



To	Rick Liew, Tim Street, Laurie Counsell – Electricity Commission
From	Ashley Milkop – M-co
Date	3 May 2007
Subject	29 April 2007 Market Prices

Summary of the issue

- Prices for Sunday 29 April 2007 were calculated by the pricing manager on Monday 30 April. The following sample of prices were observed:

Period	OTA2201	HAY2201	BEN2201	MGM0331	WDV2201	NI 6s	NI 60s
31	\$78.05	\$84.45	\$89.66	\$81.30	\$79.94	\$1.99	\$2.02
32	\$78.08	\$81.45	\$89.67	\$81.35	\$79.97	\$1.01	\$2.02
33	\$83.26	\$86.85	\$94.68	\$86.80	\$85.35	\$1.01	\$2.02
34	\$92.13	\$95.97	\$94.56	\$95.83	\$94.19	\$1.99	\$3.90
35	\$115.05	\$116.74	\$95.07	\$118.39	\$114.13	\$1.99	\$4.06
36	\$141.95	\$150.95	\$95.29	\$154.69	\$149.63	\$1.00	\$4.99
37	\$434.02	\$3,469.81	\$60.44	\$38,020.63	-\$5,425.52	\$1.00	\$4.99
38	\$94.09	\$93.81	\$90.06	\$95.53	\$92.91	\$2.01	\$6.06
39	\$87.13	\$87.94	\$84.78	\$87.80	\$86.34	\$1.00	\$4.99
40	\$74.28	\$75.43	\$72.72	\$75.23	\$73.96	\$1.00	\$4.12

- The high prices in period 37 (1800-1829) were the result of a spring washer effect caused by a combination of high demand, an outage on the HVDC and a binding group constraint.
- There were no infeasibilities in the final/provisional pricing solve for 29 April.
- Period 37 was the peak GXP demand in the North Island for any half-hour trading period on 29 April at 3379MW, compared to 3327MW for the same period of the previous Sunday.
- The following group constraint bound in the pricing solve:

MGM_WDV_1_MGM_OTAS_DISABLED_S_P_1B

6. The MGM_WDV_1_MGM_OTAS_DISABLED_S_P_1B group constraint has the effect of limiting total modelled flows over HAY_LTN1.1 and MGM_WDV.1. This group constraint was last updated on 12 April 2007.
7. There were no other group or line constraints that were close to binding.
8. The system operator has confirmed that the reserve adjustment factors in the final pricing model configuration were correctly modelled at a factor of "1" meaning the reserve market was in operation.
9. The system operator has also confirmed that to the best of its knowledge, the constraints in the model were correctly applied.
10. On 30 April the Electricity Commission instructed the pricing manager under rule 3.28 of section V of part G of the Electricity Governance Rules 2003 to delay the publication of final prices and final reserve prices for trading period 37 (18:00 to 18:29) Sunday 29 April. In the interim period, provisional prices were published for trading period 37.

HVDC link

11. There was a scheduled outage of the HVDC, which was last updated on 27 April, for trading periods 18 to 36 (or between 0830 and 1759). The end-time was extended to include trading period 37 (1800 to 1829). Transpower communicated this to the market by via COMIT at 17:56.

Offers

12. Initial analysis indicates that there were no significant changes to offer quantities or prices either before or after trading period 37.
13. There were no generator outages of note for 29 April.

Comparison with other published prices

14. The following table shows a comparison for trading period 37 of the other published prices against the provisional price at five selected nodes:

-	<u>OTA2201</u>	<u>HAY2201</u>	<u>BEN2201</u>	<u>MGM0331</u>	<u>WDV1101</u>
Provisional price	\$434.02	\$3,469.81	\$60.44	\$38,020.63	-\$5,425.52
5-minute peak price	\$408.42	\$7,413.57	\$60.32	\$88,186.74	-\$13,381.20
5-minute average price	\$281.77	\$3,576.88	\$56.56	\$41,327.09	-\$6,143.54
Dispatch (SDPQ) price	\$455.67	\$730.62	\$59.52	\$3,550.52	\$0
Forecast price	n/a	\$63.49	\$62.05	\$64.57	\$62.78

15. The key difference observed between the provisional price and the 5-minute peak price is that the half-hour price is based on average load for the entire half-hour, whereas the five-minute price reflects even higher load quantities.
16. It appears the Dispatch (SDPQ) price was showing evidence of a springwasher effect.
17. The high prices were not observed in forecast prices because the outage on the HVDC was extended after publication of these prices.
18. The 5-minute price, dispatch price and forecast price is calculated by the system operator. Further information should be sought from them in regard to these pricing outcomes.

Price explanation

19. As detailed in the above tables, prices in period 37 at MGM0331 are significantly higher than in other periods during the day. Prices in the period are the combined result of high demand, the HVDC outage blocking the export of South island generation and the binding transmission constraint on MGM_WDV_1_MGM_OTAS_DISABLED_S_P_1B.
20. To derive an explanation of how the energy prices were calculated in the SPD model at MGM0331, with a price of \$38,020.63, 1KW of demand was added at MGM0331 to determine the marginal effect.
21. The increase in demand at this node resulted in a increase to total system cost of \$38.02 comprising of:
- \$38.02 for energy; and
 - \$0.00 for reserve.

22. This increase in cost was the result of the following redistribution of modelled generator outputs, subject to transmission capacity and other model constraints, to meet this marginal unit of demand:
- a. 0.106049MW of energy was increased at "Generator A" costing \$47.19171 (\$445 offer tranche); and
 - b. 0.100165MW of energy was backed off at "Generator B" saving \$9.17108 (\$91.56 offer tranche).
23. Converting these figures to a MW base indicates that to provide another MW to MGM0331 would have cost \$38,020.63 $((\$47.19171 - \$9.17108) * 1000)$, which is the posted price for MGM0331.
24. The pricing manager is satisfied that the prices for period 37, 29 April as calculated on 30 April are correct to the extent that:
- a. The pricing process was performed correctly; and
 - b. There were no infeasibilities in the pricing solve; and
 - c. To the best of our knowledge, the inputs required to perform the pricing process as provided by other participants in accordance with the rules are present and correct.

High Spring Washer rule change

25. The pricing manager conducted a test to ascertain the effect if the high spring washer rule had been in place. This rule change was gazetted on 1 March after being approved by the Minister and will come into effect on 3 September after the necessary system changes have been made.
26. To implement this new rule requires substantial system changes. The pricing manager requires a system to correctly identify and notify spring washer situations, which are sometimes complex and therefore difficult to identify. The system operator then requires systems to identify the binding transmission security constraints, identify the constraint price associated with the binding transmission security constraint, and then apply the high spring washer relaxation factor.
27. In this 29 April situation, the high spring washer rule change would have applied. However, in many situations it is not so clear-cut due to the possibility of multiple constraints with transmission loops.
28. The highest unconstrained cleared generator offer was \$445. The ratio of the price at MGM0331 to this unconstrained offer is 85.4, which is greater than the trigger ratio of 5.



29. Under the high spring washer rule change, the next step is to relieve the relevant binding constraint by the greater of 1MW or 1% of the constraint value. In this case it is 1MW, which is greater than 1% of 40 (0.4MW).
30. By relieving this constraint by 1MW the price at MGM0331 is reduced to \$190.47/MWh, with a prevailing North Island price of around \$150/MWh.
31. The spring washer is still evident after the constraint is relieved, but the effects are much less pronounced.