APPENDIX M: DESCRIPTION OF THE FUNCTION FOR THE DETERMINATION OF CAPACITY PAYMENTS

M.1 Appendix M of the Code contains a description of the Function for the Determination of Capacity Payments. Appendix M addresses the methodology for forecasting Demand (used in the determination of the Forecast Demand (FDh), the Annual Load Forecast Data, the Monthly Load Forecast and the derivation of the associated values of MLFh), the determination of the Margin (Mh), the determination of the Interim Ex-Post Margin (IEMh), the determination of the Ex-Post Margin (EMh) and the methodology for the determination of the Loss of Load Probability (λh) and the Ex-Post Loss of Load Probability (Φh).

DETERMINATION OF LOAD FORECAST DATA

M.2 The System Operators shall produce an Annual Peak Demand Forecast for the coming year based on a linear regression analysis of the peaks from previous Years. A number of historic years will be examined and the choice of which historic years to use will be flexible in order to reduce errors and maximise forecast accuracy.

M.3 The System Operators will net forecast Output from non-Participants from the demand forecasts in a consistent manner.

M.4 The System Operators shall decompose the Annual Peak Demand Forecast into Weekly Peak Demand Forecasts by examining the ratio of each Outturn Weekly Peak Demand to that of the Outturn Annual Peak Demand from previous Years.

M.5 Each Settlement Day of the Year shall be classified by the System Operator as one of several standard day types. These standard day types will consist of a normalized Trading Period level profile along with a scalar multiplier which facilitates the determination of the peak of that Settlement Day as the product of the scalar multiplier and the corresponding weekly peak.

M.6 The System Operators shall determine these standard daily profiles along with their associated multiplier by analysis of historical demand data and will be representative of demand patterns for a particular time of year, day of the week, weekends and for special holidays.

M.7 The System Operators shall perform a yearly review the performance of the previous Year's Annual Peak Demand Forecast in order to determine possible improvements to the methodology for the production of the Annual Peak Demand Forecast for the subsequent year. This review will involve analysis of the accuracy of the previous Year's Annual Peak Demand Forecast and the Weekly Peak Demand Forecasts against the Outturn data. The System Operators shall examine as part of these reviews if temperature correction of Annual Peak Demand Forecast and Weekly Peak Demand Forecast yields any benefit in terms of accuracy.

M.8 No additional processing in addition to that described in paragraphs M.1 to M.7 inclusive shall be carried out by the System Operator to derive the Annual Peak Demand Forecast and Weekly Peak Demand Forecast. If the System Operator determines a change to the forecast methodology as a result of the process review which results in a demonstrable material and

significant improvement in the forecasts' overall accuracy, the System Operator shall raise a Modification to change the forecast process.

DETERMINATION OF CAPACITY MARGINS

Determination of Forced Outage Rates

M.9 In respect of each Year, the Unit Total Unavailability (UTUuy) of each Generator Unit other than Autonomous Generator Units, Wind Power Units, Interconnector Units, Interconnector Residual Capacity Units and Interconnector Error Units shall be determined by the System Operator in accordance with the following:

$$UTUuy = \sum_{hiny} Max\{((RCu \times TCFuh) - APuh), 0\} \times TPD$$

Where

1. RCu is the Registered Capacity of Generator Unit u

2. TCFuh is the Temperature Correction Factor for Generator Unit u in Trading Period h

3. APuh is the Availability Profile of Generator Unit u in Trading Period h

4. TPD is the Trading Period Duration

M.10 The Unit Forced Unavailability (UFUuy) for each Generator Unit u other than Autonomous Generator Units, Wind Power Units, Interconnector Units, Interconnector Residual Capacity Units and Interconnector Error Units shall be determined by the System Operator as follows:

$$UFUuy = UTUuy - \left(\sum_{hiny} Max\{((RCu \times TCFuh) - APuh), 0\} \times TPD \right) \times (1 - Max\{USOIuh, UTIuh\})$$

