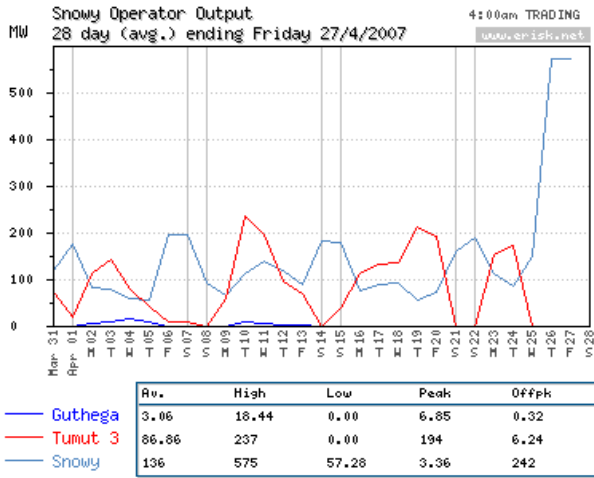


Snowy triples pumping



More price shocks: contracts force majeure call by Snowy possible, if Tumut, Murray water runs dry, May-July

1

Average pool price had doubled in the past 30 days across the NEM. Extraordinary price events may occur if – as seems likely – Snowy may call a *force majeure* on its electricity contracts.

Murray Darling water force majeure: A four-region Murray River emergency was triggered, last week by rules under emergency measures of the Murray Darling Basin Commission. The

MDBC last week called “force majeure” on irrigation and city contracts. The big question was if and when Snowy might do the same for electricity contracts.

Snowy Hydro’s core storages near zero:

- The main storage – Eucumbene – had neared its zero level of a water height of 1116.38 m above sea level, thus disabling even the pumped storage at Tumut 3, which fuels the big Tumut 1 and 2 units.
- the Snowy reported the lowest inflows in over 100 years, with the Murray, Murrumbidgee, Snowy, Tooma and Tumut rivers near empty at an over all storage of 14 per cent.
- the second pumped storage – Jindabyne was also almost below the intake level, thus disabling Murray units.

Pool prices double: Pool prices had spiked across NEM, with NSW and Qld running at averages past \$72/MWh for the past 30 days of continuous spikes.

Snowy crisis nears: Ratings agency, Moodys put Snowy on negative watch. New data showed Snowy storages were near zero.

Moodys fears contract breaches: In a credit opinion of 17 April, Clement Chong

contents

- 3 Tumut fuel: Eucumbene
- 4 Snowy 2006
- 4 Snowy 2007: new import-dependence
- 5 Snowy pumping 2007 (90 days to date)
- 5 Snowy pumping 2006
- 5 Wholesale spot trend to 2006
- 6 Retail price by capital city
- 7 Snowy warns of risks
- 7 Gold-plated grid: productivity of NSW transmission grid, falls
- 8 Ratings agency Moody’s sets Snowy on negative watch as margins fall more than 10pc
- 8 River Murray crisis: 5.7pc emergency actions triggered
- 8 NSW grid overbuilt
- 9 How to work out how make money
- 10 WA govt gets top marks for its ‘clear signal’ strategy: but NSW and Qld get ERIG stick

Find out more at the subscriber section of www.erisk.net

Published by EWN Publishing, PO Box 148, Balmain, NSW 2041. Ph: +612 9818 8877. Fax: +612 9818 8473. Editor: Laurel Fox-Allen.

Top price for NEM week 436: Oakey at \$201.23

ewn publishing

TAS			
Generator	Income (\$)	Output (MWh)	Av Price (/MWh)
Liap/Way/Cat	\$902,777	11,485	\$78.61
Bell Bay Power	\$1,134,352	15,069	\$75.28
John Butters	\$1,038,721	12,661	\$82.04
Tungatinah	\$559,271	6,896	\$81.10
Poatina	\$2,034,885	24,241	\$83.94
Tarraleah	\$643,188	8,443	\$76.18
Reece	\$892,850	10,381	\$86.01
Cethana	\$80,004	783	\$102.13
Tribute	\$227,659	2,575	\$88.40
Lemonthyme/Wilmot	\$113,152	1,308	\$86.50
Trevallyn	\$304,522	3,741	\$81.40
Mackintosh	\$384,722	4,499	\$85.52
Bastyan	\$403,903	4,658	\$86.71
Woolnorth Wind	-	-	-
Gordon	\$4,217,039	54,614	\$77.22
Vic->Tas	\$1,687,826	26,325	\$64.12
Devils Gate	-	-	-
Fisher	\$18,470	177	\$104.25
Meadowbank	132019.2531	1728.755	\$76.37
Lake Echo	309621.1439	4065.37	\$76.16
Repulse	-	-	-
Paloona	-	-	-
Cluny	-	-	-

wrote the ratings agency would “monitor Snowy Hydro's continued ability to manage its hedge portfolio in light of any constraints on its operating flexibility”.

2

Warns government not to take dividends: At the same time, any dividend payments over this time frame – whilst water levels remain low – would also be negative for the rating. The Moodys opinion was:

- Aaa rating on Snowy Hydro's credit-wrapped medium term notes could be

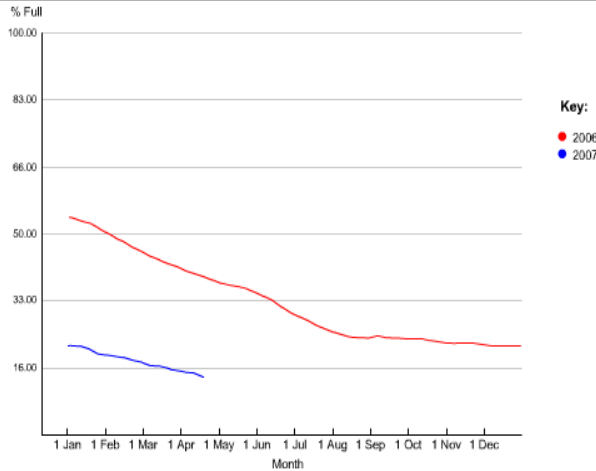
SA			
Generator	Income (\$)	Output (MWh)	Av Price (/MWh)
North'n Power	\$6,858,939	88,561	\$77.45
Ladbroke	\$233,715	2,459	\$95.03
Osborne	\$2,295,537	29,333	\$78.26
Pelican Pt	-	-	-
Torrens Is. B	\$5,466,217	67,596	\$80.87
Vic->SA	\$1,432,142	19,141	\$74.82
MLink->SA	\$17,042	264	\$64.62
Torrens Is. A	\$937,906	11,355	\$82.59
Mintaro	\$453,479	5,098	\$88.95
Dry Creek	\$143,606	1,369	\$104.87
Playford	\$1,349,245	17,506	\$77.07
Snuggery	-	-	-
Pt Lincoln	-	-	-
Quarantine	\$53,192	626	\$84.96
Angaston Power	\$2,125	19	\$110.39
Hallett Power	\$817,569	9,630	-
Lonsdale	-	-	-
Terminal Storage	-	-	-
Lake Bonney Wind	-	-	-

VIC			
Generator	Income (\$)	Output (MWh)	Av Price (/MWh)
Loy Yang A	\$20,009,924	268,637	\$74.49
Loy Yang B	\$13,082,410	176,351	\$74.18
Hazelwood	\$19,126,592	256,659	\$74.52
Yalloum	\$12,356,961	163,918	\$75.39
Anglesea	\$1,859,208	25,079	\$74.13
Energy Brix	\$1,505,883	20,178	\$74.63
Newport	\$6,186,476	81,954	\$75.49
MLink->Vic	\$423,824	5,175	\$81.90
SA->Vic	\$203,209	2,376	\$85.51
Snowy->Vic	\$224,964	3,073	\$73.22
Tas->Vic	\$853,599	9,069	\$94.12
Jeeralang	\$91,299	1,058	\$86.32
West Kiewa	\$14,717	162	\$90.98
Bairnsdale	\$706,386	9,615	\$73.47
Dartmouth	-	-	-
Eildon	\$148,636	1,680	\$88.47
Hume Vic	-	-	-
McKay Power	\$171,119	1,582	\$108.19
Clover	-	-	-
Valley Power	\$128,213	1,572	\$81.55
Rubicon	-	-	-
Laverton North	1763290.456	22565.575	-
Somerton Power	651558.9033	7298.205	-
Sunshine Energy	-	-	-
Longford	-	-	-

