B. LEGAL AND GOVERNANCE

B.9 REGISTRATION OF TRADING SITE

B.9.1 General

B.9.1.1 Any Party (or Applicant, as applicable) registering a Generator Unit shall register such Generator Unit as part of a Trading Site except as expressly provided for in paragraph B.9.1.3.

B.9.1.2 Each Trading Site shall include at least one Generator Unit and may include a single Trading Site Supplier Unit which must contain all of the Demand for the Trading Site and only the Demand within the same Trading Site. Except as provided for in section B.9.2, each Trading Site shall include all Generator Units on the Generation Site.

B.9.1.3 The following kinds of Generator Unit shall not be registered as part of a Trading Site:

(a) a Pumped Storage Unit ~~or Battery Storage Unit~~;

(b) an Aggregated Generator Unit, where the Trading Site contains a Trading Site Supplier Unit;

(c) an Assetless Unit.

B.9.1.4 All Units within a registered Trading Site must be registered to the same Participant.

B.9.1.5 If a Party (or Applicant as applicable) registering a Trading Site does not register a Trading Site Supplier Unit to that Trading Site, then on the first registration of a Generator Unit to that Trading Site, the Party (or Applicant as applicable) registering the Generator Unit shall notify the Market Operator of the identity of the Participant that shall register an Associated Supplier Unit to the Trading Site. The Participant shall register the Associated Supplier Unit in accordance with Agreed Procedure 1 “Registration”.

B.9.1.6 An Associated Supplier Unit may be registered to a different Participant than the Participant registering the other Units in the Trading Site.

B.9.1.7 An Associated Supplier Unit may contain Demand outside of the Trading Site.

B.9.1.8 No Supplier Unit can be both:

(a) an Associated Supplier Unit; and

(b) a Trading Site Supplier Unit.

B.9.1.9 For each Aggregated Generator Unit, a Party (or Applicant as applicable) shall register an Associated Supplier Unit to the Trading Site in accordance with paragraph B.9.1.6.

B.9.2 Differences Between Trading Sites and Generation Sites

B.9.2.1 Where there is more than one Meter Point Registration Number or more than one Generator Unit at a Generation Site, the Generation Site may be registered as more than one Trading Site, each such Trading Site having either one Trading Site Supplier Unit registered by the same Participant which registers the Generator Unit, or one Associated Supplier Unit recorded to the Trading Site.

B.9.2.2 Where there is more than one Meter Point Registration Number at a Generation Site, the Generation Site may be registered as a single Trading Site which excludes one or

more of the Meter Point Registration Numbers from that Trading Site's Trading Site Supplier Unit or recorded Associated Supplier Unit as appropriate, so long as those excluded Meter Point Registration Numbers do not represent Export Points and the excluded Meter Point Registration Numbers are included in another Supplier Unit or Supplier Units.

B.9.2.3 Where there is only one Meter Point Registration Number and more than one Generator Unit at a Generation Site, and the Generation Site is, as permitted under paragraph B.9.2.1, registered as more than one Trading Site, the Meter Point Registration Number will be attributable to only one such Trading Site, by the Trading Site Supplier Unit or the Associated Supplier Unit for that Trading Site and including the Demand related to the Generation Site Meter Point Registration Number. Each other Trading Site Supplier Unit and Associated Supplier Unit registered or recorded to a Trading Site within the same Generation Site shall contain no Demand related to that Trading Site.

B.9.3 **Generator Unit with Non-Firm Access**

B.9.3.1 A Generator Unit has Non-Firm Access where it operates under a Connection Agreement which provides for a Firm Access Quantity which is less than the Maximum Export Capacity of the relevant site. As part of the registration process for such Generator Units, the Firm Access Quantity of Trading Site, s, for each Trading Day, t, ($qFAQ_{st}$) shall be validated by the relevant System Operator and recorded in accordance with Appendix H "Data Requirements for Registration". No Demand Side Unit or Dual Rated Generator Unit shall be deemed to have Non-Firm Access. A Participant shall advise the Market Operator of any changes to the Firm Access Quantity of the Trading Site and this change shall be validated by the relevant System Operator.

B.9.3.2 Where a Generation Site is, as permitted under paragraph B.9.2.1, registered as more than one Trading Site, and the Generation Site under the Connection Agreement has Non-Firm Access, the relevant Participant shall record a value of Firm Access Quantity for each such Trading Site in such a way that the Firm Access Quantities recorded for all such Trading Sites together sum to the Firm Access Quantity set out in the Connection Agreement of the Generation Site.

B.9.4 **Autoproducer Sites**

B.9.4.1 The Units which form part of an Autoproducer Site are eligible to be registered as part of a Trading Site in accordance with this section B.

B.9.4.2 If all of the Generator Units which form part of an Autoproducer Site are not Controllable and not Dispatchable, those Generator Units may be registered as a single Generator Unit as part of a Trading Site with an Associated Supplier Unit.

B.9.4.3 Unless all of the Generator Units which form part of an Autoproducer Site are not Controllable and not Dispatchable, each Autoproducer Site must have separate metering for its import energy quantity and export energy quantity. A Party must register Generator Units and Supplier Units separately for the purposes of a Trading Site.

B.9.4.4 A Participant registering Generator Units which form part of an Autoproducer Site may also register a separate Trading Unit to facilitate participation in the day-ahead and intraday markets as a single Unit.

B.9.5 **Demand Side Units and Demand Sites**

B.9.5.1 Subject to paragraph B.9.5.3, a Party may register a Demand Side Unit associated with a Demand Site or Demand Sites.

B.9.5.2 Subject to the terms of the Grid Code, a single Demand Side Unit may be associated with a number of Demand Sites provided that those Demand Sites are within the same Currency Zone and that each Demand Site contributes no greater than 10MW to the Demand Side Unit MW Capacity. The combined Demand Side Unit shall for all purposes under the Code be treated as a single Demand Side Unit.

B.9.5.3 Any Demand Site associated with a Demand Side Unit must meet and continue to meet all of the following criteria:

(a) the Demand Site shall house a final customer or consumer;

(b) the Demand Site shall have the technical and operational capability to deliver Demand Reduction in response to Dispatch Instructions from the relevant System Operator in accordance with the relevant Grid Code or Distribution Code;

(c) the Demand Site shall have appropriate equipment to permit real-time monitoring of delivery by the relevant System Operator; and

(d) the Demand Site shall have a Maximum Import Capacity and shall not have a Maximum Export Capacity greater than the De Minimis Threshold.

B.9.5.4 For each Demand Side Unit, a Party (or Applicant as applicable) shall register as part of a single Trading Site in accordance with this section B:

(a) the Demand Side Unit;

(b) a single Supplier Unit which is a Trading Site Supplier Unit; and

(c) no other Unit.

D. BALANCING MARKET DATA SUBMISSION

D.4 COMMERCIAL OFFER DATA

D.4.1 **Setting of Commercial Offer Data Parameters**

D.4.1.1 The Market Price Cap (PCAP) and the Market Price Floor (PFLOOR) shall have the values determined by the Regulatory Authorities from time to time.

D.4.1.2 The Market Operator shall publish the approved values within 5 Working Days of receipt of the Regulatory Authorities' determination or four months before the start of the Year or other period to which the values are intended to apply, whichever is the later.

D.4.2 **Commercial Offer Data Requirements**

D.4.2.1 Subject to paragraph **Error! Reference source not found.**, a Participant is required to submit Commercial Offer Data in respect of each of its Generator Units which are Dispatchable in accordance with this section D.4.2. The required Data Records which must be included in the Commercial Offer Data are listed in Appendix I "Offer Data".

D.4.2.2 Where any Participant submits any value for a monetary amount as part of the Commercial Offer Data for a Generator Unit, it shall express the amount in the Currency that is relevant to the Currency Zone in which the Generator Unit is registered, provided that where such an amount is in pounds sterling, the Market Operator shall, for the purposes of all calculations under this Code, convert the value to euro in accordance with Chapter G (Financial and Settlement).

D.4.2.3 All data items submitted as part of Commercial Offer Data are deemed to apply to levels of Output which are net of Unit Load and, in the case of an Autoproducer Site, independent of Demand at that site.

D.4.2.4 A Participant submitting Default Data in accordance with section B.7.2 and section **Error! Reference source not found.** in respect of a Generator Unit shall submit Complex Bid Offer Data for the Commercial Offer Data components of Default Data.

D.4.2.5 A Participant submitting Commercial Offer Data for a Generator Unit in respect of a Trading Day may submit:

(a) Complex Bid Offer Data, in respect of multiple Open Imbalance Settlement Periods in the format specified in Appendix I "Offer Data"; and

(b) Simple Bid Offer Data, in respect of each Open Imbalance Settlement Period individually in the format specified in Appendix I "Offer Data".

D.4.2.6 Complex Bid Offer Data shall comprise the following:

(a) In the case of Generator Units which are not Demand Side Units:

(i) Start Up Costs; and

(ii) No Load Costs,

in accordance with section D.4.3;

(b) In the case of Generator Units which are Demand Side Units, a single Shut Down Cost in accordance with section D.4.3;

(c) In the case of Generator Units which are Energy Limited Generator Units, a single Energy Limit; ~~and~~

(d) Incremental and Decremental Price Quantity Pairs in accordance with section D.4.4; and

~~(d)~~(e) In the case of Generator Units which are Battery Storage Units, a single Operational Maximum Storage Quantity and a single Operational Minimum Storage Quantity.~~.~~

D.4.2.7 Simple Bid Offer Data shall comprise Incremental and Decremental Price Quantity Pairs for a specified Open Imbalance Settlement Period in accordance with section D.4.4.

D.4.2.8 Each Participant shall ensure that the Forecast Availability Profile submitted in respect of each of its Generator Units at or prior to any Gate Closure shall contain the Participant's forecast of average level of Availability, in MW, for the Generator Unit for each Imbalance Settlement Period in the Trading Day. The forecast Availability values can be positive, but cannot be negative.

D.4.2.9 The Forecast Minimum Output Profile submitted at or prior to any Gate Closure, shall contain the Participant's forecast of the average level of Minimum Output, in MW, for the Generator Unit for each Imbalance Settlement Period in the Trading Day. The Forecast Minimum Output values must be zero except as otherwise specified.

D.4.2.10 The Forecast Minimum Stable Generation Profile submitted at or prior to any Gate Closure, shall contain the Participant's forecast of the average level of Minimum Stable Generation, in MW, for the Generator Unit for each Imbalance Settlement Period in the Trading Day. The Forecast Minimum Stable Generation values can be positive but cannot be negative.

D.4.2.11 A Participant shall ensure that values of the Forecast Availability Profile submitted in respect of Pumped Storage Units or Battery Storage Units, as part of Commercial Offer Data, shall be equal to the expected generation availability for that Pumped Storage Unit or Battery Storage Unit (as the case may be) in each relevant Imbalance Settlement Period.

D.4.2.12 A Participant shall ensure that values of the Forecast Minimum Output Profile submitted in respect of Pumped Storage Units or Battery Storage Units, as part of Commercial Offer Data, shall be equal to the expected pumping capability for that Pumped Storage Unit or storage capability for that Battery Storage Unit (as the case may be) in each relevant Imbalance Settlement Period.

D.4.2.13 Participants shall submit Commercial Offer Data in accordance with the provisions of Appendix I "Offer Data" of the Code, for each of their Demand Side Units in respect of its offered Demand Reduction.

D.4.2.14 A Participant shall ensure that values of the Energy Limit submitted in respect of Energy Limited Generator Units must not exceed the total energy that the Energy Limited Generator Unit is physically capable of generating during the Trading Day.

~~D.4.2.14~~D.4.2.15 A Participant shall ensure that values of the Forecast Minimum Stable Generation Profile submitted in respect of Battery Storage Units, as part of Commercial Offer Data, shall be equal to zero.

D.4.3 **Start Up Costs and No Load Costs**

D.4.3.1 A Participant shall ensure that Complex Bid Offer Data in respect of each of its Generator Units which are not Demand Side Units shall include:

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(a) one No Load Cost;

(b) a Cold Start Up Cost, a Warm Start Up Cost and a Hot Start Up Cost, where the Cold Start Up Cost must be greater than or equal to the Warm Start Up Cost, and the Warm Start Up Cost must be greater than or equal to the Hot Start Up Cost; and

(c) a Warm Cooling Boundary and a Hot Cooling Boundary, where the Warm Cooling Boundary duration must be greater than or equal to the Hot Cooling Boundary duration.

D.4.3.2 A Participant shall ensure that Complex Bid Offer Data in respect of a Demand Side Unit shall include a single Shut Down Cost.

D.4.3.3 In respect of a Pumped Storage Unit or Battery Storage Unit, a Participant shall ensure the No Load Cost, Cold Start Up Cost, Warm Start Up Cost and Hot Start Up Cost components of Complex Bid Offer Data, including Default Data, are submitted with a value of zero.

D.4.4 **Incremental and Decremental Price Quantity Pairs**

D.4.4.1 A Participant submitting Commercial Offer Data in respect of a Generator Unit, u:

(a) shall include a set of Incremental Price Quantity Pairs; and

(b) shall include a set of Decremental Price Quantity Pairs.

D.4.4.2 Each set of Incremental Price Quantity Pairs and Decremental Price Quantity Pairs shall include a minimum of one and a maximum of ten Price Quantity Pairs, each comprising a Price and a Quantity.

D.4.4.3 Each Price can be either positive or negative but cannot exceed the Market Price Cap (PCAP) or be lower than the Market Price Floor (PFLOOR).

D.4.4.4 Each Participant shall, in respect of each of its Generator Units, ensure that each set of Price Quantity Pairs that is submitted for an Imbalance Settlement Period:

(a) is submitted in order of increasing Quantity;

(b) has both Prices and Quantities that are monotonically increasing; and

(c) does not include more than one Price for the same Quantity.

D.4.4.5 Each Participant shall ensure, in the Commercial Offer Data that it submits, that the Price in each Incremental Price Quantity Pair shall be greater than or equal to:

(a) the Price in each Decremental Price Quantity Pair that has a Quantity that is less than the Quantity in the applicable Incremental Price Quantity Pair; and

(b) the Price in the Decremental Price Quantity Pair that has the lowest Quantity out of all those Decremental Price Quantity Pairs that have a Quantity greater than or equal to the Quantity in the applicable Incremental Price Quantity Pair.

D.4.4.6 The Market Operator shall adjust the greatest Quantity specified in a set of Price Quantity Pairs to a sufficiently high value such that it is greater than the value of all function of time Dispatch Quantities ($qD_{uoh}(t)$ or $qD_{uo\gamma}(t)$, as applicable) and Final Physical Notification Quantity ($qFPN_{uh}(t)$ or $qFPN_{u\gamma}(t)$, as applicable) for the Generator Unit, u, in the Period, h, or Imbalance Settlement Period, γ, as applicable, in order to ensure that Bid Offer Acceptances can be calculated over the entire operating range of the Generator Unit.

D.4.4.7 The Market Operator shall adjust the lowest Quantity specified in a set of Price Quantity Pairs to a sufficiently low value such that it is less than or equal to the value of all function of time Dispatch Quantities ($qD_{uoh}(t)$ or $qD_{uo\gamma}(t)$, as applicable) and the function of time Final Physical Notification Quantity ($qFPN_{uh}(t)$ or $qFPN_{u\gamma}(t)$, as applicable) for the Generator Unit, u, in the Period, h, or Imbalance Settlement Period, γ, as applicable in order to ensure that Bid Offer Acceptances can be calculated over the entire operating range of the Generator Unit.

D.4.4.8 If both negative and positive Quantities are submitted but a Quantity equal to zero is not submitted as part of a set of Price Quantity Pairs, the Market Operator shall include an additional Price Quantity Pair with a Quantity equal to zero, and a Price which is equal to the Price corresponding to the first positive Quantity in the set of Price Quantity Pairs.

D.4.4.9 For the purposes of all calculations within this Code, the Market Operator shall determine the Price that shall apply at each level of Output for each Generator Unit, u, such that for levels of Output less than or equal to a Quantity specified in the set of Price Quantity Pairs (the "upper bound Quantity") and greater than the next lowest Quantity specified in the set of Price Quantity Pairs, the Price corresponding to the upper bound Quantity applies.

D.4.4.10 Intentionally Blank

D.4.4.11 A Participant, in respect of a Generator Unit which is Dispatchable, has Priority Dispatch and has zero marginal costs, shall ensure that each Price corresponding to a Quantity in a set of Decremental Price Quantity Pairs is zero.

D.4.4.12 Where a Generator Unit is Dispatchable, has Priority Dispatch and has non-zero marginal costs, each Price corresponding to a Quantity in a set of Decremental Price Quantity Pairs in respect of this Generator Unit shall be set to zero by the Market Operator for the purposes of the Imbalance Pricing calculations detailed in Section E. For the avoidance of doubt, the submitted values will be used for the calculation of Commercial Offer Data for Bid Offer Acceptances in section F.3 for the determination of Settlement Payments, Settlement Charges, Capacity Payments, Capacity Charges as detailed in Section F from Section F.5 onwards and these Price values shall be deemed to be zero for the calculation of Commercial Offer Data for Bid Offer Acceptances in section F.3 for use in Imbalance Pricing Calculations in Section E.

D.5 TECHNICAL OFFER DATA

D.5.1 Technical Offer Data Requirements

D.5.1.1 The required Data Records which must be included in the Technical Offer Data are set out in Appendix I "Offer Data".

D.5.1.2 Each Participant shall use reasonable endeavours in accordance with Prudent Electric Utility Practice to ensure that all data items submitted as part of Technical Offer Data in respect of each of its Generator Units are accurate and reflect the real capabilities of the relevant Generator Unit at the point where the Unit is Connected, net of Unit Load and with due regard for the impact of forecast ambient conditions on that Generator Unit.

D.5.1.3 Each Participant shall use reasonable endeavours in accordance with Prudent Electric Utility Practice to ensure that Technical Offer Data (including Default Data) submitted in respect of each of its Generator Units shall be consistent with data which is submitted

under the applicable Grid Code in respect of the relevant Unit, provided that Technical Offer Data submitted under this Code must be net of Unit Load and shall not be scaled by any Distribution Loss Adjustment Factor.

D.5.1.4 A Participant shall submit additional Data Records in the Technical Offer Data in respect of each of its Pumped Storage Units. These additional Data Records shall be submitted in accordance with the provisions of Appendix I "Offer Data" and shall be as follows:

(a) ~~Pumped~~ Storage Cycle Efficiency ($F^{\sim\sim PS\sim\sim}CE_{ut}$), submitted as a single value for each Trading Day to apply to all Imbalance Settlement Periods, γ, within that Trading Day, t. The value of ~~Pumped~~ Storage Cycle Efficiency shall in all cases be submitted as greater than 0% and less than or equal to 100% (with the specific value calculated as the relevant quantity of Generation divided by the relevant quantity of Demand);

(b) Off to Generating Time expressed as a whole number of minutes for each Pumped Storage Unit, u, within Trading Day, t;

(c) Off to Spin Pump Time expressed as a whole number of minutes for each Pumped Storage Unit, u, within Trading Day, t;

(d) Spin Pump to Pumping Energy Time expressed as a whole number of minutes for each Pumped Storage Unit, u, within Trading Day, t;

(e) Maximum Storage Quantity ($Q^{\sim\sim PS\sim\sim}MAXL_{ut}$) expressed in terms of generation (MWh) for each Pumped Storage Unit, u, within Trading Day, t;

(f) Minimum Storage Quantity ($Q^{\sim\sim PS\sim\sim}MINL_{ut}$) expressed in terms of generation (MWh) for each Pumped Storage Unit, u, within Trading Day, t; and

(g) Pumping Capacity expressed in terms of Output (MW) for each Pumped Storage Unit, u, within Trading Day, t.

