



Centre for Energy and  
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# Electricity Industry Restructuring: Issues for Asian countries

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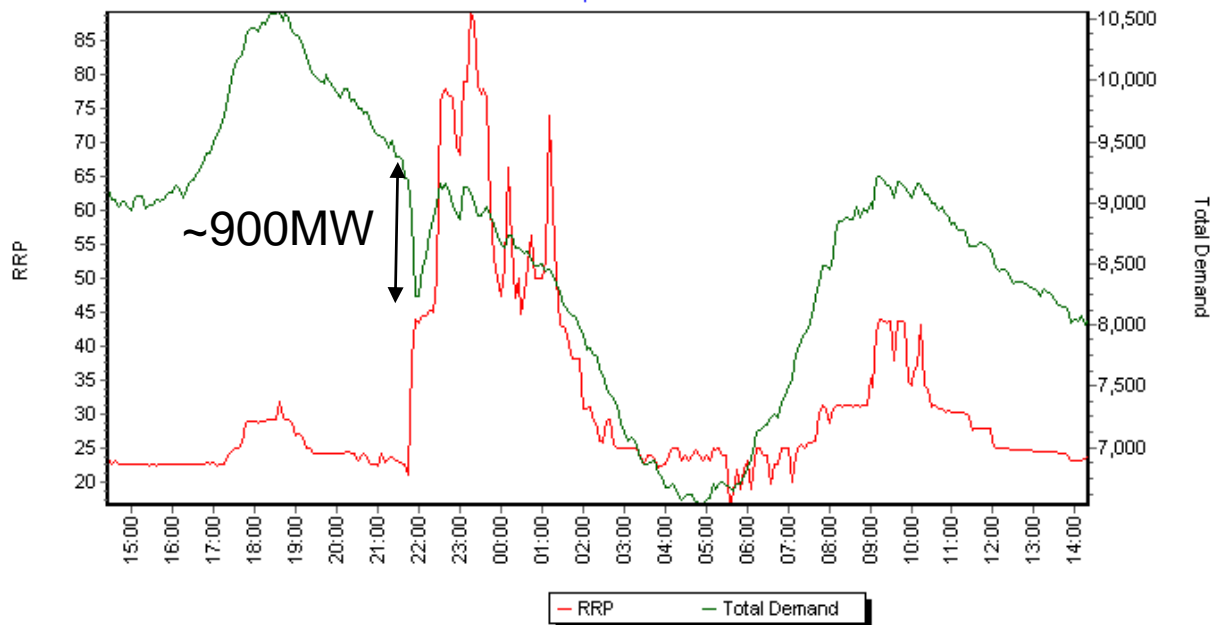
# Lessons from the Australian experience

- Build & then maintain social consensus:
  - Must reliably address commercial, economic, engineering, environmental, political & social issues, *under uncertainty*
- Adopt design principles that will achieve the goal:
  - Create a broad decision-making framework for *risk management in the stationary energy sector*:
    - Appropriate to the key uncertainties & risks
  - Determine which decision-making can be decentralised:
    - Both market structure & architecture matter
  - Design for consistency, balance & robustness:
    - Technical, commercial, environmental, political & governance
  - Use experimental techniques to test design concepts

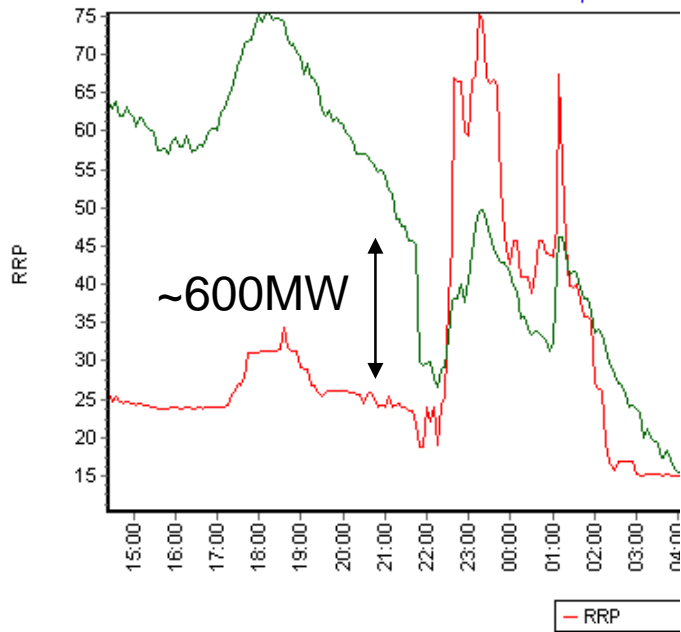


**Robustness example:**  
Transformer failure at  
2142, 13 Aug 04:  
3,100MW gen lost;  
Frequency 48.9Hz;  
2,100 MW load shed  
in NSW, Qld, Vic, SA  
([www.nemmco.com.au](http://www.nemmco.com.au))