NSW			
Generator	Income (\$)	Output (MWh)	Av Price (/MWh)
Bayswater	\$23,758,622	225,176	\$105.51
Liddell	\$28,392,812	263,547	\$107.73
Mt Piper	\$12,113,338	118,622	\$102.12
Wallerawang	\$9,221,480	99,896	\$92.31
Vales Point	\$11,180,549	108,397	\$103.14
Munmorah	\$2,563,257	28,987	\$88.43
Eraring	\$33,441,940	317,469	\$105.34
Redbank	-	-	-
Smithfield	\$2,347,427	20,092	\$116.83
Snowy->NSW	\$19,395,437	140,941	\$137.61
Shoalhaven	\$938,364	8,378	\$112.00
Hunter Valley	-	-	-
Hume Hydro	-	-	-
Blowering	-	-	-
Northern Gas	-	-	-
Burrinjuck	-	-	-
Brown Mountain	-	-	-
Keepit	-	-	-
Broken Hill	-	-	-
Ergon Energy	-	-	-
DL Q->N	\$1,275,444	11,207	\$113.81
QLD->NSW	\$7,952,919	70,717	\$112.46
Pindari Hydro	-	-	-
West Nowra	-	-	-
Country En (NSW)	-	-	-

QLD			
Generator	Income (\$)	Output (MWh)	Av Price (/MWh)
Tarong	\$11,050,258	105,438	\$104.80
Millmerran	\$14,300,604	143,938	\$99.35
Swanbank	\$3,404,440	32,065	\$106.17
Stanwell	\$20,096,087	200,535	\$100.21
Callide B	\$10,575,661	106,425	\$99.37
Callide Power	\$14,360,275	142,918	\$100.48
Townsville	\$3,347,896	30,030	\$111.48
Gladstone	\$19,668,998	181,700	\$108.25
Collinsville	\$1,574,483	14,056	\$112.02
Swanbank C. D. E	\$4,691,766	41,261	\$113.71
Barcaldine	\$307,053	2,233	\$137.52
Callide A	-	-	-
Kareeya	\$1,462,419	14,739	\$99.22
Barron Gorge	\$369,532	3,165	\$116.77
Mt Stuart	\$13,958	127	\$109.79
Wivenhoe	\$1,680,230	16,801	\$100.01
Braemar Power	\$5,152,486	41,157	\$125.19
Mackay	-	-	-
Roma	\$416,642	2,610	\$159.65
Oakey	\$119,510	594	\$201.23
DL N->Q	-	-	-
NSW->QLD	\$2,626	54	\$48.80
Rocky Point	-	-	-
Tableland	-	-	-
Stapylton	-	-	-

Tumut fuel source



downgraded upon a downgrade of XL Capital Assurance's rating; and

- A3 underlying rating could be downgraded if the current drought persists over the next 6-12 months, placing further strain on its operating performance.
- Snowy Hydro's operating and financial performance against the rating drivers, was FFO/interest below 5.0-5.3 times, FFO/Debt below 23-25pc and Debt/Capitalisation above 40-45pc.

3

No water for Murray units by late May: In a release, Snowy said "By mid to late May 2007, the (pumped storage) at Lake Jindabyne water levels may drop 1.1m to Minimum Operating Level (MOL) at around RL 896.1 metres. Jindabyne is filled from the Snowy catchment, and pumped uphill to Geehi reservoir, where it fuels Murray 1.

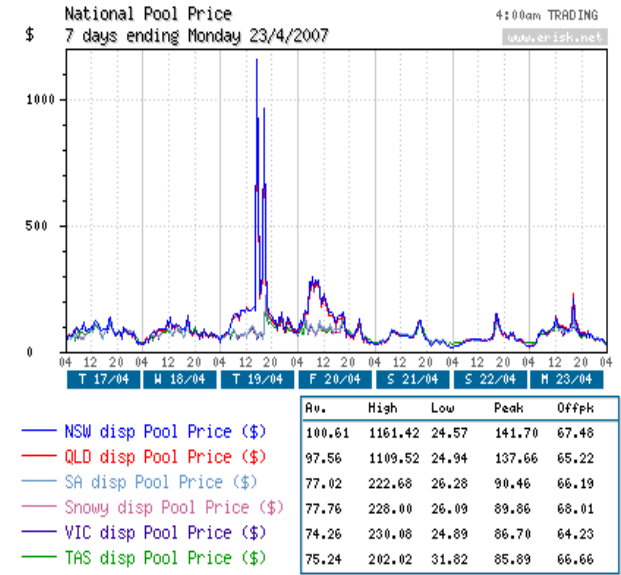
the week in detail

• **NSW:** Average price \$102.89/MWh up 68 per cent on the spike-affected \$61.32/MWh the previous week, up 392 per cent on the \$20.92/MWh of the comparable week last year; maximum price \$1161.42/MWh for the 30-minute trading interval ended 1600EST Thursday. Average demand 8324MW, up 4.1 per cent on the previous week, up 2.9 per cent on a year ago; maximum demand 9980MW in the 1830EST Thursday interval, up 2.4 per cent on the 9747MW the previous week.

• **Victoria:** Average price \$74.02/MWh up 33 per cent on the spike-affected \$55.63/MWh the previous week, up 246 per cent on the \$21.40/MWh of the comparable week last year; maximum price \$230.08/MWh for the 30-minute trading interval ended 1830EST Thursday. Average demand 5640MW, up 3.9 per cent on the previous week, up 2.1 per cent on a year ago; maximum demand 6682MW for the 1830EST Thursday interval, up 2.2 per cent on the 6539MW the previous week.

• **South Australia:** Average price \$77.04/MWh, up 29 per cent on the spike-affected \$59.60/MWh the previous week, up 203 per cent on the \$25.46/MWh the comparable week last year, maximum price \$222.68/MWh for the trading interval ended 1830EST Thursday. Average demand 1455MW, down 3.3 per cent on the previous week, up 14.0 per cent on a year ago; maximum demand 1772MW for the 1400EST Monday interval, down 18.1 per cent on the 2163MW the previous week.

• **Queensland:** Average price \$99.14/MWh, up 70 per cent on the spike-affected \$58.48/MWh the previous week, up 393 per cent on the \$20.11/MWh of the comparable week last year; maximum price \$1109.52/MWh for the trading interval ended 1600EST Thursday. Average demand 5833MW up 4.8 per cent



