Centre for Energy and Environmental Markets

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Electricity Industry Governance & Regulation

Masterclass for the Restructured Electricity Industry
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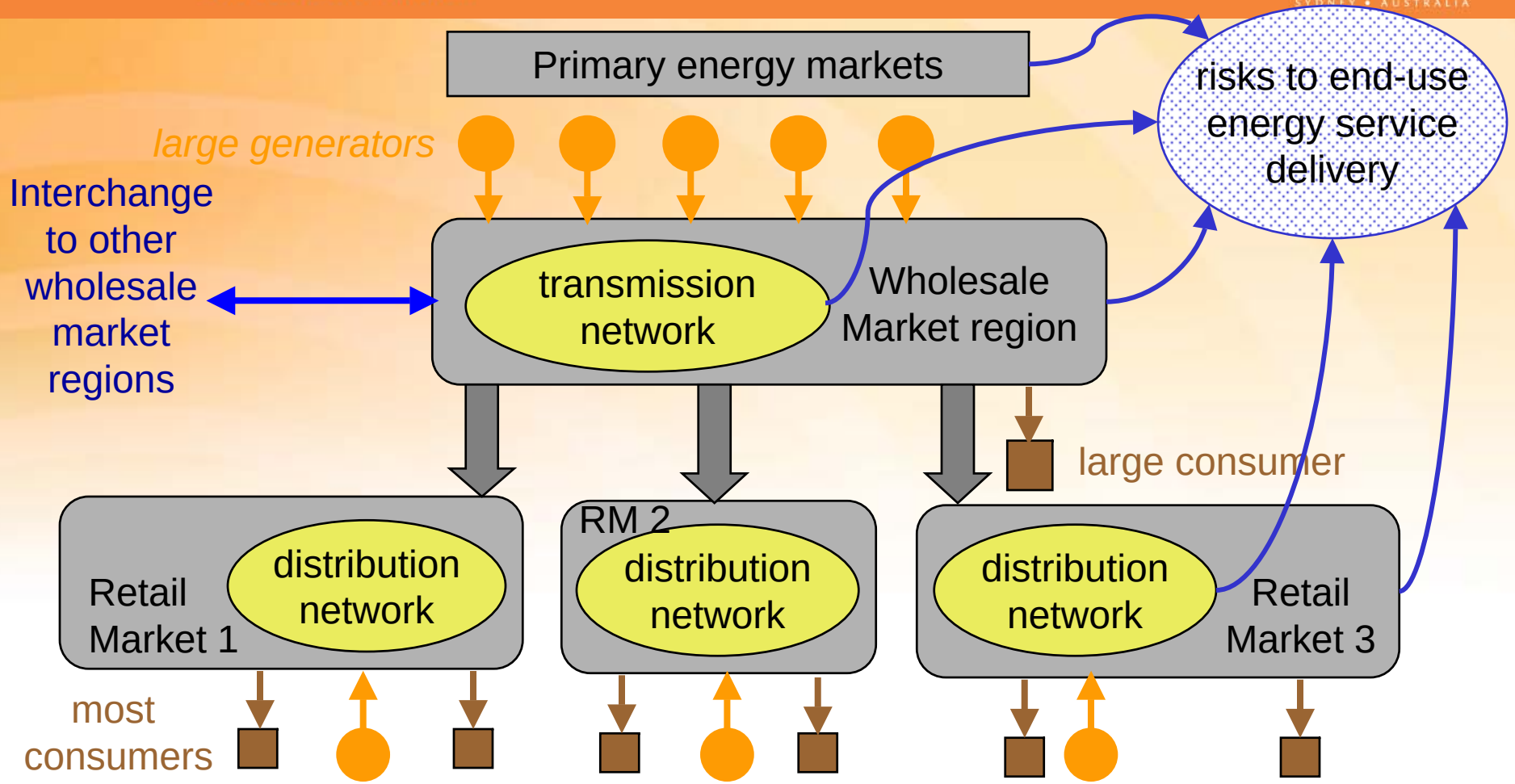
An electricity trading framework



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

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

Structure & ownership issues

- Structure:
  - All stages in energy conversion chain matter:
    - Primary energy, generation, network services, end-use
    - Shared accountability for risks to continuous energy flow
  - Retailers play an ambiguous role:
    - Don't participate in the energy conversion chain thus may be redundant in their present role
- Ownership:
  - Public owners can in principle aggregate risks & consider many issues in assessing the public good:
    - But subject to capture by interest groups
  - Private owners focus on their own specific outcomes

Infrastructure industries

- A definition of infrastructure:
  - Essential elements forming the basis of a system
- Examples of infrastructure industries:
  - Communications,electricity,gas,water,transport
  - Provide inputs to products or services
  - Often capital intensive with long asset lives
- An infrastructure industry is only essential if:
  - A particular product or service cannot be produced without it
  - No alternative product or service can be made without it

"Natural monopoly" industries

- Economist's (deterministic) definition:
  - Most efficient if production undertaken by a single firm to meet demand when price=SRMC
    - Always true for "increasing returns to scale", ie average cost decreases as production increases
- Some infrastructure industries may be both essential & natural monopolies, eg:
  - Electricity distribution networks?
  - However this may be less true than in the past

