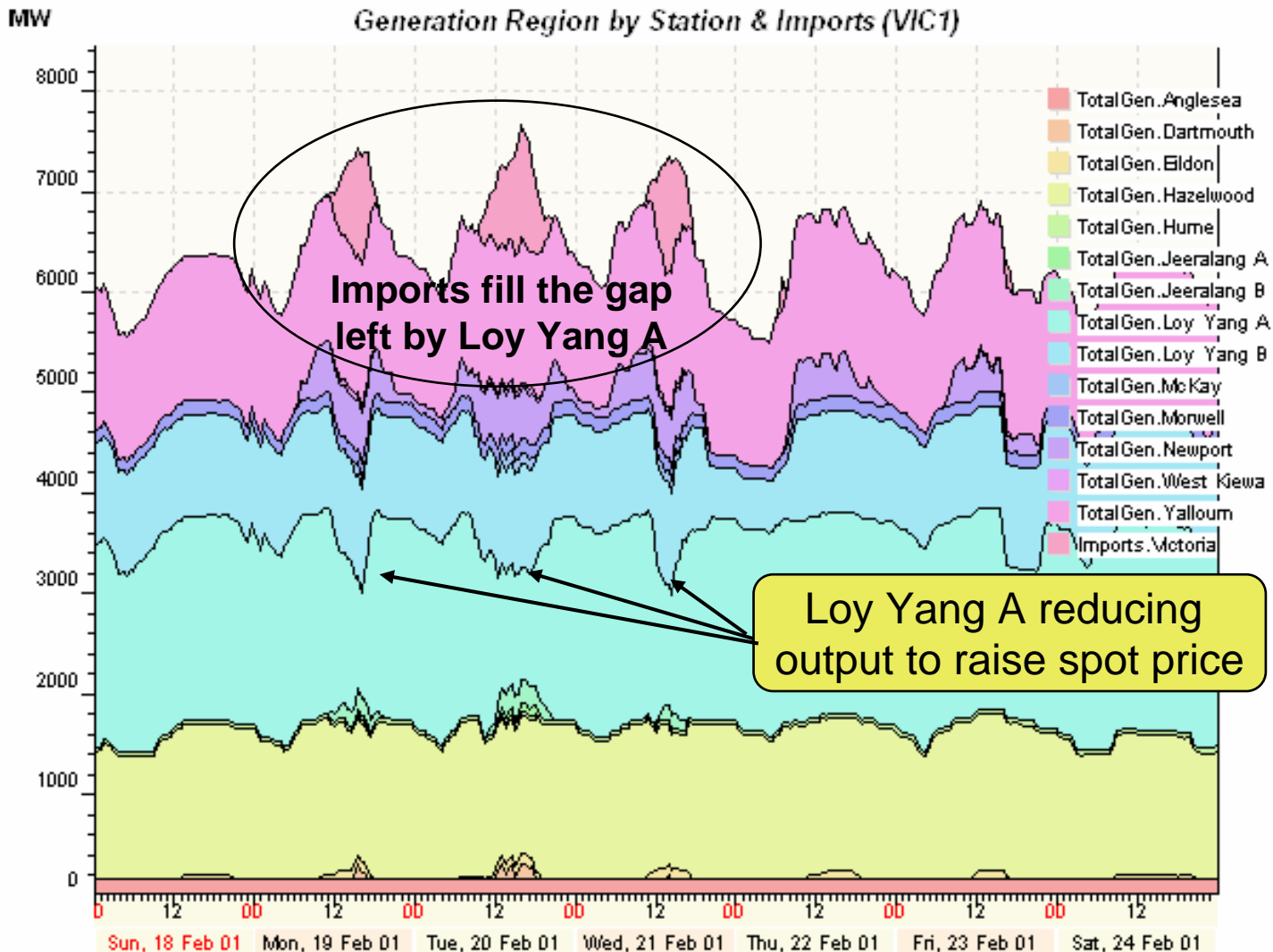
- BCA concerns about EI restructuring:
 - Insufficient disaggregation of generation:
 - In NSW, Queensland & South Australia
 - New interconnectors face too much uncertainty
 - Network pricing distorted
 - Regulation cumbersome
- However BCA recommends improvement rather than radical change:
 - Market design is basically sound