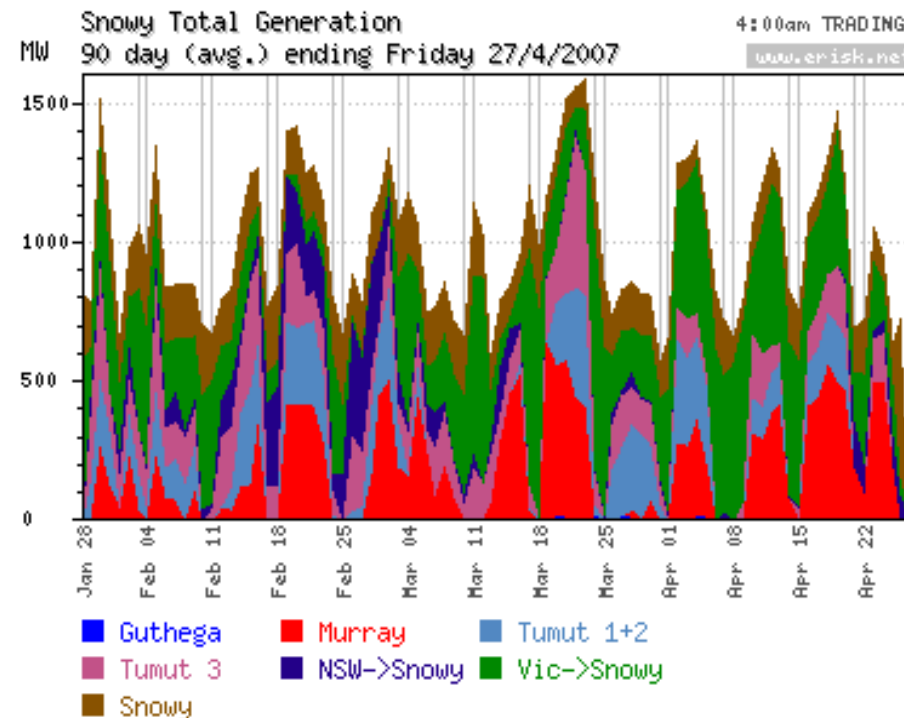
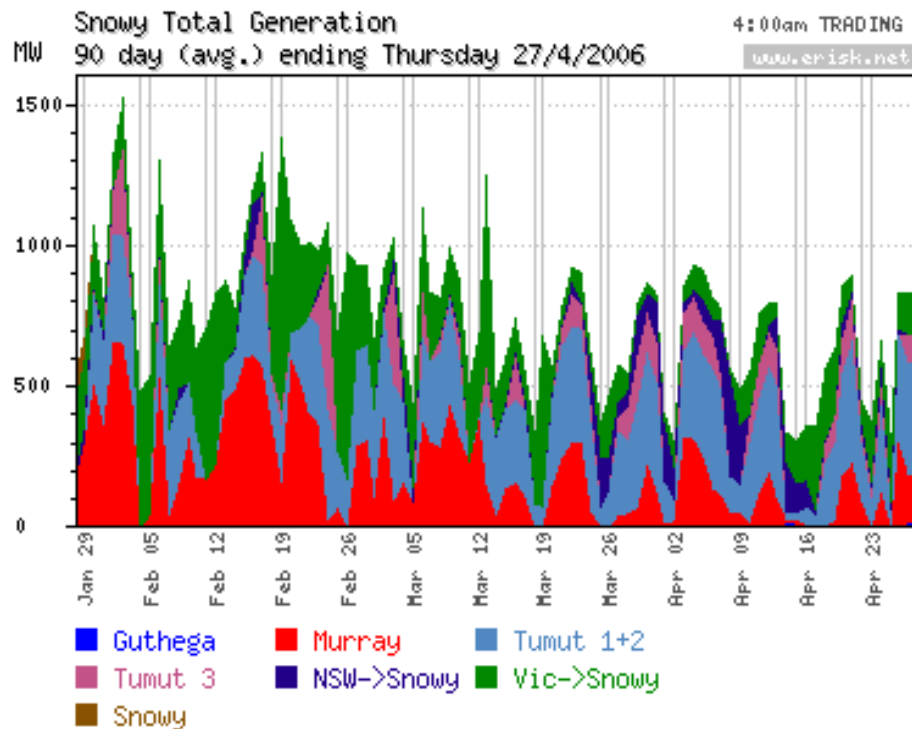
on the previous week, up 3.0 per cent on a year ago; maximum demand 6945MW for the 1430EST Thursday interval, up 1.8 per cent on the 6821MW previous week.

• **Tasmania:** Average price \$75.89/MWh, up 18 per cent on the spike-affected \$64.40/MWh the previous week, up 137 per cent on the \$32.07/MWh of the comparable week last year; maximum price \$202.02/MWh for the trading interval ended 1830EST Thursday. Average demand 1098MW, up 2.0 per cent on the previous week, up 0.8 per cent on a year ago; maximum demand 1390MW in the 1830EST Monday interval, up 5.1 per cent on the 1322MW the previous week.

Snowy 2006

Snowy 2007: new import-dependence

EWN Publishing



No water to Tumut 1 and 2 units: Snowy said in a release – “By end of April 2007, Lake Eucumbene water levels will drop 0.5m to around RL 1122.0 metres ... it is possible but not yet probable, Lake Eucumbene will drop up to a further 5.5m to around Minimum Operating Level (MOL) (zero) at RL 1116.5 metres by late July / early August 2007”. Overall levels were 14.4pc of capacity. Tumut 1 and 2 run down stream from Eucumbene, Blowering runs when irrigation is ordered from Eucumbene. Tumut 3 pumps water uphill back to Tumut 1 and 2.

Above: Snowy data shows a new dependence on electricity imports from NSW and Victoria, to recycle water back into hydro units, and less use of the hydro units at Tumut and Murray, and more pumping of the two pumping units Tumuts 3, and “Snowy” unit (also called Jindabyne unit). The Snowy Mountains Scheme has one pumping station at Jindabyne and a pumped storage facility at Tumut 3 Power Station. Jindabyne Pumping Station pumps water from Lake Jindabyne through the Jindabyne-Island Bend Tunnel to the Snowy-Geehi Tunnel at Island Bend. The pump facility at Tumut 3 Power Station returns water to Talbingo Reservoir during off-peak demands.

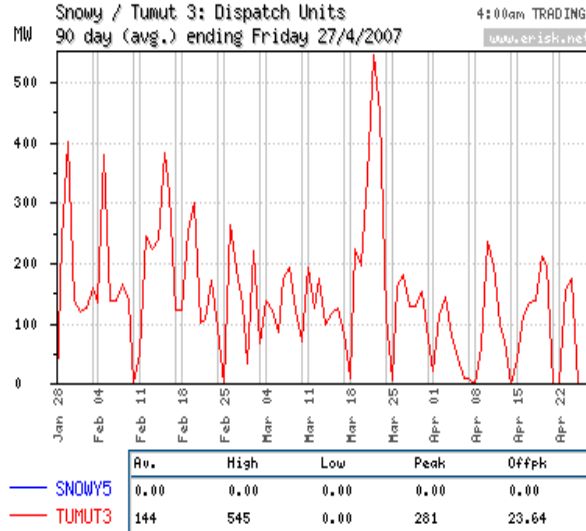
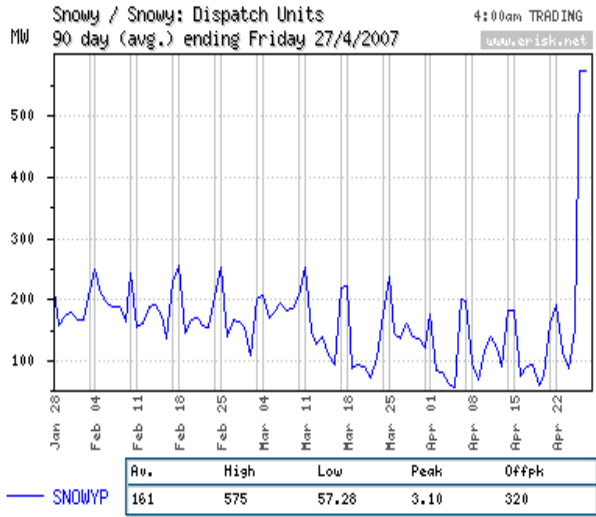
Snowy Mountains Scheme