Traditional approach to infrastructure

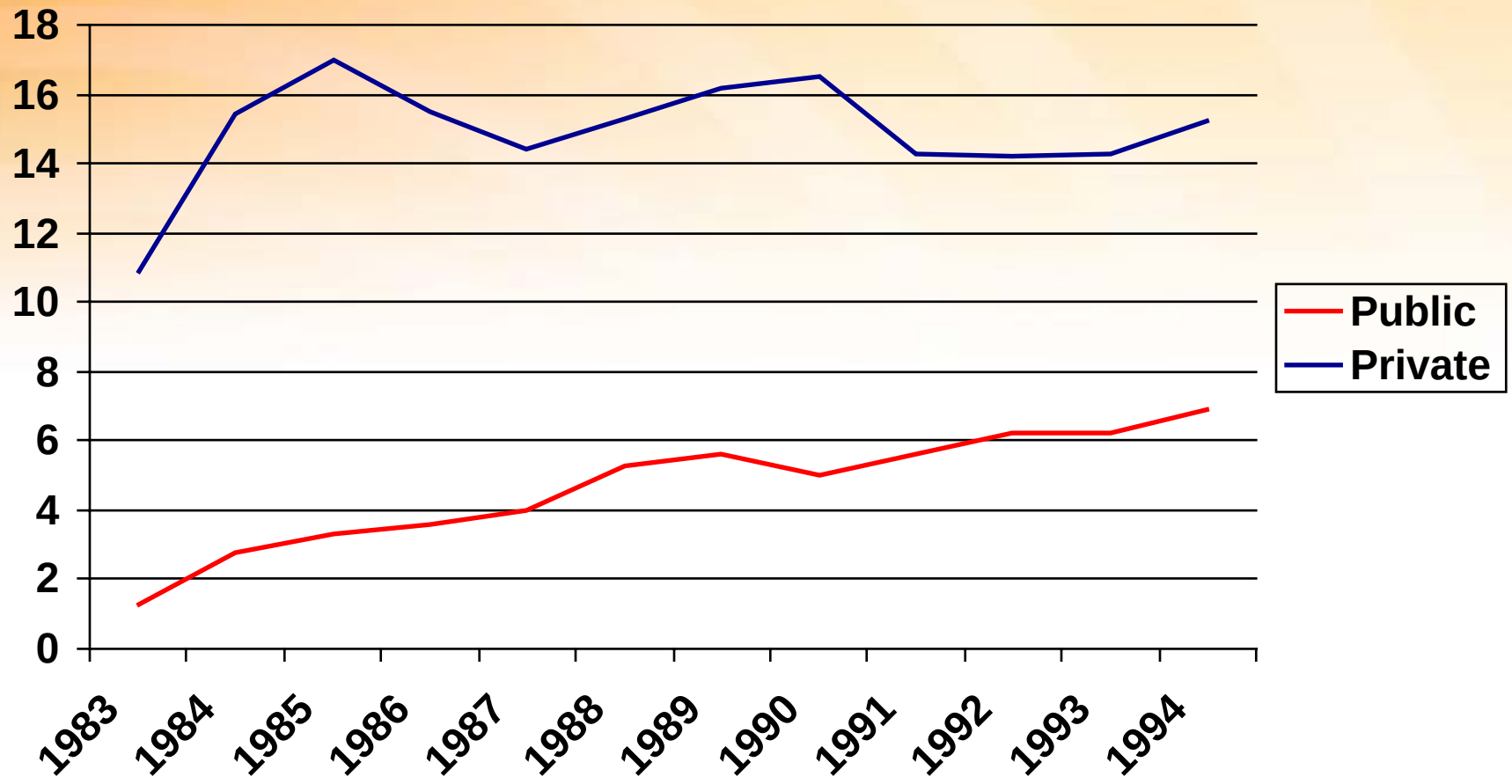
- Regarded as natural monopolies & run by:
  - State-owned enterprises (eg Australia, UK)
  - Private monopolies (eg some in USA)
- In either case, once industry had matured:
  - Often exhibited poor productivity, low rates of return, over-staffing or large calls on public funds
  - Often proved difficult to regulate due to asymmetry of information & inappropriate incentives
  - Often slow to innovate
- *But difficult to avoid the distortion of ex-post evaluation*

Traditional models for infrastructure industries

- Britain, Australia, etc:
  - Statutory authorities supervised by a Minister:
    - Usually vertically integrated monopolies
  - Decision making political, “behind closed doors”:
    - Politicians negotiate tradeoffs
- USA (in some cases):
  - Regulated private monopolies
  - Politically appointed regulatory boards
  - Formal public hearings

Rates of return (%) on assets for Australian public & private enterprises

(King & Maddock, Unlocking the Infrastructure, 1996, p7)



A US perspective on regulatory options for the electricity industry

("Regulating Regional Power Systems", CJ Andrews (Ed), 1995, p87)

	Traditional regulation	Integrated resource planning	Markets & incentives
Advantages	•Well-understood with predictable outcomes	•Increased public participation, better social & environmental outcomes	•Can reduce cost & support innovation •May have lower regulatory cost
Dis-advantages	•Poor incentives to minimise cost •Ignores externalities •Hazards of ex-post evaluation	•Cumbersome •Poor incentives to minimise cost •Subjective values •Incompatible with markets?	•Unproven model subject to gaming •Uncertain outcomes •Worse social & environmental outcomes?