Where

1. UTUuy is the Unit Total Unavailability of Generator Unit u in the Year

2. RCu is the Registered Capacity of Generator Unit u

3. TCFuh is the Temperature Correction Factor for Generator Unit u in Trading Period h

4. APuh is the Availability Profile of Generator Unit u in Trading Period h

5. USOIuh is the Unit Scheduled Outage Indicator for Generator Unit u in Trading Period h

6. UTIuh is the Unit Test Indicator for Generating Unit u in Trading Period h

7. TPD is the Trading Period Duration

M.11 The Unit Forced Outage Rate (UFORuy) of each Generator Unit u other than Autonomous Generator Units, Wind Power Units, Interconnector Units, Interconnector Residual Capacity Units and Interconnector Error Units shall be determined by the System Operator as follows:

$$if \sum_{hiny} \left(RCu \times TCFuh \times \left(1 - USOIuh\right) \times \left(1 - UTIuh\right) \times TPD\right) = 0 \quad then$$

$$UFORuy = \frac{UFUuy}{\sum_{hiny} \left(RCu \times TCFuh \times \left(1 - USOIuh\right) \times \left(1 - UTIuh\right) \times TPD\right)}$$

$else$

$$UFORuy = 0$$

Where

1. UFUuy is the Unit Forced Unavailability of Generator Unit u in the Year

2. RCu is the Registered Capacity of Generator Unit u

3. TCFuh is the Temperature Correction Factor for Generator Unit u in Trading Period h

4. USOIuh is the Unit Scheduled Outage Indicator for Generator Unit u in Trading Period h

5. UTIuh is the Unit Test Indicator for Generator Unit u in Trading Period h

6. TPD is the Trading Period Duration

M.12 The Unit Historic Forced Outage Factor (UHFOFuy) for each Generator Unit u other than Autonomous Generator Units, Wind Power Units, Interconnector Units, Interconnector Residual Capacity Units and Interconnector Error Units for such Year shall be determined 5 working days prior to the start of each Year by the System Operator as follows:

$$UHFOFuy = \overline{\left(UFORuy\right)}^{y=-5}_{y=-1}$$

Where

1. $\overline{\left(\ \right)}^{y=-5}_{y=-1}$ is the mean value over the 5 years immediately preceding Year y or, where such data is not available, the System Operator shall utilise mean values for associated Generator Unit technology

2. UFORuy is the Unit Forced Outage Rate for Generator Unit u in Year y, save that in relation to the year immediately preceding Year y, the value of Forced Outage Rate shall be determined by reference to the

available data for such immediately preceding Year y at the time the determination is made

M.13 [Interim only: for inclusion in section 7 but not enduring Code]For the purposes of establishing values of UHFOFuy to apply to each Generator Unit other than Autonomous Generator Units, Energy Limited Generator Units, Pumped Storage Units, Wind Power Units, Interconnector Units, Interconnector Residual Capacity Units and Interconnector Error Units from the Market Start Date, the System Operator shall, subject to M.14 below) use best available data in relation to each such Generator Unit to establish values of UFORuy for the year containing the Market Start Date and the preceding 4 Years.

M.14 In respect of each Year y, the Interconnector Forced Unavailability (IFUly) shall be determined for each Interconnector l by the relevant System Operator in accordance with the following:

$$IFUly = \sum_{hiny} \{IFClh \times TPD\}$$

Where

1. IFClh is the Interconnector Failure Transfer Capacity of Interconnector l in Trading Period h determined as the magnitude of the impact (in MW) of any technical failure on the Interconnector determined in accordance with 5.59

2. TPD is the Trading Period Duration

M.15 The Interconnector Forced Outage Rate (IFORly) of each Interconnector l shall be determined by the relevant System Operator as follows:

$$if \sum_{hiny} \left(AIClh \times \left(1 - ISOIlh\right) \times TPD\right) = 0 \ \ then$$

$$IFORly = \frac{IFUly}{\sum_{hiny} \left(AIClh \times \left(1 - ISOIlh\right) \times TPD\right)}$$

