Centre for Energy and Environmental Markets

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A review of experience with electricity industry restructuring in NSW

Hugh Outhred

NSW Power & Gas 2005, 23/6/05

Outline

- What is electricity industry restructuring?
- What has been the experience in NSW to date?
- What might the future hold?

The electricity industry restructuring process: *diversifying decisions, broadening options*

Issue	Transition	Key challenges
Structural disaggregation	*From* monopoly *To* competing firms *Plus* system operator(s)	Cultural change; Adequate competition; *Accountability*
Commercial Decision-making framework	*From* cost recovery *To* market prices	Market power; Market design fidelity; *Accountability*
Regulatory Decision-making (economic)	*From* rate of return *To* Incentive Regulation	Multiple objectives; Measuring outcomes; *Accountability*
Regulatory Decision-making (environmental)	*From* direct cost *To* full costs	Variable RE energy flows End-user participation; *Accountability*

Challenges in electricity industry restructuring

- Understanding & managing industry risks:
  - From short-term operation to long-term investment
- Consistency in the decision-making framework:
  - From the short-term to the long-term future
  - From primary energy providers to end-users
  - Across the full scope of the electrical network
- Decision-making compatibility:
  - *Centralised:* governance & regulation; system operation
  - *Decentralised:* participants as individuals and in groups
- Decision-maker autonomy & accountability:
  - Participants, system operators, regulators, governments

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An electricity trading framework

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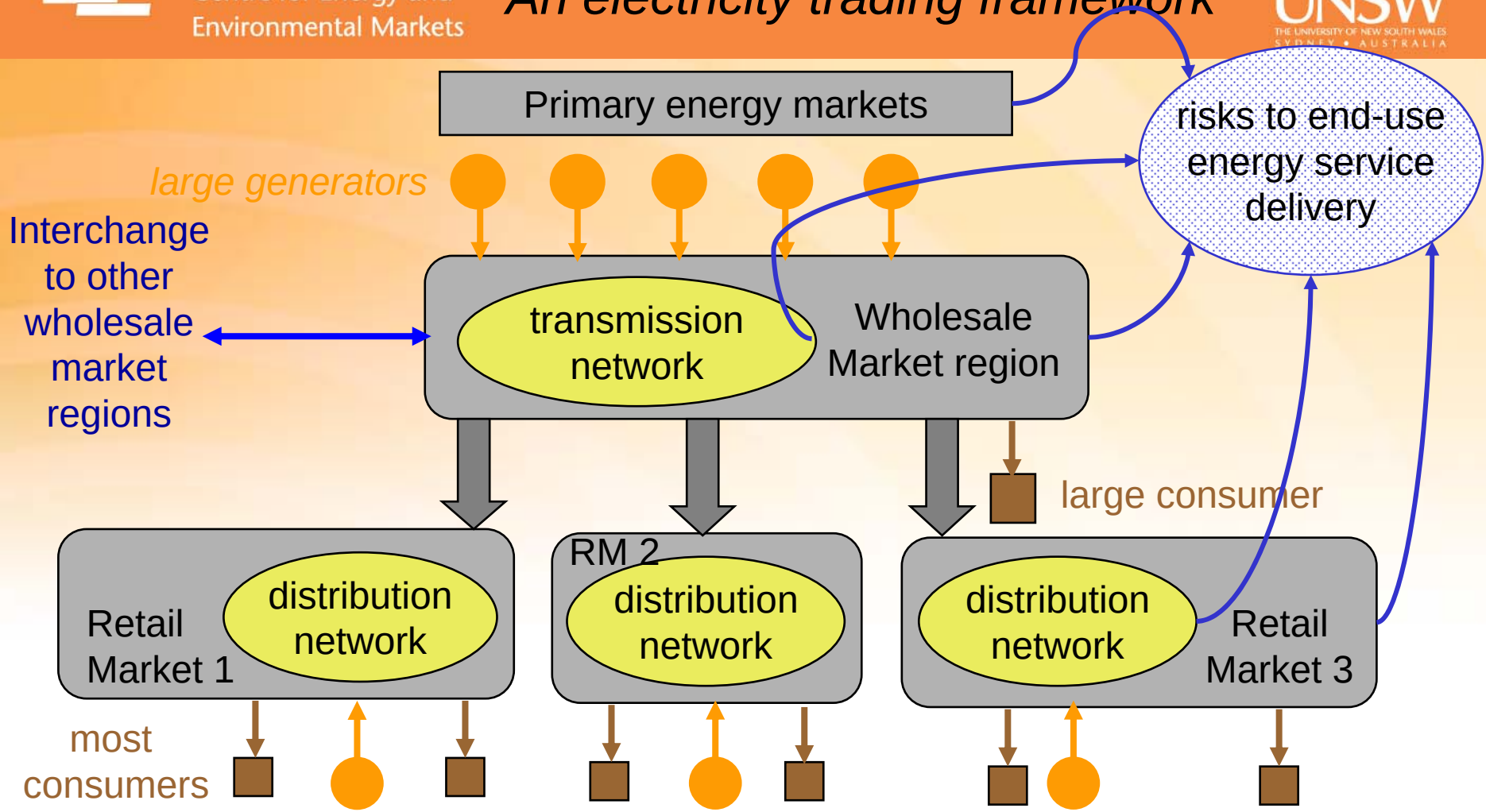
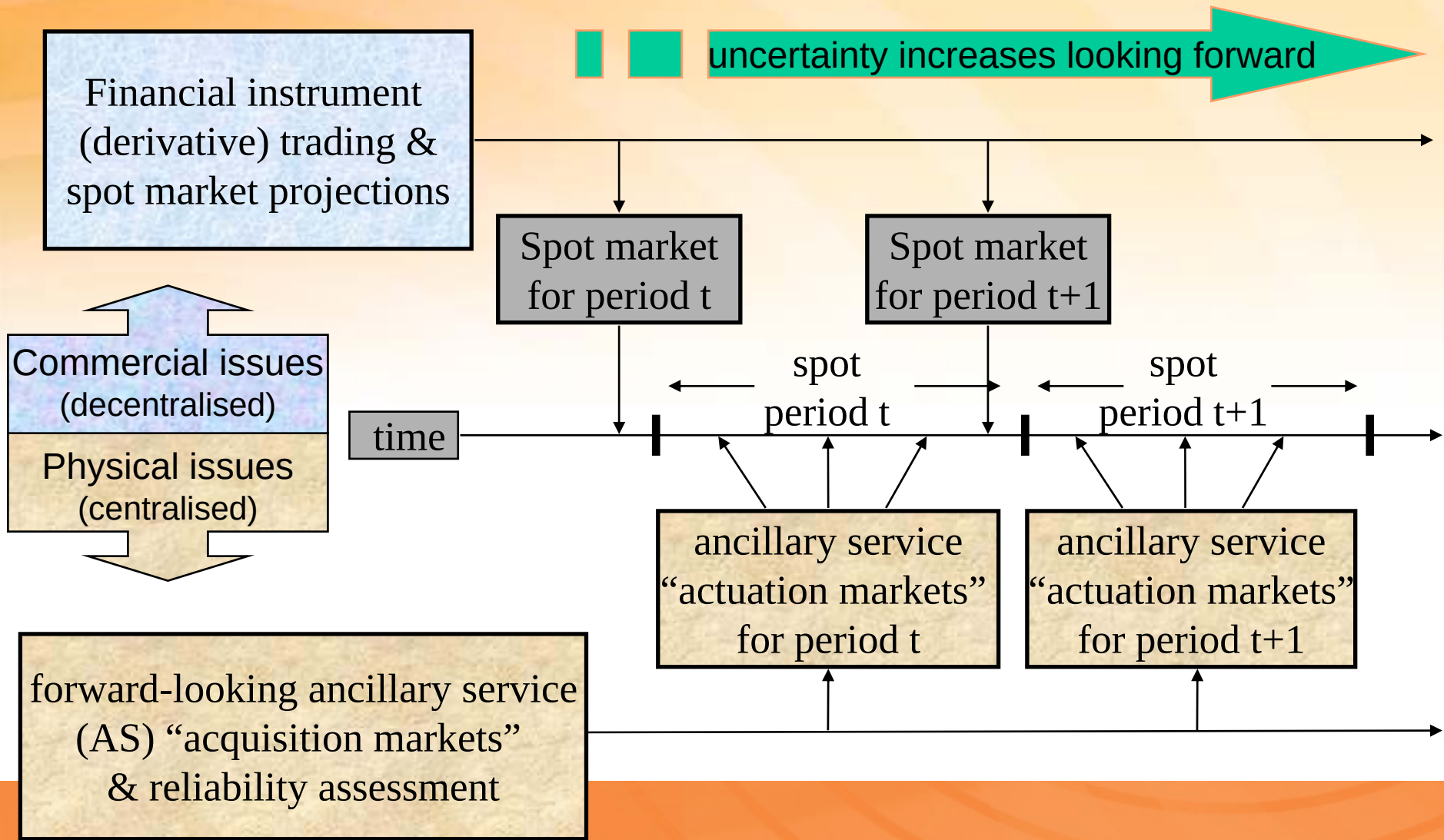


