INDEPENDENT MARKET OPERATOR

Concept Paper 2013_05: Availability, Outages and Constraint Payments for Non-Scheduled Generators

August 2013

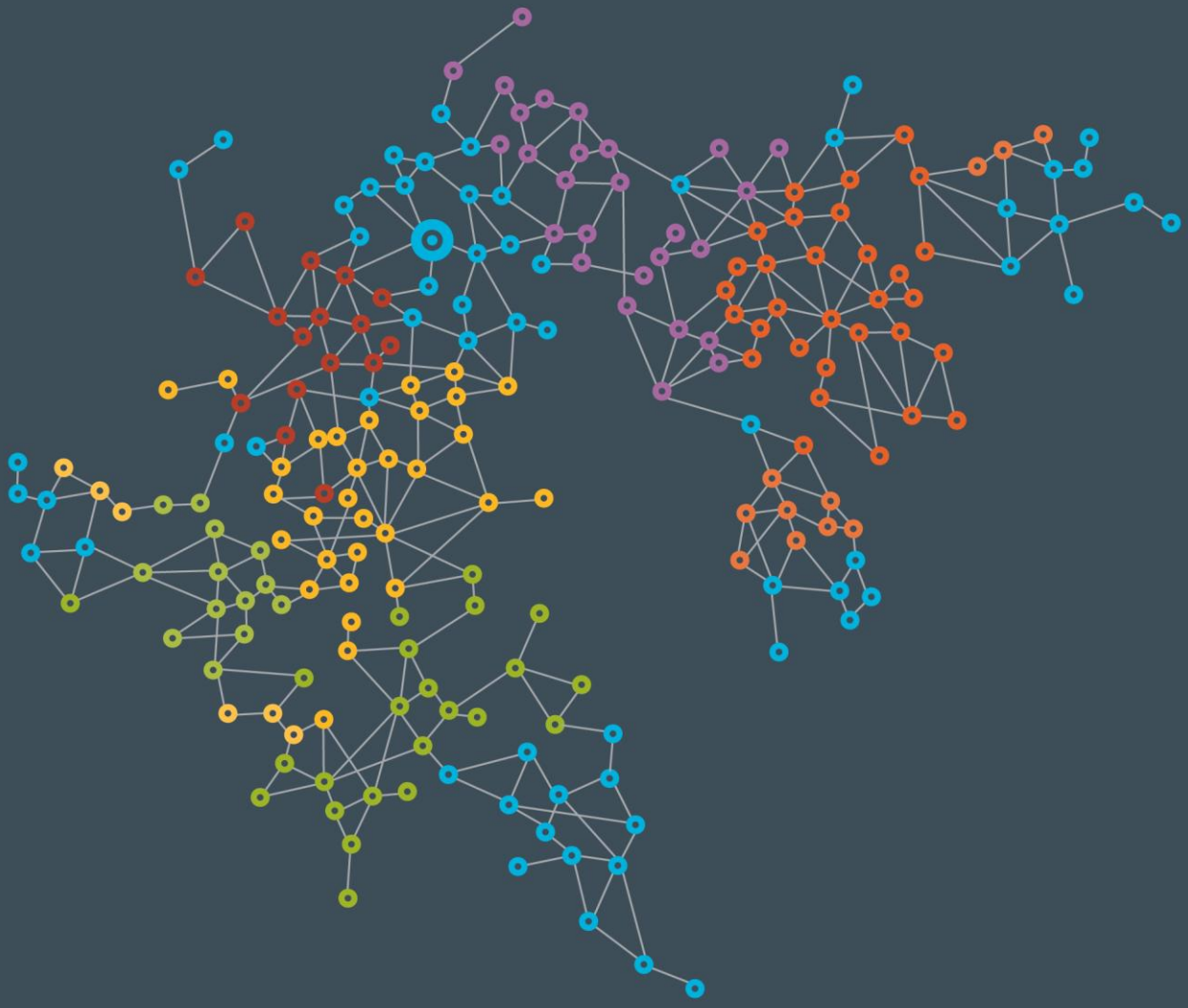

TABLE OF CONTENTS

1. Background

This Concept Paper intends to bring together a number of issues related to the calculation of constrained on/off compensation that should be paid to Market Participants. Specifically, the IMO has identified a number of issues that require amendments to the Wholesale Electricity Market Rules (Market Rules):

1. The definition of an Outage is currently not clear enough to ensure that, for a generating system, all circumstances where capacity is unavailable because of an Internal or External Constraint is logged as an Outage. This has resulted in spurious constrained off compensation payments.

