

Notice of Market Rules Modification

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Proposer:	EMC, Market Admin
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This paper evaluates the proposal for the MCE to take into account the minimum stable load (MSL) of Generation Registered Facilities (GRFs) when scheduling, such that their MSL levels are scheduled either in whole (i.e. as a block quantity) if deemed economically efficient to do so, or not at all.

Currently, the MCE could partially schedule offer blocks without consideration for technical restrictions such as the generators' respective MSLs. While base-load facilities could work around this by offering their minimum-run quantities at low or negative prices to increase their likelihood of being dispatched above their MSL, peaking facilities cannot adopt the same strategy. The latter is thus more likely to be dispatched below their MSL, which compromises system security and creates financial uncertainty for these facilities in recovering costs.

EMC's analysis suggests that there is merit in implementing the proposal, as the modelling of MSL levels allows GRFs' technical capabilities to be more accurately captured by the MCE.

When a GRF is constrained-on for energy at its MSL and its offer price is higher than the marginal clearing price, EMC proposes that the GRF be compensated since the revenue received may not recover its running costs. The proposed compensation amount will be based on the difference between the offer and marginal clearing price for energy, multiplied by the GRF's actual injection quantity. The latter will be further capped based on a conservative estimate of the GRF's output over the period. If the GRF's StartGeneration is lower than its MSL level, its output for compensation calculations is capped at $\frac{1}{2}$ MSL (assuming linear ramp to MSL level). Otherwise, it will be capped at MSL (assuming immediate ramp down to MSL level). Further, EMC has also highlighted the need for exclusions to compensation, specifically when GRFs were constrained by their ramp limits or scheduled to provide ancillary services.

Should the proposal be implemented, market participants would be able to decide whether the MSL constraint is modelled for their GRFs, in line with the principle of self-commitment. However, this choice should be a static decision, and the applicable MSL level is proposed to be technically verified and part of generators' standing capability data.

At its 68th meeting, the RCP by majority vote supported the proposed modelling of GRFs' MSL, together with (i) compensation for GRFs scheduled at MSL, as depicted in Figure 4 of main paper, (ii) allow gencos to decide whether to model their GRFs' MSL, and (iii) use of a static and technically verified MSL parameter. At the 69th RCP meeting, the Panel decided that this proposal be concurrently implemented with the EMA's directive on the Automatic Penalty Scheme, so as to

reduce implementation costs.

The proposed rule modifications to implement the RCP's decisions, as set out in Annexes 1 - 4, were presented at the 71st RCP meeting. The RCP **by majority vote** supported the changes, and recommends that the EMC Board **adopt** the proposed modifications to the market rules and market manual set out in Annexes 1 - 4.

Date considered by Rules Change Panel: 09 January 2014

Date considered by EMC Board: 24 January 2014

Date considered by Energy Market Authority: 05 February 2014

Proposed rule modification:

See attached paper.

Reasons for rejection/referral back to Rules Change Panel (if applicable):

PAPER NO. : **EMC/BD/XX/2014/XX**

RCP PAPER NO. : **EMC/RCP/71/2014/320**

SUBJECT : **MODELLING OF MINIMUM STABLE LOAD**

FOR : **DECISION**

PREPARED BY : **LOH LUCIA
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REVIEWED BY : **PAUL POH LEE KONG
SVP, MARKET ADMINISTRATION**

DATE OF MEETING : **9 JANUARY 2014**

Executive Summary

This paper evaluates the proposal for the MCE to take into account the minimum stable load (MSL) of Generation Registered Facilities (GRFs) when scheduling, such that their MSL levels are scheduled either in whole (i.e. as a block quantity) if deemed economically efficient to do so, or not at all.

Currently, the MCE could partially schedule offer blocks without consideration for technical restrictions such as the generators' respective MSLs. While base-load facilities could work around this by offering their minimum-run quantities at low or negative prices to increase their likelihood of being dispatched above their MSL, peaking facilities cannot adopt the same strategy. The latter is thus more likely to be dispatched below their MSL, which compromises system security and creates financial uncertainty for these facilities in recovering costs.

EMC's analysis suggests that there is merit in implementing the proposal, as the modelling of MSL levels allows GRFs' technical capabilities to be more accurately captured by the MCE.

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Should the proposal be implemented, market participants would be able to decide whether the MSL constraint is modelled for their GRFs, in line with the principle of self-commitment. However, this choice should be a static decision, and the applicable MSL level is proposed to be technically verified and part of generators' standing capability data.

At its 68th meeting, the RCP by majority vote supported the proposed modelling of GRFs' MSL, together with (i) compensation for GRFs scheduled at MSL, as depicted in Figure 4 of main paper, (ii) allow gencos to decide whether to model their GRFs' MSL, and (iii) use of a static and technically verified MSL parameter. At the 69th RCP meeting, the Panel decided that this proposal be concurrently implemented with the EMA's directive on the Automatic Penalty Scheme, so as to reduce implementation costs.

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1 Introduction

This paper assesses the proposal to schedule generation registered facilities (GRFs) for energy at levels at or above their minimum stable load (MSL)¹ if deemed economically efficient to do so, or not at all.

2 Background

The Singapore Wholesale Electricity Market (SWEM) is built on the principle of self-commitment; market participants have the prerogative of submitting price-quantity offer tranches for their facilities, in return for the obligation to comply with the dispatch instructions received. It is thus crucial that the market clearing engine (MCE), taking into account these offers and other physical constraints (e.g. facility-based constraints such as ramp rates and transmission-based constraints such as line ratings), generates dispatch schedules that are physically feasible for all units.

Another feature of the SWEM is that GRFs submit energy-only offers on a period-by-period basis, without any explicit provision for start-up or shut-down costs. This implies that gencos have to incorporate these costs and other technical constraints (e.g. minimum run time, minimum stable load) into their offers. Given a GRF's price-quantity (Y, X) energy offer, the MCE could then schedule it at any quantity up to X MW, as long as clearing prices are at or above \$Y/MWh².

3 Problem description

As the MCE could partially schedule energy offer blocks, GRFs, usually marginal ones³, could be scheduled without consideration for technical restrictions such as their MSL.

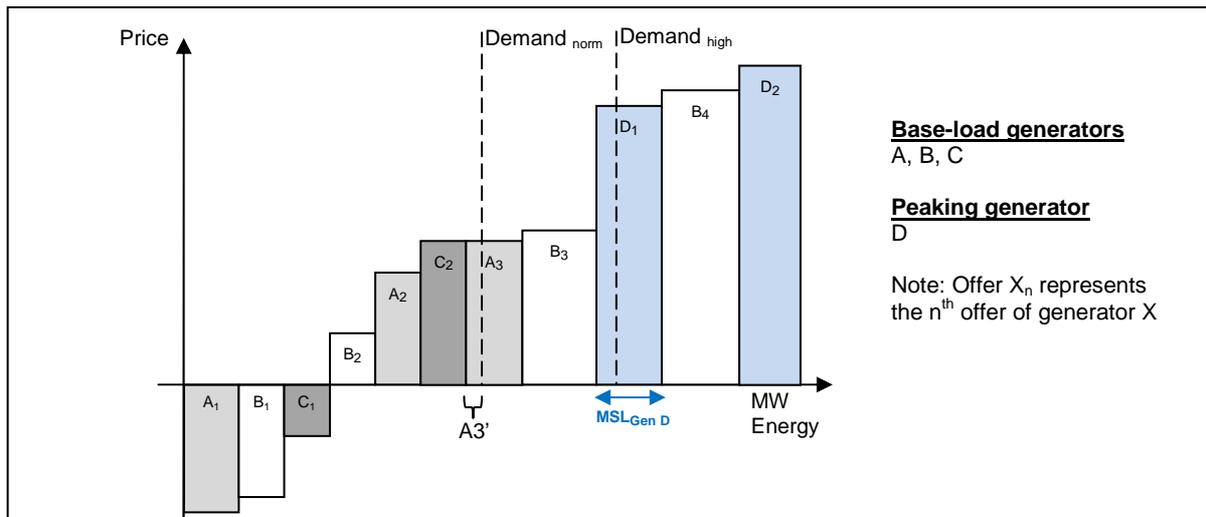
Base-load facilities currently can work around this issue by offering their minimum-run quantities at low or negative prices, to increase the likelihood that they will be dispatched above their MSL. However, peaking facilities cannot offer in the same manner. If they did, they would be scheduled to run for all periods. Yet, the clearing prices for most periods would be inadequate to cover their costs and thus, they would suffer losses. Therefore, most peaking generators would likely price their energy offers, including MSL quantities, at a relatively high price to reflect their higher cost of production. This offer strategy is illustrated in Figure 1 below:

¹ According to the System Operation Manual, the minimum stable load is the minimum power output at which the generating unit can maintain stable operation.

² There are some rare instances when this may not hold due to co-optimisation effects. For example, the MCE could schedule a GRF's energy offers which are above the market clearing price, so as to avail its cheaper reserve or regulation offers.

³ Again, similar to footnote 2, there could be instances whereby due to co-optimisation effects, non-marginal facilities could have their energy offers partially scheduled.

Figure 1: Market clearing in a self-commitment market



In Figure 1, generator A is a base-load facility. It can thus offer its minimum run quantity at negative prices (offer A_1) to secure its dispatch. Under $Demand_{norm}$, its offer A_3 is partially cleared but there is no issue as its aggregate schedule of $(A_1+A_2+A_3')$ MW of energy is above its MSL. In contrast, generator D is a peaking GRF that submits an energy offer for its MSL quantity, at a price level that allows it to recover its cost (offer D_1). Under $Demand_{high}$, offer D_1 is only partially cleared. This leads to the following issues:

- **System Security/ Dispatch Compliance** - If offer D_1 's quantity represents generator D's MSL, then it would effectively be scheduled to run at a level below what is operationally stable or technically feasible. It becomes more likely for generator D to either deviate from dispatch instructions (providing more energy than scheduled or not generating at all) or trip while trying to meet its dispatch schedule. Both scenarios compromise system security and render generator D likely to deviate from its dispatch instructions.
- **Financial Uncertainty** - Generator D's offer prices serve as a proxy for its marginal cost of production, and it may have amortized part of its start-up/shut-down costs over offer D_1 's quantity. If it is only partially scheduled for its offer block, then it may be unable to recover part of its start-up/shut-down costs. The uncertainty of being scheduled for the entire MSL quantity may thus lead generators to pass on this risk in the form of a premium in their offer prices. Furthermore, this uncertainty may also reduce incentives for high-cost peaking capacity to be offered into the market.

Given the above issues, this proposal suggests that the MCE takes into account GRFs' MSL when scheduling, such that their MSL levels are scheduled either **in whole (i.e. as a block quantity)** if it is deemed economically efficient to do so, or **not at all**.

4 Analysis

4.1 Frequency of occurrence

To examine the prevalence of this issue, Table 1 below presents the frequency with which peaking generators in SWEM⁴ were scheduled below their MSL level over a six-month period.

⁴ For this study, we consider peaking generators to be those that can reach their MSL within 1 period (30 minutes). In the SWEM, this comprises Open Cycle Gas Turbine plants.

Table 1: No. of periods when peaking generators were scheduled for energy from 1 October 2012 to 31 March 2013

X = Level of energy scheduled (MW)	No. of periods	%
0 < X < MSL	102	68.9%
X ≥ MSL	46	31.1%
Total	148	100.0%

Table 1 highlights that peaking generators were scheduled below their MSL relatively frequently, at 68.9% of the periods that they were scheduled for energy. This suggests that the issues considered earlier already exist.

4.2 Practices in Other Markets

In contrast to the SWEM, some other electricity markets employ a central unit commitment process, whereby market participants provide the system operator with more comprehensive cost and technical information for running their generators, such as start-up/shut-down costs, no-load costs, non-convex operating costs, minimum or maximum run time, ramp rate, minimum output.

The system operator will then take into account these parameters when planning the dispatch schedule, making sure that all technical constraints are met and generators receive enough revenue to cover their non-energy costs (e.g. start-up/shut-down costs). Although energy prices are still set based on marginal pricing principles, this revenue adequacy principle necessitates make-whole payments to be recovered from the market.

From the gencos' perspective, this arrangement is beneficial because they have the confidence that they will not be "out of pocket" when called to run up. From the market's perspective, this arrangement incentivises truth-telling because gencos now do not have to second-guess their clearing quantities and expected run-times, and hence remove any risk premiums incorporated into their offers. This truth-telling also allows the system operator to come up with a dispatch schedule that achieves greater efficiencies and social welfare.

The concerns of this arrangement are that it is a relatively complex offer system, with its complexities possibly giving rise to more gaming opportunities. Moreover, there could be substantial ambiguity in verifying the costs and technical information submitted. The guarantee of revenue adequacy also brings about a need to recover make-whole payments from consumers, and the cost incidence on various stakeholders should be carefully calibrated.

4.3 Evaluation

Self commitment and central commitment each have their respective strengths and weaknesses. While we are not advocating central commitment in SWEM, there appears merit to commit peaking generators up to at least their MSL as proposed, since they have no work-around strategies in the current offer paradigm.

The following table evaluates the considerations for and against the proposal to model GRFs' MSL when scheduling.

Table 2: Considerations for and against modelling GRFs' MSL

Disadvantages	Advantages
<ul style="list-style-type: none"> Deviation from principle of self-commitment <p>However, at least for peaking generators, there appears to be no other way for them to manage their dispatch level under the current offer paradigm.</p>	<ul style="list-style-type: none"> Respect technical capabilities of generating units, and reduce risks to system security from infeasible dispatch schedules.
<ul style="list-style-type: none"> Distortion to most efficient, merit-order based dispatch <p>However, given that the proposed implementation to model GRFs' MSL is for technical, rather than commercial, reasons, the impact of distortions on efficient dispatch based on merit order are justifiable and likely limited.</p>	<ul style="list-style-type: none"> Minimise instances of non-compliance with dispatch instructions.
<ul style="list-style-type: none"> Gaming <p>Generators may attempt to secure dispatch for at least their MSL level. However, this is no different from the current arrangement whereby, gencos can offer their energy quantities at very negative prices. Moreover, when the MSL constraint is binding, generators' offers do not set prices.</p>	<ul style="list-style-type: none"> Greater certainty to gencos, who can correspondingly bid in a manner more reflective of their true underlying costs.

4.4 Implementation considerations

The arguments in Table 2 suggest merit in implementing the proposal to model GRFs' MSL level. The following section thus examines various implementation considerations.

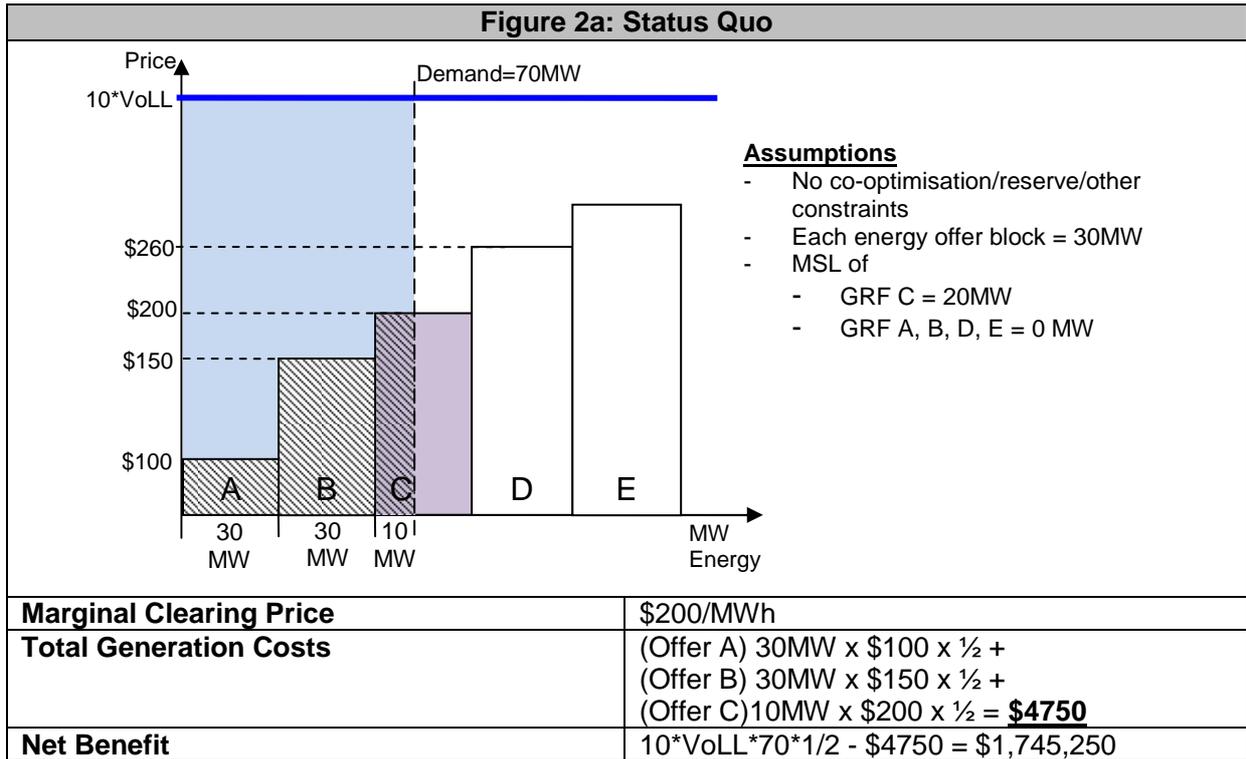
i) Compensation when constrained-on

In line with the market design principle of self-commitment, GRFs should not be allowed (nor required) to declare their start-up, shut-down or no-load costs. GRFs correspondingly would not be guaranteed that they are "made whole" for these costs.