Snowy diversions for week ending 17-Apr-2007

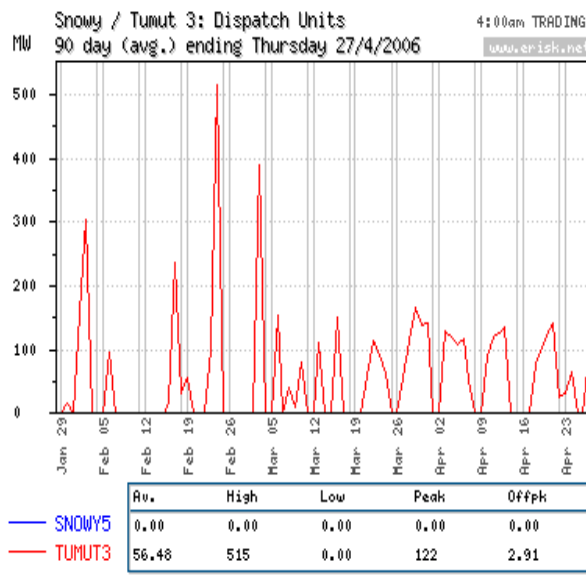
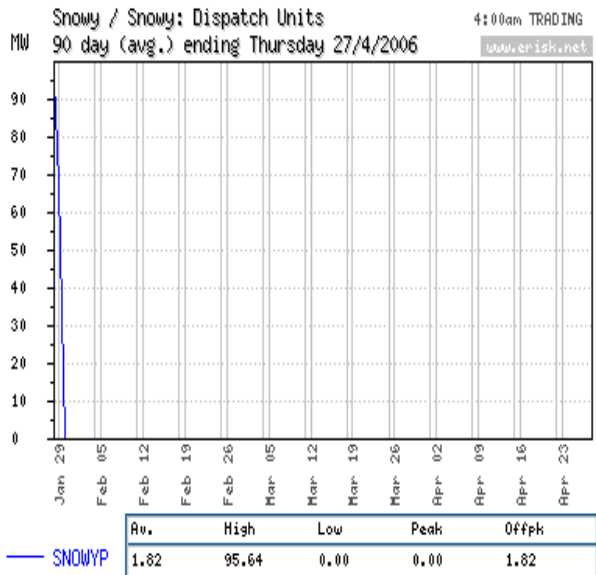
Storage	Active storage (GL)	Weekly change (GL)	Diversion (GL)	This week	From 1 May 2006
Lake Eucumbene - Total	273	-30	Snowy-Murray	+26	895
Snowy-Murray Component	203	-23	Tooma-Tumut	+0	66
Target Storage	1 340		Nett Diversion	26.2	828
			Murray 1 Release	+27	1 012

4

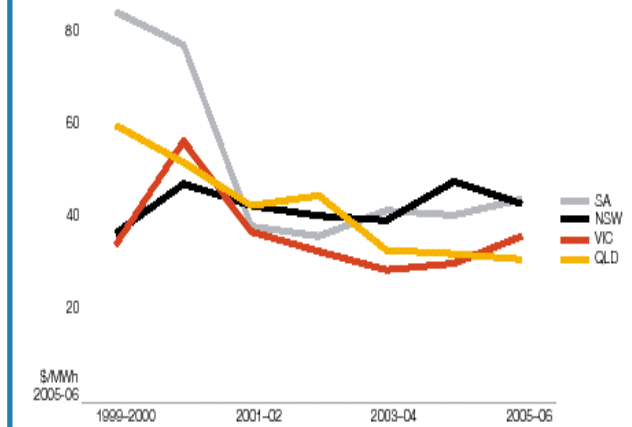
Snowy pumping 2007 (90 days to date)



Snowy pumping 2006



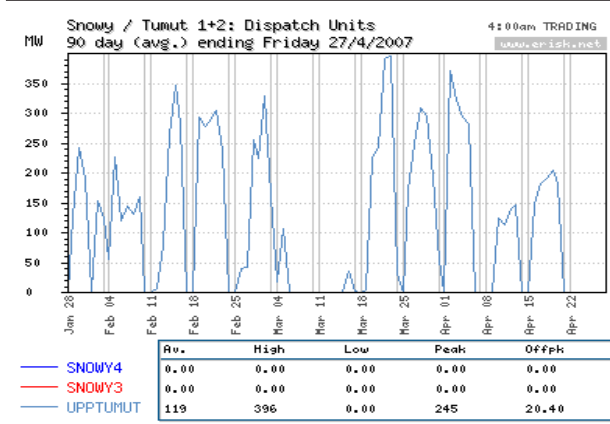
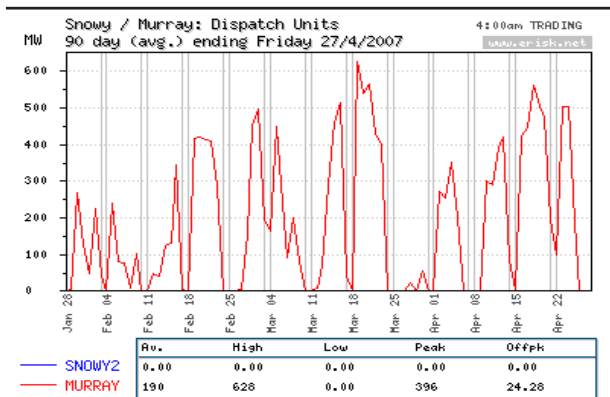
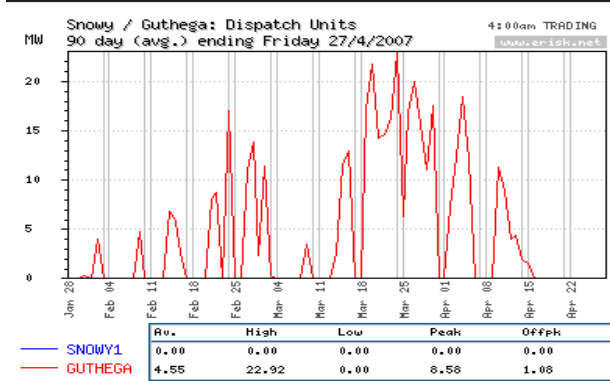
Wholesale spot trend to 2006



Down in all regions, but NSW: Real spot prices in all NEM regions except NSW trended down since 1999-2000 following investment in additional capacity— either in the form of new generating plant or through upgrades to existing plant—combined with increases in the transmission network, including interconnectors. These increases in capacity increased competition within the NEM, but also coincided with relatively cool summers. With warmer summers and record peak demands occurring over the last two years, prices have risen on average, relative to earlier this decade.

Up in NSW: In contrast, real spot prices in NSW have remained relatively stable since market start with, if anything, small upward trend over time. *A report to the Council of Australian Governments by the Energy Reform Implementation Group January 2007. Produced by the Energy Reform Implementation Group Contact: erig@industry.gov.au http://www.erig.gov.au*

Snowy contracts at risk: NEM prices and risks will rise and Snowy may have to call *force majeure* on its green, water, and hedge contracts.



The water contracts: The Snowy water contract is managed by the NSW Minister for Resources. His office was not able to conform or deny an application by Snowy (under its *Snowy Water Licence* Document No. NWEWG 22). When “prevented from or delayed in performing an obligation” by a Prescribed Event, Snowy may file for *force majeure* on its obligations. Koperberg is the new minister in charge of Snowy water contracts.

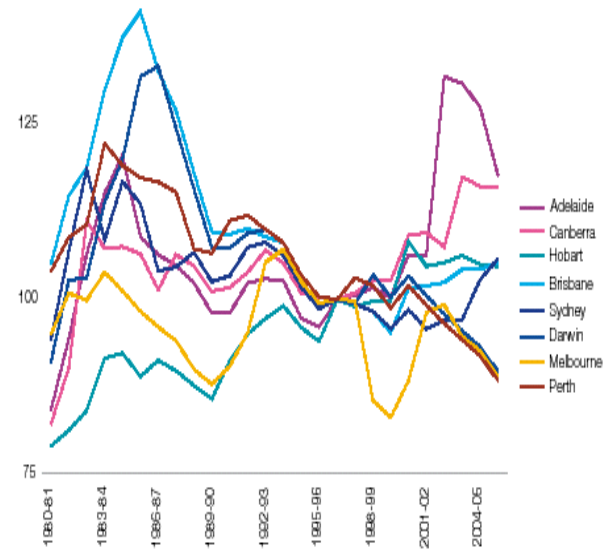
Detailed water-data hard to get: The Murray Darling Basin Commission (MDBC) said it could not supply detailed data on water levels for Eucumbene’ as “Snowy Hydro controls Eucumbene”, and its data about the Eucumbene came from Snowy. The Snowy Mountains Scheme was operated under the *Snowy Water Licence* issued by the NSW Water Ministerial Corporation. Snowy Hydro Ltd is licensed to capture, divert, store and release the water to generate hydro-electricity. These functions are controlled through the *Snowy Water Licence* which is administered by the NSW Government, and managed by Water Administration Ministerial Corporation (WAMC).

