



Investigation into the events of 7 and 8 February

On 7 and 8 February, peak demands and consequent low reserves in Victoria and South Australia resulted in NEMMCO's issuing the most significant direction for reliability since market launch. Intervention, or 'what if' pricing arrangements applied for 28 hours from 1pm on 7 February. Average prices in Victoria and South Australia for those two days were \$834 and \$1,054/MWh, peaking at \$4,426/MWh and \$4,754/MWh respectively.

Scope of the investigation

We immediately launched an investigation into those events and the effects of the intervention, including in particular:

- ◆ the discrepancy between the forecast interconnector limits published in predespatch and the actual operational limits in the time leading up to the direction;
- ◆ the circumstances that led to the direction itself; and
- ◆ the reasons for, and effects of, the failure between 1pm and 3pm on 7 February of the 'what if' pricing arrangements introduced following the issue of the direction.

Our investigation also examined the extent and effects of rebidding during the critical period immediately before and after the issue of the direction.

As part of our investigation, we commissioned independent expert advice from Burns and Roe Worley. Their report to us is attached. Our investigation also took into account the two technical reports into these events published by NEMMCO on 27 February and 2 April. Those reports are available on its website (www.nemmco.com.au).

Background

The events of 7 and 8 February occurred against a backdrop of extreme temperatures and new record demands in both Victoria and South Australia. Low reserves had been predicted in South Australia from as early as 1 February. On the evening of 6 February, NEMMCO issued a market notice seeking a market response to a forecast reserve shortfall of around 400MW in Victoria the following day. Earlier that evening, Loy Yang Power had reported the intended shutdown of one of its 500MW units from 2.30pm the following day. The unit was scheduled to return to service two days later. Increases in forecast demand in both Victoria and South Australia the following morning saw reserve notices updated to reflect the deteriorating reserve conditions. By midday on 7 February, a reserve shortfall of around 770MW in Victoria and South Australia was also forecast for the afternoon of 8 February. NEMMCO reported no response from the market to that advice and therefore intervened by

issuing a reliability direction to Loy Yang Power at 12.45pm on 7 February. The direction, effective from 1pm on 7 February until 5pm on 8 February, delayed the shutdown of the unit.

Discrepancy between forecast and actual interconnector limits

Forecasts published by NEMMCO during the evening of 6 February predicted that the Snowy to Victoria interconnector would reach its full capacity the following afternoon. NEMMCO therefore forecast prices of around \$90/MWh in New South Wales and Snowy but \$300/MWh and above, reflecting the need to draw on more expensive generation in those regions, in Victoria and South Australia. In the event, the actual limits on the interconnector on 7 February were less restrictive. NEMMCO’s own market notice reported that the forecast limits on transfers from Snowy and Victoria published in predespatch were inaccurate – at times by up to 250MW. Similar discrepancies occurred throughout the day in the accuracy of forecast interconnector limits from New South Wales to Snowy. Figures 1 and 2 below set out the discrepancies between forecast and actual limits for 7 February that existed in the predespatch run published at 8.30pm on 6 February. This run is significant because it represented the best and latest information available to Snowy Hydro at the time it rebid a third of its total capacity to prices over \$4,000/MWh just before 9pm that evening.