D.5.1.5 A Participant shall submit additional Data Records in the Technical Offer Data in respect of each of its Battery Storage Units. These additional Data Records shall be submitted in accordance with the provisions of Appendix I "Offer Data" and shall be as follows:

(a) ~~Battery~~ Storage Cycle Efficiency ($F^{\sim\sim BS\sim\sim}E_{ut}$), submitted as a single value for each Trading Day to apply to all Imbalance Settlement Periods, γ, within that Trading Day, t. The value of ~~Battery~~ Storage Cycle Efficiency shall in all cases be submitted as greater than 0% and less than or equal to 100% (with the specific value calculated as the relevant quantity of Generation divided by the relevant quantity of Demand);

(b) Maximum ~~Battery~~ Storage Quantity ($Q^{\sim\sim BS\sim\sim}MAXL_{ut}$) expressed in terms of generation (MWh) for each Battery Storage Unit, u, within Trading Day, t;

(c) Minimum ~~Battery~~ Storage Quantity ($Q^{\sim\sim BS\sim\sim}MINL_{ut}$) expressed in terms of generation (MWh) for each Battery Storage Unit, u, within Trading Day, t; and

~~(d) Battery Storage Capacity expressed in terms of Output (MW) for each Battery Storage Unit, u, within Trading Day, t.~~

D.5.1.6 For all Pumped Storage Units or Battery Storage Units which utilise the same reservoir or stored energy for any Imbalance Settlement Period, the relevant Participant shall ensure that the values of Maximum Storage Quantity ~~or Maximum Battery Storage~~

~~Quantity, as the case may be,~~ for the associated Imbalance Settlement Period shall be equal.

D.5.1.7 For all Pumped Storage Units or Battery Storage Units which utilise the same reservoir or stored energy for any Imbalance Settlement Period, the relevant Participant shall ensure that the values of Minimum Storage Quantity ~~or Minimum Battery Storage Quantity, as the case may be,~~ for the associated Imbalance Settlement Period shall be equal.

D.5.1.8 In respect of Generation at an Autoproducer Site, all Data Records submitted as part of Technical Offer Data are deemed to apply to levels of Output which are net of Unit Load and independent of Demand at that site.

D.5.1.9 Participants shall submit Technical Offer Data in accordance with the provisions of Appendix I "Offer Data" of the Code, for each of their Demand Side Units in respect of its offered Demand Reduction.

D.5.2 **Validation Data Sets**

D.5.2.1 Each Participant with one or more registered Generator Units shall have a minimum of one and a maximum of six Approved Validation Data Sets for each Generator Unit.

D.5.2.2 Each Approved Validation Data Set shall contain a set of Validation Technical Offer Data which shall be validated by the Market Operator as set out in Agreed Procedure 4 "Transactions Submission and Validation".

D.5.2.3 Approved Validation Data Set Number 1 in respect of each Generator Unit shall be the Approved Primary Validation Data Set for that Generator Unit. The Approved Primary Validation Data Set shall be deemed to contain the Validation Technical Offer Data components of Default Data for all purposes set out in the Code in respect of that Participant.

D.5.3 **Submission and Approval of Validation Data Sets**

D.5.3.1 Upon registration, and thereafter as required, a Participant shall submit a minimum of one and a maximum of six Validation Data Sets to the Market Operator for each of its Generator Units. For each Validation Data Set subsequently submitted for approval, the Participant shall identify which of the six Validation Data Sets it is intended to comprise or replace.

D.5.3.2 The Market Operator shall provide each submitted Validation Data Set that is identified as such to the relevant System Operator for approval.

D.5.3.3 The System Operator shall assess each submitted Validation Data Set within 10 Working Days and either approve or reject the submitted Validation Data Set and advise the Market Operator accordingly.

D.5.3.4 If a submitted Validation Data Set is approved by the relevant System Operator, the Market Operator shall ensure that the approved status is matched in the CMS within 1 Working Day, in order for the relevant Validation Data Set to be deemed to be an Approved Validation Data Set. The set shall be identified thereafter by its Validation Data Set Number. Otherwise the submitted Validation Data Set shall be deemed to be rejected.

D.5.4 **Validation of Data Transactions Containing Validation Technical Offer Data**

D.5.4.1 If a Participant submits a Data Transaction identifying a Validation Data Set Number for a given Trading Day at least 10 minutes before the corresponding Gate Closure 1, the relevant Data Transaction shall be Accepted by the Market Operator in respect of the Trading Day.

D.5.4.2 If a Participant does not submit a Data Transaction identifying a Validation Data Set Number for a given Trading Day, the last Accepted and Approved Primary Validation Data Set shall be used by the Market Operator for that Trading Day.

D.5.4.3 The Market Operator shall inform the System Operator as soon as possible after acceptance of data submitted under paragraph D.5.4.1 which Approved Validation Data Set is active for each Generator Unit.

D.5.4.4 In the event that a Participant submits more than one Data Transaction identifying a Validation Data Set Number for a given Trading Day, the most recent Data Transaction that has been Accepted shall supersede all previously submitted Data Transactions in respect of that same Trading Day.

D.5.5 **Updating Approved Validation Data Sets**

D.5.5.1 Each Participant that has one or more Approved Validation Data Sets shall review its Approved Validation Data Sets at least once every three months and update as necessary to ensure that the Approved Validation Data Sets for each of the Participant's Generator Units continue to comply with the requirements set out in the Code.

D.5.5.2 Any submitted Validation Data Set which is an update to an Approved Validation Data Set shall be submitted by the relevant Participant to the Market Operator in accordance with the provisions of paragraph D.5.3.1.

F. CALCULATION OF PAYMENTS AND CHARGES

F.2 DATA SOURCES, CONVENTIONS AND DEFINITIONS

F.2.1 Interpretation

F.2.1.1 For each Imbalance Pricing Period, φ, and each Imbalance Settlement Period, γ, as applicable for the relevant process, for the purposes of this Code, the Bid Offer Acceptance subscript, o, resets to zero so that the first Bid Offer Acceptance in the period has a subscript value of o = 1.

F.2.1.2 The Market Operator shall set the value of a variable at zero where this Code states that a provision does not apply to a Unit, and where the variable which is the result of that provision is to be used in a later process for that Unit.

F.2.1.3 The Market Operator shall determine whether a Pumped Storage Generator Unit, u, is in Pumping Mode for the purposes of the calculations in this Code as follows:

(a) If the value of a Pumped Storage Unit's Dispatch Quantity ($qD_{uo\gamma}(t)$) at all times within an Imbalance Settlement Period, γ, is positive (i.e. in the generating range of the Unit's output), then the Unit is deemed to be in Generating Mode for the entirety of that Imbalance Settlement Period; and

(b) If the value of a Pumped Storage Unit's Dispatch Quantity ($qD_{uo\gamma}(t)$) at any time within an Imbalance Settlement Period, γ, is negative (i.e. in the pumping range of the Unit's output), then the Unit is deemed to be in Pumping Mode for the entirety of that Imbalance Settlement Period.

F.2.1.4 Intentionally Blank

~~F.2.1.4 The Market Operator shall determine whether a Battery Storage Generator Unit, u, is in Charging Mode for the purposes of the calculations in this Code as follows:~~

~~(a) If the value of a Battery Storage Unit's Dispatch Quantity ($qD_{uo\gamma}(t)$) at all times within an Imbalance Settlement Period, γ, is positive (i.e. in the generating range of the Unit's output), then the Unit is deemed to be in Generating Mode for the entirety of that Imbalance Settlement Period; and~~

~~(b) If the value of a Battery Storage Unit's Dispatch Quantity ($qD_{uo\gamma}(t)$) at any time within an Imbalance Settlement Period, γ, is negative (i.e. in the charging range of the Unit's output), then the Unit is deemed to be in Charging Mode for the entirety of that Imbalance Settlement Period.~~

F.2.1.5 An "Incremental Action" ("Inc") is a System Operator action intended to increase the power (MW) or energy (MWh) being sent out into the system, or decrease the power or energy being taken from the system. Inc power or energy quantities are positive, resulting from the Dispatch Quantity for a Bid Offer Acceptance being higher than the Dispatch Quantity for the previous Bid Offer Acceptance for the Generator Unit in respect of an Imbalance Pricing Period or Imbalance Settlement Period (as appropriate), or being higher than the Final Physical Notification Quantity if there is no previous Bid Offer Acceptance for the Generator Unit in respect of the Imbalance Pricing Period or Imbalance Settlement Period (as appropriate), for a Unit at any point in time. Incremental Actions are represented in settlement through Accepted Offer Quantities.

F.2.1.6 A “Decremental Action” (“Dec”) is a System Operator action intended to decrease the power (MW) or energy (MWh) being sent out into the system, or increase the power or energy being taken from the system. Dec power or energy quantities are negative, resulting from the Dispatch Quantity for a Bid Offer Acceptance being lower than the Dispatch Quantity for the previous Bid Offer Acceptance for the Generator Unit in respect of an Imbalance Pricing Period or Imbalance Settlement Period (as appropriate), or being lower than the Final Physical Notification Quantity if there is no previous Bid Offer Acceptance for the Generator Unit in respect of the Imbalance Pricing Period or Imbalance Settlement Period (as appropriate), for a Unit at any point in time. Decremental Actions are represented in settlement through Accepted Bid Quantities.

F.2.1.7 Variables for power (expressed as MW) quantities begin with a lower case “q”, while variables for energy (expressed as MWh) quantities begin with an upper case “Q”.

F.2.1.8 A Scheduling Agent is the entity or entities with the task of providing details of Ex-Ante Market Contracted Quantities from market participants to TSOs, or where applicable third parties, in accordance with Article 111 of the EU Guideline on Electricity Transmission System Operation.

F.2.1.9 A variable which is a function of time may have a different value at each time within an Imbalance Settlement Period, γ, or Imbalance Pricing Period, φ, rather than a single fixed value defined for all times within an Imbalance Settlement Period, γ, or Imbalance Pricing Period, φ. Such variables are represented with the inclusion of the notation ‘(t)’ at the end of the variable term.

F.2.1.10 For the purposes of all calculations in this Code, each quantity and price calculated, deemed or defined in respect of a Generator Unit which is not Dispatchable shall be deemed, where applicable, to be at Band number i = 1, with the corresponding value for $qBOUR_{u(i=1)h}(t)$ or $qBOUR_{u(i=1)\gamma}(t)$, as applicable, being a sufficiently high value that it is greater than the value of all function of time Dispatch Quantities ($qD_{uoh}(t)$ or $qD_{uo\gamma}(t)$, as applicable) and the function of time Final Physical Notification Quantity ($qFPN_{uh}(t)$ or $qFPN_{u\gamma}(t)$, as applicable) for the Generator Unit, u, in the Period, h, or Imbalance Settlement Period, γ, as applicable.

F.2.2 **Ex-Ante Market Data**

F.2.2.1 Each Scheduling Agent for a Participant shall, in accordance with the Settlement Calendar, submit to the Market Operator details of the Contracted Quantities (the Day-ahead Trade Quantities and Intraday Trade Quantities, $qTDA_{xuh}$, $qTID_{xuh}$, $qTDA_{xvh}$ and $qTID_{xvh}$), the durations relevant to the trades (Day-ahead Trade Duration and Intraday Trade Duration, $DTDA_x$ and $DTID_x$), and the prices relevant to those quantities (the Day-ahead Trade Price and Intraday Trade Price, $PTDA_{xuh}$, $PTID_{xuh}$, $PTDA_{xvh}$ and $PTID_{xvh}$), for each Generator Unit, u, and each Supplier Unit, v, registered in respect of that Participant, for each Trade, x, in each Period, h, in this context meaning each Day-ahead Trading Period and each Intraday Trading Period (save where paragraph F.2.2.1A applies).

F.2.2.1A Each Scheduling Agent for a Participant shall not submit to the Market Operator details of any Contracted Quantities , as contemplated by paragraph F.2.2.1, for any Participant registered under a Party for whom suspension is in effect under a Suspension Order for any of its Units.

F.2.2.2 If the Market Operator has not received a submission under paragraph F.2.2.1 for a Participant's Unit which applies to an Imbalance Settlement Period by the time the Market Operator is required to calculate the payments and charges in accordance with this Code for that period, the value of the Ex-Ante Quantity ($QEX_{u\gamma}$ and $QEX_{v\gamma}$) for the relevant Generator Unit, u, or Supplier Unit, v, in each Imbalance Settlement Period, γ, shall be deemed to be zero.

F.2.2.3 If, under section **Error! Reference source not found.**, the Market Operator does not accept a Contracted Quantity, the value of the relevant Contracted Quantity (the Day-ahead Trade Quantity and / or Intraday Trade Quantity, $qTDA_{xuh}$, $qTID_{xuh}$, $qTDA_{xvh}$ and / or $qTID_{xvh}$) for the relevant Generator Unit, u, or Supplier Unit, v, shall be deemed to be zero.

F.2.2.4 The Scheduling Agent of the Shipping Agent for each Interconnector shall, in accordance with the Settlement Calendar, submit to the Market Operator the Day-ahead Interconnector Schedule Quantities ($qICSDA_{xlh}$) and Intraday Interconnector Schedule Quantities ($qICSID_{xlh}$) for each Trade, x, for that Interconnector, l, in each Period, h, in this context meaning the Day-ahead Trading Period or Intraday Interconnector Trading Period, as the case may be.

F.2.2.5 The Scheduling Agent for each SEM NEMO shall, in accordance with the Settlement Calendar, submit to the Market Operator the Day-ahead Market Area Exchange Quantities ($qEMADA_{xuh}$) and Intraday Market Area Exchange Quantities ($qEMAID_{xuh}$) for each Trade, x, for the Assetless Unit, u, registered in accordance with paragraph B.8.1.2(e), in each Period, h, in this context meaning the Day-ahead Trading Period or Intraday Interconnector Trading Period, as the case may be.

F.2.3 **Physical Notification Data**

F.2.3.1 For the purposes of calculating the Information Imbalance Charge in accordance with section **Error! Reference source not found.**, in respect of an Imbalance Settlement Period, γ, the PN Submission Period, β, means a half-hour period between 13:30 TD-1 and the Gate Closure 2 during which a Participant may submit Physical Notification Data in accordance with Chapter D (Balancing Market Data Submission).

F.2.3.2 The value of the Final Physical Notification Quantity ($qFPN_{uh}(t)$) for each Generator Unit, u, which has Priority Dispatch, and which is not Dispatchable, shall at all times in Period, h, be deemed to be equal to the Outturn Availability Quantity ($qAVAILO_{uh}(t)$) of the Unit.

F.2.3.3 The Market Operator shall derive the Physical Notification Quantity ($QPN_{u\beta\gamma}$) for Generator Unit, u, in PN Submission Period, β, for Imbalance Settlement Period, γ, by integrating the associated function of time Physical Notification Quantity ($qPN_{u\gamma}(t)$) from the Accepted Physical Notification Data prevailing at the end of that PN Submission Period, with respect to time across the Imbalance Settlement Period.

F.2.3.4 The Market Operator shall derive the Final Physical Notification Quantity ($QFPN_{u\gamma}$) for Generator Unit, u, in Imbalance Settlement Period, γ, by integrating the associated function of time Final Physical Notification Quantity ($qFPN_{u\gamma}(t)$), determined in accordance with Chapter D (Balancing Market Data Submission), with respect to time across the Imbalance Settlement Period.

F.2.3.5 The Market Operator shall derive the Final Physical Notification Quantity ($QFPN_{l\gamma}$) for Interconnector, l, in Imbalance Settlement Period, γ, by integrating the associated function of time Final Physical Notification Quantity ($qFPN_{l\gamma}(t)$), determined in

accordance with Chapter D (Balancing Market Data Submission), with respect to time across the Imbalance Settlement Period.

F.2.3.6 The Final Physical Notification Quantity ($qFPN_{uh}(t)$ and $QFPN_{uh}$) for each Interconnector Residual Capacity Unit and each Interconnector Error Unit, u, in Period, h, shall be equal to the Final Physical Notification Quantity of the relevant Interconnector, l.

F.2.4 **Dispatch Data**

F.2.4.1 Each System Operator shall, in accordance with the Settlement Calendar, submit to the Market Operator the Dispatch Instructions in respect of each Generator Unit which is Dispatchable (and which has Priority Dispatch and is not Dispatchable where relevant) and is registered within its Jurisdiction, and shall where applicable submit an associated Dispatch Ramp Up Rate or Dispatch Ramp Down Rate for each Dispatch Instruction and may state that the Dispatch Instruction is for the purposes of All-Island Curtailment through the submission of a CURL Instruction Combination Code in accordance with Appendix O: "Instruction Profiling Calculations". Notwithstanding the precedence of the Grid Code in accordance with paragraphs B.4.1.1 and B.4.1.2, the use of these Dispatch Instructions for the purposes of this Code in accordance with Appendix O "Instruction Profiling Calculations" may be different to their use in accordance with the Grid Code.

F.2.4.2 Each System Operator shall submit information referred to in paragraph F.2.4.1 to the Market Operator in accordance with Appendix K "Other Market Data Transactions", based on Outturn Data, and the values submitted shall be net of Unit Load.

F.2.4.3 Except as provided in paragraph F.2.4.4(a), the Market Operator shall derive the value of the Dispatch Quantity ($qD_{uoh}(t)$) for each Generator Unit, u, for each Bid Offer Acceptance, o, in Period, h, in accordance with Appendix O "Instruction Profiling Calculations".

F.2.4.4 The Market Operator shall derive the value of the Dispatch Quantity ($qD_{uoh}(t)$), for each Generator Unit, u, which has Priority Dispatch, and which is not Dispatchable, for each Bid Offer Acceptance, o, in Period, h, as follows:

(a) The value shall be equal to the Final Physical Notification Quantity ($qFPN_{uh}(t)$) for the Generator Unit, determined in accordance with paragraph F.2.3.2, for each time in Period, h, where the Unit does not have a Dispatch Instruction applying to it; and

(b) The Market Operator shall determine the value in accordance with paragraph F.2.4.3 for each time in respect of which a Dispatch Instruction applies to the Unit.

F.2.4.5 The Market Operator shall derive the Dispatch Quantity ($QD_{uγ}$) for each Generator Unit, u, in Imbalance Settlement Period, γ, by integrating the associated function of time Dispatch Quantity ($qD_{uoγ}(t)$) reflecting the last Dispatch Instruction in effect from time to time during the Imbalance Settlement Period, with respect to time across the Imbalance Settlement Period in accordance with Appendix O "Instruction Profiling Calculations".

F.2.4.6 Each System Operator shall, in accordance with the Settlement Calendar, submit to the Market Operator the Dispatch Quantity ($qD_{loγ}(t)$) in respect of each Interconnector, l, which is connected to its Jurisdiction, reflecting the last Dispatch Instruction in effect from time to time during the Imbalance Settlement Period.

F.2.4.7 The Dispatch Quantity ($qD_{uoγ}(t)$) for each Interconnector Residual Capacity Unit and each Interconnector Error Unit, u, reflecting the last Dispatch Instruction in effect from time to time during the Imbalance Settlement Period, shall be equal to the Dispatch Quantity of the relevant Interconnector, l.

F.2.4.8 Each System Operator shall, in accordance with the Settlement Calendar, submit to the Market Operator the SO Interconnector Trade Quantity and Price (in the form of Accepted Bid and Offer Quantities, QAB_{uoih}, QAO_{uoih}, and Bid Offer Price, PBO_{uoih}) for each Interconnector Residual Capacity Unit, u, relevant to an Interconnector, l, which is connected to its Jurisdiction, for each Bid Offer Acceptance, o, for Band, i, in Period, h. The System Operators shall set the System Operator Flag ($FSO_{uφ}$) for any Interconnector Residual Capacity Unit, u, equal to zero for each Imbalance Pricing Period, φ, in which an SO Interconnector Trade Quantity and Price is submitted.

F.2.4.9 Each System Operator shall, in accordance with the Settlement Calendar, submit to the Market Operator the Outturn Availability Quantity ($qAVAILO_{uh}(t)$) in respect of each Generator Unit u, which is registered within its Jurisdiction, in accordance with Chapter D (Balancing Market Data Submission).

~~F.2.4.9~~F.2.4.10 Each System Operator shall, in accordance with the Settlement Calendar, submit to the Market Operator the Outturn Minimum Output Quantity ($qMINOUT_{uh}(t)$) in respect of each Generator Unit u, which is registered within its Jurisdiction, in accordance with Chapter D (Balancing Market Data Submission).