NEM: overall market shares by annual energy & spot market revenue (NECA, Performance of the NEM, June 02)



Reducing generation to raise spot market price (graph courtesy of Intelligent Energy Systems EMIS facility)

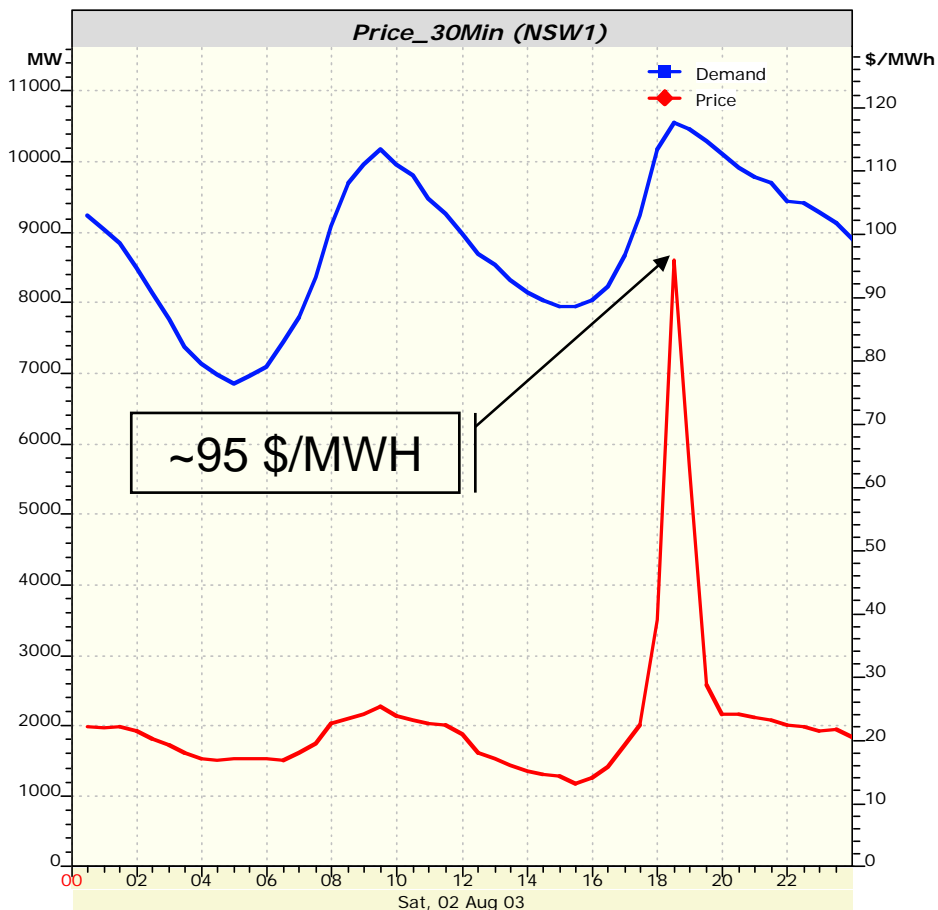
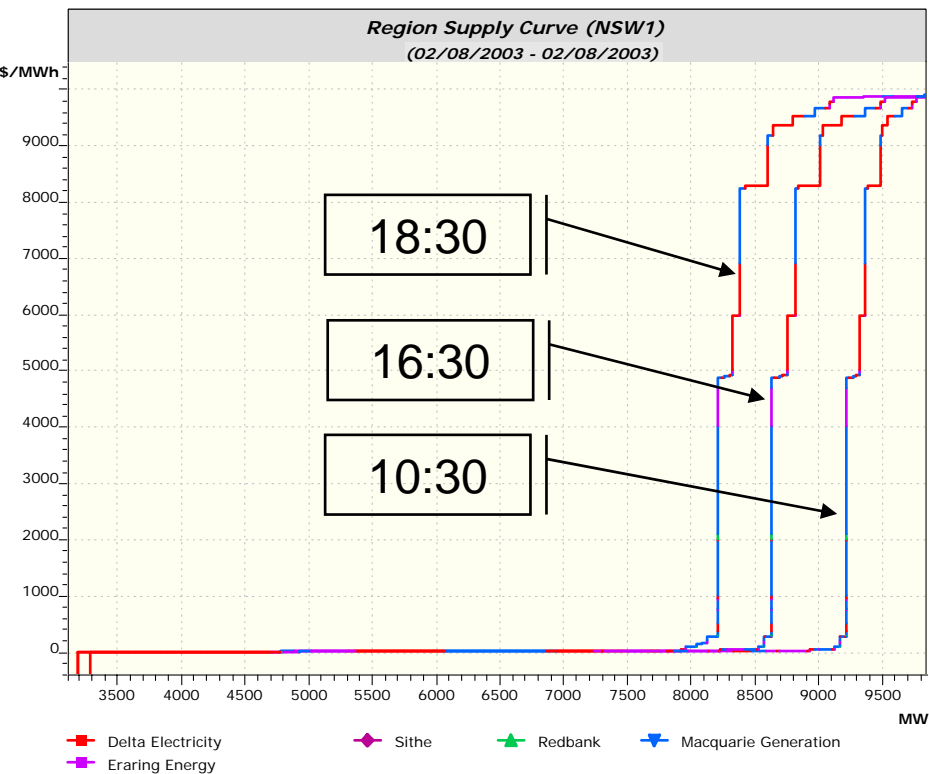