A US perspective on Federalism

("Regulating Regional Power Systems", CJ Andrews (Ed), 1995, p53)

"Even under the most favourable conditions, federalism is difficult. Dividing power between the center and the periphery is always complex, frequently unstable and often impossible…"

Australia shares the strengths & weaknesses of federalism: *ambiguity & instability in legal basis for industries with multi-state reach*

Electricity industry ownership issues

- Some concerns about private ownership:
  - Market power abuse, particularly of small end users
  - Foreign domination of a key sector of the economy
  - Vertical & horizontal concentration of ownership
  - Lack of support for innovation, sustainability & workforce development
- Some concerns about public ownership:
  - Focussed on conserving the traditional paradigm
  - Confusion of roles: equity holder vs regulator
  - Not an option for distributed resources

Comparison of ownership options

- It would be a mistake:
  - To retain public ownership merely to protect the status quo
  - To privatise an electricity industry just for the proceeds from asset sales
- In either case require:
  - Methods separate risks that can be allocated to specific industry participants from those that cannot
  - An effective, independent regulatory regime
  - Protection against concentration of ownership
  - Enhanced demand side participation
  - Measures to improve sustainability & to address equity concerns (“essential good”)

Current ownership status of the Australian electricity supply industry

Public ownership	Private ownership
Most in NSW, Qld, Tasmania, WA & NT	• All in Victoria & all leased in South Australia

Notes:

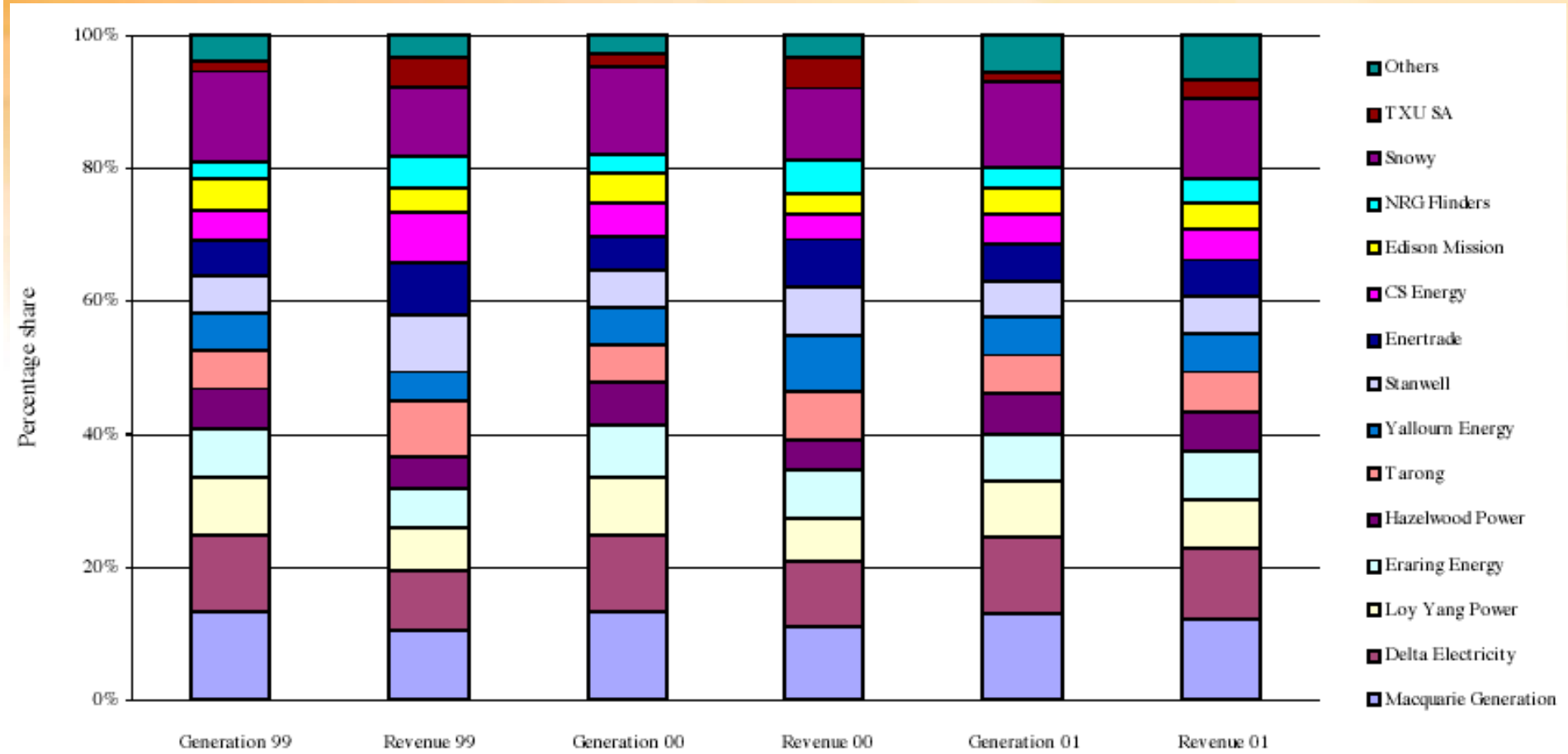
•There are privately owned retailers in most state

•There are concerns about existing or potential concentration of ownership in most states.

•The demand side of the electricity industry is largely privately owned.