Unusual actions and conditions: This week Snowy Hydro dramatically ramped up its imports from NSW and Victoria, to provide energy for internal water recycling, as its river-run capacity sank, near zero.

More price shocks ahead? In a release, Snowy warned of risks – major storages for

Retail price by capital city

2 Retail electricity price indexes by capital city (1980-81 to 2004-05)^a



a. In real 2005-06 values, 1996-97 = 100, using CPI as the deflator. Source: ABS 2006a

Bumpy road for retail rates: According to the World Bank real retail electricity price indexes had generally fallen – particularly in Melbourne - there, real retail prices had fallen to an average rate of 1 per cent a year. In Adelaide average retail prices had jumped 24 per cent. In 2002-03, associated with the removal of historical and regulated tariffs at a time, when significant new investment in generation was required. Real prices had since fallen as retail competition, in SA had increased. (Retail prices include payments for network investments, which have been substantial in some jurisdictions in recent years, as well as the wholesale and retailing cost of energy).
A report to the Council of Australian Governments by the Energy Reform Implementation Group January 2007. Produced by the Energy Reform Implementation Group Contact: erig@industry.gov.au http://www.erig.gov.au

Murray, Tumut units – Eucumbene and Jindabyne – could dry up totally, by May or July. Snowy data showed it cannot draw on Eucumbene when the level falls below 1116.48 meter.

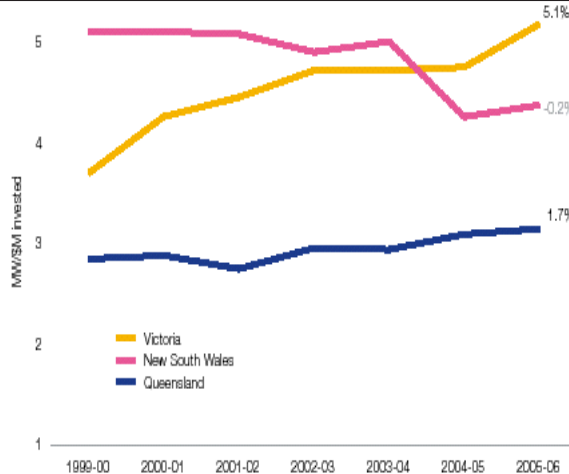
Murray River catastrophe rule triggered: Snowy water constraints were evident as Murray River – to which Snowy has obligations to deliver – to, was at catastrophically low levels – 5.7pc of long-term average, and below the ability to supply all South Australian towns. Under those emergency conditions, Snowy must supply what flow water it had; and this appeared to conflict with electricity production. (see more, inside). To compound the issue the irrigators has borrowed this year’s water in advance, and would not get more from Snowy this year if the Big Dry goes on.

Same problem in the north: In Queensland, plans had begun to evacuate some towns:

- for the last 30 days av Queensland electricity prices neared those of NSW; (NSW \$75.27, and Qld 72.51; if the pattern continued, Qld, may soon import from NSW.
- In SA, Pelican Point had not operated for one month;
- SA average pool price trebled in the past month.

South Australia to cut industrial water: South Australia last week prepared to follow Queensland, and go to level five – industrial water cuts.

Gold-plated grid: productivity of NSW transmission grid, falls



1. NSW growth rate adjusted to account for significant influence of AER reset (in 2004-05) on relatively short time period for assessing productivity. Source: MMA

NSW grid overbuilt, over-funded? A report to the Council of Australian Governments by the Energy Reform Implementation Group said over the period 1999-00 to 2005-06, said “in NSW investment may be occurring ahead of actual system requirements”. The capital base of the New South Wales transmission network grew at an annual average rate of 8.5 per cent; nevertheless, the average annual growth rate in capital productivity was minus 3.1 per cent.

This measure was strongly influenced by the revaluation associated with the AER upward reset

- NSW had four big plants offline; and
- across the NEM, transmission lines were off for scheduled maintenance;
- demand was mild, but price across the NEM near doubled on last year for the past 90 days to date.

of the asset base in 2004-05. After excluding that effect, capital productivity is still declining, albeit it at an average of minus 0.2 per cent per year.

Data hard to get: Information on the capital base for each of the networks was sourced from the relevant regulatory decision of the AER on the network revenue cap.

Capital productivity was measured in peak MW per million dollars invested. A negative growth rate suggests that, with the level of under-utilised capital increasing, investment may be occurring ahead of actual system requirements.

Vic model works better: MMA estimates of capital productivity for Queensland, Victoria and New South Wales are presented in (above) Reflecting relatively little requirement to expand the transmission network in Victoria (with an average annual growth rate of the capital base of 2 per cent) since market start, the growth in peak demand requirements results in better utilisation of the Victorian network, with capital productivity growing at more than 5 per cent per year. In contrast, the productivity of the New South Wales transmission system was gradually declining.

A report to the Council of Australian Governments by the Energy Reform Implementation Group January 2007. Produced by the Energy Reform Implementation Group Contact: erig@industry.gov.au http://www.erig.gov.au

- price was volatile; spikes at off peak times.

Snowy warns of risks

In water-speak, the euphemism for “zero water” was “below Minimum Operating Level (MOL)”. Snowy diverts water from

Eucumbene to Tumut units; 1, 2 and 3, and Blowering and also to the 1500MW Murray 1 and Murray 2, but Eucumbene was near empty. The capacity of Tumut units was around 2180MW, (if water was available).

5.5m fall in lake levels: "... should the severe drought conditions and low inflow pattern continue, it was possible but not yet probable, Lake Eucumbene would drop up to a further 5.5m to around (zero) Minimum Operating Level (MOL) at ...1116.5 metres by late July / early August 2007.

No water in Jindabyne either: On the other side the Snowy River and the Geehi river power Guthega, and the 1500MW Murray 1 and Murray 2, also backed by Eucumbene, and pumping from Jindabyne pump. But Jindabyne was also near empty, as it relies on mix of sources, all which appear near-dry. A release from Snowy said: "Water levels in Snowy Scheme storages have steadily decreased since 1997 and were currently around 10 per cent of active capacity. In order to meet the needs of all Snowy water stakeholders including environmental releases and if the current drought conditions continue, then it was likely that by mid to late May 2007, Lake Jindabyne water levels would drop 1.1m to Minimum Operating Level (MOL) at around RL 896.1 metres.

Further fall of 1.5m by June: In addition, it is possible but not yet probable, Lake Jindabyne will drop up to a further 1.5m below MOL to around RL 894.6 metres by late June / early July 2007. The likelihood of Lake Jindabyne

going 1.5m below (minimum operating level) MOL increases if there is no significant inflows from rainfall and noting that environmental flows into the Snowy River are assumed to continue".

Snowy not telling: "With no forecast improvement to water inflows in the foreseeable future Snowy Hydro must act prudently to ensure that the water remaining in the Snowy Scheme was used in a balanced way for all stakeholders and that water was conserved for the coming winter and next summer".

Eucumbene levels to fall 0.5m by April end: "In order to meet the needs of all Snowy water stakeholders including environmental releases and if the current drought conditions continued, then it was likely that by end of April 2007, Lake Eucumbene water levels will drop 0.5m to around RL 1122.0 metres".

