

RCP PAPER NO. : **EMC/RCP/44/2009/CP18**

SUBJECT : **SHORTENING OF SETTLEMENT CYCLE**

FOR : **DECISION**

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Executive Summary

This concept paper explores options to shorten the current settlement cycle in the Singapore Wholesale Electricity Market, with the twin goals of managing business risks in the market, and reducing the credit support required from market participants for their trading exposure.

Based on an analysis of the different phases of the settlement cycle, and balancing theoretical ideals with operational practicalities, EMC proposes to:

- Remove the Preliminary Settlement Statement and bring forward the Final Settlement Statement from T+10BD to T+6BD (Savings of 4BD), and
- Bring forward the payment by debtors and receipt of funds by creditors to 2BD and 3BD (i.e. T + 8 BD and T + 9 BD) respectively, after receipt of Final Settlement Statement (Savings of 2-3BD)

On balance, the proposal to shorten the settlement cycle will incur once-off system implementation costs, as well as the higher interest costs from debtors arising from having to pay earlier. However, the latter should be offset by the interest savings from creditor MPs now that they can receive their payment earlier. There are also additional benefits, such as resource savings to all parties from eliminating the preliminary run, and a reduction in the credit support for MSSL and Retailers by 20%. And more importantly, the shortening of settlement cycle will reduce business and default risks, and increase confidence in the SWEM.

Based on the industry's responses, a majority of the stakeholders support the proposal. Although there are concerns that the scrapping of the Preliminary Settlement Statement could remove the opportunity to identify metering errors, this could be ameliorated if the MSSL could provide preliminary meter data to Gencos for their checking by T+3BD, before MSSL sends the finalised metering data to EMC on T+5BD, which is used to produce the Final Settlement Statement at T+6BD.

Based on the revised inputs from the Market Participants, the proposal fails the cost-benefit assessment. However, the outcome of the cost-benefit assessment could change depending on the following factors:

- a) The cost and availability of Bankers Guarantees, which would impact the potential savings from the proposal;
- b) Full retail competition, which could impact the billing cycle for non-contestable consumers or the additional interest costs borne by the MSSL arising from having to pay earlier for the Non-Contestable Consumers;
- c) The number of MSSL contestable consumers, which would impact the recurrent costs from having to increase their metering frequency from weekly to daily, and the interest costs borne by the MSSL from having to pay earlier for the Contestable Consumers

The decision was thus taken by the Panel to keep in abeyance the proposal to shorten the settlement cycle, until such time where developments to the above factors will make the proposal more feasible.

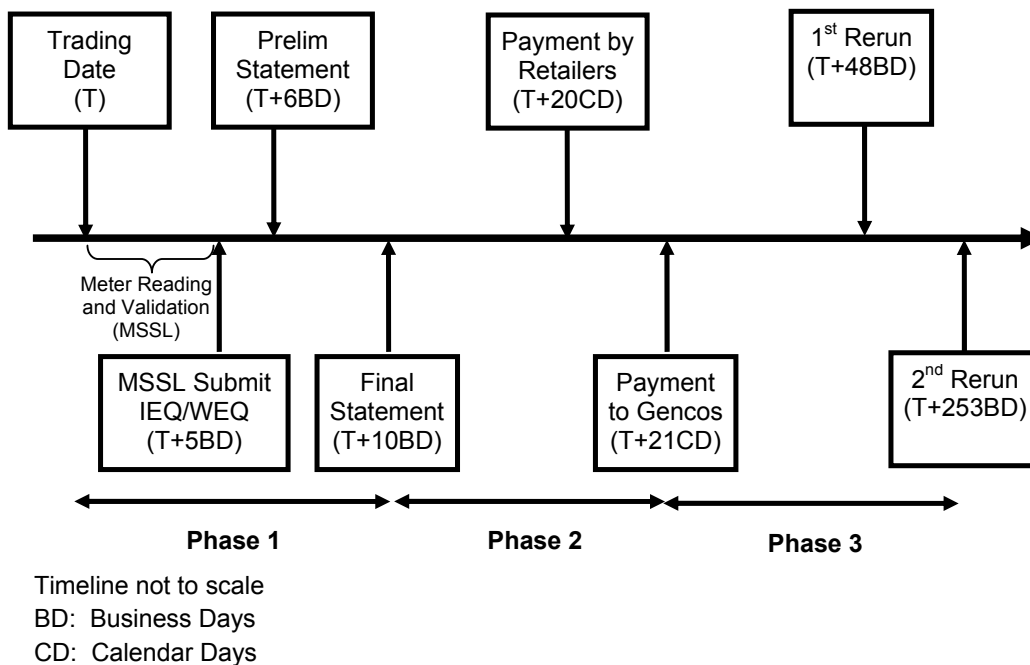
1. INTRODUCTION

This paper explores options to shorten the current settlement cycle in the Singapore Wholesale Electricity Market, with the twin goals of managing business risks in the market, and reducing the credit support required from market participants for their trading exposure.

2. BACKGROUND

2.1 Current Settlement Process

Figure 1: Schematics of Current Settlement Cycle



The above timeline shows the current settlement process in SWEM, which can be broadly divided into the following 3 phases:

Phase 1 (Settlement Statements): SWEM adopts a daily settlement design. After each Trading Date T, MSSL plays the role of both Meter Reader (MR) and Meter Data Manager (MDM) to read and validate the meter readings before sending the meter data to EMC by T+5BD. Using this data, EMC will issue the Preliminary Settlement Statement by T+6BD. If meter corrections are discovered in time to be reflected in EMC's Final Settlement Statement (FSS), MSSL will send them to EMC between T+6BD and T+9BD, to be incorporated in EMC's Final Settlement Statement at T+10BD.

Phase 2 (Payment): After receiving the Final Settlement Statements on T+10BD, debtors (typically the MSSL and Retailers) have up to T+20CD to pay EMC through their accounts in the clearing bank. At T+21CD, EMC will pay out all monies collected for Trade Date T to the creditors (typically Gencos and service providers).

Phase 3 (Reruns): After the settlement on T+21CD, the wholesale market provides for two settlement re-runs, once at T+48BD and the other at T+253BD. These re-runs serve as “safety nets”, during which any further metering errors pertaining to trading day T can be corrected.

2.2 Previous Review in 2006 (Rule Change Paper 249)

In 2006, at the request of the RCP, EMC reviewed the scope of shortening the settlement cycle using a financial cost benefit analysis. The review found the main benefit to be interest savings from the Creditors (mainly Gencos) from receiving their settlement amounts earlier, and the main cost to be interest costs from the Debtors (MSSL and Retailers) from having to pay earlier. Based on the interest savings/costs data provided by the Market Participants, the review concluded that the additional interest costs outweighed the interest savings. As a result, the study recommended that there be no changes to the settlement cycle, which was supported by the RCP.

During the 2008 Workplan consultation process, market participants felt that it was useful to relook at the shortening of settlement cycle in view of recent volatility in the financial capital markets and business operations. There is now greater emphasis on managing business risk, to which the shortening of settlement cycle would contribute.

It is therefore in this context of managing business risk and reducing credit support required that this paper revisits the issue of shortening the settlement cycle.