- *Small consumers, embedded generators & storage should be supported by energy service advisers*

- *Wholesale & retail market designs should be compatible*
  - *Both should include network models*

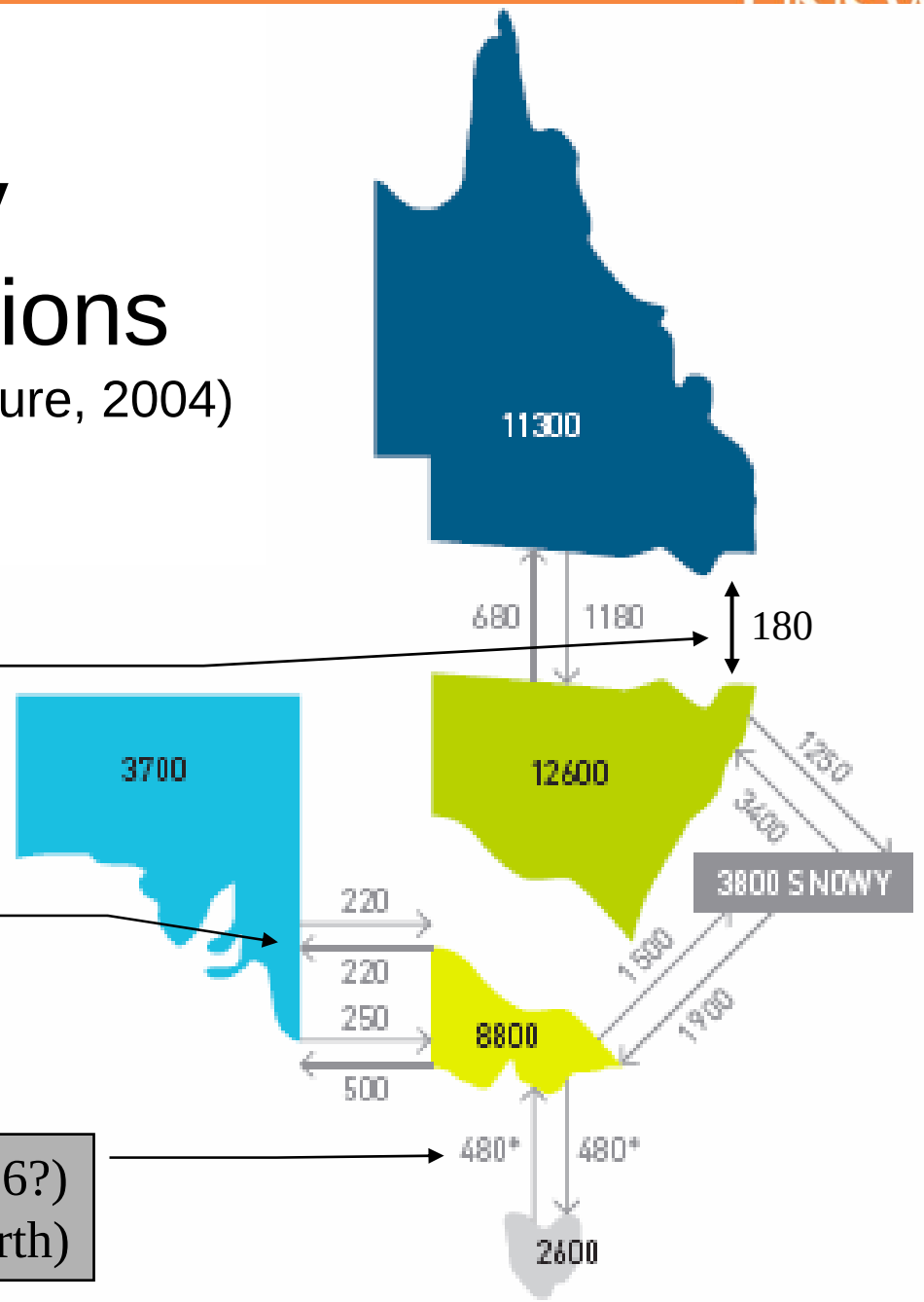
Timeline for electricity trading

(requires locational detail & active demand-side participation)



National Electricity Market market regions

(Securing Australia's Energy Future, 2004)

