Seed Advisory

Supplementary Report: the Prudential Standard in the National Electricity Market

National Generators Forum

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Contents

1. Introduction

1.1. Background

The Australian Energy Market Commission (AEMC) is consulting on a new Prudential Standard for the National Electricity Market, proposed by the Australian Energy Market Operator (AEMO). The Consultation Paper outlines a proposed approach to assessing credit risk that was developed by AEMO and its consultants, Seed Advisory Pty Ltd (Seed Advisory) and Taylor Fry as part of the Prudential Readiness Review of 2010.

Specifically, the Rule change request proposes to:

- Remove references to the 'reasonable worst case' within the prudential requirements;
- Replace 'reasonable worst case' with a new definition for a Prudential Standard, defining it as a 2% probability of incurring a loss or shortfall in the event of participant default;
- Modify various aspects of its calculation process, including:
  - use of individual load profiles and seasonal adjustments in calculating participant prudential obligations
  - removal of the option for a Reduced Maximum Credit Limit
  - modification of the methodology used to calculate the Maximum Credit Limit and Prudential Margin.

The Consultation paper seeks responses with regard to the extent to which the various aspects within it will contribute, or will be likely to contribute to the achievement of the National Electricity Objective.

Scope of Work

The National Generators Forum (NGF) is considering whether to support the proposed Rule change but advocate a Shorter Settlement Cycle (SSC) at a lower Probability of a Loss Given Default (PLGD) with equivalent prudentials to now, reducing the risk of short payment but not improving the prudential burden (the alternative proposal). In order to propose this option, the NGF will need to complete an assessment of the Prudential Standard, (expressed in % PLGD), if the settlement cycle is shortened and the level of collateral is maintained at that level proposed under the Rule change (2% PLGD with the existing settlement cycle). This analysis was not undertaken in the work undertaken earlier by Seed Advisory and Taylor Fry for AEMO.

Seed Advisory and Taylor Fry were asked by the NGF to provide a supplementary report to that submitted to AEMO in August 2010, "The Prudential Standard in the National Electricity market Final Report (the Report). This supplementary report provides the following information for the case where the settlement cycle is shortened and the level of collateral is maintained at the level proposed under the Rule change (2% PLGD with the existing settlement cycle):

- material consistent with Tables 5.5, 5.6 and 5.7 in the Report for the alternative proposal; and
- material consistent with Figures 5.8, 5.9, C.17-20 for each region and 5.11 in the Report for the alternative proposal.

Seed and Taylor Fry were also asked to provide further insight into the results for NSW, which were regarded as counterintuitive, in that the PLGD increases with a SSC, although the average loss given default reduces somewhat – this has been addressed in our covering letter.

Our Approach

In preparing this supplementary report, we have:

- Used the identical data set used in preparing the Report. This decision means no new data for 2010 or part of 2011 were included in our calculations.
- In a similar way to the Report, undertaken the analysis on the assumption that there is a single retailer for each NEM region, responsible for total regional load;
- Replicated the analysis underlying Tables 5.5, 5.6 and 5.7 in the Report for the alternative proposal ;
- Prepared material consistent with Figures 5.8, 5.9, C.17-20 for each region and 5.11 in the Report for the alternative proposal;
- Undertaken the analysis of the alternative option in a way that is directly comparable with that undertaken for the Report, noting, however, that to the extent that structural changes in the NEM, in particular, the changes to the NSW market, have changed the performance of the prudential arrangements since the Report was completed, this analysis did not capture the impact of these changes on the performance of the alternative proposal.

Section 2 presents our results and discusses the findings in the light of the NGF's concerns and the current Rule change proposal. Appendices A, B, C and D contain the results for the maximum loss given default on a $/MWh basis for NSW, Queensland, South Australia and Tasmania respectively.

2. Supplementary Results: Maintain the Level of Prudential Requirements with a shorter Settlement Cycle

Table 2.1 and Table 2.2 present the high level statistics comparing the performance of the Prudential Standard under a shorter settlement cycle with a reduced level of prudentials (as per the Report) and a shorter settlement cycle with the level of prudentials unchanged but using the improved calculation approach. The difference between Table 2.1 and Table 2.2 is solely a result of differences between the levels of prudential requirements held by AEMO on behalf of participants. In Table 2.1, the prudential holdings were reduced to achieve a 2% PLGD combined with a shorter settlement cycle, while in Table 2.2, the prudential requirements are held at the level consistent with a 2 per cent probability of a loss given default for the current, longer settlement period.