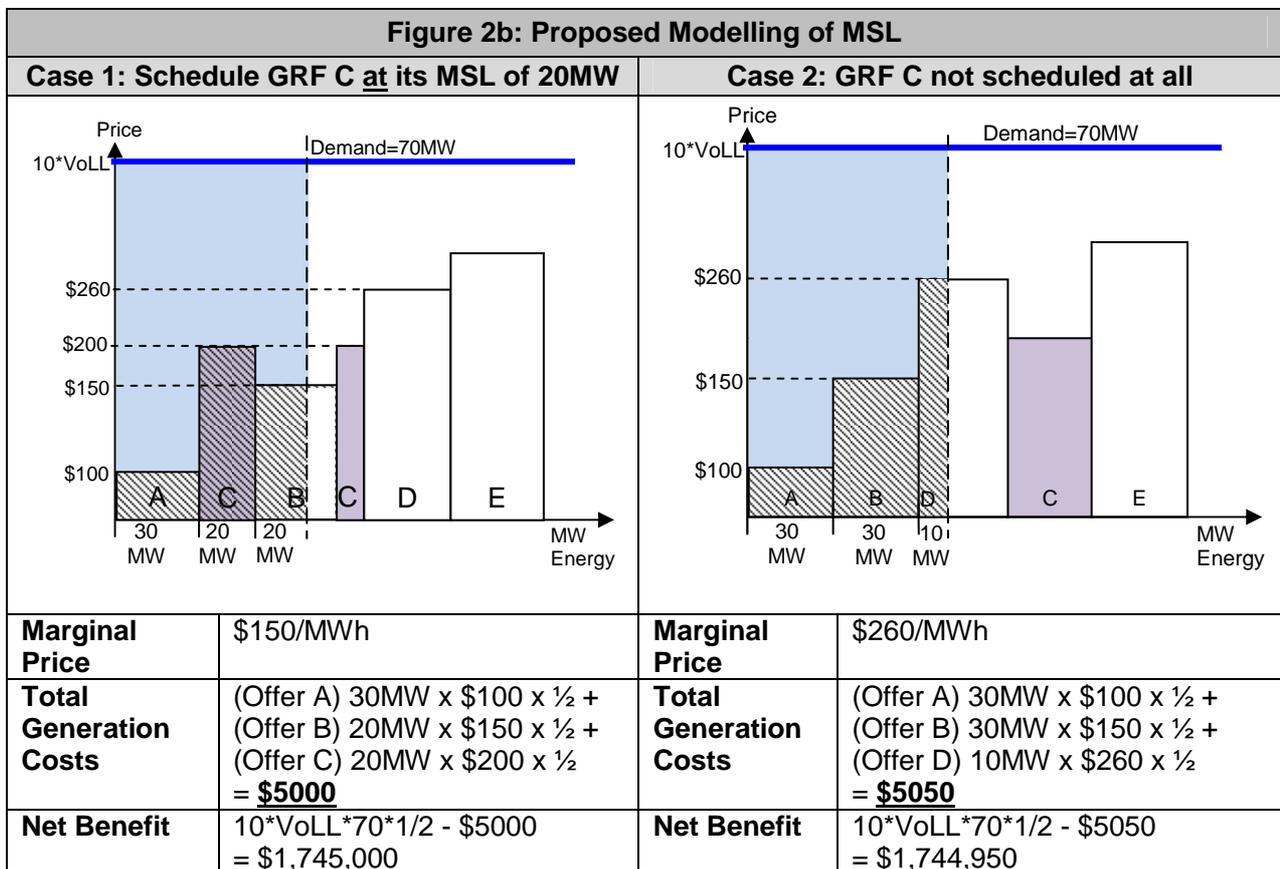
However, when MCE determines that it is economically efficient (i.e. higher Net Benefit) to schedule a GRF (that has declared for its MSL to be modelled and whose offer price for its MSL quantity is higher than the marginal clearing price) **at** its MSL, this GRF would not set the marginal clearing price for energy⁵. In such cases, there is justification to compensate the GRF given that its revenue (based on the clearing price) is unable to cover its costs (proxied by its offer price).

Figures 2a and 2b compare the differences in dispatch outcomes of a GRF (GRF C) which declared for its MSL to be modelled, under the current situation and with the proposed modelling of MSL.

⁵ It does not set prices because when a GRF is constrained-on for energy at its MSL, there exists cheaper-priced offers displaced from merit order. Since marginal prices are determined by the incremental cost of meeting incremental energy demand, which could in turn be met by these cheaper-priced offers, the latter would thus set clearing prices. Case 1 in Figure 2b provides a numerical example of this situation.

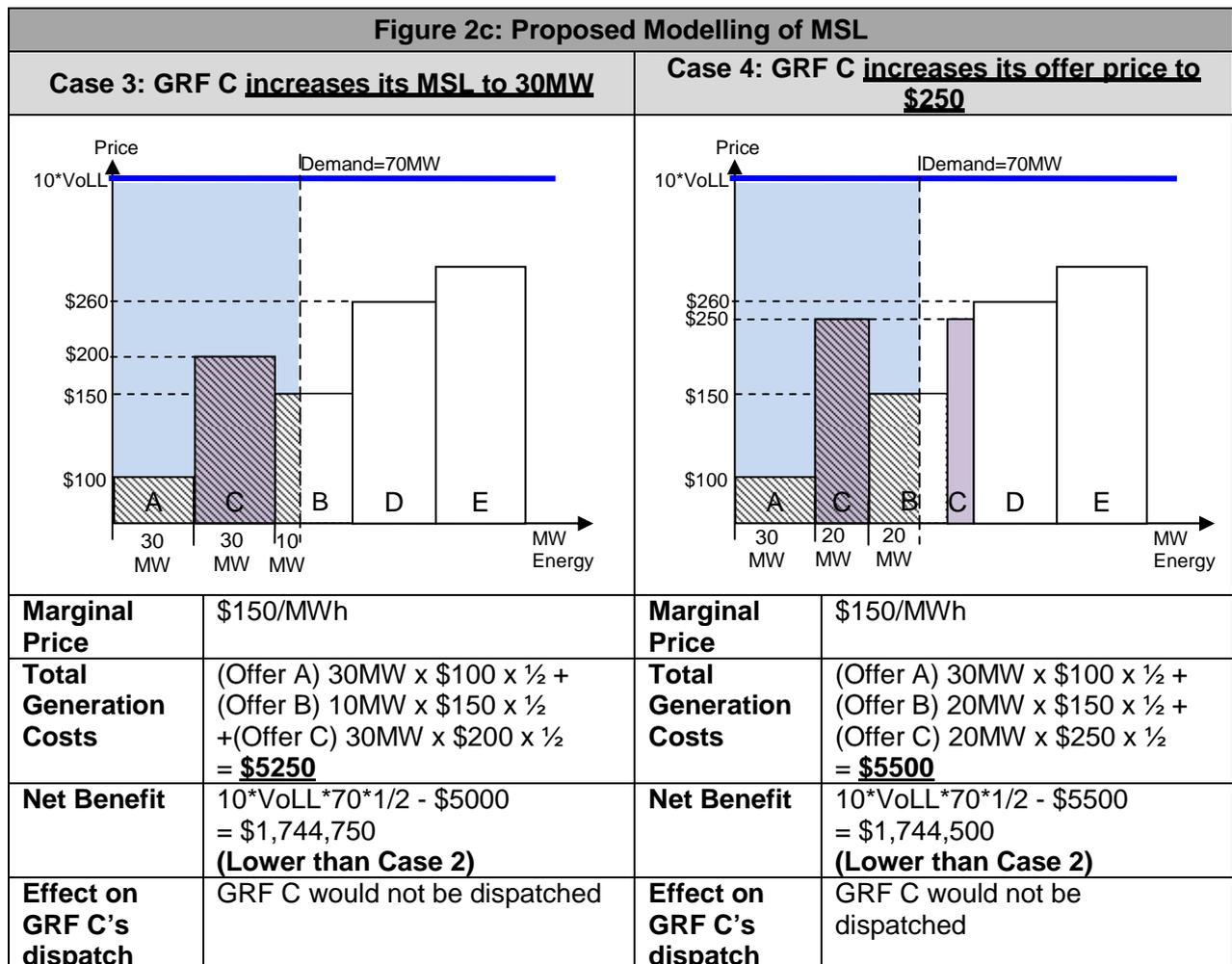


Under the status quo (Figure 2a), GRF C's offer is only partially scheduled at 10MW even though its MSL is 20MW. The total generation costs are \$4750 (black shaded area), resulting in a Net Benefit of \$1,745,250 (blue shaded area). Although the Net Benefit is maximised, it does not produce a feasible schedule for GRF C - GRF C might end up deviating from its schedule and/or trip, thereby compromising system security.



Under the proposed modelling of MSL (Figure 2b), the MCE will compare the total generation costs (which lower Net Benefit⁶) of the two cases when deciding whether GRF C should be scheduled for its whole MSL quantity or not at all.

If the MCE chooses to schedule GRF C at its MSL, as in Case 1, it will displace some lower-priced Offer B quantities in order to fully schedule GRF C at its MSL. The alternative is to not schedule GRF C entirely (Case 2), thus procuring the remaining energy quantities from Offer D, which could be partially scheduled. Based on the illustrated calculations, the MCE will prefer Case 1 and schedule GRF C at its MSL (rather than not scheduling GRF C at all), since total generation costs are lower (\$5000 for Case 1 versus \$5050 for Case 2).



However, GRF C does not have the unfettered flexibility to adjust its MSL parameters and yet still secure dispatch. Essentially, if its MSL level or energy offer prices are set too high, the MCE will bypass its offer and schedule other cheaper offers. This is illustrated in Case 3 (raising GRF C's MSL from 20MW to 30MW) and Case 4 (raising offer prices from \$200 to \$250) above.

In both cases, given GRF C's changes, the MCE will prefer the outcome in Case 2 (higher Net Benefit) over Cases 3 and 4, and leave GRF C out of the schedule altogether. This illustrates that it is in GRF C's benefit to "truth-tell" its underlying MSL level and energy offer prices.

In addition, Case 1 also illustrates that there is no guarantee that the clearing price will be above the offer price of a GRF constrained-on at its MSL. In such situations, if the clearing price is

⁶ Generation costs lower the Net Benefit, which the MCE seeks to maximise. Hence, all things equal, the MCE will choose the scenario with lowest generation costs.

indeed **below** the GRF's offer price, then there is a case for compensation for the GRF for the difference between the marginal clearing price and the offer price for that quantity. In GRF C's example, this difference would be \$200/MWh - \$150/MWh = \$50/MWh. Should GRFs choose for their MSL to be modelled, the quantity of the first energy offer block of the GRF should consist at least its MSL quantity so that if compensation is required, the relevant offer price will be that in the first offer block.

The proposed compensation is important; it is insufficient to accurately model the technical capabilities of peaking facilities, if they are uncertain of receiving at least their offer price (and hence cover costs) when dispatched. Given that the MCE has determined that scheduling a particular GRF at its MSL is an optimal outcome (with the GRF's offer price factoring into the overall Net Benefit), the market as a whole is still better off even with this "make whole" transfer payment.

The quantity eligible for compensation should be based on the GRF's actual injection (i.e. its Injection Energy Quantity for the dispatch period T, IEQ_T), subjected to a **maximum of ($\frac{1}{2}MSL$)**⁷ if the GRF was not scheduled in the previous period or **MSL** if the GRF was. These are graphically represented by the shaded areas in Table 3.

Table 3: Maximum injection quantities eligible for compensation for GRF scheduled at MSL

Scheduled for energy in previous period? ⁸	Graphical depiction of GRF scheduled at MSL in Period T	Injection quantity eligible for compensation	Rationale
<p>No</p>		<p>Minimum ($MSL \times \frac{1}{2} \times \frac{1}{2}$ hour, IEQ_T)</p>	<p>The GRF is expected to follow a linear ramp profile from 0MW to its MSL level within Period T.</p> <p>The GRF will not receive more compensation just because it ramps up faster than the assumed profile.</p>

⁷ To take into account a linear ramp-up trajectory.

⁸ Note that section 8.1 of this paper proposes that the compensation quantum be dependent on the **GRF's StartGeneration level**, i.e. Minimum of Actual IEQ and $MSL \times \frac{1}{2} \times \frac{1}{2}$ (if $StartGeneration < MSL$) or $MSL \times \frac{1}{2}$ ($StartGeneration \geq MSL$), instead of whether the GRF was scheduled in the previous dispatch period. StartGeneration is proposed to be used as a GRF may not be generating even when scheduled. Moreover, StartGeneration will be quite a close proxy given that if the GRF's StartGeneration was below its MSL, then it would likely be at 0 (since the GRF is unlikely to be operating below its MSL).

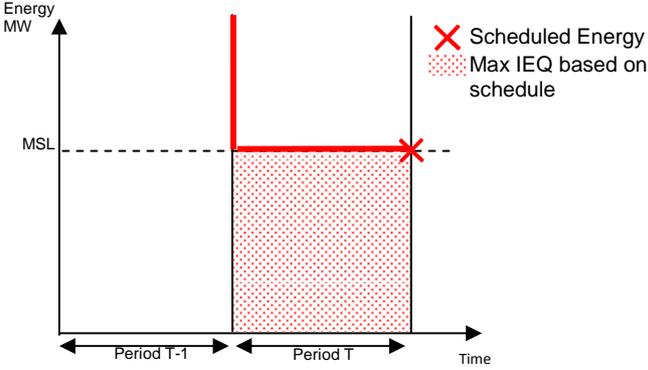
Scheduled for energy in previous period? ⁸	Graphical depiction of GRF scheduled at MSL in Period T	Injection quantity eligible for compensation	Rationale
Yes		Minimum (MSL x ½ hour, IEQ _T)	<p>The GRF is expected to ramp immediately down to its MSL and stay at this level throughout.</p> <p>The GRF will not receive more compensation just because it chooses to stay at its higher StartGeneration for some time into Period T before ramping down.</p>

Table 3 describes the injection quantities eligible for compensation depending on whether the GRF was scheduled for energy in the previous period. These quantities will then be multiplied by the (Cleared offer price – Marginal clearing price) to determine the total compensation quantum. It should be noted that no compensation will be given when the scheduled energy is above a GRF's MSL, since it implies that the MSL constraint was not binding.

