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Resource Adequacy in Restructured Electricity Industries: the Australian Experience

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Outline

- Resource adequacy: assessing risks to end-use energy services
- Decision-making framework & regimes for achieving resource adequacy
- Australian arrangements & experience to date
- Future prospects

Resource Adequacy

- The key electricity industry objectives
  - *Technical:* Maintaining the flow of end-use energy services by maintaining near-continuity of energy flow through the electricity industry conversion chain
  - *Economic:* Achieving the above in an economically efficient manner
  - *Social & environmental:* Achieving the above in a socially & environmentally acceptable manner
- A possible definition of **resource adequacy**
  - Acceptably low risks to the flow of end-use energy services for individual end users *(reliability of supply)* & to the power system overall *(power system security)*

Resource adequacy

- The challenge
  - Potential for rapid system-wide operational changes due to lack of affordable storage, instantaneous transmission
  - Institutional challenges in building & operating industries of such scope, complexity & externalities
- Its scope
  - Instantaneous operation **to** long-term investment
  - Individual end-users (reliability) **to** system-wide (security)
  - Achieved performance **to** possible future performance given all uncertainties, contingencies

Resource adequacy in restructured EIs

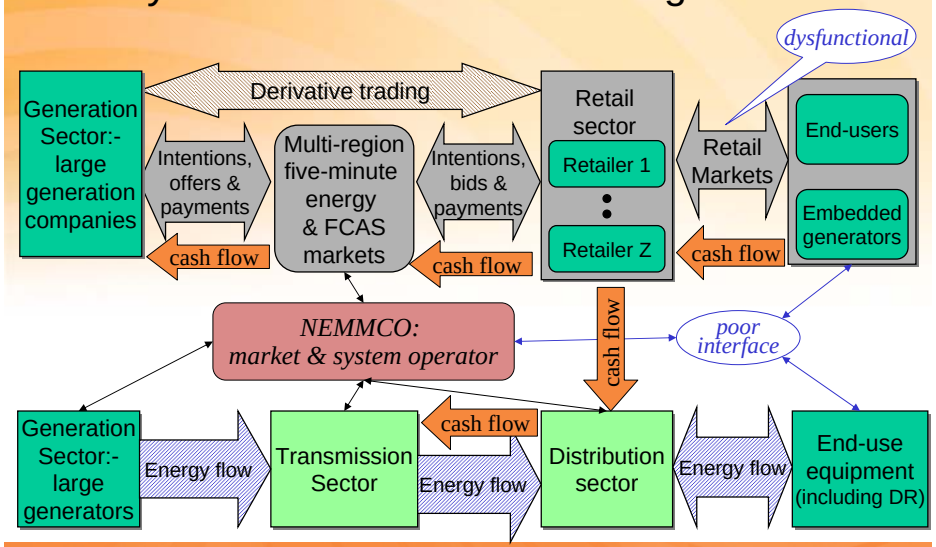
- In principle
  - EI design & operation handed over to market. End-users purchase preferred levels of assurance for future availability & QoS in competitive market
- Given challenges of establishing such a market
  - Objective of designing & implementing a consistent, efficient & compatible set of regimes for managing security, trading, regulation & policy

Decision-making framework for a restructured EI

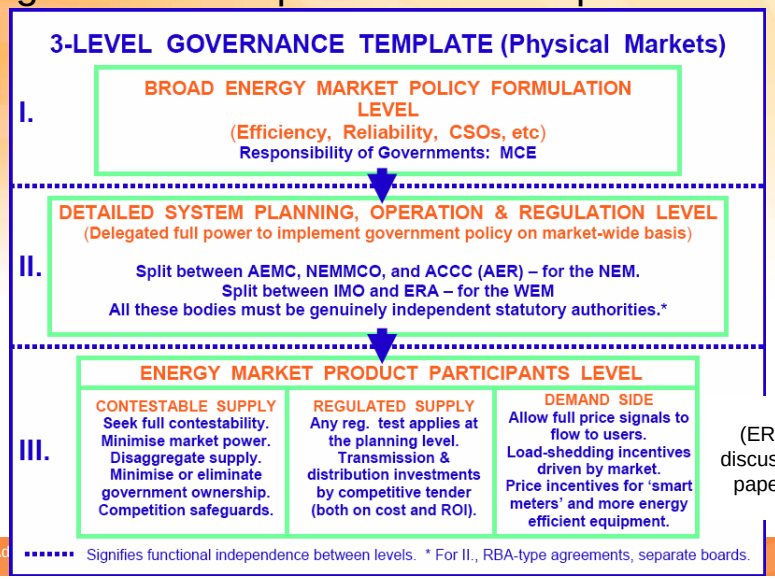
Governance regime	▪ Formal institutions, legislation & policies ▪ *Informal social context including politics*
Security regime	▪ Responsible for system integrity on local or industry-wide basis, with power to override
Technical regime	▪ To allow connected industry components to function as industry-wide machine
Commercial regime	▪ To coordinate decentralised decision-making according to commercial criteria ▪ Includes formally designed markets & interfaces for regulated participants (NSPs)