Table 2.1 Performance of the Prudential Standard, improved calculation approach and shorter settlement cycle with 2% probability of loss given default, by NEM region, 2000 – 2010

		NSW	Qld	SA	Tas	Vic
	Total days	3,653	3,653	3,653	1,583	3,653
	Prudential Standard					
CTO > Prudential Standard	Days	88	82	78	16	74
Probability	% Total Days	2.4%	2.2%	2.1%	1.2%	2.0%
Average *Loss given default*	$m	121	66	53	27	64

Table 2.2 Performance of the Prudential Standard, improved calculation approach and shorter settlement cycle with level of prudentials unchanged, by NEM region, 2000 - 2010

		NSW	Qld	SA	Tas	Vic
	Total days	3,653	3,653	3,653	1,371	3,653
	Prudential Standard					
CTO > Prudential Standard	Days	29	22	36	5	29
Probability	% Total Days	0.8%	0.6%	1.0%	0.4%	0.8%
Average *Loss given default*	$m	155	106	78	49	55

Note that the data for Total Days for Tasmania differs from that included in the Final Report for AEMO. The data included in the Final Report and in Table 2.1 – which is reproduced as in the Final Report - was an error.

As Table 2.2 demonstrates, the higher prudential level combined with a shorter settlement cycle results in:

- A significant reduction in the number of days in which the Combined Total Outstandings (CTO) of Market Participants exceeds the holdings determined by the Prudential Standard. The reduction in the number of days where the CTO exceeds the Prudential Standard ranges from 61 per cent in Victoria to 73 per cent in Queensland.
- The Probability of a Loss Given Default, expressed as the number of Total Days on which CTO is greater than the Prudential Standard also falls significantly in all states, with the reduction ranging from just over 50 per cent in South Australia to around 70 per cent in Queensland. The PLGD is now less than or equal to 1.0% for all states.
- However, while the PLGD significantly reduces, with the exception of Victoria, the *average loss given default* increases. The increases in the average loss given default range from a low of 28 per cent in NSW to a high of 81 per cent in Tasmania.
    - Comparing Figure 2.1 and Figure 2.2 on the following page for Victoria and similar charts in Appendices A - D for all other states in the NEM illustrates the basis for this result. The number of potential instances of a loss falls significantly (days where CTO exceeds the Prudential Standard), but the instances that remain are disproportionately the larger potential events of loss given default and hence the average loss given default increases.

The values for PLGD need to be interpreted in light of the standard error. Our previous analysis on page 77 of the Report highlighted that a standard error would have allowed us to draw conclusions about whether there had been changes over time or differences between months in the PLGD. This was not possible without a probabilistic model and such a model would have been very complex to model, requiring considerations such as how the weather and seasons affect electricity loads and prices to be modeled.

For our Report we presented a simplified analysis to understand the possible ranges for the standard error of the *current Prudential Standard* with *a PLGD of 4%* by considering two extremes:

- If we assume no dependency between days and a constant PLGD of 4%, the standard error of an estimate based on 3,653 days is 0.3%, based on the square root of (0.04*0.96/3,653).
- Alternatively, if we assume the dependency is so great that we effectively only have 10 independent data points – the estimates of the probability for each year – then the standard error is 1.3% (0.04/square root of (10)).
- Given the observation that the average size of clusters of loss days is 3-4, a reasonable estimate of the standard error is about 0.6%. This estimate does not allow for the simplifications made in the model or for the possibility that the probability changes over time.

Figure 2.3 and Figure 2.4 on page 7 compare the alternatives, looking at the probability of a loss given default on a monthly basis. The improved performance evident in comparing Table 2.1 and Table 2.2 can be seen throughout the year, with a marked reduction in the probability of a loss given default in all months and particularly during the peak winter period. November demonstrates the least improvement, particularly looking at the results for South Australia.

Figure 2.1 Victoria, shorter settlement cycle and improved calculation approach (2% probability of loss given default), Base Case, maximum loss given default, $/MWh p.a.

