User manual for the dcmf.co.uk EDCM workbooks

16 August 2017, Franck Latrémolière

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Introduction to the EDCM

1. The EDCM is a charging methodology used by distribution network operators (DNOs) in England, Wales and Scotland to set site-specific distribution use of system charges for some of their high-voltage and extra-high-voltage customers.

2. The dcusa.co.uk website provides official methodology documents (as schedules 17 and 18 of the DCUSA document) and spreadsheet models for the EDCM.

3. The methodology documents are complex, covering more than 100 pages of opaque language and equations. Nothing on the dcusa.co.uk website provides a guide to the main parts of the methodology or an illustration of how it operates in practice.

4. The dcusa.co.uk EDCM workbooks have limited usability, because:

   (a) A dcusa.co.uk EDCM workbook only works when populated with data for every EDCM customer in the relevant DNO area. These data are detailed and confidential, which means that nobody other than the DNO's staff can access populated model. This makes it hard for third parties such as customers, suppliers and other distributors to validate the calculations made by the DNO's staff or to estimate the impact of potential changes to their circumstances.

   (b) A dcusa.co.uk EDCM workbook contains space for 600 individual tariffs, making it a large and unwieldy beast requiring a lot of vertical scrolling.

(c) The way in which the calculations in a dcusa.co.uk EDCM workbook are laid out makes it difficult to follow or understand. The centre of the model is a very large matrix which requires a lot of horizontal scrolling (in addition to the vertical scrolling); and there are links back and forth between that matrix and other sheets in the model. The attempt at displaying the model's equations in human-readable form is negated by the fact that the relevant rows are hidden by default and that scrolling no longer operates properly if these rows are unhidden.

Purpose of the dcmf.co.uk EDCM workbooks

5. The website dcmf.co.uk provides alternative spreadsheet implementations of the EDCM which attempt to rectify some of the defects highlighted above. This is an unofficial resource unaffiliated with DCUSA or any DNO.

6. The dcmf.co.uk EDCM models are designed to offer the following benefits:

(a) The dcmf.co.uk EDCM workbooks provide a separation in input data between individual tariff inputs and inputs of DNO-wide aggregates. This enable workbooks that contain no data that would be confidential to other customers, and thus helps customers and other interested parties to understand the EDCM methodology and to analyse possible scenarios.

(b) A dcmf.co.uk EDCM workbook can operate with a limited number of tariff lines, which can be used for additional customers and/or additional scenarios, without having to scroll past hundreds of other tariff lines.

(c) The dcmf.co.uk EDCM workbooks are laid out like a book, to be read from top to bottom and left to right, with a reasonable table width (little horizontal scrolling required), and a strict policy that all formula references are to previous tables, ensuring that calculations are presented in a logical order.

(d) The dcmf.co.uk website offers pre-populated versions of the dcmf.co.uk EDCM workbooks containing the input data that are publicly available. These models cannot be used, without more, to validate DNO tariff calculations. This is because DNOs have chosen not to disclose the non-confidential aggregate parameters that are shown and used within their confidential EDCM models. In order to use these models, it is necessary to obtain the missing data, either by asking the DNO for it nicely or through reverse engineering (depending on the DNO). Ofgem has not promoted transparency in the application of the EDCM, and refuses to collect data from DNOs, thus keeping non-confidential aggregate data out of the scope of the Freedom of Information Act.

(e) The dcmf.co.uk EDCM workbooks are licensed on open-source terms, with the source code underpinning the spreadsheet generation website available from https://github.com/f20/power-models. Open source licensing allows users to rely on continued availability of these models in the future, and permits the creation of derivative works to address any issues or implement additional features.