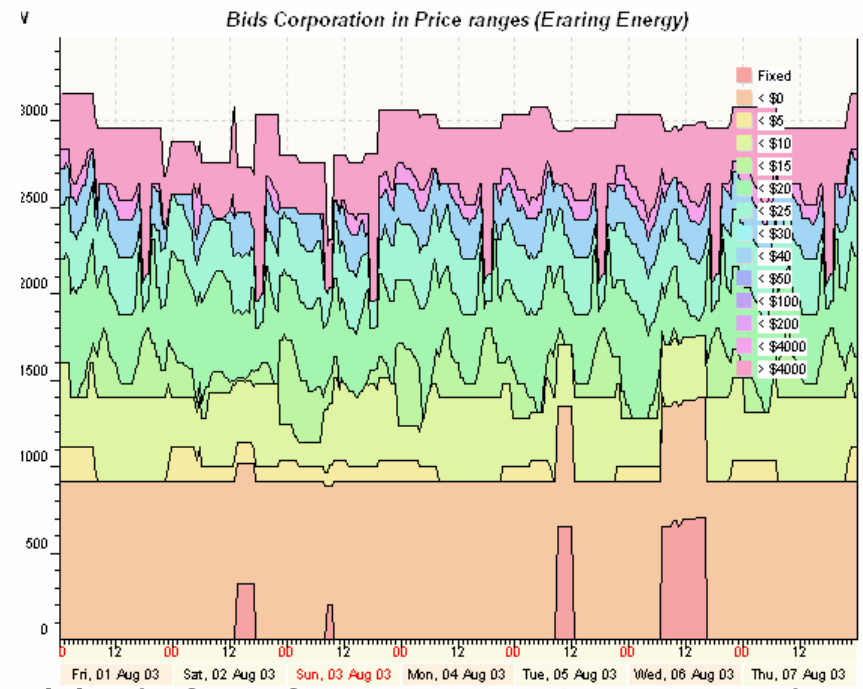
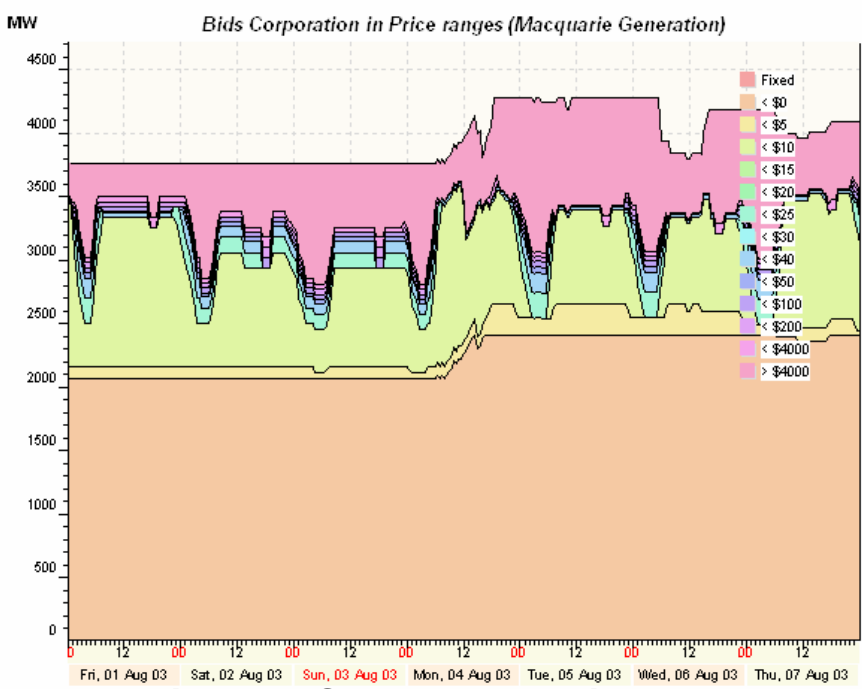
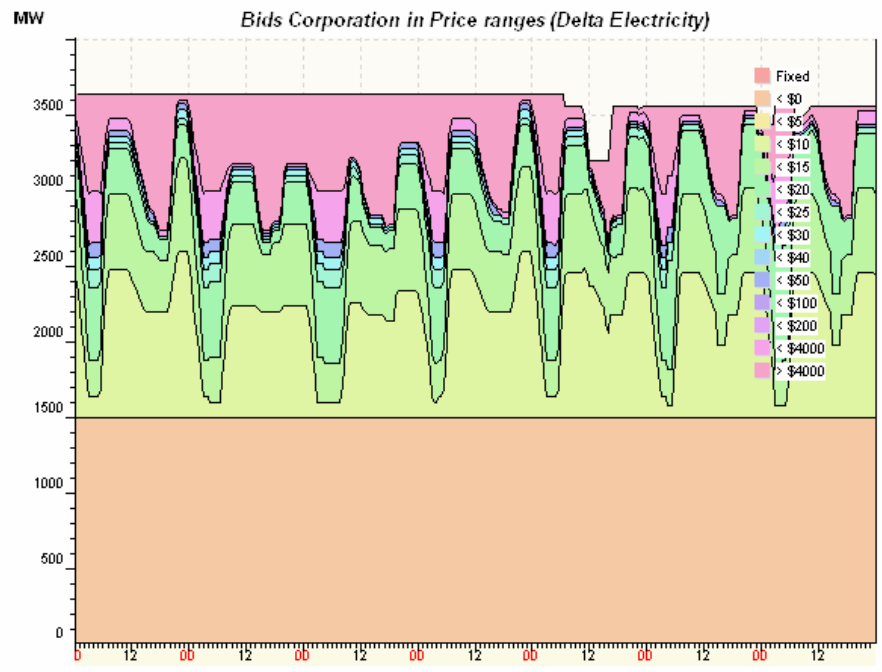
