

**CEDA SYDNEY**  
**Friday 26 October 2007**

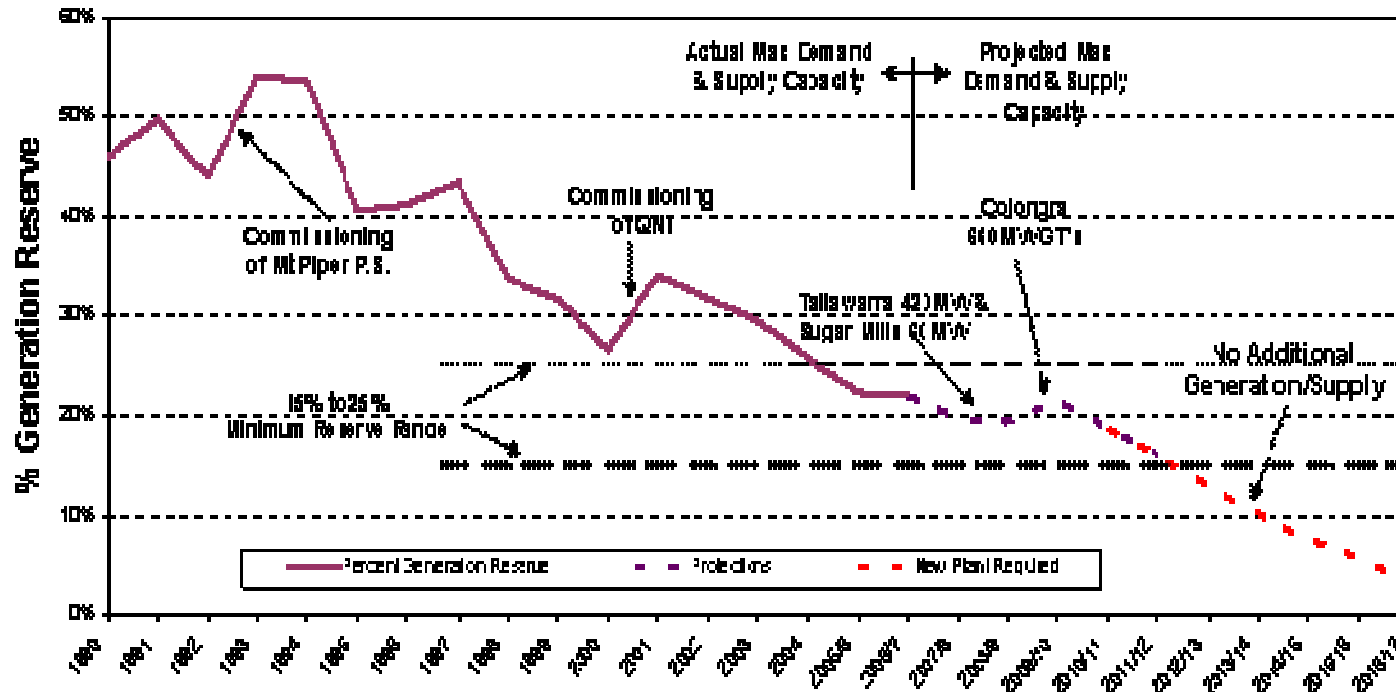
Shangri-La Hotel, The Rocks  
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# ***INQUIRY INTO ELECTRICITY SUPPLY IN NSW***

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# Why hold an Inquiry?

NSW Long Term Generation Reserve - 2007 Summer Forecast



Source Data: TransGrid and ESAA

NSW generation reserve margin:

- for 40 years above, but now approaching, 15% - the lower end of international practice (AEMC Reliability Panel, March 2007)

# The Inquiry's Terms of Reference

1. Review the need and timing for new baseload generation that maintains both security of supply and competitively priced electricity.
2. Examine the baseload options available to efficiently meet any emerging generation needs.
3. Review the timing and feasibility of technologies and/or measures available both nationally and internationally that reduce greenhouse gas emissions.
4. Determine the conditions needed to ensure investment in any emerging generation, consistent with maintaining the State's AAA credit rating.