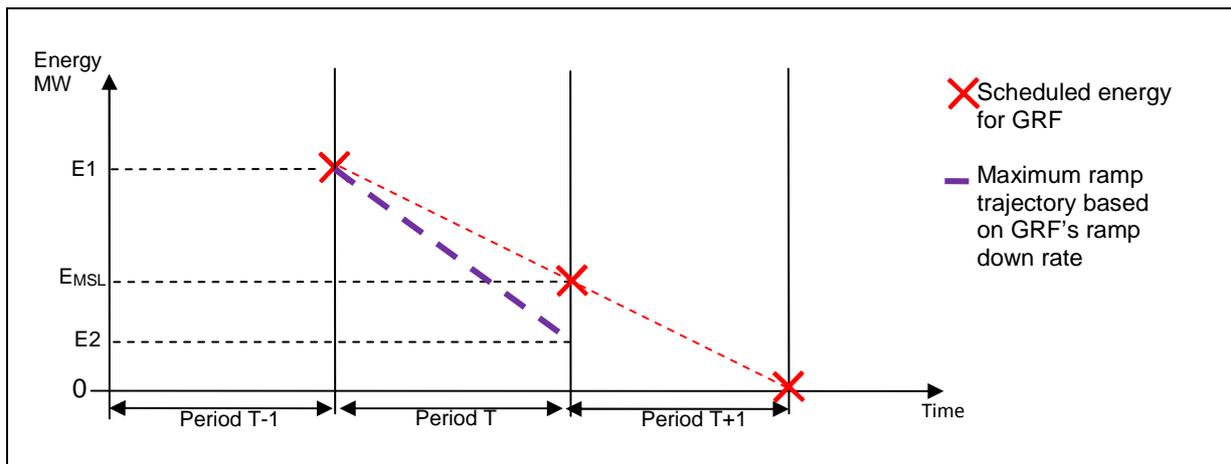
Exclusions to the compensation arrangement

The key principle in assessing whether a GRF should be compensated predicated on whether it was constrained at its MSL level **for economic reasons**. If a GRF were to be constrained for energy at its MSL for other **non-economic reasons**, then it should not receive compensation. These exclusions also serve to limit the scope of gaming.

A) GRF constrained by ramp limits

A GRF that is constrained by its ramp rates could be scheduled out-of-merit order for energy at its MSL, even if it was not economically efficient to do so. This is illustrated in Figure 3 below, whereby a GRF is constrained at its MSL level due to ramping constraints, rather than because it was the least-cost arrangement.

Figure 3: Dispatch for GRF with binding ramping limitations



The GRF described in Figure 3 was dispatched in Period (T-1) for E1 MW of energy. In the next period, its energy offers were very expensive and out of merit order. Although the MCE would rather choose not to schedule it altogether, it is constrained by its ramp rate and cannot be dispatched at zero for energy within one period. Assuming there are no MSL limitations, the MCE would ramp the GRF down to E2, and its offer prices would not set the clearing price.

If the MSL constraint for this GRF is declared, then the MCE would be forced to schedule it at E_{MSL} for Period T, respecting its MSL. This creates a situation whereby the GRF is constrained at its MSL level due to its ramping constraint, rather than due to the MCE's assessment that its energy offers were the least-cost (as were the case in Figure 2b).

Taking this scenario to the extreme, the GRF could intentionally offer a combination of very low ramp rates and extremely inflated energy offer prices. This ensures that the GRF would be scheduled out-of-merit at its MSL level, and yet be eligible for compensation for the difference between its offer price and the energy clearing price.

To prevent compensating the GRF for such non-economic reasons and limit the scope for gaming, a test is proposed to determine eligibility for compensation. Essentially, ex-post, the ramp constraints for the GRF will be removed (i.e. it would in effect have an infinite ramp rate):

- If the GRF is still scheduled at its MSL (implying ramp limitations were not binding and the MCE had scheduled it for economic reasons), then it is eligible for compensation for the difference between its offer price and the marginal clearing price;
- If the GRF is not scheduled at its MSL (implying ramp limitations were binding and the MCE had scheduled it for non-economic reasons), then it would not be eligible for compensation.

An alternative test is to check whether a GRF's ramping constraints limit its energy trajectory to a level between zero and its MSL. For each GRF, these limits could be approximated by:

$$X_g = \text{StartGeneration}_g + \text{UpRampRate (in MW/min)} \times 30\text{mins}^9$$

$$Y_g = \text{StartGeneration}_g - \text{DownRampRate (in MW/min)} \times 30\text{mins}$$

If the parameters X_g and/or Y_g is between zero and the GRF's MSL, then the GRF would not be eligible for compensation since its ramp rates were likely limiting. While this alternative test is an approximation, it would be easier to implement than the earlier proposed ex-post rerun with

⁹ Note that section 8.2 of this paper has i) proposed to remove the requirement to check X_g , i.e. a GRF's ramp up trajectory and ii) replaced StartGeneration with ExpectedStartGeneration.

removal of ramp limitations. Either test would also deter the gaming opportunities of GRFs (e.g. to declare very low ramp rates as described earlier), and incentivise gencos to truth-tell.

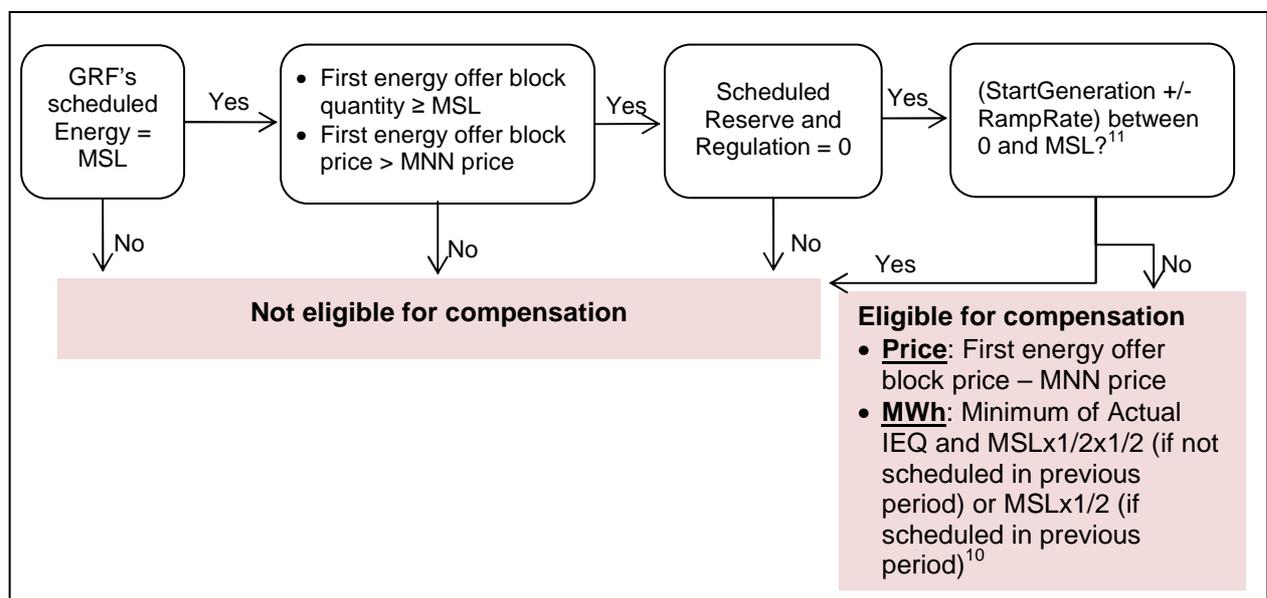
Exclusion B) GRF scheduled for ancillary services

Currently, GRFs may be scheduled out-of-merit for energy, so as to provide ancillary services. In such situations, generation facilities could be scheduled to provide energy even if their energy offers are out of merit, so as to avail their reserve or regulation offers.

Hence, for consistency, this principle is extrapolated onto the MSL situation such that generation facilities that were scheduled for reserve and/or regulation will be excluded from the proposed compensation, even if they were constrained for energy at their MSL.

Figure 4 below summarises the proposed compensation framework in the preceding section.

Figure 4: Summary of proposed compensation and exclusions



ii) Modelling of MSL

In the modelling of MSLs, there are additional operational aspects for consideration, namely:

a) Should gencos have the choice of deciding to model their GRFs' MSL?

To provide market participants greater flexibility, they should be given the choice to decide whether their GRFs' MSL is modelled when the MCE determines the dispatch schedule. In principle though, only generators that can reach their MSL level within a dispatch period should choose for the constraint to be applied.

¹⁰ Note that section 8.1 of this paper proposes that the compensation quantum be dependent on the **GRF's StartGeneration level**, i.e. Minimum of Actual IEQ and $MSL \times 1/2 \times 1/2$ (if $StartGeneration < MSL$) or $MSL \times 1/2$ ($StartGeneration \geq MSL$), instead of whether the GRF was scheduled in the previous dispatch period. StartGeneration is proposed to be used as a GRF may not be generating even when scheduled. Moreover, StartGeneration will be quite a close proxy given that if the GRF's StartGeneration was below its MSL, then it would likely be at 0 (since the GRF is unlikely to be operating below its MSL).

¹¹ Note that section 8.2 of this paper proposes i) replacing StartGeneration with ExpectedStartGeneration, which provides a better estimate of a GRF's beginning-of-period output level, and ii) removing the requirement to check a GRF's ramp up trajectory.

b) Should gencos have the choice of applying MSL on a period-to-period basis?

The choice to model a GRF's MSL could be a dynamic decision (i.e. gencos can decide whether to apply the MSL constraint for one period but not the next as part of its offer submission). Alternatively, this choice could be a static decision determined as part of its standing capability data; while it could still be changed, there would be some administrative lead-time required.

The flexibility to dynamically declare whether to model its MSL is in line with the principle of self-commitment, which entrusts gencos with the responsibility of managing their own dispatch. However, providing such flexibilities will significantly increase the overall implementation costs given the necessary changes to offer formats, which is unlikely to be justifiable given its limited applicability to only gencos with peaking facilities. Thus, this choice should be a static decision that is part of the facilities' standing capability data.

c) Should the MSL parameter be technically verified or self-declared by gencos?

Another operational detail pertains to whether generators' MSL levels should be strictly based on some technical values (e.g. manufacturer's specification) or self-declared. Specifically, this value is currently captured as part of generators' start-up curve¹².

On one hand, letting gencos self-declare their MSL accords them greater flexibility. For example, some combined cycle plants could operate on either a full- or half-block configuration, either of which would have different MSL levels. Furthermore, as depicted in Case 3 of Figure 2c, there is already a proposed incentive framework in place for generators to truth-tell their true MSL levels.

On the other, the main thrust of proposal is to better model the technical capabilities of generators. Given that generators' MSL should be a relatively constant parameter, the nominal MSL level used in modelling should be a technically verified value. On balance, weighing both arguments, it is proposed for the MSL to be technically verified.

iii) Form of constraint

To model the MSL level of respective GRFs, the following two constraints would be added to the existing formulation for each GRF:

$$\text{MSL constraint 1: } \text{Generation}_g - M \times U_g \leq 0$$

$$\text{MSL constraint 2: } \text{Generation}_g + M \times (1-U_g) \geq \text{MSL}_g$$

where M is a relatively large number, U_g is a binary variable which takes a value of either 0 (GRF is not scheduled to provide energy) or 1 (GRF is scheduled to provide energy), MSL_g is the GRF's MSL level, and Generation_g is the level of energy scheduled for the GRF. In addition, violation of a GRF's MSL constraint will incur violation at a magnitude of 20 x VoLL, consistent with existing facility violations.

The proposed constraints employ mixed-integer programming to model GRFs' MSL level, and the effect of these two constraints is summarised in Table 4 below. Essentially, for each GRF that opts for their MSL level to be modelled, its energy schedule (' Generation_g ') would either be constrained to zero or a loading level at or higher than its MSL level.

¹² This parameter is currently available in Appendix 3A of the SOM, Facility Registration form, Table 2: Generation facility operational parameters.

Table 4: Comparison of $U_g = 0$ or 1

Binary integer value	$U_g = 0$	$U_g = 1$
MSL constraint 1: $\text{Generation}_g - M \times U_g \leq 0$	Generation_g ≤ 0	$\text{Generation}_g - M \leq 0$ (non binding)
MSL constraint 2: $\text{Generation}_g + M \times (1 - U_g) \geq \text{MSL}_g$	$\text{Generation}_g + M \geq \text{MSL}_g$ (non binding)	Generation_g ≥ MSL_g
Effect	GRF's energy schedule constrained to zero	GRF's energy schedule at or more than its MSL

Notably, generation facilities that require more than one dispatch period to ramp up to their MSL level should not choose for the MSL constraint to be applied to them, as it prevents the facility from being scheduled at all.

5 Conclusion

In sum, modelling generating facilities' MSL level allows their technical capabilities to be more accurately captured by MCE. This paper also lays out some considerations, should the proposal be implemented.

Firstly, there is a case to compensate GRFs scheduled at their MSL level, if the GRF was scheduled based on economic, least-cost considerations. The basis for compensation should be the difference between the clearing price for energy and the GRF's energy offer price, and for the GRF's injection quantity up to the allowable limits. The compensation arrangement is important to align generators' truth-telling incentives with an efficient, least-cost outcome for the market.

However, cognisant of the potential for gaming, EMC has also highlighted the need for exclusions to compensation, particularly when GRFs were constrained by their ramp limits or scheduled to provide ancillary services.

Secondly, market participants should be able to decide whether the proposed MSL constraint is modelled for their GRFs, in line with the principle of self-commitment. However, this choice should be a static decision, and the applicable MSL level is proposed to be technically verified and part of generators' standing capability data.

6 Industry Consultation (Concept Paper)

The concept paper was published for consultation on 4 June 2013, seeking views specifically on the following issues:

- Whether the MCE should take into account GRFs' MSL in scheduling;
- Whether the proposed compensation arrangement is required, and whether the proposed compensation framework is sufficient to deter gaming behaviour;
- Whether gencos should be given the choice to decide if the MSL of their generators are modelled, and whether this choice should be allowed to change period-by-period; and
- Whether the MSL parameter used in modelling should be technically verified or self-declared by gencos.

Comments were received from the Power System Operator (PSO), Sembcorp Cogen, YTL PowerSeraya and Keppel. Their comments and EMC's responses are provided below:

Comments from the PSO

- *The MSL should only be applied to OCGT. For SNK CCP1&2 which is capable of operating in OCGT mode, they will have to be subjected to re-submission of MSL for open-cycle mode for PSO's approval (current MSL submitted is for full CCP block).*
- *Agree with EMC's recommendation to adopt Case 1, i.e. to schedule the OCGT at MSL as 'constraint ON', in which the OCGT becomes price taker; and pay the OCGT compensation for the difference between offer price and cleared price with the exemptions in the concept paper.*
- *The MSL has to be part of standing capability data verified by PSO, and this technical capability should not be changed from period to period.*

EMC's response

There is no need to prescribe that the MSL constraint is applicable only to a particular generation plant type. This is because only GRFs which can reach their MSL level within a dispatch period would choose for the constraint to be modelled. GRFs which need more than one dispatch period to reach MSL would not choose for the MSL constraints to be applied as they would not be able to comply with dispatch instructions if they were not dispatched in the previous period.

We note PSO's concurrence with the proposal to model MSL and the corresponding compensation framework for GRFs scheduled at MSL, and that the MSL parameter should be technically verified.

Comments from Sembcorp Cogen

On a) We would assume that when the terminology "peaking generator" is used in this paper, it refers to only the OCGTs in the system. This proposal should not be applicable to any other plant types in the system.

The paper has highlighted that peaking generators has been scheduled frequently since market starts. However, the paper has not demonstrated what "additional" risks in the system this has created. For instance, how many non-compliance and how the risk of the system has increased during periods when the peaking generators are scheduled below their MSL. As such, the advantages highlighted in the paper for modelling GRF's to reduce risks to system security is qualitative and has not been supported by evidence.

We would like to request for EMC to analyse whether in instances where the peaking generators are being scheduled for energy below their MSL, it is an outcome of the co-optimisation in MCE trying to tap on the reserve of these peaking generators? If the majority of the incidents arise due to the way the reserve are being offered by the peaking generators then we might need to re-think whether changing the reserve offer will resolve the incidents of peaking generators scheduled for energy below MSL.

In short, the justifications provided in the paper are not sufficient to warrant a change in the MCE.

EMC's response

For clarification, Table 1 shows the frequency with which OCGTs were scheduled within a six-month period from 1 October 2012 to 31 March 2013. As mentioned in EMC's response to PSO's comments, while there is no need to prescribe that the MSL constraint is applicable only for certain generation plant types, generation facilities which cannot reach their MSL within a dispatch period would by default omit themselves.