$$else$$

$$IFORly = 0$$

Where

1. IFUly is the Interconnector Forced Unavailability of Interconnector l in Year y

2. AIClh is the Aggregate Import Capacity of Interconnector l in Trading Period h

3. ISOIlh is the Interconnector Scheduled Outage Indicator for Interconnector l in Trading Period h

4. TPD is the Trading Period Duration

M.16 The Interconnector Historic Forced Outage Factor (IHFOF*l*y) for each Interconnector l shall be determined by the relevant System Operator 5 working days prior to the start of each Year y as follows:

$$IHFOFly = \overset{y=-5}{\underset{y=-1}{}}\left(\overline{IFORly}\right)$$

Where

1. $\overset{y=-5}{\underset{y=-1}{}}\left(\overline{\ }\right)$ is the mean value over the 5 years immediately preceding Year y or, where such data is not available, the System Operator shall utilise mean values for associated technology

2. IFOR*l*y is the Interconnector Forced Outage Rate for Interconnector l in Year y, save that in relation to the year immediately preceding Year y, the value of Interconnector Forced Outage Rate shall be determined by reference to the available data for such immediately preceding Year y at the time the determination is made

M.17 [Interim only: for inclusion in section 7 but not enduring Code] For the purposes of establishing values of IHFOFly to apply to each Interconnector from the Market Start Date, the relevant System Operator shall, subject to M.20 below) use best available data in relation to each Interconnector to establish values of IFORly for the Year containing the Market Start Date and the preceding 4 Years.

Determination of the Margin

M.18 The System Operator shall determine the Margin (Mh) in each Trading Period h in each Capacity Period 5 Working Days prior to each Capacity Period. The values of Registered Capacity (RCu), Temperature Correction Factor (TCFuh), Aggregate Import Capacity (AIC*l*h), Unit Scheduled Outage Indicator (USOIuh) and Interconnector Scheduled Outage Indicator (ISOI*l*h) shall take the values for the Capacity Period determined by the System Operator at the time of the calculation of the values of the Margin (Mh) of the relevant Capacity Period. The determination of whether a Generator Unit has been granted status of Under Test in any Trading Period in the relevant Capacity Period shall, for the purposes of determining the Margin, also take the values as determined by the System Operator at the time of the calculation of the values of Margin (Mh) for the relevant Capacity Period.

M.19 For each Trading Period within the relevant Capacity Period, the Forecast Unit Availability (FUAuh) for each Generator Unit u, other than Autonomous Generator Units, Wind Power Units, Interconnector Units, Interconnector Residual Capacity Units and Interconnector Error Units shall be determined by the System Operator as follows:

$$FUAuh = RCu \times TCFuh \times \left(1 - UTIuh\right) \times \left(1 - USOIuh\right) \times \left(1 - UHFOFuy\right)$$

Where:

1. RCu is the forecast of Registered Capacity for Generator Unit u

2. TCFuh is the forecast of Temperature Correction Factor for Generator Unit u in Trading Period h

3. UTIuh is the forecast of Unit Test Indicator for Generator Unit u in Trading Period h

4. USOIuh is the forecast of Unit Scheduled Outage Indicator for Generator Unit u in Trading Period h

5. UHFOFuy is the Unit Historic Forced Outage Factor for Generator Unit u for Year y

M.20 For each Trading Period h within the relevant Capacity Period, the Forecast Interconnector Availability (FIA*l*h) for each Interconnector *l* shall be determined by the relevant System Operator as follows:

$$FIAlh = AIClh \times (1 - ISOIlh) \times IHFOFly$$

Where:

1. AIC*l*h is the forecast of Aggregate Import Capacity for Interconnector *l* in Trading Period h

2. ISOI*l*h is the forecast of Interconnector Scheduled Outage Indicator for Interconnector *l* in Trading Period h

3. IHFOF*l*y is the Interconnector Historic Forced Outage Factor for Interconnector *l* for Year y

M.21 For each Trading Period h within the relevant Capacity Period, the Forecast Wind Contribution (FWCh) shall be determined by the System Operator as follows:

$$FCWh = \left\{ \sum_{u} \left(RCuh \times (1 - UTIuh) \times (1 - USOIuh) \right) \right\} \times WCCh$$