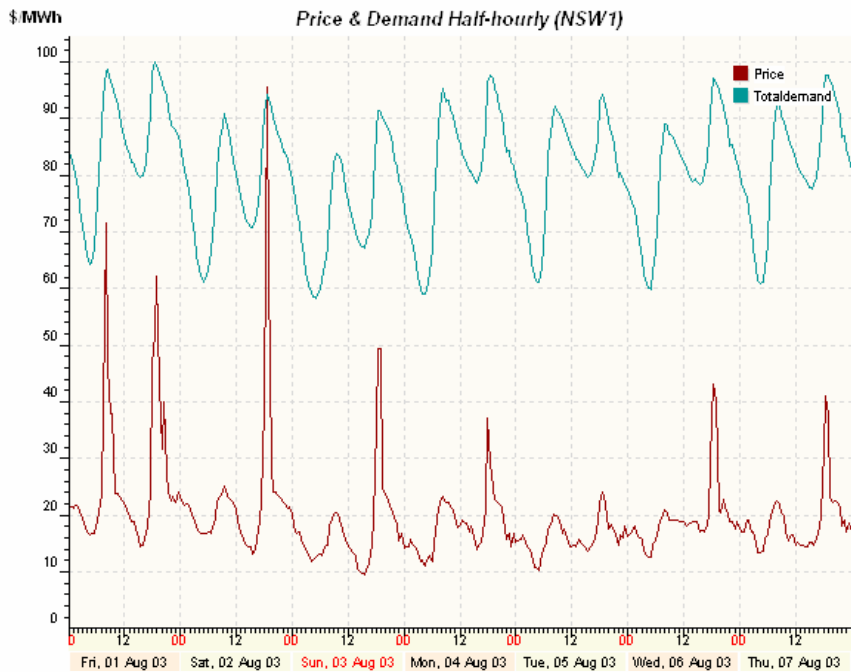
Changing generation offer to raise spot market price (2/8/03)