2. The calculation of Outages is designed to apply to Scheduled Generators and do not adequately consider Non-Scheduled Generators. This has resulted in uncertainty about the determination of the quantity of de-rating for an Outage of a Non-Scheduled Generator.

3. The uncertainty for Market Participants with respect to the quantity of de-rating that should be logged has led to varying quality data being entered into the system. This has made it difficult for the IMO to determine an appropriate level of Certified Reserve Capacity for these Facilities.

4. The IMO is required to provide each Facility's Reserve Capacity Obligation Quantity (RCOQ) to enable System Management to calculate the de-rating of a Scheduled Generator. However, the IMO cannot practically meet this obligation due to the complexities of determining a Facility's RCOQ, such as taking into account its staffing levels. The IMO currently provides the MW value of Capacity Credits as an alternative measure.

5. There is some ambiguity with respect to the time period by which Market Participants must log final details of an Outage. In addition, the Market Rules do not specifically allow Outages to be logged outside of the time period. The data for all Outages should be logged for the IMO to be able to accurately calculate a Facility's Certified Reserve Capacity.

6. Currently, contrary to the intention of the Market Rules, constrained on/off compensation is paid to Market Participants where a Facility is non-compliant with a Dispatch Instruction. The intention of the payment is to provide compensation only when a Facility is dispatched Out of Merit, not when a Dispatch Instruction is not followed.

These issues, together with the IMO's proposed solutions are discussed in more detail in the following section.

2. Issues to be addressed

2.1. Requirement to log all Outages

Currently the Market Rules define an Outage as:

…means a Forced Outage, a Planned Outage or a Consequential Outage.

Clause 3.21.1 defines a Forced Outage as:

…any outage of either a facility or item of equipment on the list described in 3.18.2 or a Facility or generation system to which 3.18.2A relates that has not received System Management's approval.

Clause 3.19.11 defines a Planned Outage as:

…an outage, including Opportunistic Maintenance that is approved by System Management under clause 3.19.4.

Clause 3.21.2 defined a Consequential Outages as:

…an outage of either a facility or item of equipment on the list described in 3.18.2 or a Facility or generation system to which 3.18.2A relates that has not received System Management's approval, but which System Management determines:

a) Was caused by a Forced Outage to another rule Participant's equipment and would not have occurred if the other Rule Participant's equipment did not suffer a Forced Outage; or

b) Was caused by a planned outage to a Network Operator's equipment and would not have occurred if the Network Operator's equipment did not undertake the Planned Outage,

but excludes any outage deemed not to be a Consequential Outage in accordance with clause 3.21.10.

Together, these clauses define the different types of Outages that can occur in the Wholesale Electricity Market (market). Clause 3.18.7 of the Market Rules makes the requirement to log an Outage clear, as it applies to Planned Outages as a result of Internal Constraints. However, the IMO has identified a number of scenarios where the Market Rules currently do not provide adequate guidance to Market Participants to determine if an Outage should be logged or not, particularly as they apply to unplanned Outages and External Constraints:

1. Where a Facility is able to provide capacity but, due to a network constraint, the network is unable to accept its capacity while maintaining operation within the Technical Envelope (i.e. ensuring a safe, reliable and stable network).

2. Where a Facility's production is limited to reduce the potential of damage to the Facility or to ensure safety of its workers. For example, a wind farm may have an automatic trip in place for periods of extreme wind.

3. Where a Non-Scheduled Generator may be unable to provide capacity without the appropriate fuel (e.g. at night for solar generation and during low wind periods for wind farms).

This lack of clarity around the requirement to log Outages has resulted in an inconsistent approach and spurious payments of constrained off compensation to Market Participants.