Other data showed:

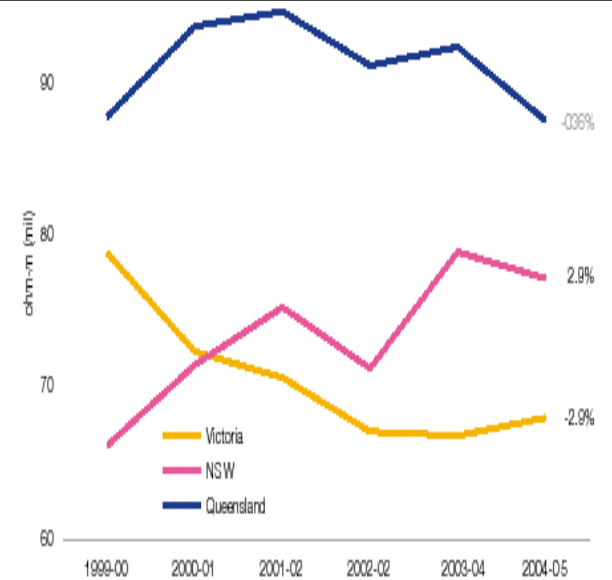
• **Jindabyne storage:**

- Full Supply Level – RL 911.35 m / 3 035 hectares; and
- Minimum Operating Level - RL 896.11 m.

• **Eucumbene storage:**

- Full Supply Level – RL 1 164.95 m / 14 500 hectares
- Minimum Operating Level –RL 1 116.48 m

NSW grid overbuilt



Source: MMA

The golden grid: New South Wales, average annual grid growth rate of 2.8 per cent suggests that the level of installed transmission lines may be moving ahead of measures of peak demand requirements.

How MMA did the math: MMA calculated a Transmission to Load Factor ratio (TTLF) for each transmission network, .. a summary measure of the geographical size of a system, denoted by a capacity measurement (associated with the size of the network), relative to its peak demand. It may be used for comparing the transmission line intensity of a transmission system between jurisdictions. In absolute terms, a reduced level of TTLF, in the absence of network development, would indicate increased asset utilisation. Although both Queensland and Victoria exhibited an average annual rate of growth that was negative.

A report to the Council of Australian Governments by the Energy Reform Implementation Group January 2007. Produced by the Energy Reform Implementation Group Contact: erig@industry.gov.au http://www.erig.gov.au

- **Jindabyne pumping:** Design pumping capacity of 25.4m³/s units pumping against head of 231.6 m.
- **Tumut three pumping:** Design pumping capacity of 297.3m³/s units pumping against head of 155.1m.

ewn publishing

Ratings agency Moody's sets Snowy on negative watch as margins fall more than 10pc

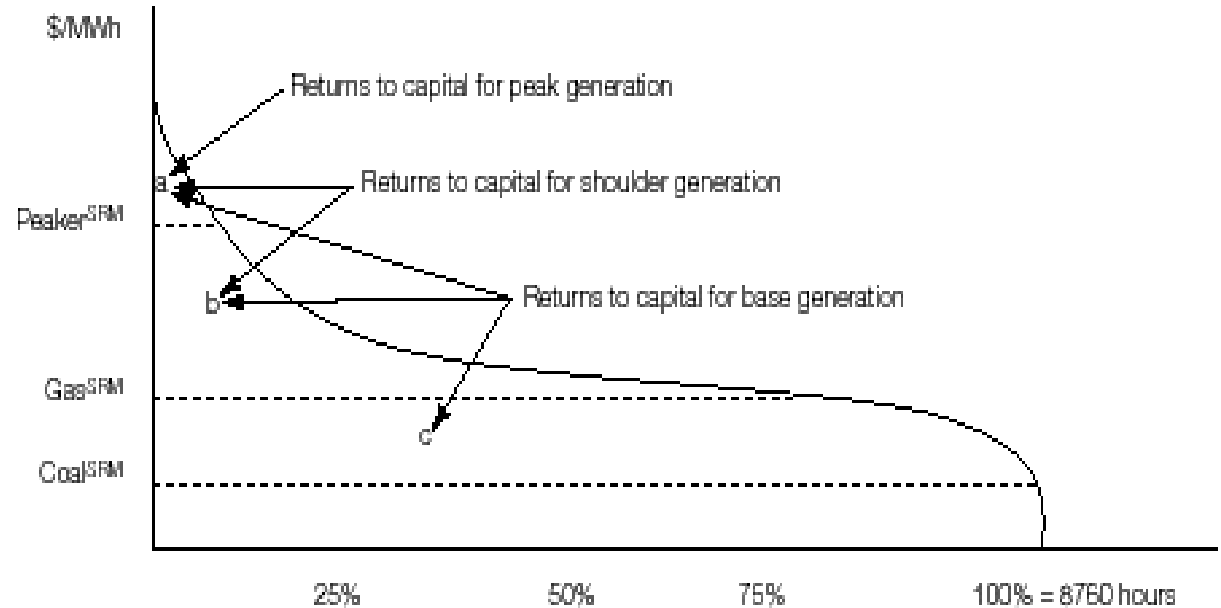
Snowy costs had risen as it was now more dependent on imports and gas generation. Moody's senior analyst Clement Chong said the outlook on Snowy Hydro's A3 rating had been downgraded to negative from stable at 17 April 2007. The lack of rainfall had prompted Snowy Hydro to use off-peak electricity from the grid to pump its remaining water for reuse. This process would materially lowering earning margins, said Chong. "Its financial metrics are likely to fall below Moody's tolerance levels for its A3 rating in this financial year," he added.

9

River Murray crisis: 5.7pc emergency actions triggered

If the Snowy Mountains Scheme continued to experience record low inflows in 2007/08, then releases from the Scheme to the Murray would also be less than the record low releases in 2006/07. Under this scenario,

How to work out how make money



The abc of price spikes: The area under the price duration curve and above the SRMC cost for a given technology gives the (expected) revenue that goes towards covering fixed costs for the year for that technology. This area is also known as the 'aggregate price spike';

- the area 'a' above the SRMC of the peaking plant represents the total returns to the peaking plant against all fixed costs, both capital and operating, for the period represented by the price duration curve.
- for base load generators, the combined area of 'a+b+c' provides payments against fixed and investment costs.

Watch the futures: Although the spot price reflects the marginal value to society at each point in time for the electricity consumed, it does not reflect the average price per megawatt-hour paid by buyers or received by sellers if those participants are also using financial contracts to manage their risk.

Spot prices over a year can be summarised by a price duration curve. Price duration curves plot prices from highest to lowest over a year (or any given period), and depict the proportion of time (or hours) when prices exceed a given level. The price duration curve can also be interpreted as the probability that prices will be at or above a certain level. A stylised example of a price duration curve is presented here. In the example shown here, prices during the year exceed the short run marginal cost (SRMC) of a base load plant for almost 100 per cent of the year.

In contrast, prices exceed the short run marginal costs of peaking plants for only a few per cent of the year. A generator can only recover fixed costs, including the investment cost, when the price is above its variable (or SRMC) costs.

A report to the Council of Australian Governments by the Energy Reform Implementation Group January 2007. Produced by the Energy Reform Implementation Group Contact: erig@industry.gov.au http://www.erig.gov.au

contingency measures would need to continue to ensure that there would be enough water in the Murray to meet evaporative losses and critical water needs of all the towns and cities that rely on the Murray from Albury to Adelaide and beyond, as well as other domestic and stock requirements, said *Murray-Darling Basin Initiative, in River Murray System – Drought Update No. 7, April 2007.*

Snowy must deliver to towns: Even if very dry conditions were experienced in 2007/08 (similar to 2006/07), it was expected that Murray catchment inflows, together with any future contributions from the Snowy Mountains Scheme, would be sufficient to meet basic human, stock and domestic requirements (subject to appropriate levels of restriction).

Driest period in 115 years: The 12 month period ending March 2007 was the driest 12 month period for the River Murray in 115 years of historical inflow record. A repeat of the same rainfall pattern for another 12 months would result in even lower inflows due largely to reduced inflows from groundwater systems. This trend was evident for the last three months.

Contingency Plans for 2007/08: A group of senior officials, drawn from the partner Governments and the Murray-Darling Basin Commission, had been meeting on a regular basis to develop and implement a Contingency Plan for operation of the River Murray in the event of low inflows in the 2007/08 season.