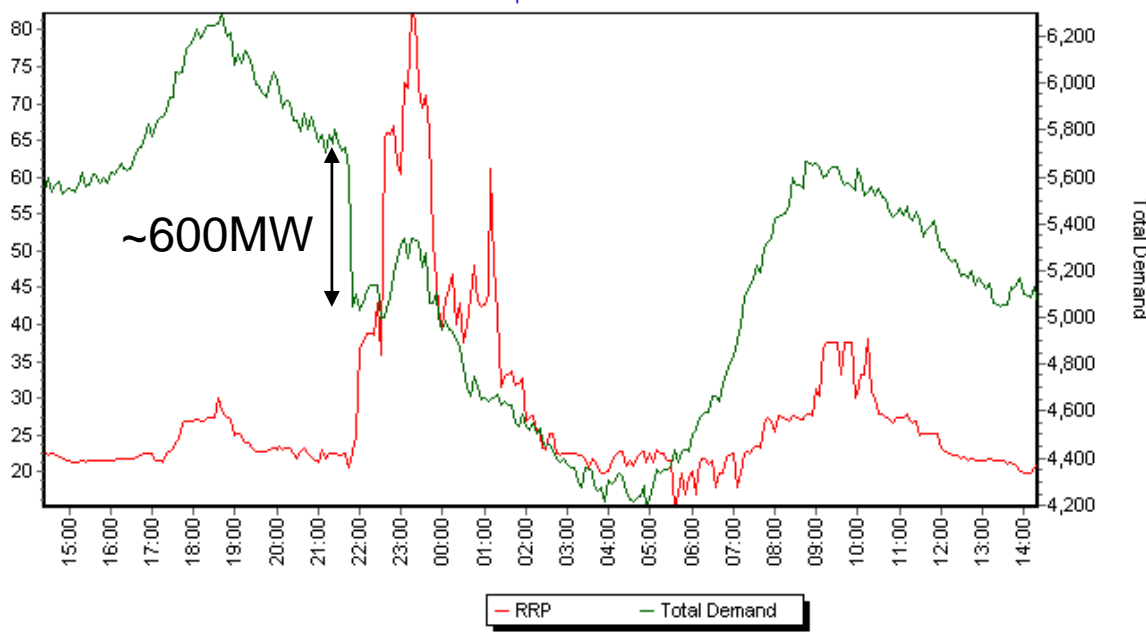
NSW1 5 minute Demand and Price for period 13/08/2004 00:00 to 14/08/2004 14:20