F.2.5 **Metered Quantity Data**

F.2.5.1 Each Meter Data Provider shall, in accordance with the Settlement Calendar, submit to the Market Operator the Metered Quantities ($QM_{uγ}$, $QM_{vγ}$, and $QM_{lγ}$) for each Generator Unit, u, Supplier Unit, v, and Interconnector, l, as applicable, which is registered within, or connected to, its Jurisdiction in each Imbalance Settlement Period, γ.

F.2.5.2 Each Meter Data Provider shall, in accordance with the Settlement Calendar, submit to the Market Operator the Non-Interval Energy Proportion Factor ($FNIEP_{vγ}$) for each Supplier Unit, v, which is registered within its Jurisdiction, in Imbalance Settlement Period, γ.

F.2.5.3 The value of the Metered Quantity ($QM_{uγ}$) for each Interconnector Error Unit and each Interconnector Residual Capacity Unit, u, shall be equal to the Metered Quantity ($QM_{lγ}$) of the relevant Interconnector, l.

F.2.5.4 The value of the Metered Quantity ($QM_{uγ}$) for each Generator Unit, u, which is an Assetless Unit or a Trading Unit, shall be deemed to be zero.

F.2.5.5 The value of the Metered Quantity ($QM_{uγ}$) for each Generator Unit, u, which is a Demand Side Unit, shall be deemed to be equal to the Dispatch Quantity ($QD_{uγ}$) of that Demand Side Unit.

F.2.5.6 If the value for any Day-ahead Trade Price ($PTDA_{xuh}$), Intraday Trade price ($PTID_{xuh}$) or Balancing Trade Price ($PTB_{uγk}$) associated with a trade, x, or position, k, in the ranked set, for Generator Unit, u, which is a Demand Side Unit, is greater than the value of the Strike Price ($PSTR_w$), then the value of the Metered Quantity ($QM_{vγ}$) for each Trading Side Supplier Unit, v, which is on a Trading Site, s, associated with that Generator Unit, in each Imbalance Settlement Period, γ, associated with the relevant Balancing Trade Price or partially or wholly within the relevant Day-ahead Trading Period or Intraday Trading Period, shall be the value as submitted by the Meter Data Providers in accordance with Section C.6. Otherwise, the value of the Metered Quantity ($QM_{vγ}$) for

each Trading Site Supplier Unit, v, which is on a Trading Site, s, associated with a Generator Unit, u, which is a Demand Side Unit, shall be deemed to be equal to the negative of the Dispatch Quantity ($QD_{u\gamma}$) of that Demand Side Unit.

F.2.6 **Timing Conventions**

F.2.6.1 The Intraday Trading Period is the period relevant to the trading of energy in the intraday market, which is the period covered by a traded product in the intraday market. It can vary depending on the products in the market, and is assumed for the calculations in this Chapter to be either one hour or thirty minutes. It is represented by the subscript for a generalised Period, h, and the time in hours covered by this Period is the Intraday Trade Duration.

F.2.6.2 The Day-ahead Trading Period is the period relevant to the trading of energy in the day-ahead market, which is the period covered by a traded product in the day-ahead market. It can vary depending on the products in the market, and is assumed for the calculations in this Chapter to be either one hour or thirty minutes. It is represented by the subscript for a generalised Period, h, and the time in hours covered by this Period is the Day-ahead Trade Duration.

F.2.6.3 The Imbalance Pricing Period is the period within an Imbalance Settlement Period relevant to the calculation of the Imbalance Price. It is represented by the subscript φ, and the time in hours covered by this Period is the Imbalance Pricing Period Duration.

F.2.6.4 An Imbalance Settlement Period is represented by the subscript γ, and the time in hours covered by this Period is the Imbalance Settlement Period Duration.

F.2.6.5 The Aggregated Settlement Period is the period relevant to the calculation of imbalance quantities covering one or multiple Imbalance Settlement Periods for the execution of the Imbalance Settlement Process. It is represented by the subscript α, and the time in hours covered by this Period is the Aggregated Settlement Period Duration.

F.2.6.6 The Intraday Interconnector Trading Period is the period relevant to the scheduling of energy flows on interconnectors in the intraday market. It is assumed for the calculations in this Chapter to be thirty minutes. It is represented by the subscript for a generalised Period, h, and the time in hours covered by this Period is the Intraday Interconnector Trade Duration.

F.2.7 **Capacity Market Data**

F.2.7.1 The System Operators shall submit to the Market Operator the following data for each Capacity Market Unit, Ω, in each Imbalance Settlement Period, γ, in accordance with Appendix M “Capacity Market Data Transactions”:

(a) The Capacity Quantity ($qC_{\Omega n}$) with Primary or Secondary Trade Flag;

(b) The Commissioned Capacity Quantity ($qCCOMMISS_{\Omega\gamma}$);

(c) The De-Rating Factor ($FDERATE_{\Omega}$);

(d) The Gross De-Rated Capacity Quantity ($qCDERATEG_{\Omega\gamma}$);

(e) The Annual Stop-Loss Limit Factor ($FSLLA_{n}$);

(f) The Billing Period Stop-Loss Factor ($FSLLB_{n}$);

(g) The Capacity Payment Price ($PCP_{\Omega n}$); and

(h) The Capacity Duration Exchange Rate ($XRCD_{n}$).

F.2.7.2 The Market Operator shall calculate the Demand Side Non-Delivery Percentage for each Capacity Market Unit, Ω which represents one or more Demand Side Units, in each Imbalance Settlement Period, γ, as follows:

If $PIMB_{\gamma} \leq PSTR_{w}$, or if $QCOB_{\Omega\gamma} = 0$, then $FNDDS_{\Omega\gamma} = 0$, otherwise:

$$FNDDS_{\Omega\gamma} = \frac{Max\left(QCOB_{\Omega\gamma} - \sum_{u \in \Omega} Max\left(QDLF_{u\gamma}, QEX_{u\gamma}, \left(qAA_{u\gamma} \times DISP \times \left(1 - FSS_{u\gamma}\right)\right)\right), 0\right)}{QCOB_{u\gamma}}$$

Where:

(a) $QCOB_{\Omega\gamma}$ is the Obligated Capacity Quantity for Capacity Market Unit, Ω, in Imbalance Settlement Period, γ;
(b) $QDLF_{u\gamma}$ is the Loss-Adjusted Dispatch Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;
(c) $QEX_{u\gamma}$ is the Ex-Ante Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;
(d) $qAA_{u\gamma}$ is the Actual Availability Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;
(e) $PIMB_{\gamma}$ is the Imbalance Settlement Price in Imbalance Settlement Period, γ, calculated in accordance with Chapter E (Imbalance Pricing);
(f) $PSTR_{w}$ is the Strike Price for Week, w, which contains Imbalance Settlement Period, γ;
(g) DISP is the Imbalance Settlement Period Duration;
(h) $FSS_{u\gamma}$ is the System Service Flag for Generator Unit, u, in Imbalance Settlement Period, γ; and
(i) $\sum_{u \in \Omega}$ is a summation over all Generator Units, u, which comprise the Capacity Market Unit, Ω.

F.2.8 **DS3 System Services Provider**

F.2.8.1 Subject to F.2.8.3, each System Operator shall submit to the Market Operator, in accordance with the Settlement Calendar, in respect of each Trading Site Supplier Unit which is registered in a Trading Site with a DS3 System Service Providing Unit contracted with the respective System Operator under the DS3 System Services Arrangements to provide DS3 System Services at zero MW exported energy, a flag with a value of 1 for each imbalance settlement periods where the DS3 System Services Providing Unit is dispatched to provide DS3 System Services to the System Operator.

F.2.8.2 Each System Operator shall submit the flag referred to in F.2.8.1 in accordance with the Appendix K “Other Market Data Transaction” based on the settlement of the respective DS3 System Services Providing Unit under the DS3 System Service Arrangements.

F.2.8.3 The System Operators shall not submit the flag referred to in F.2.8.1 for any Trading Site Supplier Unit, v, which is on a Trading Site, s, where a Demand Side Unit or any Autoproducer Unit is also registered to that Trading Site.

F.2.8.4 The Market Operator shall derive the binary value of the DS3 System Services Provider Flag (SSPFvy) for each Trading Site Supplier Unit, v, which is on the Trading Site, s, in each Imbalance Settlement Period, y, in accordance with F.2.8.5.

F.2.8.5 The Market Operator shall set the DS3 System Services Provider Flag (SSPFvγ) to zero unless a value of one has been submitted by the System Operator for a Trading Site Supplier Unit, v, which is on Trading Site, s, in imbalance Settlement Period, γ, in accordance with F.2.8.1.

F.4 TRADING BOUNDARY AND TREATMENT OF LOSSES

F.4.1 Trading Boundary

F.4.1.1 The Trading Boundary is a notional boundary between all points on the Transmission System and all points on the Distribution System. The Trading Boundary is the notional balancing point for generation and supply and is the point of sale for trading in the SEM at which the title for all products and services settled through the trading arrangements set out in the Code transfers. All volumes traded or settled at the Trading Boundary are adjusted, where required, to reflect Transmission Losses and (where applicable) Distribution Losses. For the avoidance of doubt, for all Supplier Units or Generator Units that are Distribution Connected, the Trading Boundary is not the specific boundary between the Transmission System and Distribution System for that Unit and so appropriate Combined Loss Adjustment Factors also apply to volumes associated with these Units in order to ensure that they are appropriately adjusted for Transmission Losses and Distribution Losses incurred as electricity is transported to (or from) the Trading Boundary from (or to) the relevant boundary of the Transmission System and the Distribution System for that Unit and then from (or to) the point of connection of that Unit.

F.4.1.2 Before submitting to the Market Operator Meter Data relating to a Generator Unit (other than a Demand Side Unit), or a Supplier Unit, that is Distribution Connected and for which the Distribution System Operator is the Meter Data Provider, each Distribution System Operator shall apply the appropriate Distribution Loss Adjustment Factor to the Meter Data values.

F.4.2 Setting of Loss Adjustment Factors

F.4.2.1 At least four months before the start of each Tariff Year, each System Operator shall submit to the Regulatory Authorities a set of Transmission Loss Adjustment Factors for each Generator Unit, other than a Demand Side Units, that is Connected within its Jurisdiction and for each Interconnector connected to that Jurisdiction, calculated in co-operation with the System Operator in the other Jurisdiction and in accordance with the statutory and Licence requirements pertaining within its Jurisdiction, for each Imbalance Settlement Period in the Tariff Year. The Transmission Loss Adjustment Factors for each Interconnector shall be applicable to each Interconnector Error Unit and Interconnector Residual Capacity Unit registered in respect of the relevant Interconnector.

F.4.2.2 In determining Transmission Loss Adjustment Factors the System Operator shall incorporate Transmission Losses incurred on the relevant Interconnector as estimated by the System Operator in consultation with the Interconnector Owner.

F.4.2.3 At least three months before the start of each Tariff Year, each Distribution System Operator shall provide the relevant System Operator with a set of Distribution Loss Adjustment Factors for each Generator Unit (other than Demand Side Units) that is Distribution Connected within its Jurisdiction, calculated in accordance with the statutory and Licence requirements pertaining within its Jurisdiction, for each Imbalance Settlement Period in the Tariff Year, and including the relevant supporting information to enable the System Operator to calculate the corresponding Combined Loss Adjustment Factors.

F.4.2.4 At least two months before the start of each Tariff Year, or within five Working Days of its receipt from the Regulatory Authorities, whichever is the later, each System Operator shall provide to the Market Operator in accordance with Appendix K "Other Market Data Transactions" the System Parameters Data Transaction which shall comprise a complete set of Combined Loss Adjustment Factors for each Generator Unit (other than Demand Side Units, Interconnector Error Units or Interconnector Residual Capacity Units) Connected within its Jurisdiction, and each Interconnector connected to that Jurisdiction, for each Imbalance Settlement Period in that Tariff Year.

F.4.2.5 At least two months before the start of each Tariff Year, or within five Working Days of its receipt from the Regulatory Authorities, whichever is the later, each System Operator shall provide the Market Operator with a complete set of Transmission Loss Adjustment Factors for each Generator Unit (other than Demand Side Units) that is Connected within its Jurisdiction for each Imbalance Settlement Period in that Tariff Year in accordance with those prepared and submitted to the Regulatory Authorities under paragraph F.4.2.1.

F.4.2.6 At least two months before the start of each Tariff Year each System Operator shall provide the Market Operator with a complete set of Distribution Loss Adjustment Factors for each Generator Unit (other than Demand Side Units) that is Distribution Connected within its Jurisdiction for each Imbalance Settlement Period in that Tariff Year.

F.4.2.7 The Market Operator shall publish the approved Combined Loss Adjustment Factor value(s) within 5 Working Days of receipt of the System Parameters Data Transaction.

F.4.2.8 The Market Operator shall publish the approved Distribution Loss Adjustment Factor value(s) and Transmission Loss Adjustment Factor value(s) within 5 Working Days of receipt of the Loss Adjustment Factors Data Transaction.

F.4.2.9 For each Supplier Unit, v, that is not a Trading Site Supplier Unit, the Transmission Loss Adjustment Factor ($FTLAF_{v\gamma}$) shall be equal to 1.

F.4.2.10 The Combined Loss Adjustment Factor ($FCLAF_{u\gamma}$) for each Generator Unit, u, in Imbalance Settlement Period, γ, shall be calculated by the relevant System Operator as follows:

$$FCLAF_{u\gamma} = Round\left(FTLAF_{u\gamma} \times FDLAF_{u\gamma}\right)$$

where:

(a) Round(x) is a function that rounds x to 3 decimal places;

(b) $FTLAF_{u\gamma}$ is the Transmission Loss Adjustment Factor for Generator Unit, u, in Imbalance Settlement Period, γ; and

(c) $FDLAF_{u\gamma}$ is the Distribution Loss Adjustment Factor for Generator Unit, u, in Imbalance Settlement Period, γ. In cases where a Distribution Loss Adjustment Factor has been applied to a variable in advance of data submission in accordance with paragraph F.4.1.2, a value of one for the Distribution Loss Adjustment Factor shall be used for the calculation of the Combined Loss Adjustment Factor to be applied to that variable.

F.4.2.11 For each Supplier Unit, v, that is not a Trading Site Supplier Unit the Combined Loss Adjustment Factor ($FCLAF_{v\gamma}$) for each Supplier Unit, v, in Imbalance Settlement Period, γ, shall be set equal to 1.

F.4.2.12 The Combined Loss Adjustment Factor ($FCLAF_{u\gamma}$) for each Demand Side Unit, u, in Imbalance Settlement Period, γ, shall be set equal to 1.

F.4.2.13 The Market Operator shall calculate the Combined Loss Adjustment Factor ($FCLAF_{v\gamma}$) for each Trading Site Supplier Unit, v, in each Imbalance Settlement Period, γ, as follows:

$$If\ MIC > MEC, then$$

$$FCLAF_{v\gamma} = 1$$

$$Else$$

$$If \sum_{u \in s} QM_u \leq 0, then$$

$$FCLAF_{v\gamma} = 1$$

$$Else$$

$$If \sum_{u \in s} qCR_u \neq 0, then$$

$$FCLAF_{v\gamma} = \frac{\sum_{u \in s}(FCLAF_{u\gamma} \times qCR_u)}{\sum_{u \in s}(qCR_u)}$$

$$Else$$

$$FCLAF_{v\gamma} = Max\left(\{FCLAF_{u\gamma}\}\, \forall\, u \in s\right)$$

where:

(a) qCR_u is the Registered Capacity of Generator Unit, u;

(b) $QM_{u\gamma}$ is the Metered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(c) $FCLAF_{u\gamma}$ is the Combined Loss Adjustment Factor for Generator Unit, u, in Imbalance Settlement Period, γ;

(d) $\sum_{u \in s}$ is a summation over all Generator Units, u, not including the Trading Unit, in the Trading Site, s, to which the Trading Site Supplier Unit is registered;

(e) The expression $Max(\{FCLAF_{u\gamma}\} \forall\ u\ \in s)$ denotes the highest Combined Loss Adjustment Factor ($FCLAF_{u\gamma}$) of each Generator Unit, u, not including the Trading Unit, in the Trading Site, s, to which the Trading Site Supplier Unit is registered, in Imbalance Settlement Period, γ;

(f) MIC is the registered Maximum Import Capacity of the site associated with the Trading Site Supplier Unit; and

(g) MEC is the registered Maximum Export Capacity of the site associated with the Trading Site Supplier Unit.

F.4.2.14 The Market Operator shall calculate the Combined Loss Adjustment Factor ($FCLAF_{\Omega\gamma}$) for each Capacity Market Unit, Ω, in each Imbalance Settlement Period, γ, as follows:

$$If \sum_{u \in \Omega} qCR_u \neq 0, then$$

$$FCLAF_{\Omega\gamma} = \frac{\sum_{u \in \Omega}(FCLAF_{u\gamma} \times qCR_u)}{\sum_{u \in \Omega}(qCR_u)}$$

$$Else$$

$$FCLAF_{\Omega\gamma} = Max(\{FCLAF_{u\gamma}\} \forall\ u\ \in \Omega)$$

where:

(a) qCR_u is the Registered Capacity of Generator Unit, u;

(b) $FCLAF_{u\gamma}$ is the Combined Loss Adjustment Factor for Generator Unit, u, in Imbalance Settlement Period, γ;

(c) $\sum_{u \in \Omega}$ is a summation over all Generator Units, u, in the Capacity Market Unit, Ω; and

(d) The expression $Max(\{FCLAF_{u\gamma}\} \forall\ u\ \in \Omega)$ denotes the highest Combined Loss Adjustment Factor ($FCLAF_{u\gamma}$) of each Generator Unit, u, in the Capacity Market Unit, Ω, in Imbalance Settlement Period, γ.

F.4.3 **Application of Loss Adjustment Factors**

F.4.3.1 In this Code, the term 'Loss-Adjusted' applied to any variable, or the inclusion of the letters 'LF' at the end of any variable term, denotes that a value is to be calculated at the Trading Boundary, through application of the relevant Combined Loss Adjustment Factor as determined under section F.4.2.

F.4.3.2 Where the Market Operator is required to calculate or determine a Loss-Adjusted variable which relates to a Generator Unit, u, other than an Interconnector Error Unit ~~or~~ , an Interconnector Residual Capacity Unit or a Battery Storage Unit, a Capacity Market Unit (except in the case of a Capacity Market Unit related to an Interconnector or Battery Storage Unit where Loss-Adjusted variables are calculated as set out in F.4.3.3 and

F.4.3.5) and each Supplier Unit, v, in respect of an Imbalance Settlement Period, γ, and where XXX_{γ} is the variable before the application of Transmission Losses and Distribution Losses, it shall apply the following calculation:

$$XXXLF_{\gamma} = XXX_{\gamma} \times FCLAF_{\gamma}$$

where:

(a) $XXXLF_{\gamma}$ is the relevant Loss-Adjusted variable to be determined; and

(b) $FCLAF_{\gamma}$ is the Combined Loss Adjustment Factor for Generator Unit, u, or Supplier Unit, v, in Imbalance Settlement Period, γ, determined under section F.4.2.

F.4.3.3 Where the Market Operator is required to calculate a Loss-Adjusted variable which relates to an Interconnector, Interconnector Error Unit, Interconnector Residual Capacity Unit ~~or a~~, Capacity Market Unit related to an Interconnector, or a Battery Storage Unit (except in the case of the variables set out under F.4.3.4 and F.4.3.5) in respect of an Imbalance Settlement Period, γ, and where $XXX_{u\gamma}$ is the variable before application of Transmission Losses and Distribution Losses, it shall apply the following calculation:

$$If\ XXX \geq 0\ then$$

$$XXXLF_{u\gamma} = XXX_{u\gamma} \times FCLAF_{l\gamma}$$

$$else$$

$$XXXLF_{u\gamma} = \frac{XXX_{u\gamma}}{FCLAF_{l\gamma}}$$

where:

(a) $XXXLF_{u\gamma}$ is the relevant Loss-Adjusted variable to be determined; and

(b) $FCLAF_{l\gamma}$ is the Combined Loss Adjustment Factor for the relevant Interconnector or Battery Storage Unit, l, in Imbalance Settlement Period, γ, determined under section F.4.2.