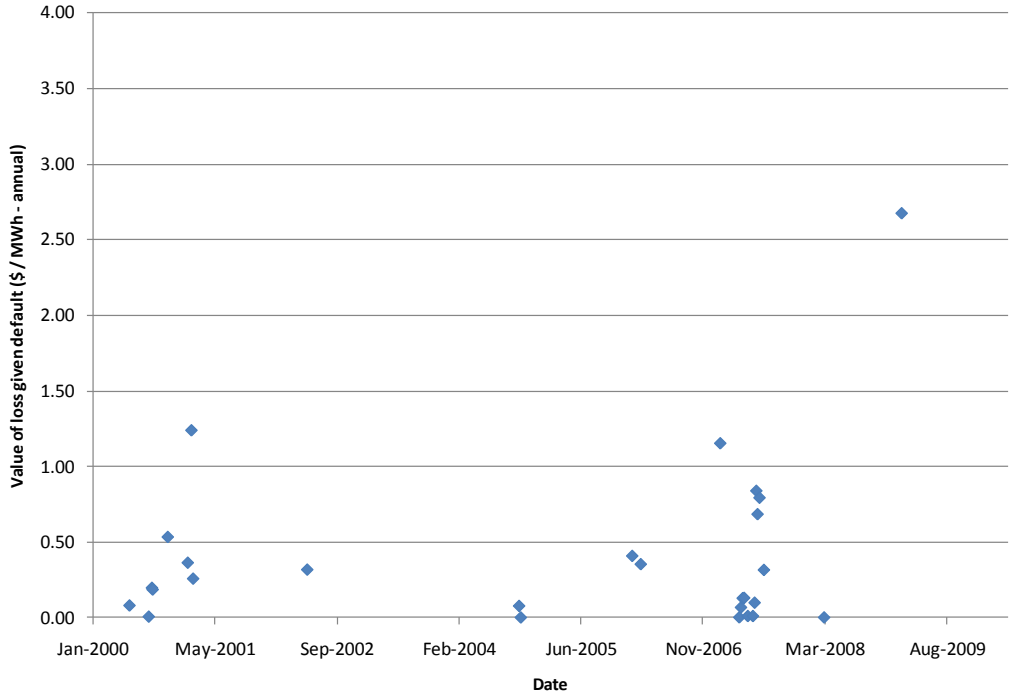


Figure 2.2 Victoria, shorter settlement cycle and improved calculation approach (level of prudentials unchanged), maximum loss given default, $/MWh p.a.

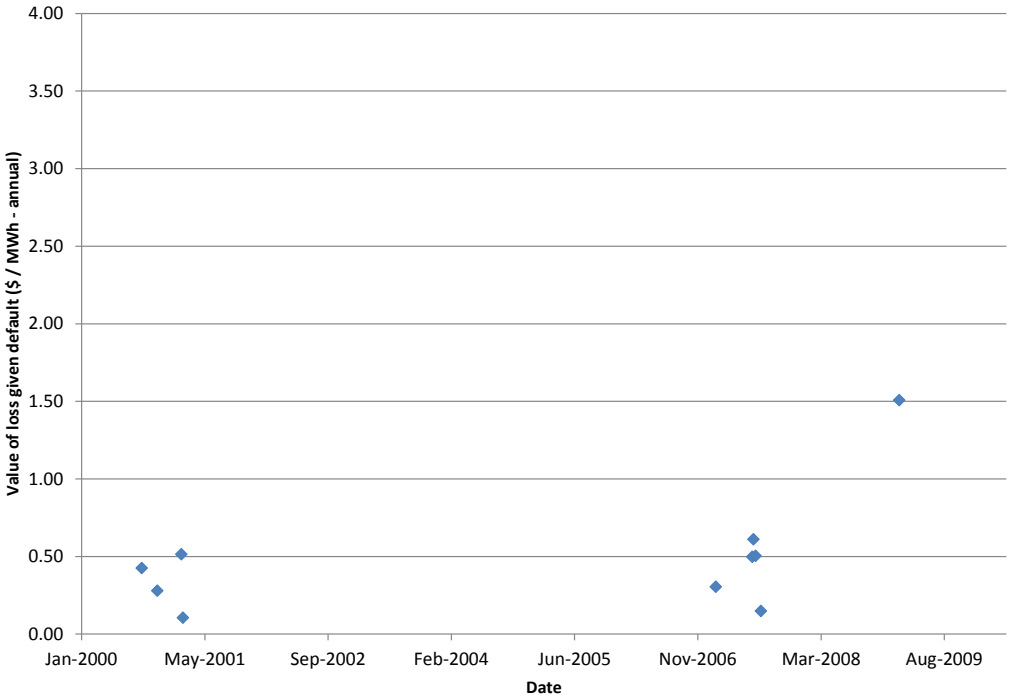


Figure 2.3 Shorter settlement cycle (2% probability of loss given default), improved calculation approach, probability of a loss given default, Base Case, percent by month

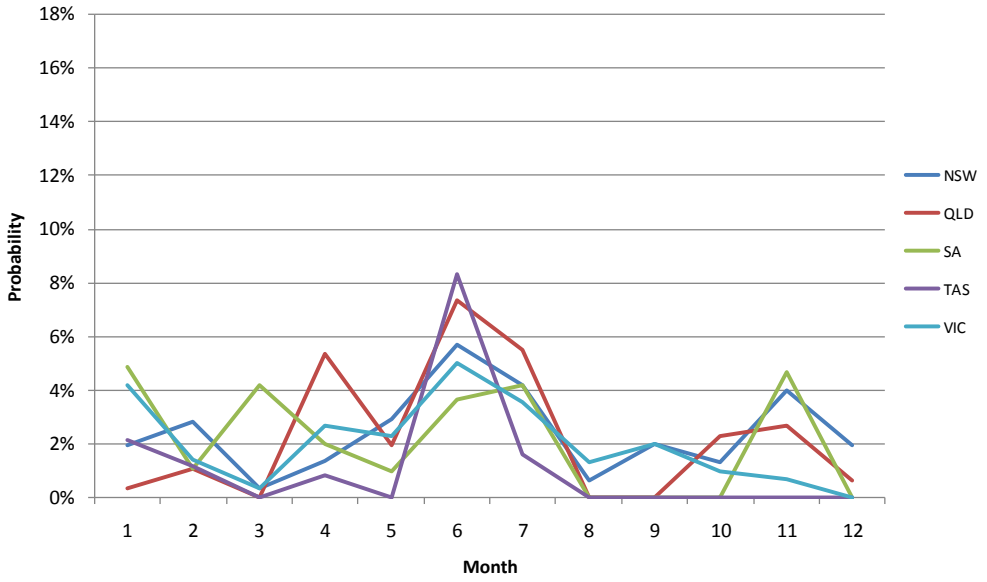


Figure 2.4 Shorter settlement cycle (level of prudentials unchanged), improved calculation approach, probability of a loss given default, percent by month