Using their IEQ for those dispatch periods, it appears that these OCGTs were indeed deviating from their energy schedule by more than 5MWh. However, whether these generation facilities were deemed non-compliant is determined by the PSO. We are however unable to quantify the risks to the system.

Sembcorp Cogen's suggestion that these OCGTs were scheduled below their MSL due to energy-reserve co-optimisation is correct in some instances. However, in a self-commitment market like the SWEM, market participants are given the ability to set their own offers, and it is not EMC's prerogative to change these offers to "resolve the incidents of peaking generators scheduled for energy below MSL".

Comments from Sembcorp Cogen

On b) A compensation regime proposed by EMC when constrained on is not justifiable. The biggest issue that we have in the proposal is the assumption that the offer price proxy the costs of generation. Offer price by a generator is not just for the recovering of cost but would have also include a desired rate of return. It is not necessarily correct to say that when the "constrained on" generator receive the lower marginal clearing energy price for energy, the peaking generator is not able to recover its cost. In fact, the peaking generator could be in a position of earning a reduced rate of return.

In addition, the compensation amount cannot be just the differential of the Market Clearing Price and Offer Price in the Energy market, earnings from reserve market for this peaking generator should be accounted for as well.

In all the proposed scenarios in Figure 2b, there are potential arguments by the other GRFs for compensation as some of them are "worse off" compared to status quo.

We would not be in favor of such compensation mechanism to be put in place. In short, we will prefer to maintain status quo.

EMC's response

In SWEM's uniform pricing regime, it is in the market participants' advantage to offer based on their marginal cost of production. In the absence of any further data, EMC uses these offers to proxy their marginal costs.

The proposed compensation aims to compensate a GRF constrained at its MSL for the economic losses incurred (and not for profits forgone), to ensure that the GRF can break-even for its MSL quantity. There is no compensation proposed for the other GRFs for compensation even if they could be "worse off" from this proposal because i) they do not incur losses, as proxied by their offer prices and ii) the revised regime still respects the principle of clearing offers based on merit order, with the marginal offer setting the clearing price.

Further, EMC's proposed compensation on the basis of offer prices is also consistent with the compensation guidelines previously endorsed by the RCP in 2006 (EMC/RCP/24/2006/CP11). Regarding Sembcorp Cogen's comments to assess reserve earnings of the GRF when compensating, we have proposed for GRFs which are scheduled for ancillary services to be excluded from the proposed compensation arrangement. Please refer to section 4.4(i) of the paper.

Comments from Sembcorp Cogen

On c) Since the MSL is a technical constraint, there is no reason why we should allow it to be change period by period.

EMC's response

Sembcorp Cogen's views are noted

Comments from Sembcorp Cogen

On d) MSL must be technically verified.

EMC's response

Sembcorp Cogen's views are noted.

Comments from YTL PowerSeraya

YTL PowerSeraya supports in principle CP48: Modelling of Minimum Stable. YTL PowerSeraya's responses to the following queries:

a) Yes.

b) Yes.

c) Yes to both queries.

d) The MSL parameter should be allowed to be self-declared. However, provision can be made for technical verification if there is sufficient reason to suspect that the self-declaration may not be accurate. Minimum Stable Load data is already provided as part of the generation facility registration.

EMC's response

YTL PowerSeraya's responses are noted. Since the MSL parameter forms part of generation facilities' registration data, it is recommended that the MSL parameter used be technically verified.

Comments from Keppel

(a) Keppel agrees that the MSL should be accounted for in scheduling as it is technically not practical to clear the MSL tranche partially. Apart from OCGTs mentioned in the clarification meeting, CCGTs would likely need to operate in open-cycle mode to meet the scheduled load if they are cleared below MSL. Costs of operating in open-cycle mode is much higher than combined cycle operations, thus this issue is not just confined to OCGTs.

EMC's response

We note Keppel's support for the proposal. On the issue of whether the MSL used in modelling should be a technically verified parameter, the PSO has indicated that CCGTs that wishes to operate in open-cycle mode would be required to re-submit their MSL for verification.

Comments from Keppel

(b) In the case of clearing the entire marginal tranche of MSL, the net effect of the proposal is compensating the MSL tranche at offer price and the rest of the GRFs at the MCE cleared price.

This practice may be biased, as the MSL tranche is compensated at a higher price than the rest of the market.

This additional compensation may not directly passed through to consumers (as intended), as the MEUC may be absorbed by the retailer. In addition, the benefit of lower prices may also not passed directly to consumer, as most consumers are not exposed to pool price.

EMC's response

Other GRFs that are cleared in merit order would at least receive what they have offered, and should be indifferent. The proposed compensation thus aims to compensate GRFs constrained at their MSL for the economic losses incurred, so that such GRFs at least receive their offer price.

For clarity, it is not the intent of this proposal to specifically recover the compensation from consumers or reduce prices.

Comments from Keppel

(c) and (d): Keppel believes that Gencos should be given the choice to indicate their preference (to clear either the full tranche or zero) period by period, as using MSL as a benchmark may be too restrictive. It may also be the Genco's intention to schedule their GRF below MSL for certain periods.

EMC's response

We note Keppel's views. For GRFs that can, or are required to, run below MSL, they should not opt for their MSL to be modelled.

7 Deliberations by the Rules Change Panel (RCP) at the 68th and 69th RCP Meetings

The proposal was first presented to the RCP at its 68th meeting with the following estimated implementation costs and effort:

Table 5: Estimated implementation costs and effort

Implementation Option	Effort (man-weeks)	Project time (calendar-weeks)	Additional costs (for Audit and External resources to support parallel MCE runs)
Implementation of MSL proposal <u>without</u> compensation (Option A)	26	42	\$60,800
Implementation of MSL proposal <u>with automated compensation</u> (Option C)	60	78	\$772,000

The RCP by majority vote in-principle supported the proposed modelling of GRFs' MSL, together with the following implementation considerations:

- Compensation for GRFs scheduled at MSL, as depicted in Figure 4
- Allowing gencos to decide whether to model their GRFs' MSL
- Use of a static and technically verified MSL parameter

The details of the voting outcomes are:

Those who voted to support the proposal:

- Mr Luke Peacocke (Representative of Generation Licensee)
- Mr Phillip Tan (Person experienced in Financial Matters)
- Mr Kng Meng Hwee (Representative of the PSO)
- Mr Toh Seong Wah (Representative of the EMC)
- Mr Sean Chan (Representative of Retail Electricity Licensee)
- Mr Daniel Lee (Representative of Generation Licensee)
- Mr Pak-Juan Koe (Representative of Generation Licensee)

Those who voted not to support the proposal:

- Mr Dallan Kay (Representative of the Wholesale Electricity Market Trader)

Those who abstained from voting:

- Mr Chan Hung Kwan (Representative of Transmission Licensee)
- Mr Lawrence Lee (Representative of Market Support Services Licensee)

The Panel also tasked EMC to explore ways to lower the costs of an implementation option with compensation.

At the 69th RCP meeting, EMC informed the RCP of an alternative (Option B) which entails concurrently implementing this MSL proposal with the EMA directive on Automatic Penalty Scheme (APS). By incurring only the incremental costs of customising calculations specific to the MSL proposal, the implementation costs are significantly reduced to \$203,000.

The detailed estimated time and costs of all three implementation options are summarised in Table 6 below.

Table 6: Detailed breakdown of implementation time and costs estimates

Time Estimates	Option (A) Dedicated Automated Compensation		Option (B) Concurrent Implementation with APS	Option (C) No Compensation	
	Man- weeks	Calendar- weeks	Man- weeks	Man- weeks	Calendar- weeks
1) Requirement Scoping & analysis	6	8	3	4	6
2) MCE Development	4	4	4	4	4
3) NEMS standing data and/or Compensation Engine development	28	40	7	4	14
4) System Tests & Performance	6	6	6	4	4
5) User Acceptance Testing	8	12	8	4	6
6) Audit	4	7	2	2	5
7) Parallel MCE runs & detailed daily check analysis/ investigation	4	8	4	4	8
Total Effort Required	60	85	34	26	47
Total Project Time (Audit overlapping with parallel run)	78 calendar-weeks after EMA's approval		Expected completion in August 2015	42 calendar-weeks after EMA's approval	
Cost					
Power Systems Consultant Resource	8 man-weeks		8 man-weeks	8 man-weeks	
External resource / Vendor	\$732,000		\$183,000	\$40,800	
Audit	\$40,000		\$20,000	\$20,000	
Total Additional Costs (from RCP budget)	\$772,000		\$203,000	\$60,800	

The RCP unanimously supported Option B (concurrent implementation with APS).

In addition to the implementation cost of \$203,000 (for Option B) in Table 6, additional implementation costs of \$6,300 would be incurred to publish the MSL level of GRFs.

8 Proposed Modifications

Arising from the RCP's decision at its 68th and 69th RCP meetings, EMC drafted the proposed modifications to the market rules and market manual required to effect the proposal. The modifications are set out in Annexes 1 - 4, and summarised in Table 7 below. Proposed changes to implement the proposal are shaded in blue, while the rest are peripheral rule changes to enhance drafting clarity and correct errors.

Table 7: Summary of proposed rule changes

Chapter/ Section	Proposed changes	Reasons for change
Chapter 2, section 5.6.2.10	Add GRF's registered MSL level in the list of facility data to be published.	To publish the MSL level of modelled GRFs.
Chapter 3, section 3.7.2.2	Replace reference to section 5.6.7 with section 5.6.6 instead.	To correct cross-referencing error.
Chapter 3, section 3.7.2.3	Add disputes relating to MSL compensation to the list for which steps in negotiation shall not apply.	To exclude disputes relating to MSL compensation from the negotiation process.
Chapter 3, section 3.7.5	Add reference to the new section K.4.14 of Appendix 6K.	To include failure to meet the timeline for submitting a notice of arbitration with respect to MSL compensation, as a waiver of right to use the dispute resolution process or start any other proceedings.
Chapter 3, section 3.8.16.2	Italicise term defined in the market rules.	For stylistic consistency.
	Replace reference to section 5.6.7 with section 5.6.6 instead.	To correct a cross-referencing error.
Chapter 3, section 3.8.16.3	Add disputes relating to MSL compensation to the list for which steps in mediation shall not apply.	To exclude disputes relating to MSL compensation from the mediation process.
Chapter 3, section 3.9.1.5	Replace reference to section 5.6.7 with section 5.6.6 instead.	To correct a cross-referencing error.
Chapter 3, section 3.9.1.6	Add disputes relating to MSL compensation as a matter that could be submitted for arbitration.	To allow MPs to dispute compensation related to MSL constraints through arbitration.
Chapter 3, section 3.9.2	Replace "filling" with "filing".	To correct typographic error.
Chapter 3, section 3.9.6	Add "where applicable".	To clarify that only the conditions which are applicable need to be met.
	Shift reference to section 5.6.7 of Chapter 7 from section 3.9.6.2 to the new section 3.9.6.4	For clarity.
	Replace "notice of dispute" with "notice	To clarify that the notice filed is a notice

Chapter/ Section	Proposed changes	Reasons for change
	of arbitration “.	of arbitration.
	Include the conditions for a notice of arbitration relating to MSL compensation	To provide that the notice of arbitration relating to MSL compensation should meet the requirements set out.
Chapter 3, section 3.12.1	Add “compensation amounts” to “compensation claims”.	To allow compensation amounts to be recovered in the same way as compensation claims (i.e. via MACP).
Chapter 3, section 3.12.2	Specify that EMC shall pay compensation amounts due within 90 days of the issuance of a final MSL invoice.	To require that compensation amounts for MSL be paid out within 90 days of the issuance of a final MSL invoice.
	Add “compensation amounts” to “compensation claims”.	To provide that EMC shall pay compensation amounts due after the same has been recovered through MEUC, similar to compensation claims.
Chapter 6, section 10.5	Introduce the conditions under which market participants are eligible for the MSL compensation, and specify the procedures and timeline for calculating such amounts.	To effect the proposed compensation for GRFs constrained at MSL.
Appendix 6D, section D.3	Add constraint D.15.1.3 under the description for “InfinitePositiveValue”.	To specify that “InfinitePositiveValue” is also used to model a GRF’s MSL level.
	Add parameter “MinimumStableLoad _g ”.	To introduce a new parameter used to model a GRF’s MSL level.
Appendix 6D, section D.4	Add four new variables “MSLSelector _g ”, “ExcessMSL _g ”, “DeficitMSL _g ”, and “FacilityMSLViolation _g ”.	To define new variables used to model a GRF’s MSL level.
Appendix 6D, section D.15	Restructure section and add title for generation constraints and purchase constraints.	For clarity.
Appendix 6D, section D.15.1.3	Introduce new constraints.	To introduce constraints to model a GRF’s MSL level.
Chapter 6, Appendix 6D, section D.21.5	Include the variable “FacilityMSLViolation _g ” in the facility violation group constraint.	To include violations related to MSL constraints as part of the aggregated violation for a facility.
Appendix 6D, section D.21.5.6	Introduce new constraint.	To sum violation variables related to the MSL constraints.
Appendix 6E, section E.1.1.14	Add a GRF’s MSL level to the list of standing capability data.	To include MSL level as part of standing capability data.
Appendix 6J, section J.3	Include DeficitMSL _g and ExcessMSL _g as incurring CVP at 20xVoLL.	To define the constraint violation penalty price for new violation variables.
Appendix 6K	Introduce new Appendix.	To specify, for compensation to GRFs constrained at their MSL, the i) criteria for compensation, ii) calculation of compensation amount, and iii) timeline for issuance of compensation statements and invoice.
Chapter 7,	Add compensation amounts relating to	To include compensation amounts for

Chapter/ Section	Proposed changes	Reasons for change
section 4.1.1.3	MSL constraints.	MSL as part of the MACP.
Chapter 7, section 5.6.6	Replace “notice of dispute” with “notice of arbitration “.	To clarify that the notice filed is a notice of arbitration.
Chapter 7, section 5.6.7	Replace “notice of dispute” with “notice of arbitration”.	To clarify that the notice filed is a notice of arbitration.
Chapter 7, section 5.16.1	Provide for bank accounts to be established for purposes other than for settlement and invoicing.	To allow the establishment and maintenance of bank accounts where required under the market rules.
Chapter 7, section 5.16.5	Amend description.	For clarity.
Chapter 8, section 1.1.17	Provide for bank accounts to be established for purposes other than settlement and invoicing.	To allow the establishment and maintenance of bank accounts where required under the market rules.
Chapter 8, section 1.1.83	Include that the electronic information system can also be used to exchange other information.	To expand the purposes which the electronic information system can be used for.
Chapter 8, section 1.1.88, section 1.1.90, section 1.1.105, section 1.1.125, section 1.1.133, section 1.1.144, section 1.1.160, section 1.1.171, section 1.1.190, 1.1.243, and 1.1.244	Replace reference to section 5.6.7 with section 5.6.6 instead.	To correct a cross-referencing error.
Chapter 8, section 1.1.143	Provide for MP bank accounts to be established for purposes other than settlement.	To expand the purposes under which MP bank accounts may be established and maintained.
	Replace reference to section 5.6.7 with section 5.6.6 instead.	To correct a cross-referencing error.
Market Manual (Standing Offers, Offer Variations and Standing Data), section 4.5.9	Addition of MSL field.	To include MSL level as part of standing capability data.

8.1 Revision to Compensation Calculations

To determine the maximum allowable injection quantities eligible for compensation, Table 3 (of section 4.4 of this paper on implementation considerations) proposed using a GRF's energy schedule in the previous dispatch period as a proxy.

EMC proposes to use a GRF's StartGeneration level instead, as it:

- i) is more reflective of a GRF's actual generation level, since StartGeneration is the GRF's actual output level captured by the PSO 10 minutes before the start of the dispatch period;

- ii) avoids overcompensating GRFs who were scheduled at \geq MSL in the previous period but did not run; and
- iii) avoids flow-on effects from situations when a real-time dispatch schedule was overridden or not produced in the previous dispatch period.