3. ANALYSIS

3.1 Economic Principles and Literature Review

At a fundamental level, a seller of a good or service should be entitled to immediate payment once the good or service has been consumed. In the electricity market, this simple ideal is difficult to attain given the lead time required to obtain accurate meter readings. Nevertheless, where technically and operationally feasible, markets should work towards this ideal benchmark.

This ideal of shortening the settlement cycle as far as possible to manage business risks is articulated in a U.S. Securities and Exchange Commission Concept Release on Securities Transactions Settlement¹ in 2004, which states that:

“It is generally accepted that a substantial portion of the risks in a clearance and settlement system is directly related to the length of time it takes for trades to settle. In other words, “time equals risk.”... In the (Federal Reserve) Board's view, the key features of an ideal settlement system were the settlement of trades immediately after execution and payment in same-day funds. Similarly, the Federal Reserve Bank of New York stated at that time that shortening the settlement cycle decreased the likelihood for adverse developments to occur between the execution and settlement of each trade, thus lowering the credit and market risks that could arise when settling individual transactions.

¹ <http://www.sec.gov/rules/concept/33-8398.htm>

A CPSS/IOSCO Report² noted that the longer the period from trade execution to settlement, the greater the risk that one of the parties may become insolvent or default on the trade”.

In the specific context of electricity markets, a Deloitte and Touche consultancy report³ for PJM in 2007 concluded the following benefits in having an accelerated settlement process:

- a) **Reduced Cost of Collateral** – The amount of collateral required to secure net exposure would be reduced
- b) **Reduced Cost of Risk Capital** – Risk capital is the amount of balance-sheet capital that must be held to offset the risk associated with potential losses that could occur related to net exposure. Since power prices are quite volatile, the risk capital required to offset potential exposures over the existing settlement period is significant.
- c) **Reduced Interest Costs** – Accelerating settlement would allow net sellers to get their cash much sooner, possibly offsetting any need to access the capital markets for working capital and even potentially providing aggregate savings on the order of tens to hundreds of millions of dollars annually.

3.2 Application to the SWEM

The above literature on the established benefits of shortening settlement cycles is applicable to the SWEM, especially against the backdrop of volatile business conditions and oil/electricity prices. Although the default risk of the debtor group in SWEM (MSSL and Retailers) is difficult to quantify, the reduction in settlement cycle reduces the likelihood and potential impact that such defaults can have on the whole market. It is therefore in the interests of all Market Participants, who would have to bear the costs of such defaults⁴, to reduce this risk.

The paper analyzes the possible options to shorten the settlement cycle, and summarizes responses from Market Participants on the proposal.

² “Recommendations for Securities Settlement Systems,” CPSS (Committee on Payment and Settlement Systems)/IOSCO(International Organization of Securities Commissions) Task Force (November 2001).

³ <http://www2.pjm.com/documents/downloads/strategic-responses/appendices/appendix13-deloitte-and-touche-market-clearing.pdf>

⁴ Under current market rules, if a debtor defaults in the SWEM, the default amount will be recovered from all non-defaulting Market Participants through a default levy weighed by their respective invoice amount. A RCP proposal in January 2007 to recover the default amount only from net creditor MPs (those with positive net invoice amount) is pending EMA’s approval.

4. OPTIONS TO SHORTEN THE SETTLEMENT CYCLE

This section analyzes the settlement cycle by the individual phases described in Figure 1.

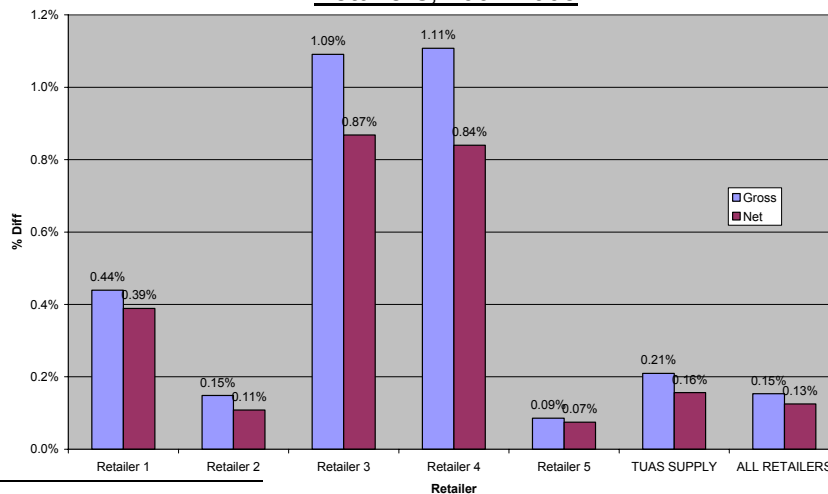
4.1 Phase 1 (Settlement Statements) (T to T+10BD)

This process comprises the two components of MSSL’s meter reading/validation, and the time gap between the issuance of the preliminary and final settlement statements. Based on feedback from the MSSL, there is no scope to reduce the 5 business days required to collect and validate meter data, given the nature of their operations.

The alternative is to eliminate the time gap between the prelim and final settlement statement, by removing the prelim statement and bring forward the final statement to T+6BD. When the settlement system was originally designed with the preliminary and final settlement statements, there were no settlement reruns at T+48BD and T+253BD. As such, the final settlement statement was important as the final “safety net” for MPs or MSSL to reflect and correct any metering errors in the prelim statements. However, with the implementation of the two reruns, any corrections can be captured under the T+48BD settlement rerun, and the removal of the preliminary run becomes more tenable.

Any decision to remove the preliminary statement boils down to a balance between streamlining the payment process versus settlement accuracy. Although any metering error can only be caught and corrected at the later T+48BD, the market can save resources by removing one settlement run, and reduce the settlement timeline by 4BD. To get a sense of the materiality of removing the preliminary statement, we analyse the preliminary and final settlement statement data as follows:

Figure 2A: Ratio of Gross/Net Adjustments between Preliminary and Final Settlement Statements to Final Settlement Amount (excluding deductions due to Bilaterals⁵) for Retailers, 2007-2008⁶

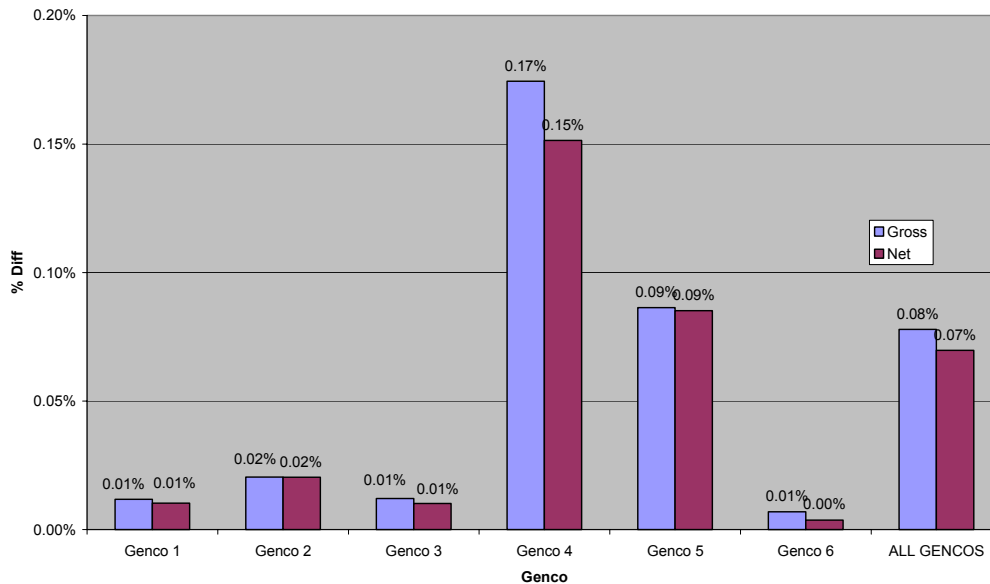


⁵ The Final Settlement Statement in itself understates the total settlement amount for a Retailer, because any amount for which it has a bilateral contract with a genco is deducted from the Final Settlement Statement. To more accurately reflect the settlement amount for a Retailer, we do not deduct the amounts due to bilaterals, which results in a larger settlement amount that that reflected in the Final Settlement Statement, and more accurately reflects the percentage error.