# Inquiry Approach

Inquiry announced - 9 May 2007

Invitations for written submissions – 74 received

Stakeholder meetings – 50 held

Review/analysis of:

- extensive modelling,
- existing forecasts of electricity supply/demand
- publicly available research papers

Commissioned research by expert industry and academic advisers to supplement existing work

Inquiry report released - 11 September 2007

Tony Owen to RWC – 12 September 2007

## Key Finding: NSW needs to *prepare* for baseload supply by 2013-14

There will always be uncertainty but -

- Consequences of investing late are profound
- Development paths are easier to slow down than speed up
- Most submissions broadly agreed on need and timing for new investment

# How did Inquiry reach this conclusion?

Compared:

- forecast NSW demand for electricity, with
- NSW electricity supply capabilities plus
- interconnector imports

**Risk averse position: NSW cannot afford to be late with supply**

# Market participants acknowledged the uncertainty around timing

TRUenergy noted in their submission:

*we believe base load investment could be required from as early as 2012, however there is significant uncertainty in the forecast, and credible cases can be made out to 2015/16*



# New baseload: long lead times

Construction contract:

- can take 6 yrs to reach signing stage
- can reduce this by parallel design/approval paths

Build: can take up to 4 yrs (coal-fired) or 2 yrs (gas)

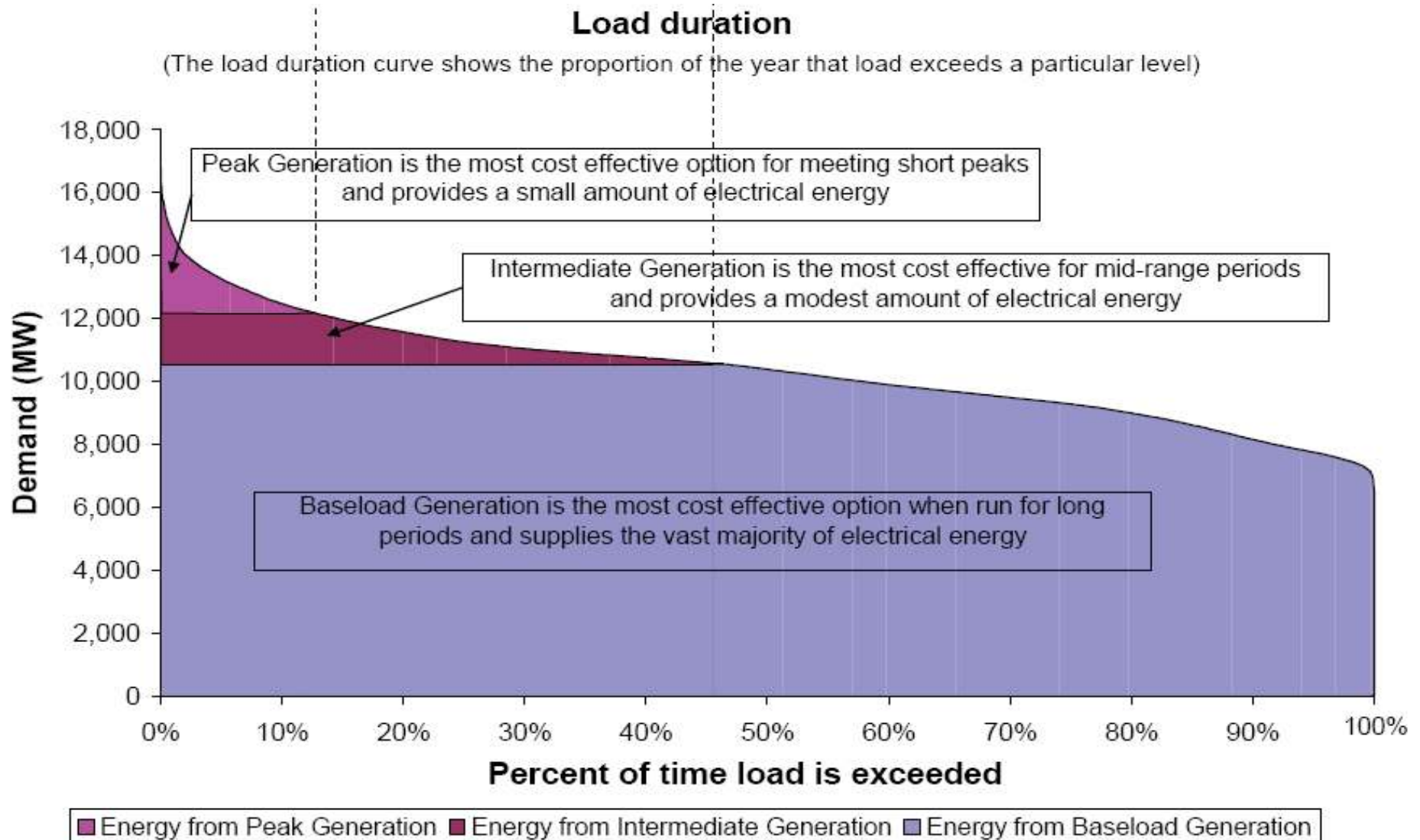
Good news - as some existing sites at advanced planning stages, commissioning can be achieved