Dispatch is currently scheduled on an end of interval value. The Theoretical Energy Schedule (TES) bridges the gap between this instantaneous output and the total energy generated in the Trading Interval. TES is then compared with the final meter readings (Sent Out Metered Schedule) for the purposes of constrained on/off compensation calculations.

As part of the settlement process, the IMO calculates the Minimum TES for each Facility. The Minimum TES reflects the maximum energy that could have been dispatched from Balancing Submission Price-Quantity Pairs, given its available capacity with a price less than the Balancing Price, taking into consideration the start of interval MW quantity and the ramp rate.

The IMO uses the Minimum TES to determine whether the amount produced is in merit, meaning that a Facility has been dispatched in accordance with the Balancing Merit Order, or Out of Merit, meaning a Facility is not dispatched in accordance with the Balancing Merit Order. The Market Participant is paid the Balancing Price for all in merit quantities, but for all Out of Merit quantities, the Market Participant must be compensated.

If Outages have not been logged, they will not be taken into consideration in the Minimum TES Calculation, meaning the Minimum TES is higher than it should be. Therefore, when it is compared to the Sent Out Metered Schedule in the Downward Out of Merit Generation[1] calculation, it is possible that the Facility will be determined to have been dispatched Out of Merit and the Market Participant is paid constrained off compensation.

Recommendation

In order to address the spurious constrained off compensation payments, the IMO proposes to provide further clarity around the definition of an Outage.

The IMO's position is that, where a Facility is not able to generate electricity, cannot export electricity, and/or the network cannot safely accept electricity, an Outage should be logged. If this Outage has not been approved by System Management, it will be logged as a Forced Outage.

Therefore, the IMO proposes to amend the definition of an Outage to ensure that it encompasses, for a generation system:

a) a reduction in a Facility's physical capacity to generate electricity, other than in the case of a Non-Scheduled Generator where the reduction in capacity is the result of a reduction in wind, sun, biomass or another fuel source approved by the IMO;

b) a reduction in the quantity of a Facility's electricity available for System Management to dispatch, for example a reduction in output as a result of potential danger to a Facility as a result of high wind speeds; and

c) a reduction in the quantity a Facility can export as a result of an External Constraint (including a system or network constraint) where a Consequential Outage may be logged.

Furthermore, the IMO also proposes to require any capacity not covered by an Outage to be made available.

[1] Downward Out of Merit is where a Facility generated less than its expected in merit quantity due to the dispatch of the Balancing Submission Price-Quantity Pair with a price equal to or below the Balancing Price.

These Outages once logged, will be provided by System Management to the IMO and therefore, included in the calculation of the Minimum TES for each Facility. This will improve the accuracy of the TES and thereby remove incorrect constrained on/off payments without manual intervention.

2.2. Quantity of de-rating for a Non-scheduled Generator

The Market Rules require Market Participants and the Network Operator to inform System Management of an Outage of a Facility or item on the equipment list, or a Facility with capacity less than 10MW, as soon as practicable.

Clause 3.21.4 of the Market Rules outlines the information that must be provided to System Management with respect to an Outage. This includes the time the Outage commenced, an estimate of the time the Outage is expected to end, the cause of the Outage, the Facility or items affected and the expected quantity of de-rating. However, currently this clause can only be applied to Scheduled Generators by requiring the expected quantity of de-rating to be determined in accordance with clause 3.21.5.

Clause 3.21.5 requires a Market Participant or Network Operator to provide the maximum capacity for each affected Facility or item of equipment as determined, by reference to its maximum capacity provided in the Standing Data under in Appendix 1(b)(iv). This section of Appendix 1 outlines the Standing Data required for Scheduled Generators only, resulting in ambiguity about how to determine the quantity of de-rating of a Non-Scheduled Generator for the purposes of Outage calculations.

Clause 3.21.6 provides the process by which System Management determines the MW de-rating of a Facility as the result of an Outage. Currently, Market Participants enter outage data on a sent out basis at 15 degrees Celsius. System Management then converts the value to a sent out basis at 41 degrees Celsius and adjusts it based on the Facility's RCOQ. System Management then calculate the total de-rating as a result of Forced, Planned and Consequential Outages under clauses 3.21.6(b) to 3.21.6(d) and provides this for each Facility to the IMO as required under clauses 7.3.4 and 7.13.1A(b).