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



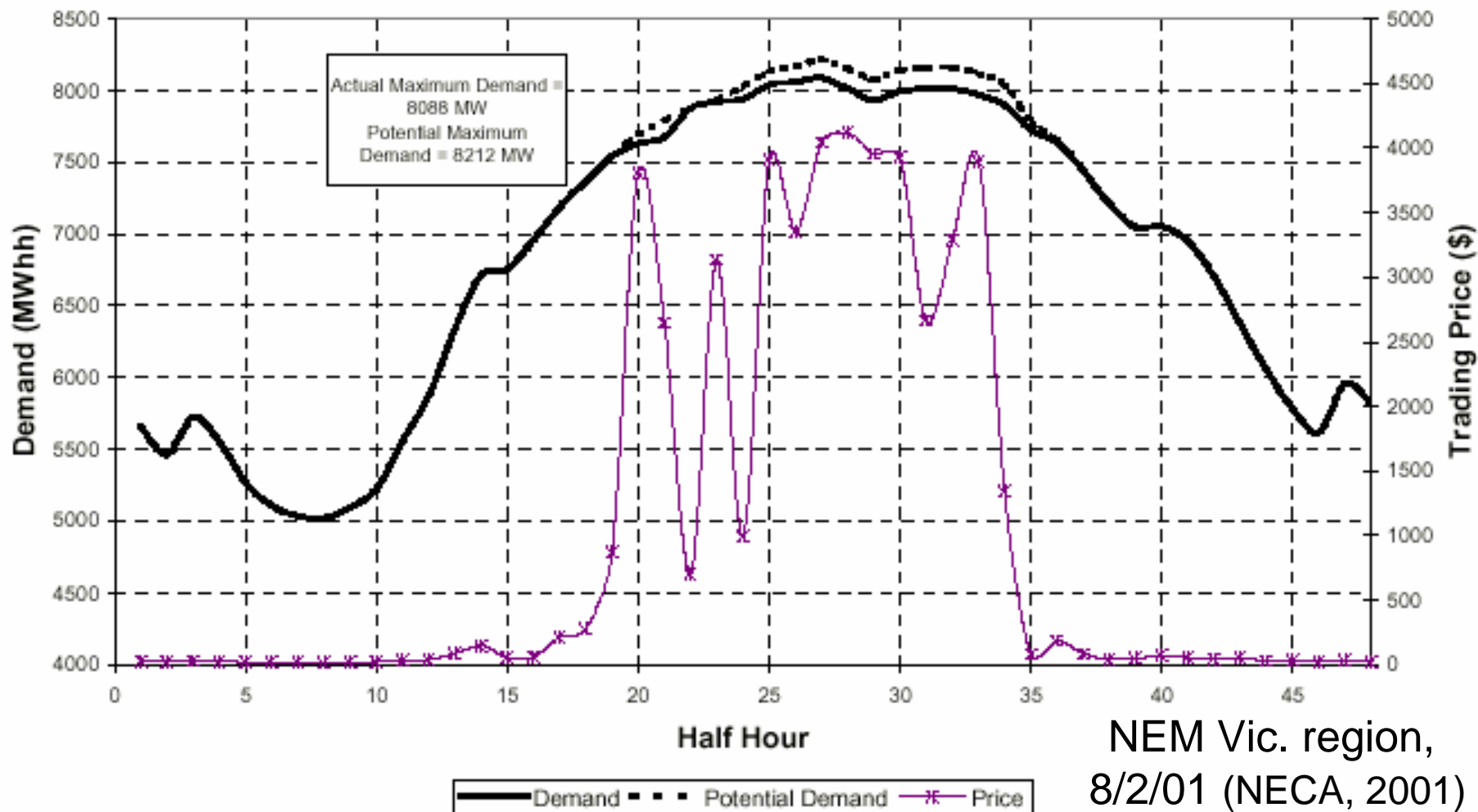
QLD1 5 minute Demand and Price for period 13/08/2004 00:00 to 14/08/2004 14:20





# Demand side participation

	Committed
Queensland	157
New South Wales	14
Victoria/South Australia	163
Tasmania	0