⁶ Gross Ratio = $\frac{\sum \text{Absolute}(\text{Final Settlement Statement Amount} - \text{Preliminary Settlement Statement Amount})}{\sum (\text{Final Settlement Statement Amount excluding deductions due to bilaterals})}$

Net Ratio = $\frac{\sum (\text{Final Settlement Statement Amount} - \text{Preliminary Settlement Statement Amount})}{\sum (\text{Final Settlement Statement Amount excluding deductions due to bilaterals})}$

Figure 2B: Ratio of Gross/Net Adjustments between Preliminary and Final Settlement Statements to Final Settlement Amount (excluding deductions due to Bilaterals⁷) for Gencos, 2007-2008⁸



Figures 2A and 2B show the difference between the Preliminary Settlement Statement and Final Settlement Statement, as a ratio of the Final Settlement Statement amount excluding deductions due to bilaterals for Retailers and Gencos respectively. The ratio is shown at both the gross and net basis for debtors (MSSL and Retailers) and creditors (Gencos) using settlement data from 2007-2008. For all debtor MPs, the correction amount (on a net basis) is below 0.1% for all debtor MPs, with an overall average of only 0.07% (or a net correction amount of \$8.9 million out of a total settlement amount of \$12.9 billion from 2007-2008). The situation is quite similar for creditor Gencos, with the correction amount on a net basis of below 0.15% for all creditor MPs, with an overall average of only 0.07%.

Given the relatively small amount of settlement adjustments during the preliminary and final settlement statements, EMC proposes to remove the preliminary settlement statement, and bring forward the final settlement statement to T+6BD. Some Gencos also suggested that it would be useful for MSSL to provide them with IEQ figures for checking before issuing sending their files to EMC by T+5BD (e.g. at T+3BD), so that they have the chance to correct any glaring errors.

⁷ The Final Settlement Statement in itself understates the total settlement amount for a Retailer, because any amount for which it has a bilateral contract with a genco is deducted from the Final Settlement Statement. To more accurately reflect the settlement amount for a Retailer, we do not deduct the amounts due to bilaterals, which results in a larger settlement amount that that reflected in the Final Settlement Statement, and more accurately reflects the percentage error.

⁸ Gross Ratio = $\frac{\sum \text{Absolute}(\text{Final Settlement Statement Amount} - \text{Preliminary Settlement Statement Amount})}{\sum (\text{Final Settlement Statement Amount excluding deductions due to bilaterals})}$

Net Ratio = $\frac{\sum (\text{Final Settlement Statement Amount} - \text{Preliminary Settlement Statement Amount})}{\sum (\text{Final Settlement Statement Amount excluding deductions due to bilaterals})}$

MSSL responded that they are unable to send meter data to generators for their checking before the proposed Final settlement Statement at T+6BD. This is because the MSSL requires 2-3BD to read the meter, and another 2BD to validate the data. EMC has requested for MSSL to consider the following 2 options:

- i) Conduct reading of the Genco meters within 3BD, and send out to the Gencos by T+3BD without validation. Gencos would have the understanding that this meter data by MSSL is non-validated and not meant to be binding, just for their own reference.
- ii) Conduct remote reading of the Genco meters at T+1BD, validate the meter date within 2BD and send out the meter data to Gencos by T+3BD. For meters that are unable to be read remotely at the first attempt, no meter data will be sent out

EMC is awaiting MSSL's response on the operational viability of the above 2 options, the implementation of which may require changes to the MSS Code.

4.2 Phase 2 (Payment) (T+10BD to T+21CD)

This phase comprises two main components: the period from T+10BD to T+20CD (translates to about 4-5BD) when debtor MPs will prepare funds for payment after receiving their final settlement statement, and the 1CD gap between when EMC collects funds from debtor MPs to payment to creditor MPs.

There is scope to reduce the timeline of first component to, say, 2 business days, as this should be adequate for debtor MPs to prepare their funds and park it in their settlement account. In addition, there is merit in shifting from the current CD basis to a BD one for alignment with the other milestones of the settlement cycle, which are all calculated based on BD. As such, EMC proposes to bring forward payment by debtor MPs to 2BD after they receive the final settlement statement (i.e. T + 8 BD).

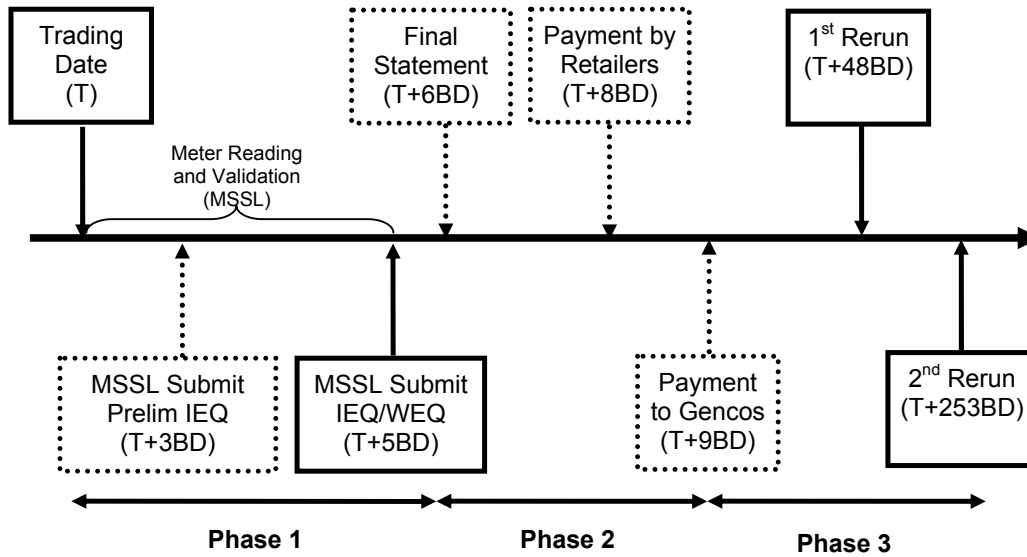
For the other component, EMC receives funds by T+20CD, and pays out by T+21CD. Conceptually, the receipt and payment of funds could be completed on the same day (e.g. funds to come in by 12 noon, payment to go out by 5pm). This could further reduce the settlement cycle by one day, and reduce any credit risk from the bank arising from leaving the SWEM settlement funds overnight in the bank. However, this reduction in time buffer could be difficult to operationalise, and further shorten the lead time that debtors have to prepare their funds. On balance, EMC feels that the savings of 1CD does not justify the additional effort and hence, propose payments to creditors to remain at 1BD after receipt of funds from debtors. As follows from the earlier proposal, EMC proposes to correspondingly bring forward payment to creditor MPs to 3BD after they receive the final settlement statement (i.e. T + 9 BD).

