

## **SCHEDULE 16 – COMMON DISTRIBUTION CHARGING METHODOLOGY**

### **Introduction**

**This Schedule 16, version 13.2, is to be used for the calculation of Use of System Charges which will become effective from, 01 April 2021 and remain effective until superseded by a revised version.**

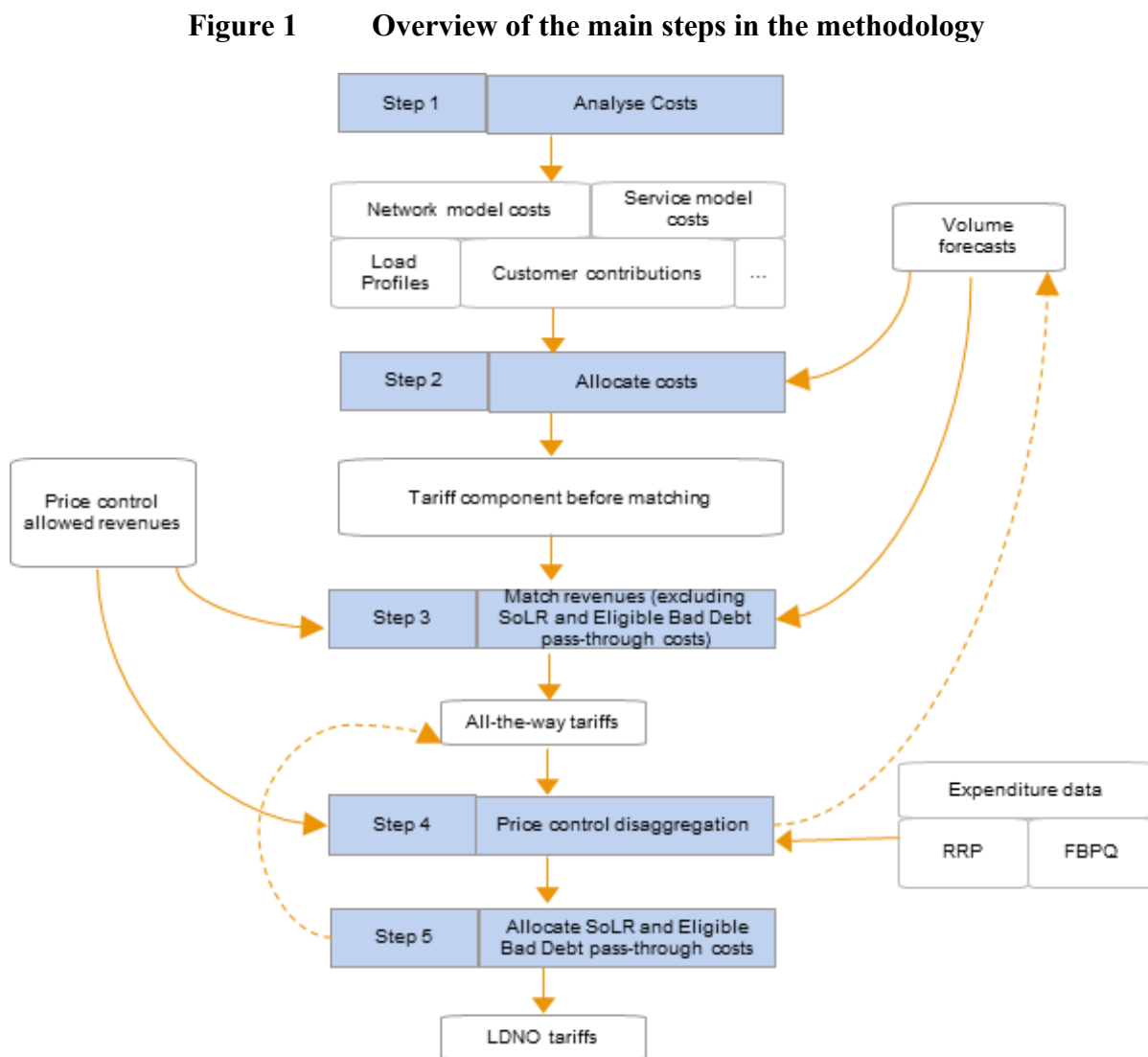
1. This Schedule 16 sets out the Common Distribution Charging Methodology (CDCM), which gives the methods, principles, and assumptions underpinning the calculation of Use of System Charges by each DNO Party (except where the DNO Party is acting as an LDNO).
- 1A. The CDCM is applicable to “Designated Properties”, as defined in Standard Condition 13A (Common Distribution Charging Methodology) of the DNO Party’s Distribution Licences.
2. This Schedule 16 comprises two main parts. Part 1 describes the cost allocation rules. Part 2 describes the tariff structures and their application.
3. In order to comply with this methodology statement when setting distribution Use of System Charges the DNO Party will populate and publish the following CDCM model versions:
  - (a) for charges effective from 1 April 2020:
    - (i) where the Authority has given no direction under Clause 19.1B, CDCM model version 3 as issued by the Panel in accordance with Clause 14.5.3;  
or
    - (ii) where the Authority has given direction under Clause 19.1B that periods of notice described in Clause 19.1A need not apply, CDCM model version 3(332) as issued by the Panel in accordance with Clause 14.5.3;
  - (b) for charges effective from 1 April 2021:
    - (i) where the Authority has given no direction under Clause 19.1B, CDCM model version 6 as issued by the Panel in accordance with Clause 14.5.3;  
or

- (ii) where the Authority has given direction under Clause 19.1B that periods of notice described in Clause 19.1A need not apply, CDCM model version 6(379) as issued by the Panel in accordance with Clause 14.5.3;  
or
  - (c) for charges effective from 1 April 2022 or later:
    - (i) where the Authority has given no direction under Clause 19.1B, CDCM model version 7 as issued by the Panel in accordance with Clause 14.5.3;  
or
    - (ii) where the Authority has given direction under Clause 19.1B that periods of notice described in Clause 19.1A need not apply, CDCM model version 8 as issued by the Panel in accordance with Clause 14.5.3.
4. The glossary at the end of this Schedule 16 contains definitions of terms and acronyms used in this Schedule 16. In the case of any conflict between the defined terms and acronyms set out in this Schedule 16 (on the one hand) and the definitions and rules of interpretation set out in Clause 1 of this Agreement (on the other), the defined terms and acronyms set out in this Schedule 16 shall prevail.
5. Algebraic formulae in this Schedule 16 use square brackets to clarify the calculations. For the avoidance of doubt, these square bracketed terms form an effective part of this Schedule 16.

## Part 1 — Cost allocation

### Main steps in the allocation

6. Figure 1 gives a general overview of how the four main steps in the methodology relate to each other.



7. Step 1 involves the gathering of information about the network, the costs of assets and operations, the users of the network, and the forecast level of use and level of allowed revenue in the charging year.
8. Step 2 is the application of the cost allocation rules set out below. These rules are only for all-the-way tariffs and do not apply to LDNO tariffs.
9. Step 3 involves adjustments to the tariff components calculated in step 2 in order to match revenue recovered from the CDCM to the amount of revenue allowed under the

price control conditions, less any adjustment needed for the recovery of the pass-through costs referred to in paragraph 10A, which are allocated in Step 5 following the application of discount factors as detailed in Step 4.

10. Step 4 uses price control condition calculations, actual expenditure data and forecast expenditure data in order to determine discount percentages, which are then applied to all-the-way tariffs in order to produce LDNO tariffs.
- 10A. Step 5 allocates pass-through of:
  - (a) the DNO Party's Supplier of Last Resort costs to all domestic tariffs with a fixed charge, including those for LDNOs; and
  - (b) the DNO Party's Eligible Bad Debt costs to all metered demand tariffs, including those for LDNOs.
11. Step 4 is independent from Steps 1 to 3. In practical terms, Step 4 must be performed first, as the discount percentages are used within Step 1 to combine volume forecasts for all-the-way and portfolio tariffs into a single composite dataset for each type of end user.

### Overview of the tariff components

12. Each tariff comprises some or all of the tariff components listed in table 1.

<b>Table 1 List of tariff components</b>		
<b>Tariff component</b>	<b>Unit</b>	
Three unit rates	p/kWh	
Fixed charge	p/day	
Capacity charge	p/kVA/day	
Exceeded capacity charge	p/kVA/day	Half hourly settled demand tariffs only.
Reactive power charge	p/kVArh	

13. For users that are acting as LDNOs, tariffs are portfolio tariffs with the same tariff components as the corresponding all-the-way end user tariff, excluding reactive power charges (but prices for some tariff components may be calculated as zero).
14. Each component of each tariff is rounded to the nearest value with no more than three decimal places in the case of unit rates expressed in p/kWh and reactive power unit

charges expressed in p/kVArh, and with no more than two decimal places in the case of fixed and capacity charges (including exceeded capacity charges) expressed in p/MPAN/day and p/kVA/day respectively.

