

SEM Establishment Programme

Title	Administered Settlement -Suggested Implementation Approach in the event of MSP System Failure
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The Single Electricity Market Trading and Settlement Code Version 2.0 (the Code) requires the Market Operator to implement an Administered Settlement during events when the Market Scheduling and Pricing (MSP) system fails, and when there is an Electrical System Collapse. An Administered Settlement requires that the Market Operator implement a process to set an Administered Price or an Administered Schedule as set out in Section 6 of the Code.

This document suggests a draft and high-level implementation approach to provide for an Administered Settlement in the instance of MSP system failure. While specific scenarios of MSP system failure have been identified, thereby defining a set of circumstances when an Administered Settlement may be required, the detailed requirements for an Administered Settlement will necessarily vary depending on the extent and quality of data available, the availability of systems, staff and tools, requirements of the Code, and the time-window available. Together these dependencies define what is practicable given the circumstances of the MSP failure event.

The Glossary of the Code defines the following:

- *Administered Price - means the System Marginal Price for a Trading Period under circumstances of Administered Settlement*
- *Administered Quantity - means the Market Schedule Quantity for a Generator Unit for a Trading Period under circumstances of Administered Settlement.*

Section 6.247 of the Code provides the following principles in the event of an Administered Settlement:

In implementing Administered Settlement, the Market Operator shall, insofar as reasonably practicable, adopt a balance between the following principles:

- *make use of all available data, and limit to the maximum extent practicable the use of estimated values;*
- *operate within the Settlement timescales, and be subject to the Settlement Query and Settlement Dispute provisions as set out in Section 6;*
- *seek results which are as close as possible to those which would have been calculated under the normal Settlement processes;*
- *obtain the prior written approval of the Regulatory Authorities for the detailed calculations and methodology used; and*
- *publish details of the calculations and methodology used as soon as practicable thereafter.*

The Code permits the Market Operator to estimate, to the extent necessary, any Settlement data in the event of Administered Settlement.

Administered Settlement in the Event of MSP System Failure

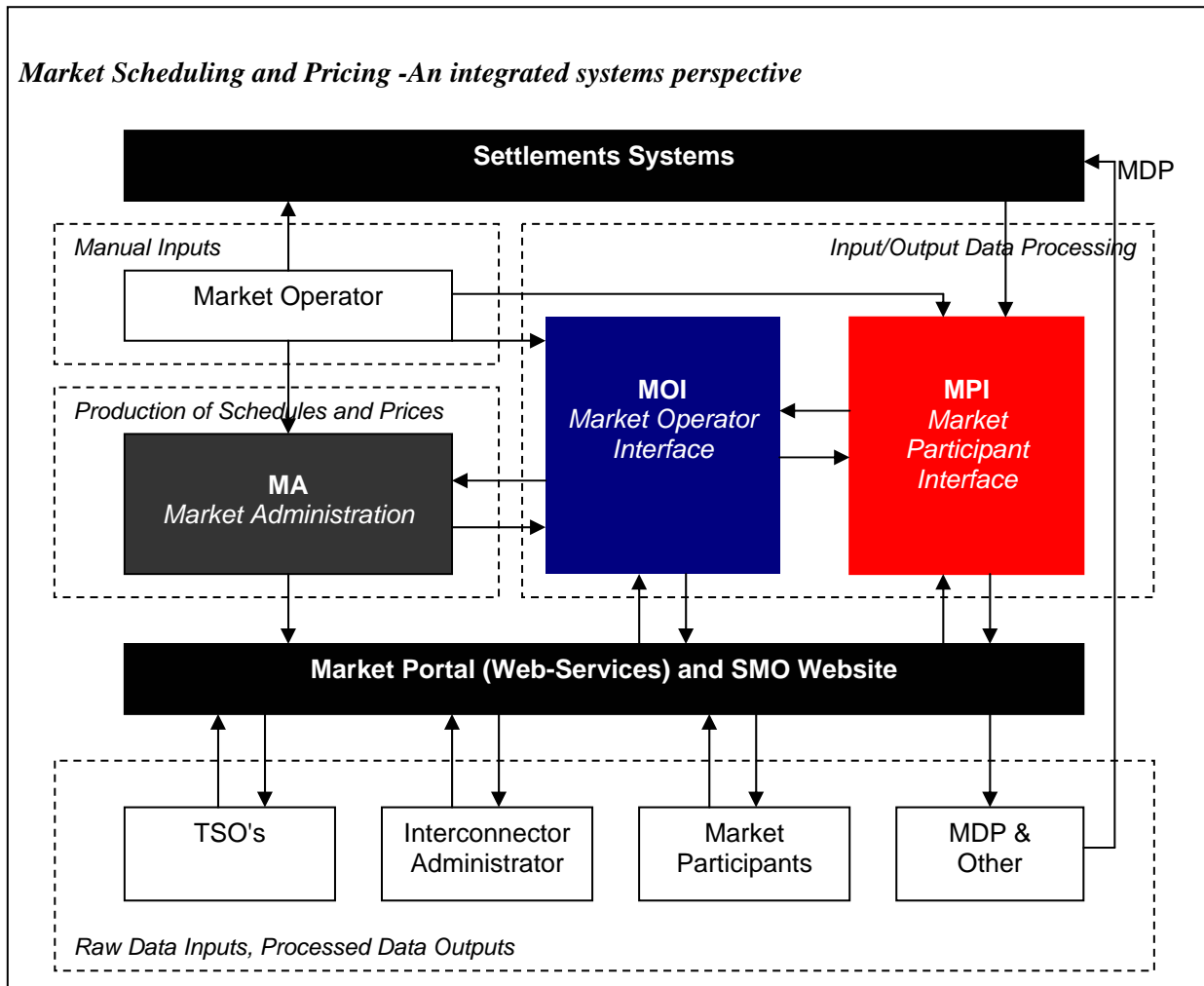
What does the Code Require?