Overview of a dcmf.co.uk EDCM workbook

7. Table 1 lists the worksheets in a dcmf.co.uk EDCM workbook.

Table 1 Worksheets in a dcmf.co.uk EDCM workbook

Sheet name	*Summary of contents*
Index	This sheet lists the data tables in the workbook and provides hyperlinks to each dataset. (Hyperlinks might not work if the workbook is displayed within a web browser. To get the full functionality, save the model as a file and open it in Microsoft Excel or compatible software.)
11	This sheet contains DNO-wide input data and is documented in more detail below.
911 or 913	This sheet contains the results of the DNO "charge 1" power flow analysis and is documented in more detail below. The sheet is labelled 911 for the EDCM/FCP variant of the EDCM charging methodology, and 913 for the EDCM/LRIC variant.
935	This sheet contains input data specific to the customer sites whose tariffs are being calculated in the workbook.
Calc	This sheet contains all the calculations. It can be very long if there are many tariff lines in the model, but all its contents are kept to a reasonable width and the calculation are presented in the order in which they are performed.
Results	This sheet shows the tariffs in a format similar to Annex 2 of a DNO charging statement.
HSummary	This sheet provides estimates of annual charges and some analysis of the different charging elements. Most DNOs are willing to provide the relevant data in the equivalent sheet of their EDCM workbook to individual customers on request, which provides a route to validating tariff calculations in more detail.
DNO totals	This summarises all the non-confidential DNO-wide aggregates that were used in the Calc sheet. The equivalent sheet in a dcusa.co.uk EDCM workbook is labelled "OneLiners". When a DNO makes them available, data from the DNO totals or OneLiners sheet of a populated EDCM workbook provide the easiest way of populating relevant aggregates in tables 1191–1193 (sheet 11) in a dcmf.co.uk EDCM tariff validation model.
LDNORev	This sheet contains calculations of tariffs payable by IDNOs in resect of customers supplied at HV (away from a primary substation) or at LV and where the IDNO/DNO boundary is at a primary substation or at EHV.
Total revenue	This sheet (not always included) estimates total revenues from all EDCM tariffs. It is only of use to DNOs seeking to comply with their price control maximum allowed revenue constraint (this compliance cannot be managed within the EDCM workbook since maximum allowed revenue applies across the CDCM, the EDCM and any other charging methodology that the DNO might use).

8. Each sheet is structured as a list of data tables, to be read from top to bottom — like a book.

9. Each data table has three or four digit table number:

   (a) Numbers that start with 9 or 11 are assigned for input data tables and their numbers do not change from version to version of the workbook. These input data tables are on sheets 911, 913, 935 or 11.

   (b) Other table numbers are assigned to tables that contain intermediate calculations or present the results. The names, numbers, content or order of these tables could vary between versions of the EDCM workbook.

10. The remainder of this document provides some additional information on each input data table.

DNO-wide input data (sheet 11)

1100. Company name, charging year and version

11. The input data entered in the three boxes in table 1100 will be reproduced at the top of each sheet in the workbook.

1101. Financial Information

12. This table collects a variety of input data, most of which can be sourced from the input data sheet of the DNO's CDCM model for the relevant year.

O&M charging rate based on FBPQ data (£/kW/year)

13. Under the methodology, this O&M charging rate (which is the main driver of export capacity charges) is set at £0.20/kW/year.

Direct cost (£/year)

14. This is intended to represent the total direct operating costs across the network relating to inspection and maintenance (including tree cutting) and direct operating costs on faults. This number can be obtained from table 1059 of the CDCM model.

Indirect cost (£/year)

15. This is the total indirect costs across the network. This number can be obtained from table 1059 of the CDCM model.

Network rates (£/year)

16. This is the total business rates (network rates) payable by the DNO in the charging year. This number can be obtained from table 1059 of the CDCM model.

The amount of money that the DNO wants to raise from use of system charges (£/year)

17. This is the total revenue for Use of System Charges from table 1001 of the CDCM model.

18. Some legacy versions of EDCM workbooks required the entry of "the amount of money that the DNO wants to raise from use of system charges, less transmission exit (£/year)", instead of the gross target revenue figure which is now required.

Transmission exit charges £/year

19. This is the total forecast annual expenditure on transmission connection point charges. This number can be taken from input data table 1055 of the CDCM model.

Note on legacy versions

20. In some legacy versions of the EDCM workbook, the data now provided in tables 1101, 1110 and 1118 were combined into a single table 1113.

1105. Diversity allowance between level exit and GSP Group

21. These allowances relate to the diversity implied by the DNO's 500MW model, measured all the way between the DNO's GSP Group and the bottom of each network level.

22. The relevant figures are calculated within the CDCM model. In some versions of the CDCM model, they can be found in table 2611.

23. In recent dcusa.co.uk EDCM workbooks, tables 1105, 1122, 1131 and 1135 are combined into a single table 1140. This change has not been made in dcmf.co.uk EDCM workbooks because the concepts are completely different and subsequent formulas are more transparent if the different inputs are kept separate.

1110. Calendar and timeband information

Days in year

24. This cell should contain the number of days in the charging year. This number is used to calculate daily charging rates.