- in 6 years if coal-fired, sooner for gas

# How much electricity does NSW need?

- around 91,000 GWh in 2013-14
  - around 10,500 GWh above current annual consumption
  - equivalent to Mt. Piper annual output

# The need for energy drives the need for base-load generation



# Can renewables meet the need?

Renewables, Embedded Generation:

- currently supply 2,000 GWh pa

New renewable/embedded generation

- forecast to contribute ~2,000 additional GWh pa (2016-17)

This will reduce, *but not eliminate*, the need for new scheduled generation

# Can energy efficiency meet the need?

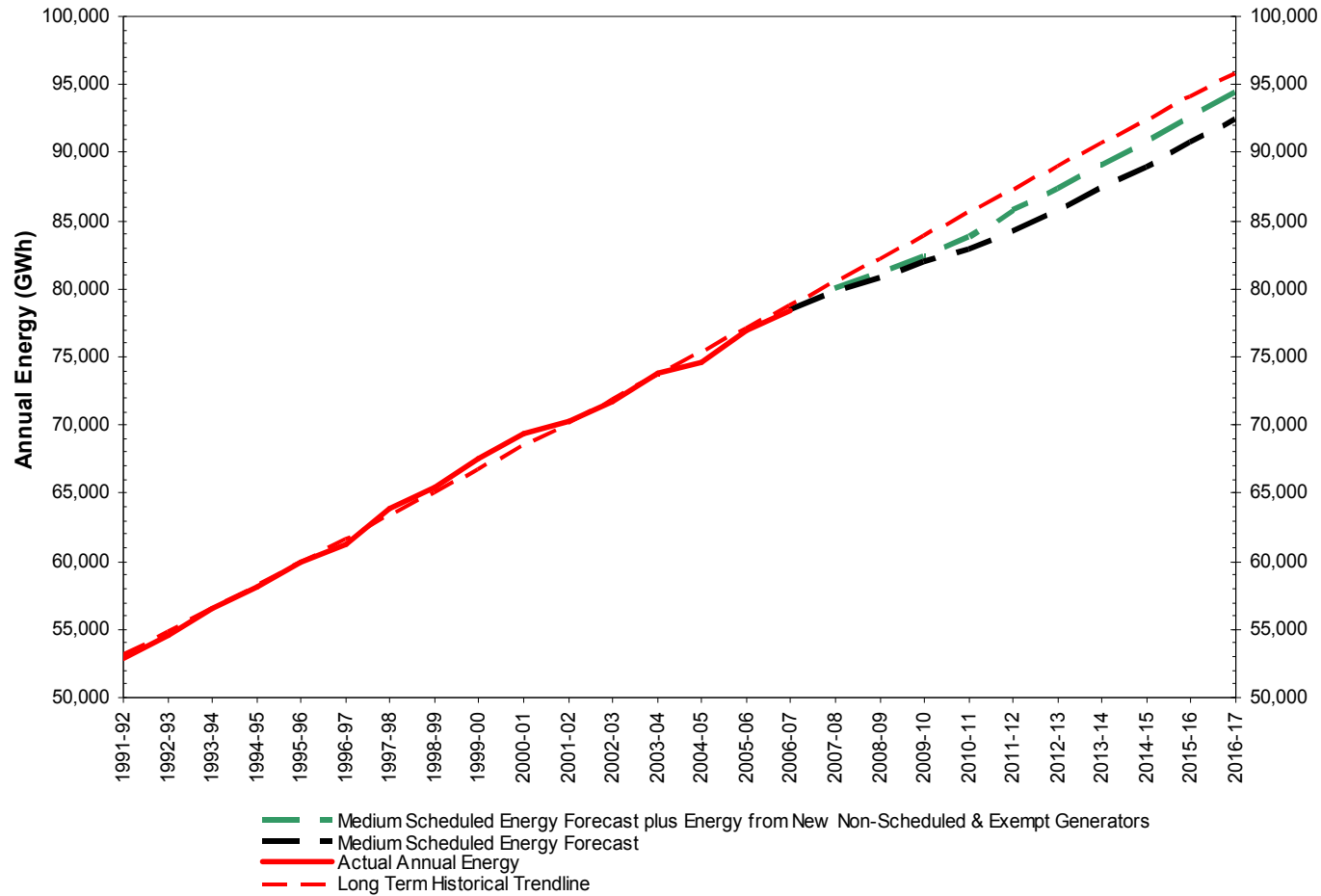
NSW electricity consumption:

- grown by ~1,700 GWh p.a. for past 30 years (around 2.5% p.a.)
- growth is forecast to slow to ~1,600 GWh p.a. (around 1.8% p.a.)

Slower growth due, in part, to greater energy efficiency

Enhanced energy efficiency reduces *but does not eliminate* the need for new supply

# Energy Efficiency and Renewables reduce the baseload needed



# What are the viable options?

The Inquiry has considered all possible baseload technology options.

The Inquiry has concluded that coal or gas-fired generation are the only viable technologies at this time to meet NSW's generation needs

# Gas-fired generation

## Is realistic for NSW

- adequate gas supply for new plant built up to 2020
- pipeline project planning well advanced (Wood Mackenzie)

## Combined Cycle Gas Turbines a realistic option

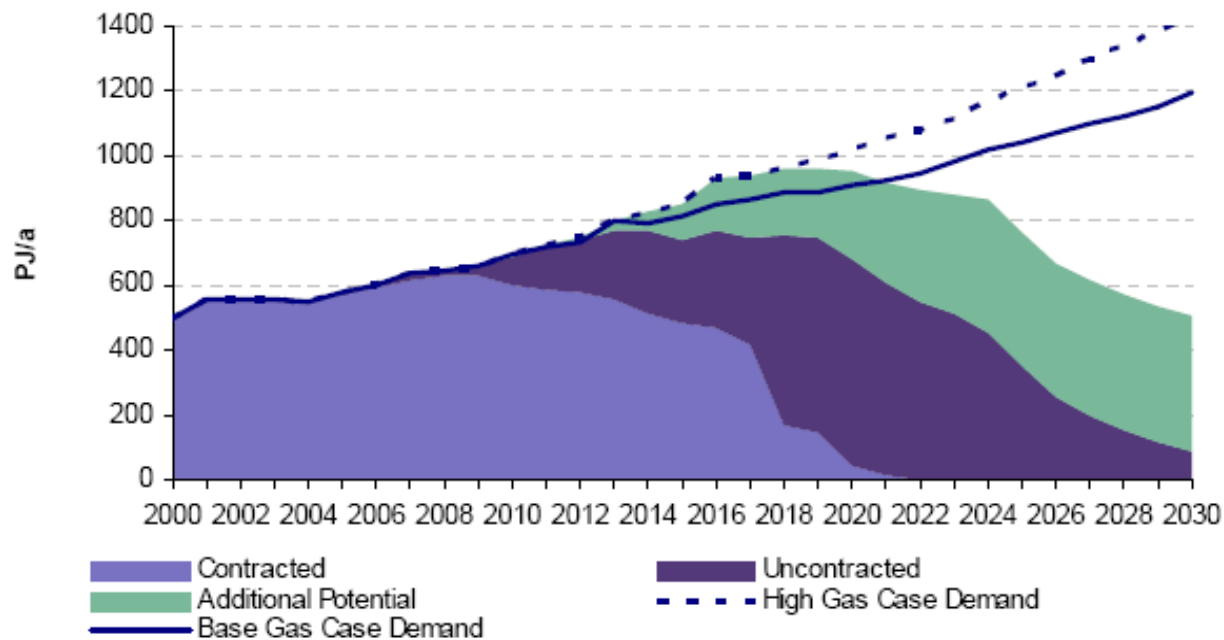
- cheaper to build than coal-fired plant
- can run efficiently at high capacity factors, lower emissions
- but higher operating costs: fuel costs >3 X higher than coal