4.3 Phase 3 (Reruns) (T+21CD to T+48BD/T+253BD)

This phase involves the reruns conducted at T+48BD and T+253BD. As the reruns do not materially affect the main settlement process, EMC does not propose any changes to this process.

4.4 Proposed Settlement Cycle

Figure 3: Schematics of Proposed Settlement Cycle



Timeline not to scale

BD: Business Days

Dashed Boxes: Proposed Changes

The figure above shows the revised Settlement Cycle incorporating EMC's proposed changes. In the new cycle, MSSL will submit prelim IEQ data to the Gencos at T+3BD, and the IEQ/WEQ data to EMC by T+5BD. The Final Settlement Statement will be issued at T+6BD (savings of 4BD from removing the Preliminary Settlement Statement), and the payment/receipt to debtor/creditor MPs will be brought forward to T+8BD and T+9BD respectively (savings of about 2-3BD). There will be no changes to the rerun dates on T+48BD and T+253BD.

The proposed changes will almost halve the original settlement cycle of 21CD (or about 15-16BD) to 9BD. This translates to a corresponding reduction in the credit support required from Debtor MPs, and reduces overall business and default risks in the SWEM.

5.0 PROPOSAL ANALYSIS

5.1 Cost Benefit Analysis

The table below analyses the qualitative costs and benefits associated with implementing the changes proposed in the earlier section:

Table 1: Costs and Benefits of Shortening the Settlement Cycle

Parties	Benefits	Costs	
	Continual	Continual	Once-Off
Creditors (Gencos)	<ul style="list-style-type: none"> • Resource savings from eliminating Prelim run • Interest Savings from receiving payment earlier 		<ul style="list-style-type: none"> • System Implementation Costs (if any)
Debtors (MSSL, Retailers)	<ul style="list-style-type: none"> • Resource savings from eliminating Prelim run • Reduction in Cost (bank charges and funding cost) of issuing Credit Support 	<ul style="list-style-type: none"> • Interest costs from having to pay earlier 	<ul style="list-style-type: none"> • System Implementation Costs (if any)
EMC	<ul style="list-style-type: none"> • Resource savings from eliminating Prelim run 		<ul style="list-style-type: none"> • System Implementation Costs (if any)
Overall	<ul style="list-style-type: none"> • Reduction in risk of default, which will be recovered from all MPs 		

On balance, the proposal will incur once-off system implementation costs, as well as the higher interest costs from debtors arising from having to pay earlier. However, the latter should be offset by the interest savings from creditor MPs now that they can receive their payment earlier. There are also additional benefits, such as resource savings to all parties from eliminating the preliminary run, and a reduction in the issuance cost of credit support for MSSL and Retailers. And perhaps most importantly, the shortening of settlement cycle will reduce business and default risks, and increase business confidence in the SWEM.

In the previous 2006 review, the additional interest costs from MSSL/Retailers in having to pay earlier were found to outweigh the interest savings from the Gencos from receiving payment earlier. However, we note now that there is no compelling theoretical case for a significant variance in the capital costs between both creditor and debtor groups. Rather, the study approaches from the holistic angle of reducing the amount of capital tied up in the wholesale market. Even if there is significant variance in the capital costs for both creditor/debtor groups, such variance should not factor in the decision to shorten the settlement cycle; after all, it would be perverse to argue that if any debtor(s) has a high cost of capital, then the settlement cycle should be extended as long as possible so that creditors with access to lower cost capital can subsidize debtors with a more expensive capital structure.

5.2 Impact on Credit Support

Credit support is required from the debtors (typically MSSL and Retailers) to cover their trades (calculated based on calendar days) for i) the payment cycle (from trade date to payment date) and ii) the suspension process. The credit support is calculated based on:

$$\text{Credit Support Required} = (\text{Number of CDs in Payment Cycle} + \text{Number of CDs in Suspension Process}) \times \text{Average Daily Exposure}$$

where Average Daily Exposure is the average net settlement amounts from the 90 most recently available preliminary settlement statements (PSS) or corresponding final settlement statements (FSS) if available.

The table below shows the credit support required under the current market rules, and the reduction in Credit Support if the proposal to shorten the settlement cycle were implemented.

Table 2: Credit Support Required under Current Rules and Proposed Changes

	Current Rules		Proposed Changes	
	Calendar Days	Business Days	Calendar Days	Business Days
A) Payment Cycle	20	N.A.	N.A.	8
B) Suspension Process	Approx 10	7	N.A.	7
C) Total Days C = A + B	30	N.A.	19 to 26	15

Under the current market rules, the payment cycle is 20CD, and the suspension process is 7BD⁹, or approximately 10CD. As such, the credit support is required to cover 30 days of the debtor's ADE.

If the proposed changes to shorten the settlement cycle were implemented, the payment cycle reduces to 8BD, while the suspension process remains at 7BD, for a total of 15BD. This 15BD translates to between 19 to 26CD¹⁰ of trading exposure. Using a 95 percent confidence interval¹¹, EMC proposes to set the credit support to cover 24 trading days, which represents a **6-day or 20% reduction from the original credit support level of 30 trading days.**

⁹ If a debtor defaults at T+8BD, EMC will issue a default notice at T+9BD, and the debtor has up to T+11BD to respond. If it does not, EMC will call for a suspension hearing at T+12BD, and the MSCP has up to T+14BD to suspend the defaulting debtor. The suspension will be carried out on T+15BD, hence resulting in a total of 7BD (T+8BD to T+15BD) for the whole suspension process.

¹⁰ In the best case scenario, 15BD would translate into 19CD, straddling 2 weekends. In the worst case scenario, the same 15BD could translate into 26CD, straddling 4 weekends and 3 public holidays.

¹¹ Using a 95 percent confidence interval, we exclude the 18 days (0.05 x 365 days) of highest exposure in setting the credit support level. In 2009, there are 9 instances when the debtors will have a trading exposure of 25 CDs, with the rest being 24 CDs or less. As such, we propose to set credit support to cover 24CDs of trade.

6.0 CONSULTATION

EMC published the proposal to shorten the settlement cycle on 24 Feb 2009, and sought the industry's feedback on the following aspects:

- Estimated savings from the removal of the Preliminary Settlement Run and/or issuance of lower credit support
- Estimated system costs in implementing the proposed streamlining of settlement processes
- Indication on whether the costs / savings are once-off or recurring on an annual basis
- Any other feasible changes to further shorten the settlement cycle
- Any operational difficulties in achieving the proposed streamlining of settlement processes

Market Participants were provided with the response forms reproduced in **Annex 1** (for Gencos) and **Annex 2** (for MSSL / Retailers). A clarification meeting was also held on 06 March 2009 to address any doubts on the proposal. Responses were received from the following 13 Market Participants:

Table 3: Respondents to EMC's Proposal

Genco	Retailer/MSSL	Market Operator
<ul style="list-style-type: none"> • Keppel • Sembcorp • Senoko • Seraya • Tuas • NEA 	<ul style="list-style-type: none"> • Keppel • Sembcorp • Senoko • Seraya • Tuas • SP Services 	<ul style="list-style-type: none"> • EMC

In general, the Market Participants were strongly supportive of the proposal to shorten the settlement cycle. **Of the total 13 responses, 9 supported the proposal, 2 did not support, and the remaining 2 were neutral.** Please refer to **Annex 3** for the responses of MPs.