F.4.3.4 Where the Market Operator is required to calculate or determine Loss Adjusted variables QABLF and QAOLF in accordance with F.2.4.8 which relate to an Interconnector Residual Capacity Unit or Battery Storage Unit, in respect of an Imbalance Settlement Period, γ, and where $QAB_{u\gamma}$ and $QAO_{u\gamma}$ is the variable before application of Transmission Losses and Distribution Losses, it shall apply the following calculation:

$$If\ QD_{u\gamma} \geq 0\ then$$

$$QAOLF_{u\gamma} = QAO_{u\gamma} \times FCLAF_{l\gamma}$$

$$QABLF_{u\gamma} = QAB_{u\gamma} \times FCLAF_{l\gamma}$$

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else

$$QAOLF_{u\gamma} = \frac{QAO_{u\gamma}}{FCLAF_{l\gamma}}$$

$$QABLF_{u\gamma} = \frac{QAB_{u\gamma}}{FCLAF_{l\gamma}}$$

where:

(a) *$QD_{l\gamma}$ is the Dispatch Quantity for the Interconnector or Battery Storage Unit, l, in Imbalance Settlement Period, γ;*

(b) *$QAOLF_{uoi\gamma}$ is the Loss-Adjusted Accepted Offer Quantity for Interconnector Residual Capacity Unit or Battery Storage Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;*

(c) *$QABLF_{uoi\gamma}$ is the Loss-Adjusted Accepted Bid Quantity for Interconnector Residual Capacity Unit or Battery Storage Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ; and*

(d) *$FCLAF_{l\gamma}$ is the Combined Loss Adjustment Factor for the relevant Interconnector or Battery Storage Unit, l, in Imbalance Settlement Period, γ, determined under section F.4.2.*

F.4.3.5 Where the Market Operator is required to calculate Loss Adjusted variable gCLF which relates to a Capacity Market Unit related to an Interconnector or Battery Storage Unit, in respect of an Imbalance Settlement Period, y, and where $qC_{u\gamma}$ is the variable before application of Transmission Losses and Distribution Losses, it shall apply the following application:

$$\mathrm{qCLF}_{u\gamma} = \mathrm{qC}_{u\gamma} \times FCLAF_{l\gamma}$$

where:

(a) $qCLF_{\Omega n}$ is the Loss-Adjusted Capacity Quantity to be determined;

(b) qC is the Capacity Quantity for Capacity Market Unit, Ω, for Contract Register Entry, n, determined in accordance with the Capacity Market Code;and

(c) FCLAF$_{l\gamma}$ is the Combined Loss Adjustment Factor for the relevant Interconnector or Battery Storage Unit, l, in Imbalance Settlement Period, γ, determined under section F.4.2.

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F.5 IMBALANCE COMPONENT PAYMENTS AND CHARGES

F.5.1 Setting of Imbalance Payment or Charge Parameters

F.5.1.1 If requested by the Regulatory Authorities, the Market Operator shall report to the Regulatory Authorities proposing the following parameters to be used in the calculation of Imbalance Payments and Charges for that Year:

(a) The value, or description of the methodology for determining the value, of the Imbalance Weighting Factor ($WFIMB_{\gamma}$) in each Imbalance Settlement Period, γ, for Year, y.

F.5.1.2 The Market Operator's report must set out any relevant research or analysis carried out by the Market Operator and the justification for the specific values, or sources for values, or methodology proposed. The report may, and shall if so requested by the Regulatory Authorities, include alternative values or methodologies from those proposed and must set out the arguments for and against such alternatives.

F.5.1.3 The Market Operator shall publish the approved value for, or methodology for determining, the parameter referred to in paragraph F.5.1.1, and the approved date and time on which it comes into effect, within 5 Working Days of receipt of the Regulatory Authorities' determination.

F.5.1.4 The duration of the Aggregated Settlement Period, α, shall be the period determined by the Regulatory Authorities from time to time. The Market Operator shall publish the approved duration of the Aggregated Settlement Period within 5 Working Days of receipt of the Regulatory Authorities' determination.

F.5.1.5 If the Regulatory Authorities determine a revised duration for the Aggregated Settlement Period, α, under paragraph F.5.1.4, the revised duration takes effect at a time specified by the Regulatory Authorities in their determination (which must not be earlier than six Months from the date of the determination).

F.5.2 Calculation of Ex-Ante Quantities

F.5.2.1 When the Aggregated Settlement Period Duration is shorter than or equal to the Imbalance Settlement Period Duration, the provisions in paragraphs F.5.2.2 to F.5.2.4 shall apply.

F.5.2.2 The Market Operator shall calculate the Ex-Ante Quantity (QEX_{γ}) for each Supplier Unit, v, and each Generator Unit, u, other than an Assetless Unit, registered under paragraph B.8.1.2(d) or paragraph B.8.1.2(e) or paragraph B.8.2.3, an Interconnector Error Unit or an Interconnector Residual Capacity Unit, in each Imbalance Settlement Period, γ, as follows:

$$QEX_{\gamma} = \sum_{x}\left(qTDA_{xh} \times Min(DTDA_{x}, DISP)\right) + \sum_{x}\left(qTID_{xh} \times Min(DTID_{x}, DISP)\right)$$

where:

(a) $qTDA_{xh}$ is the Day-ahead Trade Quantity for Trade, x, for Generator Unit, u, or Supplier Unit, v, in Day-ahead Trading Period, h;

(b) $qTID_{xh}$ is the Intraday Trade Quantity for Trade, x, for Generator Unit, u, or Supplier Unit, v, in Intraday Trading Period, h;

(c) DISP is the Imbalance Settlement Period Duration;

(d) $DTDA_x$ is the Day-ahead Trade Duration of Trade, x;

(e) $DTID_x$ is the Intraday Trade Duration of Trade, x; and

(f) $\sum_x$ is a summation over the quantities for each Trade, x, from the day-ahead market or the intraday market, as the case may be within whose Day-ahead Trading Period or Intraday Trading Period, h, as the case may be, the Imbalance Settlement Period, γ, falls in whole or in part.

F.5.2.3 The Market Operator shall calculate the Ex-Ante Quantity (QEX_{lh}) for each Interconnector, l, to be allocated into each Imbalance Settlement Period, γ, as follows:

$$QEX_{l\gamma} = \sum_x \left(qICSDA_{xlh} \times Min(DTDA_x, DISP)\right) + \sum_x \left(qICSID_{xlh} \times Min(DTICIDMIN, DISP)\right)$$

where:

(a) $qICSDA_{xlh}$ is the Day-ahead Interconnector Schedule Quantity for Trade, x, for Interconnector, l, in Day-ahead Trading Period, h;

(b) $qICSID_{xlh}$ is the Intraday Interconnector Schedule Quantity for Trade, x, for Interconnector, l, in Intraday Interconnector Trading Period, h;

(c) $\sum_x$ is a summation over the quantities for each Trade, x, from the day-ahead market or the intraday market, as the case may be within whose Day-ahead Trading Period or Intraday Interconnector Trading Period, h, as the case may be, the Imbalance Settlement Period, γ, falls in whole or in part;

(d) DISP is the Imbalance Settlement Period Duration;

(e) $DTDA_x$ is the Day-ahead Trade Duration of Trade, x; and

(f) DTICIDMIN is the shortest Intraday Interconnector Trade Duration offered in the intraday market.

F.5.2.4 The Market Operator shall calculate the Ex-Ante Quantity ($QEX_{u\gamma}$) for each Generator Unit, u, that is an Interconnector Error Unit or Interconnector Residual Capacity Unit, in each Imbalance Settlement Period, γ, as follows:

$$QEX_{u\gamma} = QEX_{l\gamma}$$

where:

(a) $QEX_{l\gamma}$ is the Ex-Ante Quantity for Interconnector, l, relevant to the Interconnector Error Unit or Interconnector Residual Capacity Unit, u, in Imbalance Settlement Period, γ.

F.5.2.5 When the Aggregated Settlement Period Duration is greater than the Imbalance Settlement Period Duration, the provisions in paragraphs F.5.2.6 to F.5.2.9 shall apply.

F.5.2.6 For Supplier Units, v, or Generator Units, u, other than an Assetless Unit, registered under paragraph B.8.1.2(d) or paragraph B.8.1.2(e) or paragraph B.8.2.3, an Interconnector Error Unit or an Interconnector Residual Capacity Unit, that do not have any Day-ahead Trade Quantities with a Day-ahead Trade Duration, or Intraday Trade Quantities with an Intraday Trade Duration, longer than the Imbalance Settlement Period Duration, the Market Operator shall calculate the Ex-Ante Quantity for each of those Generator Units, u, and each of those Supplier Units, v, in each Imbalance Settlement Period, γ, as follows:

$$QEX_{\gamma} = \sum_{x\ where\ h \leq \gamma} \left(qTDA_{xh} \times Min(DTDA_x, DISP)\right) + \sum_{x\ where\ h \leq \gamma} \left(qTID_{xh} \times Min(DTID_x, DISP)\right)$$

where:

(a) $qTDA_{xh}$ is the Day-ahead Trade Quantity for Trade, x, for Generator Unit, u, or Supplier Unit, v, in Day-ahead Trading Period, h;

(b) $qTID_{xh}$ is the Intraday Trade Quantity for Trade, x, for Generator Unit, u, or Supplier Unit, v, in Intraday Trading Period, h;

(c) DISP is the Imbalance Settlement Period Duration;

(d) $DTDA_x$ is the Day-ahead Trade Duration of Trade, x;

(e) $DTID_x$ is the Intraday Trade Duration of Trade, x; and

(f) $\sum_{x\ where\ h \leq \gamma}$ is a summation over the quantities for each Trade, x, whose Day-ahead Trade Duration or Intraday Trade Duration, as the case may be, was less than or equal to the Imbalance Settlement Period Duration.

F.5.2.7 For Supplier Units, v, or Generator Units, u, other than an Assetless Unit, registered under paragraph B.8.1.2(d) or paragraph B.8.1.2(e) or paragraph B.8.2.3, an Interconnector Error Unit or an Interconnector Residual Capacity Unit, that have any Day-ahead Trade Quantities with a Day-ahead Trade Duration, or Intraday Trade Quantities with an Intraday Trade Duration, longer than the Imbalance Settlement Period Duration:

(a) For each Day-ahead Trade Quantity ($qTDA_{xh}$) which has a Day-ahead Trade Duration, and each Intraday Trade Quantity ($qTID_{xh}$) which has an Intraday Trade Duration, longer than the Aggregated Settlement Period Duration, the Market Operator shall calculate the quantity of each Trade, x, for each Supplier Unit, v, and each Generator Unit, u, to be allocated into each Aggregated Settlement Period, α, as follows:

$$QTDA_{x\alpha} = qTDA_{xh} \times DAGSP$$

$$QTID_{x\alpha} = qTID_{xh} \times DAGSP$$

(b) The Market Operator shall calculate the Ex-Ante Quantity (QEX_γ) for each Supplier Unit, v, and each Generator Unit, u, in each Imbalance Settlement Period, γ, as follows:

$$QEX_\gamma = \left(QMLF_\gamma - \frac{WFIMB_\gamma}{\sum_{all\ \gamma \in \alpha} WFIMB_\gamma} \left(\left(\sum_{all\ \gamma \in \alpha} QMLF_\gamma \right) - \left(\sum_{x\ where\ h = \alpha} QTDA_{xh} + \sum_{x\ where\ h = \alpha} QTID_{xh} \right) \right) \right) + \sum_{x\ where\ h \le \gamma} \left(qTDA_{xh} \times Min(DTDA_x, DISP) \right) + \sum_{x\ where\ h \le \gamma} \left(qTID_{xh} \times Min(DTID_x, DISP) \right)$$

where:

(i) DAGSP is the Aggregated Settlement Period Duration;

(ii) $DTDA_x$ is the Day-ahead Trade Duration of Trade, x;

(iii) $DTID_x$ is the Intraday Trade Duration of Trade, x;

(iv) $QTID_{x\alpha}$ is the Intraday Trade Quantity for Trade, x, for Supplier Unit, v, or Generator Unit, u, in the Aggregated Settlement Period, α, relevant to Trade x;

(v) $qTID_{xh}$ is the Intraday Trade Quantity for Trade, x, for Supplier Unit, v, or Generator Unit, u, in the Intraday Trading Period, h;

(vi) $QTDA_{x\alpha}$ is the Day-ahead Trade Quantity for Trade, x, for Supplier Unit, v, or Generator Unit, u, in the Aggregated Settlement Period, α, relevant to Trade x;

(vii) $qTDA_{xh}$ is the Day-ahead Trade Quantity for Trade, x, for Generator Unit, u, or Supplier Unit, v, in Day-ahead Trading Period, h;

(viii) $WFIMB_\gamma$ is the Imbalance Weighting Factor for Imbalance Settlement Period, γ;

(ix) $QMLF_\gamma$ is the Loss-Adjusted Metered Quantity for Supplier Unit, v, or Generator Unit, u, in Imbalance Settlement Period, γ;

(x) $\sum_{all\ \gamma \in \alpha}$ is a summation over the quantities for each Imbalance Settlement Period, γ, within the Aggregated Settlement Period, α;

(xi) $\sum_{x\ where\ h= \alpha}$ is a summation over the quantities for each Trade, x, from the day-ahead market or the intraday market, as the case may be within whose Day-ahead Trading Period or Intraday Trading Period, h, as the case may be, the Aggregated Settlement Period, α, falls in whole or in part; and whose Day-ahead Trade Duration or Intraday Trade Duration, as the case may be, is no shorter than the Aggregated Settlement Period Duration; and

(xii) $\sum_{x\ where\ h\leq \gamma}$ is a summation over the quantities for each Trades, x, whose Day-ahead Trade Duration or Intraday Trade Duration, as the case may be, was less than or equal to the Imbalance Settlement Period Duration to the extent that the same Trade has not already been included in the summation set out in paragraph F.5.2.7(b)(xi).

F.5.2.8 For Interconnectors, l, that do not have any Day-ahead Interconnector Schedule Quantities with a Day-ahead Trade Duration, or Intraday Interconnector Schedule Quantities with an Intraday Interconnector Trade Duration, longer than the Imbalance Settlement Period Duration, the Market Operator shall calculate the Ex-Ante Quantity for each Generator Unit, u, which is an Interconnector Error Unit and an Interconnector Residual Capacity Unit, relevant to Interconnector, l, in each Imbalance Settlement Period, γ, as follows:

$$QEX_{u\gamma} = \sum_{x} \left(qICSDA_{xlh} \times Min(DTDA_{x}, DISP) \right) + \sum_{x} \left(qICSID_{xlh} \times Min(DTICIDMIN, DISP) \right)$$

where:

(a) $qICSDA_{xlh}$ is the Day-ahead Interconnector Schedule Quantity for Trade, x, for Interconnector, l, relevant to the Interconnector Error Unit or Interconnector Residual Capacity Unit, u, in Day-ahead Trading Period, h;

(b) $qICSID_{xlh}$ is the Intraday Interconnector Schedule Quantity for Trade, x, for Interconnector, l, relevant to the Interconnector Error Unit or Interconnector Residual Capacity Unit, u, in Intraday Interconnector Trading Period, h;

(c) DISP is the Imbalance Settlement Period Duration;

(d) $DTDA_x$ is the Day-ahead Trade Duration of Trade, x;

(e) DTICIDMIN is the shortest Intraday Interconnector Trade Duration offered in the intraday market; and

(f) $\sum_{x}$ is a summation over the quantities for each Trade, x, from the day-ahead market or the intraday market, as the case may be within whose Day-ahead Trading Period or Intraday Interconnector Trading Period, h, as the case may be, the Imbalance Settlement Period, γ, falls in whole or in part.

F.5.2.9 For Interconnectors, l, that have any Day-ahead Interconnector Schedule Quantities with a Day-ahead Trade Duration, or Intraday Interconnector Schedule Quantities with an Intraday Interconnector Trade Duration, longer than the Imbalance Settlement Period Duration:

(a) For each Day-ahead Interconnector Schedule Quantity ($qICSDA_{xlh}$) which has a Day-ahead Trade Duration, and each Intraday Interconnector Schedule Quantity ($qICSID_{xlh}$) which has an Intraday Interconnector Trade Duration, longer than the Aggregated Settlement Period Duration, the Market Operator shall calculate the quantity of each Trade, x, for each Interconnector, l, to be allocated into each Aggregated Settlement Period, α, as follows:

$$QICSDA_{xl\alpha} = qICSDA_{xlh} \times DAGSP$$

$$QICSID_{xl\alpha} = qICSID_{xlh} \times DAGSP$$

(b) The Market Operator shall calculate the Ex-Ante Quantity ($QEX_{u\gamma}$) for each Generator Unit, u, which is an Interconnector Error Unit and an Interconnector Residual Capacity Unit, relevant to Interconnector, l, in each Imbalance Settlement Period, γ, as follows:

$$QEX_{u\gamma} = \left(QMLF_{l\gamma} - \frac{WFIMB_{\gamma}}{\sum_{all\ \gamma \in \alpha} WFIMB_{\gamma}} \left(\left(\sum_{all\ \gamma \in \alpha} QMLF_{l\gamma} \right) - \left(\sum_{x\ where\ h = \alpha} QICSDA_{xlh} + \sum_{x\ where\ h = \alpha} QICSID_{xlh} \right) \right) \right) + \sum_{x\ where\ h \leq \gamma} \left(qICSDA_{xlh} \times Min(DTDA_x, DISP) \right) + \sum_{x\ where\ h \leq \gamma} \left(qICSID_{xlh} \times Min(DTICIDMIN, DISP) \right)$$

where:

(i) $QICSDA_{xh}$ or $qICSDA_{xlh}$ is the Day-ahead Interconnector Schedule Quantity for Trade, x, for Interconnector, l, in Day-ahead Trading Period, h;

(ii) $QICSID_{xlh}$ or $qICSID_{xlh}$ is the Intraday Interconnector Schedule Quantity for Trade, x, for Interconnector, l, in Intraday Interconnector Trading Period, h;

(iii) DAGSP is the Aggregated Settlement Period Duration;

(iv) $DTDA_x$ is the Day-ahead Trade Duration of Trade, x;

(v) DTICIDMIN is the shortest Intraday Interconnector Trade Duration offered in the intraday market;

(vi) $WFIMB_\gamma$ is the Imbalance Weighting Factor for Imbalance Settlement Period, γ;

(vii) $QMLF_{l\gamma}$ is the Loss-Adjusted Metered Quantity for Interconnector, l, in Imbalance Settlement Period, γ;

(viii) $\sum_{all\ \gamma \in \alpha}$ is a summation over the quantities for each Imbalance Settlement Period, γ, within the Aggregated Settlement Period, α;

(ix) $\sum_{x\ where\ h=\alpha}$ is a summation over the quantities for each Trade, x, from the day-ahead market or intraday market, as the case may be, within whose Day-ahead Trading Period or Intraday Interconnector Trading Period, h, as the case may be, the Aggregated Settlement Period, α, falls in whole or in part; and whose Day-ahead Trade Duration or Intraday Interconnector Trade Duration, as the case may be, is no shorter than the Aggregated Settlement Period Duration; and

(x) $\sum_{x\ where\ h\leq\gamma}$ is a summation over the quantities for each Trade, x, whose Day-ahead Trade Duration or Intraday Interconnector Trade Duration, as the case may be, was less than or equal to the Imbalance Settlement Period Duration to the extent that the same Trade has not already been included in the summation set out in paragraph F.5.2.9(b)(ix).