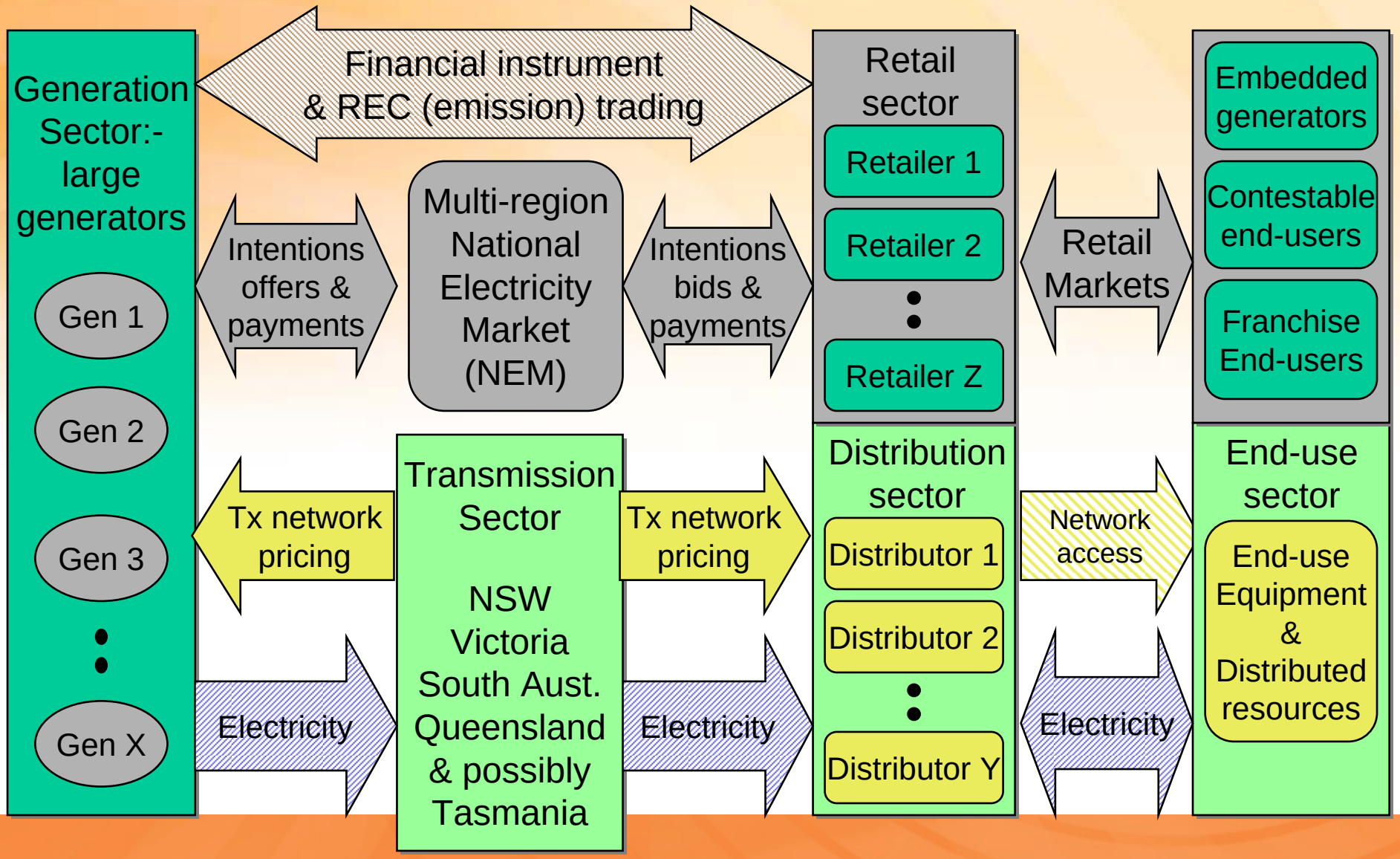


Directlink DC link, currently MNSP

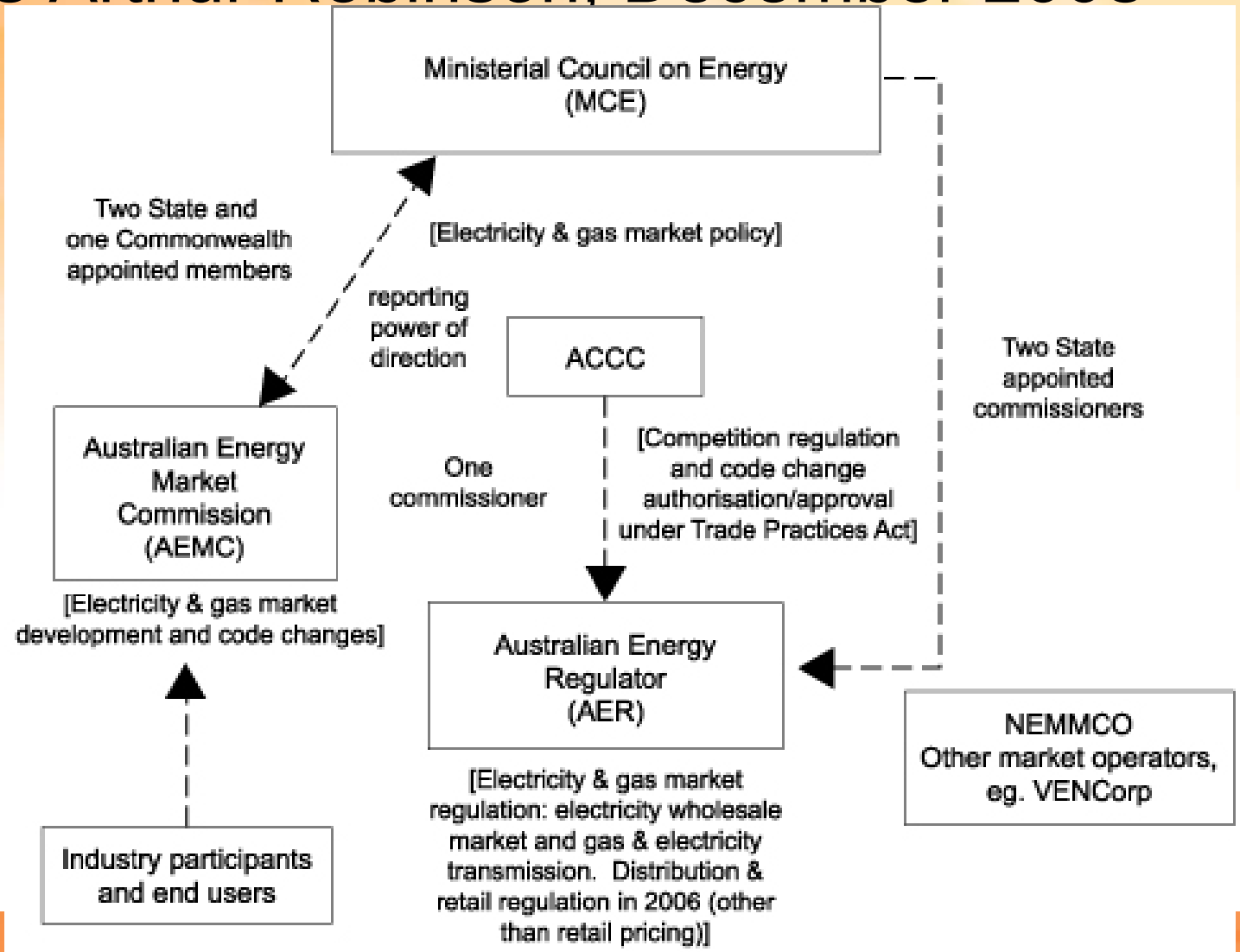
Murraylink DC link, now regulated, formerly MNSP