6.1 Quantitative Analysis

The table below summarises the returns from the above respondents:

Table 4: Summary of Responses to EMC's Proposal¹²

Item	Max Number of Respondents	Number of Responses Received	Range of Answers	Average Value of Answers
System Costs (Once-Off)	13	4	\$50,000 - \$150,000	\$97,000
Admin Savings (Annual Recurrent)	13	1 (EMC)	\$80,000	\$80,000
Interest Rate (Gencos)	6	2	0.11%-1.45%	0.78%
Interest Rate (Retailers)	6	3	0.11%-3.00%	1.52%
Bank Charges for Issuing Collateral (Retailers)	6	3	0.48%-0.75%	0.58%

Given the paucity of responses received, it is not possible to conduct a definitive cost-benefit analysis. However, we can draw some inferences from the limited data provided as follows:

Table 5: Estimated Costs and Savings from Implementation of Proposal

	Once-Off		Recurrent (Annual)	
	Estimate	Explanation	Estimate	Explanation
Costs	\$1,261,000	Assuming that all 13 MPs incur the average system cost of \$97,000 each (average from Table 4)	-	-
Savings	-	-	\$80,000	Assume that in the worst case scenario, only EMC enjoys recurrent savings of \$80,000 per year
			\$396,000	As of 31 Mar 09, EMC was holding total Banker's Guarantees of \$341.7 Million. We assume that this amount can be reduced by 20% (or \$68.34 Million), and the

¹² No responses were received for the items on "Once-off Admin Savings", "Recurrent Admin Costs" and "Reduction in funding costs of credit support".

	Once-Off		Recurrent (Annual)	
	Estimate	Explanation	Estimate	Explanation
				applicable bank issuance rate is 0.58% (average from Table 4)
Total	\$1,261,000	-	\$476,000	

The table above estimates the costs and savings from implementing the proposal, using the limited data provided by the MP respondents. Upon incurring a one-time estimated cost of \$1,261,000, the market would enjoy savings of \$476,000 per annum. While the above analysis is not definitive, it does provide a sense of the approximate financial impact arising from the proposal's implementation. The following points are also noted:

- a) **Exclusion of Interest Savings/Costs** – The analysis assumes that the costs of capital for both retailers and gencos are comparable. As such, any interest savings from the gencos will be offset by the additional interest costs born by the retailers.
- b) **Funding Cost for Issuing Collateral** - No Retailer/MSSL indicated that they will enjoy a reduction in the funding costs for issuing collaterals, even though we expected that there would be some level of reduction.
- c) **Winners and Losers** – Inevitably, there will be some MPs that benefit, and others that lose out from the proposal. However, the decision should be made by considering the costs and benefits to the wholesale market as a whole. In principle, we could also expect any gains from the winners to pass on to the losers (e.g. if gencos know that they can receive their payments earlier with a lower credit risk, they should be willing to bid at a lower price into the market which will then benefit the retailers).

6.2 Qualitative Analysis

This section summarises and analyses the qualitative responses received from the industry, under the categories of “Comments”, “Operational Difficulties” and “Additional Recommendations”. Please refer to **Annex 3** for a verbatim record of all responses received.

Comments

A summary of the responses received from the industry are shown below:

- Greater efficiency in records management
- Reduction in credit risk
- Interest savings for Gencos from receiving payment earlier
- Negative consequences to be borne by the end consumers
- Not equitable for MPs to benefit, while consumers have to bear the costs for the proposed change
- Overall cost outweighs the benefit

All the above points were already addressed as part of the paper, namely that there would be resources savings from the removal of the preliminary settlement statement and

reduction in credit risk in the wholesale electricity market. The gencos would gain from interest savings from receiving their payments earlier, while the retailers/end-consumers will have to bear the costs of paying up earlier. However, as argued, the gains of the gencos from the great certainty of earlier payment should translate into lower offer bids (reduction in credit risk premium), and the benefits of which will flow through to the retailers/end-consumers. Overall, the benefits should outweigh the costs of implementing the proposal.

Operational Difficulties and Additional Recommendations

The section tackles the responses to both “Operational Difficulties” and “Additional Recommendations” together, given their inter-relations.

1) Currently, MSSL updates gencos with their meter accuracy report only at T+6BD. By removing the preliminary settlement run, any meter error can thus be adjusted only at the 1st settlement rerun on T+48BD. It would be useful for MSSL to provide MPs with IEQ figures for checking (e.g. at T+2BD) before issuing sending their files to EMC by T+5BD, so that Gencos have the chance to correct any glaring errors.

MSSL responded that they are unable to send meter data to generators for their checking before the proposed Final settlement Statement at T+6BD. This is because the MSSL requires 2-3BD to read the meter, and another 2BD to validate the data. EMC has requested for MSSL to consider the following 2 options:

- i) Conduct reading of the Genco meters within 3BD, and send out to the Gencos by T+3BD without validation. Gencos would have the understanding that this meter data by MSSL is non-validated and not meant to be binding, just for their own reference.
- ii) Conduct remote reading of the Genco meters at T+1BD, validate the meter date within 2BD and send out the meter data to Gencos by T+3BD. For meters that are unable to be read remotely at the first attempt, no meter data will be sent out

EMC is awaiting MSSL’s response on the operational viability of the above 2 options, the implementation of which may require changes to the MSS Code.

2) The removal of the preliminary settlement run would lead to a greater chance of metering errors at the Final Settlement Statements. As such, EMC could consider either shortening the rerun cycle (from the current T+48BD and T+253 BD), or introduce a third settlement rerun executed earlier than the other current two.

There is little scope for the shortening of the rerun cycle, as the 1st rerun at T+48BD is meant to take into account the billing cycle of retailers, and the time taken for retail customers to review their bills and revert to their retailers on suspected discrepancies. The retailers can then bring up the issue with MSSL for checking and adjustments.

The introduction of a third settlement rerun would unnecessarily add on to the effort and resources required of all MPs involved, and does not appear justified given the small amount of adjustments (average of 0.07%) based on historical data from 2007-2008.

For IEQs, if the MSSL is able to provide meter data earlier to Gencos for checking before the issuance of the Final Settlement Statement, the frequency and magnitude of meter errors should not be significant and thus, there is no need to change the rerun timings.

For WEQ, given the 20% validation threshold, it is very unlikely for glaring errors to occur.

3) Based on the current market rules, reruns do not allow for the revision of charges and fees (AFP, HEUC, MEUC, PSO and EMC Fees). As such, any large genco's meter error will therefore distort the charges and fees.

This is a valid concern. Currently, the AFP, HEUC, MEUC, PSO fees and EMC fees are computed based on the injection and/or withdrawal quantities. If there are any large errors to these quantities, the charges/fees would be materially wrongly computed. Under the current market rules, they will not be changed, even at the settlement reruns of T+48BD and T+253BD.