NEM generator market shares by annual energy & spot market revenue

(NECA, Performance of the NEM, June 02)



Issues & choices in regulation

- Desirable characteristics for regulation:
  - Independent, unbiased, knowledgeable, consistent, accountable
  - Incorporate externalities
  - Support competitive processes, not act as a central planner:
    - Monitor, advise, reward, threaten rather than directly intervene
  - *Align participant & social interests:*
    - *Incentives preferable to penalties*

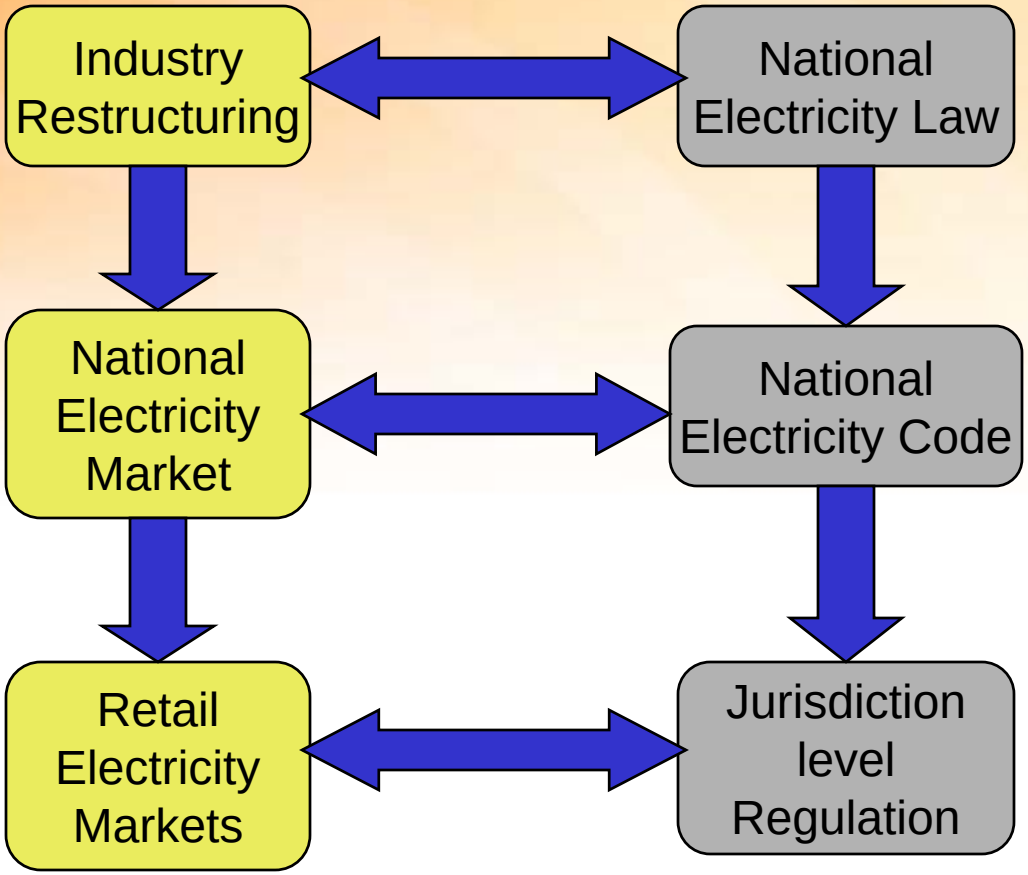
Choices in regulatory arrangements

- Industry-specific or generic?
  - Industry-specific more knowledgeable, but:
    - More likely to suffer ‘regulatory capture’
    - More likely to engage in heavy-handed intervention
- Narrow or broad regulatory objectives?
  - Narrow focus on financial regulation:
    - Simpler to implement, but ignores important issues
  - Achieving other regulatory objectives:
    - ‘Monetarise’ (e.g. taxes or tradeable permits)
    - Licence regime (e.g. customer service, QOS)

Choices in regulatory arrangements

- Single regulatory body or multiple bodies sharing regulatory responsibility?
  - Shared responsibility:
    - promotes innovation & robustness
    - requires good communication & cooperation
- Single regulator or multi-member tribunal?
  - Tribunal members must negotiate but share responsibility
- External regulation or self-regulation?
  - Self-regulation can be more flexible & subtle if all stakeholders are adequately represented

Australian electricity reform process



National Electricity Law (NEL)

- Supports the operation of the NEC and NEM:
  - Creates NECA & NEMMCO
  - Only NEMMCO may operate a wholesale market
  - Generators & Network service providers must register with NEMMCO
  - Retailers & customers may only purchase wholesale from NEMMCO
- Passed by participating jurisdictions:
  - Proclaimed December 1998
  - Changes require jurisdictions' unanimous approval

National Electricity Code (now Rules)

- Defines National Electricity Market (NEM):
  - Terms of participation
  - Rules for market operation
  - Security arrangements
  - Network regulation and access arrangements:
    - Network pricing, metering, connection requirements
  - Code administration & enforcement
  - Dispute resolution, rule change, derogations

Jurisdiction-level laws & regulation

- Determine retail market arrangements:
  - Determine customer eligibility for wholesale market access and retail contestability:
    - Set retail prices for franchise customers
  - Distribution network access regime:
    - To the extent derogated from NEC
  - Issue distribution and retail licences:
    - Regulatory requirements in licence conditions:
      - e.g. reliability of supply, customer service
      - Enforce safety and environmental standards
      - Penalties rather than incentives

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

Concerns about joint distributor/retailers

(eg: ACCC FRC Determination, 2001; IPART Ring Fencing Guidelines, 2003; Metrology Review, 2003)

- Potential barriers to entry:
  - Discriminatory charges or requirements
  - Network data, metering & control equipment
  - Ownership of customer data, customer inertia
  - Economies of scale & cross-subsidies
- Ring-fencing options for distribution & retail:
  - Legal, accounting or operations separation:
    - Legal separation clearly the strongest requirement
- Metrology issues paper 2003:
  - Meters to be owned by the distributor?