Basslink DC link MNSP (2006?) 600MW short term rating (north)

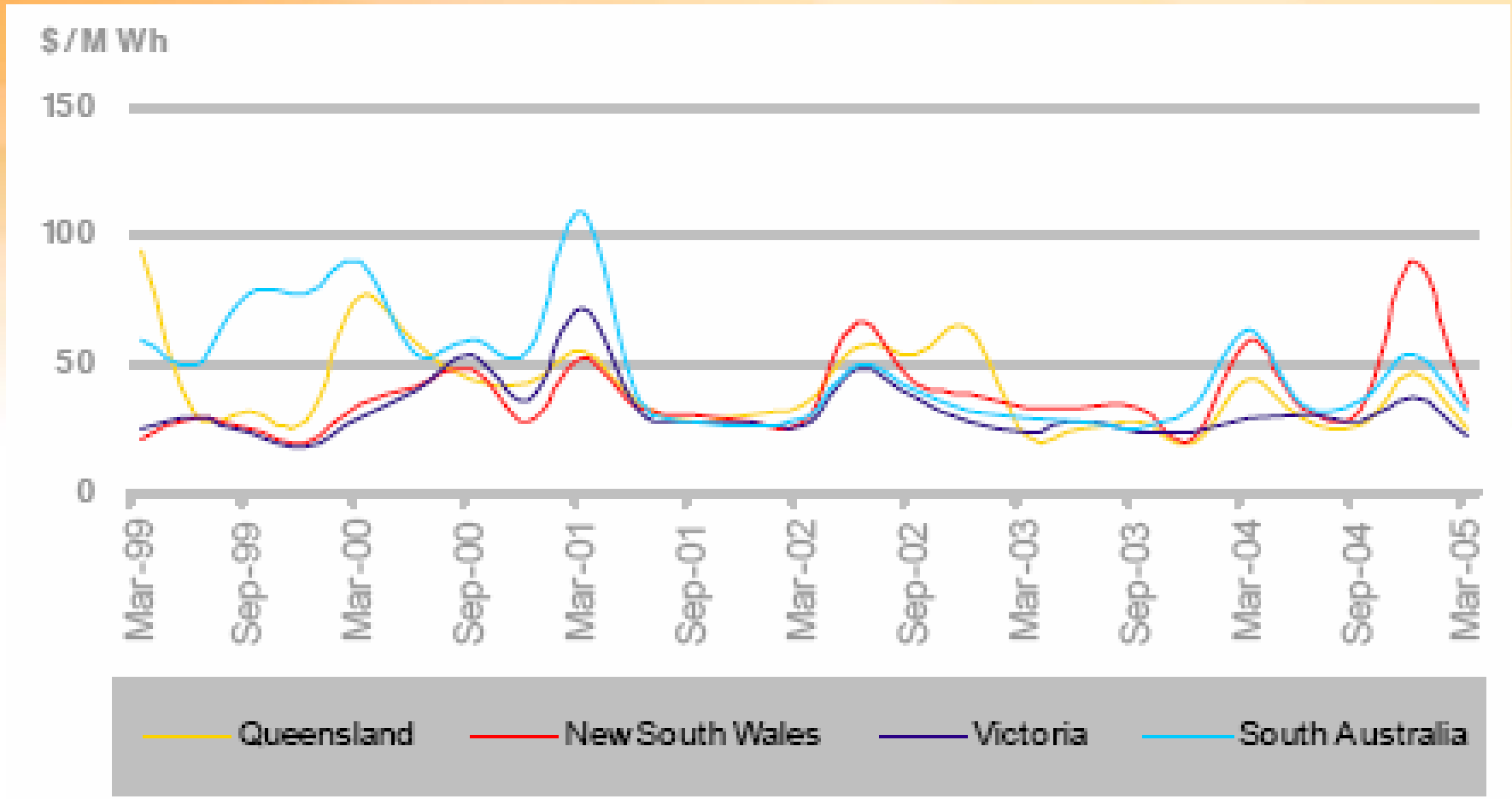
Electricity industry structure in SE Australia