# Is gas-fired generation an option for NSW?

- Adequate gas supply for new plant built up to 2020
- Planning for pipeline projects well advanced

Eastern Australia High Gas Case Supply/Demand 2000-2030



# Coal-fired technologies

1. Ultra-supercritical coal-fired plant:
  - runs at higher temperature, steam pressure than existing sub-critical power stations
  - uses less coal for same output, has lower CO<sub>2</sub> emissions
2. Integrated Gasification Combined Cycle plant:
  - converts coal to CO and hydrogen, fed into gas turbine and burnt
3. Ultra Clean Coal plant
  - chemically refined coal used as fuel in gas turbine combined cycle plant

# Which coal-fired technology is best?

## IGCC and Ultra Clean Coal

- not yet commercially viable

USC is more efficient, cleaner than existing plant

- Thermal efficiency:
  - Sub-critical 38%, USC 42%
- Greenhouse emissions intensity (tonnes CO<sub>2</sub>-e/MWh):
  - USC                      0.78 - 0.82
  - Sub-critical            0.9 - 0.94

# Greenhouse gas emissions

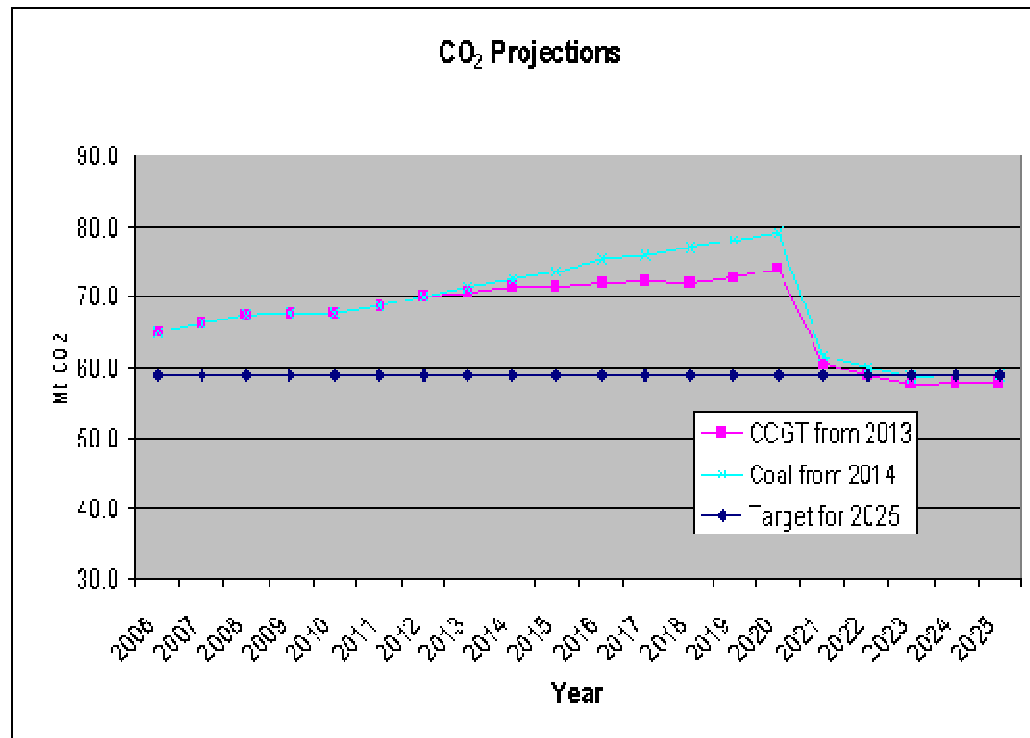
Total NSW emissions will rise whether new generation is gas- or USC coal-fired