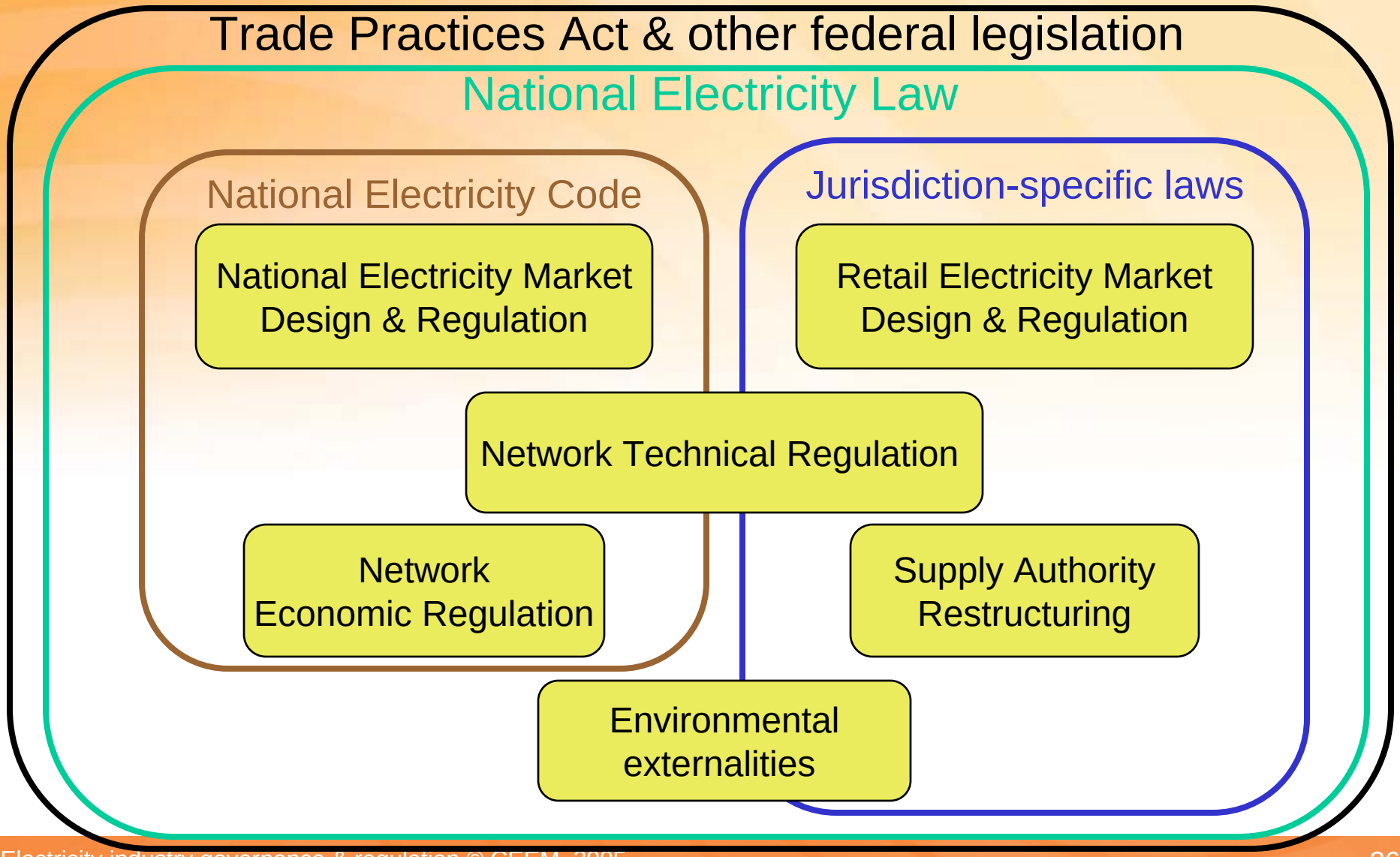
Concerns about legal accountability
(based on work of Dr R Stillman)

- Trade Practices Act:
  - Goods must be merchantable or fit for purpose
- Electricity is continuous flow industry:
  - Fitness determined by quality & availability:
    - Only assessable at point of use & time of use
- Accountability for availability & quality:
  - Shared between all industry participants
- Legal accountability is ambiguous:
  - National Electricity Law clauses 77A & 78 try to limit accountability of electricity supply industry participants
  - But Trade Practices Act may override this

Conclusion: *difficult compromises required*

- Structure:
  - Vertical separation difficult due to shared accountability & overlap of functions
  - Horizontal separation can be hampered by shared network or primary energy resources
- Ownership:
  - Private ownership hampered by ambiguity of property rights and large externalities
  - Public ownership creates tension between equity & regulatory roles
- Legal framework (blurred by federalism):
  - Legislative basis for the industry is ambiguous & unstable

Legal & regulatory framework



COAG electricity industry review (Parer) (Ministerial Council on Energy Communiqué, 1/8/03)

- MCE recommended the establishment of:
  - A single energy market governance body
  - A new national legislative framework
  - Two new statutory commissions from 1/7/04:

    (electricity (& later gas) wholesale market & transmission)
    - Australian Energy Market Commission (AEMC):
      - Rule making & market development, replacing NECA
    - Australian Energy Regulator (AER)
      - Wholesale market & transmission regulation & possibly distribution & retail; partly taking over ACCC role
- MCE recommended a comprehensive review of transmission planning (national planning function?)