### **Step 1: Analyse costs**

15. The first step of the methodology involves the determination of costs or revenue allowances for various parts of the network, and the collection of information about the relevant characteristics of network users.

### **Network model asset values**

16. The DNO Party specifies a network model, also known as a distribution reinforcement model (DRM) or a 500 MW model, in line with the requirements of this section.
17. The network model determines the £/kW/year figure (based on simultaneous maximum load at each network level) corresponding to amortisation and return on capital for assets at the LV circuits, HV/LV, HV, EHV/HV and EHV network levels, and, in England and Wales, at the 132kV/EHV, 132kV/HV and 132kV network levels.
18. Not Used.
19. The network model consists of a costed design for an increment to the DNO Party's network.
20. At each network level, the model is sized to provide secure capacity to meet demand that, aggregated up to individual grid supply point (GSP) level, amounts to 500 MW of simultaneous maximum demand.
21. The model's design assumes a power factor of 0.95 and no embedded generation.
22. The assets included in the network model are modern equivalent assets of the kind that the DNO Party would normally install on new networks.
23. The nature, quantity and size of assets in the model is such as to meet demand and security to the DNO Party's design and planning standards, allowing for the use of standard size equipment and typical utilisation factors.

24. The proportion of assets of different types at each network level, e.g. overhead and underground circuits, reflects the mix of users and the topography in the DNO Party's Distribution Services Area.
25. The cost assumed for each asset type reflect total purchase and installation cost in the charging year, using the DNO Party's normal procurement methods.

#### **Diversity allowances**

26. For each of the 132kV (except in Scotland), EHV and HV voltage levels, the DNO Party determines a diversity allowance between the transformation level above circuits at that voltage and the transformation level below circuits at that voltage.
27. Each diversity allowance represents the extent, expressed as a percentage, to which the sum of the maximum load across all substations below would exceed the corresponding sum for substations above.
28. The DNO Party also determines a diversity allowance between the GSP Group as a whole and the individual grid supply points.

#### **Customer contributions under current connection charging policy**

29. The DNO Party estimates the extent to which the assets at each network level used by each category of users would have been expected to be covered by customer contributions if they had been constructed under the charging year's connection charging policy.
30. The DNO Party groups users into categories, by network level of supply, for the purpose of making these estimates.
31. In the case of generators, the proportions relate to the notional assets whose construction or expansion might be avoided due to the generator's offsetting of demand on the network, and takes the same values as for a demand user at the same network level of supply.

#### **Service model asset values**

32. The DNO Party specifies a set of service models covering the range of typical dedicated assets operated for the benefit of individual HV and LV users of the network.

33. For each service model, the DNO Party estimates the number and types of connections that the model covers, and a total construction cost for the assets in the model.
34. For each tariff, the DNO Party identifies the extent to which each of the service models represents the relevant assets for an average user in that tariff. For the purpose of this calculation, users on the following pairs of tariffs shall be considered in aggregate:
  - LV Site Specific together with LV Site Specific Storage Import;
  - LV Sub Site Specific together with LV Sub Site Specific Storage Import; and
  - HV Site Specific together with HV Site Specific Storage Import.
35. A weighted average of service models is used if several service models apply to the same tariff.
36. In the case of unmetered supplies, service model assets are modelled on the basis of units delivered.
37. In the case of generation service models, the service models should reflect the additional costs of protection equipment for a typical generator in each category, for example the difference in cost between a fuse and a circuit breaker, or the cost of additional telecommunications equipment used for control purposes.

### **Transmission exit expenditure**

38. The DNO Party prepares a forecast of expenditure on transmission exit charges in the charging year.

### **Other expenditure**

39. The DNO Party prepares a forecast of other expenditure for the charging year, where other expenditure is defined as the sum of:
  - (a) 100 per cent of direct operating costs.
  - (b) 60 per cent of indirect costs (as defined in RRP guidance).
  - (c) 100 per cent of network rates.

### **Distribution time bands**

40. The DNO Party determines five distribution time bands, labelled black, red, yellow, amber and green. The 'red', 'amber' and 'green' time bands will apply to tariffs that are metered. The 'black', 'yellow' and 'green' time bands will apply to tariffs that are unmetered.
41. Distribution time bands are defined separately for Monday-Friday and for Saturday/Sunday. In each case, time bands are defined by reference to UK clock time only, and always begin and end on the hour or half hour. There will be no constraint on either the number of hours that can be covered by each time band or whether the time band applies to all or only part of a day. The red, amber and green times bands will apply throughout the year. The black and yellow time bands can be set to apply to only part of the year, where so specified by the DNO Party.
- 41A. The DNO Party may only change distribution time bands with effect from 1 April and must provide a minimum of 15 months prior notice of such changes. However, where a change to distribution time bands is caused by the implementation of a change to this methodology, the requirement to provide a minimum of 15 months' notice prior notice will not apply.
- 41B. Notice of changes to the distribution time bands should be given in the relevant charging statement, and such notice should appear in the same paragraph of the statement as the time bands that are being changed.

### **Load characteristics**

42. The DNO Party estimates the following load characteristics for each category of demand users:
- a) A load factor, defined as the average load of a user group over the year, relative to the maximum load level of that user group. Load factors are numbers between 0 and 1; and
  - b) A coincidence factor, defined as the expectation value of the load of a user group at the time of system simultaneous maximum load, relative to the maximum load level of that user group. Coincidence factors are numbers between 0 and 1.

For the purpose of this estimation, users on the following pairs of tariffs shall be considered in aggregate:



- LV Site Specific together with LV Site Specific Storage Import;
  - LV Sub Site Specific together with LV Sub Site Specific Storage Import; and
  - HV Site Specific together with HV Site Specific Storage Import.
- 42A. The load characteristics for non-half hourly unmetered supplies are not determined from settlement data. For each non half hourly unmetered supplies tariff the load characteristics are calculated using profile data derived for each GSP Group.
43. In determining the load characteristics of each category of demand user the DNO Party will use reasonable endeavours to analyse meter and profiling data received for the most recent 3 year period (at the time of setting charges for the relevant charging year) for which data are available in time for use in the calculation of charges. Load factors and coincidence factors will be calculated individually for each of the 3 years and a simple arithmetic average will be calculated to be used in tariff setting.
44. For load factors and coincidence factors in the case of non half hourly settled customer classes (except the non half hourly unmetered supplies customer classes), data adjusted for GSP Group correction factor are used.
45. Not used.
46. Not used.

#### **Loss adjustment factors to transmission**

47. For each network level, the DNO Party determines a single loss adjustment factor to transmission relating to Exit Points from its network at that level. These loss adjustment factors should be representative of average losses at the time of system simultaneous maximum load.

#### **Peaking probabilities**

48. The DNO Party determines a peaking probability in respect of each network level and each of the distribution time bands.
49. The peaking probability represents the probability that an asset at that network level would experience maximum load during that distribution time band. In deriving peaking probabilities the DNO Party will use reasonable endeavours to use the most

recent 3 year period (at the time of setting charges for the relevant charging year) for which information is available in time for use in the calculation of charges. Peaking probabilities will be derived individually for each of the 3 years and a simple arithmetic average will be calculated to be used in tariff setting.

### **Power factor data**

50. The DNO Party determines or estimates, for each network level, the average of the ratio of reactive power flows (kVAr) to network capacity (kVA), weighted by reactive power flow.
51. If data are not available for any network level, the DNO Party uses data for the nearest network level at which they are available.

### **Volume forecasts**

52. The DNO Party forecasts the volume chargeable to each tariff component under each tariff for the charging year.
- 52A. For the purposes of the calculations described in Step 2 below, forecast volumes for the Domestic Aggregated (Related MPAN) and Non-Domestic Aggregated (Related MPAN) tariffs are added to the volumes for Domestic Aggregated and Non-Domestic Aggregated tariffs as follows:
  - (a) Domestic Aggregated (Related MPAN) volumes are added to Domestic Aggregated volumes;
  - (b) LDNO LV: Domestic (Related MPAN) volumes are added to LDNO LV: Domestic Aggregated volumes;
  - (c) LDNO HV: LV Domestic (Related MPAN) volumes are added to LDNO HV: LV Domestic Aggregated volumes;
  - (d) Non-Domestic Aggregated (Related MPAN) volumes are added to Non-Domestic Aggregated volumes.
  - (e) LDNO LV: Non-Domestic (Related MPAN) volumes are added to LDNO LV: Non-Domestic Aggregated volumes; and

(f) LDNO HV: Non-Domestic (Related MPAN) volumes are added to LDNO HV: Non-Domestic Aggregated volumes.