Annual hours in super red

25. This is the annual number of hours in the DNO's super red time band.

Note on legacy versions

26. In some legacy versions of the EDCM workbook, the data now provided in tables 1101, 1110 and 1118 were combined into a single table 1113.

1118. Generation data

Average adjusted GP (£/year)

27. This cell is now set to zero. In some previous years a non-zero figure was derived from DNO price control data.

GL term from the DG incentive revenue calculation (£/year)

28. This cell is now set to zero. In some previous years a non-zero figure was derived from DNO price control data.

Total CDCM generation capacity 2005-2010 (kVA)

29. This is the sum of the export capacities of all non-exempt CDCM generators in the DNO area that connected on or after 1 April 2005, but before 1 April 2010. This information needs to be obtained from the relevant DNO.

Total CDCM generation capacity post-2010 (kVA)

30. This is the sum of the export capacities of all non-exempt CDCM generators in the DNO area that connected on or after 1 April 2010. This information needs to be obtained from the relevant DNO.

Note on legacy versions

31. In some legacy versions of the EDCM workbook, the data now provided in tables 1101, 1110 and 1118 were combined into a single table 1113.

1122. Forecast system simultaneous maximum load (kW) from CDCM users

32. These figures relate to CDCM users only. They are calculated in the CDCM model. In some versions of the CDCM model, they can be found in table 2506.

33. In recent dcusa.co.uk EDCM workbooks, tables 1105, 1122, 1131 and 1135 are combined into a single table 1140. This change has not been made in dcmf.co.uk EDCM workbooks because the concepts are completely different and subsequent formulas are more transparent if the different inputs are kept separate.

1131. Assets in CDCM model (£)

34. This is the MEAV of assets required by CDCM users at each network level, to be used to allocate allowed revenue for demand scaling. These data are calculated in the CDCM model. In some versions of the CDCM model, they can be found in table 2705.

35. The data in table 1020 of the CDCM model should not be entered in this table, as they relate to a hypothetical 500 MW of load at each network level, not to the actual CDCM loads, and also exclude service model assets which should be included in table 1131.

36. In recent dcusa.co.uk EDCM workbooks, tables 1105, 1122, 1131 and 1135 are combined into a single table 1140. This change has not been made in dcmf.co.uk EDCM workbooks because the concepts are completely different and subsequent formulas are more transparent if the different inputs are kept separate.

1132. Override notional asset rate for 132kV/HV (£/kW)

37. This should be left blank (or #VALUE) if the cell corresponding the 132kV/HV network level in table 1131 has a valid value entered.

38. Otherwise, this should contain the £/kW notional asset rate that should be used in the model for the 132kV/HV network level.

39. If table 1131 and 1132 both contain values for the 132kV/HV network level, the number in table 1132 are used in the workbook.

40. The information in this table needs to be obtained from the relevant DNO.

1133. Maximum network use factor

41. These figures are common to all DNOs but are not routinely published. They may change from year to year. They need to be obtained from a DNO.

42. In recent dcusa.co.uk EDCM workbooks, tables 1133 and 1134 are combined into a single table 1136. This change has not been made in dcmf.co.uk EDCM workbooks because the way in which the figures enter into formulas is different for the maximum and minimum network use factors so they are best kept as separate input data tables.

1134. Minimum network use factor

43. These figures are common to all DNOs but are not routinely published. They may change from year to year. They need to be obtained from a DNO.

44. In recent dcusa.co.uk EDCM workbooks, tables 1133 and 1134 are combined into a single table 1136. This change has not been made in dcmf.co.uk EDCM workbooks because the way in which the figures enter into formulas is different for the maximum and minimum network use factors so they are best kept as separate input data tables.

1135. Loss adjustment factor to transmission for each network level

45. This is the loss adjustment factor between the transmission level and the bottom of each network level. It is laid out in a form that can be copied to table 1135 within the CDCM model. In some versions of the CDCM model, this is table 2004.

46. In recent dcusa.co.uk EDCM workbooks, tables 1105, 1122, 1131 and 1135 are combined into a single table 1140. This change has not been made in dcmf.co.uk EDCM workbooks because the concepts are completely different and subsequent formulas are more transparent if the different inputs are kept separate.

1181. LDNO discounts

47. This table should be populated with discount percentages from the method M model. DNOs other than those operated by SP Energy Network publish their method M models. Data published by DNO are reproduced (subject to any errors or omissions) on the Method M section of the dcmf.co.uk spreadsheet generation service, https://dcmf.co.uk/models/modelm-core.html.