Governance & institutions:- as seen by Allens Arthur Robinson, December 2003

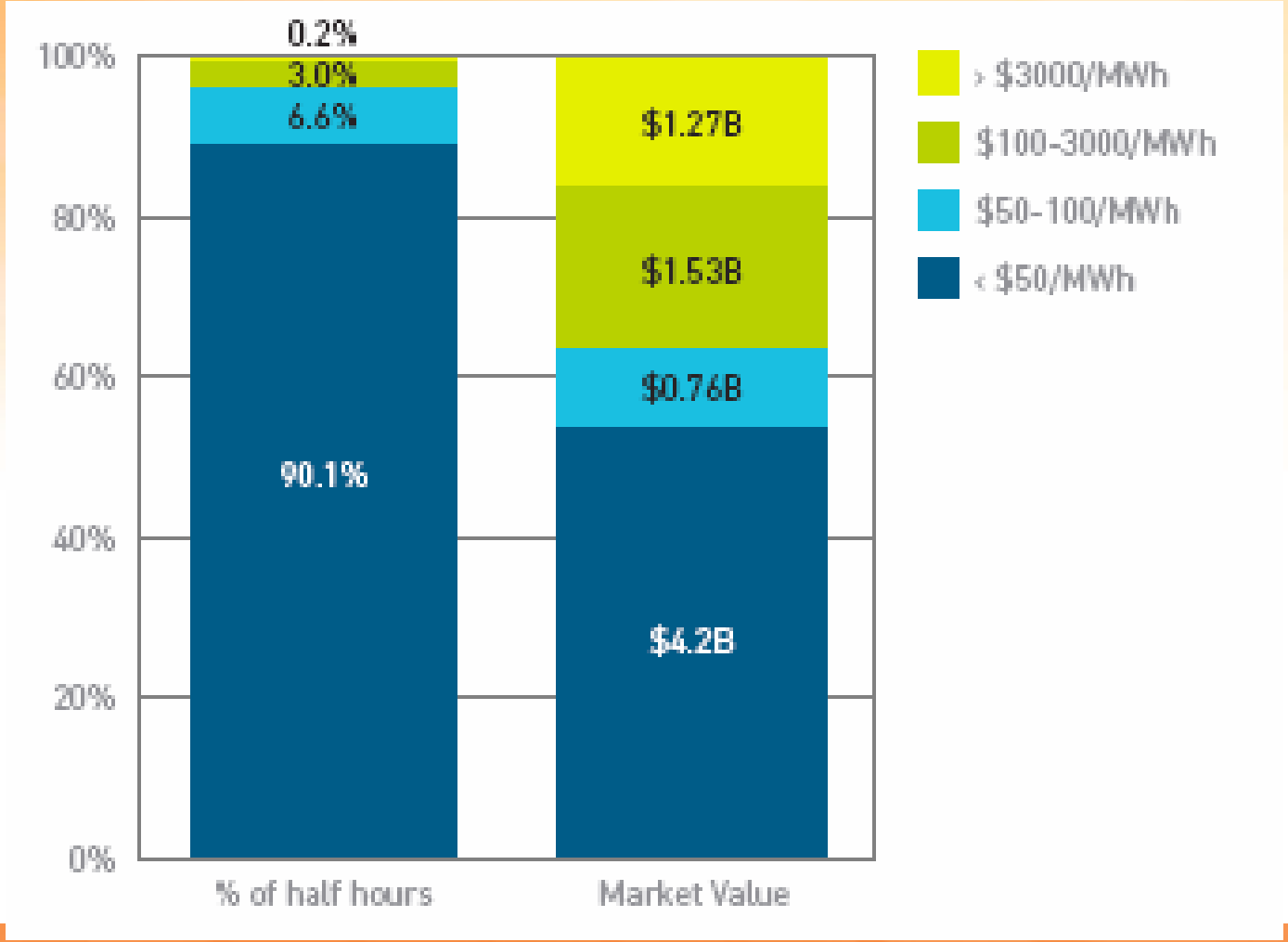


Weekly avg. NEM spot prices since market inception (NECA, 05Q1 Stats, 2005)



Distribution of NEM spot prices & revenues

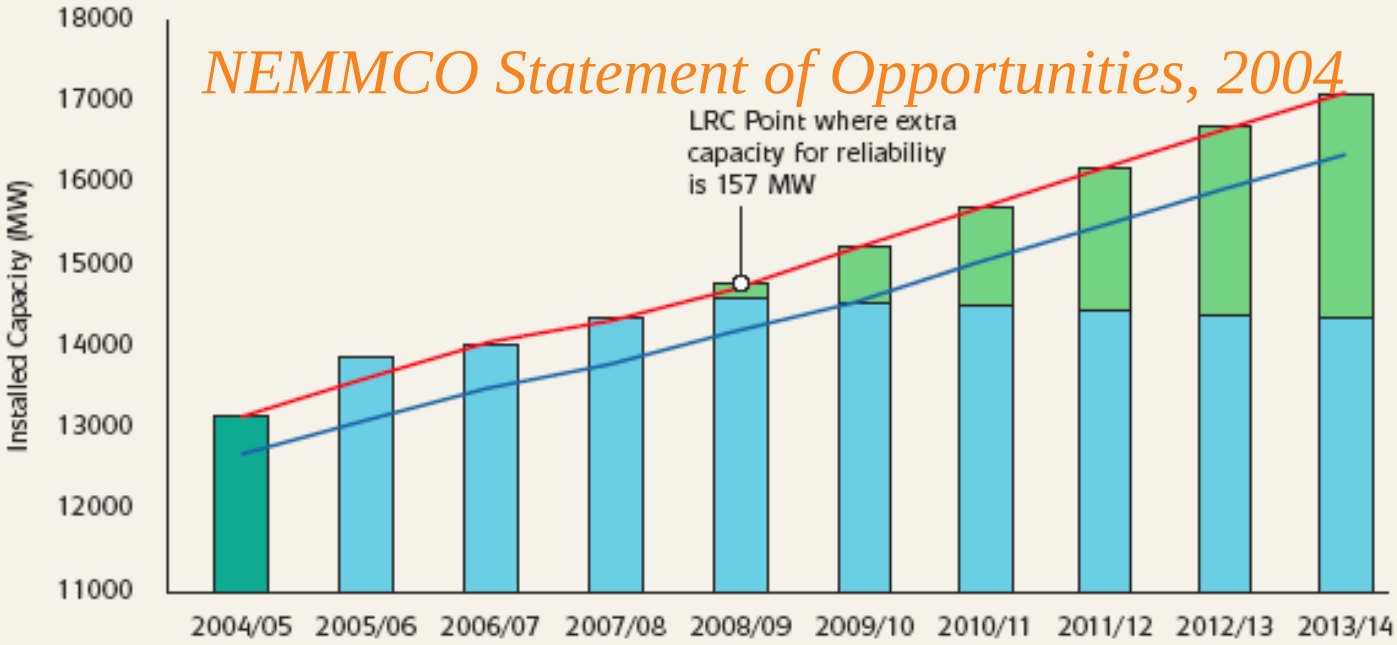
(Federal Government: *Securing Australia's Energy Future*, 2004)