MCE response to Parer Report, ctd
(Ministerial Council on Energy Communiqué, 1/8/03)

- Examine options to enhance user participation, including interval metering
- Respond to current Productivity Commission review of National Gas Access Regime
- Review upstream gas arrangements
- Address greenhouse emissions from energy sector on a national basis

MCE response to Parer Report, ctd

(MCE Report to COAG, 11/12/03)

- MCE to be the single energy policy body
- Develop national governance framework
- Establish AER & AEC by July 2004
- Develop national approach to access
- Develop national framework for distribution & retailing
- Improve transmission planning & investment
- Enhance end-user participation
- Increase the penetration of gas

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Energy Market Reform Program Summary (30/4/04) (www.mce.gov.au)

Projects	Qtr 1 / 2004	Qtr 2 / 2004	Qtr 3 / 2004	Qtr 4 / 2004	2005	2006
1. Governance and Institutions [SA, NSW]						
Inter-Governmental Agreement	• SCO draft IGA	• Finalise IGA and legislative framework • MCE approve IGA • CoAG sign IGA				
National Legislation	• MCE agree legislative framework • SCO develop drafting instructions	• MCE approve establishment and supporting bills • Establishment bills introduced in Cw and SA Parliaments	• Establishment legislation enacted (Cw and SA) • Supporting legislation introduced and passed (other jurisdictions)			
Establish AEMC, AER *- establishment* *- industry levy*	• MCE agree location of AER and AEMC • SCO develop levy discussion paper	• MCE select Commissioners • MCE agree interim funding	• AER and AEMC commence operation • SCO drafts levy policy	• MCE agree levy policy	• Levy policy implemented • Transfer gas transmission (Note↗)	Note: except WA for AER (with scope for transfer at a later date).
MOU between ACCC-AEMC-AER *- MoU* *- code change process*	• SCO develop MOU framework • SCO draft code-change process	• Code change process finalised • MoU drafted • MCE endorses	• MOU signed and implemented			
Transition: *- NECA* *- NEMMF* *- NGPAC*	• SCO and NECA develop plan • NEMMF work reviewed	• NEMMF work continues under MCE/SCO	• NEMMF dissolved	• NECA ceases operation	• NGPAC dissolved (subject to project 5)	
2. Economic Regulation [Vic]						
Energy Access		• SCO develop draft access issues paper	• MCE endorse policy framework • SCO develop draft national approach to access, including PC gas review outcome		• MCE agree national access structure	
Distribution and Retail	• SCO compile regulations stock take	• SCO develop draft distribution and retail issues paper	• MCE endorse policy framework • SCO develop detailed national regulatory structure		• MCE agree national structure	• Responsibility transferred to AER

Denotes stakeholder consultation

MCE denotes MCE decision point

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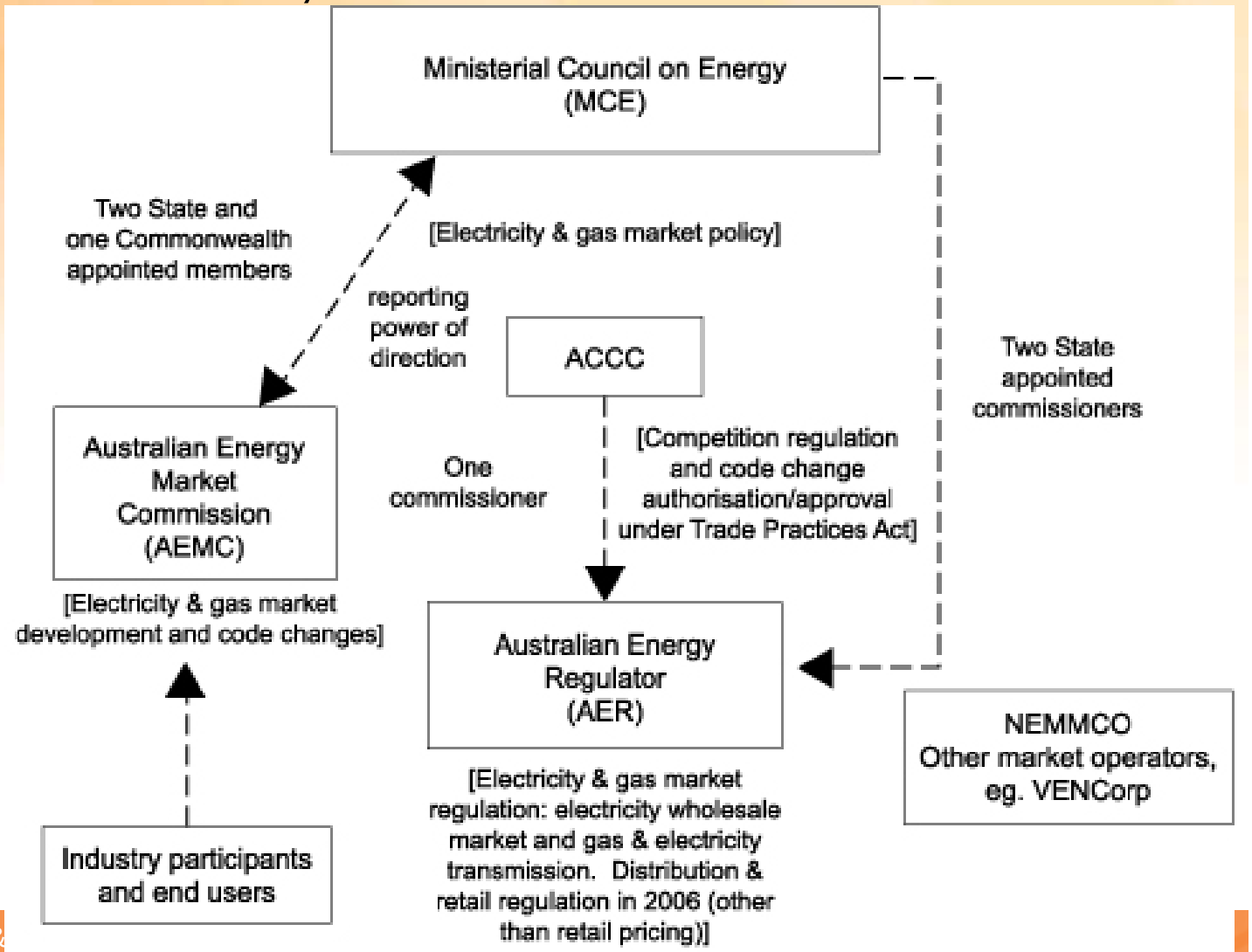
Energy Market Reform Program Summary (30/4/04) (www.mce.gov.au)