As such, the quantum determination for compensation would be revised as follows:

Table 8: Revised parameter to determine quantum eligible for compensation

StartGeneration level compared to MSL level for a GRF:	Injection quantity eligible for compensation:
StartGeneration \geq MSL	Minimum (MSL $\times \frac{1}{2}$, IEQ _T)
StartGeneration $<$ MSL	Minimum (MSL $\times \frac{1}{4}$, IEQ _T)

8.2 Revision to Exclusion A

To gauge whether GRFs were constrained by their ramp rates, EMC proposes using ExpectedStartGeneration instead of StartGeneration (as previously suggested) because ExpectedStartGeneration takes into account the GRF's scheduled energy level in the previous dispatch period and physical constraints (StartGeneration and ramp rates), and provides a better estimate of the GRF's beginning-of-period output level.

Further, only the ramp down trajectory of a GRF would constrain the GRF to be dispatched at its MSL non-economically. The ramp up check is not required because if a GRF's energy ramp up trajectory is within 0 and its MSL, the GRF would not be dispatched at its MSL level. The latter check to determine Exclusion A is thus proposed to be removed.

In sum, a GRF is considered bounded by its ramp rate and excluded from compensation if the calculated ramping trajectory of the GRF is:

$$0 < (\text{ExpectedStartGeneration} - \text{DownRampRate} \times 30\text{mins}) < \text{MSL}$$

9 Legal sign-off

The text of the rule modifications in Annexes 1 and 2 has been vetted by EMC's external legal counsel whose opinion is that the modification reflects the intent of the rule modification proposal as expressed in the third column of the table in Annex 1.

For the rule modifications in Annexes 3 and 4, EMC's external legal counsel has indicated that because of the technical nature of the rule modifications, they are unable to provide a legal sign-off.

10 Industry Consultation for Proposed Rule Modifications

The proposed rule modifications, as set out in Annexes 1 - 4 were published for consultation on 29 November 2013. Comments were received from Sembcorp Cogen.

Comments from Sembcorp Cogen

We refer to Figure 4 of the paper whereby the criteria for eligibility of compensation is being tabulated.

EMC should also exclude GRF whose Actual IEQ is less than the Scheduled Energy (i.e. at MSL) from the compensation regime. If a GRF has been scheduled at MSL but was not actually dispatching at MSL, it is imposing the same “reliability” risk to the system as if the rule change has not been passed i.e. partially dispatch by MCE. Thus, no compensation should be allowed.

We believe that the above comment is the underlying intent of the proposal but was not stated explicitly. Appreciate if EMC can take this into consideration and include explicitly this condition for eligibility for compensation in the modification of the market rules.

EMC's response

We do not agree with Sembcorp Cogen's comment. Deviation of a generator's actual output from its dispatch schedule may be a case of non-compliance and could be reported to the Market Surveillance and Compliance Panel by the PSO

The proposed compensation pays generators based on their actual injection quantity, so that taking into account both energy payments and the proposed compensation, generators will receive their full offer price for the energy injected. If generators do not inject, they do not receive compensation.

Pursuant to section 5.3.6 of Chapter 3 of the market rules, EMC has also consulted the Dispute Resolution Counsellor's (DRC) on the modification proposal. The DRC's comments, together with EMC's responses, are as follows:

Comments from the DRC

Clause K.4.14: The time period for filing a notice of arbitration is 20 business days. We need to check that this is covered under Section 3.9.6.2 of Chapter 3.

EMC's response

This time period is included in the proposed new section 3.9.6.5 of Chapter 3.

Comments from the DRC

Clause K.4.15: This is at variance with Section 3.4.10, which gives me the power to grant extensions of time in certain circumstances. Need to reconcile.

EMC's response

Clause K.4.15 already provides leeway for the DRC to accept notices of arbitration relating to issues that were not raised timely, if the DRC is satisfied with reasons provided by the market participant. Further, this clause is modelled based on the existing rules, specifically section 5.6.8 of Chapter 7.

11 RCP's Decision at the 71st RCP Meeting

At the 71st RCP meeting, the RCP considered the proposed revisions to the original compensation framework (as detailed in sections 8.1 and 8.2). The proposed modifications to the market rules and market manual incorporating these revisions were also presented for the RCP's consideration.

The Panel **by majority vote** supported the proposed modifications to the market rules and market manual in Annexes 1 - 4. The details of the votes are as follows:

Those who voted in support of the proposal:

- 1) Mr Toh Seong Wah Representative of the EMC
- 2) Mr Kng Meng Hwee Representative of the PSO
- 3) Mr Daniel Lee Representative of Generation Licensee
- 4) Mr Luke Peacocke Representative of Generation Licensee
- 5) Mr Koe Pak-Juan Representative of Generation Licensee
- 6) Mr Chan Hung Kwan Representative of Transmission Licensee
- 7) Mr Sean Chan Representative of Retail Electricity Licensee
- 8) Mr Phillip Tan Person experienced in Financial Matters
- 9) Ms Frances Chang Representative for the interests of consumers of Electricity in Singapore
- 10) Dr Toh Mun Heng Representative for the interests of consumers of Electricity in Singapore

Those who abstained from voting:

- 1) Mr Michael Wong Representative of Retail Electricity Licensee
- 2) Mr Lawrence Lee Representative of the market support services licensee

12 Recommendation

The RCP by majority vote recommends that the EMC Board:

- a) **adopt** the proposed modifications to the market rules and market manual as set out in **Annexes 1 - 4**;
- b) **seek** the EMA's approval of the proposed modifications to the market rules and market manual as set out in **Annexes 1 - 4**; and
- c) **recommend** that the proposed modifications to the market rules and market manual come into force in **August 2015**.

Annex 1 - Part 1 of the Proposed Rule Modifications

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<u>CHAPTER 2</u>	<u>CHAPTER 2</u>	
<p>5.6 PUBLICATION OF FACILITY DATA</p> <p>...</p> <p>5.6.2 The list referred to in section 5.6.1 shall contain the following information most currently available to the <i>EMC</i> in respect of each <i>generation facility</i> registered with the <i>EMC</i> under sections 5.2, 5.3 and 5.4:</p> <p>...</p> <p>5.6.2.8 the maximum <i>regulation</i> capacity that such <i>generation facility</i> is registered to provide; and</p> <p>5.6.2.9 whether such <i>generation facility</i> is frequency responsive, that is, whether it has a positive maximum <i>reserve</i> capacity for either primary or secondary <i>reserve</i>.</p>	<p>5.6 PUBLICATION OF FACILITY DATA</p> <p>...</p> <p>5.6.2 The list referred to in section 5.6.1 shall contain the following information most currently available to the <i>EMC</i> in respect of each <i>generation facility</i> registered with the <i>EMC</i> under sections 5.2, 5.3 and 5.4:</p> <p>...</p> <p>5.6.2.8 the maximum <i>regulation</i> capacity that such <i>generation facility</i> is registered to provide; and</p> <p>5.6.2.9 whether such <i>generation facility</i> is frequency responsive, that is, whether it has a positive maximum <i>reserve</i> capacity for either primary or secondary <i>reserve</i>; and</p> <p><u>5.6.2.10 the minimum stable load level registered for such <i>generation facility</i>, if any.</u></p>	<p>To publish the minimum stable load (MSL) level of generation registered facilities (GRFs) that chooses for their MSL level to be registered for modelling.</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<u>CHAPTER 3</u>	<u>CHAPTER 3</u>	
<p>3.7 NEGOTIATION</p> <p>...</p> <p>3.7.2 The steps in section 3.7.1 do not apply to:</p> <p style="padding-left: 40px;">3.7.2.1 a dispute over a request for compensation referred to in section 3.3.1.5. Section 3.11 shall apply to that dispute instead; or</p> <p style="padding-left: 40px;">3.7.2.2 a dispute over a <i>final settlement statement</i> referred to in section 5.6.6 of Chapter 7. Section 5.6.7 of Chapter 7 shall apply to that dispute instead.</p> <p>...</p> <p>3.7.5 If a party fails to comply with the time limit</p>	<p>3.7 NEGOTIATION</p> <p>...</p> <p>3.7.2 The steps in section 3.7.1 do not apply to:</p> <p style="padding-left: 40px;">3.7.2.1 a dispute over a request for compensation referred to in section 3.3.1.5. Section 3.11 shall apply to that dispute instead; or</p> <p style="padding-left: 40px;">3.7.2.2 a dispute over a <i>final settlement statement</i> referred to in section 5.6.6 of Chapter 7. Section 5.6.6<u>7</u> of Chapter 7 shall apply to that dispute instead.; <u>or</u></p> <p style="padding-left: 40px;"><u>3.7.2.3 a dispute over a final minimum stable load compensation statement or as to whether such a statement should have been issued to a market participant referred to in section K.4.13 of Appendix 6K. Section K.4.13 of Appendix 6K shall apply to that dispute instead.</u></p> <p>...</p> <p>3.7.5 If a party fails to comply with the time limit set out in</p>	<p>To correct a typographical error in the cross-reference to section 5.6.7 of Chapter 7.</p> <p>To exclude disputes relating to a final minimum stable load compensation statement from the negotiation process in the dispute resolution procedures of Chapter 3 of the Market Rules.</p> <p>This is a consequential</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p>set out in section 3.7.3, section 3.11, or in section 5.6.7 of Chapter 7, that party is deemed to waive its right:</p> <p>3.7.5.1 to use the dispute resolution process in the <i>market rules</i> to resolve the dispute; or</p> <p>3.7.5.2 to start any other proceeding about the subject-matter of the dispute.</p>	<p>section 3.7.3; <u>or</u> section 3.11 <u>of this Chapter, in section K.4.14 of Appendix 6K</u> or in section 5.6.7 of Chapter 7, that party is deemed to waive its right:</p> <p>3.7.5.1 to use the dispute resolution process in the <i>market rules</i> to resolve the dispute; or</p> <p>3.7.5.2 to start any other proceeding about the subject-matter of the dispute.</p>	<p>change further to the new proposed section K.4.14 of Appendix 6K (see below) which sets out the timeline for submitting the notice of arbitration for disputes over the final minimum stable load compensation statement (including the non-issuance of such statement).</p>
<p>3.8 MEDIATION</p> <p>...</p> <p>3.8.16 Section 3.8 does not apply to:</p> <p>3.8.16.1 a dispute over a request for compensation in 3.3.1.5. Section 3.11 shall apply to the dispute instead; or</p> <p>3.8.16.2 a dispute over a final settlement statement in section 5.6.6 of Chapter 7. Section 5.6.7 of Chapter 7 shall apply to the dispute instead.</p>	<p>3.8 MEDIATION</p> <p>...</p> <p>3.8.16 Section 3.8 does not apply to:</p> <p>3.8.16.1 a dispute over a request for compensation in 3.3.1.5. Section 3.11 shall apply to the dispute instead; or</p> <p>3.8.16.2 a dispute over a final settlement statement <u>final settlement statement</u> in section 5.6.6 of Chapter 7. Section 5.6.67 of Chapter 7 shall apply to the dispute instead; <u>or</u></p> <p><u>3.8.16.3 a dispute over a final minimum stable load compensation statement or as to whether</u></p>	<p>To correct a formatting error in the reference to "final settlement statement" and a typographical error in the cross reference to section 5.6.7 of</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
	<p><u>such a statement should have been issued to a market participant referred to in section K.4.13 of Appendix 6K. Section K.4.13 of Appendix 6K shall apply to that dispute instead.</u></p>	<p>Chapter 7.</p> <p>To exclude disputes relating to a final minimum stable load compensation statement from the mediation process in the dispute resolution procedures of Chapter 3 of the Market Rules.</p>
<p>3.9 ARBITRATION</p> <p>3.9.1 Either party (the “<i>arbitration complainant</i>”) may submit the matter to the <i>dispute resolution counsellor</i> for arbitration if:</p> <p>...</p> <p>3.9.1.4 the dispute is over a request for compensation in section 3.3.1.5 that is not resolved under section 3.11; or</p> <p>3.9.1.5 the dispute is over a <i>final settlement statement</i> in section 5.6.6 that is not resolved under section 5.6.7 of Chapter 7.</p>	<p>3.9 ARBITRATION</p> <p>3.9.1 Either party (the “<i>arbitration complainant</i>”) may submit the matter to the <i>dispute resolution counsellor</i> for arbitration if:</p> <p>...</p> <p>3.9.1.4 the dispute is over a request for compensation in section 3.3.1.5 that is not resolved under section 3.11; or</p> <p>3.9.1.5 the dispute is over a <i>final settlement statement</i> in section 5.6.6 that is not resolved under section 5.6. 67 of Chapter 7; <u>or</u></p> <p><u>3.9.1.6 the dispute is over a final minimum stable load compensation statement or as to whether such a statement should have been issued to a</u></p>	<p>To correct a typographical error in the cross-reference to section 5.6.7 of Chapter 7.</p> <p>To allow disputes</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p>...</p> <p>3.9.2 An <i>arbitration complainant</i> submits a dispute to the <i>dispute resolution counsellor</i> for arbitration by filling a <i>notice of arbitration</i>.</p> <p>...</p> <p>3.9.6 Before taking any further action, the <i>dispute resolution counsellor</i> shall decide if all of the following conditions are met:</p> <p>...</p> <p>3.9.6.2 the <i>notice of dispute</i> was served</p>	<p>... <u>market participant</u> referred to in section K.4.13 of Appendix 6K.</p> <p>...</p> <p>3.9.2 An <i>arbitration complainant</i> submits a dispute to the <i>dispute resolution counsellor</i> for arbitration by <u>filing</u>filling a <i>notice of arbitration</i>.</p> <p>...</p> <p>3.9.6 Before taking any further action, the <i>dispute resolution counsellor</i> shall decide if all of the following conditions (<u>where applicable</u>) are met:</p> <p>...</p> <p>3.9.6.2 the <i>notice of dispute</i> was served within the</p>	<p>relating to a final minimum stable load compensation statement, or as to whether a market participant should have been considered for compensation under section 10.5 of Chapter 6, to be resolved by way of arbitration as contemplated under section K.4.13 of the new Appendix 6K below.</p> <p>To correct a typographical error in the existing Market Rules.</p> <p>To provide that only the conditions which are applicable will all need to be met.</p> <p>To shift the reference</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p>within the time limit in section 3.7.3 of this Chapter or section 5.6.7 of Chapter 7, or the request for compensation was made within the time limit in section 3.11.2; and</p> <p>3.9.6.3 where the <i>notice of dispute</i>:</p> <p>a. relates to a dispute to which section 13.1.4.3, 13.2.4.3 or 13.3.4.3 of Chapter 1 applies (whether because of any of those sections or section 13.5 of Chapter 1 or by agreement); and</p> <p>b. includes a claim for damages, the aggregate of that claim for damages (exclusive of claims for costs) in respect of a given event and a given person, exceeds \$5,000.</p>	<p>time limit in section 3.7.3 of this Chapter or section 5.6.7 of Chapter 7, or the request for compensation was made within the time limit in section 3.11.2; and</p> <p>3.9.6.3 where the <i>notice of dispute</i>:</p> <p>a. relates to a dispute to which section 13.1.4.3, 13.2.4.3 or 13.3.4.3 of Chapter 1 applies (whether because of any of those sections or section 13.5 of Chapter 1 or by agreement); and</p> <p>b. includes a claim for damages, the aggregate of that claim for damages (exclusive of claims for costs) in respect of a given event and a given person, exceeds \$5,000;</p> <p><u>3.9.6.4 where the <i>notice of arbitration</i> relates to a dispute over a final settlement statement, such notice of arbitration was submitted within the time limit in section 5.6.7 of Chapter 7; and</u></p> <p><u>3.9.6.5 where the <i>notice of arbitration</i> relates to a</u></p>	<p>to section 5.6.7 of Chapter 7 from section 3.9.6.2 to section 3.9.6.4 and to refer to notice of arbitration (instead of notice of dispute) in section 3.9.6.4.</p> <p>To provide that the</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
	<p><u>dispute over a final minimum stable load compensation statement or as to whether such a statement should have been issued to a market participant pursuant to section K.4.13 of Appendix 6K:</u></p> <p>a. <u>such notice of arbitration was submitted within the time limit in section K.4.14 of Appendix 6K; and</u></p> <p>b. <u>such notice of arbitration is not required to be dismissed under section K.4.15 of Appendix 6K.</u></p>	notice of arbitration relating to a final minimum stable load compensation statement should meet the requirements set out in Appendix 6K.
<p>3.12 COMPENSATION PAYABLE BY THE EMC</p> <p>3.12.1 The <i>EMC</i> shall pay all compensation claims due under the <i>market rules</i> as soon as practicable after it has recovered those amounts through the monthly energy uplift charge under section 4.1 of Chapter 7.</p> <p>3.12.2 Notwithstanding section 3.12.1, the <i>EMC</i> shall pay all compensation claims as soon as practicable but no later than 90 days after:</p>	<p>3.12 COMPENSATION PAYABLE BY THE EMC</p> <p>3.12.1 The <i>EMC</i> shall pay all <u>compensation amounts due under section 10.5 of Chapter 6 and all</u> compensation claims due under the <i>market rules</i> as soon as practicable after it has recovered the same<u>those amounts</u> through the monthly energy uplift charge under section 4.1 of Chapter 7.</p> <p>3.12.2 Notwithstanding section 3.12.1, the <i>EMC</i> shall pay all <u>compensation amounts due under section 10.5 of Chapter 6 and all</u> compensation claims, <u>in such manner as the <i>EMC</i> deems appropriate,</u> as soon as practicable</p>	<p>To provide that compensation amounts due under section 10.5 of Chapter 6 are to be paid out after recovery of the same through monthly energy uplift charge (MEUC).</p> <p>To allow the EMC to fulfil its payment obligations for compensation amounts</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p>3.12.2.1 the date the <i>claimant</i> notifies its agreement to the amount of compensation determined by the <i>EMC</i> or <i>PSO</i>;</p> <p>3.12.2.2 the date the <i>arbitration tribunal</i> makes the determination against the <i>EMC</i>; or</p> <p>3.12.2.3 the date the parties resolve their dispute.</p>	<p>but no later than 90 days after:</p> <p>3.12.2.1 the date the <i>claimant</i> notifies its agreement to the amount of compensation determined by the <i>EMC</i> or <i>PSO</i>;</p> <p>3.12.2.2 the date the <i>arbitration tribunal</i> makes the determination against the <i>EMC</i>; or</p> <p>3.12.2.3 the date the parties resolve their dispute; <u>or</u></p> <p><u>3.12.2.4 the issuance of the final minimum stable load compensation invoice referred to in Appendix 6K.</u></p>	<p>due under section 10.5 of Chapter 6 and compensation claims in such manner as the EMC deems appropriate.</p> <p>To add a further requirement that the compensation for MSL constraints be paid out within 90 days after the issuance of the final minimum stable load compensation invoice.</p>
<u>CHAPTER 6</u>	<u>CHAPTER 6</u>	
[New section]	<p><u>10.5 COMPENSATION FOR MINIMUM STABLE LOAD CONSTRAINTS</u></p> <p><u>10.5.1 The <i>EMC</i> shall calculate, in accordance with Appendix 6K, the compensation amount payable to a <i>market participant</i> whose <i>generation registered facility</i> has a</u></p>	To require the EMC to calculate compensation for a GRF scheduled at its MSL level in a real-time dispatch schedule