graph courtesy of Stuart Thorncraft &

Intelligent Energy Systems EMIS facility (www.iesys.com.au)

(possible demand-side responses: derivative contract or reduce demand)



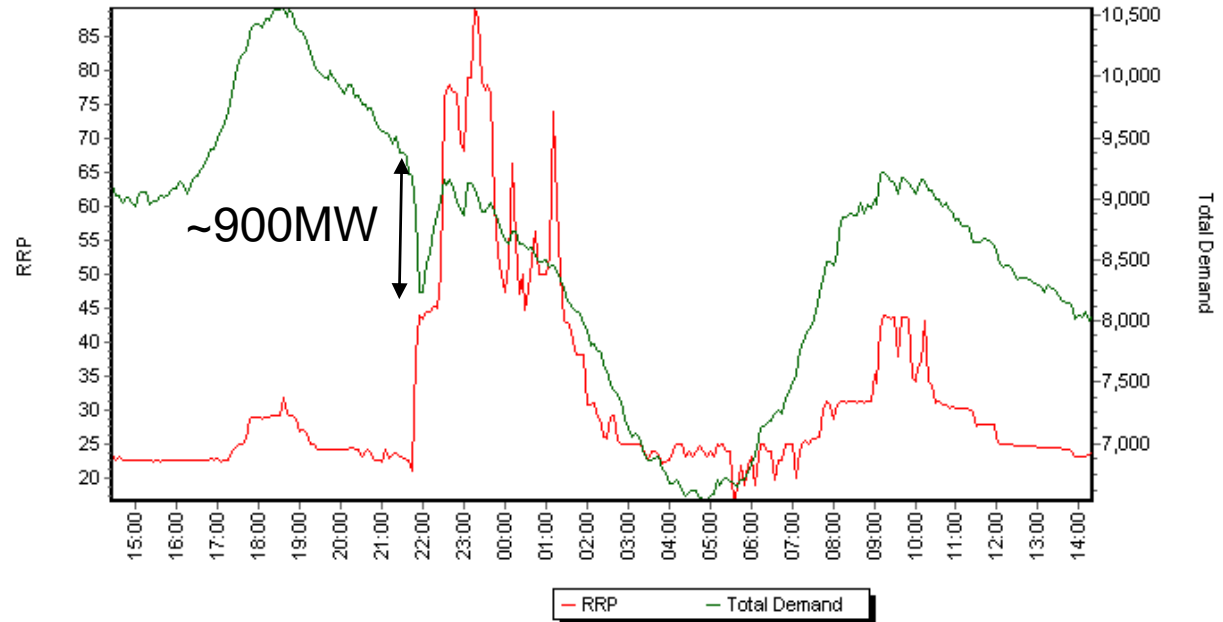


Bids by NSW generators in the week starting 1/8/03 (IES EMIS graphs, www.iesys.com.au)