Figure 1: forecast and actual Victoria – Snowy import capability

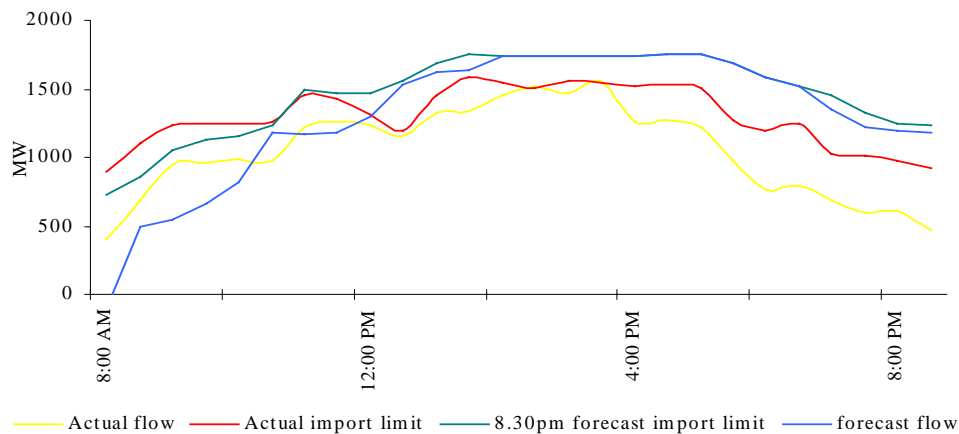
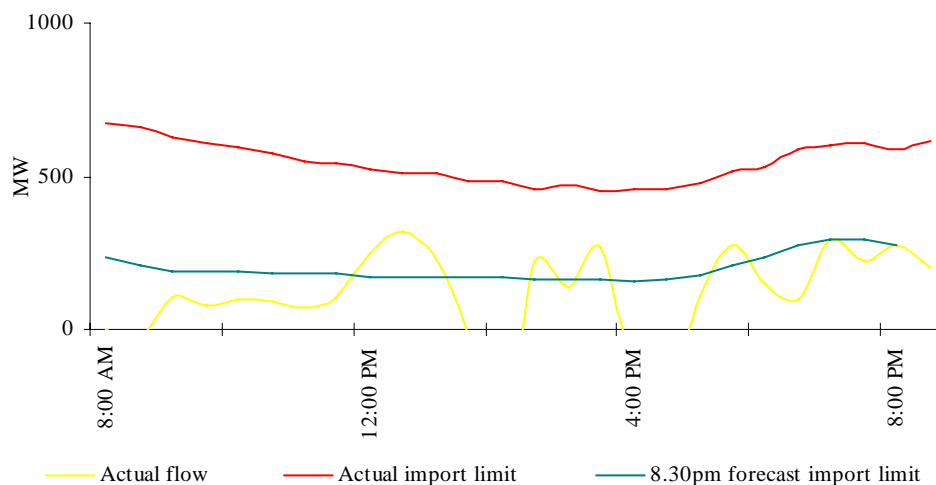


Figure 2: forecast and actual Snowy – NSW import capability



These discrepancies affected the usefulness of NEMMCO's price, demand and despatch forecasts. Although they did not lead directly to the direction that was issued to Loy Yang, they contributed to the uncertainty which had existed throughout the market during the morning of 7 February and which became confusion in the early afternoon following the issue of that direction and the initial failure of the 'what if' pricing arrangements. This in turn limited market participants' ability to respond to unfolding events.

A major contributing factor to the discrepancy in the Snowy to New South Wales import limit was an inaccurate forecast of demand in south-west New South Wales. This was not the first time such an error had been identified. NEMMCO has now altered the demand factors input into its model. We understand the accuracy of forecast interconnector limits has improved as a result. NEMMCO is also considering other refinements to its forecasts. We welcome those initiatives. We recommend, however, that NEMMCO should keep under review, and act promptly on, the scope for further refinements to its predespatch forecasts. It should review the performance of predespatch in instances where interconnector constraints create significant pricing effects. For these instances, NEMMCO should report on the accuracy of predespatch in forecasting the limit, the reasons for any significant inaccuracy and action proposed to address the issues identified. In cases where it is apparent to NEMMCO in advance that any forecast of interconnector limits in predespatch will be significantly inaccurate, and thus could have a significant impact on accuracy of pricing forecasts, then NEMMCO should advise the market accordingly. The market auditor should ensure that the necessary review and reporting arrangements are put in place.

The usefulness of the predespatch forecasts during periods of intervention as on 7 and 8 February would be significantly increased if those forecasts took account of the effects of the intervention on spot prices. We understand NEMMCO's system could be rearranged to provide forecasts based on what-if pricing. We also understand that there is a number of possible configurations for predespatch and that NEMMCO will shortly be undertaking consultation to determine the preferred predespatch configuration.

Intervention in the market should and will only ever be a last resort. Arrangements to take account of the effect of intervention on forecast prices will therefore be necessary only exceptionally rarely. Where intervention does take place, however, accurate forecasts are essential to an informed market and effective responses. We therefore recommend that NEMMCO should move immediately to enable its forecasts to take account of the effects of intervention on spot prices.