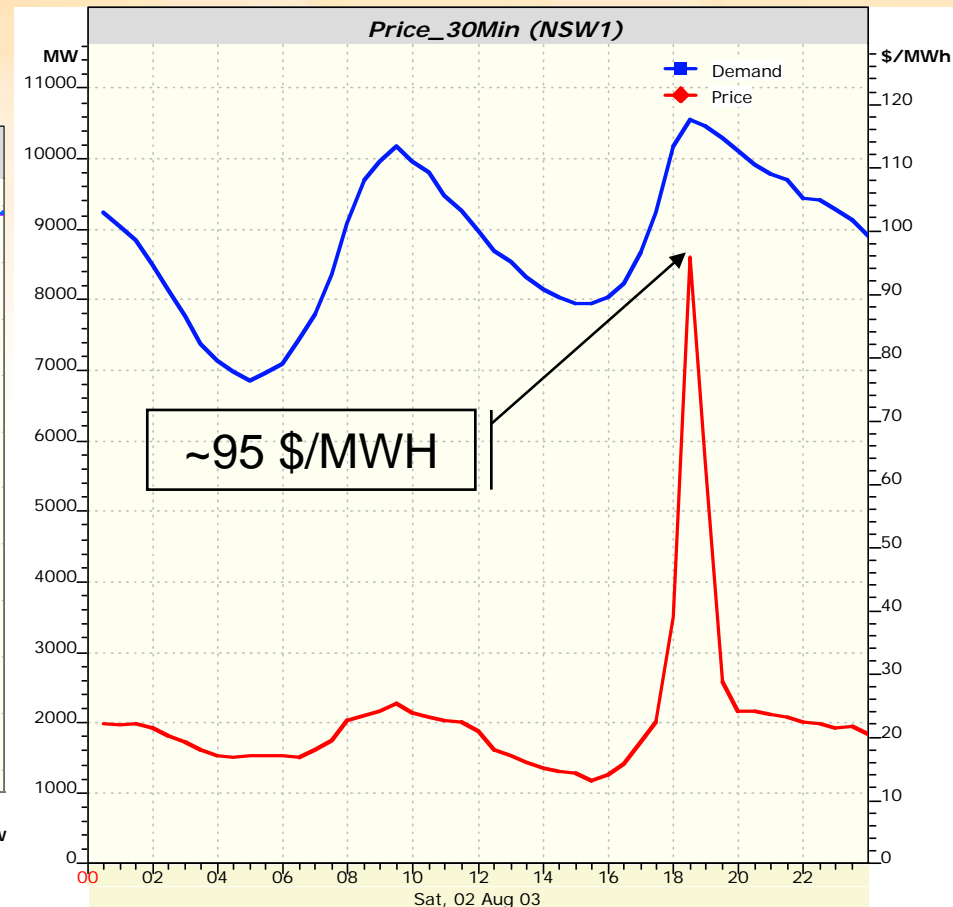
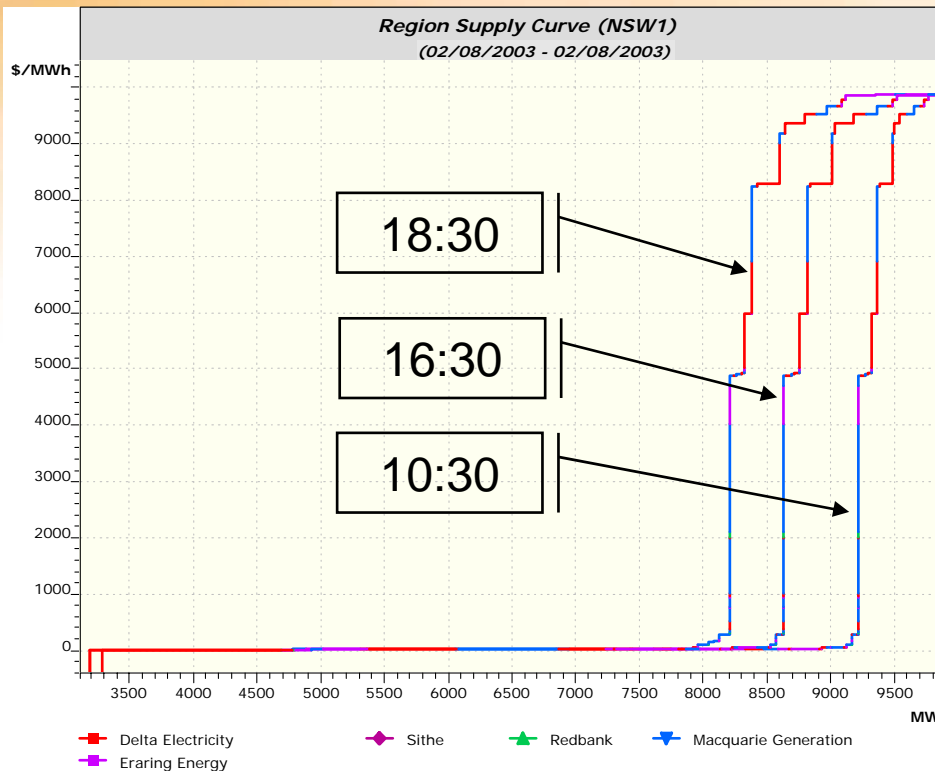
NEM Vic. region,  
8/2/01 (NECA, 2001)