Key challenges – gaps & overlaps (no / blurred accountability)

Industry structure & decision-making in the NEM

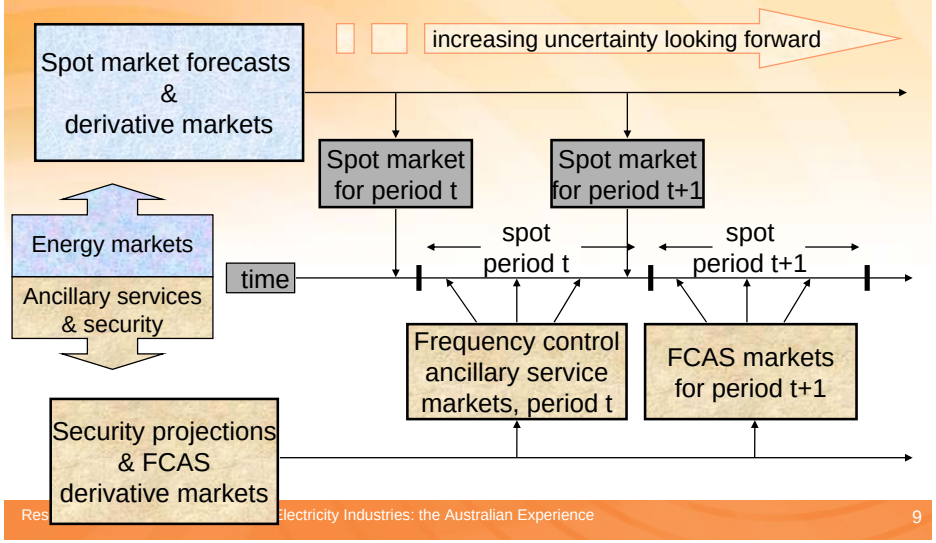


NEM governance – partial 3-level implementation

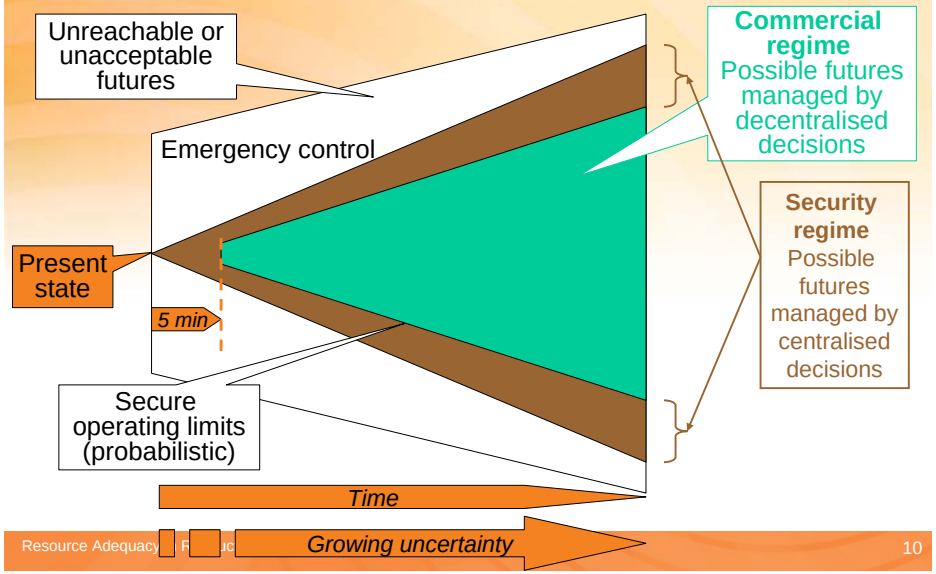


(ERIG discussion papers)