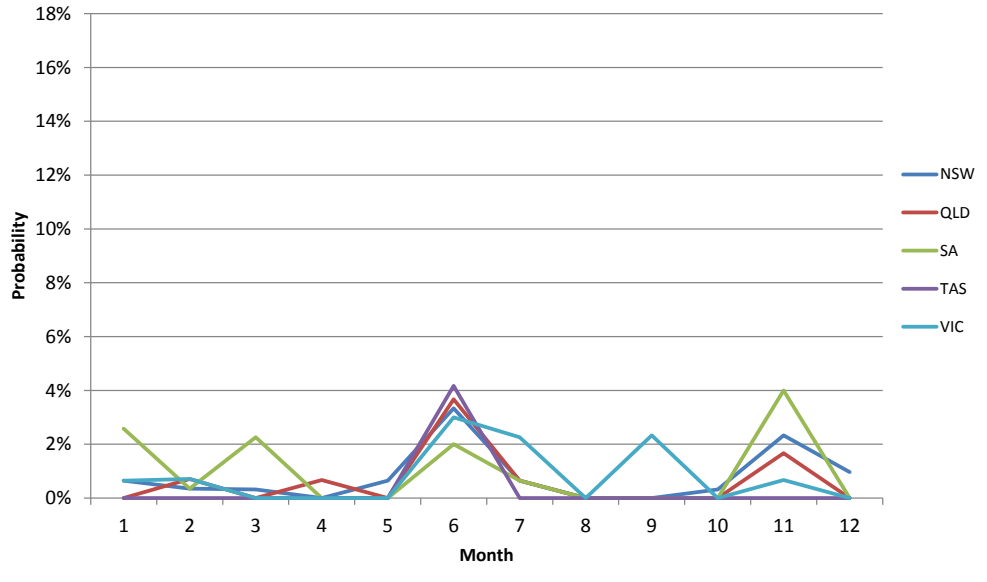


Table 2.3 and Table 2.4 on the following page show the difference in the frequency with which additional security is required, under the case with the shortened settlement cycle (the Report) and the case where a shortened settlement cycle is accompanied by the higher level of prudentials utilising the improved calculation approach but combined with the current settlement cycle.

Compared with the results in Table 2.3, the combination of a shortened settlement cycle and an unchanged prudential requirement:

- Significantly reduces the number of days on which additional security would be required, with the percentage of days on which additional security is required falling by between 50 and 80 per cent.
- Significantly reduces the number of days the additional security is held for, with the percentage of days for which the additional security is held falling by significantly more than 50 per cent in all states in the NEM.
- Increases the average total additional security balance required, by between 6.5 per cent in NSW to around 60 per cent in Tasmania. This result is consistent with the earlier results on the increase in the average loss given default.

Figure 2.5 and Figure 2.6 on page 10 illustrate the additional security required as a proportion of the prudential standard across time for each of the NEM states. As the figures illustrate, the reduction in the requirement for additional securities is common to the period since 2001. There is a much lower level of clustering than was previously the case in the requirement to provide additional securities – a reduction in a source of systemic stress in and of itself. Finally, the additional security required is, on average, a much lower proportion of the Prudential Standard than is the case under the Rule Change proposal.

Table 2.3 Additional security required by number of days required and dollar values by NEM region, shortened settlement cycle (2% probability of loss given default)

Region	NSW	Qld	SA	Tas	Vic
Total days	3,653	3,653	3,653	1,583	3,653
Number of days additional security is required	161	137	154	27	137
Percentage of days additional security is required	4.4%	3.8%	4.2%	2.0%	3.8%
Average new security deposit required ($m)	32	18	8	5	17
Total number of days with additional security held	447	369	409	96	418
Percentage of days with additional security held	12.2%	10.1%	11.2%	7.0%	11.4%
Average total additional security balance ($m)	107	64	28	14	48

Table 2.4 Additional security required by number of days required and dollar values by NEM region, shortened settlement cycle (level of prudentials unchanged)

Region	NSW	Qld	SA	Tas	Vic
Total days	3,653	3,653	3,653	1,371	3,653
Number of days additional security is required	56	52	82	5	47
Percentage of days additional security is required	1.5%	1.4%	2.2%	0.4%	1.3%
Average new security deposit required ($m)	41	19	10	12	21
Total number of days with additional security held	179	145	180	12	110
Percentage of days with additional security held	4.9%	4.0%	4.9%	0.9%	3.0%
Average total additional security balance ($m)	114	70	42	45	77

Note that the data for Total Days for Tasmania differs from that included in the Final Report for AEMO. The data included in the Final Report and in – which is reproduced as in the Final Report - was an error.