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

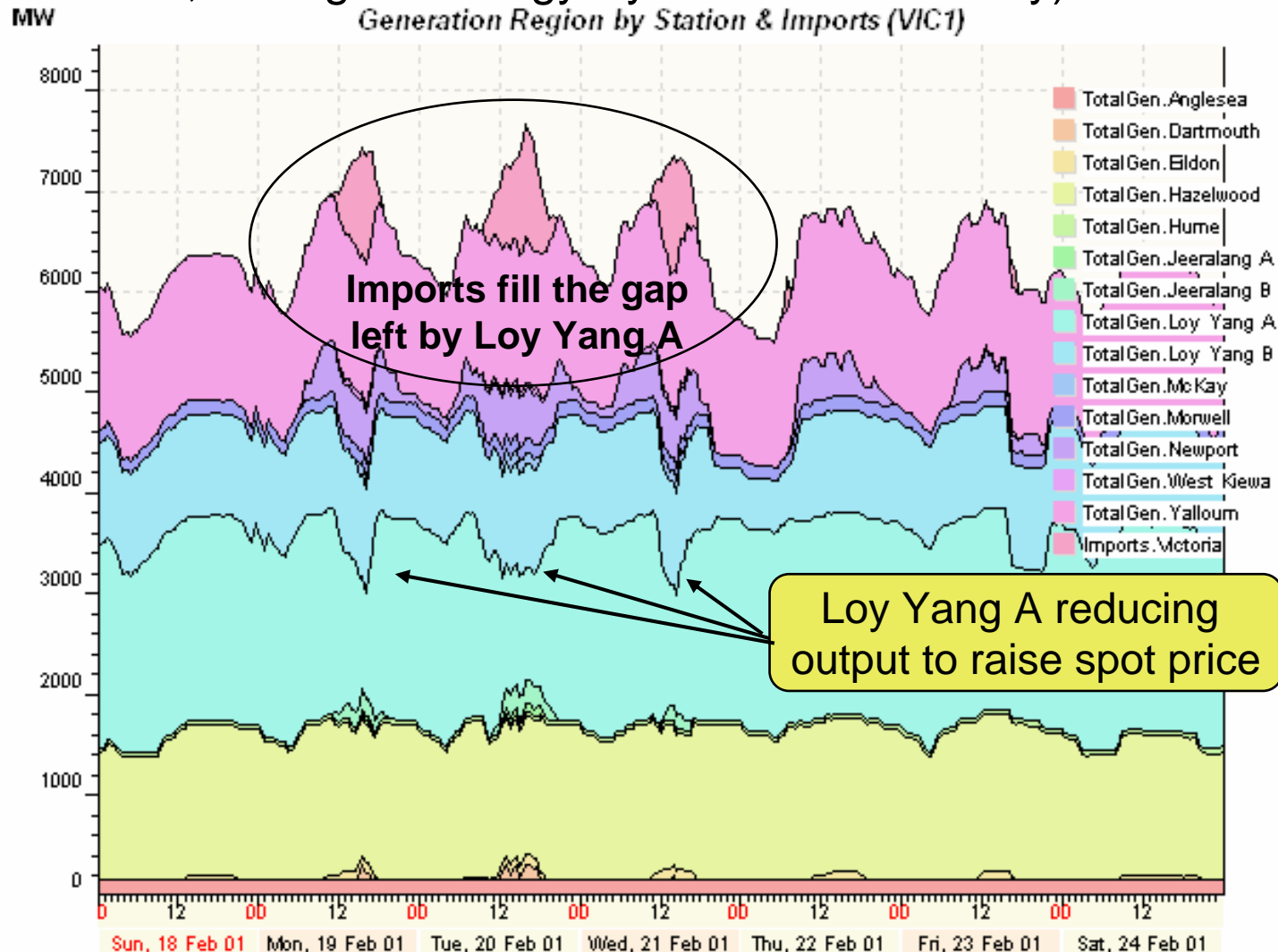
graph courtesy of Stuart Thorncraft &

Intelligent Energy Systems EMIS facility ([www.iesys.com.au](http://www.iesys.com.au))