The specific context in NSW

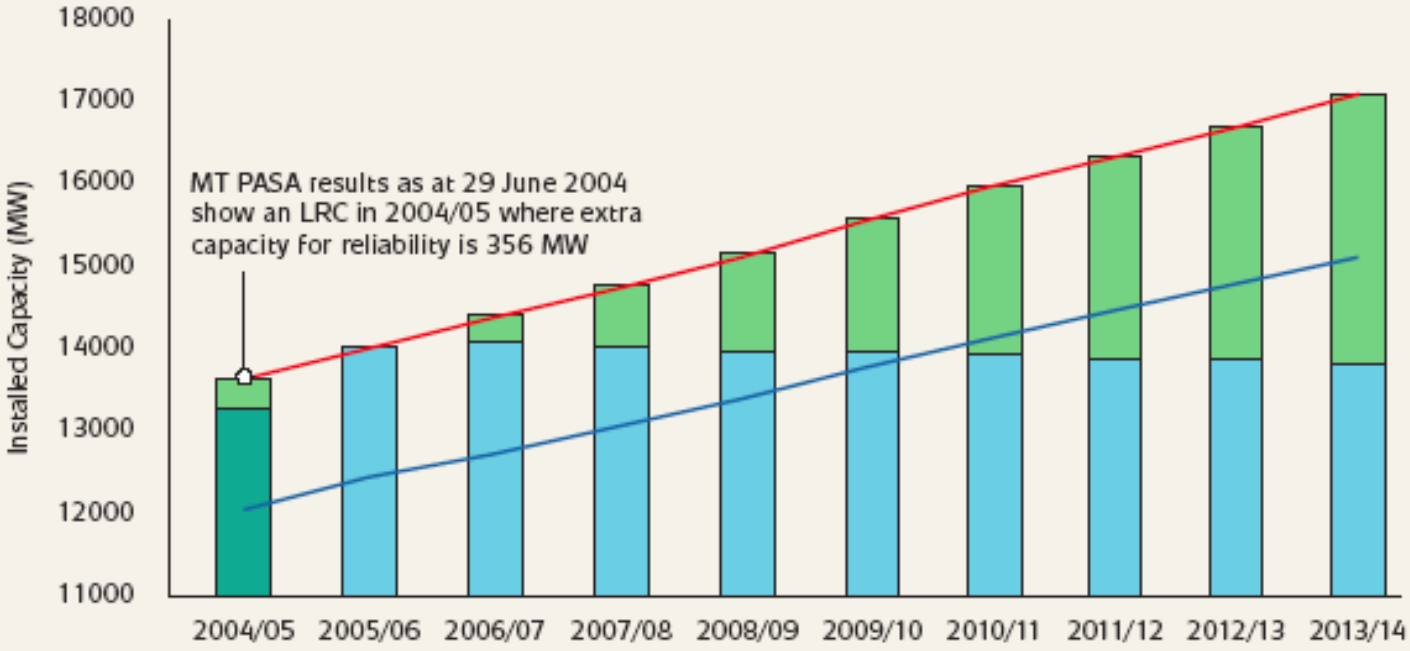
- Trends in supply-demand balance
- Distribution and retail market issues
- Climate change issues

Figure 4 New South Wales Summer Outlook



- reserve capacity support from the Snowy Hydro Scheme and Queensland provide additional available capacity in 2006/07 and 2007/08
- in 2008/09, New South Wales experiences deficits, even though Queensland has additional available capacity. This is due to interconnector transfer limits from Queensland
- in 2008/09, New South Wales cannot source additional capacity from Snowy, as Victoria and South Australia are already experiencing deficits

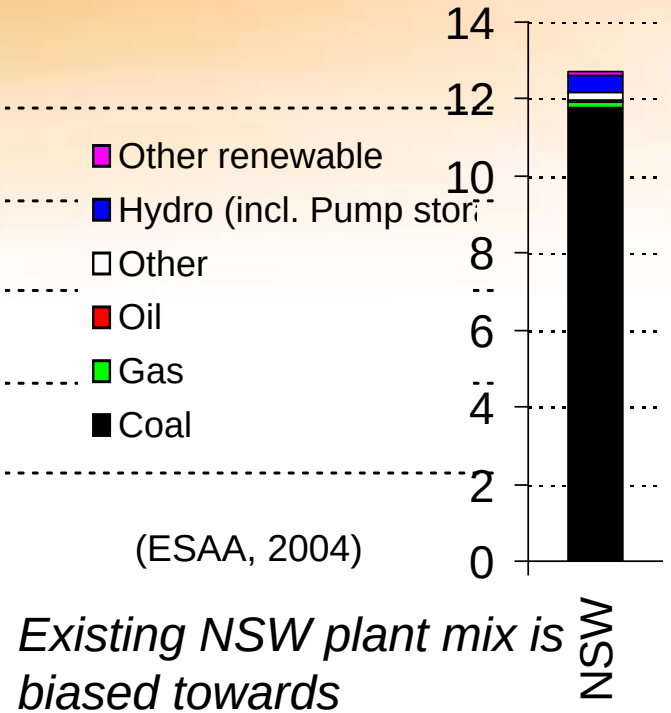
Figure 5 Victoria and South Australia Summer Outlook*



- from 2005/06 onwards, following commissioning of Basslink, there is an additional available capacity of 600 MW to the Victoria and South Australia region
- an LRC point occurs in the following year (2006/07), when the Extra Capacity for Reliability is 321 MW
- in 2006/07 and 2007/08, reserve support from Snowy, New South Wales and Queensland is limited by the capability of the Snowy to Victoria interconnector

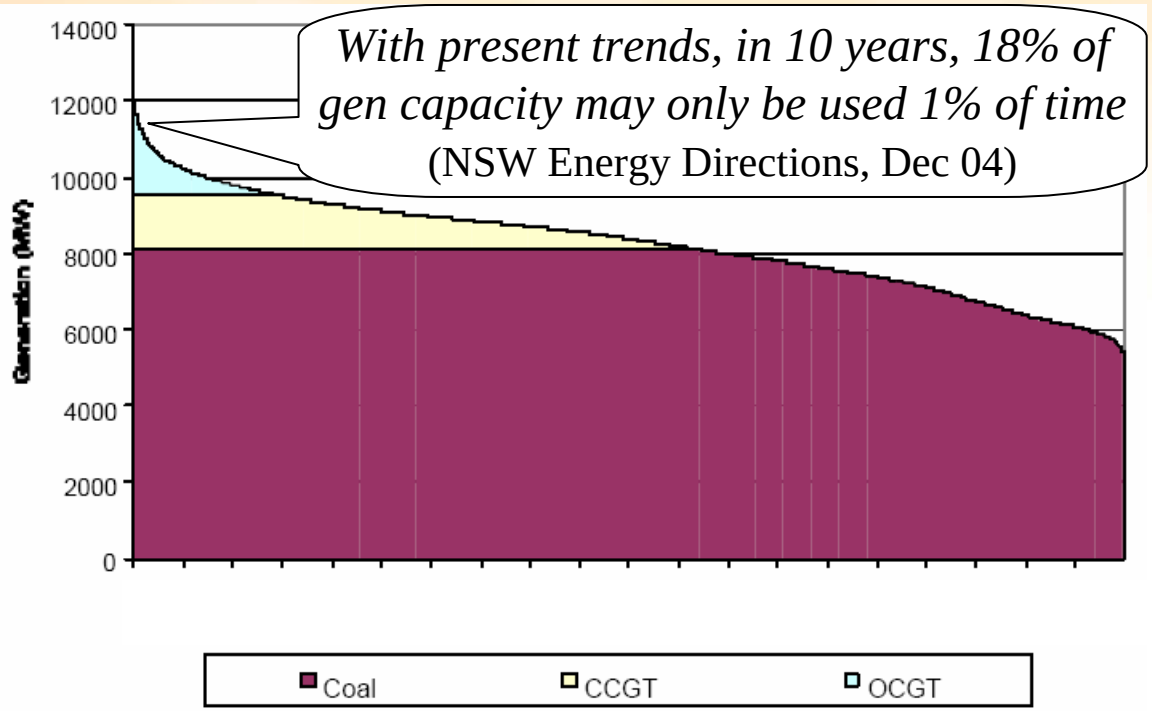
NSW does not need base load generation at present