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
	<p><u>minimum stable load level registered with the EMC, if such generation registered facility:</u></p> <p><u>10.5.1.1 is scheduled for energy at its minimum stable load level in its real-time dispatch schedule referred to in section 9.2.3 for a given dispatch period, and where the PSO did not also issue subsequent dispatch instructions for such generation registered facility for that dispatch period pursuant to section 9.1.3 of Chapter 5; and</u></p> <p><u>10.5.1.2 satisfies all other criteria for compensation set out in section K.2 of Appendix 6K.</u></p> <p><u>10.5.2 The EMC shall calculate the compensation amount referred to in section 10.5.1 in accordance with the procedures and timeline set out in Appendix 6K.</u></p>	<p>(referred to in section 9.2.3 of Chapter 6) which is not overridden by the PSO (in the manner referred to in section 9.1.3 of Chapter 5) if such GRF satisfies the criteria in section 10.5.1 of Chapter 6.</p> <p>To provide that the EMC shall calculate such compensation amounts in accordance with procedures and timeline set out in the new Appendix 6K.</p>
APPENDIX 6E – STANDING CAPABILITY DATA	APPENDIX 6E – STANDING CAPABILITY DATA	
E.1 GENERATION FACILITY DATA E.1.1 The <i>standing capability data</i> pertaining to a <i>generation facility</i> shall include:	E.1 GENERATION FACILITY DATA E.1.1 The <i>standing capability data</i> pertaining to a <i>generation facility</i> shall include:	

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p>...</p> <p>E.1.1.12 the lowest <i>energy</i> output level that the <i>generation facility</i> is capable of providing <i>reserve</i> for all <i>reserve class</i>; and</p> <p>E.1.1.13 the <i>reserve</i> capacity of the <i>generation facility</i> at low, medium and high <i>energy</i> output level for each <i>reserve class</i> which the <i>generation facility</i> is or seeks to be registered to provide.</p>	<p>...</p> <p>E.1.1.12 the lowest <i>energy</i> output level that the <i>generation facility</i> is capable of providing <i>reserve</i> for all <i>reserve classes</i>; and</p> <p>E.1.1.13 the <i>reserve</i> capacity of the <i>generation facility</i> at low, medium and high <i>energy</i> output levels for each <i>reserve class</i> which the <i>generation facility</i> is or seeks to be registered to provide; <u>and</u></p> <p><u>E.1.1.14 the minimum stable load level of the <i>generation facility</i> where the <i>generation facility</i> has or seeks to have its minimum stable load level registered.</u></p>	<p>To correct expressions.</p> <p>To include a GRF's MSL in its standing capability data, where such facility has its MSL level registered for modelling.</p>
[New Appendix – Please refer to Annex 2]	<u>APPENDIX 6K – COMPENSATION WHEN SCHEDULED AT MINIMUM STABLE LOAD LEVEL</u>	New appendix to detail certain criteria, procedures and timeline for compensation under section 10.5 of Chapter 6.
<u>CHAPTER 7</u>	<u>CHAPTER 7</u>	
<p>4.1 THE MONTHLY ENERGY UPLIFT CHARGE</p> <p>4.1.1 Prior to the beginning of each calendar</p>	<p>4.1 THE MONTHLY ENERGY UPLIFT CHARGE</p> <p>4.1.1 Prior to the beginning of each calendar month, the <i>EMC</i></p>	

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p>month, the <i>EMC</i> shall calculate for that calendar month the monthly amount for compensation and other payments (MACP), which shall be the sum of:</p> <p>...</p> <p>4.1.1.3 the amounts of compensation claims to be paid by the <i>EMC</i> or the <i>PSO</i> under section 3.11 of Chapter 3 ; and</p> <p>...</p>	<p>shall calculate for that calendar month the monthly amount for compensation and other payments (MACP), which shall be the sum of:</p> <p>...</p> <p>4.1.1.3 the amounts of compensation claims to be paid by the <i>EMC</i> or the <i>PSO</i> under section 3.11 of Chapter 3, <u>and the compensation amounts to be paid by the <i>EMC</i> under section 10.5 of Chapter 6;</u> and</p> <p>...</p>	<p>To include compensation amounts for MSL paid by the EMC as part of the MACP.</p>
<p>5.6 FINAL SETTLEMENT STATEMENT COVERAGE</p> <p>...</p> <p>5.6.6 If a <i>market participant</i>, after having made reasonable efforts to resolve with the <i>EMC</i> any disagreement pertaining to a <i>final settlement statement</i>, wishes to continue to dispute the matter it shall, subject to section 5.6.7, refer the matter to the <i>dispute resolution counsellor</i> pursuant to section 3.9.2 of Chapter 3 and shall indicate, in the notice of dispute submitted to the <i>dispute resolution counsellor</i> for such purpose, the contested amount.</p> <p>5.6.7 No <i>market participant</i> may submit, and the <i>dispute resolution counsellor</i> shall not accept or take any action with respect to, a</p>	<p>5.6 FINAL SETTLEMENT STATEMENT COVERAGE</p> <p>...</p> <p>5.6.6 If a <i>market participant</i>, after having made reasonable efforts to resolve with the <i>EMC</i> any disagreement pertaining to a <i>final settlement statement</i>, wishes to continue to dispute the matter it shall, subject to section 5.6.7, refer the matter to the <i>dispute resolution counsellor</i> pursuant to section 3.9.2 of Chapter 3 and shall indicate, in the notice of dispute <u>notice of arbitration</u> submitted to the <i>dispute resolution counsellor</i> for such purpose, the contested amount.</p> <p>5.6.7 No <i>market participant</i> may submit, and the <i>dispute resolution counsellor</i> shall not accept or take any action with respect to, a notice filed pursuant to section 5.6.6</p>	<p>To replace “notice of dispute” with “notice of arbitration” as defined in Chapter 8.</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p>notice filed pursuant to section 5.6.6 if:</p> <p>5.6.7.1 where the dispute relates to the accuracy of metering data, more than forty <i>business days</i> has elapsed since the date on which the <i>final settlement statement</i> to which the notice of dispute relates was issued; or</p> <p>5.6.7.2 in all other cases, more than twenty <i>business days</i> has elapsed since the date on which the <i>final settlement statement</i> to which the notice of dispute relates was issued.</p>	<p>if:</p> <p>5.6.7.1 where the dispute relates to the accuracy of metering data, more than forty <i>business days</i> has elapsed since the date on which the <i>final settlement statement</i> to which the notice of dispute <u>notice of arbitration</u> relates was issued; or</p> <p>5.6.7.2 in all other cases, more than twenty <i>business days</i> has elapsed since the date on which the <i>final settlement statement</i> to which the notice of dispute <u>notice of arbitration</u> relates was issued.</p>	<p>To replace “notice of dispute” with “notice of arbitration” as defined in Chapter 8.</p> <p>To replace “notice of dispute” with “notice of arbitration” as defined in Chapter 8.</p>
<p>5.16 BANK ACCOUNTS</p> <p>5.16.1 The <i>EMC</i> shall establish and maintain the <i>bank accounts</i> described in this section 5.16 for the operation of its <i>settlement</i> and <i>invoicing</i> processes.</p>	<p>5.16 BANK ACCOUNTS</p> <p>5.16.1 The <i>EMC</i> shall establish and maintain the <i>bank accounts</i> described in this section 5.16 for the operation of its <i>settlement</i> and <i>invoicing</i> processes <u>and for such other purposes as may be prescribed or contemplated under the market rules or any market manual.</u></p>	<p>To expand the purposes under which bank accounts may be established and maintained to other purposes as may be prescribed or contemplated under the market rules or any market manual.</p>

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<p>...</p> <p>5.16.5 The <i>EMC</i> may establish <i>bank accounts</i> at its bank or financial institution described in section 5.16.2 in addition to those <i>bank accounts</i> referred to in this section 5.16 as may be necessary to implement the <i>settlement</i> and <i>invoicing</i> processes outlined in this Chapter. <i>Market participants</i> shall be notified 60 <i>business days</i> prior to any such additional <i>bank accounts</i> becoming operational.</p>	<p>...</p> <p>5.16.5 <u>In addition to those <i>bank accounts</i> referred to in this section 5.16 as may be necessary to implement the <i>settlement</i> and <i>invoicing</i> processes outlined in this Chapter.</u> the <i>EMC</i> may establish <i>bank accounts</i> at its bank or financial institution described in section 5.16.2 in addition to those <i>bank accounts</i> referred to in this section 5.16 as may be necessary to implement the <i>settlement</i> and <i>invoicing</i> processes outlined in this Chapter. <i>Market participants</i> shall be notified 60 <i>business days</i> prior to any such additional <i>bank accounts</i> becoming operational.</p>	<p>To clarify that the EMC may establish bank accounts other than those necessary to implement settlement and invoicing processes outlined in Chapter 7.</p>
<u>CHAPTER 8</u>	<u>CHAPTER 8</u>	
<p>1.1.17 <i>bank account</i> means a bank account held by the <i>EMC</i> or a <i>market participant</i> for <i>settlement</i> purposes and has, where applicable, the extended meaning ascribed thereto in section 5.16 of Chapter 7;</p>	<p>1.1.17 <i>bank account</i> means a bank account held by the <i>EMC</i> or a <i>market participant</i> for <u><i>settlement or other</i></u> purposes <u>as may be prescribed or contemplated under the <i>market rules</i> or any <i>market manual</i></u> and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p>	<p>To expand the definition of bank account to include payments for other purposes as may be prescribed or contemplated under the market rules or any market manual.</p> <p>To correct a typographical error in the cross-reference to section 5.16 of</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
		Chapter 7.
<p>...</p> <p>1.1.83 <i>electronic information system</i> means the communication network that is used for the exchange of <i>settlement</i> information;</p>	<p>...</p> <p>1.1.83 <i>electronic information system</i> means the communication network that is used for the exchange of <i>settlement</i> information <u>and such other information as may be prescribed or contemplated under the market rules or any market manual.</u></p>	To expand the definition of electronic information system to include the exchange of information for other purposes as may be prescribed or contemplated under the market rules or any market manual.
<p>...</p> <p>1.1.88 <i>EMC payment date</i> means a date on which the <i>EMC</i> is to make <i>settlement</i> payments to <i>market participants</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16 of Chapter 7;</p>	<p>...</p> <p>1.1.88 <i>EMC payment date</i> means a date on which the <i>EMC</i> is to make <i>settlement</i> payments to <i>market participants</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p>	To correct a typographical error in the cross-reference to section 5.16 of Chapter 7.
<p>...</p> <p>1.1.90 <i>EMC prepayment account</i> means the <i>bank account</i> operated by the <i>EMC</i> to hold payments by <i>market participants</i> prior to the relevant <i>market participant payment date</i> to which such payments apply and has, where applicable, the</p>	<p>...</p> <p>1.1.90 <i>EMC prepayment account</i> means the <i>bank account</i> operated by the <i>EMC</i> to hold payments by <i>market participants</i> prior to the relevant <i>market participant payment date</i> to which such payments apply and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p>	To correct a typographical error in the cross-reference to section 5.16 of Chapter 7.

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
extended meaning ascribed thereto in section 5.16 of Chapter 7;		
<p>...</p> <p>1.1.105 <i>final settlement statement</i> means the <i>EMC's</i> final statement of the payments to be made by or to a <i>market participant</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16 of Chapter 7;</p>	<p>...</p> <p>1.1.105 <i>final settlement statement</i> means the <i>EMC's</i> final statement of the payments to be made by or to a <i>market participant</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p>	To correct a typographical error in the cross-reference to section 5.16 of Chapter 7.
<p>...</p> <p>1.1.125 <i>invoice</i> means an invoice from the <i>EMC</i> to a <i>market participant</i> which sets forth one or more <i>settlement amounts</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16 of Chapter 7;</p>	<p>...</p> <p>1.1.125 <i>invoice</i> means an invoice from the <i>EMC</i> to a <i>market participant</i> which sets forth one or more <i>settlement amounts</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p>	To correct a typographical error in the cross-reference to section 5.16 of Chapter 7.
<p>...</p> <p>1.1.133 <i>market creditor</i> means a person that is owed monies by the <i>EMC</i> as a result of transactions effected in the <i>wholesale electricity markets</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16 of Chapter 7;</p>	<p>...</p> <p>1.1.133 <i>market creditor</i> means a person that is owed monies by the <i>EMC</i> as a result of transactions effected in the <i>wholesale electricity markets</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p>	To correct a typographical error in the cross-reference to section 5.16 of Chapter 7.