F.5.2.10 The Market Operator shall calculate the Ex-Ante Quantity ($QEX_{u'\gamma}$) for each Assetless Unit, u', registered in respect of a SEM NEMO in accordance with paragraph B.8.1.2(d), in each Imbalance Settlement Period, γ, as follows:

$$QEX_{u\gamma} = \left(\sum_{u \ and \ v \in u'} \left(\sum_x \left(qTDA_{xh} \times Min(DTDA_x, DISP) \right) + \sum_x \left(qTID_{xh} \times Min(DTID_x, DISP) \right) \right) + \sum_{u \in u'} \left(\sum_x \left(qEMADA_{xuh} \times Min(DTDA_x, DISP) \right) + \sum_x \left(qEMAID_{xuh} \times Min(DTICIDMIN, DISP) \right) \right) \right) \times -1$$

where:

(a) $qTDA_{xh}$ is the Day-ahead Trade Quantity for Trade, x, for Generator Unit, u, or Supplier Unit, v, in Day-ahead Trading Period, h;

(b) $qTID_{xh}$ is the Intraday Trade Quantity for Trade, x, for Generator Unit, u, or Supplier Unit, v, in Intraday Trading Period, h;

(c) DISP is the Imbalance Settlement Period Duration;

(d) $DTDA_x$ is the Day-ahead Trade Duration of Trade, x;

(e) $DTID_x$ is the Intraday Trade Duration of Trade, x;

(f) $\sum_x$ is a summation over the quantities for each Trade, x, from the day-ahead market or the intraday market, as the case may be within whose Day-ahead Trading Period, Intraday Interconnector Trading Period, or Intraday Trading Period, h, as the case may be, the Imbalance Settlement Period, γ, falls in whole or in part, submitted in accordance with section F.2.2 by the Scheduling Agent for the Participant, and the Scheduling Agent for the SEM NEMO, represented by Assetless Unit, u';

(g) $qEMADA_{xuh}$ is the Day-ahead Market Area Exchange Quantity for Trade, x, for Assetless Unit, u, registered in accordance with paragraph B.8.1.2(e) in respect of the same SEM NEMO as that represented by the Assetless Unit, u', in Intraday Interconnector Trading Period, h;

(h) $qEMAID_{xuh}$ is the Intraday Market Area Exchange Quantity for Trade, x, for Assetless Unit, u, registered in accordance with paragraph B.8.1.2(e) in respect of the same SEM NEMO as that represented by the Assetless Unit, u', in Intraday Interconnector Trading Period, h;

(i) DTICIDMIN is the shortest Intraday Interconnector Trade Duration offered in the intraday market;

(j) $\sum_{u\ and\ v\ \in u'}$ is a summation over all Generator Units, u, excluding Interconnector Residual Capacity Units or Interconnector Error Units, and Supplier Units, v, registered in respect of all Participants for whom the Assetless Unit, u', is registered in respect of the SEM NEMO which acts as a Scheduling Agent which submits Contracted Quantities for that Participant in accordance with section F.2.2; and

(k) $\sum_{u\ \in u'}$ is a summation over all Assetless Units, u, registered in accordance with paragraph B.8.1.2(e) in respect of the same SEM NEMO as that represented by the Assetless Unit, u'.

F.5.2.11 For the purposes of further uses in this code, Ex-Ante Quantities (QEX_γ and $QEX_{u'\gamma}$) calculated in section F.5.2 shall be read as $QEX_{u\gamma}$ where they relate to quantities for a Generator Unit, and be read as $QEX_{v\gamma}$ where they relate to quantities for a Supplier Unit.

F.5.3 Calculation of Imbalance Component Payments and Charges

F.5.3.1 Except as provided in paragraph F.5.3.3, the Market Operator shall calculate the Imbalance Component Payment or Charge ($CIMB_{u\gamma}$) for each Generator Unit (other than an Interconnector Error Unit or an Interconnector Residual Capacity Unit), u, in each Imbalance Settlement Period, γ, as follows:

$$CIMB_{u\gamma} = PIMB_{\gamma} \times \left(QMLF_{u\gamma} - QEX_{u\gamma}\right)$$

where:

(a) $PIMB_{\gamma}$ is the Imbalance Settlement Price in Imbalance Settlement Period, γ, calculated in accordance with Chapter E (Imbalance Pricing);

(b) $QMLF_{u\gamma}$ is the Loss-Adjusted Metered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ; and

(c) $QEX_{u\gamma}$ is the Ex-Ante Quantity for Generator Unit, u, in Imbalance Settlement Period, γ.

F.5.3.2 The Market Operator shall calculate the Imbalance Component Payment or Charge ($CIMB_{v\gamma}$) for each Supplier Unit, v, in Imbalance Settlement Period, γ, as follows:

$\text{if } (\text{SSPFvy} = 0, \text{then}$

$CIMB_{v\gamma} = PIMB_{\gamma} \times \left(QMLF_{v\gamma} - QEX_{v\gamma}\right)$

Else

$CIMB\,v\gamma = 0)$

where:

(a) $SSPF_{v\gamma}$ is the DS3 System Service Provider Flag for Supplier Unit, v, in Imbalance Settlement Period, γ.

(b) $PIMB_{\gamma}$ is the Imbalance Settlement Price in Imbalance Settlement Period, γ, calculated in accordance with Chapter E (Imbalance Pricing);

(c) $QMLF_{v\gamma}$ is the Loss-Adjusted Metered Quantity for Supplier Unit, v, in Imbalance Settlement Period, γ; and

(d) $QEX_{v\gamma}$ is the Ex-Ante Quantity for Supplier Unit, v, in Imbalance Settlement Period, γ.

F.5.3.3 The Market Operator shall calculate the Imbalance Component Payment or Charge ($CIMB_{u\gamma}$) for each Pumped Storage Unit ~~or Battery Storage Unit~~, u, in each Imbalance Settlement Period, γ, for which it is in Pumping Mode (as determined in paragraph F.2.1.3) ~~or in Charging Mode (as determined in paragraph F.2.1.4)~~, as the case may be, as follows:

$$CIMB_{u\gamma} = PIMB_{\gamma} \times \left(\sum_{o}\sum_{i}\left(QAOLF_{uoi\gamma} - Max\left(QAOBIAS_{uoi\gamma}, QAOUNDEL_{uoi\gamma}\right)\right) + \sum_{o}\sum_{i}\left(QABLF_{uoi\gamma} - Min\left(QABBIAS_{uoi\gamma}, QABUNDEL_{uoi\gamma}\right)\right)\right)$$

where:

(a) $PIMB_{\gamma}$ is the Imbalance Settlement Price in Imbalance Settlement Period, γ, calculated in accordance with Chapter E (Imbalance Pricing);

(b) $\sum_o$ is a summation over all Bid Offer Acceptances, o;

(c) $\sum_i$ is a summation over all Bands, i;

(d) $QAOLF_{uoi\gamma}$ is the Loss-Adjusted Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;

(e) $QABLF_{uoi\gamma}$ is the Loss-Adjusted Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;

(f) $QAOUNDEL_{uoi\gamma}$ is the Undelivered Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;

(g) $QABUNDEL_{uoi\gamma}$ is the Undelivered Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;

(h) $QAOBIAS_{uoi\gamma}$ is the Biased Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ; and

(i) $QABBIAS_{uoi\gamma}$ is the Biased Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ.

F.5.3.4 The Market Operator shall calculate the Imbalance Component Payment or Charge ($CIMB_{u\gamma}$) for each Interconnector Residual Capacity Unit, u, in each Imbalance Settlement Period, γ, as follows:

$$CIMB_{u\gamma} = PIMB_{\gamma} \times \left(\sum_{o} \sum_{i} \left(QAOLF_{uoi\gamma} \right) + \sum_{o} \sum_{i} \left(QABLF_{uoi\gamma} \right) \right)$$

where:

(a) $PIMB_{\gamma}$ is the Imbalance Settlement Price in Imbalance Settlement Period, γ, calculated in accordance with Chapter E (Imbalance Pricing);

(b) $\sum_o$ is a summation over all Bid Offer Acceptances, o;

(c) $\sum_i$ is a summation over all Bands, i;

(d) $QAOLF_{uoi\gamma}$ is the Loss-Adjusted Accepted Offer Quantity for Interconnector Residual Capacity Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ; and

(e) $QABLF_{uoi\gamma}$ is the Loss-Adjusted Accepted Bid Quantity for Interconnector Residual Capacity Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ.

F.5.3.5 The Market Operator shall calculate the Imbalance Component Payment or Charge ($CIMB_{u\gamma}$) for each Interconnector Error Unit, u, in each Imbalance Settlement Period, γ, as follows:

$$CIMB_{u\gamma} = PIMB_{\gamma} \times \left(QMLF_{u\gamma} - QEX_{u\gamma} - \left(\sum_{o} \sum_{i} \left(QAOLF_{uoi\gamma} \right) + \sum_{o} \sum_{i} \left(QABLF_{uoi\gamma} \right) \right) \right)$$

where:

(a) $PIMB_{\gamma}$ is the Imbalance Settlement Price in Imbalance Settlement Period, γ, calculated in accordance with Chapter E (Imbalance Pricing);

(b) $\sum_{o}$ is a summation over all Bid Offer Acceptances, o;

(c) $\sum_{i}$ is a summation over all Bands, i;

(d) $QMLF_{u\gamma}$ is the Loss-Adjusted Metered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(e) $QEX_{u\gamma}$ is the Ex-Ante Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(f) $QAOLF_{uoi\gamma}$ is the Loss-Adjusted Accepted Offer Quantity for Interconnector Residual Capacity Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ; and

(g) $QABLF_{uoi\gamma}$ is the Loss-Adjusted Accepted Bid Quantity for Interconnector Residual Capacity Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ.

F.6 PREMIUM AND DISCOUNT COMPONENT QUANTITIES AND PAYMENTS

F.6.1 Application to Imbalance Settlement Period and Imbalance Pricing Period

F.6.1.1 The provisions in sections F.6.2 and F.6.3 are applied to two different timeframes. For the purposes of calculating the Imbalance Price applicable to an Imbalance Pricing Period in accordance with Chapter E (Imbalance Pricing), sections F.6.2 and F.6.3 are applied using the Imbalance Pricing Period, φ, instead of the generalised Period, h. For the purposes of calculating the settlement quantities applicable to an Imbalance Settlement Period, sections F.6.2 and F.6.3 are applied using the Imbalance Settlement Period, γ, instead of the generalised Period, h.

F.6.1.2 The provisions in this Chapter shall be based on the data available to the Market Operator at the time of applying those provisions to the Imbalance Pricing Period in calculating the Imbalance Price, or the time of applying those provisions to the Imbalance Settlement Period in calculating the settlement quantities, as applicable.

F.6.2 Calculation of Accepted Bid Quantities and Accepted Offer Quantities

F.6.2.1 The Market Operator shall calculate the Accepted Offer Quantities and Accepted Bid Quantities for the purposes of the Imbalance Pricing process and for the purposes of the Settlement process, as set out in paragraphs F.6.2.2 to F.6.2.7, except in the case of an Interconnector Error Unit or an Interconnector Residual Capacity Unit, where the relevant System Operator shall submit those values under paragraph F.2.4.8.

F.6.2.2 The Market Operator shall calculate two values for the Accepted Bid Offer Quantity ($qBOA_{uoih}(t)$) as a function of time, for each Generator Unit, u, for each Bid Offer

Acceptance, o, for each Band, i, in Period, h, calculating separately one value for all Incs resulting from the Bid Offer Acceptance and one value for all Decs resulting from the Bid Offer Acceptance, as follows:

(a) For i > 0:

$$qBOA_{uoih}(t) = Max\{Min\{qDA_{uoh}(t), qBOUR_{uih}(t)\}, qBOUR_{u(i-1)h}(t)\} - Max\{Min\{qDA_{u(o-1)h}(t), qBOUR_{uih}(t)\}, qBOUR_{u(i-1)h}(t)\}$$

(b) For i < 0:

$$qBOA_{uoih}(t) = Min\{Max\{qDA_{uoh}(t), qBOLR_{uih}(t)\}, qBOLR_{u(i+1)h}(t)\} - Min\{Max\{qDA_{u(o-1)h}(t), qBOLR_{uih}(t)\}, qBOLR_{u(i+1)h}(t)\}$$

F.6.2.3 When calculating the value for the Accepted Bid Offer Quantity ($qBOA_{uoih}(t)$) for the Incs resulting from the Bid Offer Acceptance, the Market Operator shall calculate the relevant variables as follows:

$$qDA_{uoh}(t) = Max\left(qD_{uoh}(t), qDA_{u(o-1)h}(t)\right)$$

$$qDA_{u(o-1)h}(t) = Max(qD_{u(o-1)h}(t), qMINOUT_{uh}(t))$$

$$qD_{u(o=0)h}(t) = qFPN_{uh}(t)$$

$$qBOUR_{u(i=0)h}(t) = 0$$

$$qBOLR_{u(i=0)h}(t) = 0$$

F.6.2.4 When calculating the value for the Accepted Bid Offer Quantity ($qBOA_{uoih}(t)$) for the Decs resulting from the Bid Offer Acceptance, the Market Operator shall calculate the relevant variables as follows:

$$qDA_{uoh}(t) = Min\left(qD_{uoh}(t), qDA_{u(o-1)h}(t)\right)$$

$$qDA_{u(o-1)h}(t) = Min\left(qD_{u(o-1)h}(t), qAVAILO_{uh}(t)\right)$$

$$qD_{u(o=0)h}(t) = qFPN_{uh}(t)$$

$$qBOUR_{u(i=0)h}(t) = 0$$

$$qBOLR_{u(i=0)h}(t) = 0$$

F.6.2.5 For the purposes of paragraphs F.6.2.2 to F.6.2.4:

(a) $qD_{uoh}(t)$ is the Dispatch Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, in Period, h;

(b) $qDA_{uoh}(t)$ is the Adjusted Dispatch Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, in Period, h;

(c) $qBOUR_{uih}(t)$ is the Bid Offer Upper Range Quantity as a function of time for Generator Unit, u, for Band, i, in Period, h;

(d) $qBOLR_{uih}(t)$ is the Bid Offer Lower Range Quantity as a function of time for Generator Unit, u, for Band, i, in Period, h;

(e) $qFPN_{uh}(t)$ is the Final Physical Notification Quantity as a function of time for Generator Unit, u, in Period, h;

(f) $qAVAILO_{uh}(t)$ is the Outturn Availability Quantity as a function of time for Generator Unit, u, in Period, h;

(g) (o – 1) is for the previous Bid Offer Acceptance in respect of the same Period, h;

(h) (i – 1) is for the previous Band when considering Bands in the positive direction (i > 0);

(i) (i + 1) is for the previous Band when considering Bands in the negative direction (i < 0); ~~and~~

(j) (o = 0) or (i = 0) is for the 0th value for the relevant aspect (i.e. the implicit default value before an explicit Bid Offer Acceptance, o; the value for Band, i, where i = 0) ; and

~~(j)~~(k) ~~.~~ $qMINOUT_{uh}(t)$ is the Outturn Minimum Output Quantity as a function of time for Generator Unit, u, in Period, h.

F.6.2.6 The Market Operator shall calculate the Accepted Offer Quantity ($qAO_{uoih}(t)$) as a function of time, and the Accepted Bid Quantity ($qAB_{uoih}(t)$) as a function of time, for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Period, h, separately for the Incs and Decs, as follows:

$$qAO_{uoih}(t) = Max(qBOA_{uoih}(t)\ for\ Incs, 0)$$

$$qAB_{uoih}(t) = Min(qBOA_{uoih}(t)\ for\ Decs, 0)$$

where:

(a) $qBOA_{uoih}(t)$ is the Accepted Bid Offer Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Period, h.

F.6.2.7 The Market Operator shall calculate the Accepted Offer Quantity (QAO_{uoih}) and the Accepted Bid Quantity (QAB_{uoih}) for Generator Unit u, in period h, by integrating the associated function of time Accepted Offer Quantity ($qAO_{uoih}(t)$) and Accepted Bid Quantity ($qAB_{uoih}(t)$) with respect to time across the Period, h.

F.6.3 **Determination of Accepted Bid and Accepted Offer Prices**

F.6.3.1 Except in the case of an Interconnector Error Unit or an Interconnector Residual Capacity Unit, the Bid Offer Price (PBO_{uoih}) for each Accepted Bid Quantity and each Accepted Offer Quantity shall be:

(a) For each Accepted Offer Quantity, QAO_{uoih}, the Incremental Price in the Band, i, provided in the relevant Commercial Offer Data set as determined in sections **Error! Reference source not found.** and **Error! Reference source not found.**; and

(b) For each Accepted Bid Quantity, QAB_{uoih}, the Decremental Price in the Band, i, provided in the relevant Commercial Offer Data set as determined in sections **Error! Reference source not found.** and **Error! Reference source not found.**.

F.6.3.2 The Bid Offer Price (PBO_{uoih}) for each Accepted Bid Quantity and Accepted Offer Quantity, for each Bid Offer Acceptance, o, relevant to an Interconnector Residual Capacity Unit, u, shall be the values submitted by the System Operator for the relevant Interconnector, l, in accordance with paragraph F.2.4.8.

F.6.4 **Calculation of Trade in the Opposite Direction to the TSO Quantities**

F.6.4.1 The following provisions of section F.6.4 do not apply to an Interconnector Error Unit or Interconnector Residual Capacity Unit.

F.6.4.2 Where the Regulatory Authorities have given notice to the Market Operator of a requirement to include $QAOTOTSO_{uoiγ}$ and $QABTOTSO_{uoiγ}$ in the calculation of Premium and Discount Component Payments, the Market Operator shall, from the time the notice takes effect, calculate $QAOTOTSO_{uoiγ}$ and $QABTOTSO_{uoiγ}$ in accordance with the procedure set out in paragraphs F.6.4.6 to F.6.4.12.

F.6.4.3 Where the Regulatory Authorities have not given a notice under paragraph F.6.4.2, or have withdrawn a notice under that paragraph, the Market Operator shall set the values of $QAOTOTSO_{uoiγ}$ and $QABTOTSO_{uoiγ}$ to zero.

F.6.4.4 A notice under paragraph F.6.4.2, or a withdrawal under that paragraph, shall take effect at the beginning of the Settlement Day which is the later of:

(a) That specified in the notice or withdrawal; and

(b) The expiration of two months after the notice was received by the Market Operator.

F.6.4.5 Following receipt of a notice or withdrawal of a notice by the Regulatory Authorities under paragraph F.6.4.2, the Market Operator shall promptly publish such notice or notice of withdrawal.