However, the application of clause 3.21.6 to determine the quantity of Outage for Non-Scheduled Generators is currently inappropriate because Non-Scheduled Generators have an RCOQ of zero. This results in negative Outage quantities, where the MW de-rating of a Facility is greater than its RCOQ.

Recommendation

The IMO proposes that clause 3.21.5 should specifically apply to Scheduled Generators and an alternative calculation for Non-Scheduled Generators be introduced. It is proposed that the Market Rules will require, for a Non-Scheduled Generator, a Market Participant to calculate the quantity of de-rating by reference to the maximum capacity provided in the Standing Data under Appendix 1(e)(iiiA).

In addition, the IMO proposes that clause 3.21.6 is specified to only apply to Scheduled Generators, and an alternative calculation of a Facility's Outage for a Non-Scheduled Generator is introduced. It is expected that this calculation will simply be the greater of zero and the sum of all Forced, Planned or Consequential Outages.

The IMO will require System Management to provide the raw MW de-rating for Scheduled and

Non-Scheduled Generators together with the current RCOQ-adjusted values provided for Scheduled Generators. It should also be clarified that this data is to be used in calculating the Minimum TES.

The IMO also proposes to ensure that all Outages are factored into System Management's calculation of a Non-Scheduled Generator's expected quantity (for use in calculating the Minimum TES) by amending clause 7.7.5B to specify the inclusion of all Outages. The IMO also recommends the revision of section 5.5.5 of the *Power System Operation Procedure (PSOP): Dispatch* to provide greater clarity on calculation of the expected quantity.

2.3. Setting Certified Reserve Capacity for Non-Scheduled Generators

The rule change, *RC_2013_09: Incentives to Improve Availability of Scheduled Generators* was developed to allow the IMO more flexibility in assigning Certified Reserve Capacity to Scheduled Generators that display excessive outage rates over a three-year period. The proposed Amending Rules in RC_2013_09 change the IMO's process for setting a Facility's Certified Reserve Capacity under clause 4.11.1(h) and Reserve Capacity performance monitoring under section 4.27 of the Market Rules.

The introduction of greater incentives for Market Participants to maximise the availability of their capacity should equally apply to Non-Scheduled Generators. However, clause 4.11.1(h) is unable to be applied under the current Market Rules, as the calculations of Planned Outage rates and Forced Outage rates referred to in this clause currently only consider the application to a Scheduled Generator.

The *PSOP: Facility Outages* contains the calculations of both the Forced Outage Rate and the Planned Outage Rate that clause 4.11.1(h) refers to. These calculations rely on the Outage MW being equated to the MW value of Capacity Credits. While this works for a Scheduled Generator, for a Non-Scheduled Generator, it is likely that the maximum capacity will be significantly greater than the Capacity Credits, resulting in a nonsensical outcome.

Recommendation

Given the above proposed amendments, the IMO considers it appropriate to propose further amendments to those in RC_2013_09 to align the incentives to improve availability of Scheduled Generators and Non-Scheduled Generators.

The IMO proposes that, for the purposes of calculating the Planned Outage Rate and the Forced Outage Rate for a Non-Scheduled Generator, the Outage quantity is specified as the MW quantity by which the maximum capacity of a Facility is reduced (as determined in section 2.2).

The IMO also proposes that, with the increasing significance of these calculations, they should be transferred from the *PSOP: Facility Outages* into an Appendix of the Market Rules.

2.4. Quantity of de-rating for a Scheduled Generator

Under clause 3.21.6(e), the IMO must provide System Management with the RCOQ for each Facility as currently applicable. This is used in System Management's calculation of the Outage quantity for Scheduled Generators to determine the amount of de-rating that will affect the Facility's expected quantity, as opposed to its maximum quantity.

However, practically, the IMO cannot determine in advance of a Trading Interval each Facility's RCOQ. For example, the RCOQ must account for staffing and other restrictions on the ability of the Facility to provide energy. While this is not practical, it is also not necessary.