The direction to Loy Yang Power

As we have already noted, NEMMCO issued a series of low reserve notices from as early as 1 February. The immediate trigger for its intervention in the market, however, was Loy Yang's intention to shut down one of its 500MW units. The unit had been operating defectively since the end of January and had been scheduled for repair as soon as the necessary parts became available. Loy Yang Power announced its intention to shut down the unit just before 7pm on 6 February. The shutdown was intended to last for two days from 2.30pm on 7 February. At 9.10am on that day, Loy Yang Power brought the proposed shutdown forward by two hours to 12.30pm on that day. Following discussions between Loy Yang Power and NEMMCO throughout the morning, during which Loy Yang Power agreed to postpone the shutdown to allow NEMMCO time to assess the need for intervention, NEMMCO directed Loy Yang Power to keep the unit in service at 12.45pm. The direction lasted until 5pm the following day. We commissioned Burns and Roe Worley to give us independent expert advice on:

- ◆ whether the information reasonably available to Loy Yang Power on 6 and 7 February about the damage to the unit warranted shutdown for repair prior to the evening of Thursday 8 February;
- ◆ if immediate shutdown was to avoid the risk of further damage, what was that risk, what additional repair costs were likely to have been incurred and how much additional time would have been needed to repair it; and
- ◆ whether it was likely that alternative operating strategies or modes would have been adopted to reduce the need for shutdown and/or reduce the minimum load at which the unit could have been safely operated until late on 8 February.

Their report to us is attached. It concludes that the information reasonably available to Loy Yang Power on 6 and 7 February justified the proposed shutdown. A catastrophic failure as a result of delaying the repairs could have led to an outage conservatively in the order of a month or more, depending on the degree of investigation and modifications needed. Major changes to the operation of the plant would also have been required. Operating experience with the unit in the weeks prior to 7 and 8 February had indicated uncontrolled loss of output at load less than 460MW. Operating the unit at lower loads was not therefore a realistic option.

Failure of the ‘what if’ pricing arrangements

The market rules provide for prices during a period of intervention to be set on a ‘what if’ basis as though the direction had not been issued. Those arrangements failed for the first two hours following the direction. The failure was due to a software error in NEMMCO’s despatch process that was introduced as a result of an earlier, unrelated software change, the impacts of which NEMMCO has acknowledged had not been fully tested. We understand NEMMCO has implemented an interim remedy for that error and has modified its software testing procedures so that all critical functionality is tested before any change is implemented. We understand that NEMMCO is moving to implement a permanent remedy for the error in its despatch process. The market auditor should satisfy himself, and report to the market, that the remedy is satisfactory and has been fully tested. He should also report to the market on the adequacy of NEMMCO’s revised software testing procedures generally.

The failure of the ‘what if’ pricing arrangements also led directly to the publication of \$5,000 prices in Queensland and South Australia, and very high prices across the rest of the market, for the four despatch (five minute) intervals between 1.05pm and 1.20pm on 7 February. Those prices were subsequently retrospectively adjusted by NEMMCO under agreed procedures governing so-called over-constrained despatch intervals. Those retrospective adjustments were not, however, made until just before 5pm on 8 February. There have been over 300 such retrospective price adjustments since market launch. NEMMCO originally committed to improve its systems in order to allow most of those adjustments to be made in real time by January 2000. We understand it is currently planning to introduce those improvements in September. It is crucial that there should be no further slippage in that implementation timetable.

The market rules also provide for compensation to affected participants following intervention in the market. PA Consulting published its independent expert report determining the compensation payable as a result of the events of 7 and 8 February on 4 May.

A key issue in determining that compensation has been the appropriate treatment of settlement residue auction proceeds across the New South Wales to Snowy and Snowy to Victoria interconnectors. The Code Change Panel is currently consulting separately, in the context of the joint NECA/NEMMCO review of power system directions, about the most appropriate treatment of those proceeds in such circumstances in future.

Rebidding by Snowy and Southern Hydros

Just before 9pm on 6 February Snowy Hydro rebid 1,260MW from prices between \$67 and \$1,100/MWh to \$4,100/MWh with effect from midday the following day. The reason given for those rebids was to manage its exposure in Victoria due to a forecast price separation between the Snowy and Victoria regions. Those rebids were prompted, at least in part, by the uncertainty created by the inaccuracies in NEMMCO's forecasts and seem to have been intended to remove the forecast constraints on the Snowy to Victoria interconnector.