F.6.4.6 The Market Operator shall calculate two values for the Without Trade Opposite TSO Accepted Bid Offer Quantity ($qBOAWTOTSO_{uoiγ}(t)$) as a function of time, for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Period, h, calculating separately one value for all Incs resulting from the Bid Offer Acceptance and one value for all Decs resulting from the Bid Offer Acceptance, as follows:

(a) For i > 0:

$$qBOAWTOTSO_{uoiγ}(t) = Max\{Min\{qDA_{uoγ}(t), qBOUR_{uiγ}(t)\}, qBOUR_{u(i-1)γ}(t)\} - Max\{Min\{qDA_{u(o-1)γ}(t), qBOUR_{uiγ}(t)\}, qBOUR_{u(i-1)γ}(t)\}$$

(b) For i < 0:

$$qBOAWTOTSO_{uoiγ}(t) = Min\{Max\{qDA_{uoγ}(t), qBOLR_{uiγ}(t)\}, qBOLR_{u(i+1)γ}(t)\} - Min\{Max\{qDA_{u(o-1)γ}(t), qBOLR_{uiγ}(t)\}, qBOLR_{u(i+1)γ}(t)\}$$

F.6.4.7 When calculating the value for the Without Trade Opposite TSO Accepted Bid Offer Quantity ($qBOAWTOTSO_{uoiγ}(t)$) for the Incs resulting from the Bid Offer Acceptance, the Market Operator shall calculate the relevant variables as follows:

$$qDA_{uoγ}(t) = Max\left(qD_{uoγ}(t), qDA_{u(o-1)γ}(t)\right)$$

$$qDA_{u(o-1)γ}(t) = qDAWTOTSO_{u(o-1)γ}(t)$$

$$If\ qD_{uoγ}(t) \geq qPN_{uoγ}(t), then$$

$$qDAWTOTSO_{u(o-1)γ}(t) = Max\left(qD_{u(o-1)γ}(t), qPN_{uoγ}(t), qMINOUT_{uγ}(t)\right)$$

$$else$$

$$qDAWTOTSO_{u(o-1)γ}(t) = qD_{u(o-1)γ}(t)$$

$$qD_{u(o=0)γ}(t) = qDWTOTSO_{u(o=0)γ}(t)$$

$$If\ qD_{uoγ}(t) \geq qPN_{uoγ}(t), then$$

$$qDWTOTSO_{u(o=0)γ}(t) = Max\left(qPN_{uoγ}(t), qFPN_{uγ}(t)\right)$$

$$else$$

$$qDWTOTSO_{u(o=0)\gamma}(t) = qFPN_{u\gamma}(t)$$

$$qPN_{u(o=0)\gamma}(t) = 0$$

$$qBOUR_{u(i=0)\gamma}(t) = 0$$

$$qBOLR_{u(i=0)\gamma}(t) = 0$$

F.6.4.8 When calculating the value for the Without Trade Opposite TSO Accepted Bid Offer Quantity ($qBOAWTOTSO_{uoi\gamma}(t)$) for the Decs resulting from the Bid Offer Acceptance, the Market Operator shall calculate the relevant variables as follows:

$$qDA_{uo\gamma}(t) = Min\left(qD_{uo\gamma}(t), qDA_{u(o-1)\gamma}(t)\right)$$

$$qDA_{u(o-1)\gamma}(t) = qDAWTOTSO_{u(o-1)\gamma}(t)$$

$$If\ qD_{uo\gamma}(t) \leq\ qPN_{uo\gamma}(t), then$$

$$qDAWTOTSO_{u(o-1)\gamma}(t) = Min\left(qD_{u(o-1)\gamma}(t), qPN_{uo\gamma}(t), qAVAILO_{u\gamma}(t)\right)$$

$$else$$

$$qDAWTOTSO_{u(o-1)\gamma}(t) =\ Min\left(qD_{u(o-1)\gamma}(t), qAVAILO_{u\gamma}(t)\right)$$

$$qD_{u(o=0)\gamma}(t) = qDWTOTSO_{u(o=0)\gamma}(t)$$

$$If\ qD_{uo\gamma}(t) \leq qPN_{uo\gamma}(t), then$$

$$qDWTOTSO_{u(o=0)\gamma}(t) = Min\left(qPN_{uo\gamma}(t), qFPN_{u\gamma}(t)\right)$$

$$else$$

$$qDWTOTSO_{u(o=0)\gamma}(t) =\ qFPN_{u\gamma}(t)$$

$$qPN_{u(o=0)\gamma}(t) = 0$$

$$qBOUR_{u(i=0)\gamma}(t) = 0$$

$$qBOLR_{u(i=0)\gamma}(t) = 0$$

F.6.4.9 For the purposes of paragraphs F.6.4.6 to F.6.4.8:

(a) $qD_{uoy}(t)$ is the Dispatch Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, in Imbalance Settlement Period, γ;

(b) $qDA_{uoy}(t)$ is the Adjusted Dispatch Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, in Imbalance Settlement Period, γ;

(c) $qDWTOTSO_{uoy}(t)$ is the Without Trade Opposite TSO Dispatch Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, in Imbalance Settlement Period, γ;

(d) $qDAWTOTSO_{uoy}(t)$ is the Without Trade Opposite TSO Adjusted Dispatch Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, in Imbalance Settlement Period, γ;

(e) $qBOUR_{uiy}(t)$ is the Bid Offer Upper Range Quantity as a function of time for Generator Unit, u, for Band, i, in Imbalance Settlement Period, γ;

(f) $qBOLR_{uiy}(t)$ is the Bid Offer Lower Range Quantity as a function of time for Generator Unit, u, for Band, i, in Imbalance Settlement Period, γ;

(g) $qFPN_{uy}(t)$ is the Final Physical Notification Quantity as a function of time for Generator Unit, u, in Imbalance Settlement Period, γ;

(h) $qPN_{uoy}(t)$ is the Physical Notification Quantity as a function of time for Generator Unit, u, being the last valid Physical Notification Quantity submitted by the relevant Participant before the Bid Offer Acceptance Time of Bid Offer Acceptance, o, in Imbalance Settlement Period, γ;

(i) $qAVAILO_{uy}(t)$ is the Outturn Availability Quantity as a function of time for Generator Unit, u, in Imbalance Settlement Period, γ;

(j) (o – 1) is for the previous Bid Offer Acceptance in respect of the same Imbalance Settlement Period;

(k) (i – 1) is for the previous Band when considering Bands in the positive direction (i > 0);

(l) (i + 1) is for the previous Band when considering Bands in the negative direction (i < 0); ~~and~~

(m) (o = 0) or (i = 0) is for the 0^{th} value for the relevant aspect (i.e. the implicit default value before an explicit Bid Offer Acceptance, o; the value for Band, i, where i = 0) ; and~~.~~

~~(m)~~(n) $qMINOUT_{uy}(t)$ is the Outturn Minimum Output Quantity as a function of time for Generator Unit, u, in Imbalance Settlement Period, γ.

F.6.4.10 The Market Operator shall calculate the Without Trade Opposite TSO Accepted Offer Quantity ($qAOWTOTSO_{uoiy}(t)$) as a function of time, and the Without Trade Opposite TSO Accepted Bid Quantity ($qABWTOTSO_{uoiy}(t)$) as a function of time, for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

$$qAOWTOTSO_{uoiy}(t) = Max\left(qBOAWTOTSO_{uoiy}(t)\ for\ Incs, 0\right)$$

$$qABWTOTSO_{uoi\gamma}(t) = Min\left(qBOAWTOTSO_{uoi\gamma}(t)\ for\ Decs, 0\right)$$

where:

(a) $qBOAWTOTSO_{uoi\gamma}(t)$ is the Without Trade Opposite TSO Accepted Bid Offer Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ.

F.6.4.11 The Market Operator shall calculate the Trade Opposite TSO Accepted Offer Quantity ($qAOTOTSO_{uoi\gamma}(t)$) as a function of time, and the Trade Opposite TSO Accepted Bid Quantity ($qABTOTSO_{uoi\gamma}(t)$) as a function of time, for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

$$qAOTOTSO_{uoi\gamma}(t) = Max\left(qAO_{uoi\gamma}(t) - qAOWTOTSO_{uoi\gamma}(t), 0\right)$$

$$qABTOTSO_{uoi\gamma}(t) = Min\left(qAB_{uoi\gamma}(t) - qABWTOTSO_{uoi\gamma}(t), 0\right)$$

where:

(a) $qAO_{uoi\gamma}(t)$ is the Accepted Offer Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;

(b) $qAB_{uoi\gamma}(t)$ is the Accepted Bid Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;

(c) $qAOWTOTSO_{uoi\gamma}(t)$ is the Without Trade Opposite TSO Accepted Offer Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ; and

(d) $qABWTOTSO_{uoi\gamma}(t)$ is the Without Trade Opposite TSO Accepted Bid Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ.

F.6.4.12 The Market Operator shall calculate the Trade Opposite TSO Accepted Offer Quantity ($QAOTOTSO_{uoi\gamma}$), and the Trade Opposite TSO Accepted Bid Quantity ($QABTOTSO_{uoi\gamma}$), for Generator Unit u, for the Imbalance Settlement Period, γ, by integrating the associated function of time quantities Trade Opposite TSO Accepted Offer Quantity ($qAOTOTSO_{uoi\gamma}(t)$) and Trade Opposite TSO Accepted Bid Quantity ($qABTOTSO_{uoi\gamma}(t)$) with respect to time across the Imbalance Settlement Period, γ.

F.6.5 **Calculation of Non-Firm Decremental Quantities**

F.6.5.1 The following provisions of section F.6.5 do not apply to an Interconnector Error Unit or Interconnector Residual Capacity Unit.

F.6.5.2 The Market Operator shall determine the Firm Access Quantity ($qFAQ_{u\gamma}(t)$) as a function of time for each Generator Unit, u, in Trading Site, s, with Non-Firm Access in Imbalance Settlement Period, γ, as follows:

$$QFPNNF_{s\gamma} = Max\left(\sum_{u \in s} QFPN_{u\gamma} + \sum_{v \in s} QM_{v\gamma} - \left(qFAQ_{s\gamma} \times DISP\right), 0\right)$$

$$If \sum_{u \in s}\sum_{o}\sum_{i} QAB_{uoi\gamma} < 0, then$$

$$qFAQ_{u\gamma}(t) = \frac{Max\left(QFPN_{u\gamma} - QFPNNF_{s\gamma}\left(\frac{\sum_o \sum_i QAB_{uoi\gamma}}{\sum_{u \in s}\sum_o \sum_i QAB_{uoi\gamma}}\right), 0\right)}{DISP}$$

$$Else$$

$$qFAQ_{u\gamma}(t) = \frac{QFPN_{u\gamma}}{DISP}$$

where:

(a) $QFPNNF_{s\gamma}$ is the Non-Firm Final Physical Notification Quantity for Trading Site, s, in Imbalance Settlement Period, γ;

(b) $QFPN_{u\gamma}$ is the Final Physical Notification Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(c) $QM_{v\gamma}$ is the Metered Quantity for Supplier Unit, v, in Imbalance Settlement Period, γ;

(d) $QFAQ_{s\gamma}$ is the Firm Access Quantity for Trading Site, s, in Imbalance Settlement Period, γ;

(e) $QAB_{uoi\gamma}$ is the Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;

(f) $\sum_o$ is a summation over all Bid Offer Acceptances, o;

(g) $\sum_i$ is a summation over all Bands, i;

(h) $\sum_{u \in s}$ is a summation over all Generator Units, u, in Trading Site, s;

(i) $\sum_{v \in s}$ is the value for the single Trading Site Supplier Unit, v, in Trading Site, s, in accordance with paragraph B.9.1.2; and

(j) DISP is the Imbalance Settlement Period Duration.

F.6.5.3 The Market Operator shall calculate the value of the Non-Firm Accepted Bid Offer Quantity ($qBOANF_{uoi\gamma}(t)$) as a function of time, for each Generator Unit, u, for all Decs resulting from each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

(a) For i > 0:

$$qBOANF_{uoi\gamma}(t) = Max\{Min\{qDA_{uo\gamma}(t), qBOUR_{ui\gamma}(t)\}, qBOUR_{u(i-1)\gamma}(t)\} - Max\{Min\{qDA_{u(o-1)\gamma}(t), qBOUR_{ui\gamma}(t)\}, qBOUR_{u(i-1)\gamma}(t)\}$$

(b) For i < 0:

$$qBOANF_{uoi\gamma}(t) = Min\{Max\{qDA_{uo\gamma}(t), qBOLR_{ui\gamma}(t)\}, qBOLR_{u(i+1)\gamma}(t)\} - Min\{Max\{qDA_{u(o-1)\gamma}(t), qBOLR_{ui\gamma}(t)\}, qBOLR_{u(i+1)\gamma}(t)\}$$

F.6.5.4 When calculating the value for the $qBOANF_{uoi\gamma}(t)$, the Market Operator shall calculate the relevant variables as follows:

$$qDA_{uo\gamma}(t) = qDANF_{uo\gamma}(t)$$

$$qDANF_{uo\gamma}(t) = Min\left(Max\left(qD_{uo\gamma}(t), qFAQ_{u\gamma}(t)\right), qDA_{u(o-1)\gamma}(t)\right)$$

$$qDA_{u(o-1)\gamma}(t) = Min\left(qD_{u(o-1)\gamma}(t), qAVAILO_{u\gamma}(t)\right)$$

$$qD_{u(o=0)\gamma}(t) = qFPN_{u\gamma}(t)$$

$$qBOUR_{u(i=0)\gamma}(t) = 0$$

$$qBOLR_{u(i=0)\gamma}(t) = 0$$

F.6.5.5 For the purposes of paragraphs F.6.5.2 to F.6.5.4:

(a) $qD_{uo\gamma}(t)$ is the Dispatch Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, in Imbalance Settlement Period, γ;

(b) $qDA_{uo\gamma}(t)$ is the Adjusted Dispatch Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, in Imbalance Settlement Period, γ;

(c) $qDANF_{uo\gamma}(t)$ is the Non-Firm Adjusted Dispatch Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, in Imbalance Settlement Period, γ;

(d) $qFAQ_{u\gamma}(t)$ is the Firm Access Quantity as a function of time for Generator Unit, u, in Imbalance Settlement Period, γ;

(e) $qBOUR_{ui\gamma}(t)$ is the Bid Offer Upper Range Quantity as a function of time for Generator Unit, u, for Band, i, in Imbalance Settlement Period, γ;

(f) $qBOLR_{ui\gamma}(t)$ is the Bid Offer Lower Range Quantity as a function of time for Generator Unit, u, for Band, i, in Imbalance Settlement Period, γ;

(g) $qFPN_{u\gamma}(t)$ is the Final Physical Notification Quantity as a function of time for Generator Unit, u, in Imbalance Settlement Period, γ;

(h) $qAVAILO_{u\gamma}(t)$ is the Outturn Availability Quantity as a function of time for Generator Unit, u, in Imbalance Settlement Period, γ;

(i) (o – 1) is for the previous Bid Offer Acceptance in respect of the same Imbalance Settlement Period;

(j) (i – 1) is for the previous Band when considering Bands in the positive direction (i > 0);

(k) (i + 1) is for the previous Band when considering Bands in the negative direction (i < 0); and

(l) (o = 0) or (i = 0) is for the 0^{th} value for the relevant aspect (i.e. the implicit default value before an explicit Bid Offer Acceptance, o; the value for Band, i, where i = 0).

F.6.5.6 The Market Operator shall calculate the Non-Firm Accepted Bid Quantity ($qABNF_{uoi\gamma}(t)$) as a function of time, for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

$$qABNF_{uoi\gamma}(t) = Min\left(qBOANF_{uoi\gamma}(t)\ ,0\right)$$

where:

(a) $qBOANF_{uoi\gamma}(t)$ is the Non-Firm Accepted Bid Offer Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ.

F.6.5.7 The Market Operator shall calculate the Non-Firm Accepted Bid Quantity ($QABNF_{uoi\gamma}$) as an integrated quantity for the Imbalance Settlement Period γ, for Generator Unit u, for Bid Offer Acceptance, o, for Band, i, for the Imbalance Settlement Period, γ, by integrating the associated function of time the quantity Non-Firm Accepted Bid Quantity ($qABNF_{uoi\gamma}(t)$) with respect to time across the Imbalance Settlement Period, γ.

F.6.6 **Calculation of Undelivered Quantities**

F.6.6.1 The following provisions of section F.6.6 do not apply to an Interconnector Error Unit.

F.6.6.2 The Market Operator shall calculate the Undelivered Quantity ($QUNDEL_{u\gamma}$) for each Generator Unit, u, in Imbalance Settlement Period, γ, as follows:

$$QUNDEL_{u\gamma} = QMLF_{u\gamma} - QDLF_{u\gamma}$$

where:

(a) $QMLF_{u\gamma}$ is the Loss-Adjusted Metered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ; and

(b) $QDLF_{u\gamma}$ is the Loss-Adjusted Dispatch Quantity for the Generator Unit, u, in Imbalance Settlement Period, γ.

F.6.6.3 Where the Undelivered Quantity has a positive value, the Market Operator shall determine which of the Accepted Bid Quantities were not delivered, in whole or in part, for each Generator Unit, u, in Imbalance Settlement Period, γ, in accordance with paragraphs F.6.6.4 to F.6.6.6.

F.6.6.4 The Market Operator shall derive a ranked set of all Accepted Bid Quantities for Generator Unit, u, in Imbalance Settlement Period, γ, in order of increasing price. The Accepted Bid Quantity with the lowest price shall be allocated a position number k = 1, the next lowest priced Accepted Bid Quantity a position number k = 2 and so on until all Accepted Bid Quantities have been allocated a position number. Where two or more Accepted Bid Quantities have equal prices, they shall be ranked using a systematic process of random selection which may include making small alterations to the submitted prices. Any such amended prices shall only be used for this purpose in the ranking process.

F.6.6.5 The Market Operator shall calculate the Undelivered Accepted Bid Quantity ($QABUNDEL_{uoi\gamma k}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in ascending order of each position, k, in the ranked set, in Imbalance Settlement Period, γ, as follows:

$$QABUNDEL_{uoi\gamma k} = Min\left(Max\left(QABLF_{uoi\gamma k}, -QUNDELR_{u\gamma(k-1)}\right), 0\right)$$

$$QUNDELR_{u\gamma k} = QUNDELR_{u\gamma(k-1)} + QABUNDEL_{uoi\gamma k}$$

$$QUNDELR_{u\gamma(k=0)} = QUNDEL_{u\gamma}$$

where:

(a) $QABLF_{uoi\gamma k}$ is the Loss-Adjusted Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in the position, k, in the ranked set, in Imbalance Settlement Period, γ;

(b) $QUNDELR_{u\gamma k}$ is the Remaining Undelivered Quantity for Generator Unit, u, for the calculations in the position, k, in the ranked set, in Imbalance Settlement Period, γ;

(c) $QUNDEL_{u\gamma}$ is the Undelivered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(d) (k – 1) is for the previous position in the ranked set; and

(e) (k = 0) is for the 0^{th} position in the ranked set, i.e. where a calculation is being performed on the first position in the ranked set, (k = 1), for which there is no previous position.

F.6.6.6 The Market Operator shall calculate the Undelivered Accepted Bid Quantity ($QABUNDEL_{uoiγ}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

$$QABUNDEL_{uoiγ} = QABUNDEL_{uoiγk}$$

where:

(a) $QABUNDEL_{uoiγk}$ is the Undelivered Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in the position, k, in the ranked set, in Imbalance Settlement Period, γ.

F.6.6.7 Where the Undelivered Quantity has a negative value, the Market Operator shall determine which of the Accepted Offer Quantities were not delivered, in whole or in part, for each Generator Unit, u, in Imbalance Settlement Period, γ, in accordance with paragraphs F.6.6.8 to F.6.6.10.

F.6.6.8 The Market Operator shall derive a ranked set of all Accepted Offer Quantities for Generator Unit, u, in Imbalance Settlement Period, γ, in order of decreasing price. The Accepted Offer Quantity with the highest price shall be allocated a position number k = 1, the next highest priced Accepted Offer Quantity a position number n = 2 and so on until all Accepted Offer Quantities have been allocated a position number. Where two or more Accepted Offer Quantities have equal prices, they shall be ranked using a systematic process of random selection which may include making small alterations to the submitted prices. Any such amended prices shall only be used for this purpose in the ranking process.

F.6.6.9 The Market Operator shall calculate the Undelivered Accepted Offer Quantity ($QAOUNDEL_{uoiγk}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in ascending order of each position, k, in the ranked set, in Imbalance Settlement Period, γ, as follows:

$$QAOUNDEL_{uoiγk} = Max\left(Min\left(QAOLF_{uoiγk}, -QUNDELR_{uγ(k-1)}\right), 0\right)$$

$$QUNDELR_{uγk} = QUNDELR_{uγ(k-1)} + QAOUNDEL_{uoiγk}$$

$$QUNDELR_{uγ(k=0)} = QUNDEL_{uγ}$$

where:

(a) $QAOLF_{uoiγk}$ is the Loss-Adjusted Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in the position, k, in the ranked set, in Imbalance Settlement Period, γ;

(b) $QUNDELR_{uγk}$ is the Remaining Undelivered Quantity for Generator Unit, u, for the calculations in the position, k, in the ranked set, in Imbalance Settlement Period, γ;

(c) $QUNDEL_{u\gamma}$ is the Undelivered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(d) (k – 1) is for the previous position in the ranked set; and

(e) (k = 0) is for the 0th position in the ranked set, i.e. where a calculation is being performed on the first position in the ranked set, (k = 1), for which there is no previous position.

F.6.6.10 The Market Operator shall calculate the Undelivered Accepted Offer Quantity ($QAOUNDEL_{uoi\gamma}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

$$QAOUNDEL_{uoi\gamma} = QAOUNDEL_{uoi\gamma k}$$

where:

(a) $QAOUNDEL_{uoi\gamma k}$ is the Undelivered Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in the position, k. in the ranked set, in Imbalance Settlement Period, γ.

F.6.7 **Calculation of Biased Quantities**

F.6.7.1 The following provisions of section F.6.7 do not apply to any Generator Unit which is registered as part of an Autoproducer Site.

F.6.7.2 The following provisions of section F.6.7 do not apply to an Interconnector Error Unit.