Figure 2.5 Additional securities as a share of required prudential holdings, shorter settlement cycle and improved calculation approach (2% probability of loss given default), percent

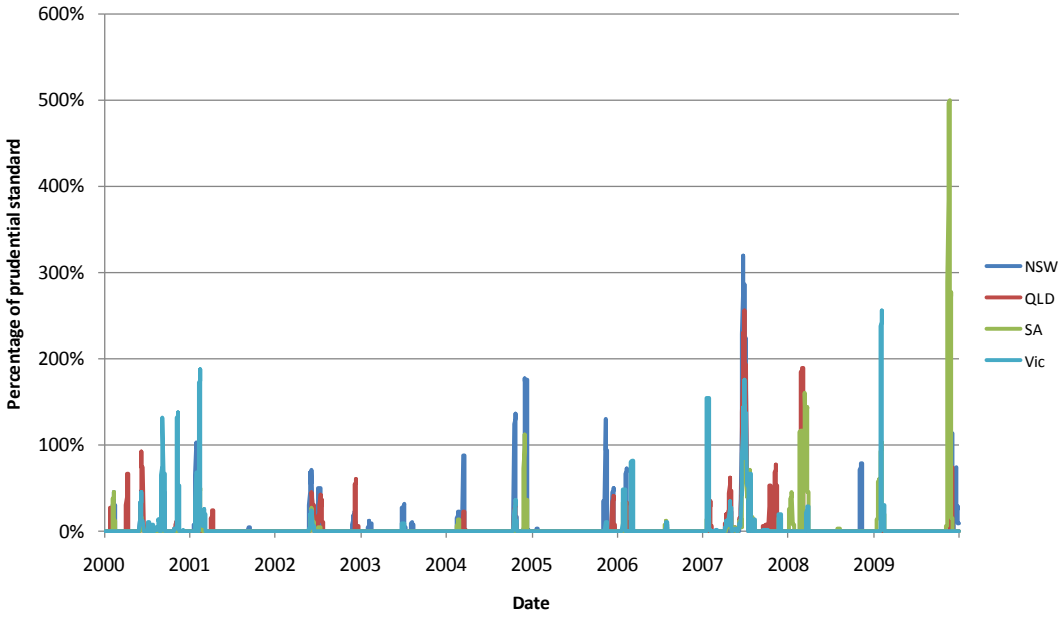
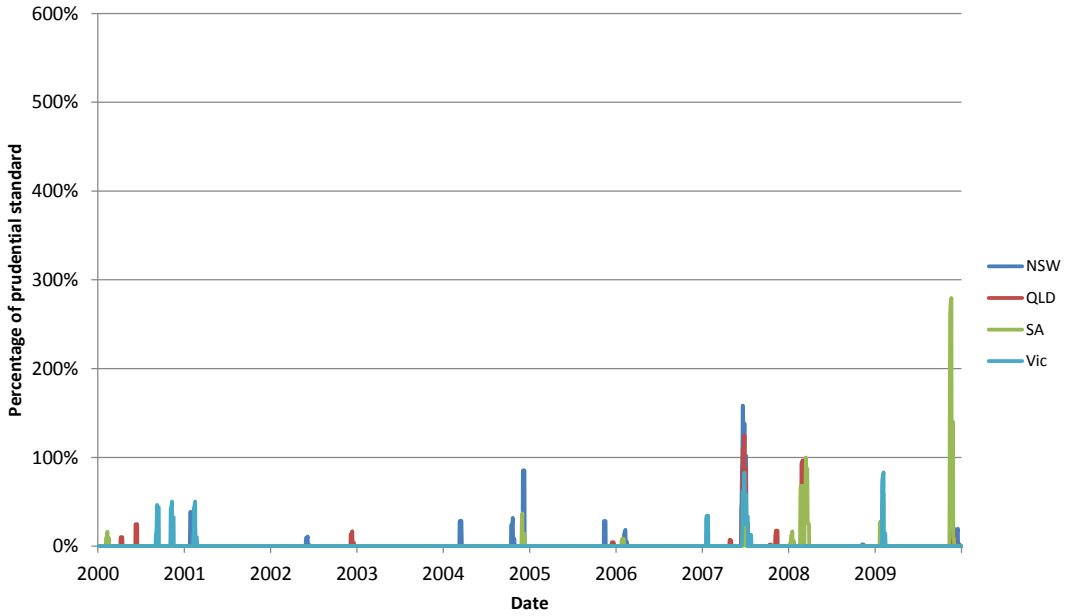


Figure 2.6 Additional securities as a share of required prudential holdings, shorter settlement cycle and improved calculation approach (level of prudentials unchanged), percent



The improvements in the performance of the prudential arrangements as outlined in Table 2.2 come at a cost. As Table 2.5 shows, the required prudential holdings associated with the alternative proposal are between 1.5 and 1.8 times the average level of prudentials associated with the alternative approach of a reduced level of prudentials combined with a shorter settlement cycle whilst maintaining the PLGD at 2%.

