

To	Tim Street, Laurie Counsell – Electricity Commission
From	Shelley Nixon, Shane Dinnan – M-co
Date	27 June 2006
Subject	19 June 2006 Final Prices

Summary of issue

- Provisional prices from 19 June were published on 20 June. The following sample of prices were observed:

<u>Period</u>	<u>OTA2201</u>	<u>HAY2201</u>	<u>BEN2201</u>	<u>NI 6s</u>	<u>NI 60s</u>	<u>SI 6s</u>	<u>SI 60s</u>
31	92.15	87.25	82.26	0.32	4.94	0.00	0.00
32	97.62	92.33	85.45	4.49	4.94	0.00	0.00
33	119.90	113.06	108.54	4.49	40.35	0.00	0.00
34	201.92	189.17	176.24	130.00	98.25	0.00	0.00
35	50,069.73	45,218.45	263.60	130.00	140,000.00	0.00	0.01
36	92,764.13	793.04	710.66	84.57	93,493.68	0.70	111.66
37	310.86	281.43	260.46	0.00	0.00	0.00	0.00
38	165.11	150.72	139.49	0.00	0.00	0.00	0.00
39	95.73	89.71	84.58	0.00	0.00	0.01	0.00
40	87.60	82.33	79.04	0.00	0.00	0.00	0.00

- Provisional prices were published containing the following infeasibilities:
 - Period 35, Deficit **60s** North Island Reserve resulting in a **\$140k** published value;
 - Period 35, Maximum Limit MarketNodeConstraint for FK_WKA_MW+60 resulting in a **\$130k** unpublished value; and
 - Period 36, Deficit Generation at DAR, KOE, and KTA resulting in **\$100k** published values.
- The grid owner investigated and resolved the infeasibilities on 22 June. The subsequent final price solution yielded the following price observations:

<u>Period</u>	<u>OTA2201</u>	<u>HAY2201</u>	<u>BEN2201</u>	<u>NI 6s</u>	<u>NI 60s</u>	<u>SI 6s</u>	<u>SI 60s</u>
31	92.15	87.25	82.26	0.32	4.94	0.00	0.00
32	97.62	92.33	85.45	4.49	4.94	0.00	0.00
33	119.90	113.06	108.54	4.49	40.35	0.00	0.00
34	201.92	189.17	176.24	130.00	98.25	0.00	0.00
35	1,109.81	1,007.91	263.60	130.00	2,707.83	0.00	0.01
36	10,654.82	9,392.86	8,421.76	130.00	10,100.86	0.02	7,649.79
37	310.86	281.43	260.46	0.00	0.00	0.00	0.00
38	165.11	150.72	139.49	0.00	0.00	0.00	0.00
39	95.73	89.71	84.58	0.00	0.00	0.01	0.00
40	87.60	82.33	79.04	0.00	0.00	0.00	0.00

4. The resulting price changes between the provisional price solution and the final price solution are as follows:

<u>Period</u>	<u>OTA2201</u>	<u>HAY2201</u>	<u>BEN2201</u>	<u>NI 6s</u>	<u>NI 60s</u>	<u>SI 6s</u>	<u>SI 60s</u>
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	-48,959.92	-44,210.54	0.00	0.00	-137,292.17	0.00	0.00
36	-82,109.31	8,599.82	7,711.10	45.43	-83,392.82	-0.68	7,538.13
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5. On 22 June the Commission instructed the pricing manager under rule 3.28 of section V of part G of the Electricity Governance Rules to delay publication of final prices for 19 June pending further investigation.