53. The volume forecasts for portfolio tariffs are multiplied by the LDNO discount percentages determined in Step 4, and combined with the all-the-way volume forecasts for each end user type. These combined volume forecasts are used throughout Steps 2 and 3 of the methodology.
- 53A. The DNO Party also forecasts the total customer count for tariffs for domestic customers connected to LDNO networks which are calculated in the EDCM.
- 53B. The DNO Party also forecasts the total customer count for tariffs for all demand tariffs for Designated Properties connected to LDNO networks which are calculated in the EDCM.

### **Forecast of price control allowed revenues**

54. The DNO Party prepares a forecast of allowed revenue for the charging year in accordance with the requirements of the price control conditions and in a manner which is consistent with its volume forecasts and in a format consistent with table 1 of Schedule 15.

### **Step 2: Allocate costs**

#### **Categories of costs**

55. The cost and revenue allocation is driven by a representation of the different voltage and transformation levels in the network and by a distinction between the elements of cost related to assets and those related to operations.
56. Table 2 shows the network levels and categories of costs used in the model. In this Schedule 16, the acronym EHV refers to voltages of 22 kV and above, up to and excluding 132 kV. In the case of the Scottish Distribution Services Areas, the entries for the 132kV and 132kV/EHV network levels are zero as these voltages are part of the transmission network. LV refers to voltages below 1 kV, and HV refers to voltages of at least 1kV and less than 22kV.

<b>Table 2 Categories of unit costs in the model</b>			
<b>Category</b>	<b>Description</b>	<b>Unit</b>	<b>Levels</b>
<b>Network assets</b>	Amortisation and return on capital for networks or substations at each level, excluding assets that are deemed to be covered by customer contributions.  This is expressed per kW of system simultaneous maximum load.	£/kW/year	132kV 132kV/EHV EHV EHV/HV 132kV/HV HV HV/LV LV circuits
<b>Transmission exit</b>	Expressed per kW of system simultaneous maximum load	£/kW/year	Transmission exit
<b>Other expenditure</b>	Other expenditure is attributed to levels and assets in the network following the rules set out below.  The part allocated to network levels is expressed per kW of system simultaneous maximum load.	£/kW/year	132kV 132kV/EHV EHV EHV/HV 132kV/HV HV HV/LV LV circuits
	The part of other expenditure allocated to assets dedicated to one customer is expressed per user for each user type.	£/year	For each type of user

### **Annuitisation of network model asset values**

57. Capital costs that are not covered by customer contributions are converted to annual costs using a level annuity with the annuity period and rate of return set out in table 3.

<b>Table 3 Annuity rate of return and annuity period</b>	
<b>Parameter</b>	<b>Value</b>
<b>Annuity period</b>	40
<b>Annuity rate of return</b>	Set to equal the latest pre-tax real weighted average cost of capital (CC below) for each DNO Party calculated using the following formula:

	<p>CC = (Gearing Assumption x Pre-Tax Cost of Debt) + (1- Gearing Assumption)*(Post Tax Cost of Equity/(1-Corporation Tax Rate))</p> <p>where:</p> <p>Gearing Assumption is set to the ‘notional Gearing’ value referred to in the ED1 Price Control Financial Handbook;</p> <p>Pre-Tax Cost of Debt is set to the ‘cost of corporate debt’ value specified in or calculated in accordance with the most recent Annual Iteration Process applicable when setting distribution Use of System Charges;</p> <p>Post Tax Cost of Equity is set to the ‘cost of equity’ value referred to in the ED1 Price Control Financial Handbook; and</p> <p>Corporation Tax Rate is the rate of corporation tax which is, when setting distribution Use of System Charges, expected to be applicable in respect of the regulatory year (as defined in the Distribution Licence) in which those Charges will take effect.</p> <p>The CC value is calculated as a percentage, and rounded to two decimal places.</p>
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### **Determination of unit costs from network model**

58. For each network level, the DNO Party determines the flow at time of system simultaneous maximum load, measured at Exit Points from the network level, that could be accommodated by the network model on the basis of a normal mix and diversity of loads for its network.
59. The asset value and unit cost for that network level are obtained by dividing the annuitised cost of purchasing and installing the assets in the network model by this exit flow at time of system simultaneous maximum load.

$$[\text{network level assets } \text{£/kW}] = [\text{assets } \text{£}] / [\text{modelled exit flow at time of system simultaneous maximum load kW}]$$

$$[\text{network level } \text{£/kW/year}] = [\text{network level assets } \text{£/kW}] * [\text{annuity factor}]$$

60. The modelled exit flow at peak time is obtained by combining the 500 MW at GSP sizing assumption, the diversity allowance between GSP and GSP Group, and the loss adjustment factor for the relevant network level.

### **Allocation of other expenditure**

61. Estimated load at each network level is calculated from:
- a) volume forecasts for each tariff;
  - b) the loss adjustment factors representative of the time of system simultaneous maximum load;
  - c) the load characteristics for users on each tariff, used to estimate the contribution of each user category to load at the time of system simultaneous maximum load.
62. For the purposes of this calculation, a generation user is taken to make a zero contribution to load at the network level corresponding to circuits at its Entry Point, and a full negative contribution to load at all network levels above its Entry Point. For demand users, account is taken of differences between the diversity allowance in the network model and the diversity of each customer group in order to ensure that the estimated load matches the volumes subject to charges in respect of each network level.
63. For each network level covered by the network model, a notional asset value is calculated by multiplying the unit asset cost by the estimated load:
- $$[\text{notional asset value } \pounds] = [\text{network level assets } \pounds/\text{kW}] * [\text{estimated load kW}]$$
64. For each service model, a notional asset value is calculated by multiplying the unit asset value of that service model by the extent to which each user requires that model.
65. Other expenditure (excluding transmission exit charges) is allocated between network levels in the proportion given by these notional assets.
66. The result is combined with forecast transmission exit charges to give an annual expenditure figure for each network level and for each service model. These figures are converted into unit cost using the same rules as for costs and revenues from network assets and customer assets.

### **Allocation of costs on the basis of contribution to system simultaneous maximum load**

67. All £/kW/year unit costs and revenue are used in the calculation of yardstick charges for each tariff.
68. For demand tariffs and portfolio tariffs related to demand users, the contributions of each network level to the unit rate are calculated as follows:

$$[\text{p/kWh from network model assets}] = 100 * [\text{network level } \text{£/kW/year}] * [\text{user loss factor}] / [\text{network level loss factor}] * [\text{pseudo load coefficient}] * (1 - [\text{contribution proportion}]) / [\text{days in charging year}] / 24$$

$$[\text{p/kWh from operations}] = 100 * [\text{transmission exit or other expenditure } \text{£/kW/year}] * [\text{user loss factor}] / [\text{network level loss factor}] * [\text{pseudo load coefficient}] / [\text{days in charging year}] / 24$$

69. These calculations are repeated for each network level.
70. In the paragraph 68 equation:
- (a) the user loss factor is the loss adjustment factor to transmission for the network level at which the user is supplied;
  - (b) the network level loss factor is the loss adjustment factor to transmission for the network level for which costs are being attributed; and
  - (c) the pseudo load coefficient is calculated as follows:
    - i) calculate the ratio of coincidence factor to load factor that would apply if units were uniformly spread within each time band, based on the estimated proportion of units recorded in each relevant time pattern regime that fall within each distribution time band and the assumption that the time of system simultaneous maximum load is certain to be in the red or black (as appropriate) distribution time band;
    - ii) calculate a correction factor for each user type as the ratio of the coincidence factor to load factor, divided by the result of the calculation above;
    - iii) for each network level and each unit rate, derive the ratio of coincidence factor (to network asset peak) to load factor that would apply given peaking

probabilities at that network level if units were uniformly spread within each time band, multiplied by the correction factor; and

iv) the result of (iii) above is the pseudo load coefficient for the network level and unit rate, save that the coefficients calculated for each of the following pairs of tariffs are aggregated to produce one value per network level for each pair:

- non-half hourly together with half hourly unmetered supplies
- LV Site Specific together with LV Site Specific Storage Import;
- LV Sub Site Specific together with LV Sub Site Specific Storage Import; and
- HV Site Specific together with HV Site Specific Storage Import.