Table 2.5 Required Prudential Holdings, Shorter Settlement Cycle with/out reduced Prudential Requirements, $ million, avg of monthly holdings

	NSW	QLD	SA	TAS	VIC
Improved calculation approach, shorter settlement cycle and 2% PLGD (as per Table 5.6 of the Report)	260	190	67	50	143
Improved calculation approach, shorter settlement cycle, level of prudentials unchanged (as per Table 5.6 of the Report)	442	305	101	75	251
Ratio	1.7	1.6	1.5	1.5	1.8

A. Further Results - NSW

Figure A. 1 NSW, shorter settlement cycle and improved calculation approach (2% probability of loss given default), Base Case, maximum loss given default, $/MWh p.a.

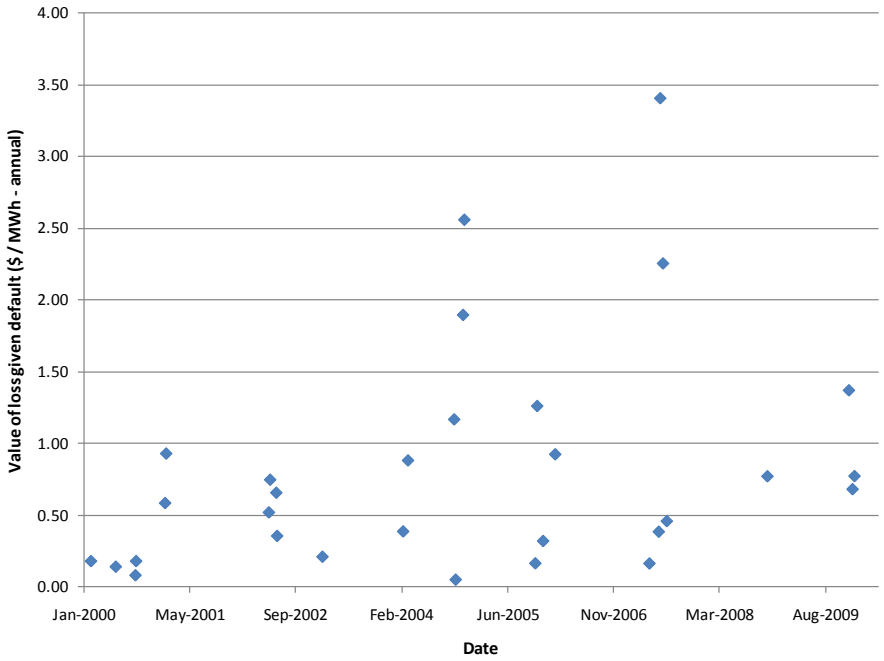
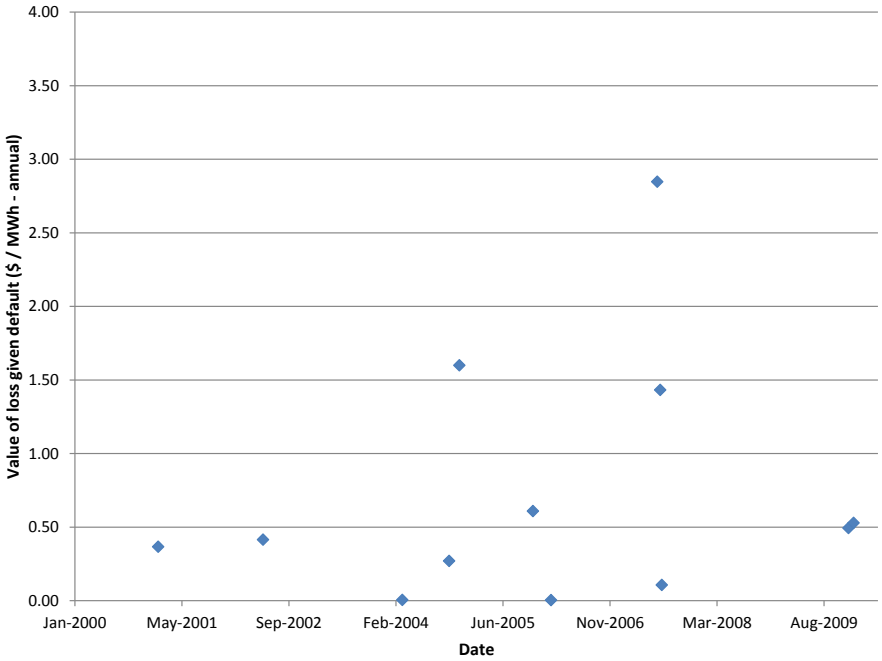


Figure A. 2. NSW, shorter settlement cycle and improved calculation approach (level of prudentials unchanged), maximum loss given default, $/MWh p.a



B. Further Results - Queensland

Figure B. 1 Queensland, shorter settlement cycle and improved calculation approach (2% probability of loss given default), Base Case, maximum loss given default, $/MWh p.a.