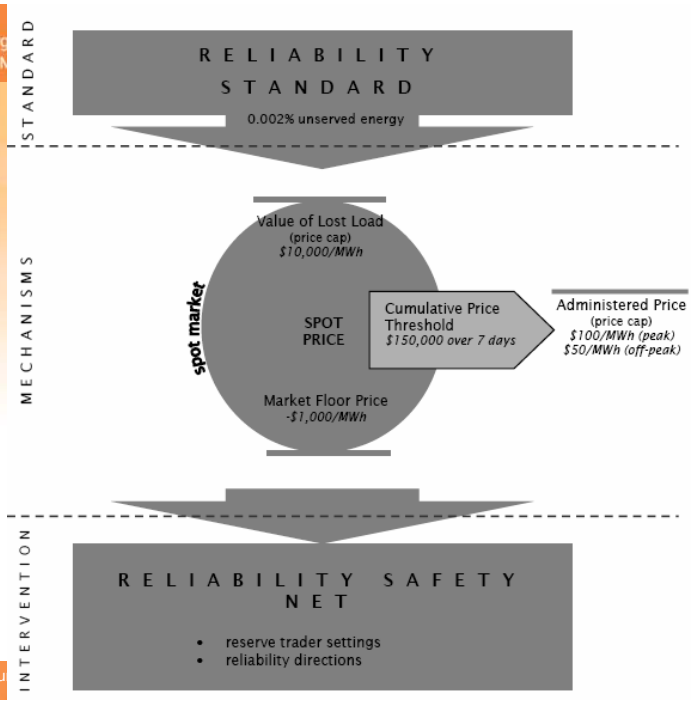
Integrated security & commercial regimes



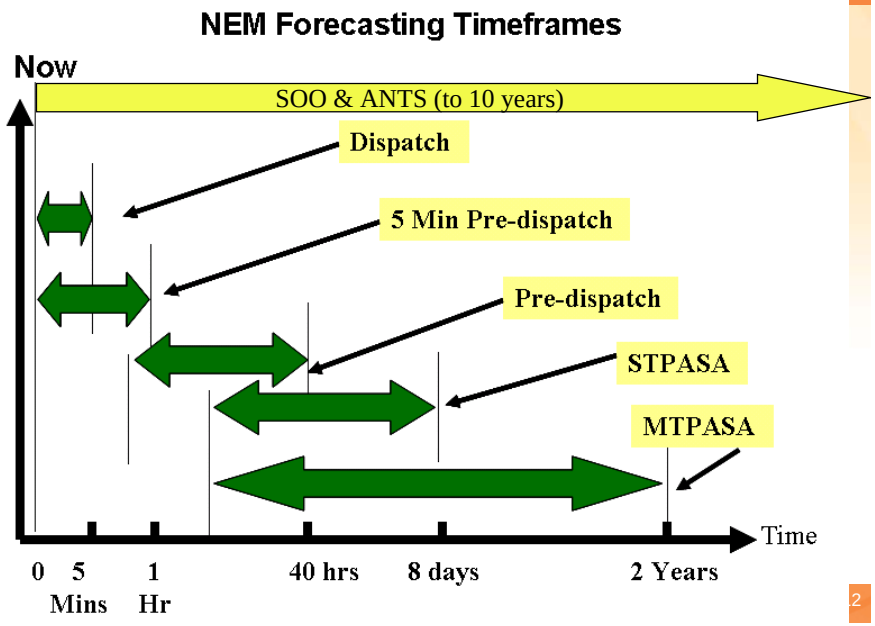
NEM security & commercial regimes



NEM Tx level reliability target, spot market mechs & intervention to meet it
(AEMC Reliability Review, 2006)