Where:

1. RCu is the forecast of Registered Capacity for Generator Unit u in Trading Period h

2. USOIuh is the forecast of Unit Scheduled Outage Indicator for Generator Unit u in Trading Period h

3. UTIuh is the forecast of Unit Test Indicator for Generator Unit u in Trading Period h

4. $\sum_{u}$ is the summation over all Wind Power Units

5. WCCh is the Wind Capacity Credit determined for all Wind Power Units in Trading Period h by the System Operator

M.22 For each Trading Period h within the relevant Capacity Period, the Interim Margin (IMh) shall be determined as follows:

$$IMh = \left(\sum_{u} (FUAuh) + \sum_{l} (FIAlh) + FCWh \right) - MLFh$$

Where

1. FUAuh is the Forecast Unit Availability of Generator Unit u in Trading Period h

2. FIA*l*h is the Forecast Interconnector Availability of Interconnector l in Trading Period h

3. FCWh is the Forecast Wind Contribution in Trading Period h

4. MLFh is the Monthly Load Forecast value in Trading Period h

5. $\sum_{u}$ is the summation over all Generator Units u other than Autonomous Generator Units, Energy Limited Generator Units, Pumped Storage Units, Wind Power Units, Interconnector Units, Interconnector Residual Capacity Units and Interconnector Error Units

6. $\sum_{l}$ is the summation over all Interconnectors l

M.23 For each Trading Period within the relevant Capacity Period, the Market Operator shall determine the Margin (Mh) by adjusting the Interim Margin (IMh) to account for the forecast availability of Energy Limited Generator Units and Pumped Storage Units by first forecasting values of SELut for each such Generator Unit for each Trading Day and adjusting this to each Settlement Day.

M.24 For each Trading Period within the relevant Capacity Period, the Forecast Generation Site Availability ($FGSA_{Gh}$) for each Generation Site G containing Energy Limited Generator Units or Pumped Storage Units shall be determined by the System Operator as follows:

$$FGSA_{Gh} = \sum_{u} FUAuh$$

Where:

1. FUAuh is the Forecast Unit Availability of Generator Unit u in Trading Period h

2. $\sum_{u}$ is the summation over all Energy Limited Generator Units or Pumped Storage Units at Generation Site G

M.25 The System Operator shall then determine the Margin (Mh) in accordance with the following procedure:

Loop for each Settlement Day

Continue while there is remaining energy in any Generating Site containing Energy Limited Generator Units or Pumped Storage Units.

Find the Trading Period(s) of minimum Interim Margin and the number of Trading Periods of minimum Interim Margin

Loop for each Generation Site containing Energy Limited Generator Units or Pumped Storage Units

1. Increase the Optimised Output from current Generation Site for each Trading Period of Minimum Interim Margin by 1MW divided by the number of Trading Periods of Minimum Interim Margin, except if there is not sufficient remaining energy for this Generation Site to do this. If there is insufficient energy to do this, increase the Optimised Output from that Generation Site by the remaining energy divided by the number of Trading Periods of Minimum Interim Margin.

2. If increasing the Output for a Generation Site for any Trading Period in the step above would result in a violation of the Unit's Technical Capability, only increase the Output in those Trading Periods by an amount that would not exceed the Forecast Generation Site Availability ($FGSA_{Gu}$) for that Generation Site. If the Output for the Generation Site is already equal to $FGSA_{Gu}$ in previous step, do not update Output.

3. Update remaining energy for Generation Site bearing in mind that for each MW of Output allocated to a Generation Site in a Trading Period, 0.5MWh is deducted from the energy remaining for that Unit.