F.6.7.3 The Market Operator shall calculate the Biased Quantity ($QBIAS_{u\gamma}$) for each Generator Unit, u, in Imbalance Settlement Period, γ, as follows:

$$QBIAS_{u\gamma} = QEX_{u\gamma} - QFPNLF_{u\gamma}$$

where:

(a) $QEX_{u\gamma}$ is the Ex-Ante Quantity for Generator Unit, u, in Imbalance Settlement Period, γ, as calculated under section F.5.2; and

(b) $QFPNLF_{u\gamma}$ is the Loss-Adjusted Final Physical Notification Quantity for the Generator Unit, u, in Imbalance Settlement Period, γ.

F.6.7.4 Where the Biased Quantity has a positive value, the Market Operator shall determine which of the Accepted Offer Quantities were biased, in whole or in part, for each Generator Unit, u, in Imbalance Settlement Period, γ, in accordance with paragraphs F.6.7.5 to F.6.7.7.

F.6.7.5 The Market Operator shall derive a ranked set of all Accepted Offer Quantities for Generator Unit, u, in Imbalance Settlement Period, γ, in order of increasing price. The Accepted Offer Quantity with the lowest price shall be allocated a position number k = 1, the next lowest priced Accepted Offer Quantity a position number k = 2 and so on until all Accepted Offer Quantities have been allocated a position number. Where two or more Accepted Offer Quantities have equal prices, they shall be ranked using a

systematic process of random selection which may include making small alterations to the submitted prices. Any such amended prices shall only be used for this purpose in the ranking process.

F.6.7.6 The Market Operator shall calculate the Biased Accepted Offer Quantity ($QAOBIAS_{uoi\gamma k}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in ascending order of each position, k, in the ranked set, in Imbalance Settlement Period, γ, as follows:

$$QAOBIAS_{uoi\gamma k} = Max\left(Min\left(QAOLF_{uoi\gamma k}, QBIASR_{u\gamma(k-1)}\right), 0\right)$$

$$QBIASR_{u\gamma k} = QBIASR_{u\gamma(k-1)} - QAOBIAS_{uoi\gamma k}$$

$$QBIASR_{u\gamma(k=0)} = QBIAS_{u\gamma}$$

where:

(a) $QAOLF_{uoi\gamma k}$ is the Loss-Adjusted Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in the position, k, in the ranked set, in Imbalance Settlement Period, γ;

(b) $QBIASR_{u\gamma k}$ is the Remaining Biased Quantity for Generator Unit, u, for the calculations in the position, k, in the ranked set, in Imbalance Settlement Period, γ;

(c) $QBIAS_{u\gamma}$ is the Biased Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(d) (k – 1) is for the previous position in the ranked set; and

(e) (k = 0) is for the 0th position in the ranked set, i.e. where a calculation is being performed on the first position in the ranked set, (k = 1), for which there is no previous position.

F.6.7.7 The Market Operator shall calculate the Biased Accepted Offer Quantity ($QAOBIAS_{uoi\gamma}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

$$QAOBIAS_{uoi\gamma} = QAOBIAS_{uoi\gamma k}$$

where:

(a) $QAOBIAS_{uoi\gamma k}$ is the Biased Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in the position, k, in the ranked set, in Imbalance Settlement Period, γ.

F.6.7.8 Where the Biased Quantity has a negative value, the Market Operator shall determine which of the Accepted Bid Quantities were biased, in whole or in part, for each

Generator Unit, u, in Imbalance Settlement Period, γ, in accordance with paragraphs F.6.7.9 to F.6.7.11.

F.6.7.9 The Market Operator shall derive a ranked set of all Accepted Bid Quantities for Generator Unit, u, in Imbalance Settlement Period, γ, in order of decreasing price. The Accepted Bid Quantity with the highest price shall be allocated a position number k = 1, the next highest priced Accepted Bid Quantity a position number k = 2 and so on until all Accepted Bid Quantities have been allocated a position number. Where two or more Accepted Bid Quantities have equal prices, they shall be ranked using a systematic process of random selection which may include making small alterations to the submitted prices. Any such amended prices shall only be used for this purpose in the ranking process.

F.6.7.10 The Market Operator shall calculate the Biased Accepted Bid Quantity ($QABBIAS_{uoi\gamma k}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in ascending order of each position, k, in the ranked set, in Imbalance Settlement Period, γ, as follows:

$$QABBIAS_{uoi\gamma k} = Min\left(Max\left(QABLF_{uoi\gamma k}, QBIASR_{u\gamma(k-1)}\right), 0\right)$$

$$QBIASR_{u\gamma k} = QBIASR_{u\gamma(k-1)} - QABBIAS_{uoi\gamma k}$$

$$QBIASR_{u\gamma(k=0)} = QBIAS_{u\gamma}$$

where:

(a) $QABLF_{uoi\gamma k}$ is the Loss-Adjusted Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in the position, k, in the ranked set, in Imbalance Settlement Period, γ;

(b) $QBIASR_{u\gamma k}$ is the Remaining Biased Quantity for Generator Unit, u, for the calculations in the position, k, in the ranked set, in Imbalance Settlement Period, γ;

(c) $QBIAS_{u\gamma}$ is the Biased Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(d) (k – 1) is for the previous position in the ranked set; and

(e) (k = 0) is for the 0^{th} position in the ranked set, i.e. where a calculation is being performed on the first position in the ranked set, (k = 1), for which there is no previous position.

F.6.7.11 The Market Operator shall calculate the Biased Accepted Bid Quantity ($QABBIAS_{uoi\gamma}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

$$QABBIAS_{uoi\gamma} = QABBIAS_{uoi\gamma k}$$

where:

(a) $QABBIAS_{uoi\gamma k}$ is the Biased Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in the position, k, in the ranked set, in Imbalance Settlement Period, γ.

F.6.8 **Calculation of Premium and Discount Component Payments**

F.6.8.1 Paragraph F.6.8.2 does not apply to any Unit which is:

(a) An Assetless Unit;

(b) A Trading Unit; or

(c) A Generator Unit which is not Dispatchable and not Controllable.

F.6.8.2 The Market Operator shall calculate Premium and Discount Component Payments for each Generator Unit, u, and each Imbalance Settlement Period, γ, as follows:

$$CPREMIUM_{u\gamma} = \sum_{o}\sum_{i}\Big(Max\big(PBO_{uoi\gamma} - PIMB_{\gamma}, 0\big) \times \Big(QAOLF_{uoi\gamma} - Max\big(QAOOPOLF_{uoi\gamma}, QAOBIAS_{uoi\gamma}, QAOUNDEL_{uoi\gamma}, QAOTOTSOLF_{uoi\gamma}\big)\Big)\Big)$$

$$CDISCOUNT_{u\gamma} = \sum_{o}\sum_{i}\Big(Min\big(PBO_{uoi\gamma} - PIMB_{\gamma}, 0\big) \times \Big(QABLF_{uoi\gamma} - Min\big(QABBPOLF_{uoi\gamma}, QABBIAS_{uoi\gamma}, QABUNDEL_{uoi\gamma}, QABNFLF_{uoi\gamma}, QABCURLLF_{uoi\gamma}, QABTOTSOLF_{uoi\gamma}\big)\Big)\Big)$$

where:

(a) $PIMB_{\gamma}$ is the Imbalance Settlement Price in Imbalance Settlement Period, γ, calculated in accordance with Chapter E (Imbalance Pricing);

(b) $PBO_{uoi\gamma}$ is the Bid Offer Price for each Accepted Bid Quantity and Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, determined in accordance with section F.6.3;

(c) $\sum_o$ is a summation over all Bid Offer Acceptances, o;

(d) $\sum_i$ is a summation over all Bands, i;

(e) $QAOLF_{uoi\gamma}$ is the Loss-Adjusted Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, calculated in accordance with section F.6.1;

(f) $QABLF_{uoi\gamma}$ is the Loss-Adjusted Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, calculated in accordance with section F.6.1;

(g) $QAOTOTSOLF_{uoi\gamma}$ is the Loss-Adjusted Trade Opposite TSO Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, calculated in accordance with section F.6.4;

(h) $QABTOTSOLF_{uoi\gamma}$ is the Loss-Adjusted Trade Opposite TSO Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, calculated in accordance with section F.6.4;

(i) $QABNFLF_{uoi\gamma}$ is the Loss-Adjusted Non-Firm Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, calculated in accordance with section F.6.5;

(j) $QAOUNDEL_{uoi\gamma}$ is the Undelivered Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, calculated in accordance with section F.6.6;

(k) $QABUNDEL_{uoi\gamma}$ is the Undelivered Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, calculated in accordance with section F.6.6;

(l) $QAOBIAS_{uoi\gamma}$ is the Biased Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, calculated in accordance with section F.6.7;

(m) $QABBIAS_{uoi\gamma}$ is the Biased Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, calculated in accordance with section F.6.7;

(n) $QABCURLLF_{uoi\gamma}$ is the Loss-Adjusted Curtailment Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, calculated in accordance with section **Error! Reference source not found.**;

(o) $QAOOPOLF_{uoi\gamma}$ is the Loss-Adjusted Offer Price Only Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, calculated in accordance with section F.7.1; and

(p) $QABBPOLF_{uoi\gamma}$ is the Loss-Adjusted Bid Price Only Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ, calculated in accordance with section F.7.1.

F.7 ACCEPTED OFFERS BELOW PHYSICAL NOTIFICATION, AND ACCEPTED BIDS ABOVE PHYSICAL NOTIFICATION, QUANTITIES, PAYMENTS AND CHARGES

F.7.1 Calculation of Accepted Offers Below Physical Notification and Accepted Bids Above Physical Notification Quantities

F.7.1.1 The following provisions of section F.7 do not apply to any Unit which is:

(a) An Assetless Unit;

(b) A Trading Unit;

(c) An Interconnector Error Unit;

(d) An Interconnector Residual Capacity Unit; or

(e) A Generator Unit which is not Dispatchable and not Controllable.

F.7.1.2 The Market Operator shall calculate two values for the Price Only Accepted Bid Offer Quantity ($qBOAPO_{uoi\gamma}(t)$) as a function of time, for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, calculating separately one value for all Incs resulting from the Bid Offer Acceptance and one value for all Decs resulting from the Bid Offer Acceptance as follows:

(a) For i > 0:

$$qBOAPO_{uoi\gamma}(t) = Max\{Min\{qDA_{uo\gamma}(t), qBOUR_{ui\gamma}(t)\}, qBOUR_{u(i-1)\gamma}(t)\} - Max\{Min\{qDA_{u(o-1)\gamma}(t), qBOUR_{ui\gamma}(t)\}, qBOUR_{u(i-1)\gamma}(t)\}$$

(b) For i < 0:

$$qBOAPO_{uoi\gamma}(t) = Min\{Max\{qDA_{uo\gamma}(t), qBOLR_{ui\gamma}(t)\}, qBOLR_{u(i+1)\gamma}(t)\} - Min\{Max\{qDA_{u(o-1)\gamma}(t), qBOLR_{ui\gamma}(t)\}, qBOLR_{u(i+1)\gamma}(t)\}$$

F.7.1.3 When calculating the value for the Price Only Accepted Bid Offer Quantity ($qBOAPO_{uoi\gamma}(t)$) for the Incs resulting from the Bid Offer Acceptance, the Market Operator shall calculate the relevant variables as follows:

$$qDA_{uo\gamma}(t) = qDAPO_{uo\gamma}(t)$$

$$qDAPO_{uo\gamma}(t) = Min\left(Max\left(qD_{uo\gamma}(t),\ qDA_{u(o-1)\gamma}(t)\right), qFPN_{u\gamma}(t)\right)$$

$$qDA_{u(o-1)\gamma}(t) = Max(qD_{u(o-1)\gamma}(t), qMINOUT_{u\gamma}(t))$$

$$qD_{u(o=0)\gamma}(t) = qFPN_{u\gamma}(t)$$

$$qBOUR_{u(i=0)\gamma}(t) = 0$$

$$qBOLR_{u(i=0)\gamma}(t) = 0$$

F.7.1.4 When calculating the value for the Price Only Accepted Bid Offer Quantity ($qBOAPO_{uoi\gamma}(t)$) for the Decs resulting from the Bid Offer Acceptance, the Market Operator shall calculate the relevant variables as follows:

$$qDA_{uo\gamma}(t) = qDAPO_{uo\gamma}(t)$$

$$qDAPO_{uo\gamma}(t) = Max\left(Min\left(qD_{uo\gamma}(t),\ qDA_{u(o-1)\gamma}(t)\right), qFPN_{u\gamma}(t)\right)$$

$$qDA_{u(o-1)\gamma}(t) = Min\left(qD_{u(o-1)\gamma}(t), qAVAILO_{u\gamma}(t)\right)$$

$$qD_{u(o=0)\gamma}(t) = qFPN_{u\gamma}(t)$$

$$qBOUR_{u(i=0)\gamma}(t) = 0$$

$$qBOLR_{u(i=0)\gamma}(t) = 0$$

F.7.1.5 For the purposes of paragraphs F.7.1.2 to F.7.1.4:

(a) $qD_{uo\gamma}(t)$ is the Dispatch Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, in Imbalance Settlement Period, γ;

(b) $qDA_{uo\gamma}(t)$ is the Adjusted Dispatch Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, in Imbalance Settlement Period, γ;

(c) $qDAPO_{uo\gamma}(t)$ is the Price Only Adjusted Dispatch Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, in Imbalance Settlement Period, γ;

(d) $qBOUR_{ui\gamma}(t)$ is the Bid Offer Upper Range Quantity as a function of time for Generator Unit, u, for Band, i, in Imbalance Settlement Period, γ;

(e) $qBOLR_{ui\gamma}(t)$ is the Bid Offer Lower Range Quantity as a function of time for Generator Unit, u, for Band, i, in Imbalance Settlement Period, γ;

(f) $qFPN_{u\gamma}(t)$ is the Final Physical Notification Quantity as a function of time for Generator Unit, u, in Imbalance Settlement Period, γ;

(g) $qAVAILO_{u\gamma}(t)$ is the Outturn Availability Quantity as a function of time for Generator Unit, u, in Imbalance Settlement Period, γ;

(h) (o – 1) is for the previous Bid Offer Acceptance in respect of the same Imbalance Settlement Period;

(i) (i – 1) is for the previous Band when considering Bands in the positive direction (i > 0);

(j) (i + 1) is for the previous Band when considering Bands in the negative direction (i < 0); ~~and~~

(k) (o = 0) or (i = 0) is for the 0th value for the relevant aspect (i.e. the implicit default value before an explicit Bid Offer Acceptance, o; the value for Band, i, where i = 0); and

~~(k)~~(l) ~~.~~ $qMINOUT_{uy}(t)$ is the Outturn Minimum Output Quantity as a function of time for Generator Unit, u, in Imbalance Settlement Period, ɣ.

F.7.1.6 The Market Operator shall calculate the Offer Price Only Accepted Offer Quantity ($qAOOPO_{uoiɣ}(t)$) as a function of time, and the Bid Price Only Accepted Bid Quantity ($qABBPO_{uoiɣ}(t)$) as a function of time, for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, ɣ, as follows:

$$qAOOPO_{uoi\gamma}(t) = Max\left(qBOAPO_{uoi\gamma}(t)\ for\ Incs, 0\right)$$

$$qABBPO_{uoi\gamma}(t) = Min\left(qBOAPO_{uoi\gamma}(t)\ for\ Decs, 0\right)$$

where:

(a) $qBOAPO_{uoiɣ}(t)$ is the Price Only Accepted Bid Offer Quantity as a function of time for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, ɣ.

F.7.1.7 The Market Operator shall calculate the Offer Price Only Accepted Offer Quantity ($QAOOPO_{uoiɣ}$) as an integrated period quantity, and the Bid Price Only Accepted Bid Quantity ($QABBPO_{uoiɣ}$) for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, ɣ, by integrating the associated function of time Offer Price Only Accepted Offer Quantity ($qAOOPO_{uoiɣ}(t)$) and Bid Price Only Accepted Bid Quantity $qABBPO_{uoiɣ}(t)$) over the Imbalance Settlement Period, ɣ.

F.7.2 **Calculation of Accepted Offers Below Physical Notification and Accepted Bids Above Physical Notification Payments and Charges**

F.7.2.1 The Market Operator shall calculate the Offer Price Only Accepted Offer Payment or Charge ($CAOOPO_{uɣ}$) and the Bid Price Only Accepted Bid Payment or Charge ($CABBPO_{uɣ}$) for each Generator Unit, u, in each Imbalance Settlement Period, ɣ, as follows:

$$CAOOPO_{u\gamma} = \sum_{o}\sum_{i}\Big(\left(PBO_{uoi\gamma} - PIMB_{\gamma}\right) \times Max\left(QAOOPOLF_{uoi\gamma} - QAOUNDEL_{uoi\gamma}, 0\right)\Big)$$

$$CABBPO_{u\gamma} = \sum_{o}\sum_{i}\Big(\left(PBO_{uoi\gamma} - PIMB_{\gamma}\right) \times Min\left(QABBPOLF_{uoi\gamma} - Min\left(QABCURLLF_{uoi\gamma}, QABUNDEL_{uoi\gamma}\right), 0\right)\Big)$$

where:

(a) $PIMB_{\gamma}$ is the Imbalance Settlement Price in Imbalance Settlement Period, γ, calculated in accordance with Chapter E (Imbalance Pricing);

(b) $PBO_{uoi\gamma}$ is the Bid Offer Price for each Accepted Bid Quantity and Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;

(c) $\sum_o$ is a summation over all Bid Offer Acceptances, o;

(d) $\sum_i$ is a summation over all Bands, i;

(e) $QAOOPOLF_{uoi\gamma}$ is the Loss-Adjusted Offer Price Only Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;

(f) $QABBPOLF_{uoi\gamma}$ is the Loss-Adjusted Bid Price Only Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;

(g) $QAOUNDEL_{uoi\gamma}$ is the Undelivered Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;

(h) $QABCURLLF_{uoi\gamma}$ is the Loss-Adjusted Curtailment Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ; and

(i) $QABUNDEL_{uoi\gamma}$ is the Undelivered Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ.

F.9 UNINSTRUCTED IMBALANCE QUANTITIES AND CHARGES

F.9.1 Setting of Uninstructed Imbalance Parameters

F.9.1.1 The following provisions of section F.9 do not apply to any Unit which is:

(a) An Assetless Unit;

(b) A Trading Unit;

(c) A Generator Unit which is not Dispatchable and not Controllable; or

(d) An Interconnector Residual Capacity Unit.

F.9.1.2 If requested by the Regulatory Authorities, the System Operators shall report to the Regulatory Authorities at least four months before the start of the Year, proposing values for the following parameters to be used in the calculation of Uninstructed Imbalances for that Year:

(a) The Engineering Tolerance (TOLENG) (where $0 \leq TOLENG \leq 1$);

(b) The MW Tolerance ($TOLMW_t$) (where $0 \leq TOLMW_t$) for each Trading Day, t;

(c) The System per Unit Regulation Factor (FUREG);

(d) The Discount for Over Generation Factor ($FDOG_{u\gamma}$) for each Generator Unit, u, in each Imbalance Settlement Period, γ, such that $0 \leq FDOG_{u\gamma} \leq 1$; and

(e) The Premium for Under Generation Factor ($FPUG_{u\gamma}$) for each Generator Unit, u, in each Imbalance Settlement Period, γ, such that $0 \leq FPUG_{u\gamma} \leq 1$.

F.9.1.3 The System Operators' report must set out any relevant research or analysis carried out by the System Operators and any justification for the specific values proposed. The report may, and shall if so requested by the Regulatory Authorities, include alternative values from those proposed and must set out the arguments for and against such alternatives.

F.9.1.4 The System Operators shall, in accordance with Appendix K "Other Market Data Transactions", provide to the Market Operator at least two months prior to the start of each Year or within 5 Working Days of receipt of approval by the Regulatory Authorities, whichever is the later, the Uninstructed Imbalance Parameters Data Transaction, which comprises a complete set of Uninstructed Imbalance Parameters that have been approved by the Regulatory Authorities for that Year.

F.9.1.5 The Market Operator shall publish the approved value(s) for each Uninstructed Imbalance Parameter within 5 Working Days of receipt of the Regulatory Authorities' determination or two months before the start of the Year to which they shall apply, whichever is the later.