1182. CDCM end user tariffs

48. This table should be populated with CDCM end user tariffs from table 3701 of the CDCM model.

1183. LDNO volume data

49. This table, if present, can be populated with volume data. If provided, these data are only used to calculate total revenues from EDCM tariffs.

1190. Is this the master model containing all the tariff data?

50. This is the master switch to determine how the workbook operates.

51. If this is set to TRUE or to #VALUE!, then the data in tables 1191 to 1193 are ignored, and DNO-wide aggregated parameters are calculated by reference to the tariff-specific data in table 935. This is only appropriate for a model used by DNO staff and containing data for all customers.

52. If this is set to FALSE, then the aggregates from tables 1191 to 1193 are used, subject to the following modifications:

    (a) Data from any line in table 935 where the tariff name contains "[ADDED]" are added to the aggregates. This is useful to model the impact of adding a tariff to the model.

    (b) Data from any line in table 935 where the tariff name contains "[REMOVED]" are removed from the aggregates. Taken together with the "[ADDED]" feature, this is useful to model the impact of making a change to an existing tariff in the model (by "removing" the existing data and "adding" the revised data).

    (c) All other lines in table 935 are not taken into account in the calculation of aggregates. This is useful for rapid modelling of multiple scenarios in cases where the additional tariffs would have only a small impact on the DNO-wide aggregates anyway.

1191. Baseline EDCM demand and revenues aggregates

53. This table contains DNO-wide aggregates related to EDCM demand and revenues affecting demand charges. The data in this table are only used if the table 1190 master switch is set to FALSE.

Baseline total EDCM peak time consumption (kW)

54. This is the sum of estimated average consumption during super-red for all EDCM import tariffs (including LDNO tariffs set on a site-specific basis). It is used to allocated transmission exit charges to import capacity charges.

Baseline total marginal effect of indirect cost adder (kVA) and Baseline total marginal effect of demand adder (kVA)

55. These two figures are the same (they used to be different but that difference was removed by a change to the methodology).

56. It is the sum of estimated average consumption during super-red and half of maximum import capacity for EDCM end-user tariffs, plus half of the same calculation for LDNO import tariffs set on a site-specific basis. It is used to allocate indirect costs and a (usually fairly small) "fixed adder" to import capacity charges.

Baseline revenue from demand charge 1 (£/year)

57. This is the sum of all income forecast to be collected as a result of charge 1. It is used in adjusting the "fixed adder" and "asset adder" to match revenue from EDCM customers with the EDCM "revenue pot" calculated in the model.

Baseline net forecast EDCM generation revenue (£/year)

58. This is the forecast net income from all EDCM export tariffs (including LDNO tariffs set on a site-specific basis). The netting is between income from fixed charges and capacity charges and any payments for unit rate credits.

1192. Baseline EDCM generation aggregates

59. This table contains DNO-wide aggregates related to EDCM generation. The data in this table are only used if the table 1190 master switch is set to FALSE.

Baseline total chargeable export capacity (kVA)

60. This is the sum of non-exempt parts of maximum export capacity for all EDCM export tariffs (including LDNO tariffs set on a site-specific basis). The exemption referred to here is a 25-year exemption from EDCM charges and credits for generators connected to DNO systems before 1 April 2005.

Baseline total non-exempt 2005-2010 export capacity (kVA)

61. This is the sum of non-exempt parts of maximum export capacity for EDCM export tariffs (including LDNO tariffs set on a site-specific basis) where the capacity was first provided between April 2005 and April 2010.

Baseline total non-exempt post-2010 export capacity (kVA)

62. This is the sum of non-exempt parts of maximum export capacity for EDCM export tariffs (including LDNO tariffs set on a site-specific basis) where the capacity was first provided in or after April 2010.

1193. Baseline EDCM notional asset aggregates

63. This table contains DNO-wide aggregates related to notional assets used by EDCM demand and generation. The data in this table are only used if the table 1190 master switch is set to FALSE.

Baseline total sole use assets for demand (£)

64. This is the sole use asset value allocated to demand (import).

Baseline total sole use assets for generation (£)

65. This is the sole use asset value allocated to generation (export).

Baseline total notional capacity assets (£) and Baseline total notional consumption assets (£)

66. Only the sum of these two numbers is used in the workbook. It represents the notional value of EDCM shared assets deemed required to meet EDCM demand, calculated using uncapped/uncollared network use factors.