Projects	Q1/04	Q2/04	Q3/04	Q4/04	2005	2006
3. Electricity Transmission [Qld]						
Planning *- Annual National Transmission Statement (ANTS)* *- policy direction*	• NEMMCO develop ANTS specification	• ANTS design finalised • SCO develop draft planning policy framework	• First ANTS produced • MCE agree policy on last resort power of direction			
Transmission Regulatory Reform *- regional boundaries* *- regulatory test* *- TNSP incentives* *- transmission pricing*	• SCO commission study on regional boundary policy • ACCC release draft regulatory test decision	• SCO develop draft regional boundary policy proposal • SCO and ACCC develop draft code change package	• MCE agree boundary policy • MCE endorse reg test framework • Implement new reg test and incentives	• AEMC develop new transmission pricing policy		
4. User Participation [Tas]						
○ *Demand side response* ○ *Interval metering* ○ *Retail pricing*	• SCO develop discussion paper	• SCO develop draft policy proposal	• MCE approve user participation policy			
5. Gas Market Development [NT]						
Productivity Comm. Gas Access Review	• PC consult on draft report	• PC issue final report	• SCO draft response to report	• MCE response to PC review		
Market Development	• MCE agree scope of market project	• SCO develop gas market issues paper	• MCE agree gas market principles • SCO develop draft gas market plan	• SCO finalise gas market plan • MCE agree gas market plan		
MCMPR Upstream Issues	• MCMPR review unproduced areas and third party access		• MCE respond to MCMPR review			
6. Program Coordination [Cw]						
Market Consultation	• Market consultation (as above)	• Consultation continues, as appropriate (bulletins, papers, workshops, meetings) • MCE website upgraded				

Denotes stakeholder consultation

MCE denotes MCE decision point

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



Electricity transmission: Principles adopted in MCE report to COAG

- The transmission system provides transportation from generators to loads, facilitates competition and ensures secure & reliable supply
- Central & ongoing role for regulated transmission with some scope for competitive (market) transmission
- Transmission investment decisions should be timely, transparent, predictable & nationally consistent, at the lowest sustainable cost
- Regulatory framework should maximise the economic value of transmission, including through the efficient removal of regional price differences in the operation of the NEM.

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Electricity transmission: ANTS