71. For generation users and portfolio tariffs for generation users, no contribution to the unit rate is calculated in respect of the network level corresponding to circuits at the Entry Point, and a negative contribution to the unit rate (i.e. a credit) comes from each network level above the Entry Point. That contribution is calculated as follows:

$$[\text{p/kWh from network model assets}] = -100 * [\text{network level } \text{£/kW/year}] * [\text{user loss factor}] / [\text{network level loss factor}] * (1 - [\text{contribution proportion}]) / [\text{days in year}] / 24$$

$$[\text{p/kWh from operations}] = -100 * [\text{transmission exit or other expenditure } \text{£/kW/year}] * [\text{user loss factor}] / [\text{network level loss factor}] / [\text{days in year}] / 24$$

72. Not used.

#### **Allocation of network costs to standing charges (fixed and capacity)**

73. For demand users, other than unmetered users, standing charge factors are used to reduce unit charges and to attribute these costs or revenues to capacity charges (p/kVA/day) or fixed charges (p/day) instead.

74. The standing charge factors for demand tariffs are shown in the table below:



Tariff	EHV	EHV/HV	HV	HV/LV	LV circuits
Domestic Aggregated					100%
Non-Domestic Aggregated					100%
LV Site Specific			20%	100%	100%
LV Sub Site Specific			100%	100%	
HV Site Specific	20%	100%	100%		
LV Site Specific Storage Import			20%	100%	100%
LV Sub Site Specific Storage Import			100%	100%	
HV Site Specific Storage Import	20%	100%	100%		
Unmetered Supplies					0%

75. Where a standing charge factor is specified for the EHV/HV network level, the same standing charge factor applies to the 132kV/HV network level.
76. Where a standing charge factor is specified for the EHV network level, and where the 500 MW model includes 132kV/HV transformation, the 132kV standing charge factor is set to the EHV standing charge factor multiplied by the proportion of load going through 132kV/HV transformation.
77. For each tariff, the unit rates are reduced to take account of the allocation of costs to capacity or fixed charges. This is achieved by multiplying the cost element for each relevant network level by  $(1 - [\text{standing charge factor}])$ .
78. For each demand user type, and for each network level, the unit cost to be attributed to capacity charges or fixed charges in respect of that network level is:

$$[\text{p/kVA/day from network model assets}] = 100 * [\text{standing charge factor}] * [\text{network level } \text{£/kW/year}] * [\text{user loss factor}] / [\text{network level loss factor}] * (1 - [\text{contribution proportion}]) / [\text{days in year}] / (1 + [\text{diversity allowance}]) * [\text{power factor in network model}]$$

$$[\text{p/kVA/day from transmission exit or other expenditure}] = 100 * [\text{standing charge factor}] * [\text{transmission exit or other expenditure } \text{£/kW/year}] * [\text{user loss factor}] / [\text{network level loss factor}] / [\text{days in year}] / (1 + [\text{diversity allowance}]) * [\text{power factor in network model}]$$

79. The power factor in network model parameter is set to 0.95.
80. The diversity allowance for the LV circuit level is defined as the amount by which the aggregate maximum demand load determined for that network level exceeds the estimated demand at the time of system simultaneous maximum load. The aggregate maximum demand is calculated by aggregating agreed import capacities for users in Measurement Class C or E and estimated capacities for users in Measurement Class A, F or G.
81. For the tariffs listed below, the unit costs calculated by the formula above are allocated to the capacity charge. The exceeded capacity charge for half hourly settled demand users, except unmetered users, is calculated using the same formula, but with the customer proportion set to zero.
- LV Site Specific
  - LV Sub Site Specific
  - HV Site Specific
  - LV Site Specific Storage Import
  - LV Sub Site Specific Storage Import
  - HV Site Specific Storage Import.
82. Otherwise, the unit costs calculated by the formula above are allocated to the fixed charge.
83. For the tariffs listed below, LV costs are allocated to the fixed charge by estimating the proportion of LV network capacity used by these categories of users, and dividing the corresponding proportion of LV costs by the number of domestic and non-domestic MPANs:
- Domestic Aggregated
  - Non-Domestic Aggregated.

- Small Non-Domestic Two Rate
- LV Network Domestic
- LV Network Non-Domestic Non-CT.

84. Not used.

#### **Costs associated with LV customer and HV customer levels**

85. Other expenditure allocated to the LV customer and HV customer network levels are included in the fixed charge for each tariff where there is such a tariff component.

86. In the case of unmetered supplies, these charges are spread across all units.

#### **Costs associated with reactive power flows**

87. For each tariff and each network level, the contribution to reactive power unit charges is obtained as follows:

- (a) Calculate what the contribution to a single unrestricted unit rate in p/kWh from each network level would be.
- (b) Take the absolute value.
- (c) Adjust for standing charge factors at the relevant network levels (for demand users only).
- (d) Multiply by the assumed power factor in the network model.
- (e) Multiply by the DNO Party's estimate of the average ratio of the reactive power flow (kVAr) to network load (kVA) at the relevant network level.

88. For the purpose of the calculation of reactive power unit charges, generation users are taken to make a full contribution to the reactive power flows in the network at their Entry Point and at each network level above their Entry Point. Users on the following pairs of tariffs shall be considered in aggregate:

- LV Site Specific together with LV Site Specific Storage Import;
- LV Sub Site Specific together with LV Sub Site Specific Storage Import; and

- HV Site Specific together with HV Site Specific Storage Import.

### **Step 3: Match revenues**

89. The DNO Party uses its volume forecasts to estimate the revenues that would be raised by applying the tariff components derived from step 2, excluding any revenues treated as excluded revenue under the price control conditions.
90. If any separate charging methodology is used alongside the CDCM, e.g. for EHV users, then the forecast revenues from these charges, excluding any revenues treated as excluded revenue under the price control conditions, are added to the total.
- 90A. The DNO Party calculates an adjusted forecast of allowed revenues, which excludes any Eligible Bad Debt and Supplier of Last Resort pass-through costs. Such pass-through costs are taken into account in Step 5 after LDNO discounts have been applied in Step 4.
91. If the adjusted forecast of allowed revenue exceeds the estimate of relevant revenues, then the difference is a shortfall. If the estimate of relevant revenues exceeds the adjusted forecast of allowed revenue, then the difference is a surplus.
92. Revenue matching is achieved by applying a unit charge adder (p/kWh) calculated as follows: the revenue surplus or shortfall (in pence) to be recovered; divided by the total volume of all demand customers (in kWh), excluding the demand associated with the LV Site Specific Storage Import, LV Sub Site Specific Storage Import and HV Site Specific Storage Import tariffs. The unit charge adder is applied to demand tariffs only, excluding the LV Site Specific Storage Import, LV Sub Site Specific Storage Import and HV Site Specific Storage Import tariffs.
93. The unit charges adder is positive if there is a shortfall and negative if there is a surplus.
94. If this procedure would result in negative value for any tariff component, then that tariff component is set to zero, and the unit charge adder figure is modified to the extent necessary to match forecast and target revenue.
95. Tariffs for generation do not have any revenue matching element.

### **Step 4: Price control disaggregation**

96. Step 4 involves calculations based on price control and expenditure data which produce a series of discount percentages to be used to determine portfolio tariffs for LDNOs.
97. The discount percentages are determined in accordance with Schedule 29, which schedule is deemed to form part of this CDCM (as if it were set out herein).
98. For demand users, the discount percentages are applied to all tariff components in all-the-way tariffs in order to determine embedded network portfolio tariffs.
99. For generation users, the unit rate element (p/kWh) is not discounted, reflecting the modelling assumption that generation benefits are seen at the voltage level above the Exit Point, and therefore the embedded LDNO simply “passes on” the benefits seen at the DNO Party level. The fixed charge element (p/day) is discounted at 100 per cent, as this tariff component in the all-the-way tariff recovers costs associated with the allocation of other expenditure to service assets, which are not provided by the DNO Party.

#### **Step 5: Allocation of pass-through costs**

100. Step 5 involves calculations based on the level of Supplier of Last Resort pass-through costs to be recovered in the charging year. Such costs are allocated to all domestic tariffs with a fixed charge (including LDNO tariffs) on an equivalent basis (i.e. without discounting LDNO tariffs). Step 5 also involves calculations based on the level of Eligible Bad Debt pass-through costs to be recovered in the charging year. Such costs are allocated to all demand tariffs (including LDNO tariffs) on an equivalent basis (i.e. without discounting LDNO tariffs).
101. Supplier of Last Resort pass-through costs are allocated by applying a fixed charge adder (p/day) to the tariffs for following customer groups (as further described in paragraph 102):
  - Domestic Aggregated;
  - LDNO LV: Domestic Aggregated;
  - LDNO HV: Domestic Aggregated;
  - LDNO HVplus: Domestic Aggregated (which is calculated in the EDCM);

- LDNO EHV: Domestic Aggregated (which is calculated in the EDCM);
  - LDNO 132kV/EHV: Domestic Aggregated (which is calculated in the EDCM);
  - LDNO 132kV: Domestic Aggregated (which is calculated in the EDCM);
  - LDNO 0000: Domestic Aggregated (which is calculated in the EDCM).
102. The fixed charge adder is calculated as the costs to be passed through (in £) multiplied by 100 divided by the combined customer count of the groups listed in paragraph 101 (including those with tariff calculated in the EDCM, as determined in paragraph 53A) divided by the number of days in the charging year.
103. Eligible Bad Debt pass-through costs are allocated by applying a fixed charge adder (p/day) to all metered demand tariffs excluding ‘related MPAN’ tariffs. The fixed charge adder is calculated as the costs to be passed through (in £) multiplied by 100 divided by the combined customer count of all metered demand customer groups (including those with tariffs calculated in the EDCM, as determined in paragraph 53B) excluding ‘related MPAN’ customer groups divided by the number of days in the charging year.
104. The DNO Party will publish details of the fixed charge adders calculated under this Step 5 in its Use of System Charging Statement (as defined in and required by Standard Condition 14 of the DNO Party’s Distribution Licence).
105. The DNO Party will publish details of the fixed charge adders calculated under this Step 5 in its Use of System Charging Statement (as defined in and required by Standard Condition 14 of the DNO Party’s Distribution Licence).
106. Not used.
107. Not used.
108. Not used.
109. Not used.
110. Not used.
111. Not used.