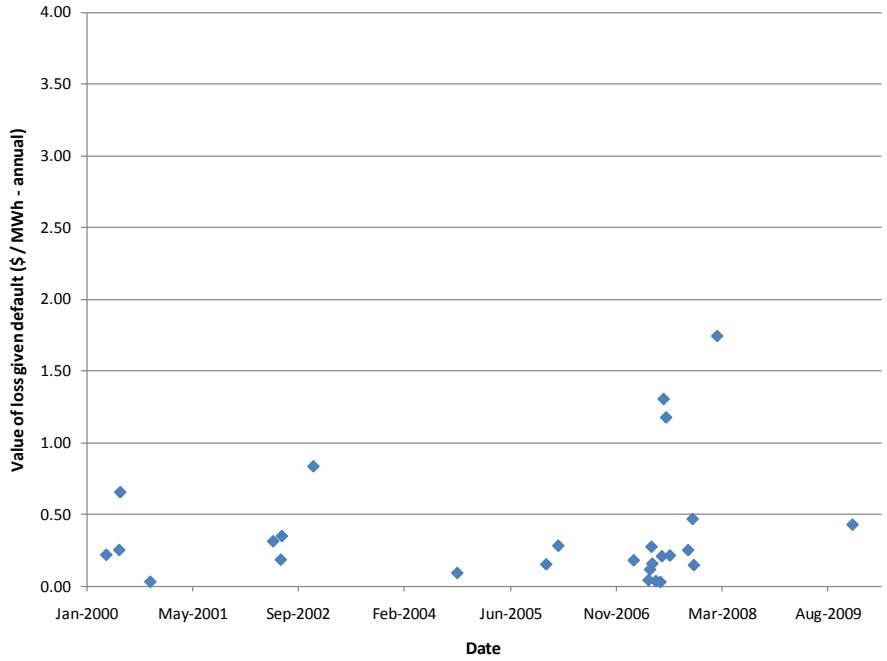
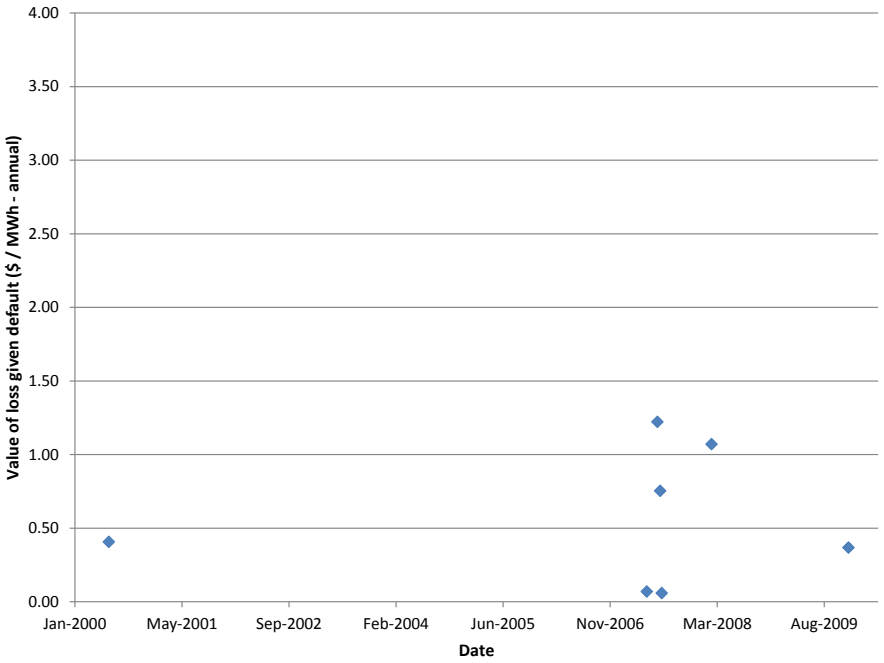


Figure B. 2. Queensland, shorter settlement cycle and improved calculation approach (level of prudentials unchanged), maximum loss given default, $/MWh p.a.



C. Further Results - South Australia

Figure C. 1. South Australia, shorter settlement cycle and improved calculation approach (2% probability of loss given default), Base Case, maximum loss given default, $/MWh p.a.