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p>...</p> <p>1.1.143 <i>market participant bank account</i> means, in respect of a <i>market participant</i>, a <i>bank account</i> designated by that <i>market participant</i> as the <i>bank account</i> from and into which <i>settlement</i> payments are made and has, where applicable, the extended meaning ascribed thereto in section 5.16 of Chapter 7;</p> <p>1.1.144 <i>market participant payment date</i> means a date on which <i>market participants</i> are to make <i>settlement</i> payments to the <i>EMC</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16 of Chapter 7;</p>	<p>...</p> <p>1.1.143 <i>market participant bank account</i> means, in respect of a <i>market participant</i>, a <i>bank account</i> designated by that <i>market participant</i> as the <i>bank account</i> from and into which <u><i>settlement and other payments as may be prescribed or contemplated under the market rules or any market manual</i></u>, are made and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p> <p>1.1.144 <i>market participant payment date</i> means a date on which <i>market participants</i> are to make <i>settlement</i> payments to the <i>EMC</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p>	<p>To expand the definition of market participant bank account to include payments for other purposes as may be prescribed or contemplated under the market rules or any market manual.</p> <p>To correct a typographical error in the cross-reference to section 5.16 of Chapter 7.</p> <p>To correct a typographical error in the cross-reference to section 5.16 of Chapter 7.</p>
<p>...</p> <p>1.1.160 <i>monthly confirmation notice</i> means a notice issued by the <i>EMC</i> to a <i>market</i></p>	<p>...</p> <p>1.1.160 <i>monthly confirmation notice</i> means a notice issued by the <i>EMC</i> to a <i>market participant</i> containing</p>	<p>To correct a typographical error in</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p><i>participant</i> containing statements of amounts received from or paid to that <i>market participant</i> in a month and has, where applicable, the extended meaning ascribed thereto in section 5.16 of Chapter 7;</p>	<p>statements of amounts received from or paid to that <i>market participant</i> in a month and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p>	<p>the cross-reference to section 5.16 of Chapter 7.</p>
<p>...</p> <p>1.1.171 <i>notice of disagreement</i> means a notice provided by a <i>market participant</i> to the <i>EMC</i> pursuant to section 5.5.2 of Chapter 7 with respect to a disagreement relating to a <i>preliminary settlement statement</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16 of Chapter 7;</p>	<p>...</p> <p>1.1.171 <i>notice of disagreement</i> means a notice provided by a <i>market participant</i> to the <i>EMC</i> pursuant to section 5.5.2 of Chapter 7 with respect to a disagreement relating to a <i>preliminary settlement statement</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p>	<p>To correct a typographical error in the cross-reference to section 5.16 of Chapter 7.</p>
<p>...</p> <p>1.1.190 <i>preliminary settlement statement</i> means the <i>EMC's</i> preliminary statement of the payments to be made by or to a <i>market participant</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16 of Chapter 7;</p>	<p>...</p> <p>1.1.190 <i>preliminary settlement statement</i> means the <i>EMC's</i> preliminary statement of the payments to be made by or to a <i>market participant</i> and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p>	<p>To correct a typographical error in the cross-reference to section 5.16 of Chapter 7.</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p>...</p> <p>1.1.243 <i>settlement account</i> means an accounting balance maintained by the <i>EMC</i> in respect of a given <i>market participant</i> to and from which the <i>EMC</i> transfers or allocates <i>settlement amounts</i> for <i>settlement</i> purposes in accordance with Chapter 7 and has, where applicable, the extended meaning ascribed thereto in section 5.16 of Chapter 7;</p> <p>1.1.244 <i>settlement amount</i> means any amount of money to be credited to, debited from or paid by or to a <i>market participant</i>, determined in accordance with Chapter 7 and has, where applicable, the extended meaning ascribed thereto in section 5.16 of Chapter 7;</p>	<p>...</p> <p>1.1.243 <i>settlement account</i> means an accounting balance maintained by the <i>EMC</i> in respect of a given <i>market participant</i> to and from which the <i>EMC</i> transfers or allocates <i>settlement amounts</i> for <i>settlement</i> purposes in accordance with Chapter 7 and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p> <p>1.1.244 <i>settlement amount</i> means any amount of money to be credited to, debited from or paid by or to a <i>market participant</i>, determined in accordance with Chapter 7 and has, where applicable, the extended meaning ascribed thereto in section 5.16<u>5.17</u> of Chapter 7;</p>	<p>To correct a typographical error in the cross-reference to section 5.16 of Chapter 7.</p> <p>To correct a typographical error in the cross-reference to section 5.16 of Chapter 7.</p>

Annex 2 - New Appendix 6K (forming part of Part 1 of the Proposed Rule Modifications)

APPENDIX 6K – COMPENSATION WHEN SCHEDULED AT MINIMUM STABLE LOAD LEVEL

K.1 PURPOSE AND DEFINITIONS

K.1.1 This Appendix sets forth the other criteria for compensation referred to in section 10.5.1.2 of Chapter 6, as well as the procedures and timeline for compensation applicable to a market participant whose generation registered facility has a minimum stable load level registered with the EMC (the “registered MSL”).

K.1.2 In this Appendix:

K.1.2.1 “final minimum stable load compensation statement” or “FMCS” in respect of a market participant means the EMC’s final statement of compensation amounts to be paid to the market participant for the purposes of section 10.5.1 of Chapter 6 and this Appendix;

K.1.2.2 “final minimum stable load compensation invoice” or “FMI” shall mean an invoice to be issued by the EMC to a market participant which sets forth the aggregate compensation amount to be paid by the EMC to the market participant for the purposes of section 10.5.1 of Chapter 6 and this Appendix 6K; and

K.1.2.3 “preliminary minimum stable load compensation statement” or “PMCS” in respect of a market participant means the EMC’s preliminary statement of compensation amounts to be paid to the market participant for the purposes of section 10.5.1 of Chapter 6 and this Appendix 6K.

K.1.3 In this Appendix, the following definitions apply:

$COMP_t^m$ ≡ Compensation amount payable to GRF m, where it meets all the criteria under section 10.5.1 of Chapter 6 for compensation, for dispatch period t.

MEP_h^m ≡ Market energy price (in \$/MWh) at MNN m for the settlement interval h corresponding to dispatch period t.

GRF_m ≡ A GRF located at MNN m.

pq ≡ Index of the price-quantity pairs in an energy offer, which are ordered by increasing price.

$P_t^{m,pq}$ ≡ Price for the price-quantity pair pq for the energy offer for GRF m for dispatch period t.

IEQ_h^m ≡ Injection energy quantity for GRF m for the settlement interval h corresponding to dispatch period t.

- MSL_t^m ≡ Minimum stable load level for GRF m that is used in the real-time dispatch schedule referred to in section 10.5.1.1 of Chapter 6, for dispatch period t.
- DownRampRate_t^m ≡ Ramp-down rate for GRF m used in the real-time dispatch schedule referred to in section 10.5.1.1 of Chapter 6, for dispatch period t.
- ExpectedStartGeneration_{g,t} ≡ Forecast generation level of GRF m at the beginning of dispatch period t associated with an energy offer g for that dispatch period, as determined in accordance with section D.13A.2 of Appendix 6D, which is used in the real-time dispatch schedule referred to in section 10.5.1.1 of Chapter 6, for dispatch period t.
- StartGeneration_{g,t} ≡ Forecast generation level of GRF m at the beginning of dispatch period t associated with an energy offer g for that dispatch period, received in accordance with section G.3.1 of Appendix 6G. For multi-unit facilities, this is calculated in accordance with section D.8.3 of Appendix 6D.

K.2 CRITERIA FOR COMPENSATION

K.2.1 The other criteria for compensation referred to in section 10.5.1.2 of Chapter 6 for a given dispatch period are as follows:

- K.2.1.1 it is not scheduled for reserve or regulation in its real-time dispatch schedule referred to in section 10.5.1.1 of Chapter 6 for that given dispatch period;
- K.2.1.2 the price in the first price-quantity pair of its energy offer for that given dispatch period is higher than the market energy price for the settlement interval corresponding to that given dispatch period for the market network node at which the generation registered facility is located;
- K.2.1.3 the quantity in the first price-quantity pair of its energy offer for that given dispatch period is more than or equal to its registered MSL; and
- K.2.1.4 it was not bounded by its ramp-down rate for that given dispatch period, which shall be the case if its (ExpectedStartGeneration_{g,t} – DownRampRate_t^m × 30) for that given dispatch period does not take on a value between zero and its MSL_t^m.

K.3 CALCULATION OF COMPENSATION AMOUNT

K.3.1 For each generation registered facility that meets all the criteria under section 10.5.1 of Chapter 6 for a given dispatch period, the compensation amount as described in section 10.5 of Chapter 6 for that dispatch period shall be calculated as follows:

K.3.1.1 if the $\text{StartGeneration}_{g,t}$ of such *generation registered facility* is higher than or equal to its MSL_{t-} ,

$$\text{COMP}_{t-}^m = (P_{t-}^{m,pq=1} - \text{MEP}_h^m) \times \text{Min}(\text{IEQ}_h^m, \text{MSL}_{t-}^m \times 1/2)$$

K.3.1.2 if the $\text{StartGeneration}_{g,t}$ of such *generation registered facility* is lower than its MSL_{t-} ,

$$\text{COMP}_{t-}^m = (P_{t-}^{m,pq=1} - \text{MEP}_h^m) \times \text{Min}(\text{IEQ}_h^m, \text{MSL}_{t-}^m \times 1/4)$$

K.4 TIMELINE AND COMPENSATION STATEMENTS

K.4.1 The timeline for the calculation, verification and disbursement of compensation amounts are set out in the following table:

<u>Day</u>	<u>Time of Day</u>	<u>Event</u>	<u>Provided By</u>	<u>Provided To</u>	<u>Frequency</u>
<u>By T+6</u>	<u>By 17:00</u>	<u>The EMC to calculate, in accordance with section K.3, the compensation amount payable to a market participant referred to in section 10.5.1 of Chapter 6 for each dispatch period for trading day T, based on the metering data received by the EMC for such dispatch period on or before 17:00 on T+5. The aggregate compensation amount payable to each such market participant for trading day T shall be posted in the PMCS for that market participant for trading day T.</u>	<u>EMC</u>	<u>The market participant</u>	<u>As required</u>
<u>By T+8</u>	<u>By 17:00</u>	<u>Deadline for a market participant to notify the EMC by way of a notice of dissent of:</u> <u>i) any disagreement with the compensation amount stated in its PMCS (whether due to errors therein or otherwise); or</u> <u>ii) any request to be considered for compensation under section 10.5 of Chapter 6, where it believes that it has a reasonable basis to seek to receive compensation but was not issued a PMCS.</u>	<u>Market participant</u>	<u>EMC</u>	<u>As required</u>
<u>By</u>	<u>By</u>	<u>The EMC to notify the market</u>	<u>EMC</u>	<u>The</u>	<u>Once per</u>

Day	Time of Day	Event	Provided By	Provided To	Frequency
<u>T+10</u>	<u>17:00</u>	<u>participant of its determination in respect of such market participant's notice of dissent above (if any), and to issue the FMCS taking into account its determination (if any), the latest metering data received by the EMC on or before T+9, 17:00, and any other information that the EMC deems appropriate.</u>		<u>market participant</u>	<u>business day</u>
<u>With in 90 days after T+10</u>		<u>The EMC pays market participants which have been issued a FMCS and a corresponding FMI the compensation amount stipulated in the FMI, subject always to section 3.12 of Chapter 3.</u>	<u>EMC</u>	<u>Market participants</u>	<u>As required</u>

K.4.2 The EMC shall issue to a market participant (referred to in section 10.5.1 of Chapter 6) a PMCS that sets out the aggregate amount of the compensation payable to such market participant for all relevant dispatch periods for a given trading day, in accordance with the timeline set forth in section K.4.1.

K.4.3 A market participant who is issued with a PMCS shall notify the EMC, by way of a notice of dissent to the EMC, if it disagrees with the compensation amount stated in the PMCS (whether due to errors therein or otherwise) within the timeline set forth in section K.4.1.

K.4.4 A market participant who is not issued a PMCS shall notify the EMC, by way of a notice of dissent to the EMC, if it believes that it has a reasonable basis to seek to receive compensation, within the timeline set forth in section K.4.1.

K.4.5 Each notice of dissent shall relate to only one PMCS, if any, or one trading day (if there is no such PMCS issued for that trading day). Each notice of dissent shall be submitted together with all relevant supporting material, and shall clearly state at least the following information:

K.4.5.1 the date of issuance of the relevant PMCS, if any, to which the notice of dissent relates;

K.4.5.2 the trading day to which such notice of dissent relates;

K.4.5.3 the nature and particulars of the disagreement with the compensation amount or as to why the market participant believes that it has a reasonable basis to seek to receive compensation;

- K.4.5.4 the reason(s) the *market participant* disagrees with the compensation amount or as to why the *market participant* believes that it has a reasonable basis to seek to receive compensation; and
- K.4.5.5 to the extent that the *market participant* is able to do so, a proposed correction of the compensation amount or its calculation in the relevant PMCS, if any.
- (A notice of dissent submitted to the *EMC* within the timeline set forth in section K.4.1 and in compliance with all the requirements in this section K.4.5 is referred to in this Appendix as a “duly submitted notice of dissent”.)
- K.4.6 The *EMC* shall acknowledge its receipt of a duly submitted notice of dissent.
- K.4.7 No *market participant* may submit a notice of dissent, and the *EMC* shall not acknowledge receipt or take any further action in respect of a notice of dissent, unless the notice of dissent is a duly submitted notice of dissent.
- K.4.8 The *EMC* shall notify the *market participant* of the *EMC*’s determination in respect of the *market participant*’s duly submitted notice of dissent, in accordance with the timeline set forth in section K.4.1, taking into account any corrected *metering data* or other information, if any, which the *EMC* receives prior to such determination.
- K.4.9 Whether or not any duly submitted notice of dissent has been received by the *EMC*, the *EMC* shall issue the FMCS to a *market participant* and may, on its own initiative, also issue a FMCS if no PMCS was issued, or make such adjustments to the corresponding FMCS for an existing PMCS as the *EMC* may deem appropriate, based on any corrected *metering data* or other information received by the *EMC* prior to its issuance of such FMCS, in accordance with the timeline set forth in section K.4.1.
- K.4.10 The FMCS shall be the basis for the FMI and the payments to be made thereunder.
- K.4.11 At the same time that the *EMC* issues the FMCS referred to in section K.4.9 to a *market participant*, the *EMC* shall issue an FMI for the aggregate compensation amount stated in the FMCS for that *trading day* to such *market participant*.
- K.4.12 The *EMC* shall pay to a *market participant* the compensation amount stated in the FMI in accordance with the procedures set forth in section 3.12 of Chapter 3.
- K.4.13 If a *market participant* disagrees with the compensation amount stated in the FMCS or has a reasonable basis to believe that a FMCS should have been issued to it, and wishes to dispute the matter, it shall refer the matter to the *dispute resolution counsellor* by filing a *notice of arbitration* pursuant to section 3.9.2 of Chapter 3.
- K.4.14 No *market participant* may submit, and the *dispute resolution counsellor* shall not accept or take any action with respect to, a *notice of arbitration* filed pursuant to section K.4.13 if more than twenty *business days* has elapsed since the date on

which the FMCS to which that *notice of arbitration* relates was issued or should have been issued.

K.4.15 The *dispute resolution counsellor* shall dismiss a *notice of arbitration* filed pursuant to section K.4.13 and shall not take any further action with respect to that *notice of arbitration* if the element of the FMCS that is the subject matter of the *notice of arbitration* is identical to the same element in the corresponding PMCS for which no disagreement had been raised in any duly submitted notice of dissent, unless the *market participant* demonstrates to the satisfaction of the *dispute resolution counsellor* that the *market participant* could not, with the exercise of due diligence, have submitted a duly submitted notice of dissent in respect of that element in the PMCS.

K.5 COMMUNICATION OF INFORMATION

K.5.1 All communications between *market participants* and the *EMC* relating to the criteria, procedures and timeline for compensation under section 10.5 of Chapter 6 and this Appendix shall be effected using the *electronic information system*, or via other means as the *EMC* may approve or prescribe.

K.5.2 If there is a failure of a communication system and it is not possible to communicate using the *electronic information system*, then the *EMC* or the *market participant*, as the case may be, shall communicate information relating to compensation under section 10.5 of Chapter 6 and this Appendix by facsimile or other alternative means specified by the *EMC*.