F.9.2 **Calculation of Uninstructed Imbalance Tolerance Quantities**

F.9.2.1 The following provisions of section F.9.2 do not apply to any Unit which is an Interconnector Error Unit.

F.9.2.2 For each Trading Day, each System Operator shall submit to the Market Operator the System Characteristics Data, consisting of values of Nominal System Frequency ($FRQNOR_{\gamma}$) and Average System Frequency ($FRQAVG_{\gamma}$) for each Imbalance Settlement Period, γ, in that Trading Day, in accordance with Appendix K "Other Market Data Transactions".

F.9.2.3 The Market Operator shall calculate the Tolerance Bands for over generation and under generation for each Generator Unit for each Imbalance Settlement Period with reference to system frequency and the frequency characteristics of the Generator Unit in accordance with paragraphs F.9.2.4 and F.9.2.5.

F.9.2.4 The Market Operator shall calculate the Engineering Limit Quantity ($qLIMENG_{u\gamma}$) for each Generator Unit, u, in each Imbalance Settlement Period, γ, as follows:

$$qLIMENG_{u\gamma} = Max\left(\left|\frac{QD_{u\gamma}}{DISP}\right| \times TOLENG, TOLMW_t\right)$$

where:

(a) $QD_{u\gamma}$ is the Dispatch Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(b) TOLENG is the Engineering Tolerance;

(c) DISP is the Imbalance Settlement Period Duration; and

(d) $TOLMW_t$ is the MW Tolerance for the relevant Imbalance Settlement Period, γ, within Trading Day, t.

F.9.2.5 The Market Operator shall calculate the Tolerance for Over Generation ($TOLOG_{u\gamma}$) and Tolerance for Under Generation ($TOLUG_{u\gamma}$) as positive values, expressed in MW, for each Generator Unit, u, in each Imbalance Settlement Period, γ, as follows:

$$If\ FRQAVG_{\gamma} \leq FRQNOR_{\gamma}, then$$

$$TOLOG_{u\gamma} = \left(\frac{\left(FRQNOR_{\gamma} - FRQAVG_{\gamma}\right) \times qCR_{u}}{FUREG \times FRQNOR_{\gamma}}\right) + qLIMENG_{u\gamma}$$

$$TOLUG_{u\gamma} = qLIMENG_{u\gamma}$$

$$else$$

$$TOLOG_{u\gamma} = qLIMENG_{u\gamma}$$

$$TOLUG_{u\gamma} = \left(\frac{\left(FRQAVG_{\gamma} - FRQNOR_{\gamma}\right) \times qCR_{u}}{FUREG \times FRQNOR_{\gamma}}\right) + qLIMENG_{u\gamma}$$

where:

(a) $FRQAVG_{\gamma}$ is the Average System Frequency in Imbalance Settlement Period, γ;

(b) $FRQNOR_{\gamma}$ is the Nominal System Frequency in Imbalance Settlement Period, γ;

(c) qCR_{u} is the Registered Capacity of Generator Unit, u;

(d) FUREG is the System per Unit Regulation Factor; and

(e) $qLIMENG_{u\gamma}$ is the Engineering Limit Quantity for Generator Unit, u, in Imbalance Settlement Period, γ.

F.9.3 **Calculation of Uninstructed Imbalance Quantities**

F.9.3.1 The following provisions of F.9.3 do not apply to any Unit which is an Interconnector Error Unit.

F.9.3.2 The Market Operator shall calculate the Outside Tolerance Undelivered Quantity ($QUNDELOTOL_{u\gamma}$) for each Generator Unit, u, in Imbalance Settlement Period, γ, as follows:

$$If\ \left(QMLF_{u\gamma} - QDLF_{u\gamma}\right) < 0, then$$

$$QUNDELOTOL_{u\gamma} = Min\left(\left(QMLF_{u\gamma} - QDLF_{u\gamma}\right) + \left(TOLUGLF_{u\gamma} \times DISP\right), 0\right)$$

$$If\ \left(QMLF_{u\gamma} - QDLF_{u\gamma}\right) > 0, then$$

$$QUNDELOTOL_{u\gamma} = Max\left(\left(QMLF_{u\gamma} - QDLF_{u\gamma}\right) - \left(TOLOGLF_{u\gamma} \times DISP\right), 0\right)$$

where:

(a) $QMLF_{u\gamma}$ is the Loss-Adjusted Metered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(b) $QDLF_{u\gamma}$ is the Loss-Adjusted Dispatch Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(c) $TOLUGLF_{u\gamma}$ is the Loss-Adjusted Tolerance for Under Generation for Generator Unit, u, in Imbalance Settlement Period, γ;

(d) $TOLOGLF_{u\gamma}$ is the Loss-Adjusted Tolerance for Over Generation for Generator Unit, u, in Imbalance Settlement Period, γ; and

(e) DISP is the Imbalance Settlement Period Duration

F.9.3.3 Where the Outside Tolerance Undelivered Quantity has a positive value, the Market Operator shall determine which of the Undelivered Accepted Bid Quantities were outside of tolerance, in whole or in part, for each Generator Unit, u, in Imbalance Settlement Period, γ, in accordance with paragraphs F.9.3.4 to F.9.3.7.

F.9.3.4 The Market Operator shall derive a ranked set of all Undelivered Accepted Bid Quantities for Generator Unit, u, in Imbalance Settlement Period, γ, in order of increasing price. The Undelivered Accepted Bid Quantity with the lowest price shall be allocated a position number k = 1, the next lowest priced Undelivered Accepted Bid Quantity a position number k = 2 and so on until all Undelivered Accepted Bid Quantities have been allocated a position number. Where two or more Undelivered Accepted Bid Quantities have equal prices, they shall be ranked using a systematic process of random selection which may include making small alterations to the submitted prices. Any such amended prices shall only be used for this purpose in the ranking process.

F.9.3.5 The Market Operator shall calculate the Outside Tolerance Undelivered Accepted Bid Quantity ($QABUNDELOTOL_{uoi\gamma k}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in ascending order of each position, k, in the ranked set, in Imbalance Settlement Period, γ, as follows:

$$QABUNDELOTOL_{uoi\gamma k} = Min\left(Max\left(QABUNDEL_{uoi\gamma k}, -QUNDELOTOLR_{u\gamma(k-1)}\right), 0\right)$$

$$QUNDELOTOLR_{u\gamma k} = QUNDELOTOLR_{u\gamma(k-1)} + QABUNDELOTOL_{uoi\gamma k}$$

$$QUNDELOTOLR_{u\gamma(k=0)} = QUNDELOTOL_{u\gamma}$$

where:

(a) $QABUNDEL_{uoi\gamma k}$ is the Undelivered Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in the position, k, in the ranked set, in Imbalance Settlement Period, γ;

(b) $QUNDELOTOLR_{u\gamma k}$ is the Remaining Outside Tolerance Undelivered Quantity for Generator Unit, u, for the calculations in the position, k, in the ranked set, in Imbalance Settlement Period, γ;

(c) $QUNDELOTOL_{u\gamma}$ is the Outside Tolerance Undelivered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(d) (k – 1) is for the previous position in the ranked set; and

(e) (k = 0) is for the 0th position in the ranked set, i.e. where a calculation is being performed on the first position in the ranked set, (k= 1), for which there is no previous position.

F.9.3.6 The Market Operator shall calculate the Outside Tolerance Undelivered Accepted Bid Quantity ($QABUNDELOTOL_{uoi\gamma}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

$$QABUNDELOTOL_{uoi\gamma} = QABUNDELOTOL_{uoi\gamma k}$$

where:

(a) $QABUNDELOTOL_{uoi\gamma k}$ is the Outside Tolerance Undelivered Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in the position, k, in the ranked set, in Imbalance Settlement Period, γ.

F.9.3.7 The Market Operator shall determine the Outside Tolerance Undelivered Accepted Offer Quantity ($QAOUNDELOTOL_{uoi\gamma}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

$$QAOUNDELOTOL_{uoi\gamma} = 0$$

F.9.3.8 Where the Outside Tolerance Undelivered Quantity has a negative value, the Market Operator shall determine which of the Undelivered Accepted Offer Quantities were outside of tolerance, in whole or in part, for each Generator Unit, u, in Imbalance Settlement Period, γ, in accordance with paragraphs F.9.3.9 to F.9.3.12.

F.9.3.9 The Market Operator shall derive a ranked set of all Undelivered Accepted Offer Quantities for Generator Unit, u, in Imbalance Settlement Period, γ, in order of decreasing price. The Undelivered Accepted Offer Quantity with the highest price shall be allocated a position number k = 1, the next highest priced Undelivered Accepted Offer Quantity a position number k = 2 and so on until all Undelivered Accepted Offer Quantities have been allocated a position number. Where two or more Undelivered Accepted Offer Quantities have equal prices, they shall be ranked using a systematic process of random selection which may include making small alterations to the submitted prices. Any such amended prices shall only be used for this purpose in the ranking process.

F.9.3.10 The Market Operator shall calculate the Outside Tolerance Undelivered Accepted Offer Quantity ($QAOUNDELOTOL_{uoi\gamma k}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in ascending order of each position, k, in the ranked set, in Imbalance Settlement Period, γ, as follows:

$$QAOUNDELOTOL_{uoi\gamma k} = Max\left(Min\left(QAOUNDEL_{uoi\gamma k}, -QUNDELOTOLR_{u\gamma(k-1)}\right), 0\right)$$

$$QUNDELOTOLR_{u\gamma k} = QUNDELOTOLR_{u\gamma(k-1)} + QAOUNDELOTOL_{uoi\gamma k}$$

$$QUNDELOTOLR_{u\gamma(k=0)} = QUNDELOTOL_{u\gamma}$$

where:

(a) $QAOUNDEL_{uoi\gamma k}$ is the Undelivered Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in the position, k, in the ranked set, in Imbalance Settlement Period, γ;

(b) $QUNDELOTOLR_{u\gamma k}$ is the Remaining Outside Tolerance Undelivered Quantity for Generator Unit, u, for the calculations in the position, k, in the ranked set, in Imbalance Settlement Period, γ;

(c) $QUNDELOTOL_{u\gamma}$ is the Outside Tolerance Undelivered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ;

(d) (k – 1) is for the previous position in the ranked set; and

(e) (k = 0) is for the 0^{th} position in the ranked set, i.e. where a calculation is being performed on the first position in the ranked set, (k = 1), for which there is no previous position.

F.9.3.11 The Market Operator shall calculate the Outside Tolerance Undelivered Accepted Offer Quantity ($QAOUNDELOTOL_{uoi\gamma}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

$$QAOUNDELOTOL_{uoi\gamma} = QAOUNDELOTOL_{uoi\gamma k}$$

where:

(a) $QAOUNDELOTOL_{uoi\gamma k}$ is the Outside Tolerance Undelivered Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in the position, k, in the ranked set, in Imbalance Settlement Period, γ.

F.9.3.12 The Market Operator shall determine Outside Tolerance Undelivered Accepted Bid Quantity ($QABUNDELOTOL_{uoi\gamma}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

$$QABUNDELOTOL_{uoi\gamma} = 0$$

F.9.3.13 Where the Outside Tolerance Undelivered Quantity has a zero value, the Market Operator shall determine the Outside Tolerance Undelivered Accepted Offer Quantity ($QAOUNDELOTOL_{uoi\gamma}$) and Outside Tolerance Undelivered Accepted Bid Quantity ($QABUNDELOTOL_{uoi\gamma n}$) for each Generator Unit, u, for each Bid Offer Acceptance, o, for each Band, i, in Imbalance Settlement Period, γ, as follows:

$$QAOUNDELOTOL_{uoi\gamma} = 0$$

$$QABUNDELOTOL_{uoi\gamma} = 0$$

F.9.3.14 The price for each Outside Tolerance Undelivered Accepted Offer Quantity and Outside Tolerance Undelivered Accepted Bid Quantity ($PBO_{uoi\gamma}$) shall be the same as the price for the Accepted Bid Quantity and Accepted Offer Quantity to which they are related through belonging to the same Generator Unit, u, and Bid Offer Acceptance, o, and Band, i, and Imbalance Settlement Period, γ.

F.9.4 **Calculation of Uninstructed Imbalance Charges**

F.9.4.1 Subject to paragraph F.9.4.2, the Market Operator shall calculate the Uninstructed Imbalance Charge ($CUNIMB_{u\gamma}$) for each Generator Unit, u, in each Imbalance Settlement Period, γ, as follows:

$$If\ PBOuoi\gamma\ -\ PIMB\gamma\ \neq\ 0, then$$

$$CUNIMBA_{uoi\gamma} = \left(FDOG_{u\gamma} \times \left(\frac{Min\left(\left(PBO_{uoi\gamma} - PIMB_{\gamma} \right), 0 \right)}{PBO_{uoi\gamma} - PIMB_{\gamma}} \right) \times \left(\left(|PBO_{uoi\gamma}| - |PIMB_{\gamma}| \right) \times \left(QABUNDELOTOL_{uoi\gamma} \right) \right) \right) + \left(-FPUG_{u\gamma} \times \left(\frac{Max\left(\left(PBO_{uoi\gamma} - PIMB_{\gamma} \right), 0 \right)}{PBO_{uoi\gamma} - PIMB_{\gamma}} \right) \times \left(\left(|PBO_{uoi\gamma}| - |PIMB_{\gamma}| \right) \times \left(QAOUNDELOTOL_{uoi\gamma} \right) \right) \right)$$

$$CUNIMB_{u\gamma} = Min\left(QUNDELOTOL_{u\gamma}, 0 \right) \times \left(\left(FPUG_{u\gamma} \times |PIMB_{\gamma}| \right) \right) + Max\left(QUNDELOTOL_{u\gamma}, 0 \right) \times \left(-\left(FDOG_{u\gamma} \times |PIMB_{\gamma}| \right) \right) + \sum_{o} \sum_{i} CUNIMBA_{uoi\gamma}$$

$$If\ PBOuoi\gamma\ -\ PIMB\gamma\ =\ 0, then$$

$$CUNIMB_{u\gamma} = Min\left(QUNDELOTOL_{u\gamma}, 0\right) \times \left(\left(FPUG_{u\gamma} \times |PIMB_{\gamma}|\right)\right) + Max\left(QUNDELOTOL_{u\gamma}, 0\right) \times \left(-\left(FDOG_{u\gamma} \times |PIMB_{\gamma}|\right)\right)$$

where:

(a) $QUNDELOTOL_{u\gamma}$ is the Outside Tolerance Undelivered Quantity for Generator Unit, u, in Imbalance Settlement Period, γ.

(b) $QAOUNDELOTOL_{uoi\gamma n}$ is the Outside Tolerance Undelivered Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ.

(c) $QABUNDELOTOL_{uoi\gamma n}$ is the Outside Tolerance Undelivered Accepted Bid Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ.

(d) $PIMB_{\gamma}$ is the Imbalance Settlement Price in Imbalance Settlement Period, γ, calculated in accordance with Chapter E (Imbalance Pricing);

(e) $PBO_{uoi\gamma}$ is the Bid Offer Price for each Outside Tolerance Undelivered Accepted Bid Quantity and Outside Tolerance Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ;

(f) $\sum_o$ is a summation over all Bid Offer Acceptances, o;

(g) $\sum_i$ is a summation over all Bands, i;

(h) $FPUG_{u\gamma}$ is the Premium for Under Generation Factor for Generator Unit, u, in Imbalance Settlement Period, γ; and

(i) $FDOG_{u\gamma}$ is the Discount for Over Generation Factor for Generator Unit, u, in Imbalance Settlement Period, γ.

(j) $CUNIMBA_{uoi\gamma}$ is the Uninstructed Imbalance Adjustment Charge for Generator Unit, u, for Bid Offer Acceptance, O, for Band, i, in Imbalance Settlement Period, y which is an interim amount required to calculate the final value for $CUNIMB_{uy.}$

(k) $|PIMB_{\gamma}|$ is the absolute value of the Imbalance Settlement Price in Imbalance Settlement Period, γ, calculated in accordance with Chapter E (Imbalance Pricing); and

(l) $|PBO_{uoi\gamma}|$ is the absolute value of the Bid Offer Price for each Outside Tolerance Undelivered Accepted Bid Quantity and Outside Tolerance Accepted Offer Quantity for Generator Unit, u, for Bid Offer Acceptance, o, for Band, i, in Imbalance Settlement Period, γ.

F.9.4.2 When a Pumped Storage Unit ~~or Battery Storage~~, u, is in Pumping Mode ~~or Charging Mode~~, as the case may be, for an Imbalance Settlement Period, γ, or any part thereof, the Market Operator shall calculate the Uninstructed Imbalance Charge ($CUNIMB_{u\gamma}$) for

that Pumped Storage Unit ~~or Battery Storage Unit~~, u, in that Imbalance Settlement Period, γ, as having a value of zero.

F.13 TESTING CHARGES

F.13.1 Setting Testing Tariffs

F.13.1.1 If requested by the Regulatory Authorities, the relevant System Operator shall report to the Regulatory Authorities proposing values for the Testing Tariffs at least four months before the start of the Year to which they shall apply. The System Operator's report must set out the justification for the specific values proposed. The report may, and shall if so requested by the Regulatory Authorities, include alternative values from those proposed and must set out the arguments for and against such alternatives.

F.13.1.2 Each System Operator shall provide to the Market Operator at least two months prior to the start of each Year or within 5 Working Days of approval of the Testing Tariffs by the Regulatory Authorities, whichever is the later, the Testing Tariff Data Transaction, which comprises a complete set of Testing Tariffs that have been approved by the Regulatory Authorities for each Generator Unit that is registered within its Jurisdiction, for each Imbalance Settlement Period in the Year, y, in accordance with Appendix K "Other Market Data Transactions".

F.13.1.3 The Market Operator shall publish the approved Testing Tariffs for each parameter within 5 Working Days of receipt of the Regulatory Authorities' determination or two months before the start of the Year to which they shall apply, whichever is the later.

F.13.1.4 The relevant System Operator may update the Testing Tariffs within the Year to which they apply subject to the prior approval of the Regulatory Authorities. If the Testing Tariffs are so updated, the relevant System Operator shall provide the updated Testing Tariff Data Transaction to the Market Operator within 5 Working Days of approval by the Regulatory Authorities.

F.13.1.5 The Market Operator shall publish each Year the schedule of Testing Tariffs and the detailed tariff methodology and periodically in the event that the Tariffs are updated within a Year.

F.13.2 Calculation of Testing Charges

F.13.2.1 The Market Operator shall calculate the Testing Charge ($CTEST_{u\gamma}$) for each Generator Unit, u, except for any Interconnector Error Unit or Battery Storage Unit, u, in each Imbalance Settlement Period, γ, for which it is Under Test as follows:

$$CTEST_{u\gamma} = -Max\left(QMLF_{u\gamma}, 0\right) \times PTESTTARIFF_{u\gamma}$$

where:

(a) $QMLF_{u\gamma}$ is the Loss-Adjusted Metered Quantity for Generator Unit, u, Under Test in Imbalance Settlement Period, γ; and

(b) $PTESTTARIFF_{u\gamma}$ is the Testing Tariff Price for Generator Unit, u, Under Test in Imbalance Settlement Period, γ, as set out in the schedule of Testing Tariffs.

F.13.2.2 The Market Operator shall calculate the Testing Charge ($CTEST_{u\gamma}$) for each Interconnector Error Unit or Battery Storage Unit, u, in each Imbalance Settlement Period, γ, for which it is Under Test as follows:

$$If\ QMLF_{u\gamma} > 0\ then$$

$$CTEST_{u\gamma} = -Max\left(QMLF_{u\gamma}, 0\right) \times PTESTTARIFF_{u\gamma}$$

$$else$$

$$CTEST_{u\gamma} = QMLF_{u\gamma} \times PTESTTARIFF_{u\gamma}$$

where:

(a) $QMLF_{u\gamma}$ is the Loss-Adjusted Metered Quantity for Interconnector Error Unit or Battery Storage Unit, u, Under Test in Imbalance Settlement Period, γ; and

(b) $PTESTTARIFF_{u\gamma}$ is the Testing Tariff Price for Generator Unit, u, Under Test in Imbalance Settlement Period, γ, as set out in the schedule of Testing Tariffs.