From 3.55pm on 7 February, Southern Hydro made a number of rebids that effectively declared 340MW (45 per cent) of its available capacity as 'must run', that is representing the fixed level at which it could be despatched. Snowy Hydro made a series of rebids between 2.30pm and 3.15pm on 8 February similarly to make 1,821MW of the 3,080MW it was then offering as available 'must run'. The 'must run' arrangements in the market rules are designed specifically to cope with circumstances where a market participant expects its scheduled generating units to be unable to operate in accordance with despatch instructions due to, for example, abnormal plant conditions or other abnormal operating requirements related to the plant itself. Snowy and Southern Hydros used them in this instance to try to manage their financial positions. We acknowledge the difficult and confused circumstances they faced. It would nonetheless have been more appropriate for them to make use of straightforward energy rebids, rather than the "must run" arrangement, in their circumstances. We are satisfied, however, that they had no intention to manipulate or take advantage of, but simply to manage, the evolving situation.

Summary of conclusions and recommendations

The events of 7 and 8 February occurred against a backdrop of extreme temperatures and new record demands in both Victoria and South Australia. Low reserves had been predicted in South Australia from as early as 1 February. On the evening of 6 February, NEMMCO issued a market notice seeking a market response to a forecast reserve shortfall of around 400MW in Victoria the following day. Earlier that evening, Loy Yang Power had reported the intended shutdown of one of its 500MW units from 2.30pm the following day. The unit was scheduled to return to service two days later. Increases in forecast demand in both Victoria and South Australia the following morning saw reserve notices updated to reflect the deteriorating reserve conditions. By midday on 7 February, a reserve shortfall of around 770MW in Victoria and South Australia was also forecast for the afternoon of 8 February. NEMMCO reported no response from the market to that advice and therefore intervened by issuing a reliability direction to Loy Yang Power at 12.45pm on 7 February. The direction, effective from 1pm on 7 February until 5pm on 8 February, delayed the shutdown of the unit.

The inaccuracies in NEMMCO's forecasts of interconnector limits, which first emerged on the evening of 6 February, affected the usefulness of NEMMCO's price, demand and despatch forecasts. Although they did not lead directly to the direction that was issued to Loy Yang, they contributed to the uncertainty which had existed throughout the market during the morning of 7 February and which became confusion in the early afternoon following the

issue of that direction and the initial failure of the ‘what if’ pricing arrangements. This in turn limited market participants’ ability to respond to unfolding events.

We welcome the improvements NEMMCO has made and is considering to its forecasting procedures. It should publish reports to the market on the accuracy of those forecasts during critical market events. Especially during such events, where discrepancies between forecast and actual limits are likely to increase trading risks for participants, NEMMCO should use market notices to alert participants to those discrepancies in real time. The market auditor should ensure that the necessary review and reporting arrangements are put in place.

Burns and Roe Worley’s conclusion is that the information reasonably available to Loy Yang Power on 6 and 7 February justified the proposed shutdown. A catastrophic failure as a result of delaying the repairs could have led to an outage conservatively in the order of a month or more, depending on the degree of investigation and modifications needed. Major changes to the operation of the plant would also have been required. Operating experience with the unit in the weeks prior to 7 and 8 February had indicated uncontrolled loss of output at load less than 460MW. Operating the unit at lower loads was not therefore a realistic option.

The initial failure of the ‘what if’ pricing arrangements was due to a software error in NEMMCO’s despatch process that was introduced as a result of an earlier, unrelated software change for which NEMMCO has implemented an interim remedy. NEMMCO should move urgently to implement a permanent remedy for that error. The market auditor should satisfy himself, and report to the market, that the remedy is satisfactory and has been fully tested. He should also report to the market on the adequacy of NEMMCO’s revised software testing procedures generally.

NEMMCO should improve its systems to allow real-time adjustments to spot prices during over-constrained despatch intervals by September at the very latest.

It would have been more appropriate for Snowy and Southern Hydros to have made use of straightforward energy rebids, rather than the “must run” arrangements. We are satisfied, however, that they had no intention to manipulate or take advantage of, but simply to manage, the evolving situation.