4. Update Interim Margin in all Trading Periods

5. Find the Trading Period(s) of Minimum Interim Margin and the number of Trading Periods of Minimum Interim Margin

Loop to next Generation Site

Loop to next Settlement Day

Determination of the Ex-Post Margin

M.26 For each Trading Period within the relevant Capacity Period, the Interim Ex-Post Margin (IEMh) used in determining the Interim Ex-Post Loss of Load Probability IΦh shall be determined as follows:

$$IEMh = \left(\sum_{\alpha} (EAuh) + \sum_{\beta} (MSQuh) \right) - \sum_{u} \left(\frac{MGuh}{TPD} \right)$$

Where:

1. IEMh is the Interim Ex-Post Margin for Trading Period h
2. EAuh is the Eligible Availability for Generator Unit u in Trading Period h
3. MSQuh is the Market Schedule Quantity for Generator Unit u in Trading Period h
4. MGuh is the Metered Generation for Generator Unit u in Trading Period h
5. TPD is the Trading Period Duration
6. $\sum_{\alpha}$ is the summation over all Generator Units eligible to receive Capacity Payments, other than Pumped Storage Units and Energy Limited Generator Units
7. $\sum_{\beta}$ is the summation over all Pumped Storage Units and Energy Limited Generator Units eligible to receive Capacity Payments
8. $\sum_{u}$ is the summation over all Generator Units u eligible to receive Capacity Payments

M.27 For each Trading Period h within the relevant Capacity Period, the Ex-Post Margin used in determining the Ex-Post Loss of Load Probability Φh shall be determined as follows:

$$EMh = \left(\sum_{\alpha} (EAuh) + \sum_{\beta} (IEAuh) \right) - \sum_{u} \left(\frac{MGuh}{TPD} \right)$$

Where:

1. EMh is the Ex-Post Margin for Trading Period h
2. EAuh is the Eligible Availability for Generator Unit u in Trading Period h
3. IEAuh is the Interim Eligible Availability for Generator Unit u in Trading Period h
4. MGuh is the Metered Generation for Generator Unit u in Trading Period h
5. TPD is the Trading Period Duration
6. $\sum_{\alpha}$ is the summation over all Generator Units eligible to receive Capacity Payments, other than Pumped Storage Units and Energy Limited Generator Units

7. $\sum_{\beta}$ is the summation over all Pumped Storage Units and Energy Limited Generator Units eligible to receive Capacity Payments

8. $\sum_{u}$ is the summation over all Generator Units u eligible to receive Capacity Payments

DETERMINATION OF THE LOSS OF LOAD PROBABILITY TABLE

M.28 With respect to the Loss of Load Probability Table, the Flattening Power Factor (FPFy) for Year y shall take a value in the range 0 ≤ FPF ≤ 1, such value being proposed by the System Operator, approved by the Regulatory Authorities and published by the Market Operator at least 2 months prior to the first Capacity Period of the Year. The System Operator may propose revisions to the value of FPFy during the Year and, subject to the approval of the Regulatory Authorities, the Market Operator shall publish such revised value not less than thirty 30 days prior to the first Capacity Period for which such revised value is to be applied.

M.29 The Loss of Load Probability Table for Year y shall be determined by the System Operator and published by the Market Operator at least 5 Working Days prior to the first Capacity Period in each Year and shall relate Input Margin (IM) to Output Loss Of Load Probability (OLOLP). .

M.30 If during the course of a Year y any of the following conditions arise:

1. A Generator Unit with Registered Capacity (RCu) greater than 50MW is newly registered in accordance with paragraph 2.32B; or

2. An existing Generator Unit with Registered Capacity (RCu) greater than 50MW is Deregistered.

the System Operator shall recalculate the Loss of Load Probability Table and the Market Operator shall publish such table at least 5 Working Days prior to the Capacity Period in which either such condition becomes effective and such table shall apply until the earlier of the end of the Year or another occurrence of one of the above conditions..