- CCS needed to reverse this trend

However:

1. both gas- and coal-fired generation can meet NSW electricity needs and 2025 target
  - provided CCS retrofitted to new coal-fired generators and some current plant
2. New coal-fired generators can be built carbon capture 'ready' if design allows retro-fitting of post combustion capture

# Carbon Capture and Storage could achieve emissions targets



Total NSW emissions will continue to rise whether new generation is USC coal or gas-fired. CCS could reverse this emissions trend.

# Carbon Capture and Storage

## Uncertainty:

1. potential for CCS is in future, not now
  - CCS unlikely to be available before 2020  
experts and stakeholders agree
2. power station with CCS requires up to 30% of electricity generated to be used in station and C capture process plant
  - compared to 5% for station without CCS

# Investors need certainty on emissions trading

Policy uncertainty is delaying investment

- submissions unanimous

Commonwealth should:

- accelerate timetable for national emissions trading scheme
- resolve, announce national emissions reduction target, short term caps, penalties, basis for allocating permits

# Retaining ownership could cost Government up to \$15 billion

NSW may need to invest up to \$15 billion to ensure:

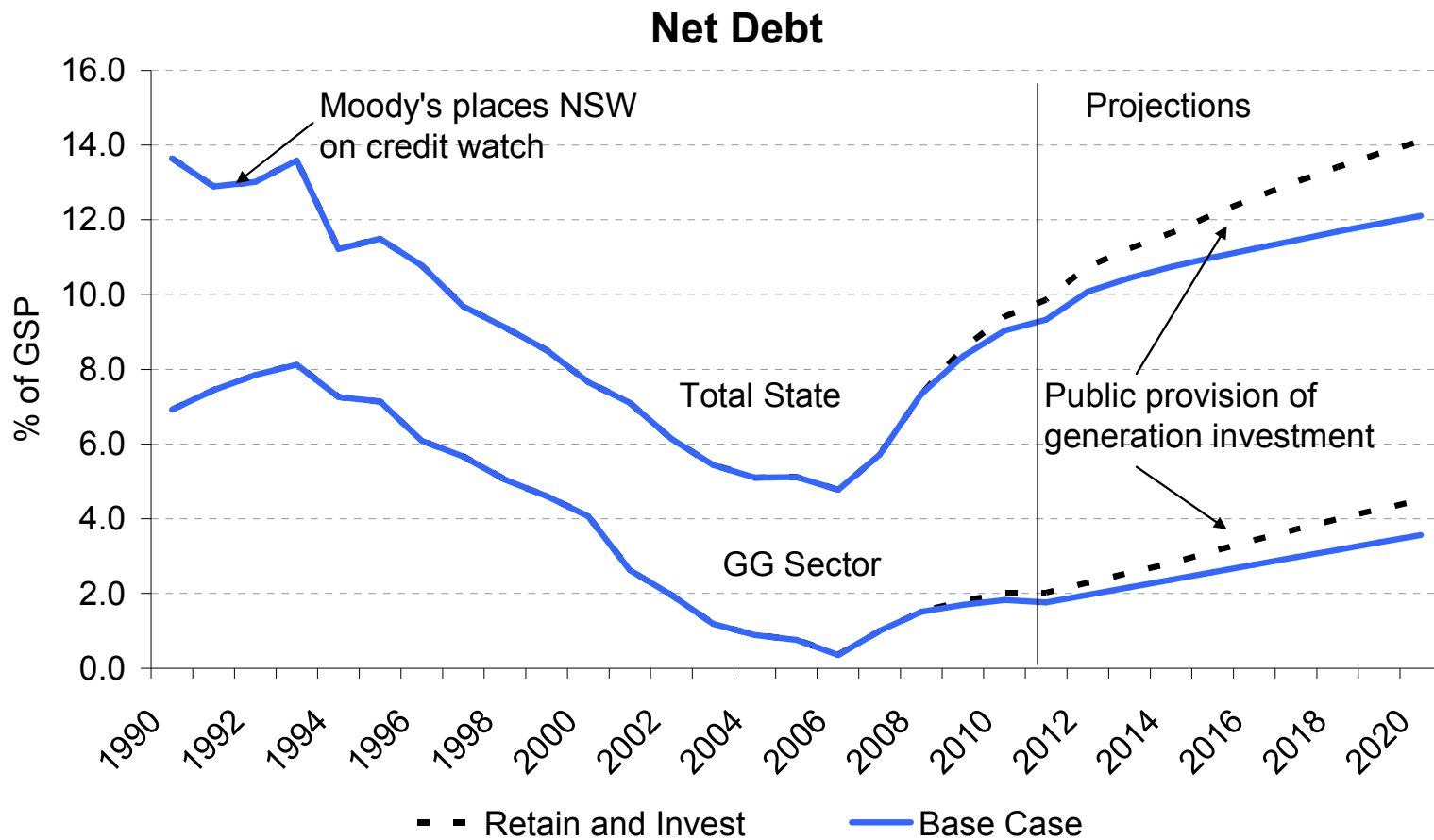
- security of supply,
- compliance with regulatory requirements and
- commercial competitiveness