"Mr Yeadon said the NSW Statement of System Opportunities indicated that over the next 10 years there was scope for a whole range of supply and demand-side projects, including renewable projects (such as wind and solar) and gas-fired plants." (NSW Govt. media release, 21/6/02)



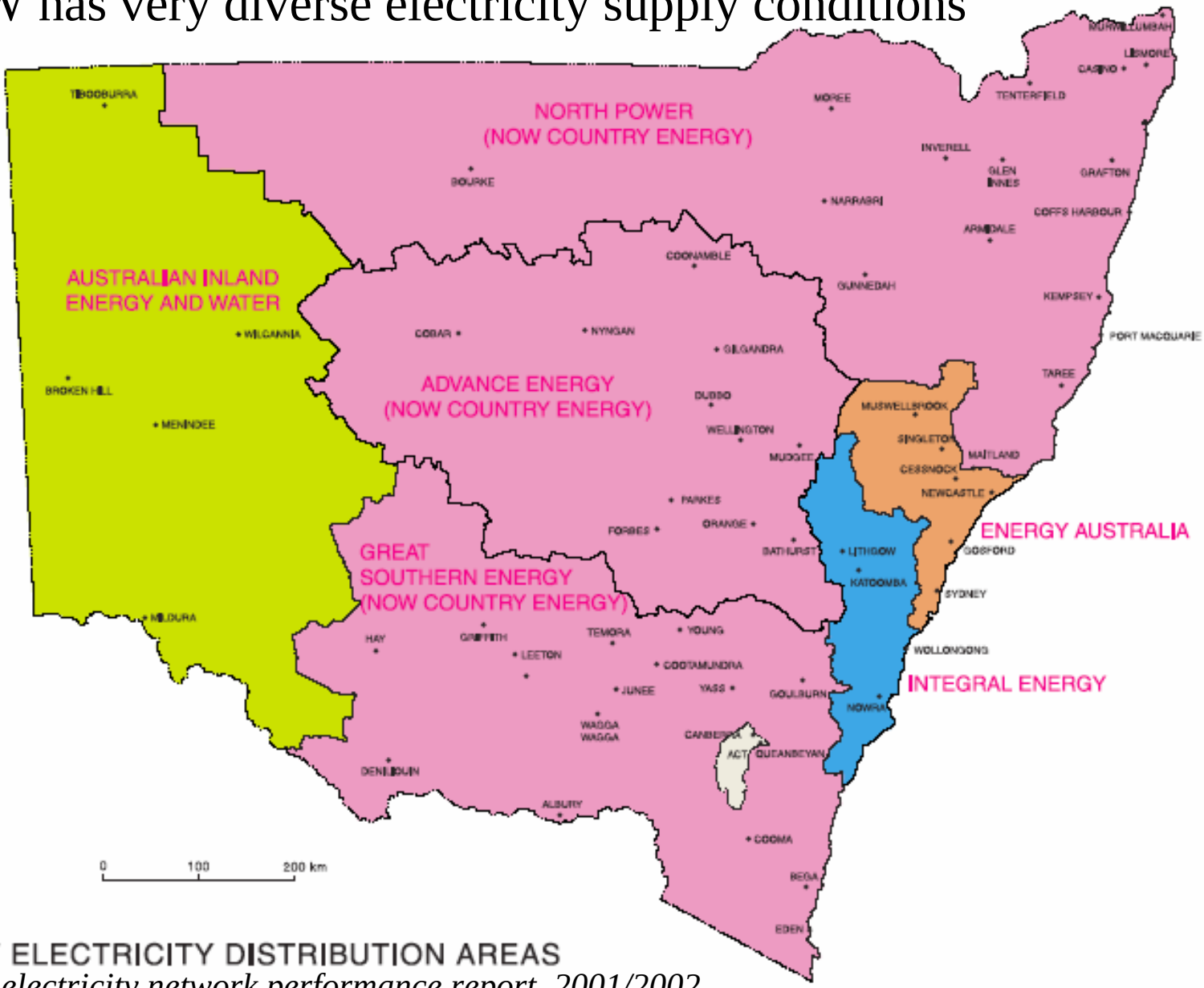
(ESAA, 2004)