- 112. Not used.
- 113. Not used.
- 114. Not used.
- 115. Not used.
- 116. Not used.
- 117. Not used.
- 118. Not used.
- 119. Not used.
- 120. Not used.
- 121. Not used.
- 122. Not used.
- 123. Not used.
- 124. Not used.
- 125. Not used.

## **Part 2 — Tariff structures and application**

- 126. The CDCM provides for a common tariff structure for all 14 DNO Parties and their Distribution Service Areas.
- 127. This part details the common tariff structure and associated tariff elements for demand and generation, for unmetered supplies and for charges to LDNOs.

### **Tariff structures for demand customers**

#### **Aggregated Metered Demand**

- 128. For MPANs that are to be charged on an aggregated basis (as further described in Paragraph 132C), Use of System Charges will be via the Supercustomer approach which uses data from the D0030 industry data flow and is based on Settlements Classes comprising:

- (a) Line Loss Factor Class (LLFC);
  - (b) Profile Class (PC);
  - (c) Standard Settlement Configuration (SSC); and
  - (d) Time Pattern Regime (TPR)
129. For NHH settled MPANs, the combination of LLFC/PC/SSC/TPR determines the associated profile and half-hourly data values. For HH metered MPANs, the half-hourly data is used. The PC for HH aggregated metered demand MPANs will always be zero.
130. DNO specific network time bands will be applied to the appropriate SSC/TPR combinations stated in Paragraph 129.
131. Charges will be applied on a fixed charge and unit rate basis. The latter allocated to DNO specific network time bands. There will be no capacity, exceeded capacity or reactive charges for aggregated metered demand MPANs.
132. Structure of aggregated metered demand charges will be as follows:
- (a) Fixed charge will be p/MPAN/day; and
  - (b) Unit charges will be p/kWh.

### **Changes from NHH to HH Settlement for Metered Demand**

- 132A Domestic Aggregated (Related MPAN) and Non-Domestic Aggregated (Related MPAN) and unmetered supplies will be charged on a p/kWh basis only.
- 132B As described in Paragraph 40, there will be three unit rate time bands on a time-of-day basis for all aggregated customers with the exception of the unmetered supplies tariff, to reflect the requirements of the cost drivers of their individual networks. These three time bands will be called 'red', 'amber' and 'green' to represent three differing cost signals.
- 132C. Those users in Measurement Class A, F or G will be charged on an aggregated basis. All aggregate charged customers will be assigned to the appropriate tariff based on the Measurement Class, type of metering equipment installed and the voltage of connection as specified in the table below:



<b>Tariff</b>	<b>Voltage of Connection</b>	<b>Settlement Type (HH or NHH)</b>	<b>Metering</b>	<b>Measurement Class</b>
Domestic Aggregated	LV	NHH	Whole Current or Current Transformer	A
Domestic Aggregated	LV	HH	Whole Current or Current Transformer	F
Domestic Aggregated (Related MPAN)	LV	NHH	Whole Current or Current Transformer	A
Domestic Aggregated (Related MPAN)	LV	HH	Whole Current or Current Transformer	F
Non-Domestic Aggregated	LV	NHH	Whole Current or Current Transformer	A
Non-Domestic Aggregated	LV	HH	Whole Current	G
Non-Domestic Aggregated (Related MPAN)	LV	NHH	Whole Current or Current Transformer	A
Non-Domestic Aggregated (Related MPAN)	LV	HH	Whole Current	G

132D. Where the Supplier transfers customers from NHH Settlement to HH Settlement the following Measurement Classes will apply:

- Domestic users connected at LV with non-CT metering installed will transfer from Measurement Class A to Measurement Class F.
- Domestic users connected to LV with CT metering can (at supplier option in discussion with user) move to Measurement Class C (must be more than 100kW), Measurement Class E (must be 100kW or less) or Measurement Class F (must be 100kW or less).
- Non-Domestic users connected at LV with non-CT metering installed will transfer from Measurement Class A to Measurement Class G.

- Non-Domestic users connected at LV with CT metering installed will transfer from Measurement Class A to Measurement Class C (more than 100kW) or Measurement Class E (100kW or less).

### Site-Specific Metered Demand

133. For HH metered demand not subject to aggregated charging, Use of System Charges will be settled on a site-specific basis using data from the D0275 or D0036 industry data flows based on half hourly metered data provided for the MPAN.
134. Charges will consist of a fixed, unit, capacity and reactive power charge.
135. As described in Paragraph 40, there will be three unit rate time bands on a time of day basis for all half hourly settled customers with the exception of the half hourly unmetered supplies tariff, to reflect the requirements of the cost drivers of their individual networks. These three time bands will be called ‘red’, ‘amber’ and ‘green’ to represent three differing cost signals.
- 135A Those users in Measurement Class C or E will be HH settled on a site-specific basis, and assigned to the appropriate tariff based on the Measurement Class, type of metering equipment installed and the voltage of connection as specified in the table below:

Tariff	Voltage of Connection	Metering	Measurement Class
LV Site Specific	LV	Current Transformer	C / E
LV Sub Site Specific	LV Sub	Current Transformer	C / E
HV Site Specific	HV	Current Transformer	C / E
LV Site Specific Storage Import	LV	Current Transformer	
LV Sub Site Specific Storage Import	LV Sub	Current Transformer	
HV Site Specific Storage Import	HV	Current Transformer	

136. Structure of the HH demand charges:

- (a) Fixed charge p/MPAN/day;

- (b) Unit rate charge p/kWh;
  - (c) Capacity charge p/kVA/day;
  - (d) Exceeded capacity charge p/kVA/day; and
  - (e) Reactive power charge p/kVArh.
137. Generally the p/MPAN/day charge relates to one MPAN. However, where a site is a group of MPANs as identified in the connection agreement, billing systems should be able to group the MPANs where appropriate for charging purposes.
138. Unit charges will be allocated by settlements HH data and DNO Party specific network time bands.
139. There will be no charges applied to correctly de-energised HH MPANs/sites as determined by the de-energisation status in MPAS Registration System.
140. Where a site is incorrectly de-energised, i.e. when actual metering advances are received the DNO Parties should contact suppliers to ensure the status is corrected. If a site is found to be energised charges will be back dated to the date of energisation.

### **Unmetered Supplies**

- 140A. Use of System Charges for aggregated settled unmetered demand MPANs (Measurement Class B) will be via the Supercustomer approach which uses data from the D0030 industry data flow and is based on Settlement Classes comprising. As described in Paragraph 40, there will be three unit rate time bands for the Unmetered Supplies tariff, to reflect the requirements of the cost drivers of their individual networks. The three time bands will be called 'black', 'yellow' and 'green' to represent three differing cost signals.
- 140B. Use of System Charges for unmetered supplies which are pseudo HH metered (Measurement Class D) will use data from the D0275 or D0036 industry data flows based on half hourly data provided for the MPAN.
- 140C. Charges will consist of unit rates only.

Tariff	Voltage of Connection	Measurement Class
Unmetered Supplies	LV	B / D

### Demand Tariff Structures

141. Table 4 below shows the structure for aggregated metered demand tariffs, and Table 5 below shows the structure for site-specific demand tariffs.