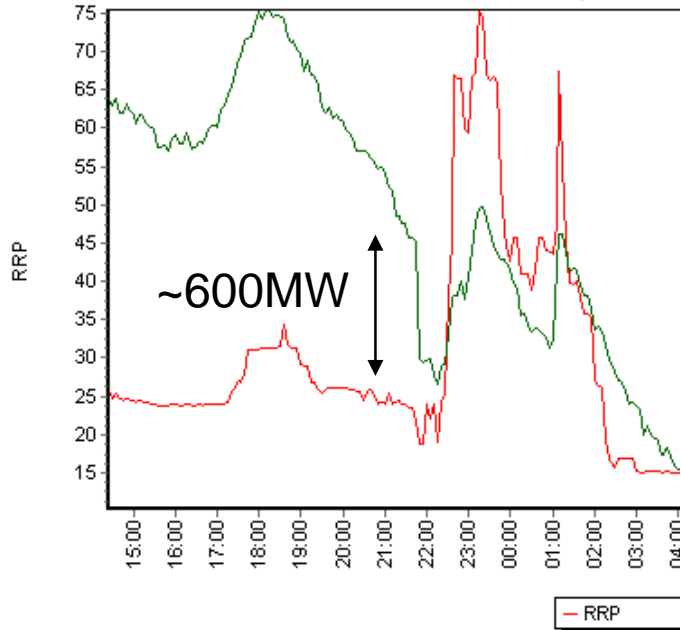


Transgrid transformer failure at 2142, 13/8/04 causes 5 generators to trip: frequency fell to 48.9Hz, ~2100 MW load shed in NSW, Qld & Vic (also some in SA) (www.nemmco.com.au)

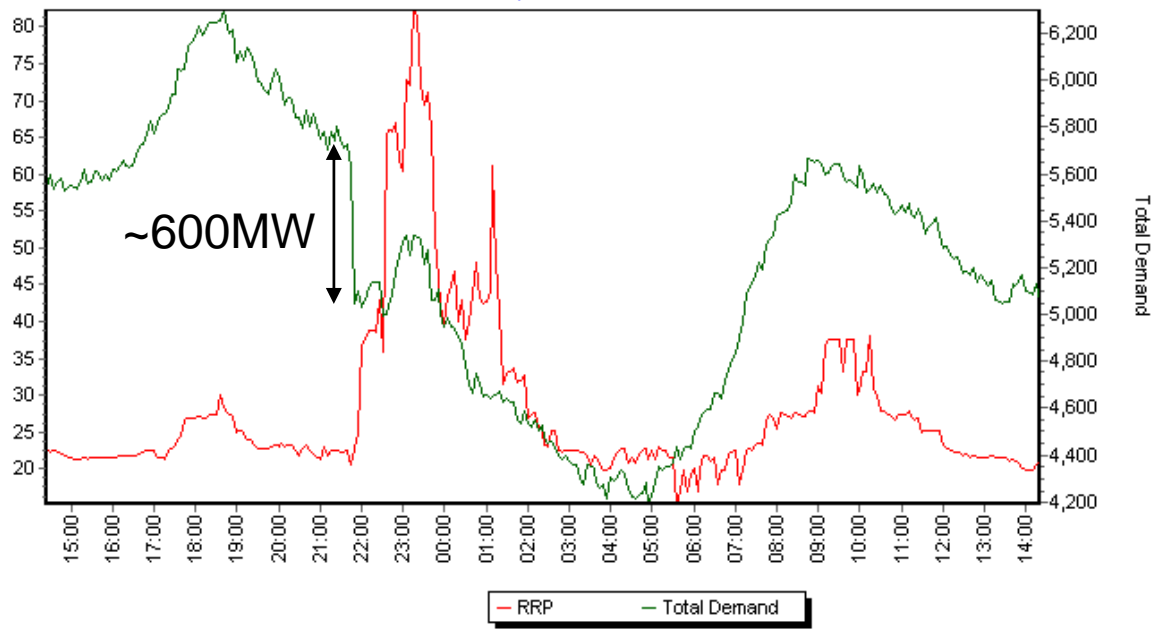
NSW1 5 minute Demand and Price for period 13/08/2004 00:00 to 14/08/2004 14:20