Sections 6.249 to 6.255 of the Code require the following:

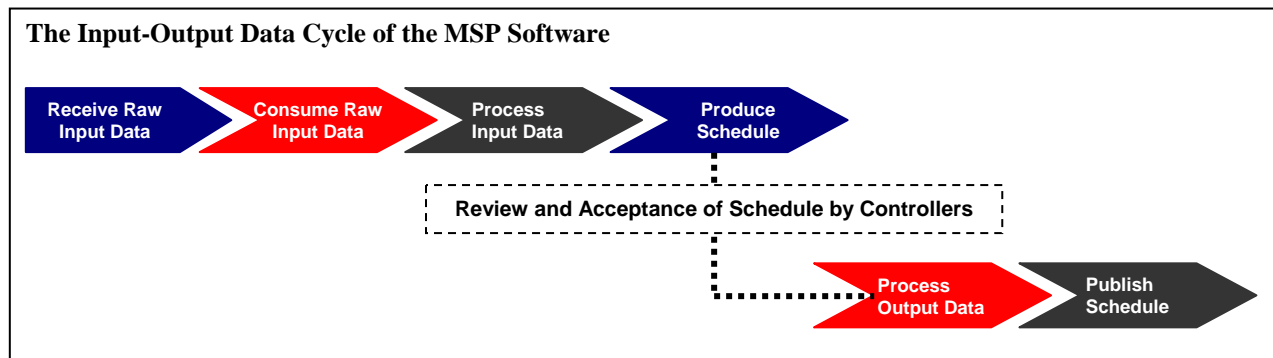
- 6.249 *In the event of MSP Failure for a Trading Day, the Market Operator will calculate an Administered Schedule for all Trading Periods for the Trading Day.*
- 6.250 *An Administered Schedule comprises Administered Prices for each Trading Period and Administered Quantities for each Generator Unit for each Trading Period.*
- 6.251 *In creating an Administered Schedule, the objective of the Market Operator shall be to reproduce, to the greatest degree practicable, the results that would have been determined by the MSP Software.*
- 6.252 *The SMP value for each Trading Period in the Trading Day (SMP_h) will be set to equal the relevant Administered Price.*
- 6.253 *The Market Schedule Quantity value for each Generator Unit for each Trading Period for the Trading Day (MSQ_{uh}) will be set to equal the relevant Administered Quantity value.*
- 6.254 *All Settlement calculations will be made using these values for SMP and Administered Quantities.*
- 6.255 *In the event of Administered Settlement resulting from MSP Failure, then once the MSP Failure is corrected, the Market Operator shall procure that Settlement Reruns shall be undertaken as soon as*

reasonably possible in respect of the relevant Trading Periods and that revised Settlement Statements, Invoices and Self Billing Invoices in respect of the relevant Billing Period or Periods shall be issued to Participants.

Scenarios of MSP System Failure



The MSP software features the Market Administration (MA) system which provides the primary functionality to produce each of the Ex-Ante and Ex-Post market schedules. The MA system comprises a number of integrated components with linkages to adjacent systems, including the Market Participant Interface (MPI), the Market Operator Interface (MOI) and other connected systems such as various web services. These connected systems have varying and sequential roles in receiving, consuming/uploading and processing various input data, producing schedules of quantities and prices, processing outputs and publishing reports. MSP system failure can therefore occur at various stages of an input-output data cycle, having ramifications for the appropriate implementation of an Administered Settlement. Further, any such failure can occur at varying points of a Schedule preparation timetable, having implications for the time windows that may be available to address system failure and to effect, if necessary, an Administered Settlement. Section 6.25 of the Code in particular requires that in the event of MSP system failure, the Administered Schedule reproduce to the extent practicable, the results that would have been determined by the MSP software. This therefore requires a suite of Administered Settlement approaches depending on the nature and extent of MSP system failure, the extent of data, systems, time and resources that can be employed in a practicable capacity.