Table 4: Aggregated Tariffs				
Tariff Name	Unit 1 (p/kWh)	Unit 2 (p/kWh)	Unit 3 (p/kWh)	Fixed charge p/MPAN/day
Domestic Aggregated	Red	Amber	Green	✓
Domestic Aggregated (Related MPAN)	Red	Amber	Green	
Non-Domestic Aggregated	Red	Amber	Green	✓
Non-Domestic Aggregated (Related MPAN)	Red	Amber	Green	
Unmetered Supplies	Black	Yellow	Green	

Table 5: Site Specific Tariffs							
Tariff	Unit rate 1 p/kWh	Unit rate 2 p/kWh	Unit rate 3 p/kWh	Fixed charge p/MPAN/day	Capacity charge p/kVA/day	Exceeded Capacity charge p/kVA/day	Reactive power charge p/kVAh
LV Site Specific	Red	Amber	Green	✓	✓	✓	✓
LV Sub Site Specific	Red	Amber	Green	✓	✓	✓	✓
HV Site Specific	Red	Amber	Green	✓	✓	✓	✓
LV Site Specific Storage Import	Red	Amber	Green	✓	✓	✓	✓
LV Sub Site Specific Storage Import	Red	Amber	Green	✓	✓	✓	✓

HV Site Specific Storage Import	Red	Amber	Green	✓	✓	✓	✓
Unmetered Supplies	Black	Yellow	Green				

Note 1: The Domestic Aggregated (Related MPAN) and Non-Domestic Aggregated (Related MPAN) tariffs are supplementary to a standard published tariff and therefore only available under these conditions. These will be charged the same red, amber and green unit rates but will have a zero fixed charge.

Note 2: Where DNO Parties use a default tariff for invalid settlement combinations these will be charged at the Domestic Aggregated rates.

Note 3: LV Sub applies to customers connected to the DNO Party's network at a voltage of less than 1 kV at a substation with a primary voltage (the highest operating voltage present at the substation) of at least 1 kV and less than 22 kV, where the current transformer (CT) used for the customer's settlement metering is located at the substation. For these purposes, 'at the substation' means:

- a) an HV/LV substation with the metering CT in the same chamber as the substation transformer; or
- b) an HV/LV substation with the metering CT in a chamber immediately adjacent to the substation transformer chamber.

Note 4: not used.

Note 5: Where a customer or its supplier requests a DNO Party to confirm if a connection may be eligible for an LV Sub tariff, the DNO Party will investigate and reach a decision, taking account of any supporting information provided by the customer or supplier and any additional information that is available to it. Administration charges (to cover reasonable costs) may apply if a technical assessment or site visit is required, but shall not be applied where the DNO Party agrees to the change of tariff request. In all circumstances where a DNO Party decides or agrees that a customer should be moved to an LV Sub tariff, the new tariff charges will be applied in the next calendar month following the DNO Party's decision or agreement. Where a customer is already registered on an LV Sub tariff they will remain so.

Note 6: not used.

Note 7: Fixed charges are generally levied on a pence per MPAN basis. However, there are some instances where more than one MPAN exists on a customer's connection and only one fixed charge is appropriate. Where a group of MPANs is classed as a site as identified in the connection agreement, billing systems should be able to group the MPANs, where appropriate, for charging purposes.

Note 8: The LV Site Specific Storage Import, LV Sub Site Specific Storage Import and HV Site Specific Storage Import tariffs will only be applicable to Eligible Electricity Storage Facilities.

### **Tariff structures for generation**

#### **NHH and Aggregated HH Metered Generation**

142. NHH metered generation in measurement class A and HH metered generation in Measurement Classes F and G will be charged on an aggregated basis. Use of System Charges for LV generation aggregated tariffs will be billed via Supercustomer. The billing systems will be required to apply fixed charges plus negative unit charges with the process being managed through the DNO Party's invoicing of the supplier.
143. Structure of aggregated generation charges:
- (a) Fixed charge will be p/MPAN/day;
  - (b) Unit rate charge p/kWh; and
  - (c) Reactive Charges will not apply.

#### **Site Specific HH Generation**

144. Use of System Charges for HH Site Specific generation tariffs (which excludes Measurement Class F and G) will be via the HH billing systems. The billing systems will be required to apply fixed charges plus reactive power unit charges, negative unit charges and manage the process through the DNO Party's invoicing of the supplier
145. Structure of Site Specific HH generation charges:
- (a) Fixed charge will be p/MPAN/day;
  - (b) Unit rate charge p/kWh; and

(c) Reactive power charge p/kVArh.

146. The following tables and notes show the structure for generation tariffs.

<b>Table 6: Generation Aggregated Tariffs</b>				
<b>Tariff Name</b>	<b>Unit rate 1 (p/kWh)</b>	<b>Unit rate 2 (p/kWh)</b>	<b>Unit rate 3 (p/kWh)</b>	<b>Fixed charge p/MPAN/day</b>
LV Generation Aggregated	Red	Amber	Green	✓
LV Sub Generation Aggregated	Red	Amber	Green	✓

<b>Table 7: Generation Site-Specific Tariffs</b>					
<b>Tariff</b>	<b>Unit rate 1 p/kWh</b>	<b>Unit rate 2 p/kWh</b>	<b>Unit rate 3 p/kWh</b>	<b>Fixed charge p/MPAN/day</b>	<b>Reactive power charge p/kVArh</b>
LV Generation Site Specific	Red	Amber	Green	✓	✓
LV Sub Generation Site Specific	Red	Amber	Green	✓	✓
HV Generation Site Specific	Red	Amber	Green	✓	✓
LV Generation Site Specific no RP charge	Red	Amber	Green	✓	
LV Sub Generation Site Specific no RP charge	Red	Amber	Green	✓	
HV Generation Site Specific no RP charge	Red	Amber	Green	✓	

Note 1: not used.

Note 2: not used.

Note 3: not used.

Note 4: LV Sub Generation applies to customers connected to the DNO Party's network at a voltage of less than 1 kV at a substation with a primary voltage (the highest operating voltage present at the substation) of at least 1 kV and less than 22 kV, where the current transformer used for the customer's settlement metering is located at the substation.

Note 5: not used.

Note 6: Note 4 above for LV generation substation tariffs will be applied for new customers from 1 April 2010.

Note 7: Where a DNO Party has requested (and still requires) a generator to operate with a power factor of less than 0.95, excess reactive power charges will not apply (these instances are identified in the table as 'no RP charge').

### **Tariff structures for LDNOs**

147. The tariff structure for LDNOs will mirror the structure of the all-the-way-tariff, and is dependent on the voltage of the Point of Connection being either LV (see Table 8) or HV (see Table 9); except for the LDNO unmetered tariffs (marked with \*\* in Tables 8 and 9 below), which are charged by reference to the voltage of the Points of Connection that provide the majority of the energised domestic connections for the LDNO in the GSP Group (or, where there is no such majority, on such other reasonable basis as the DNO Party determines). In all cases, the same tariff elements will apply.



**Table 8: LDNO LV connection\***

<b>Tariff Name</b>	<b>Unit rate 1 p/kWh</b>	<b>Unit rate 2 p/kWh</b>	<b>Unit rate 3 p/kWh</b>	<b>Fixed charge p/MPAN/day</b>	<b>Capacity charge p/kVA/day</b>	<b>Exceeded Capacity charge p/kVA/day</b>	<b>Reactive power charge p/kVArh</b>
LV Domestic Aggregated	Red	Amber	Green	✓			
Domestic Aggregated (Related MPAN)	Red	Amber	Green				
Non-Domestic Aggregated	Red	Amber	Green	✓			
Non-Domestic Aggregated (Related MPAN)	Red	Amber	Green				
LV Site Specific	Red	Amber	Green	✓	✓	✓	✓
LV Site Specific Storage Import	Red	Amber	Green	✓	✓	✓	✓
**Unmetered Supplies**	Black	Yellow	Green				
LV Generation Aggregated	✓			✓			
LV Generation Site Specific	✓			✓			✓

\* Where the boundary between the LDNO and DNO network is at LV

**Table 9: LDNO HV connection\***

<b>Tariff Name</b>	<b>Unit rate 1 p/kWh</b>	<b>Unit rate 2 p/kWh</b>	<b>Unit rate 3 p/kWh</b>	<b>Fixed charge p/MPAN/day</b>	<b>Capacity charge p/kVA/day</b>	<b>Exceeded Capacity charge p/kVA/day</b>	<b>Reactive power charge p/kVArh</b>
LV Domestic Aggregated	Red	Amber	Green	✓			
LV Domestic Aggregated (Related MPAN)	Red	Amber	Green				
LV Non-Domestic Aggregated	Red	Amber	Green	✓			
LV Non-Domestic Aggregated (Related MPAN)	Red	Amber	Green				
LV Site Specific	Red	Amber	Green	✓	✓	✓	✓
**Unmetered Supplies**	Black	Yellow	Green				
LV Sub Site Specific	Red	Amber	Green	✓	✓	✓	✓
HV Site Specific	Red	Amber	Green	✓	✓	✓	✓
LV Generation Aggregated	Red	Amber	Green	✓			
LV Sub Generation Aggregated	Red	Amber	Green	✓			✓
LV Generation Site Specific	Red	Amber	Green	✓			✓
LV Sub Generation Site Specific	Red	Amber	Green	✓			✓
HV Generation Site Specific	Red	Amber	Green	✓			✓
LV Site Specific Storage Import	Red	Amber	Green	✓	✓	✓	✓
LV Sub Site Specific Storage Import	Red	Amber	Green	✓	✓	✓	✓
HV Site Specific Storage Import	Red	Amber	Green	✓	✓	✓	✓