To date, the IMO has provided System Management with a Facility's MW value of Capacity Credits as a proxy for its RCOQ. While there is a difference between the two values, it is not expected to result in significantly different outcomes for the purpose of calculating a Facility's Outage value.

Recommendation

The IMO proposes to amend clause 3.21.6(e) of the Market Rules to align to current practice by requiring the IMO to provide each Facility's MW value of Capacity Credits, rather than its RCOQ.

In addition, the IMO proposes to amend clauses 3.21.6(b) to (d) to reflect this.

2.5. Clarification of timeframes for providing information of Outages

Clause 3.21.7 provides the timeframe under which Market Participants or Network Operators must provide full and final details of the relevant Planned, Forced or Consequential Outage to System Management. However, based on the current drafting, it is unclear which Trading Day the 15 day timeframe should start.

Furthermore, the obligation to provide full and final details of an Outage no later than 15 calendar days following the Trading Day on which the Outage commenced is impractical to apply to extended Outages. For example, if an Outage is expected to continue for 20 days, a Market Participant cannot be expected to provide full and final details of the entire Outage before it is finished.

Clause 7.13.1A requires System Management to provide the IMO with the Outage data for a Trading Day within 15 Business Days. Currently, the drafting of this clause does not allow System Management to accept or provide to the IMO any information for Outages logged after the 15 calendar days.

Recommendation

The IMO proposes to amend clause 3.21.7 to be consistent with clause 3.21.8. This will provide a reference to 15 calendar days following the Trading Day on which the Outage commenced.

The IMO also proposes that, given its reference to full and final details, clause 3.21.7 should specifically refer to a particular Trading Day affected by the Outage. This provides Market Participants with the ability to update the Outage information for each affected Trading Day on a rolling basis until the conclusion of the Outage, but retains the requirement to provide final details for each affected Trading Day within the 15 day timeframe.

In order to ensure that the IMO is aware of all Outages, the IMO proposes to amend the Market Rules to require Market Participants to log all outages, even after the 15 day timeframe has lapsed. This amendment will also require System Management to provide this information to the IMO. The record of all Outage data is necessary for the accurate calculation of Certified Reserve Capacity and to ensure compliance with the Market Rules.

2.6. Removing constrained on/off compensation for non-compliance

Currently Scheduled Generators receive constrained on/off compensation when they are clearly non-compliant with Dispatch Instructions issued by System Management. This is based on the inherent assumption in the Market Rules that the only reason a generator would deviate from its TES is because of an Outage, or if they were dispatched Out of Merit.

Currently Scheduled Generators who are non-compliant with Dispatch Instructions have constrained on/off compensation included in the initial settlement amount, with a determination on compliance happening after settlement. The IMO Compliance team is responsible for investigating the merit of any constrained on/off compensation.

Recently, there have been a number of situations where these (often large) incorrect payments have been included in the initial settlement. As they are only then only able to be removed as part of the first or second adjustment, the delays will result in an inequity resulting from the time value of money. Furthermore, the payment could result in an increase in the required level of Credit Support to be provided by the Market Participant.

Recommendation

As constrained on/off compensation is intended to be paid only when a Facility is dispatched Out of Merit, the IMO proposes to make a number of changes to the Out of Merit calculations under 6.16A.1 and 6.16A.2 to remove the instances resulting in incorrect payments before they are processed.

The IMO proposes to amend the Upward Out of Merit Generation calculation in clause 6.16A.1(a) to ensure that in a Trading Interval for a Balancing Facility it equals:

> Subject to clause 6.16A.1(b), the lower of:
>
> I. the Sent Out Metered Schedule; and
>
> II. the quantity that would have been produced if the Facility had complied with the issued Dispatch Instructions; less
>
> the Maximum TES.

It is also proposed that clause 6.16A.1(b) is amended to account for the scenario where the Upwards Out of Merit Generation equals zero where the Maximum TES is greater than the Sent Out Metered Schedule.

