P138 MECHANISM

This document describes the basic mechanism for P138. The mechanism for P138 has been split down into a number of steps:

- Notification of Demand Control;
- Initial Notification of Demand Control Volumes and Prices;
- Preparation of the data set for workaround 18, including
  - Calculation of the Demand Control Offer Price; and
  - Calculation of BM Unit Deemed Demand;
- Allocation of Demand Control Volume to the Bid Offer Stack;
- Payment of Demand Control Offers by the System Operator; and
- Calculation of Energy Imbalance.

Notification of Demand Control

The SO would instruct the LDSOs in accordance with OC6.2.1 (c), (d) and (e). (Note that it is assumed that the instruction to the LDSOs is synonymous with the corresponding Grid Supply Point (GSP) Groups).

The SO sends a message as soon as possible following the Demand Control instruction to the BMRA notifying the start time of the Demand Control Period, the affected GSP Group(s) and LDSO(s) and the amount of Demand Control requested (as both a MW value and percentage of Demand to be reduced in each GSP Group) per Settlement Period to be published on the system warning messages screen on the BMRA. The start time of the Demand Control Period is defined as the time at which the instruction to reduce demand is issued by the SO. (Note that it is assumed that the SO will not issue an instruction for Demand Control to take effect at a given point in the future, i.e. the Demand Control instruction would take affect at the moment that it is instructed).

The SO instructs the LDSOs to start reconnecting demand in accordance with OC6, (but only where the initial instruction was issued in accordance with OC6.2.1 (c), (d) or (e)).

The SO sends a message to the BMRA as soon as possible following the instruction to start reconnecting demand notifying the time of the end of the Demand Control Period the affected GSP Group(s) and LDSO(s) and an estimate of the Demand Control achieved per Settlement Period, if possible, to be published on the system warning messages screen on the BMRA. (Note that OC6.5.9 and OC6.6.8 require LDSOs to notify the SO of an estimate of the Demand Reduction that occurred within five minutes of the disconnection or restoration for Demand Control initiated by the SO or Automatic Low Frequency Demand Disconnection). The end time of the Demand Control Period is defined as the time at which the instruction to reconnect demand is issued by the SO.

Demand Control Settlement Periods are Settlement Periods that fall within the start and end time notified above. For the avoidance of doubt, where the start or end of a Demand Control Period falls part way through a Settlement Period, then the whole Settlement Period is a Demand Control Settlement Period.

Initial Notification of Demand Control Volumes and Prices

As soon as practicable, the SO sends a message to BMRA to be published on the system warning messages screen providing an estimate of the total Demand Control Volume for each Demand Control Settlement Period, the Offer Acceptance with the highest price, which is greater than 1 MW in energy and that would not be tagged out by the Continuous Acceptance Duration Limit (CADL) tagging, taken in the Settlement Period within which Demand Control was actually instructed and the affected GSP Group(s).

Under the auspices of the Grid Code, LDSOs would write to the SO informing them of their estimates of the volume demand reduction was deemed to have achieved and an estimate of what the demand would have been had the Demand Control not occurred, as soon as possible, and in all cases by Day + 1 (As required by OC1.5.6). The format of this data is specified in the appendix to OC6 and gives a percentage of demand reduction every five minutes from the instruction and the peak MW value.

If not supplied by the LDSOs, the SO calculates the total volume of energy that it deems to have been reduced due to the Demand Control as a MWh per Settlement Period figures and passes this information onto the SAA, at the latest by D+2. This communication would be via email.

The Demand Control Volume for each Settlement Period as notified to the SAA by the SO by Day + 2 will be deemed to be correct, aside from any manifest error (Note that this is not a Manifest Error as defined under the BSC. Any grossly incorrect volume would be disputable under the current disputes process but only if the error is manifestly large).

Any Settlement Period falling wholly or partially between the time the SO instructed Demand Control to start and the time the SO instructed Demand Control to finish (as defined in 2.1.1) will be determined to be a Demand Control Settlement Period and the procedure set out in 2.1.4 to 2.1.8 will be followed.