M.31 To determine the Loss of Load Probability Table, the System Operator shall first determine the Total Conventional Capacity (TCCy) for the Year y as follows:

$$TCC_y \sum_u round(RC_u) + \sum_l round(AIC_l)$$

Where:

1. RCu is the Registered Capacity of Generator Unit u other than Wind Power Units, Interconnector Units, Interconnector Residual Capacity Units and Interconnector Error Units

2. AICl is the Aggregate Import Capacity of Interconnector l

3. $round(x)$ is a function which rounds x to the nearest interger

M.32 The values of Input Margin (IM) in the Loss of Load Probability Table shall take all values in the domain:

$IM \in Integers$ for all $0 \leq IM \leq TCC_y$

Where:

1. TCCy is the Total Conventional Capacity for Year y

M.33 In relation to each value of Input Margin (IM) in the Loss of Load Probability Table, the corresponding value of Output Loss of Load Probability ($OLOLP_{IM}$) shall be determined by reference to the first Generator Unit u, other than Wind Power Units, Interconnector Units, Interconnector Residual Capacity Units and Interconnector Error Units, as follows:

$$OLOLP_{TCC-\Omega} = UHFOF_{uy} \quad \forall \ 0 \leq \Omega < round(RC_u)$$

$$OLOLP_{TCC-\Omega} = 1 \quad \forall \ round(RC_u) \leq \Omega \leq TCC_y$$

Where

1. TCCy is the Total Conventional Capacity for Year y

2. UHFOFuy is the Unit Historic Forced Outage Factor for such first Generator Unit u in Year y

3. RCu is the Registered Capacity of such first Generator Unit u

4. $round(x)$ is a function that rounds x to the nearest integer

M.34 In relation to each value of Input Margin in the Loss of Load Probability Table, the corresponding values of Output Loss of Load Probability ($OLOLP_{IM}$) determined in M.33 shall be amended by reference to the remaining Generator Units u, other than Wind Power Units, Interconnector Units, Interconnector Residual Capacity Units and Interconnector Error Units, as follows

$For\ u = 2:1:NU_y$

$For\ \Omega = 0:1:TCC_y$

$$FTMPOLOLP_{TCC-\Omega} = \{OLOLP_{TCC-\Omega} \times UHFOF_{uy} + OLOLP_{(TCC-\Omega)+round(RC_u)} \times (1 - UHFOF_{uy})\}$$

$End\ \Omega$

$For\ IM = 0:1:TCC_y$

$OLOLP_{IM} = FTMPOLOLP_{IM}$

$End\ IM$

$End\ u$

Where:

1. *'For a:b:c'* means "Starting with a, increment up to and including c, taking steps of size b"

2. NUy is the total number of Generator Units u other than Wind Power Units, Interconnector Units, Interconnector Residual Capacity Units and Interconnector Error Units in Year y

3. TCCy is the Total Conventional Capacity for Year y

4. FTMPOLOLPx is the First Temporary Output Loss of Load Probability associated with the value of IM corresponding to x

5. OLOLPx is the Output Loss of Load Probability in the Loss of Load Probability Table associated with the value of IM corresponding to x and shall equal 1 where x < 0 and shall equal 0 where x >TCCy

6. UHFOFuy is the Unit Historic Forced Outage Factor for Generator Unit u in Year y

7. RCu is the Registered Capacity of Generator Unit u

8. IM is the Input Margin in the Loss of Load Probability Table

9. round(x) is a function which rounds x to the nearest integer

M.35 In relation to each value of Input Margin in the Loss of Load Probability Table, the corresponding values of Output Loss of Load Probability ($OLOLP_{IM}$) determined in M.34 shall be further amended by reference to the Interconnectors *l* as follows

$$For\ l = 1:1:NI$$

$$For\ \Omega = 0:1:TCC_y$$

$$STMPOLOLP_{TCC-\Omega} = \{OLOLP_{TCC-\Omega} \times IHFOF_{ly} + OLOLP_{(TCC-\Omega)+round(AIC_l)} \times (1 - IHFOF_{ly})\}$$

$$End\ \Omega$$

$$For\ IM = 0:1:TCC_y$$

$$OLOLP_{IM} = STMPOLOLP_{IM}$$

$$End\ IM$$

$$End\ l$$

Where

1. *'For a:b:c'* means "Starting with a, increment up to and including c, taking steps of size b"

2. NIy is the total number of Interconnectors in Year y

3. TCCy is the Total Conventional Capacity for Year y

4. STMPOLOLPx is the Second Temporary Output Loss of Load Probability associated with the value of IM corresponding to x

5. OLOLPx is the Output Loss of Load Probability in the Loss of Load Probability Table associated with the value of IM corresponding to x