Baseline total non sole use notional assets subject to matching (£)

67. It represents the notional value of EDCM shared assets deemed required to meet EDCM demand, calculated using capped/collared network use factors.

Baseline total demand sole use assets qualifying for DCP 189 discount (£)

68. This is the amount of assets included in demand sole use assets which are exempt from a portion of the fixed charges under the arrangements put in place by DCP 189 for some legacy sites.

Power flow modelling data (sheet 911 or 913)

911. FCP power flow modelling data

69. Sheet 911 is only included in FCP models. The DNO areas in which the FCP model is used are:

    (a) SP Distribution.

    (b) SP Manweb.

    (c) Southern Electric Power Distribution.

    (d) Scottish Hydro Electric Power Distribution.

(e) WPD East Midlands.

(f) WPD West Midlands.

70. Table 911, the only table in sheet 911, contains outputs from the FCP power flow modelling and reinforcement costing analysis.

71. The columns labelled "Not used" have no conceivable purpose, but they do little harm. They are included to ensure consistency with the table structure of dcusa.co.uk EDCM workbooks.

72. A description of each column in table 911 follows below.

Location name/ID

73. This is an identifier for the location to which each row relates. The location might be either a network group or a pseudo-hybrid network group in the case of a network group with two or more parent or grandparent groups.

74. This identifier needs to be unique. Any combination of letters and numbers is permissible, provided that it is unique in Microsoft Excel's view.

Level

75. Information entered in this column is not used in the workbook.

Parent location (if any)

76. This column contains the location name/ID of the higher level network group serving the location. This is to be left blank if the location is at the top of the hierarchy.

Charge 1 £/kVA/year

77. This is the network group charge in £/kVA/year for demand (load). Under the FCP methodology, this number is always zero or positive. If this number is positive, it will be a charge to demand users connected to that network group, and a credit to non-intermittent generation users connected to that network group.

Not used

Maximum demand run: load kW

78. This is the total relevant active power consumption in kW in the maximum demand scenario. This number should be negative or zero.

Maximum demand run: load kVAr

79. This is the total relevant reactive power consumption in kVAr in the maximum demand scenario. This number is negative if the current to demand lags voltage.

Maximum demand run: generation kW

80. This is the total relevant active power generation in kW in the maximum demand scenario. This number should be zero or positive.

Maximum demand run: generation kVAr

81. This is the total relevant reactive power generation in kVAr in the maximum demand scenario. This number is positive if the current from generation lags voltage.

913. LRIC power flow modelling data

82. Sheet 913 is only included in LRIC models. The DNO areas in which the LRIC model is used are:

    (a) Electricity North West.

    (b) Northern Powergrid Northeast.

    (c) Northern Powergrid Yorkshire.

    (d) Eastern Power Networks.

    (e) London Power Networks.

    (f) South Eastern Power Networks.

    (g) WPD South Wales.

    (h) WPD South West.

83. Table 913, the only table in sheet 913, contains outputs from the LRIC power flow modelling and reinforcement costing analysis.

84. The columns labelled "Not used" have no conceivable purpose, but they do little harm. They are included to ensure consistency with the table structure of dcusa.co.uk EDCM workbooks.

85. A description of each column in table 913 is provided below.

Location name/ID

86. This is an identifier for the node to which each row relates.

87. This identifier needs to be unique. Any combination of letters and numbers is permissible, provided that it is unique in Microsoft Excel's view.

Demand or Generation

88. Information entered in this column is not used in the workbook.

Linked location (if any)

89. This should be blank unless this location is one of several nodes serving the same EDCM customer.

90. If an EDCM customer is served by several locations (nodes) then a chain-linked list of these locations must be established through the linked location field. The chain-linked list should be uni-directional, and not circular. For example, take a chain-linked list with three linked locations, A, B and C. One of these locations should be selected as the first link in the chain. If the first location is A, then one of either Location B or location C (let's say B) should be entered as the linked location for location A. The third location (in this case, C) should be as the linked location for location B. Location C should not have a linked location entered against it.

Local charge 1 £/kVA/year

91. This is the local £/kVA/year charge at the location under maximum demand conditions.

92. This number may be positive or negative. If this is positive, it is a charge to demand at that location or a credit to non-intermittent generation at that location.