In one incident from 15-18 Dec 2006, erroneous meter readings from a Genco MP resulted in an inflated average IEQ/WEQ value for the whole market of 3797/3787 MWh per period for the preliminary settlement statement. Fortunately, this error was detected and corrected in time for the final settlement statement, to 2073/2063 MWh per period. This corresponded to an average adjustment of \$2.19 /MWh of the fees/charges, with the adjustments as shown below:

Table 6: Average Fees/Charges Computed for Preliminary and Final Settlement Statements per period (15-18 December 2006)

	AFP	MEUC ¹³	HEUC	EMC Admin	PSO Admin	Total
Prelim Statement	\$2.45	\$0.25	-\$0.44	\$0.19	\$0.11	\$2.55
Final Statement	\$4.52	\$0.25	-\$0.58	\$0.35	\$0.20	\$4.74
Change	\$2.07	0	-\$0.14	\$0.16	\$0.09	\$2.19

Note: figures may not add up due to rounding adjustments

As shown in Table 6, significant changes to the IEQ/WEQ could have a material impact on the associated charges/fees, leading to MPs being over/under-charged. This is because the adjustments due to metering errors at the T+48 and T+253 settlement reruns do not allow for changes to prices and charges, which was determined in the FSS. A possible solution to address future such incidents are as follows:

- i) Set a materiality threshold for changes to IEQ/WEQ (say 500MWh over a period of 1 whole day)
- ii) If the threshold is exceeded, to adjust the settlement statement as follows:

Let A be the erroneous Final Settlement Statement with the IEQ/WEQ error
 B be the correct Final Settlement Statement without the IEQ/WEQ error

¹³ There are no changes to the MEUC rates even after the WEQ adjustments. This is because MEUC rates are calculated based on the projected WEQ for the month. As such, they are fixed for the prevailing month, and do not vary based on actual WEQ that vary by period.

ΔX be the settlement adjustments that would be applied at the 1st rerun at T+48 (ΔX only adjusts quantity without adjusting charges/fees)

Note that A, B, and ΔX are 2-dimensional matrices describing the charges/fees for given time periods

Assuming that the meter error was not detected by the Final Settlement Statement, a given MP would be given statement A instead of B. Statement A would be applied a further adjustment of ΔX at the 1st rerun, such that the MP effectively receives a statement of $A+\Delta X$ (correct quantities but erroneous prices), instead of B (correct quantities and prices). As such, an adjustment ($B-A-\Delta X$) should be applied to the statements upon the discovery of the IEQ/WEQ error, such that the MP effectively faces the correct statement B.

It is notable that in addition to affecting the MP with the metering error, all MPs/MSSL statements would be affected, as changes to the charges/fees will affect the whole market. To make the adjustments required to obtain B, a FULL rerun would be necessary. This leads to the problems associated with a FULL re-run, which had earlier led to the Settlement Rerun Task Force to propose (and RCP agreed to) to implement the current "partial settlement rerun" in the first place.

Prior to implementing the current "partial settlement rerun", EMC performed a "FULL settlement rerun" when a metering error is detected. This FULL settlement rerun re-computes all charges and fees (except MEP, MRP, MFP and USEP) for the affected trading day. Consequently, if MSSL and Retailers have to pass through all these charges/fees changes to their customers, they would have to adjust past invoices of their affected customers. Hence, a metering error discovered for one consumer could lead to adjustments to the invoices for a large number of consumers. There is no price certainty for consumers, and the small adjustment amounts and their frequent occurrences create significant inefficiencies.

Three undesirable outcomes are identified:

- The invoices of too many customers are affected
- Frequent changes to invoiced prices/quantities undermine the credibility of the settlement functions in the market
- FULL settlement reruns performed for small adjustment amounts are not cost-effective

We thus recommend the RCP **not to proceed** on this approach but instead, work with MSSL to provide preliminary IEQs to gencos by T+3 BD, so as to avoid large metering errors.

4) Retailers require 4 working days to settle rather than the current proposed 2 BD, as 2 working days are too short to reconcile the figures for settlement

This point is not valid, as retailers can ensure that there are adequate funds in their clearing bank account to pay off upcoming statements. In any case, other retailers do not have this problem.

5) As EMC has embarked on the settlement revamp project, this proposal can only be implemented in the new settlement system.

We can take this point into consideration when planning for the implementation date of this proposal. One possible option is to implement the proposal in conjunction with the rollout of the new settlement system, which is targeted in the region of February to April 2010.

6) Instead of removing the prelim run, to align the payment date from the current D+20CD and D+21CD to D+12BD and D+13BD respectively.

This would only align the payment dates from a CD basis to a BD one, rather than materially shorten the settlement cycle, which was the original intent of this proposal.

7.0 AFFECTED RULES

Table 7: Preliminary List of Affected Rules, Arising from the Proposal to Shorten the Settlement Cycle

Section	Explanation
Chapter 2, Section 7.3.2	The prudential requirements laid out in this section will be revised to reflect the corresponding reduction in credit support for retailers, from the current 30-day ADE to 24-day ADE.
Chapter 2, Section 7.4.1, 7.4.2	With the revision to credit support, the margin call level at which EMC require the retailers to top up their credit support will be corresponding revised.
Chapter 7, Section 5.2, Appendix 7B, B.3	The settlement timetable described in this section will be amended to reflect the revised schedule shown in Figure 3 of this paper.
Chapter 7, Section 5.4, 5.5	These sections, which describe the coverage and validation of the preliminary statement, will be revised with the removal of the preliminary statement.
Chapter 7, Section 5.6.8	With the removal of the preliminary settlement statement, the clause that MPs must raise their notice of disagreement at the preliminary settlement statement stage, unless they demonstrate that they were unable to even with the exercise of due diligence, will be taken out.
Other Sections	All references to “preliminary settlement statement” will be reviewed, as and where they appear in the Market Rules (e.g. in Chapter 8-Definitions).
Market Manual	The above changes to the Market Rules will be correspondingly updated in the Market Manual (Market Operations – Settlement/ Prudential Requirement).

8.0 UPDATE OF COST BENEFIT ANALYSIS

At the 43rd RCP Meeting in 05 May 09, the panel requested for MPs who had not earlier provide detailed responses to do so, so that the Panel can have a more complete picture to arrive at a more informed decision. The detailed returns from the updated responses are given in Annex 4, with a summary of key parameters shown below:

Table 8: Summary of Key Cost/Saving Parameters

Item	# of Responses Received	Range of Answers
System Costs (Once-Off)	11	Nil to \$250,000
System Costs (Recurrent)	1 (SP Services)	\$348,400
Admin Savings (Recurrent)	1 (EMC)	\$80,000
Interest Rate (Gencos)	4	0.00%-5.38%
Interest Rate (Retailers)	4	0.11%-5.38%
Bank Charges for Issuing Collateral (Retailers)	4	0.50%-1.00%

The figures above are in line with the earlier returns provided in Table 4, with the key difference being an annual recurrent system cost of \$348,400 as reported by SP Services. Based on SP Services' inputs, the proposal to shorten the settlement cycle necessitates them to increase the frequency of meter reading for their Contestable Consumers from weekly to daily, with the associated increased manpower requirements and telephone charges reflected in this \$348,400 figure.