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



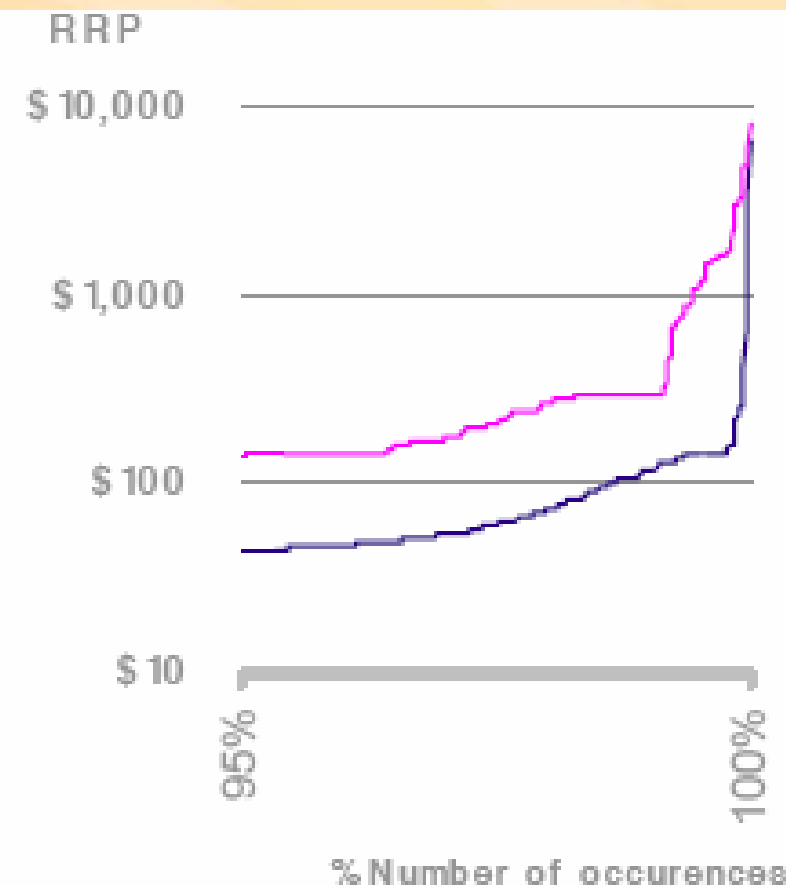
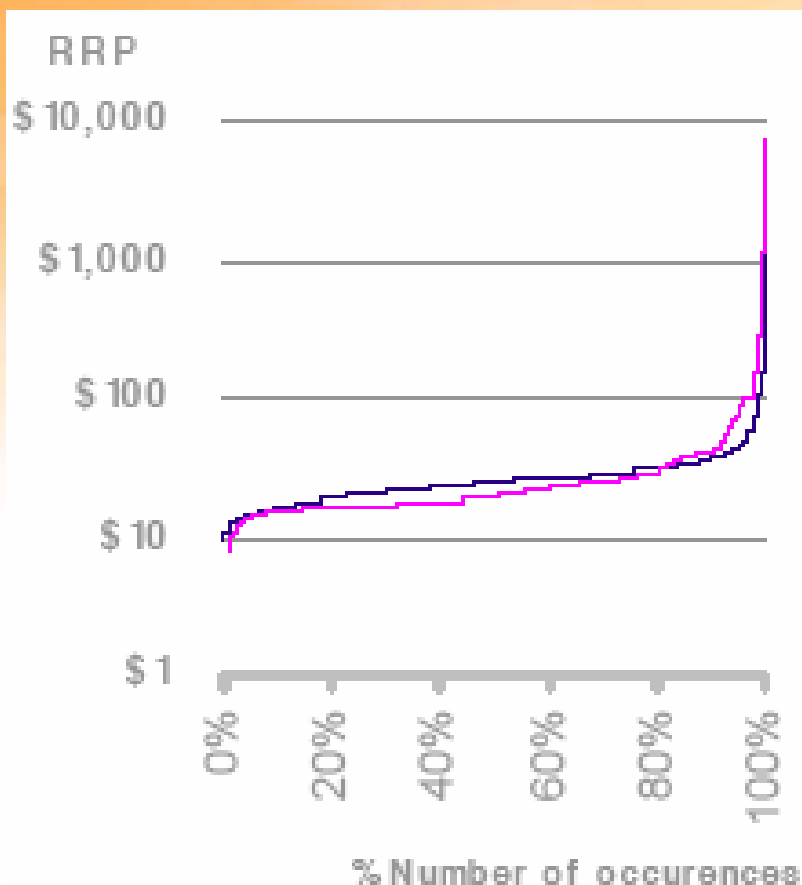
# Reducing generation to raise spot market price (Feb 2001; Intelligent Energy Systems EMIS facility)