Preparation of the data set for workaround 18

Calculation of the Demand Control Offer Price

By II, the SAA calculates the Demand Control Offer Price. The Demand Control Offer Price for a Demand Control Period is calculated as the Accepted Offer with the highest Offer price with a volume greater than 1 MW and that would not be tagged out by the CADL tagging (note that this does not include Balancing Services Adjustment Data (BSAD)) accepted in the Settlement Period in which Demand Control occurred [as it is considered that in a Demand Control Settlement Period, all actions are taken for energy balancing purposes (even if the Demand Control was taken for locational reasons)] Note that the Offer setting the Demand Control Offer Price may have been taken in the same Settlement Period within which Demand Control was invoked, but equally may have originally been taken in a Settlement Period prior to the Settlement Period within which Demand Control was invoked, but is ongoing in the Settlement Period within which Demand Control was invoked. The Demand Control Offer Price derived for the Settlement Period within which Demand Control was invoked would be used for all subsequent Settlement Periods which were subject to the same

period of Demand Control. (Note that the Demand Control Offers may be tagged out later on in the Process by Net Imbalance Volume (NIV) tagging).

If there are no Accepted Offers then as a default, the Market Index Price would be used as the Demand Control Offer Price. If there was also no Market Index Price for that Settlement Period, then the Demand Control Offer Price will default to the Energy Imbalance Price derived from a volume weighted average of balancing actions in the Net Imbalance Volume (as calculated in accordance with Section T4.4.5(a) or T4.4.6(a) as the case may be. Note that this is the same value to which Market Index Price defaults when it is zero).

It should be noted that since the volume of energy lost due to the period of Demand Control will only ever be an estimate, an overtly accurate price for this energy may not be necessary. The proposed Modification refers to the Demand Control Offer Price as being a marginal price, since the cost associated with Demand Control should be a cost that reflects this action.

Calculation of BM Unit Deemed Demand

P138 makes the assumption that all Suppliers and therefore all BM Units in the affected GSP Group are affected by the Demand Control equally. Although this is true for voltage reduction, it will not necessarily be true if some supply is disconnected, however, for the purposes of the solution, equal impact is assumed.

The volume allocation rules described will be used to apportion the Demand Control Volume notified by the SO at Day + 2 across all Importing Suppliers in the affected GSP Group, by either the SAA or BSCCo.

For the avoidance of doubt, these volume allocation rules will be applied no matter by which method demand is reduced (within the previously defined constraints).

The volume allocation rules will only apply to Supplier BM Units (i.e. those beginning 2_) that are importing in the given Settlement Period (i.e. which have negative consumption on the equivalent day used in the following volume allocation rules). Exporting BM Units, Embedded Generation and Directly Connected Demand will not be affected.

To calculate the Demand Control volume:

- Identify the most recent day D' which has the same day of the week as the Settlement Day D, and for which Initial Settlement has been performed.
- For the Settlement Period(s) in which Demand Control occurred on day D, identify the corresponding Settlement Period j' on the previous day D'. This mapping process is entirely trivial (period 1 mapping to period 1, period 2 mapping to period 2, and so on), except in the case where the two days contain different numbers of Settlement Periods (due to a clock change on one of the days). In this case, the mapping should assume that the Settlement Period j affected in Day D would map to the last Settlement Period of Day D' (i.e. If Settlement Period j on Day D was 49 or 50, it would map to Settlement Period 48 on Day D'. If Settlement Period j on Day D was 47 or 48 and Settlement Period D' was a Short Day, then it would map to Settlement Period 46. If Day D was a short day, Settlement Period 46 would map to Settlement Period 46 on Day D'.)
- If the Metered volume apportioned to a particular BM Unit in Settlement Period j' and day D' is zero, then the Metered volume for that BM Unit from Settlement period j'-1 from D' is substituted to be the Metered

Volume for Settlement Period j'. (Note If the Meted Volume in Settlement Period j'-1 is zero, then a value of zero is used in the calculation.)

- Sum the Metered Volume of all the BM Units i, in the affected GSP Group in Day D' and Settlement Period j' (to give ∑iQMij')
- Divide the Metered Volume of each BM Unit i, in Day D' and Settlement Period j' by the total over the GSP Group (as calculated above) to give the proportion of demand per BM Unit throughout the GSP Group (to give PDCij = QMij' / ∑iQMij').
- Multiply this value obtained by the total Demand Control Volume (TDCj as notified by the SO by D+2) to give the volume that should be added onto that BM Unit to take account of the Demand Control (i.e. VDCij = PDCij * TDCj).
- Then multiply this volume by the Demand Control Offer Price (DCOPj) to give the amount that the SO will pay the Lead Party of each affected BM Unit i (i.e. QVDCij = VDCij * DCOPj).
- Notify the SO of each affected BM Unit, the associated Supplier, the volume by which it is assumed its Demand to have been reduced by and the amount that the SO should pay that Supplier for the Demand Lost from its BM Unit (i.e. BM Unit i, associated Supplier, VDCij, QVDCij for each BM Unit i and Settlement Period j affected by the Demand Control).