Remote charge 1 £/kVA/year

93. This is the remote £/kVA/year charge at the location under maximum demand conditions.

94. This number may be positive or negative. If this is positive, it is a charge to demand at that location or a credit to non-intermittent generation at that location.

Not used (two columns)

Maximum demand run: kW

95. This is the total relevant active power in kW in the maximum demand scenario. This number is positive for a generation flows and negative for demand flows.

Maximum demand run: kVAr

96. This is the total relevant reactive power in kVAr in the maximum demand scenario.

97. This number has the same sign as kW in the maximum demand run if current lags voltage.

Customer-specific input data (sheet 935)

98. Sheet 935 contains a single table, also labelled 935. This table provides input information about each EDCM customer.

99. Specifically, each line in table 935 represents one of the following:

(a) An EDCM property with an import tariff and an export tariff.

(b) An EDCM property with an import-only tariff.

(c) An EDCM property with an export-only tariff.

(d) A portfolio tariff element for an EDCM-like property on an embedded network.

100. A description of each column in table 935 is provided below.

Name

101. This is a name or additional identifier for the tariff. This is for labelling purposes only and does not affect any calculations.

Maximum import capacity (kVA)

102. This is the forecast average maximum import capacity over the charging year (or the part of the year for which the customer is expected to be active). If there is no import capacity at a site, enter the text string "VOID" (not blank or zero).

Exempt export capacity (kVA)

103. This is the portion, if any, of the forecast average maximum export capacity over the charging year (or the part of the year for which the customer is expected to be active) which is exempt from use of system charges/credits under legacy arrangements for pre-2005 sites. If there is no exempt export capacity at a site, enter the text string "VOID".

Non-exempt pre-2005 export capacity (kVA)

104. This is the portion, if any, of the forecast average maximum export capacity over the charging year (or the part of the year for which the customer is expected to be active) which was first provided before 1 April 2005 but is not exempt from use of system charges/credits under legacy arrangements for pre-2005 sites. If there is no such export capacity at a site, enter the text string "VOID".

Non-exempt 2005-2010 export capacity (kVA)

105. This is the portion, if any, of the forecast average maximum export capacity over the charging year (or the part of the year for which the customer is expected to be active) which was first provided between April 2005 and April 2010. If there is no such export capacity at a site, enter the text string "VOID".

Non-exempt post-2010 export capacity (kVA)

106. This is the portion, if any, of the forecast average maximum export capacity over the charging year (or the part of the year for which the customer is expected to be active) which was first provided on or after 1 April 2010. If there is no such export capacity at a site, enter the text string "VOID".

Sole use asset MEAV (£)

107. This is the modern equivalent asset value of the sole use assets attributed to the customer associated with the site (not split between import and export tariff: that split is done within the workbook).

108. Sole use assets are defined as distributor-owned assets on which the power flow is modelled to depend only on the flow to or from the site (and not on any other power flows to/from other sites), taking into consideration all possible credible running arrangements and network switching configurations.

109. The modern equivalent asset value is the distributor's estimate of what it would cost to replace the relevant assets. For above-ground assets, civil engineering costs associated with the assets should probably not be included (although some DNOs appear to include them).

Percentage of sole use assets where Customer is entitled to reduction for capitalised O&M

110. This is the percentage of sole-use assets which are covered by legacy arrangements introduced by DCP 189. For new sites it should be zero. For pre-2005 export-dominated sites it will usually be 100 per cent.

LRIC location (in a LRIC model) or FCP network group (in a FCP model)

111. This is the identifier (location name/ID) of the lead location for this tariff in table 913 (in a LRIC model) and table 911 (in a FCP model).

112. In the case of a LRIC model, if the location is part of a chain of linked locations, the location name/ID of the first location in the chain must be entered here.

Customer category for demand scaling

113. The customer category is an identifier which represents which parts of the EHV network the customer is deemed to use.

114. Sole use assets are disregarded for the purpose of this analysis: the question is about the location of the point of common coupling, defined as the point at which the sole use assets meet the rest of the distribution network. Not that the point of common coupling might be at a different voltage than the customer's supply, and might also be at a different voltage than the voltage of connection when the customer was connected.

115. In the case of LDNO tariffs set on a site-specific basis, the customer category for each embedded customer is determined as if the entire LDNO embedded network was a single customer served by the DNO network.

116. Table 2 lists the customer categories and their meaning. In applying the definitions in table 2, the distributor can choose to treat 66kV equipment as being equivalent to 132kV equipment. GSPs are defined as substations where the distribution system meets the main onshore transmission system.