Table 9: Summary of Costs/Savings Revised Responses

MSSL Meter Reading Frequency	Once-Off Costs	Recurrent Annual Costs		Recurrent Annual Savings		
	System Cost	System Cost	Interest Costs (Retailers)	Admin Savings	BG Savings	Interest Savings (Gencos)
Daily	1A) \$732k	2A) \$348k	3) \$2,474k	4) \$80k	5) \$221k	6) \$1,399k
Weekly	1B) \$602k	2B) \$0				

Based on the parameters in Table 8, the total cost and savings to the wholesale market arising from the proposal are shown in Table 9 above. We consider 2 scenarios whereby MSSL's meter reading frequency is increased to daily-read, and if MSSL could stay on the current weekly-read frequency. If the latter scenario were possible, the system costs

would be reduced from \$732k to \$602k, while the recurrent annual costs of \$348k from SP Services having to increase their meter reading frequency could be avoided.

From Table 9, we also note a large difference in the interest costs and savings: Retailers reported that they would incur additional interests cost of \$2,474k, while Gencos report a comparably lower savings of only \$1,399k. This resulted in net additional interest costs of \$1,075k to the market, based on the quoted interest figures. This is in contrast to the recurrent savings of \$80k (admin savings from removing the preliminary settlement run) and \$221k (savings from reduction in Banker’s Guarantees requirements).

Table 10: Net Cost/Savings Outcomes under Different Scenarios

Frequency of MSSL Reading	Method of Interest Calculation	
	Net-Off Interest	Based on Quoted Interest
Daily	<u>Scenario 1</u>	<u>Scenario 2</u>
	Once-Off = -\$732k (1A) Recur = -\$47k (4+5-2A)	Once-Off = -\$732k (1A) Recur = -\$1122k (4+5+6-2A-3)
Weekly	<u>Scenario 3</u>	<u>Scenario 4</u>
	Once-Off = -\$602k (1B) Recur = \$301k (4+5)	Once-Off = -\$602k (1B) Recur = -\$774k (4+5+6-3)

The table above analyses the net financial impact, using the individual cost/savings components (1A, 1B, 2A, 2B, 3, 4, 5, 6) in Table 9 above, under different permutations of the following dimensions:

- **Meter reading frequency** - Whether MSSL can implement the settlement shortening proposal while sticking to the current frequency of weekly meter read, or has to increase the meter reading frequency to daily read.
- **Interest calculation** – Whether we assume that the cost of capital should be uniform across all stakeholders, in which case the additional interest costs/savings from retailers/gencos will net off each other. The alternative scenario is to use the interests costs/savings quoted by the individual stakeholders.

Scenarios 1 and 2 in Table 10 above assumes that MSSL has to increase their reading frequency to daily read, resulting in a total once-off implementation costs of \$732k. Depending on whether interests costs/savings are assumed to be netted off, the recurrent costs would be either \$47k (admin savings + BG savings – System costs), or \$1122k (admin savings + BG savings + Genco interest savings – System costs – Retailer interest costs).

Alternatively, Scenarios 3 and 4 assumes that MSSL can stick to a frequency of weekly read, resulting in lower once-off implementation costs of \$602k. Depending on whether interests costs/savings are assumed to be netted off, the recurrent savings of \$301k (admin savings + BG savings), or recurrent costs of \$774k (admin savings + BG savings + Genco interest savings – Retailer interest costs).

Of the 4 scenarios described, only scenario 3 passes the cost-benefit assessment. The outcome of the cost benefit assessment could change depending on the following key factors:

- a) The cost and availability of bankers guarantees, which would impact the potential savings from the proposal;
- b) Full retail competition, which could impact the billing cycle for non-contestable consumers or the additional interest costs borne by the MSSL arising from having to pay earlier for the Non-Contestable Consumers;
- c) The number of MSSL contestable consumers, which would impact the recurrent costs from having to increase their metering frequency, and interest costs borne by the MSSL arising from having to pay earlier for the Contestable Consumers

The decision was thus taken by the Panel to keep in abeyance the proposal to shorten the settlement cycle, until such time where developments to the above factors will make the proposal more feasible.

9.0 CONCLUSION

Against the backdrop of the current volatile business climate, this paper explores options to shorten the settlement cycle in the SWEM so as to manage business risks in the market, and reduce the credit support that market participants need to put up for their trading exposure.

Based on an analysis of the different phases of the settlement cycle, and balancing theoretical ideals with operational practicalities, EMC proposes to:

- Remove the Preliminary Settlement Statement, and bring forward the Final Settlement Statement from T+10BD to T+6BD (Savings of 4BD)
- Bring forward the payment by debtors and receipt of funds by creditors to 2 and 3BD respectively from receipt of Final Settlement Statement (Savings of 2-3BD)

Although a similar review back in 2006 concluded that the costs of shortening the settlement cycle would outweigh its benefits based on inputs from MPs, this study finds that there is a much greater impetus to do so to reduce business risks in the SWEM. The shortening of settlement cycle will also reduce capital outlay in the SWEM, and reduce the credit support required by debtors by 20%.

A majority of the industry stakeholders support the proposal. Based on the limited data received, the benefits of the proposal are likely to outweigh the costs, although some parties could lose out from the proposal's implementation. There are also concerns that the scrapping of the Preliminary Settlement Statement could remove the opportunity to identify metering errors, but this could be ameliorated if the MSSL could provide preliminary meter data to Gencos for their checking by T+3BD, before MSSL sends the finalised metering data to EMC on T+5BD, which is used to produce the Final Settlement Statement at T+6BD.

Based on the revised inputs from the Market Participants, the proposal would fail the cost-benefit assessment. This is partly due to the requirement by SP Services to increase the meter reading frequency from weekly to daily.

The decision was thus taken by the Panel to keep in abeyance the proposal to shorten the settlement cycle, until such time where developments to the above factors will make the proposal more feasible.

ANNEX 1: RESPONSE TO PROPOSAL ON “SHORTENING OF SETTLEMENT CYCLE” FOR GENCOS

TO : EMC - MARKET ADMINISTRATION DEPARTMENT
 FAX : 6779 3030
 SUBJECT : SHORTENING OF SETTLEMENT CYCLE
 ATTENTION : JAN LEE

As a result of the proposed shortening of the wholesale settlement cycle, the following applies for my generation company:

1. Expected once-off systems costs from the removal of the preliminary settlement statement
 = \$ _____

2. Expected annual recurrent systems costs from the removal of the preliminary settlement statement
 = \$ _____

3. Expected once-off administrative/manpower savings from the removal of the preliminary settlement statement
 = \$ _____

4. Expected annual recurrent administrative/manpower savings from the removal of the preliminary settlement statement
 = \$ _____

5. Expected annual recurrent interest/working capital savings from being paid 9 calendar days¹⁴ earlier in the wholesale market:

Average Payment per Trading Day (\$) A	Interest (%) B	Savings (\$) C= A*B*9
\$ _____	_____ % Basis ¹⁵ _____	\$ _____

¹⁴ Based on the proposal, the Gencos will be paid 9 business days after the trading date, which translates to an average of 12 calendar days. This has the effect of bringing forward the original payment date of T+21CD by 9 calendar days.