The following summarises a range of potential MSP system failure scenarios that can define a basis for implementing an Administered Settlement. Each of these is specific to the MSP software input-output data process shown above.

1. Failure to receive raw input data

Certain necessary input data may not be received by the MSP software, whether due to a failure with the Market Portal (web link/web services), a problem with a Market Participant's source system, or due to files that fail to conform with certain transmittal protocols or time schedules. While the Code is explicit in prescribing actions when certain market participant data is not submitted, such as bids/offers, in many circumstances requiring that the MSP software be run with such data absent, some data is critical to producing a schedule with valid outcomes, such as exchange rate data, metering data, unit availability data, dispatch instructions etc. When such data is not received, the MSP software may fail to run, or may produce results that lack validity under the Code.

2. Failure to consume raw input data

Raw input data may be appropriately received, either via standard system interfaces, fax or other approved method, but may fail a system upload process, preventing the data from entering input data processing components of the MSP software. Examples of failures can include files that may feature poorly structured XML, or which may feature inconsistent data internal to the file.

3. Failure to process input data

Raw XML data files and other input data is processed by the MSP software to convert it and assemble it in a format that is consistent with the UUC requirements of the MA system. Such processing includes selecting appropriate bids for the trading day, using standing data if required, consolidating regional load forecasts, converting monetary values from Sterling into euro etc.

4. Failure to produce a market schedule of quantities and prices

Although input data may have been received, consumed and processed, the MA system may fail to produce a schedule due to hardware failure, or due to other conditions such as absent data, data integrity problems or other conditions that compromise the availability of a solution.

5. Failure to process output data

Raw schedule and pricing output data from the UUC sequence of the MA system is filtered and reassembled into a set of data reports that must comply with schedule publishing requirements under the Code.

6. Failure to publish output data

Processed output reports from the MA or MOI systems may fail to load into the Market Participant Interface, or the Market Portal may fail, preventing participant connectivity with the MPI.

7. Schedule outputs fail an acceptance standard

Controllers are trained to provide a summary review of schedule outputs to ensure such appear consistent with a review of market conditions and input data. This review supports a recommendation to accept and publish the schedule. This summary review is constrained by a Schedule preparation timetable, which limits the extent and breadth of investigation. At the time of this summary review, although the MSP software may appear to have successfully produced a schedule, this schedule may feature anomalous price or quantity outcomes, including Price Cap and Price Floor events, that cannot be explained within the time constraints, and which give the controllers cause for not accepting and publishing the schedule.

Suggested Implementation Options

It is noted that in instances when an Administered Settlement is required due to MSP software failure, it will be temporary and indicative, given section 6.255 of the Code which requires a Settlement re-run once the MSP failure is corrected.

The following suggests an Administered Settlement approach for each of the identified MSP software failure scenarios.

1. Failure to receive raw input data

Suggested Approach

While the approach will necessary vary given what is practicable in the time available, and given the specific type and source of absent input data, the following principles are proposed with declining priority:

1. Run the MSP software without the data if the Code allows (i.e. Market Participant Bids); otherwise:
2. Substitute the absent data with alternative data:
 - i. Use indicative data if available for the Trading Day (i.e. Use Ex-Ante MS input data in place of Ex-Post Indicative Input data, use Ex-Post Indicative MS data in place of Ex-Post Initial MS data.
 - ii. Use data from the previous day (i.e. yesterday's exchange rate in place of today's)
 - iii. Use data from a similar trading day (i.e. use data from the same week-day from the week before the trading day)
 - iv. Estimate data using an agreed method

2. Failure to consume raw input data

Suggested Approach

If raw data has been received but cannot be uploaded into particular components of the MSP software, the following approach is suggested:

1. Bypass the upload and subsequent input data processing steps and use an offline data translation tool that:
 - i. Converts raw data into a processed form that is consistent with the requirements of the MA software (i.e. Assembles bids in a DSI-ready format, converts Sterling values into euro, etc.)
 - ii. Prepares a set of MA-ready input data upload files that can bypass the MOI data-transfer process.
2. Run the MSP software without the data if the Code allows.

It is noted that if option 1 has the result that the full set of received input data can be assembled and processed into a form without approximation, and if these data upload files can then be loaded into the MA software, the resulting market schedule may not differ from the schedule that may otherwise have been produced; in this instance an Administered Settlement will not be required.

3. Failure to process input data

Suggested Approach

As above in scenario 2.