This will have an opportunity cost for other State priorities

Divesting the State of generation and electricity retail provides flexibility to fund other priority projects



# NSW Net Debt: General Government and Total State Sectors



# Generation Investment Models

## **Retail-led Investment**

Retailer builds generation to hedge exposure to volatility in wholesale market (but needs a sizeable retail load to do so)

## **Generator-led Investment**

Generator builds new units to meet rising demand, preserve market share, optimise their portfolio, avoid stranding by competitors and smooth wholesale price outcomes

# Policy conditions for private investment

- Certainty of Government ownership and investment intentions
- Adequate level of certainty over greenhouse gas policy.

# Inquiry Recommendations

1. Divest the State of the retail arms of EnergyAustralia, Integral Energy and Country Energy.
2. Divest the State of the generation businesses of Macquarie Generation, Delta Electricity and Eraring Energy.
3. In the event that the Government does not wish to sell generation, then it should implement an appropriately structured long-term leasing of current generation assets. The State would retain ownership of the assets, with operational and commercial control by the private sector.

# Inquiry Recommendations (cont)

4. Actively monitor the progress of reforms to NSW planning, development approval and environmental licensing process to ensure that proposals for new generation capacity, and associated fuel supplies, are considered expeditiously, and in a cost-effective and predictable manner, without compromising the quality of environmental assessment.
5. Support the planned review of the effectiveness of retail competition by the Australian Energy Market Commission in 2010, and consider the removal of regulated retail price caps at that time, should the review find effective competition in the NSW retail market.

# Inquiry Recommendations (cont)

6. Encourage the Commonwealth Government to bring forward the timetable for establishing a national emissions trading scheme. At a minimum the Commonwealth should resolve and announce:
  - the national greenhouse gas reduction target and short term caps and associated penalties
  - the basis for allocating emissions permits.
7. Develop and implement clear and timely transitional rules for existing State-based greenhouse gas and emission schemes to the national emissions trading scheme (in the event of its introduction).
8. Encourage and support energy efficiency initiatives where possible.