¹⁵ Please indicate the basis for determining the rate (e.g. overdraft rate, deposit rate)

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6. I support / do not support* the proposed changes to shorten the settlement cycle for the following reasons:
(* delete where applicable)

7. Expected operational difficulties in achieving the proposed streamlining of settlement process:

8. Any additional recommendations to shorten the settlement cycle

Signature : _____

Name : _____

Company : _____

Date : _____

ANNEX 2: RESPONSE TO PROPOSAL ON “SHORTENING OF SETTLEMENT CYCLE” FOR MSSL / RETAILERS

TO : EMC - MARKET ADMINISTRATION DEPARTMENT
 FAX : 6779 3030
 SUBJECT : SHORTENING OF SETTLEMENT CYCLE
 ATTENTION : JAN LEE

As a result of the proposed shortening of the wholesale settlement cycle, the following applies for my company:

1. Expected once-off system costs from the removal of the preliminary settlement statement
 = \$ _____

2. Expected annual recurrent systems costs from the removal of the preliminary settlement statement
 = \$ _____

3. Expected once-off administrative/manpower savings from the removal of the preliminary settlement statement
 = \$ _____

4. Expected annual recurrent administrative/manpower savings from the removal of the preliminary settlement statement
 = \$ _____

5. Expected annual recurrent savings from:
 - (i) Reduced funding cost of credit support (credit support requirement reduced by 6¹⁶ times average daily exposure)

Reduction in Credit Support Requirement (\$) A (6xADE)	Cost of Funding Collateral (%) B	Savings (\$) C= A*B
\$ _____	_____ % Basis ¹⁷	\$ _____

¹⁶ Under the proposal, the credit support will drop from the current 30 times Average Daily Exposure to 24 times Average Daily Exposure.

(ii) Reduced bank charges for issuing collateral

Reduction in Credit Support Requirement (\$) A (6xADE)	Cost of Issuing Collateral (%) B	Savings (\$) C= A*B
\$ _____	_____ %	\$ _____

6. Expected annual recurrent increase in annual interest/working capital in having to pay 9 calendar days¹⁸ earlier in the wholesale market:

Average Payment per Trading Day (\$) A	Interest (%) B	Savings (\$) C= A*B*9
\$ _____	_____ % Basis ¹⁹ _____	\$ _____

7. I support / do not support* the proposed changes to shorten the settlement cycle for the following reasons:
(* delete where applicable)

8. Expected operational difficulties in achieving the proposed streamlining of settlement process:

¹⁷ Please indicate the basis for determining the rate (e.g. overdraft rate, deposit rate)

¹⁸ Based on the proposal, the Retailers will have to settle 8 business days after the trading date, which translates to an average of 11 calendar days. This has the effect of bringing forward the original payment date of T+20CD by 9 calendar days.

¹⁹ Please indicate the basis for determining the rate (e.g. overdraft rate, deposit rate).

9. Any additional recommendations to shorten the settlement cycle

Signature : _____

Name : _____

Company : _____

Date : _____

Responses from MPs on Proposal to Shorten Settlement Cycle

Class	MP	Responses			
		Support?	Comments	Operational Difficulties	Additional Recommendations
Gencos	Seraya	Yes	-	-	Settlement re-run nearer the trading date so that glaring errors could quickly be dealt with. This could be done by introducing a third settlement rerun executed earlier than the other current two. Useful for MSSL to provide MPs with the IEQ figures for checking before issuing the Final Settlement Statement to avoid glaring errors in the final settlement statements.
	Tuas	Yes	-	-	With the removal of the buffer between the Preliminary Settlement Statement and the Final Settlement Statement, how would we treat meter corrections that have significant impact on prices (i.e. through EMC/PSO fees, MEUC, HEUC) since the current settlement rerun at T+48BD do not provide for price revision?
	Senoko	Yes	Greater efficiency in records management, earlier payment to gencos	Nil. Shorter settlement cycle simplifies operational procedures	-
	Keppel	Yes	Credit risk expected to reduce	Rerun due to meter adjustment/differential, longer time required for adjustment in invoice/settlement	-

Class	MP	Responses			
		Support?	Comments	Operational Difficulties	Additional Recommendations
	Sembcorp	Yes	Interest Savings from receiving payment earlier	Based on current practice, gencos depend on preliminary reports to verify their IEQ and would then inform MSSL of any meter errors with their adjusted meter data file from MSSL to submit to EMC for the final settlement run. Also, in accordance with the Metering Code, MSSL will only inform gencos with their meter accuracy report on T+6BD if the main and check meter data difference is +/-0.5% (no report will be sent if both the main and check meters drop by same amount). By doing away with 1 settlement run, any meter error will only be adjusted at the 1st settlement rerun on T+48BD. Based on the current market rules, reruns will not change the market clearing price. As such, any genco's meter error will therefore distort the EMC & PSO fees.	Sembcorp Cogen would like to propose an additional process for MSSL to send over their raw meter data in csv format via secured emails on T+2BD for verification. Gencos will then inform MSSL of any error in their meter readings by T+4BD, so that MSSL can send their files to EMC by T+5BD for their final settlement run
	NEA	Neutral	-	-	-
Retailers	Seraya	Yes	-	-	-
	Senoko	Neutral	Neutral	Unable to evaluate at this stage	-
	Tuas	Yes	Except we need 4 working days to settle i.e. T+10D for Retailers to pay rather than T+8D	2 working days too short to reconcile the figures for settlement	-
	Keppel	Yes	Reduce credit risk	Rerun due to meter adjustment, more time and effort in reconciling adjustment	For MSSL to look into means to reduce time required to submit meter data to EMC
	Sembcorp	No	Overall Cost outweighs the benefit	-	Pls look into the shortening of the rerun cycle

Class	MP	Responses			
		Support?	Comments	Operational Difficulties	Additional Recommendations
	MSSL	No	Tremendous Impact, negative consequences to be borne by the end consumers. Not equitable for MPs to benefit, while consumers have to bear the costs for the proposed change.	-	-
Service Provider	EMC	Yes	-	As EMC has embarked on the settlement revamp project, this proposal can only be implemented in the new settlement system	Instead of removing the prelim run, align the payment date from current D+20CD and D+21CD to D+12BD and D+13BD respectively. Status quo for the current timeline of Prelim/Final R and S runs.

ANNEX 4

Revised Cost/Savings Inputs from Stakeholders

Stakeholder	System Costs (Once-Off)	System Costs (Recurrent)	Admin Savings (Recurrent)	Interest Rate	Bank Charges for Issuing Collateral (Retailers)
Genco 1	\$5000	Minimal	Minimal	5.38%	N.A.
Genco 2	Nil	Nil	Nil	1.45%	
Genco 3	Unable to Estimate	Unable to Estimate	Unable to Estimate	Unable to provide	
Genco 4	\$150,000	Nil	Nil	0.1075%	
Genco 5	Nil	Nil	Nil	0%	
Genco 6	Nil	Nil	Nil	Variable	
Retailer 1	Minimal	Minimal	Minimal	5.38%	0.75%
Retailer 2	\$100,000	Nil	Nil	0.75%	0.75%
Retailer 3	Unable to Estimate	Unable to Estimate	Unable to Estimate	Unable to provide	No Input
Retailer 4	\$50,000	Nil	Nil	0.1075%	0.50%
Retailer 5	\$90,000	Nil	Nil	Variable	1.00%
Retailer 6	\$250,000	\$348,400	Nil	3.00%	0.48%
EMC	\$86,750	Nil	\$80,000	N.A.	N.A.

Note: To get a complete picture for the cost/benefit assessment, the interest costs/savings for Genco 3/Retailer 3 were estimated using their average trading amount over the past 3 months, and applying the average interest rates based on Gencos/Retailers comparable to its size.