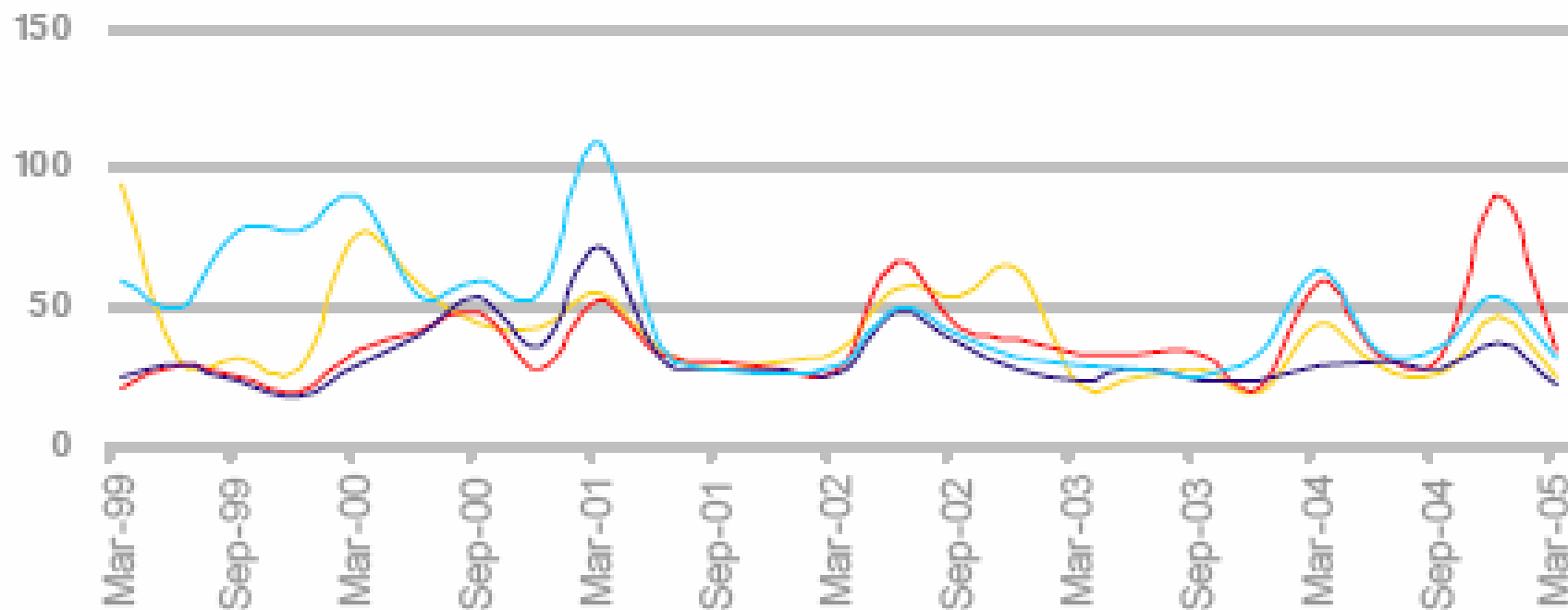
# Spot price duration curve, SA, Jan-Mar 05

(NECA, 04Q4 Stats, 2005; half-hour spot prices)