Note that this calculation is carried out once and does not alter as more information becomes available in each Settlement Run.

For the avoidance of doubt no specific processing is required to account for Bank Holidays i.e. volumes for a Bank Holiday Monday will be estimated in the same way as those for a working day.

Note that this calculation would have to be carried out separately for each Settlement Period affected by the Demand Control. The SO will report a MW figure of Demand Control Volume for each Settlement Period affected by the Demand Control.

For example:

- Demand Control is called in GSP Group X wholly within Settlement Period 45 on 2 October. The SO notifies SAA that 50MW of Demand was reduced within the GSP Group. The most recent day which has the same day of the week as the 2 October and for which Initial Settlement has been performed is the 28 August. In Settlement Period 45 on the 28 August, BM Unit A consumed 100MWh, BM Unit B consumed 200MWh, BM Unit C consumed 300 MWh and BM Unit D consumed 400MWh. There are no other BM Units in GSP Group X.
- The Demand Control Offer Price is £100 per MWh.
- Therefore the total Consumption in GSP group X on the 28 August was 100+200+300+400=1000MWh
- BM Unit A had 100/1000 = 0.1 proportion of the consumption
- BM Unit B had 200/1000 = 0.2 proportion of the consumption
- BM Unit C had 300/1000 = 0.3 proportion of the consumption
- BM Unit D had 400/1000 = 0.4 proportion of the consumption

- Therefore:
  - The volume attributed to BM Unit A due to the Demand Control is 0.1*50 = 5MWh;
  - The volume attributed to BM Unit B due to the Demand Control is 0.2*50 = 10MWh;
  - The volume attributed to BM Unit C due to the Demand Control is 0.3*50 = 15MWh; and
  - The volume attributed to BM Unit D due to the Demand Control is 0.4*50 = 20MWh.
    - The Supplier responsible for BM Unit A is paid 5*100 = £500 by the SO;
    - The Supplier responsible for BM Unit B is paid 10*100 = £1000 by the SO;
    - The Supplier responsible for BM Unit C is paid 15*100 = £1500 by the SO; and
    - The Supplier responsible for BM Unit D is paid 20*100 = £2000 by the SO;

Allocation of Demand Control Volume to the Bid Offer Stack

The BM Unit deemed Demand Control Volume, for all affected BM Units is allocated an Offer price of the Demand Control Offer Price. These are entered into the Bid Offer stack, using a method based upon Workaround 18 by II. For importing Supplier BM Units, the Non-Delivery Rules should not apply for Demand Control Settlement Periods. For all other BM Units, the Non-Delivery Rules should apply for Demand Control Settlement Periods. Therefore Physical Notifications (PNs) of all importing Supplier BM Units, including those that do not submit PNs will be altered to the Demand Capacity (DC) value of that BM Unit (For only the Demand Control Settlement Periods) to mitigate the effects of Non-Delivery for those BM units. (Note that Workaround 18 can be used to submit PNs.)

The Bids and Offers would then be stacked, using the current mechanism and NIV tagging would occur and the main price for that Settlement Period would be calculated as normal (noting that the Bid Offer stack includes the Demand Control Offers at the Demand Control Offer Price).

Payment of Demand Control Offers by the System Operator

Provided a method similar to workaround 18 is used to create the Demand Control Offers as Bid Offer Acceptances, the SO will then pay each affected Supplier the required amount for that Offer by normal methods in normal timescales as the Demand Control Offers will automatically be included in the Settlement Report.

Calculation of Energy Imbalance

Provided a method similar to workaround 18 is used to create the Demand Control Offers as Bid Offer Acceptances, the Demand Control volume will feed into the Account Period Balancing Services Volume (QABSaj) value in the calculation of the Energy Imbalance for each energy account by normal methods and in normal timescales. Therefore each Parties position, had the Demand Control not occurred, will be similar to that if the Demand Control does occur.