Average spike revenue for base load, gas peaking

	South Australia	Victoria	New South Wales	Queensland
	\$/MWh	\$/MWh	\$/MWh	\$/MWh
1999	\$44.18	\$15.63	\$12.93	\$32.79
2000	\$44.51	\$31.60	\$26.12	\$41.90
2001	\$38.58	\$29.12	\$23.31	\$25.97
2002	\$27.69	\$26.42	\$29.88	\$38.85
2003	\$28.27	\$16.36	\$16.91	\$13.70
2004	\$31.86	\$23.69	\$35.24	\$25.57
2005	\$22.32	\$19.35	\$25.89	\$16.20

a For South Australia, the base load technology is taken to be a gas plant, whilst for the other jurisdictions, it is taken to be a coal plant. b. New entrant capital and fixed costs are sourced from ACIL-Tasman 2005. c. At an assumed 91 per cent capacity factor.

Seven lean years for new gen: The average aggregate price spike revenue from the spot market for base load and gas peaking plants for the past seven years show how increased capacity and availability of inter-state exports re moved any spot market signals for new investment in most jurisdictions of the NEM.

- The figures in black (bold) represent values exceeding estimated new entrant costs.
- Figures in grey represent values below estimated new entrant costs.

In an energy only market, even when the level of installed capacity is 'just right', average prices exceeding new entrant costs will occur, as will prices being below new entrant costs. This reflects the real world variations in demand associated with unexpected weather outcomes, or variations in supply due to overall plant availability being lower than normal due to coincident outages.

This phenomenon will be exacerbated when there is excess capacity in the market following restructuring. In this case, the number of years when prices are below new entrant costs are likely to be greater than those years in which prices exceed new entrant costs.

This will continue to occur until demand growth over time absorbs the additional capacity, or some plant operations are scaled back or removed completely from the market.

For this reason, care must be taken in assessing the information in spot markets.

Only if high prices are expected to be sustained are they a signal for new entry. Although prices exceeded new entrant cost, for both base load and peaking capacity, frequently in the early days of the NEM, investments in those technologies in South Australia, Victoria and (more recently for base load plants) in Queensland, combined with Queensland becoming connected to the NEM, and upgrades to the interconnectors into South Australia, resulted in prices falling post-2001.

A report to the Council of Australian Governments by the Energy Reform Implementation Group January 2007. Produced by the Energy Reform Implementation Group Contact: erig@industry.gov.au http://www.erig.gov.au

Contingency measures: The Contingency Plan covered a range of measures a number of which had already been initiated, including:

- conserving as much water in upstream storages as possible;
- adopting a very low target reserve for storage in Lake Victoria for end May 2007;
- reduced targets for minimum flow along the River Murray;
- early pumping of water to Mt. Lofty storages in South Australia; and
- temporarily disconnecting selected permanent wetlands from the River Murray.

Reference: Murray-Darling Basin Initiative, River Murray System - Drought Update No. 7, April 2007.
Website: website: <http://www.mdbc.gov.au>

WA govt gets top marks for its ‘clear signal’ strategy: but NSW and Qld get ERIG stick

Private sector operators told the Energy Reform Implementation Group “willingness of government owners to be guided in their investment and operational decisions by drivers other than purely commercial considerations, such as political factors and/or desires for regional development, was one of the biggest impediments to private investment in the energy sector.”

NSW Munmorrah “reserve” a barrier to entry to new entrants

	South Australia	Victoria	New South Wales	Queensland
	\$/MWh	\$/MWh	\$/MWh	\$/MWh
1999	\$1175.07	\$69.57	\$28.95	\$1005.58
2000	\$1381.44	\$576.40	\$411.12	\$1180.58
2001	\$1116.06	\$751.14	\$349.96	\$399.37
2002	\$568.70	\$538.48	\$995.49	\$1684.90
2003	\$218.33	\$248.18	\$635.44	\$435.38
2004	\$825.36	\$270.78	\$1589.97	\$768.84
2005	\$413.95	\$220.12	\$1174.85	\$449.93

a. The aggregate price spike is considered for only 1 per cent of the year to assess signals for investment in peaking plant.
 b. New entrant capital and fixed costs are sourced from ACIL-Tasman 2006.

NSW market does not compute: In contrast, spot market outcomes in New South Wales seem to have signalled that a new base load plant would have covered its annual investment costs in three out of the last four years. Further, it would seem that, on the face of it, from 2002 to 2005, investment in additional peaking capacity would also have earned a sufficient return on investment in both in NSW and in Queensland. MMA has advised that some of the capacity within New South Wales, particularly at Liddell and Munmorrah, is maintained in a ‘semi-reserve’ status and is not fully available at least for some of the year. Further, the Snowy region, the largest peaking capacity available in Australia, is a neighbouring NEM region to New South Wales. It is difficult to

If you must, then, make it fair: The Ministers reform committee – ERIG (Energy Reform, *The way forward for Australia*). A report to the Council of Australian Governments by the Energy Reform Implementation Group, January 2007) – said: “If governments wish to retain the ownership of their energy assets, then ERIG considers that initiatives to improve competitive neutrality should be implemented immediately to:

- place government businesses, as far as is possible, on the same commercial footing as their private sector counterpart.

reconcile the observed market outcomes indicating potential signals for both peaking and base-load capacity with the capacities available to support consumption in New South Wales.

One possible explanation is that by being kept in reserve, this ‘reserve’ capacity may also act to support price levels for suppliers in that region—that is, effectively operate as practical barriers to entry to new entrants—despite relatively high price signals driven by customers through market demand.

ERIG notes that TRUenergy has committed to building a 400 MW gas fired power station at Tallawarra in NSW.

ERIG also notes that, in addition to market signals, the NSW government has provided more certainty to TRUenergy by

- clarifying the arrangements that apply to greenhouse gas emissions, and by
- agreeing that publicly owned generators in NSW would not be investing in new generation capacity at the same time.

A report to the Council of Australian Governments by the Energy Reform Implementation Group January 2007. Produced by the Energy Reform Implementation Group Contact: erig@industry.gov.au <http://www.erig.gov.au>

- For those governments who decide to retain their existing energy assets but seek to encourage the private investment for new investment, ERIG considers that clear and unequivocal signals about their intention to do so is fundamental.
- Without such signals, private investor perceptions of ‘sovereign risk’ at best adds to hurdle rates of return (and therefore energy costs) before investment occurs, or, at worst, may delay or prevent desirable energy investments from taking place”.

WA setting good signal examples: The Government of Western Australia appears to be the most advanced within Australia in following this 'clear signal' strategy. Placing a cap on generator expansion and other limits on the government owned market incumbents in the Western Australian energy market appears to have sent a positive message to the private sector about the intentions of the WA Government.

Sale plans wanted: "For jurisdictions where signals are less clear (such as in NSW and to a much lesser extent Queensland), industry participants strongly asserted that continued public ownership of a large amount of a state's competitive energy assets is a significant impediment to future private investment in those states.

Bell tolls for NEMMCO board

Firecone recommended that all energy market operator Directors should be jointly appointed by a government and industry panel. The appointing panel would consist of:

- two industry representatives;
- two government representatives; and the
- Governments would also appoint a chair with a casting vote.
- The Government appointments would be made by the MCE; and

How NSW generator market power doubles price

Region	estimated efficient prices ^{1,2,3} \$/MWh	estimated market prices ^{3,3} \$/MWh	Percentage increase %
South Australia	47.10	53.84	14
Victoria	24.65	28.18	14
New South	36.07	54.04	50
Wales			
Queensland	31.56	37.45	19

1. The efficient price represents the expected price, given the level of installed capacity, rather than the price that would be expected to arise if historical capacity investment decisions had been optimal. 2. Average prices for the period when market power was deemed to be exercised. 3. These price outcomes reflect the 'simplified NEM Dispatch Engine' used in the Biggar analysis and are not actual market prices. Appropriate identification of potential impact requires dispatch outcomes be identically modelled.

Source Biggar, 2006.