Infeasibility fixes implemented by Transpower

6. The grid owner made the following adjustments to the pricing input data to resolve the respective infeasibilities:
 - a. Period 35, Deficit 60s North Island Reserve resulting in a \$140k published value. **Adjustment:** NI Net Free Reserve 60s factor revised from 0MW to 2MW;
 - b. Period 35, Maximum Limit MarketNodeConstraint for FK_WKA_MW+60 resulting in a \$130k unpublished value. **Adjustment:** FK_WKA_MW+60 constraint removed.
 - c. Period 36, Deficit Generation at DAR, KOE, KTA resulting in \$100k published values. **Adjustment:** UPPER_NORTH_ISLAND_STABILITY_W_P_A group equation constraint adjusted from 755 to 802 . NI Net Free Reserve 60s factor revised from 0MW to 23MW.
7. These adjustments were provided to the pricing manager on 22 June.

System characteristics

8. As detailed in the above tables, final prices in period 36 are extremely high. Final prices in the period are the combined result of high demand, an effective shortage of "cheap" energy and reserve and the binding transmission constraint on MTI_WKM1.1 due to an outage on MTI_WKM2.1.
9. The following tables compare system characteristics on 19 June with those evidenced the previous Monday 12 June (acknowledging that NI demand on that day was artificially low due to the OTA substation outage):

<u>12 June Period</u>	<u>Offered</u>	<u>NI Demand</u>	<u>SI Demand</u>
31	6,527	2,990	1,848
32	6,553	3,089	1,873
33	6,568	3,288	1,899
34	6,728	3,483	1,941
35	6,997	3,702	1,996
36	7,039	3,925	2,026
37	7,046	3,924	1,989
38	7,075	3,864	1,974
39	7,088	3,788	1,964
40	7,080	3,745	1,953

19 June Period	<u>Offered</u>	<u>NI Demand</u>	<u>SI Demand</u>
31	7,314	3,669	1,839
32	7,312	3,744	1,860
33	7,312	3,866	1,904
34	7,334	3,976	1,991
35	7,225	4,065	2,075
36	7,179	4,227	2,100
37	7,183	4,185	2,056
38	7,225	4,093	2,002
39	7,197	3,961	1,965
40	7,198	3,904	1,939

Period Change	<u>Offered</u>	<u>NI Demand</u>	<u>SI Demand</u>
31	788	680	-9
32	760	655	-13
33	745	577	6
34	606	492	50
35	229	363	79
36	141	302	74
37	138	260	67
38	151	229	28
39	110	172	1
40	119	159	-14

Price explanation

10. As an explanation of how the energy prices were derived in the SPD model, the WKM2201 node was used as an example. The final price at WKM2201 is \$9,724.47.
11. An equivalent of 1MW of demand was added at WKM2201 to determine the marginal plant in this period.

12. The increase in demand at WKM resulted in a system cost increase of \$9,724.47 comprising of:
 - a. \$7,166.89 for energy; and
 - b. \$2,557.58 for reserve.
13. This increase in cost was the result of the following redistribution of modelled energy and reserve outputs (including Excel rounding difference of (\$0.50):
 - a. 19.63MW of energy was backed off at "Gen A" saving \$1,080.44 (\$55.04 offer tranche);
 - b. 19.64MW of energy was increased at "Gen B" costing \$8,248.80 (\$420 offer tranche);
 - c. 19.63MW of 6s reserve was increased at "Res. provider A" costing \$2,551.90 (\$130 offer tranche); and
 - d. 19.63MW of 60s reserve was increased at "Res. provider B" costing \$4.71 (\$0.24 offer tranche).
14. Because of the binding transmission constraint of 246.3MW on MTI_WKM1.1, available generation of approximately 125MW from MTI and WPA were unable to meet system demand. Prices of \$500 were therefore observed at these two islanded nodes.
15. the pricing manager is satisfied that the final prices for 19 June as calculated on 22 June are correct to the extent that:
 - a. the pricing process was performed correctly; and
 - b. The database was "refreshed" following advice from the grid owner that the infeasibilities identified earlier had been removed; and
 - c. There are no infeasibilities in the final pricing solve; and
 - d. To the best of our knowledge, the inputs provided under the rules by other parties which are required to perform the pricing process in accordance with the rules were present and correct.