6. IHFOF*l*y is the Unit Historic Forced Outage Factor for Interconnector *l* in Year y

7. AIC*l*h is the Aggregate Import Capacity of Interconnector *l* in Trading Period h

8. IM is the Input Margin in the Loss of Load Probability Table

9. round(x) is a function which rounds x to the nearest integer

M.36 In relation to each value of Input Margin in the Loss of Load Probability Table, the corresponding values of Output Loss of Load Probability ($OLOLP_{IM}$) determined in M.35 shall be further amended by reference to the Flattening Power Factor (FPFy) as follows:

$$TTMPOLOLP_{IM} = (OLOLP_{IM})^{FPF_y} \quad \forall\, 0 \le IM \le TCC_y$$

then

$$OLOLP_{IM} = TTMPOLOLP_{IM} \quad \forall\, 0 \le IM \le TCC_y$$

Where:

1. $TTMPOLOLP_{IM}$ is the Third Temporary Output Loss of Load Probability corresponding to the Input Margin IM in the Loss of Load Probability Table

2. $OLOLP_{IM}$ is the Output Loss of Load Probability corresponding to the Input Margin IM in the Loss of Load Probability Table

3. FPFy is the Flattening Power Factor for Year y, the value for which shall be determined by the Regulatory Authorities and published by the Market Operator no later than 2 months prior to the first Capacity Period of the year

4. TCCy is the Total Conventional Capacity in Year y

5. $(x)^{FPFy}$ is a function which raises the value of x to the power of the Flattening Power Factor

M.37 The Loss of Load Probability (λh) in each Trading Period h shall be determined by the System Operator as follows:

$$if\ M_h < 0\ then$$
$$\lambda_h = 1$$
$$else\ if\ M_h > TCC_y\ then$$
$$\lambda_h = 0$$
$$else$$
$$\lambda_h = OLOLP_{round(M_h)}$$

Where:

1. Mh is the Margin for Trading Period h

2. TCCy is the Total Conventional Capacity in Year y

3. OLOLPx is the Output Loss of Load Probability in the Loss of Load Probability Table associated with the value of Input Margin corresponding to x

4. round(x) is a function that rounds x to the nearest integer.

M.38 The Ex-Post Loss of Load Probability (Φh) in each Trading Period h shall be determined by the System Operator as follows:

$$if\ EM_h < 0\ then$$
$$\phi_h = 1$$
$$else\ if\ EM_h > TCC_y\ then$$
$$\phi_h = 0$$
$$else$$
$$\phi_h = OLOLP_{round(EM_h)}$$

Where:

1. EMh is the Ex-Post Margin for Trading Period h

2. TCCy is the Total Conventional Capacity in Year y

3. OLOLPx is the Output Loss of Load Probability in the Loss of Load Probability Table associated with the value of Input Margin corresponding to x

4. round(x) is a function that rounds x to the nearest integer.

DRAFT ADDITIONS TO THE DEFINITIONS

Name	Term	Subscripts	Units	Description
Flattening Power Factor	FPF	y		means the power factor used to flatten the distribution of LOLP values in the Loss of Load Probability Table and which takes a value between 0 and 1
Forecast Generation Site Availability	FGSA	Gh	MW	means the forecast of the available capacity at a Generation Site in relation to Energy Limited Generator Units or Pumped Storage Units at such site
Forecast Interconnector Availability	FIA	lh	MW	means the forecast of the available capacity of each Interconnector l for each Trading Period in the Capacity Period immediately following that Capacity Period in which the forecast is determined
Forecast Unit Availability	FUA	uh	MW	means the forecast of the available capacity of each Generator Unit u for each Trading Period in the Capacity Period immediately following that Capacity Period in which the forecast is determined
Forecast Wind Contribution	FCW	h	MW	means the forecast of the aggregate available capacity of all Wind Power Units for each Trading Period in the Capacity Period immediately following that Capacity Period in which the forecast is determined