Similarly, the IMO proposes to amend the Downward Out of Merit Generation calculation in clause 6.16A.2(a) to ensure that in a Trading Interval for a Balancing Facility it equals:

> Subject to clause 6.16A.2(b), the Minimum TES less the greater of:
>
> I. the Sent Out Metered Schedule; and
>
> II. the quantity that would have been produced if the Facility had complied with the issued Dispatch Instructions.

It is also proposed that clause 6.16A.2(b) is amended to account for the scenario where the Downward Out of Merit Generation equals zero where the Sent Out Metered Schedule is greater than the Minimum TES.

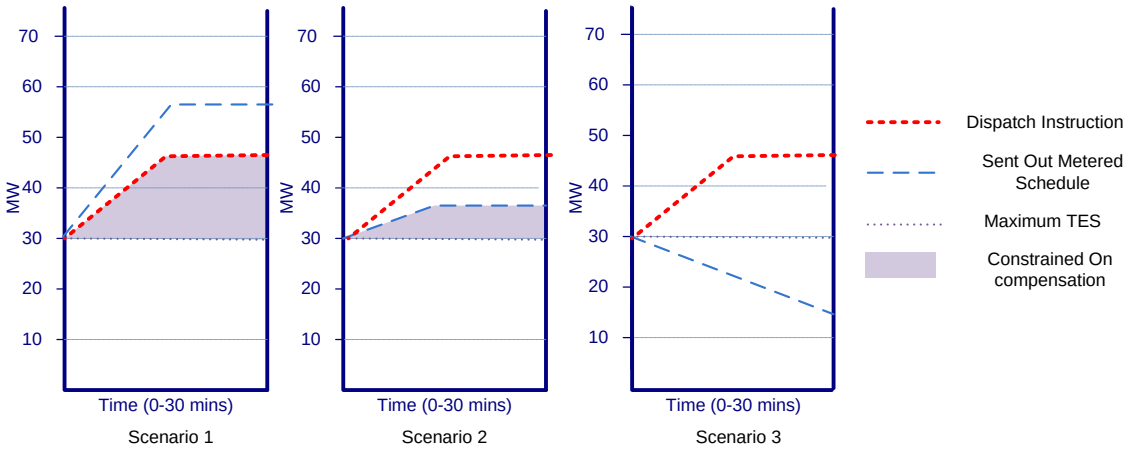

Figure 1: Upwards Out of Merit Scenarios

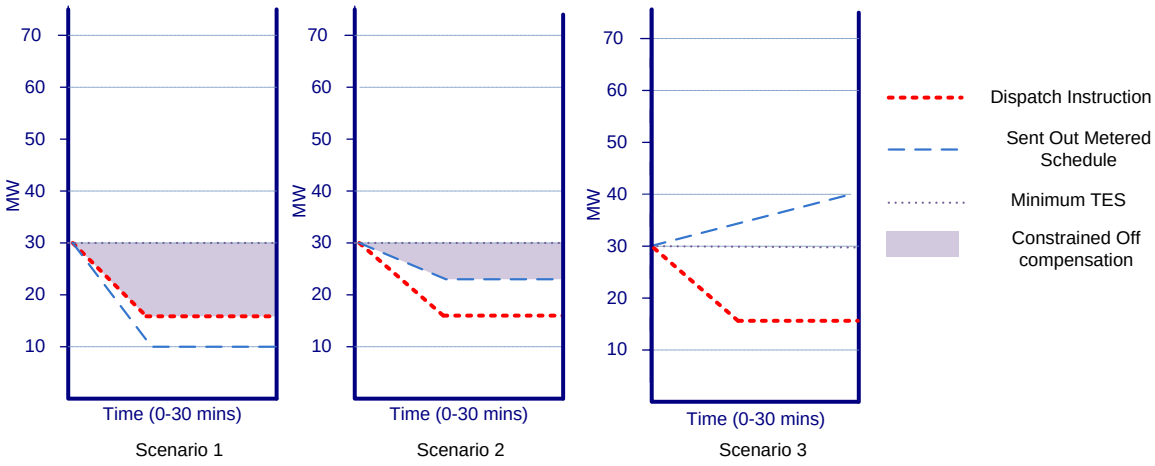

Figure 2: Downwards Out of Merit Scenarios

Figures 1 and 2 show the resulting constrained on/off compensation payments following the proposed amendments to clause 6.16A. The amendments will ensure that:

1. the Market Participant will only be compensated for the quantity issued under the Dispatch Instructions despite the potential to produce more than this quantity (scenario one);

2. the Market Participant will only be compensated for the quantity produced if it is unable to provide the quantity required in the Dispatch Instruction (scenario two); and

3. the Market Participant will not have to pay the IMO compensation (i.e. get negative compensation) for any negative quantity, however, these scenarios will instead be dealt with under the IMO's market surveillance and compliance regime (scenario three).