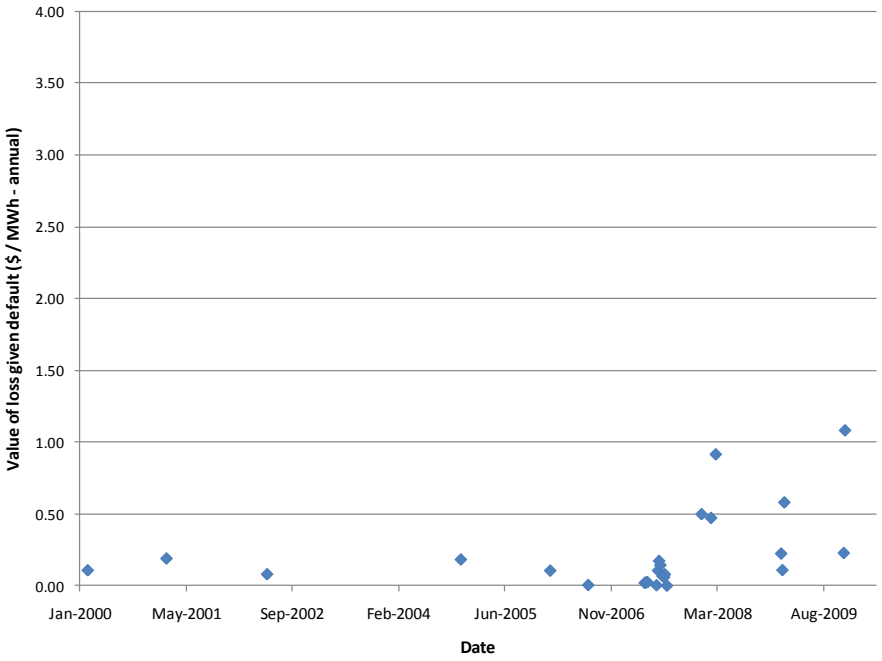
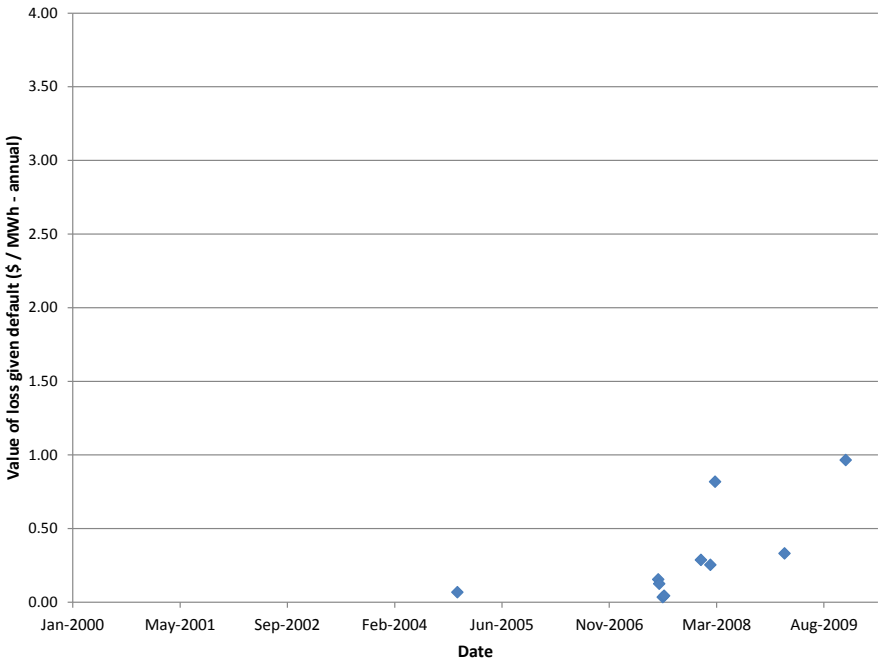


Figure C. 2. South Australia, shorter settlement cycle and improved calculation approach (level of prudentials unchanged), maximum loss given default, $/MWh p.a



D. Further Results - Tasmania

Figure D. 1. Tasmania, shorter settlement cycle and improved calculation approach (2% probability of loss given default), Base Case, maximum loss given default, $/MWh p.a.

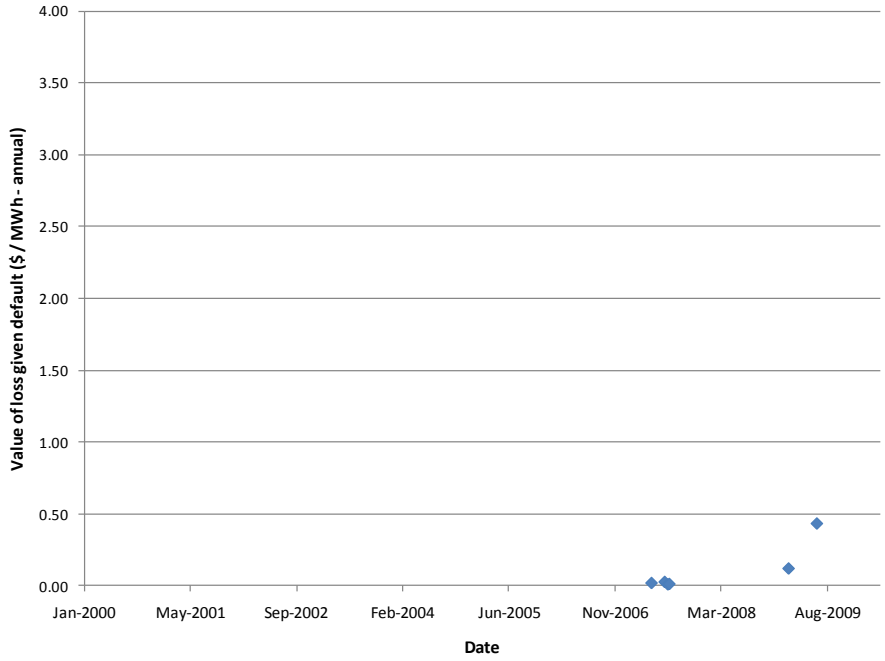


Figure D. 2. Tasmania, shorter settlement cycle and improved calculation approach (level of prudentials unchanged), maximum loss given default, $/MWh p.a