Existing NSW plant mix is biased towards base-load generation



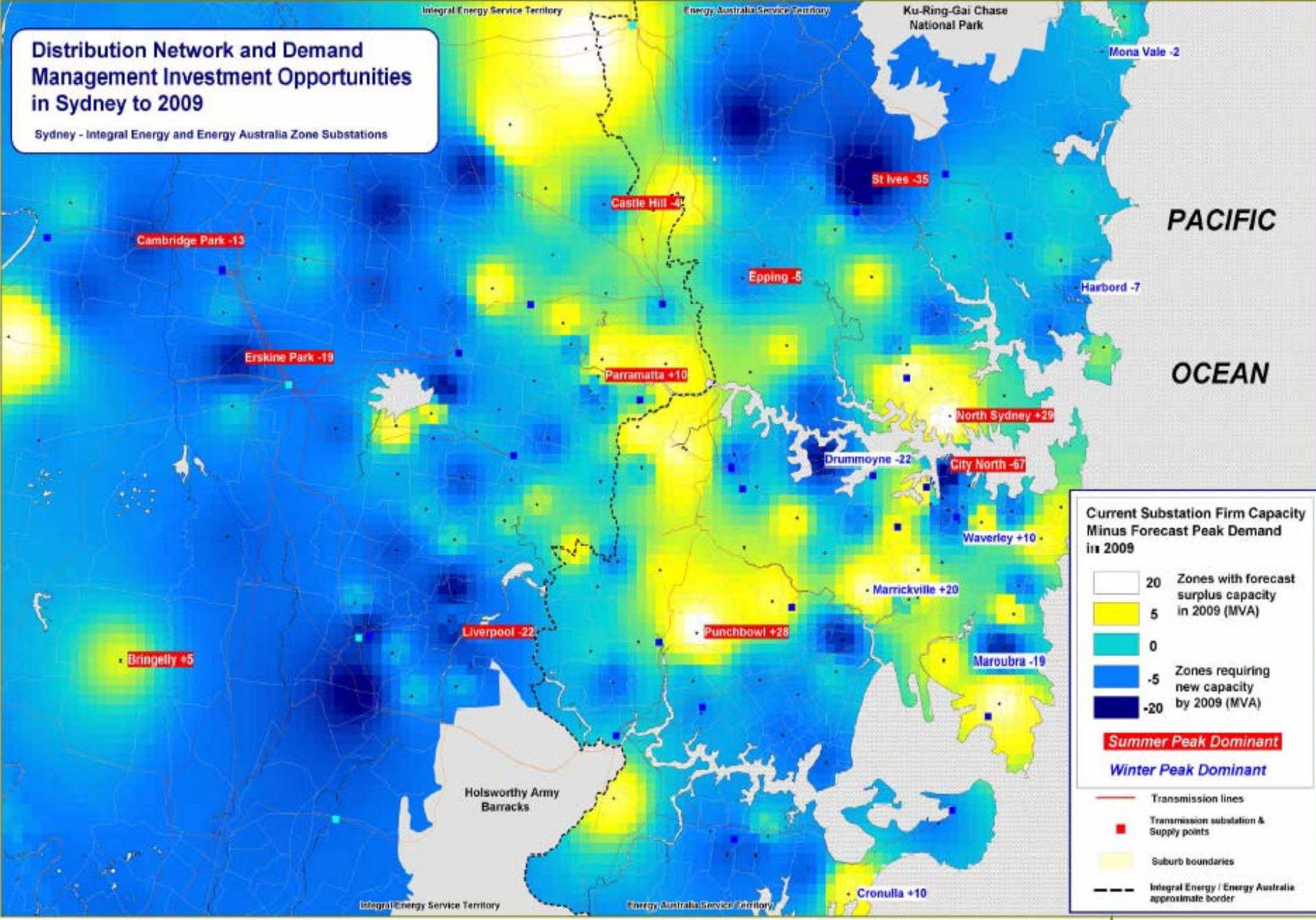
IES "Optimal plant mix" for NSW (IES 2004 report to IPART)

NSW has very diverse electricity supply conditions



NSW ELECTRICITY DISTRIBUTION AREAS

NSW electricity network performance report, 2001/2002


Distribution Network and Demand Management Investment Opportunities in Sydney to 2009
Sydney - Integral Energy and Energy Australia Zone Substations
Integral Energy Service Territory
Energy Australia Service Territory
Ku-Ring-Gai Chase National Park
Mona Vale -2
St Ives -35
Castle Hill -4
Cambridge Park -13
Epping -5
Harbord -7
PACIFIC
OCEAN
Erskine Park -19
Parramatta +10
North Sydney +29
Drummoyne -22
City North -67
Waverley +10
Marrickville +20
Liverpool -22
Punchbowl +28
Bringelly +5
Maroubra -19
Holsworthy Army Barracks
Cronulla +10
Integral Energy Service Territory
Energy Australia Service Territory
Current Substation Firm Capacity Minus Forecast Peak Demand in 2009
20
Zones with forecast surplus capacity in 2009 (MVA)
5
0
-5
Zones requiring new capacity by 2009 (MVA)
-20
Summer Peak Dominant
Winter Peak Dominant
Transmission lines
Transmission substation & Supply points
Suburb boundaries
Integral Energy / Energy Australia approximate border
SEDA
NSW Government
© SEDA 2003
0
4
8
kilometres
Source: Integral Energy ESDR 2003
Energy Australia ESDR 2003
DEPARTMENT OF ENERGY, UTILITIES AND SUSTAINABILITY
NEW SOUTH WALES GOVERNMENT
Substations - Available Capacity (MVA) for 2009
Prepared for Ministry of Energy and Utilities Statement of System Opportunities

EnergyAustralia strategy for metering & network tariffs (H Colebourn, 2005)

- Only interval meters installed from July 2004
- Replacement meters for most of 25,000 40-160 MWH end-users in 2004/05
- Replacement meters for 110,000 15-40MWH end-users by 2009/10
- 3-rate TOU tariff for interval meters from March 05
- Seasonal network tariff from July 2005
- Tests of communication systems to support non-predetermined pricing & interruptible loads

Issues for interval metering

- Interval metering should record:
  - Energy & key measures of availability & quality of supply for each market period
- Interval metering would facilitate:
  - Accountability for end-user decision-makers
    - Operation and investment
  - End-user participation in provision of ancillary services
  - The transition towards nodal pricing
- Automated meter reading & communication also required

NSW Greenhouse Abatement Scheme (NGAS)

- Emissions Trading (ET) Schemes:
  - Environmental Instrument trading to enhance energy industry environmental outcomes
- NGAS, *an innovative ET scheme, commenced Jan 2003*:
  - Policy intent to reduce ‘‘greenhouse gas emissions created through NSW electricity consumption’’ (NSW Government, 2001).
  - Prior State scheme (1997–2001) failed (NSW EPA, 2002).
  - Changes to previous design, developed 2001-03:
    - penalties, abatement measurement, certificate trading
- Concerns expressed during NGAS development:
  - Abstraction, additionality, transparency, complexity, market design
- CEEM research on NGAS & related ET schemes:
  - Assess performance of NGAS to date & consider enhancements
  - Explore future options, considering the evolving international context
- Outcomes of our research to date (www.ceem.unsw.edu.au):
  - Poor transparency, market concentration, little impact on emissions

NSW government objectives & statements

- NSW Energy Directions Green Paper objectives (12/04):
  - Competitively priced & reliable supply
  - Benefits of improved energy efficiency
  - Reduced greenhouse & other emissions
  - Regulatory certainty & transparent siting assessment
- Government statements since then:
  - *"The world's got to debate whether uranium-derived power is more dangerous than coal"* Bob Carr, 2/6/05 (www.abc.net.au)
  - Premier's media release, 11/6/05:
    - Extension of NGAS scheme until 2020 with 15 year extensions after that
    - Two gas-fired power stations with plans for up to three more
    - A 110MW wind farm

Conclusions

- Generation mix should address climate change:
  - *"Alcoa has concluded that available evidence indicates Greenhouse Gas (GHG) emissions from human activities affect climate, making it an issue requiring action"* (www.alcoa.com/overbey)
  - Gas-based generation is an important near-term option
  - NGAS scheme has had little impact on reducing emissions
- End-user participation becoming ever more important:
  - Improved end-use efficiency & price-responsive demand
  - Appropriate choice of energy supply option at point of end-use:
- Government leadership also of growing importance:
  - But must be in a manner compatible with a restructured industry

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