# Weekly avg. NEM spot prices since market inception (NECA, 05Q1 Stats, 2005)

\$/MWh

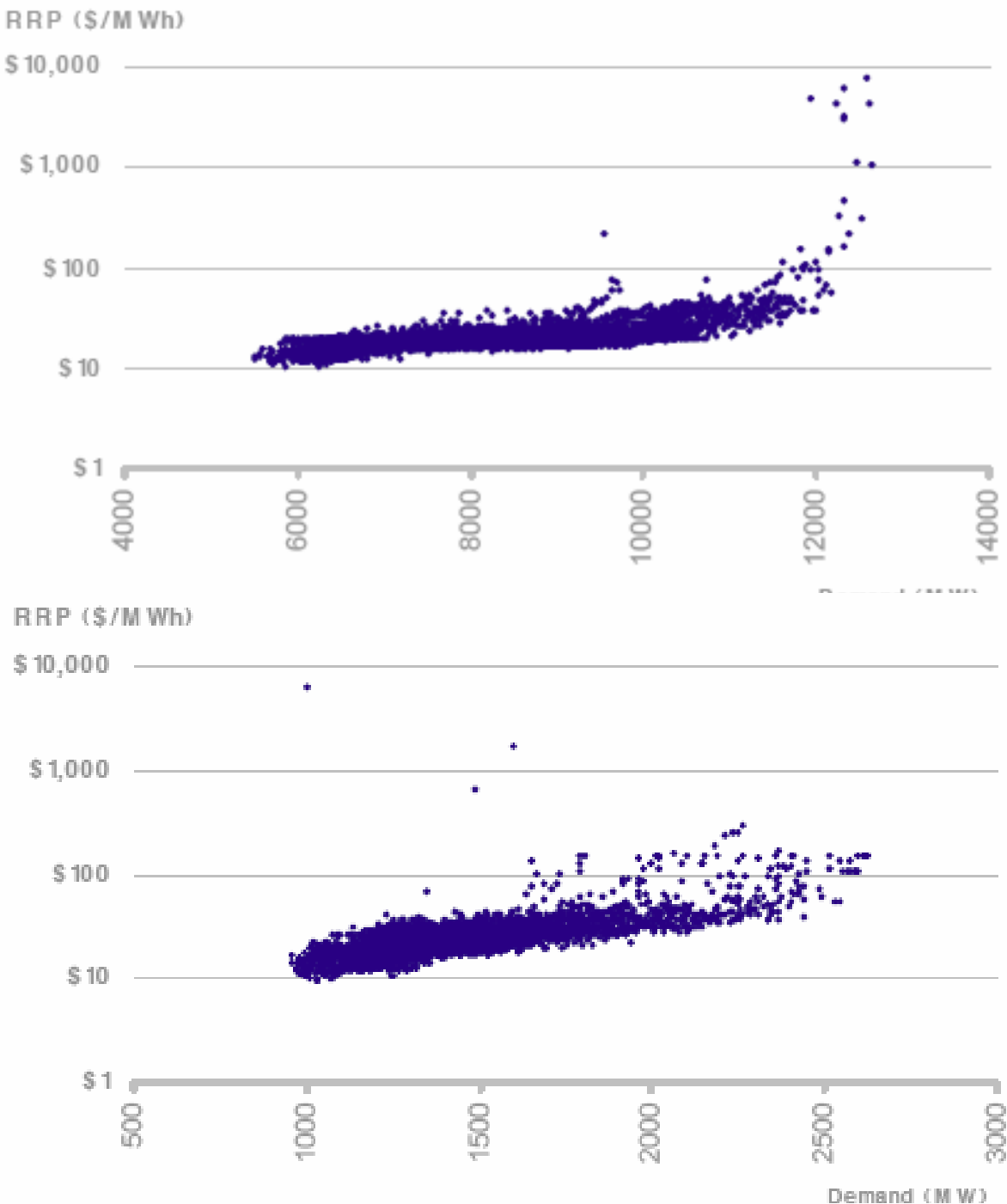


— Queensland — New South Wales — Victoria — South Australia





Scatter plots of  
price-demand  
pairs for NSW &  
SA regions of  
NEM Jan-Mar 05  
(NECA, 2005)



# Recommendations for Asian countries #1

- Build & then maintain social consensus:
  - Support key development objectives, eg: infrastructure, skills, governance, competitiveness, environment
- Build regional stationary energy infrastructure, eg:
  - ASEAN electricity grid, gas pipeline network
- Identify & manage risks to achieving objectives, eg:
  - Access to primary energy supply
  - Availability & quality of supply
  - Adequacy of governance, financial & human resources
  - Stability of employment, growth of professional skills
  - Environmental impact

# Recommendations for Asian countries #2

- Build sector initially with state-owned corporations:
  - Competitive industries require sufficient maturity:
    - Industry size & stability; governance; engineering & financial skills
- Design electricity industry restructuring strategy:
  - Identify key regional & national objectives & risks to achieving those objectives
  - Design consistent decision-making & accountability framework that best manages the risks:
    - Adopt a staged approach, using experimental trials
    - Decentralise those decisions & risks that markets can manage
    - Chose a market design that is robust to abnormal conditions & allows integration of high levels of renewable energy



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**Key references** (*these & other publications at [www.ceem.unsw.edu.au](http://www.ceem.unsw.edu.au)*):

H R Outhred & R J Kaye, “Incorporating Network Effects in a Competitive Electricity Industry: An Australian Perspective”, Chapter 9 in M Einhorn & R Siddiqi (eds), *Electricity Transmission Pricing and Technology*, Kluwer Academic Publishers, 1996.

H R Outhred, “The Evolving Australian National Electricity Market: An Assessment” in *Power Progress: An Audit of Australia’s Electricity Reform Experiment* edited by Graeme Hodge, Valarie Sands, David Hayward and David Scott, Australian Scholarly Publishing, Melbourne, ISBN 1 74097 034 9, 2004.