Name	Term	Subscripts	Units	Description
Input Margin	IM		MW	means the variable that is recorded in the left-hand column of the Loss Of Load Probability Table (LOLPT)
Interconnector Forced Outage Rate	IFOR	ly	decimal value	means the percentage of time (expressed as a decimal value) an Interconnector was not available at the Interconnector Capacity other than for reasons of maintenance in a Year
Interconnector Forced Unavailability	IFU	ly	MWh	means the energy an Interconnector was not able to deliver in a Year due to the Available Transfer Capacity being less than the Interconnector Capacity for reasons other than maintenance
Interconnector Historic Forced Outage Factor	IHFOF	ly	decimal value	means the average of the Interconnector Forced Outage Rate for an Interconnector over a 5 year period
Interconnector Scheduled Outage Indicator	ISOI	lh		an indicator used in the determination of the Interconnector Forced Outage Rate for each Interconnector in Appendix M. It takes the value of 1 if the Interconnector is on maintenance and takes the value of 0 if the Interconnector is not on scheduled maintenance, the determination of such values being by reference to the agreed Outage Programme as determined in accordance with the relevant Grid Code
Interconnector Total Unavailability	ITU	ly	MWh	means the energy an Interconnector was not able to deliver in a Year due to the Available Transfer Capacity being less than the Interconnector Capacity
Loss Of Load Probability Table	LOLPT			means the 2-column table that relates Input Margin (IM) to Output Loss of Load Probability (OLOLP)
Number of Interconnectors	NI			means the number of interconnectors
Number of Units	NU			means the number of conventional units
Output Loss of Load Probability	OLOLP		probability	means the values contained in the Loss Of Load Probability Table relating to the Input Margin and which are used to determine the values of the Loss of Load Probability and the Ex-Post Loss of Load Probability
Temperature Correction Factor	TCF	uh		means the factor determined annually by the Market Operator to account for variations in the capacity of a Generator Unit caused by changes in ambient temperature, determined by establishing the correlation between historic monthly mean temperatures and Generator Unit availability
Temporary Loss Of Load Probability Table	TMPLOLPT			A temporary data-holding table identical in structure to the Loss of Load Probability Table.

Name	Term	Subscripts	Units	Description
Total Conventional Capacity	TCC		MW	means the summed capacity of Generator Units and Interconnectors other than Wind units, each rounded to their nearest whole MW.
Unit Forced Outage Rate	UFOR	uy	decimal value	means the percentage of time (expressed as a decimal value) a Generator Unit was not available at its Unit Capacity other than for reasons of maintenance in a Year
Unit Forced Unavailability	UFU	uy	MWh	means the energy a Generator Unit was not able to deliver in a Year due to the Eligible Availability being less than the Unit Capacity for reasons other than maintenance
Unit Historic Forced Outage Factor	UHFOF	uy	decimal value	means the average of the Unit Forced Outage Rate for a Generator Unit over a 5 year period
Unit Scheduled Outage Indicator	USOI	uh		an indicator used in the determination of the Unit Forced Outage Rate for each Generator Unit in Appendix M. It takes the value of 1 if the Generator Unit is on scheduled maintenance and takes the value of 0 if the Generator Unit is not on scheduled maintenance, the determination of such values being by reference to the agreed Outage Programme as determined in accordance with relevant Grid Code
Unit Total Unavailability	UTU	uy	MWh	means the energy a Generator Unit was not able to deliver in a Year due to the Eligible Availability being less than the Unit Capacity
Unit Test Indicator	UTI	uh		an indicator used to identify a Generator Unit which is determined as being under test (in accordance with the relevant Grid Code) or is in its Commissioning phase (in accordance with its Connection Agreement) and which takes the value of 1 if the Generator Unit is under test or commissioning and takes the value of 0 if the Generator Unit is not under test or is not commissioning, such values being determined by reference to the relevant Grid Code or Connection Agreement
Wind Capacity Credit	WCC	h	decimal value	means the factor derived by reference to the Capacity Credit graph in the Generation Adequacy Report and which reflects the impact of Wind Power Units on the System in terms of conventional plant equivalent