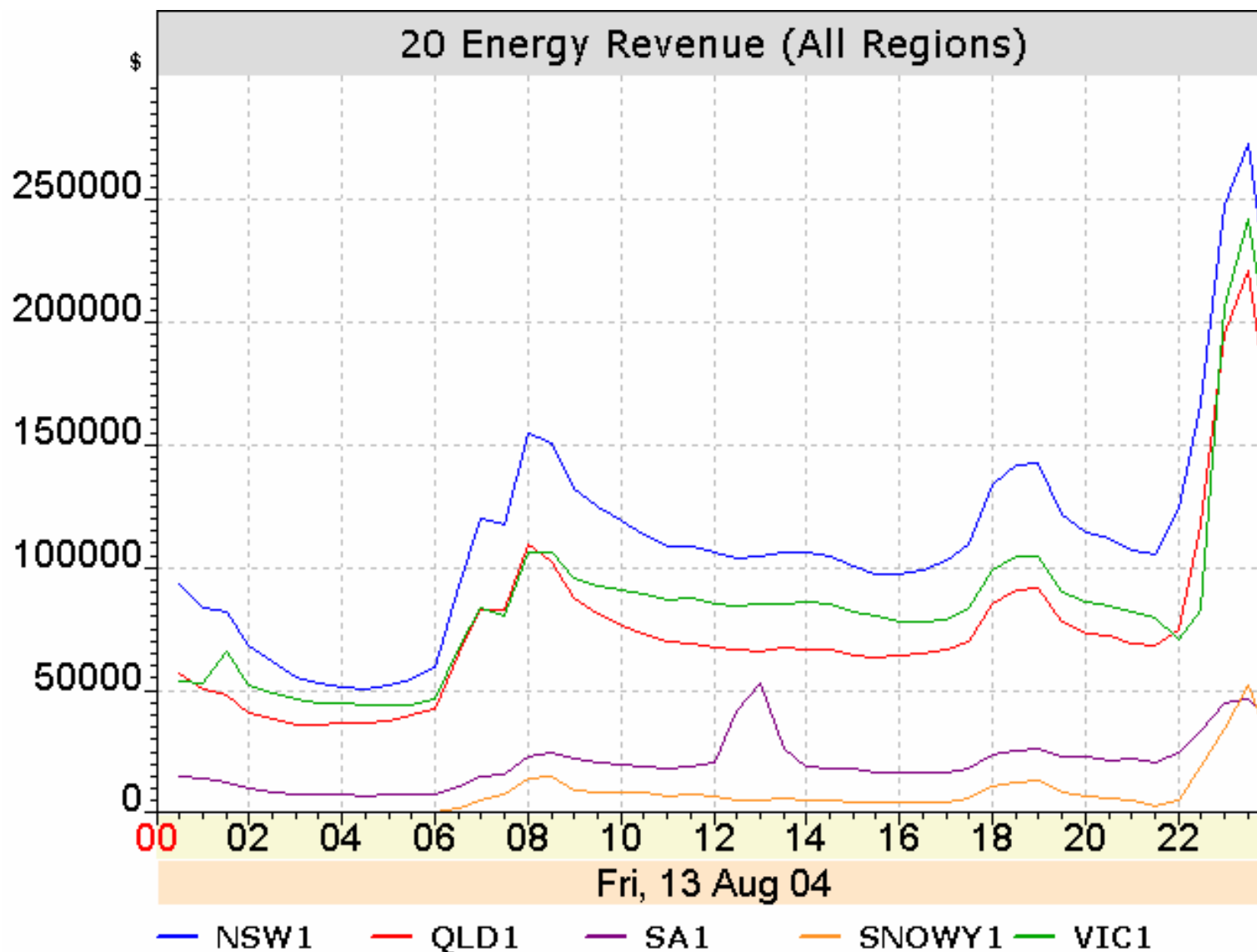
VIC1 5 minute Demand and Price for period 13/08/2004 00:00 to 14/08/2004 14:20



QLD1 5 minute Demand and Price for period 13/08/2004 00:00 to 14/08/2004 14:20



NEM energy revenue, 13/8/04



NEM FCAS revenue 13/8/04