The above proposed amendments will result in the Minimum TES reflecting all Outages of a Facility as provided in the Dispatch Schedule, thereby also ensuring that Market Participants are

not paid Out of Merit compensation when a Facility is unavailable. The IMO will calculate a Facility's Minimum TES by reference to its Dispatch Schedule. This will require the IMO to calculate the Dispatch Schedule from the Dispatch Instructions provided by System Management. This will require changes to the IMO's IT and settlement systems and processes.

The IMO also notes that following the initial Dispatch Instruction, System Management is currently able to issue a second Dispatch Instruction. This is often used to reflect the expected output when a Facility is unable to comply with a Dispatch Instruction, to rectify the non-compliance as required under clause 7.7.6B. The IMO would need to be able to differentiate these 'rectification Dispatch Instructions' from others. The IMO will work with System Management to identify an appropriate solution.

The IMO also proposes that the Maximum and Minimum TES and Out of Merit calculations are moved to an Appendix and presented as a mathematical formula for clarity.

3. Assessment against Wholesale Market Objectives

The IMO considers that the Market Rules as a whole, if amended to reflect the recommendations above, will not only be consistent with the Wholesale Market Objectives but also generally allow the Market Rules to better achieve Wholesale Market Objectives (a), (c) and (d).

The concepts in this paper are designed to align the treatment of Scheduled Generators and Non-Scheduled Generators as far as practicable with respect to availability, Outages and constraint payments. On this basis, the IMO's assessment is presented below:

a) *to promote the economically efficient, safe and reliable production and supply of electricity and electricity related services in the South West interconnected system*

The IMO considers that the proposed changes will ensure that all limitations on a Facility's capacity to generate will be more accurately reflected in a Facility's Minimum TES, thereby improving the accuracy of constrained off compensation and the assignment of Certified Reserve Capacity to Facilities. This will ensure that significant costs as a result of inaccurate compensation payments are not borne by the market.

The IMO considers that the proposed amendments also provide greater clarity and transparency with respect to existing obligations in the Market Rules. This will better equip Market Participants to comply with their obligations.

c) *to avoid discrimination in that market against particular energy options and technologies, including sustainable energy options and technologies such as those that make use of renewable resources or that reduce overall greenhouse gas emissions*

The proposed changes are expected to improve consistency between Scheduled and Non-Scheduled Generators, by providing alternative calculations for Non-Scheduled Generators, consistent with the obligations on Scheduled Generators. In addition, the IMO considers that the resulting clarity around Non-Scheduled Generators' obligations will improve the ability for the IMO to avoid discrimination between Facility Classes.

d) *to minimise the long-term cost of electricity supplied to customers from the South West interconnected system*

Currently, a significant proportion of the IMO's legal and compliance resources are investigating the merit of compensation payments and ensuring the recovery of incorrect payments. However, the proposed amendments will ensure that the majority of these incorrect payments are not made in the initial settlement process, thereby remove the need for many of these investigations, reducing the long-term compliance cost to the IMO.

The IMO considers that the proposed amendments are consistent with the remaining Objectives.

4. Practicality and Cost of Implementation

There are expected to be some costs associated with making and testing the necessary changes to the IMO's settlement and IT systems with respect to the proposed amendments to constrained on/off compensation. The IMO will provide stakeholders with an estimate of the cost of these changes during the consultation periods provided in the rule change process.

There may be costs to System Management associated with the provision of the MW de-rating of each Facility by Trading Interval and the identification of Dispatch Instructions that resolve non-compliances.

There are not expected to be any significant costs for Market Participants.