4. Failure to produce a schedule of prices and quantities

Suggested Approach

Use an offline Administered Pricing Tool to estimate a schedule of Administered Prices and Quantities; such a tool could be configured to read three input data formats:

1. MA-ready input data upload files as described in scenario 2;
2. Exported DSI csv files from the MA software; and
3. Exported UUC-Input csv files from the MA software.

If this approach is not practicable, the following option is suggested:

1. Republish an indicative schedule for the trading day:
 - i. Republish the Ex-Post Indicative Market Schedule in place of the Ex-Post Initial Market Schedule,
 - ii. Republish the Ex-Ante Market Schedule in place of the Ex-Post Indicative Market Schedule.

5. Failure to process output data**Suggested Approach**

If a schedule of prices and quantities has been produced but cannot be processed into a suite of reports that meet the publishing guidelines of the Code, then the use of an off-line data translation tool is suggested, such that:

1. UUC-output data or DSP-output data (which-ever is available) is exported in csv format from the MA software
2. A data translation tool uses these csv files, converting and reformatting data into a suite of reports that can be manually uploaded into the MPI system.

Again, it is noted that if the resultant reports provide the same extent and quality of data than what would have otherwise been published, then the resultant schedule would not constitute an Administered Settlement

6. Failure to publish output data**Suggested Approach**

Implement a communication protocol with the data recipients to publish the data via an alternative and acceptable method.

If this alternative method can employ an alternative communication protocol that is provide for by the Code, then the published schedule of prices and quantities will not constitute an Administered Settlement.

7. Schedule outputs fail an acceptance standard**Suggested Approach**

As per scenario 4

Administered Settlement Tool

The following suggests a number of components that together could provide for an Administered Settlement Tool for use when an Administered Settlement is required, and when the MA software cannot function as desired.

1. A Data Collection Process

A routine daily process to export critical data from the various systems that comprise and/or supply the MSP software. Such data would include all input data necessary to produce a market schedule of prices and quantities, as well as indicative Day + 1 and Day -1 market schedules that may suffice as an Administered Settlement if it is considered impracticable to compute an Administered Settlement from import data. It is envisaged that input data will be collected at various stages of the MSP process, including raw XML files from participants, partially processed data from the MOI or MPI, and processed UUC-ready data from the DSI sequence of the MA software.

2. A Data Translation Tool

A spreadsheet or other tool that can take input data from various stages of the MSP process, including raw XML files, and translate such into a set of standard CSV files in a UUC-ready format. Exported input and output data from the MA system will already be in this format, and will likely be the data files that would most frequently be used in an event when an Administered Settlement is implemented.

3. A Pricing and Scheduling Tool

A spreadsheet or other tool that can be linked with a set of input data csv files in a UUC-ready format, and which can use these files to:

- (i) Produce a set of 48 market supply curves, one for each trading interval, using a limited set of commercial and technical offer data. A possible approach to produce a market supply curve is to combine a set of market participant supply curves, each of which is based on submitted bids and processed such that curves are truncated at maximum operating limits, feature a zero cost bid step up to Minimum Stable Generation, which are linked with an availability schedule that can manage Minimum-Off-Time and

Notification/Start-up time constraints. It may be impracticable to model ramping limits, energy limits, Maximum On Time and some other technical operating constraints;

- (ii) Produce a set of 48 estimates of system demand, one for each trading interval
- (iii) Estimate a market clearing price for each trading interval, with administered market schedule quantities for each market participant, using the market supply curve from (i) and the estimate of system demand from (ii).
- (iv) Use the market clearing price from (iii) as a proxy for the system shadow price;
- (v) Estimate an SMP for each trading interval using the market clearing price from (iii) and an agreed logic to estimate and allocate uplift as part of an Administered Settlement methodology. The agreed logic may be to not calculate uplift, or to estimate it according to the Code and to allocate it across intervals based on an allocation method that is feasible to implement in a spreadsheet tool. This step will also need to apply penalty costs in the event that the system energy balance cannot be maintained.
- (vi) Produce output files according to two formats:
 - 1. a format that can be readily transferred and interpreted by market participants. An approach may be to use the csv UUC file format of the MA software;
 - 2. a format that can be uploaded into existing participant interfaces.

Next Steps

This draft and high-level approach is suggested for discussion purposes only; it is expected that it will be refined, and a detailed methodology developed, pending the outcome of consultative discussion.

To further the development an Administered Settlement methodology and process, the following steps are proposed:

1. Discuss, refine and agree on a high-level approach for implementing an Administered Settlement for anticipated MSP failure scenarios, and for a suite of contexts defining what may or may not be practicable in the circumstances of the failure event.
2. Review major classes of input and output data and develop a detailed methodology that is consistent with (1) the agreed high level approach, (2) the tools and systems that are immediately available, and (3) the tools and systems that could be feasibly developed in a development time-frame. The latter suggests an implementation methodology that evolves as tools are developed and processes are refined.