## Capacity charges

### Maximum Import Capacity

148. The Maximum Import Capacity (MIC) will be charged on a site basis (p/kVA/day).
149. The level of MIC will be agreed at the time of connection and when an increase has been approved. Following such an agreement (be it at the time of connection or an increase) no reduction in MIC will be allowed for a period of one year (subject to Part 4 below).
150. Subject to Part 4 below, reductions to the MIC may only be permitted once in a 12 month period and no retrospective changes will be allowed. Where MIC is reduced the new lower level will be agreed with reference to the level of the customers' maximum demand. It should be noted that where a new lower level is agreed the original capacity may not be available in the future without the need for network reinforcement and associated cost.
151. For LDNO connections, if capacity ramping has been agreed with the DNO Party, in accordance with the DNO Party's connection charging methodology, the phasing profile will apply instead of the above rules. Where an LDNO has agreed a phasing of capacity this will be captured in the Bilateral Connection Agreement with the DNO Party.

### Standby Capacity for Additional Security on Site

152. Where standby capacity charges are applied, the charge will be set at the same rate as that applied to normal MIC.

### Exceeded Capacity

153. Where a customer takes additional capacity over and above the MIC without authorisation, the excess will be classed as exceeded capacity. The exceeded portion of the capacity will be charged at the exceeded capacity rate (p/kVA/day). The exceeded capacity will be charged for the duration of the month in which the breach occurs and derived as follows:

$$\text{Exceeded capacity (kVA)} = \max (0, \text{Chargeable capacity} - \text{MIC})$$

Where:

Chargeable capacity = actual capacity utilised as set out below

MIC = Maximum Import Capacity

### Minimum Capacity Levels

154. There is no minimum capacity threshold.

### Capacity Value Calculations – Import

155. The actual capacity utilised will be calculated by the following formula:

$$\text{Import Demand} = 2 \times \sqrt{\text{AI}^2 + \max(\text{RI}, \text{RE})^2}$$

Where:

AI = Import consumption in kWh

RI = Reactive import in kVArh

RE = Reactive export in kVArh

Import Demand = kVA

156. This calculation is completed for every half hour and the maximum value from the billing period is captured.
157. Not used.
158. Only kVArh Import and kVArh Export values occurring at times of kWh Import are used.

### Capacity Value Calculations – Export

159. The actual capacity utilised will be calculated by the following formula:

$$\text{Export Demand} = 2 \times \sqrt{\text{AE}^2 + \max(\text{RI}, \text{RE})^2}$$

Where:

AE = Export production in kWh

RI = Reactive import in kVArh

RE = Reactive export in kVArh

Export Demand = kVA

160. This calculation is completed for every half hour and the maximum value from the billing period is captured.
161. The export demand value is calculated to record the highest export value and used for information only.
162. Only kVArh Import and kVArh Export values occurring at times of kWh Export are used.

### Reactive power charges

163. Reactive power charges will be applied based on chargeable reactive power. The charge will be p/kVArh for units in excess of a set amount.
164. The chargeable reactive power units will be calculated by the following formulae.

#### Chargeable Reactive Power Unit Calculations - Import

$$\text{Chargeable kVArh} = \max\left(\max(\text{RI}, \text{RE}) - \left(\sqrt{\left(\frac{1}{0.95^2} - 1\right)} \times \text{AI}\right), 0\right)$$

Where:

AI = Import consumption in kWh

RI = Reactive Import in kVArh

RE = Reactive export in kVArh

165. The 0.95 constant refers to the reactive charging threshold and the design power factor of the network model within the CDCM.
166. This calculation is completed for every half hour and the values summated over the billing period.
167. Only kVArh Import and kVArh Export values occurring at kWh Import are used.
168. The square root calculation will be to two decimal places.

#### Chargeable Reactive Power Unit Calculations - Export

$$\text{Chargeable kVArh} = \max\left(\max(\text{RI}, \text{RE}) - \left(\sqrt{\left(\frac{1}{0.95^2} - 1\right)} \times \text{AE}\right), 0\right)$$

Where:

AE = Export production in kWh

RI = Reactive import in kVArh

RE = Reactive export in kVArh

169. The 0.95 constant refers to the reactive charging threshold and the design power factor of the network model within the CDCM.
170. This calculation is completed for every half hour and the values summated over the billing period.
171. Only kVArh Import and kVArh Export values occurring at kWh Export are used.
172. The square root calculation will be to two decimal places.

#### **Charging decimal places**

173. DNO Parties will set unit charges (kWh) and reactive power charges (kVArh) to three decimal places. The rates for fixed charges and capacity charges and exceeded capacity charges will be set to two decimal places.

### Part 3 — Network Unavailability Rebate Payments

174. A compensation payment may be payable to customers for network outages under two schemes.
175. The majority of customers are compensated under the Guaranteed Standards arrangements set out in The Electricity (Standards of Performance) Regulations 2015.
176. Customers who are off supply for greater than defined periods of time are entitled to a payment. This scheme applies to all demand customers and to all generators not included in the scheme described below.
177. For customers with generation connected at more than 1,000 volts and who have agreed a standard connection the following scheme will apply. This scheme is known as Distributed Generation Network Unavailability Rebate and payments will be calculated for each generator on the following basis:

$$\text{Payment} = A * B * (C - D)$$

Where:

A = the network unavailability price of £2 per MW per hour.

B = incentivised generator capacity; the highest active electrical power that can be generated (or the relevant incremental change of this amount in cases of the expansion of existing generation plant) by the generator for the year, according to the connection and/or use of system agreement(s).

C = network interruption duration; the total duration of all occurrences (in minutes) on the network each of which involves a physical break in the circuit between itself and the rest of the system or due to any other open circuit condition, which prevents the generator from exporting power. It excludes:

- 50 per cent of the total duration of cases where the DNO Party takes pre-arranged outages of its equipment for which the statutory notification has been issued to the generator;
- the cases where the generator has specific exemption agreements with the DNO Party in the connection and/or use of system agreement(s); and

- the cases which are part of exempted events in the quality of service incentive or the Guaranteed Standard Statutory Instrument (such exemptions include interruptions of less than three minutes duration and industrial action).

D = the baseline network interruption duration for the relevant year which either has a default value of zero or some other value agreed between the customer and the DNO Party and recorded within either; the connection offer, connection agreement and/or use of system agreement(s).

178. Distributed Generation Network Unavailability Rebate scheme payments will be calculated by the DNO Party on an annual basis (1st April - 31st March) and payments made shortly after the end of each year. This payment is automatic and does not need to be claimed by the generation customer. The de minimis level of rebate is £5 (and below that amount no payment will be made).



**Part 4 – Transitional Protection for Customers affected by BSC Modification P272**

179. This Part 4 sets out the transitional protection for Customers who may be affected by BSC Modification P272, being demand Customers in Profile Class (PC) 5-8 which are required to become half-hourly settled (where capable metering has been installed).
180. This Part 4 forms part of the CDCM, but also applies to IDNO Parties and to DNO Parties acting outside of their distribution services area.
181. Subject to paragraph 183 below, where:
- (a) a Customer takes a supply of electricity at a Premises where the electricity conveyed to the Premises is recorded through a CT meter; and
  - (b) the Metering Point for such Premises has, on or before 31 March 2017, been migrated to Measurement Class C or E, as a result of BSC Modification P272,
- then, for a period of twelve months immediately following the date of the migration to Measurement Class C or E, a lower Maximum Import Capacity (**MIC**) may be agreed between the Customer and the DNO/IDNO Party. In such circumstances, the revised MIC will be applied retrospectively from the date of the migration to Measurement Class C or E.
182. In respect of any change in MIC under paragraph 181 above:
- (a) such revised MIC will be agreed with reference to the level of the Customer's maximum demand;
  - (b) no further changes in MIC shall be permitted under paragraph 181 above; and
  - (c) paragraphs 149 and 150 of the CDCM (or any equivalent or similar statements in the applicable charging methodology if the CDCM does not apply) shall apply to the revised MIC from the date the retrospective change is agreed.
183. Paragraph 181 above shall not apply:
- (a) where a Connection Agreement has been entered into for the Premises within the twelve months immediately prior to the date of the change in Measurement Class, in which case the terms of that Connection Agreement shall stand; or

- (b) where the Customer was neither the owner nor the occupier of the Premises at the time of the migration to Measurement Class C or E.

