A review of experience with electricity industry restructuring in NSW

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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*

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<th>Key challenges</th>
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<td><em>From</em> monopoly <em>To</em> competing firms <em>Plus</em> system operator(s)</td>
<td>Cultural change; Adequate competition; <em>Accountability</em></td>
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<td>Commercial Decision-making framework</td>
<td><em>From</em> cost recovery <em>To</em> market prices</td>
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<td>Regulatory Decision-making (economic)</td>
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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
An electricity trading framework

- Primary energy markets
  - Wholesale Market region
    - Transmission network
  - Retail Market 1
    - Distribution network
  - Retail Market 2
    - Distribution network
  - Retail Market 3
    - Distribution network

- Interchange to other wholesale market regions
- Risks to end-use energy service delivery

- Large generators
- Large consumer

- Most consumers
- 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)

- Financial instrument (derivative) trading & spot market projections

- Uncertainty increases looking forward

- Commercial issues (decentralised)

- Physical issues (centralised)

- Spot market for period t

- Spot market for period t+1

- Spot period t

- Spot period t+1

- Ancillary service “actuation markets” for period t

- Ancillary service “actuation markets” for period t+1

- Forward-looking ancillary service (AS) “acquisition markets” & reliability assessment
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

**Generation Sector:**
- Large generators
  - Gen 1
  - Gen 2
  - Gen 3
  - Gen X

**Financial instrument & REC (emission) trading**

**Multi-region National Electricity Market (NEM):**

**Transmission Sector:**
- NSW
- Victoria
- South Aust.
- Queensland
- Possibly Tasmania

**Distribution sector:**
- Retailer 1
- Retailer 2
- Retailer Z

**Retail Markets:**
- Franchise End-users
- Contestable end-users
- Embedded generators

**Retail sector:**
- Retailer 1
- Retailer 2
- Retailer Z

**End-use sector:**
- End-use Equipment & Distributed resources

**Electricity distribution:**
- Network access

**End-use equipment & distributed resources:**
- Electric equipment
- Distributed resources
Governance & institutions: - as seen by Allens Arthur Robinson, December 2003

- Ministerial Council on Energy (MCE)
  - Two State and one Commonwealth appointed members
  - [Electricity & gas market policy]
  - Reporting power of direction

- ACCC
  - One commissioner
  - [Competition regulation and code change authorisation/approval under Trade Practices Act]

- Australian Energy Market Commission (AEMC)
  - [Electricity & gas market development and code changes]
  - Industry participants and end users

- Australian Energy Regulator (AER)
  - [Electricity & gas market regulation: electricity wholesale market and gas & electricity transmission. Distribution & retail regulation in 2006 (other than retail pricing)]

- NEMMCO
  - Other market operators, eg. VENCorp
Weekly avg. NEM spot prices since market inception (NECA, 05Q1 Stats, 2005)
Distribution of NEM spot prices & revenues
The specific context in NSW

- Trends in supply-demand balance
- Distribution and retail market issues
- Climate change issues
NEMMCO Statement of Opportunities, 2004

Figure 4 New South Wales Summer Outlook

LRC Point where extra capacity for reliability is 157 MW

- 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

MT PASA results as at 29 June 2004 show an LRC in 2004/05 where extra capacity for reliability is 356 MW

- 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)

With present trends, in 10 years, 18% of gen capacity may only be used 1% of time (NSW Energy Directions, Dec 04)

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 network performance report, 2001/2002
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
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).
- 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](http://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](http://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
Many of our publications are available at:
www.ceem.unsw.edu.au