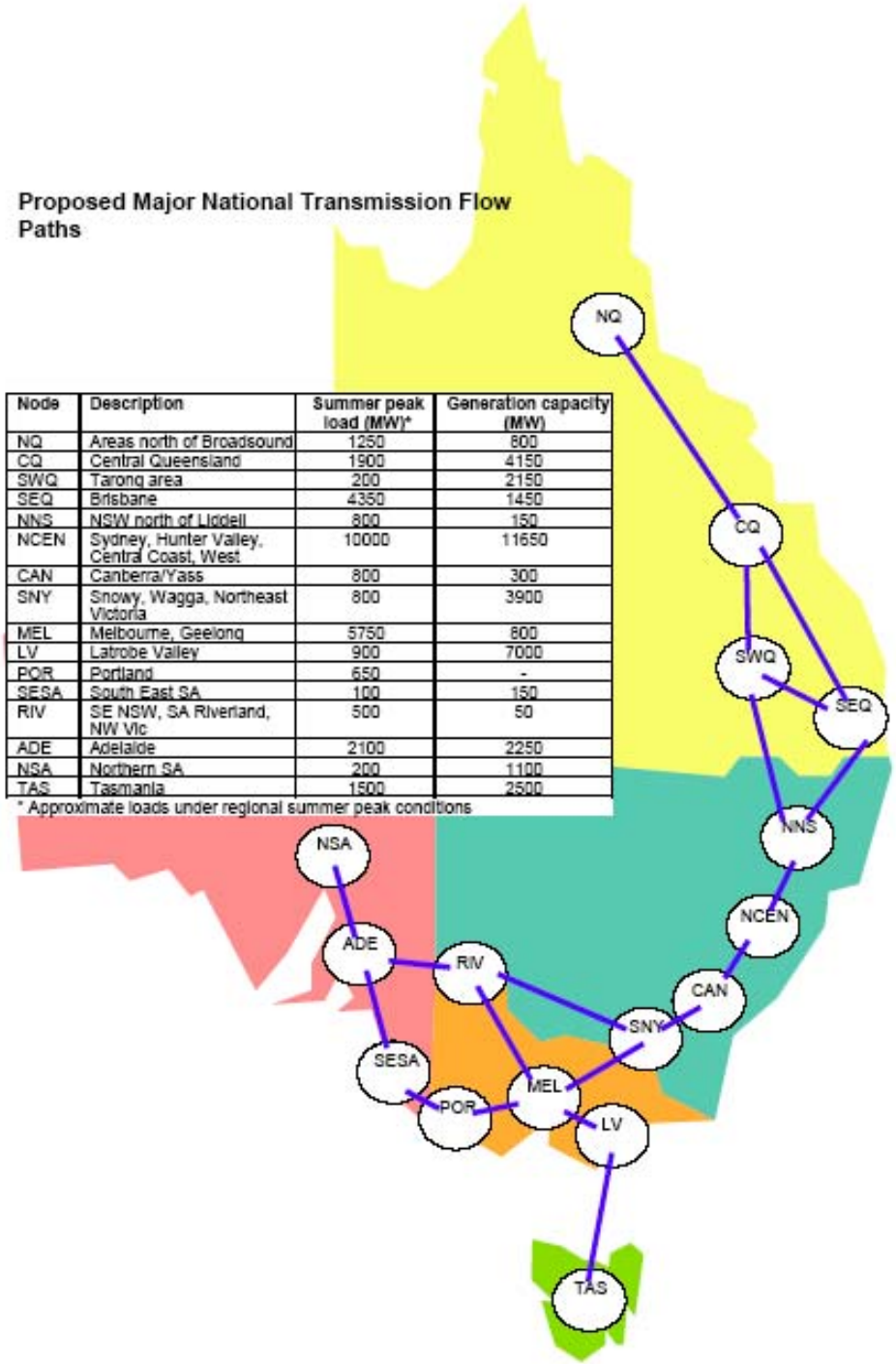
- An integrated overview:
  - Future constraints on major transmission paths
  - Information on augmentation options
  - Incorporated into SOO & complimentary to projection of supply-demand balance

(www.mce.gov.au)

Proposed Major National Transmission Flow Paths

Node	Description	Summer peak load (MW)*	Generation capacity (MW)
NQ	Areas north of Broadsound	1250	800
CQ	Central Queensland	1900	4150
SWQ	Tarong area	200	2150
SEQ	Brisbane	4350	1450
NNS	NSW north of Liddell	800	150
NCEN	Sydney, Hunter Valley, Central Coast, West	10000	11650
CAN	Canberra/Yass	800	300
SNY	Snowy, Wagga, Northeast Victoria	800	3900
MEL	Melbourne, Geelong	5750	800
LV	Latrobe Valley	900	7000
POR	Portland	650	-
SESA	South East SA	100	150
RIV	SE NSW, SA Riverland, NW Vic	500	50
ADE	Adelaide	2100	2250
NSA	Northern SA	200	1100
TAS	Tasmania	1500	2500

* Approximate loads under regional summer peak conditions



Electricity transmission - boundary review:

"A new process to be developed for assessing wholesale market regional boundaries, while maintaining jurisdictional boundaries for retail customer pricing"

- Challenges in meeting this objective:
  - Must manage power system security as well as provide commercial signals with risk management instruments
  - Security constraints easier to apply between rather than within market regions
  - Location risk is commercialised across boundaries between regions
  - Different wholesale & retail market boundaries could make it difficult to manage risk commercially

Electricity transmission - regulatory test

- The aim of the regulatory test is to identify:
  - The least-cost augmentation if required for reliability reasons
  - The augmentation that maximises (>0) the present value of the market benefit in a majority of reasonable scenarios, when compared to a number of alternative projects
- Distributed resource options are to be considered as well as network augmentations
- *Practical application of the regulatory test has sometimes been contentious*

User participation: demand side response

- NEM options considered:
  - Pay-as-bid (by COAG energy market review)
  - Aggregation facility (based on EUAA trial)
- Aggregation facility preferred & further work to be commissioned on this option
- Also to be addressed:
  - End-use capacity building
- *Improved retail market design not included in this scope of work*

User participation: 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 the provision of ancillary services
  - The transition towards nodal pricing

Conclusions

- The electricity industry is complex & infused with risk:
  - Governance & regulation are also complex
- The central issues are:
  - Identification & specification of risks
  - Efficient allocation of the management of risks
  - Appropriate use of market mechanisms
  - Appropriate use of regulatory mechanisms
  - Careful management of boundary issues