Annex 3 - Part 2 of the Proposed Rule Modifications

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change				
APPENDIX 6D – MARKET CLEARING FORMULATION	APPENDIX 6D – MARKET CLEARING FORMULATION					
SECTION A: DEFINITIONS	SECTION A: DEFINITIONS					
D.3 PARAMETERS <table border="1" data-bbox="192 608 846 831"> <tr> <td data-bbox="192 608 495 831">InfinitePositiveValue</td> <td data-bbox="495 608 846 831">A relatively large positive value applied in section D.17.2.8 and section D.18.3 as a selector variable coefficient.</td> </tr> </table>	InfinitePositiveValue	A relatively large positive value applied in section D.17.2.8 and section D.18.3 as a selector variable coefficient.	D.3 PARAMETERS <table border="1" data-bbox="884 608 1711 754"> <tr> <td data-bbox="884 608 1211 754">InfinitePositiveValue</td> <td data-bbox="1211 608 1711 754">A relatively large positive value applied in <u>section D.15.1.3</u>, section D.17.2.8 and section D.18.3 as a selector variable coefficient.</td> </tr> </table>	InfinitePositiveValue	A relatively large positive value applied in <u>section D.15.1.3</u> , section D.17.2.8 and section D.18.3 as a selector variable coefficient.	To include that this parameter is also used in the new section D.15.1.3 for the purposes of modelling a GRF's MSL level.
InfinitePositiveValue	A relatively large positive value applied in section D.17.2.8 and section D.18.3 as a selector variable coefficient.					
InfinitePositiveValue	A relatively large positive value applied in <u>section D.15.1.3</u> , section D.17.2.8 and section D.18.3 as a selector variable coefficient.					
[New parameter]	<table border="1" data-bbox="884 906 1711 1278"> <tr> <td data-bbox="884 906 1211 1278"><u>MinimumStableLoad_g</u></td> <td data-bbox="1211 906 1711 1278"><u>The minimum output level in MW of a generation registered facility associated with energy offer g, at which the generation registered facility can maintain stable operation. Set in accordance with section E.1.1.14 of Appendix 6E. For other generation registered facilities, this takes on a value of zero.</u></td> </tr> </table>	<u>MinimumStableLoad_g</u>	<u>The minimum output level in MW of a generation registered facility associated with energy offer g, at which the generation registered facility can maintain stable operation. Set in accordance with section E.1.1.14 of Appendix 6E. For other generation registered facilities, this takes on a value of zero.</u>	To include a new parameter to be used in the new section D.15.1.3, for the purposes of modelling a GRF's MSL level.		
<u>MinimumStableLoad_g</u>	<u>The minimum output level in MW of a generation registered facility associated with energy offer g, at which the generation registered facility can maintain stable operation. Set in accordance with section E.1.1.14 of Appendix 6E. For other generation registered facilities, this takes on a value of zero.</u>					

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change								
[New variables]	<p>D.4 VARIABLES</p> <table border="1" data-bbox="887 419 1709 1278"> <tr> <td data-bbox="887 419 1211 603"><u>MSLSelector_g</u></td> <td data-bbox="1211 419 1709 603"><u>Binary integer variable associated with <i>energy offer g</i>, used for the modelling of a <i>generation registered facility's</i> minimum stable load level in section D.15.1.3.</u></td> </tr> <tr> <td data-bbox="887 603 1211 826"><u>ExcessMSL_g</u></td> <td data-bbox="1211 603 1709 826"><u>The MW amount by which the constraint in section D.15.1.3.1 that limits the <i>dispatch of energy for the generation registered facility</i> associated with <i>energy offer g</i> to zero is violated.</u></td> </tr> <tr> <td data-bbox="887 826 1211 1086"><u>DeficitMSL_g</u></td> <td data-bbox="1211 826 1709 1086"><u>The MW amount by which the constraint in section D.15.1.3.2 that limits the <i>dispatch of energy for the generation registered facility</i> associated with <i>energy offer g</i> to at least its minimum stable load is violated.</u></td> </tr> <tr> <td data-bbox="887 1086 1211 1278"><u>FacilityMSLViolation_g</u></td> <td data-bbox="1211 1086 1709 1278"><u>The total MW violation of the minimum stable load constraints associated with the <i>generation registered facility</i> that <i>energy offer g</i> is for.</u></td> </tr> </table>	<u>MSLSelector_g</u>	<u>Binary integer variable associated with <i>energy offer g</i>, used for the modelling of a <i>generation registered facility's</i> minimum stable load level in section D.15.1.3.</u>	<u>ExcessMSL_g</u>	<u>The MW amount by which the constraint in section D.15.1.3.1 that limits the <i>dispatch of energy for the generation registered facility</i> associated with <i>energy offer g</i> to zero is violated.</u>	<u>DeficitMSL_g</u>	<u>The MW amount by which the constraint in section D.15.1.3.2 that limits the <i>dispatch of energy for the generation registered facility</i> associated with <i>energy offer g</i> to at least its minimum stable load is violated.</u>	<u>FacilityMSLViolation_g</u>	<u>The total MW violation of the minimum stable load constraints associated with the <i>generation registered facility</i> that <i>energy offer g</i> is for.</u>	<p>To include new variables to be used in the new section D.15.1.3, for the purposes of modelling a GRF's MSL level.</p> <p>To sum up violations of the MSL constraints in the new section D.15.1.3, for inclusion as a facility violation in D.21.5.</p>
<u>MSLSelector_g</u>	<u>Binary integer variable associated with <i>energy offer g</i>, used for the modelling of a <i>generation registered facility's</i> minimum stable load level in section D.15.1.3.</u>									
<u>ExcessMSL_g</u>	<u>The MW amount by which the constraint in section D.15.1.3.1 that limits the <i>dispatch of energy for the generation registered facility</i> associated with <i>energy offer g</i> to zero is violated.</u>									
<u>DeficitMSL_g</u>	<u>The MW amount by which the constraint in section D.15.1.3.2 that limits the <i>dispatch of energy for the generation registered facility</i> associated with <i>energy offer g</i> to at least its minimum stable load is violated.</u>									
<u>FacilityMSLViolation_g</u>	<u>The total MW violation of the minimum stable load constraints associated with the <i>generation registered facility</i> that <i>energy offer g</i> is for.</u>									
SECTION C: LINEAR PROGRAM	SECTION C: LINEAR PROGRAM									

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p>D.15 CONSTRAINTS ON ENERGY GENERATION AND PURCHASES</p> <p>D.15.1.1 Generation Block Constraint: $\text{GenerationBlock}_{g,j} \leq \text{GenerationBlockMax}_{g,j}$ $\{j,g \mid j \in \text{GENERATIONOFFERBLOCKS}_g, \text{ where } g \in \text{ENERGYOFFERS}\}$</p> <p>D.15.1.2 Generation Summation Constraint: $\text{Generation}_g = \sum_{j \in \text{GENERATIONOFFERBLOCKS}_g} \text{GenerationBlock}_{g,j} \quad \{g \in \text{ENERGYOFFERS}\}$</p>	<p>D.15 CONSTRAINTS ON ENERGY GENERATION AND PURCHASES</p> <p><u>D.15.1 Generation Constraints</u></p> <p>D.15.1.1 Generation Block Constraint: $\text{GenerationBlock}_{g,j} \leq \text{GenerationBlockMax}_{g,j}$ $\{j,g \mid j \in \text{GENERATIONOFFERBLOCKS}_g, \text{ where } g \in \text{ENERGYOFFERS}\}$</p> <p>D.15.1.2 Generation Summation Constraint: $\text{Generation}_g = \sum_{j \in \text{GENERATIONOFFERBLOCKS}_g} \text{GenerationBlock}_{g,j} \quad \{g \in \text{ENERGYOFFERS}\}$</p> <p><u>D.15.1.3 Mixed Integer Program Based Minimum Stable Load constraints:</u></p> <p><u>D.15.1.3.1 Minimum Stable Load Decommitment Constraint:</u></p> <p><u>$\text{Generation}_g - \text{InfinitePositiveValue} \times \text{MSLSelector}_g - \text{ExcessMSL}_g < 0$</u> <u>$\{g \in \text{ENERGYOFFERS}, \text{ for which } \text{MinimumStableLoad}_g > 0\}$</u></p>	<p>Restructure section D.15 to separate generation and purchase constraints.</p> <p>Addition of title for generation constraints.</p> <p>To include new constraints to model a GRF's MSL level.</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p>D.15.1.3 Purchase Block Constraint:</p> $\text{PurchaseBlock}_{p,j} \leq \text{PurchaseBlockMax}_{p,j}$ <p>$\{j,p \mid j \in \text{PURCHASEBIDBLOCKS}_p, \text{ where } p \in \text{ENERGYBIDS}\}$</p> <p>D.15.1.4 Purchase Summation Constraint:</p> $\text{Purchase}_p = \sum_{j \in \text{PURCHASEBIDBLOCKS}_p} \text{PurchaseBlock}_{p,j}$ <p>$\{p \in \text{ENERGYBIDS}\}$</p> <p>D.15.1.5</p> $\text{TotalPurchase} = \sum_{\substack{p \in \text{ENERGYBIDS} \\ p \notin \text{INTERTIEENERGYBIDS}}} \text{Purchase}_p$	<p><u>D.15.1.3.2 Minimum Stable Load Commitment Constraint:</u></p> $\frac{\text{Generation}_g - \text{MSLSelector}_g \times \text{MinimumStableLoad}_g + \text{DeficitMSL}_g}{\{g \in \text{ENERGYOFFERS, for which } \text{MinimumStableLoad}_g > 0\}}$ <p><u>D.15.2 Purchase Constraints</u></p> <p>D.15.1.3<u>D.15.2.1</u> Purchase Block Constraint:</p> $\text{PurchaseBlock}_{p,j} \leq \text{PurchaseBlockMax}_{p,j}$ <p>$\{j,p \mid j \in \text{PURCHASEBIDBLOCKS}_p, \text{ where } p \in \text{ENERGYBIDS}\}$</p> <p>D.15.1.4<u>D.15.2.2</u> Purchase Summation Constraint:</p> $\text{Purchase}_p = \sum_{j \in \text{PURCHASEBIDBLOCKS}_p} \text{PurchaseBlock}_{p,j}$ <p>$\{p \in \text{ENERGYBIDS}\}$</p> <p>D.15.1.5<u>D.15.2.3</u> Total Purchase Calculation</p> $\text{TotalPurchase} = \sum_{\substack{p \in \text{ENERGYBIDS} \\ p \notin \text{INTERTIEENERGYBIDS}}} \text{Purchase}_p$	<p>Addition of title for purchase constraints and numbering changes arising from the restructuring of section D.15.</p> <p>Addition of title for Total purchase calculation.</p>

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)	Reasons for Rule Change
<p>D.21 VIOLATION GROUP CONSTRAINTS ... D.21.5 Facility Constraint: (after RC317)</p> $\sum_{j \in \text{VIOLATIONGROUPBLOCKSFAC}_{y(g)}} \text{ViolationGroupBlock}_{y(g),j} \geq$ <p> FacilityReserveViolation_g + FacilityRegulationViolation_g + FacilityRampViolation_g + FacilityMultiUnitViolation_g + FacilityLineFlowViolation_g </p>	<p>D.21 VIOLATION GROUP CONSTRAINTS ... D.21.5 Facility Constraint:</p> $\sum_{j \in \text{VIOLATIONGROUPBLOCKSFAC}_{y(g)}} \text{ViolationGroupBlock}_{y(g),j} \geq$ <p> FacilityReserveViolation_g + FacilityRegulationViolation_g + FacilityRampViolation_g + FacilityMultiUnitViolation_g + FacilityLineFlowViolation_g + <u>FacilityMSLViolation_g</u> </p> <p>...</p> <p><u>D.21.5.6 Facility Minimum Stable Load Constraint:</u></p> $\text{FacilityMSLViolation}_g = \text{DeficitMSL}_g + \text{ExcessMSL}_g$ <p style="text-align: center;"> $\{g \in \text{ENERGYOFFERS, for which}$ $\text{MinimumStableLoad}_g > 0\}$ </p>	<p>Addition of FacilityMSLViolation_g as a facility violation.</p> <p>Addition of violation variable FacilityMSLViolation_g which sums up the violation variables associated with the MSL constraints.</p>
<p>APPENDIX 6J – PRICE LIMITS AND CONSTRAINT VIOLATION PENALTIES</p>	<p>APPENDIX 6J – PRICE LIMITS AND CONSTRAINT VIOLATION PENALTIES</p>	

Existing Market Rules (1 July 2013)	Proposed Rule Changes (Deletions represented by strikethrough text and additions represented by double-underlined text)		Reasons for Rule Change												
<p>J.3 MAPPING OF VIOLATION PENALTIES TO VARIABLES USED IN THE MARKET CLEARING ENGINE FORMULATION</p> <table border="1" data-bbox="192 528 846 1018"> <thead> <tr> <th data-bbox="192 528 524 715">Variable used in MCE formulation</th> <th data-bbox="524 528 678 715">Violation Penalty Block Prices</th> <th data-bbox="678 528 846 715">Violation Penalty Block Quantities</th> </tr> </thead> <tbody> <tr> <td data-bbox="192 715 524 1018"> ExcessRawReserve_r ... ExcessWLineFlow_k where {k ∈ ARTIFICIALLINES1 ∪ ARTIFICIALLINES2} </td> <td data-bbox="524 715 678 1018"> 20 * VoLL </td> <td data-bbox="678 715 846 1018"> 10,000 MW </td> </tr> </tbody> </table>	Variable used in MCE formulation	Violation Penalty Block Prices	Violation Penalty Block Quantities	ExcessRawReserve _r ... ExcessWLineFlow _k where {k ∈ ARTIFICIALLINES1 ∪ ARTIFICIALLINES2}	20 * VoLL	10,000 MW	<p>J.3 MAPPING OF VIOLATION PENALTIES TO VARIABLES USED IN THE MARKET CLEARING ENGINE FORMULATION</p> <table border="1" data-bbox="884 491 1720 1058"> <thead> <tr> <th data-bbox="884 491 1274 643">Variable used in MCE formulation</th> <th data-bbox="1274 491 1453 643">Violation Penalty Block Prices</th> <th data-bbox="1453 491 1720 643">Violation Penalty Block Quantities</th> </tr> </thead> <tbody> <tr> <td data-bbox="884 643 1274 1058"> ExcessRawReserve_r ... ExcessWLineFlow_k where {k ∈ ARTIFICIALLINES1 ∪ ARTIFICIALLINES2} <u>DeficitMSL_g</u> <u>ExcessMSL_g</u> </td> <td data-bbox="1274 643 1453 1058"> 20*VoLL </td> <td data-bbox="1453 643 1720 1058"> 10,000MW </td> </tr> </tbody> </table>		Variable used in MCE formulation	Violation Penalty Block Prices	Violation Penalty Block Quantities	ExcessRawReserve _r ... ExcessWLineFlow _k where {k ∈ ARTIFICIALLINES1 ∪ ARTIFICIALLINES2} <u>DeficitMSL_g</u> <u>ExcessMSL_g</u>	20*VoLL	10,000MW	<p>To define the constraint violation penalty price for new violation variables relating to the MSL constraints.</p>
Variable used in MCE formulation	Violation Penalty Block Prices	Violation Penalty Block Quantities													
ExcessRawReserve _r ... ExcessWLineFlow _k where {k ∈ ARTIFICIALLINES1 ∪ ARTIFICIALLINES2}	20 * VoLL	10,000 MW													
Variable used in MCE formulation	Violation Penalty Block Prices	Violation Penalty Block Quantities													
ExcessRawReserve _r ... ExcessWLineFlow _k where {k ∈ ARTIFICIALLINES1 ∪ ARTIFICIALLINES2} <u>DeficitMSL_g</u> <u>ExcessMSL_g</u>	20*VoLL	10,000MW													

Annex 4 - Modifications for Market Manual (Standing Offers, Offer Variations and Standing Data), version 21 Dec 2012.

4.5.9 Generation Registered Facility form

Facility Details		
Field Names on Data Admin Screen	DATA	Unit
FACILITY TYPE	UNIT	N/A
UNIT TYPE	REGISTERED	N/A
B1		N/A
B2		N/A
B3		N/A
FACILITY NAME		N/A
GENERATION TYPE	CCGT / ST / GT / RENEWABLE / OTHERS	N/A
GENERATION SUB TYPE	SINGLE / MULTI- GENERATING UNIT	N/A
INTERTIE INDICATOR	Y / N	N/A
NODE NAME		N/A
MAXIMUM RATING		MW
NORMAL RAMP DOWN		MW/m
REGULATED RAMP DOWN		MW/m
NORMAL RAMP UP		MW/m
REGULATED RAMP UP		MW/m
PRIMARY RISK	Y / N	N/A
SECONDARY RISK	Y / N	N/A
FAILURE PROBABILITY		%
DAMPING GENERATOR	Y / N	N/A
PENALTY NAME		N/A
<u>MINIMUM STABLE LOAD LEVEL TO BE REGISTERED FOR MODELLING</u>		<u>MW</u>