184. In this Part 4, the following definitions shall apply:

<b>BSC Modification P272</b>	means the modification to the BSC referred to as modification ‘P272, Mandatory Half Hourly Settlement for Profile Classes 5-8’, which was approved by the Authority on 29 October 2014.
<b>Measurement Class</b>	has the meaning given to that expression in the BSC.
<b>Profile Class</b>	has the meaning given to that expression in the BSC.

#### **Glossary of Terms used in this Schedule 16**

In this Schedule 16, except where the context otherwise requires, the expressions in the left-hand column below shall have the meaning given to them in the right-hand column below:

<i>Term</i>	<i>Meaning</i>
<b>allowed revenue</b>	the DNO Party’s “Combined Allowed Distribution Network Revenue” (as defined in the DNO Party’s price control conditions).
<b>all-the-way tariff</b>	a tariff applicable to an end user rather than an LDNO.
<b>boundary tariff</b>	a tariff for use of the DNO Party’s network by an LDNO where charges are based on boundary flows.
<b>CDCM</b>	the Common Distribution Charging Methodology.
<b>charging year</b>	the 12-month period ending on a 31st March for which charges and credits are being calculated.

<i>Term</i>	<i>Meaning</i>
<b>coincidence factor</b>	for a user category, aggregate load at the time of the DNO Party's system simultaneous maximum load divided by maximum aggregate load.
<b>Common Distribution Charging Methodology</b>	the methodology of that name with which the DNO Party is obliged to comply under its Distribution Licence.
<b>contribution proportion</b>	the proportion of asset annuities which are deemed covered by customer contributions. This is defined for each combination of a tariff and a network level.
<b>customer contribution</b>	capital charges payable by customers under the DNO Party's connection charging policy.
<b>CT</b>	Current Transformer, indicating metering which uses current transformers to induce a reference current which is then passes through the meter (as compared to non-CT or whole current metering, where the full electrical current passes through the meter).
<b>distribution time bands</b>	the time bands described in paragraphs 40, 41 and 135.
<b>diversity allowance</b>	the extent, expressed as a percentage, to which the sum of the maximum load across all assets in the modelled network level is expected to exceed the simultaneous maximum load for the network level as a whole, as per paragraph 27.
<b>DRM</b>	distribution reinforcement model. This may refer either to a 500 MW network model or to a cost allocation method based on such a model.
<b>EDCM</b>	means the EHV distribution charging methodology as described in Schedule 17 or Schedule 18 (as applicable to each DNO Party).

<i>Term</i>	<i>Meaning</i>
<b>EHV</b>	EHV refers to nominal voltages of at least 22kV and less than 132kV; network elements with a nominal voltage of 132kV are excluded from EHV for the purpose of this Schedule 16.
<b>Electricity Storage</b>	is the conversion of electrical energy into a form of energy, which can be stored, the storing of that energy, and the subsequent reconversion of that energy back into electrical energy.
<b>Eligible Bad Debt</b>	means any bad debts with respect to Use of System Charges that the DNO Party can recover in accordance with the DNO Party's Distribution Licence. For the avoidance of doubt, this definition includes the DNO Party's bad debt and bad debt which the DNO Party is recovering on behalf of LDNOs.
<b>Eligible Electricity Storage Facility</b>	<p>means a facility at which Electricity Storage occurs and that:</p> <p>(a) has an export MPAN and an import MPAN with associated metering equipment which only measure export from Electricity Storage and import for or directly relating to Electricity Storage (and not export from another source or import for another activity);</p> <p>(b) all metering equipment referred to in point (a) above is CT metering; and</p> <p>is subject to certification from a Supplier Party that the facility meets the above criteria, which certificate has been provided to the DNO/IDNO Party.</p>
<b>embedded network</b>	an electricity distribution system operated by an LDNO and embedded within the DNO Party's network.
<b>end user</b>	is a user, but excluding LDNOs.
<b>excluded revenue</b>	revenue from "Excluded Services" (as defined in the price control conditions).

<i>Term</i>	<i>Meaning</i>
<b>Forecast Business Plan Questionnaire or FBPQ</b>	the questionnaire that the DNO Party is required to submit under the Regulatory Instructions and Guidance issued by the Authority under the DNO Party's Distribution Licence.
<b>GSP</b>	grid supply point: where the network is connected to a transmission network.
<b>HV</b>	nominal voltages of at least 1kV and less than 22kV.
<b>kV</b>	Kilovolt (1,000 Volts): a unit of voltage.
<b>kVAr</b>	Kilo Volt Ampere reactive: a unit of reactive power flow.
<b>kVArh</b>	Kilo Volt Ampere reactive hour: a unit of total reactive power flow over a period of time.
<b>kW</b>	Kilowatt (1,000 Watts): a unit of power flow.
<b>kWh</b>	Kilowatt hour: a unit of energy.
<b>LDNO</b>	a licensed distribution network operator, meaning an IDNO Party or DNO Party operating an electricity distribution system outside of its Distribution Services Area.
<b>load factor</b>	for a user category, average load divided by maximum aggregate load.
<b>LV</b>	nominal voltages of less than 1kV.
<b>LV Mains</b>	LV distributing mains where: <ul style="list-style-type: none"> <li>(a) the upper boundary is at the secondary side (LV) of a distributor transformer; and</li> <li>(b) the lower boundary is the point of connection associated with the LV service.</li> </ul>

<b><i>Term</i></b>	<b><i>Meaning</i></b>
<b>LV Services</b>	the service line from the LV main to the DNO's protection device situated upon the customer's premises, including the joint and associated components connecting the service line to the distributing main.
<b>Measurement Class</b>	has the meaning given to that expression in the BSC.
<b>modern equivalent asset and modern equivalent asset value</b>	is a reference to the cost of replacing an asset at the time of the calculation.
<b>MPAN</b>	the unique number identifying a particular Metering Point or Metering System.
<b>MVA</b>	Mega Volt Ampere (1,000 kVA): a unit of network capacity.
<b>MW</b>	Megawatt (1,000 kW): a unit of power flow.
<b>MWh</b>	Megawatt hour (1,000 kWh): a unit of energy.
<b>network</b>	the DNO Party's Distribution System within the DNO Party's Distribution Services Area.
<b>network level</b>	the network is modelled as a stack of circuit and transformation levels between supplies at LV and the transmission network. A network level is any circuit or transformation level in that stack. Additional network levels are used for transmission exit and for LV and HV customer assets.
<b>network model</b>	a costed design for a 500 MW extension to the DNO Party's network, as described in paragraph 16.
<b>peaking probability</b>	is the peaking probability described in paragraph 49.

<b><i>Term</i></b>	<b><i>Meaning</i></b>
<b>power factor</b>	the ratio of energy transported (kW) to network capacity used (kVA).
<b>portfolio tariff</b>	a tariff for use of the DNO Party's network by an LDNO where charges are based on flows out of/into the LDNO's electricity distribution system from its end users or further nested networks.
<b>price control conditions</b>	the charge restriction conditions contained as special conditions within the DNO Party's Distribution Licence.
<b>profile class</b>	has the meaning given to that expression in the Balancing and Settlement Code.
<b>regulatory asset value</b>	is the DNO Party's regulatory asset value as described in the Regulatory Instructions and Guidance issued by the Authority under the DNO Party's Distribution Licence.
<b>Related MPAN</b>	has the meaning given to the expression "Related Metering Points" in the Retail Energy Code.
<b>RRP</b>	regulatory reporting pack, a dataset produced each year by each DNO Party for the Authority.
<b>service model</b>	a costed design for the typical dedicated assets of a category of network users.
<b>standing charge</b>	any fixed or capacity charge that does not depend on actual use of the network.
<b>Supercustomer</b>	in relation to billing, is billing by Settlement Class.
<b>Supplier of Last Resort</b>	a supply licensee to which a Last Resort Supply Direction applies, where Last Resort Supply Direction has the meaning given to that expression in the Supply Licence.
<b>system simultaneous maximum load</b>	the maximum load for the GSP Group as a whole.

<i>Term</i>	<i>Meaning</i>
<b>time pattern regime or TPR</b>	means a code that is used to identify the switching times of a meter register.
<b>unit</b>	where the context permits, the word unit refers to kWh.
<b>unit rate</b>	a charging or payment rate based on units distributed or units generated. Unit rates are expressed in p/kWh. Tariffs applied to multi-rate meters and/or using several time bands for charging have several unit rates.
<b>user</b>	refers to customers (whether demand customers or generators) and (where relevant) LDNOs.