How to play the game: *The Energy Reform Implementation Group* reported the Biggar study compared the estimated impact on market outcomes from withholding output in 2004 based on the assumption that the amount of capacity identified as being withdrawn in any given period was instead made available to the market (see Table).

Prices 50 pc higher: Of the results, the most significant impact of supply withholding is that simulated prices in NSW were 50 per cent above the efficient level.

The reason why: Price outcomes in the NEM will deviate from the competitive level whenever a generator has

- industry appointees would be selected by voting, with one vote for each registered market participant.

Firecone notes that this approach "leaves government with significant control over NEMMCO's overall performance." (Firecone, 2006, page vi). This has some justification as the jurisdictions jointly own NEMMCO and bear risks from any under-performance, and

reduced its output from a given level (or conversely raises the minimum price at which it is willing to sell output) and increased its revenues by doing so. In this case, the generator is said to be exercising market power. In an energy only market, only when this behaviour is able to be repeated frequently do concerns arise about market power.

A better way to do it: The alternative, leading to fully competitive outcomes, occurs when generators are prepared to offer to supply the market whilst ever prices equal or exceed their short run marginal costs of operation.

ERIG notes that yearly price outcomes in the NSW region were the highest in 2004 (in nominal terms), and that although the Biggar analysis of withholding covered the period of January 2003 to August 2005, the impact on price outcomes in 2003 and 2005 is likely to have been lower in those year relative to 2004.

But does it impact the whole NEM? In an interconnected NEM, the higher than normal price volatility occurring in New South Wales identified in the Biggar analysis may have spill over effects into other regions. That is, the increased risk of price spikes in New South Wales may lead to high risk premiums arising in financial markets in regions outside of New South Wales. As far as ERIG is aware, the potential impact of this has not been examined in publicly available studies.

A report to the Council of Australian Governments by the Energy Reform Implementation Group January 2007.

*Produced by the Energy Reform Implementation Group
Contact: erig@industry.gov.au http://www.erig.gov.au*

the inclusion of industry in the Board appointment process would add value to the selection process and to the quality and independence of the Board selected. Whilst a significant ongoing role for Governments in the appointment of the NEMMCO Board may be appropriate, NEMMCO's market operations function should have a greater level of industry control. Firecone suggested that this could be achieved by establishing a 'Market Operations

Panel' which would oversee the market operation services. A number of respondents commented favourably on the potential of a new national planning body being within NEMMCO, subject to suitable governance reforms. This matter is further addressed in the Transmission chapter. The implementation of the proposed 'Market Operations Panel' could provide an appropriate body to manage further financial services, and a second 'Gas Market Operations Panel' would be a potential way to integrate national gas market operations into a reformed NEMMCO at an appropriate point of development.

Concerns about NEMMCO governance: Concerns about NEMMCO's current governance and hence its ability to move in these areas have been raised by many in the financial markets area and by the Gas Market Leaders' Group. The proposed reforms to NEMMCO's governance would have a significant impact on the assessment of NEMMCO's ability to take on further roles proposed in the planning and broader energy market operation areas.

ERIG findings: Australian Energy Market Commission needs to be refocused, adequately funded

According to Bill Scales AO, Chairman of the Energy Reform Implementation Group, on 12 January 2007: A number

Reform advice: States to remove all retail price controls

Jurisdiction	Year	Net margin %
South Australia	2005	5
New South Wales	2004	2
Victoria	2003	5
South Australia	2003	5
Tasmania	2003	3
Australian Capital Territory	2003	5
New South Wales	2002	1.5-2.5
Victoria	2001	2.5-5
New South Wales	2000	1.5-2.5
Tasmania	1999	12.5

Source: KPMG

Catch-22 situation: The Energy Reform Implementation Group said "if the emergence of competition is a prerequisite for removal of retail price caps that themselves impede competition, this is a Catch-22 situation".

Just do it: ERIG encouraged COAG and the MCE to "deal with this inherently contradictory situation as soon as possible".

Time to remove retail price caps: ERIG agrees with the decision to remove retail price caps, and the introduction of full retail contestability in accordance with the MCE work program. ERIG encouraged the MCE to move as quickly as possible. ERIG said: Retail price caps may be either

- (i) higher than actual market prices, or
- (ii) binding (that is, actually constraining market prices).

Prisoners' dilemma: In case (i), price caps are

effectively redundant – regulation imposing some 'red tape' costs but otherwise not affecting market outcomes.

In case (ii), where price caps are binding, ERIG concludes that governments responsible for such restrictions face a dilemma. In such cases, there are government policy-induced competition problems:

- retail price caps and retail price restrictions are effectively barriers to entry, impeding the bringing-forward of efficient supply;
- such price controls themselves are impediments to competitive and efficient electricity markets.

A report to the Council of Australian Governments by the Energy Reform Implementation Group January 2007. Produced by the Energy Reform Implementation Group Contact: erig@industry.gov.au http://www.erig.gov.au

of improvements can be made to strengthen the national character of energy market governance.

ERIG findings: He sought to draw attention to ERIG's findings that:

- the Australian Energy Market Commission needs to be refocused and adequately funded;
- the establishment of a national energy market operator is an important longer term objective;
- and proposed changes to the governance of the National Electricity Market Management Company would make it more market oriented.

Improve interstate trading arrangements: Regarding energy financial markets, while ERIG found that they are generally maturing well, significant proposals are presented to improve interstate trading arrangements and market settlement. Important proposals are also presented relating to gas markets and removing barriers that discourage an appropriate demand management response within the sector.

COAG agrees to start plan for smart meter: to commission review of terms, types and territories

Based on the recommendations of the MCE, a major cost-benefit assessment is being undertaken to determine optimal smart meter functionalities, the scale of smart meter deployment and a cost-effective installation schedule which takes account of different market circumstances in each state and territory and the circumstances of different groups of consumers, according to a COAG Reform Agenda document.

COAG backs staged smart meters roll out: COAG endorsed a staged approach for the national mandated roll out of electricity smart meters to areas where benefits outweigh costs, as indicated by the results of the cost-benefit analysis which will be completed by the end of 2007:

- By September 2007, MCE will agree to a national minimum functionality for smart meters, including open communication protocols to support competition. Replacement criteria for existing meters will also be agreed to minimise costs of unnecessary replacements.
- By end 2007, MCE will finalise the cost-benefit analysis.

- By March 2008, MCE will also agree to any specific areas where replacement and roll out may be exempt or delayed, on the basis of local factors which are demonstrated to reduce net benefits for consumers, as informed by the results of the cost-benefit analysis.
- By March 2008, MCE will agree necessary changes in the National Electricity Rules to require new and replacement meters to comply with this minimum functionality and enable the national roll out to commence.
- During 2008, MCE will implement the necessary rule changes to mandate the roll out of smart meters, consistent with the outcomes of the cost benefit analysis.
- By end 2008, replacement of existing meters with smart meters will have commenced.

What can smart meters do? While a smart meters functionality is yet to be determined, COAG noted the MCE's view that smart meters could allow for:

- two way communications interface;
- remote reading;
- remote load control;
- import and export metering;
- remote connect/disconnect;
- outage detection;
- meter tamper detection;

- remote time synchronisation; and
- quality of supply measurement and recording.

National implementation plan: MCE will finalise the details of the national framework and implementation plan to optimise the net benefits identified. This plan will include:

- implementation roles and responsibilities;
- facilitation of new time-related tariffs to pass benefits on to consumers; and
- the required changes to the National Electricity Rules and jurisdictional arrangements, including any transitional arrangements.

Smart meter stakeholder working group: To support the development of this implementation plan, MCE has formed a smart meter stakeholder working group (SMSWG) with balanced representation from consumers, the electricity industry, regulators and market bodies. This group will advise on stakeholder priorities, technical aspects of the plan and the assessment of costs and benefits. The MCE will consult with consumers and industry to develop the technical details behind the national minimum functionality.

Reference: COAG Reform Agenda, Competition Reform