NEMMCO Forecasting Timeframes



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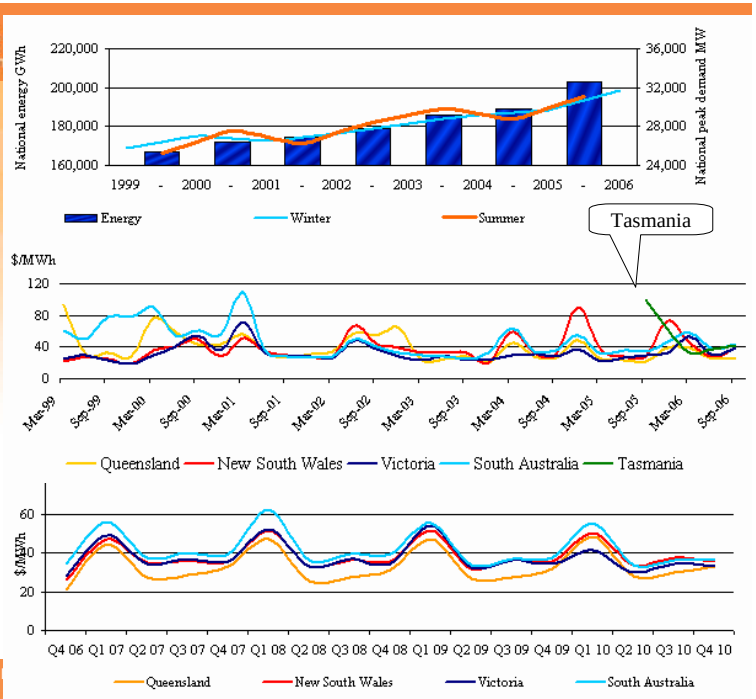
NEM outcomes to date
(AER, 2006)



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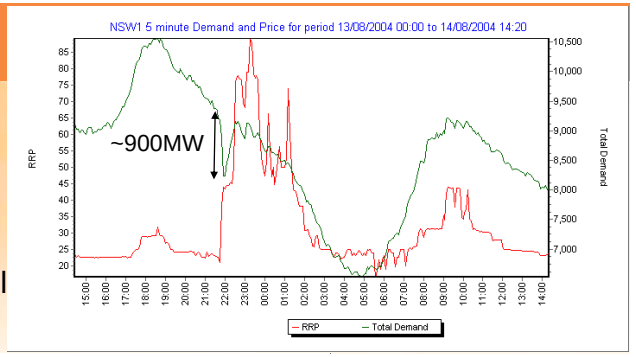
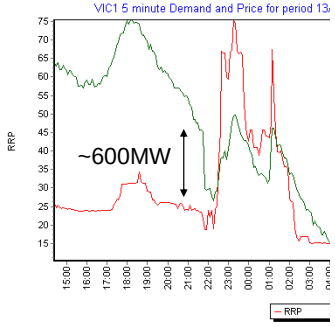
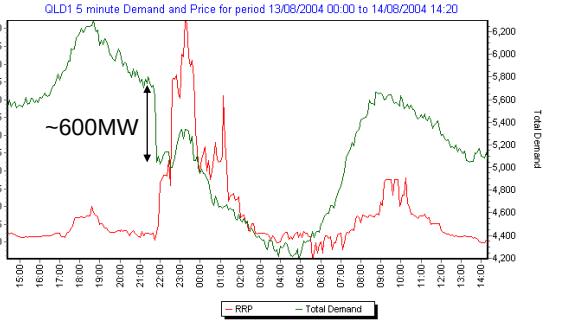
Transgrid CT failure @ 2142 13/8/04 led to 3100 MW gen trip. Frequency fell to 48.9Hz, ~2100 MW load shed in NSW, Qld, Vic & SA







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NEM forecast & actual low reserve conditions
(hours/year) (AEMC Comprehensive Reliability Review, 2006)

	Year	Qld	NSW	VIC	SA
Forecast duration below the threshold (hours)	2004 – 2005	17.5	0	0	6
	2003 – 2004	11.5	4.5	17.5	645
	2002 – 2003	2.5	3.5	7	115.5
	2001 – 2002	1	0	0	45.5
	2000 – 2001	188	8	67	716
	1999 – 2000	43	33	145	699
Actual duration below the threshold (hours)	2004 – 2005	0	2	0	0
	2003 – 2004	0	1	4	6
	2002 – 2003	0	1	0	0
	2001 – 2002	0	0	0	0
	2000 – 2001	0	0	3	24
	1999 – 2000	5	4	36	88

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Conclusions

- Broad approach needed to achieve a coherent approach to resource adequacy:
  - Governance, security, technical & commercial regimes
- Strengths of the Australian NEM approach:
  - Consistent & effective security, technical & commercial regimes… *to date anyway*
- Weaknesses of the Australian NEM approach:
  - Government-owned businesses remain contentious
  - Dysfunctional retail markets
  - Network investment remains contentious
  - Incoherent & ineffective climate change policy

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