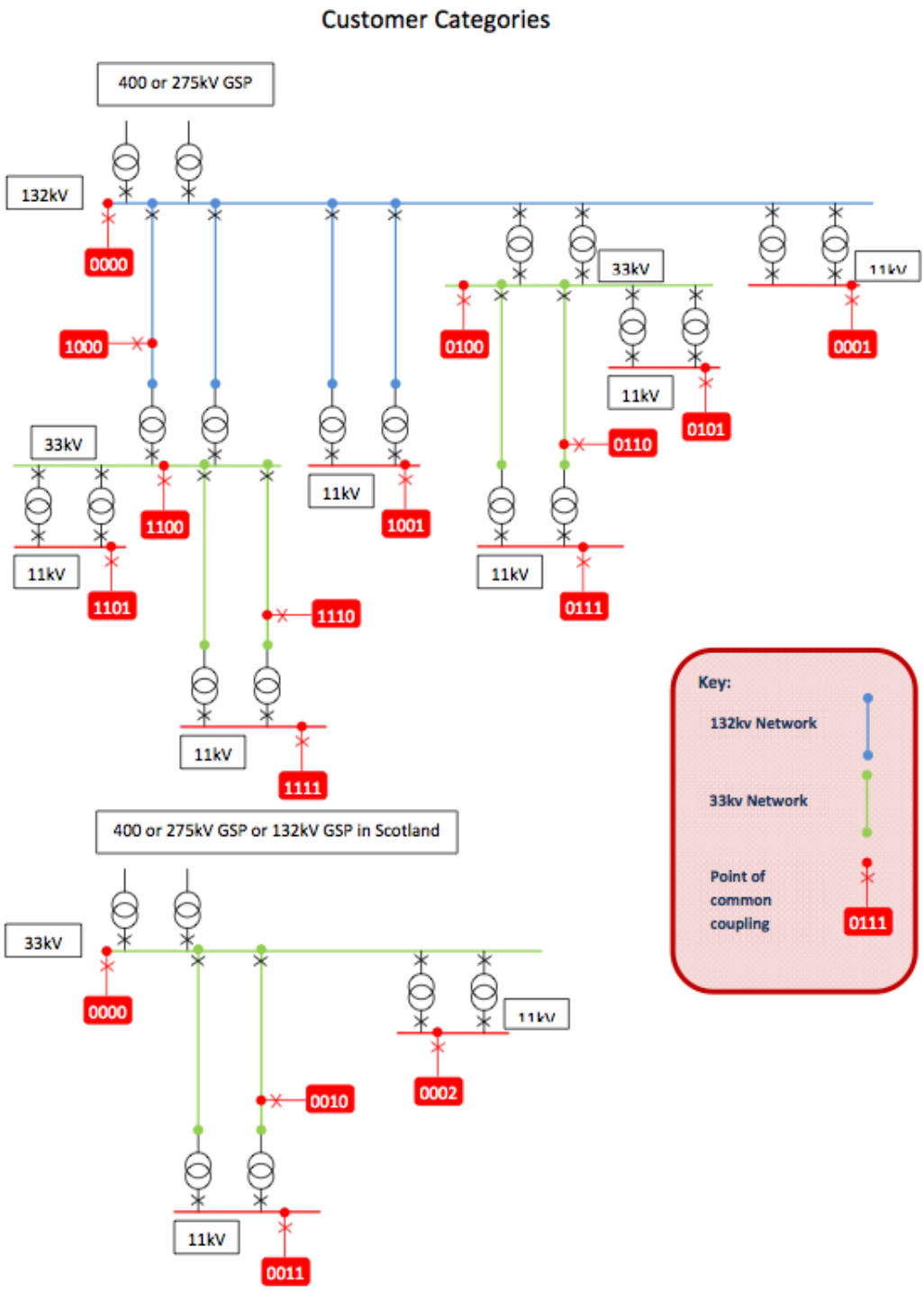
Table 2 Definition of EDCM customer categories for demand

Category	*Definition of category*
0000	Point of common coupling at the GSP, whether the GSP is shared or not.
1000	Point of common coupling at 132kV, unless the customer qualifies for category 0000.
1100	Point of common coupling at 22kV at a transformation substation whose primary side is attached to a 132kV circuit.
0100	Point of common coupling at 22kV or more, but less than 132kV, at a transformation substation whose primary side is attached at 132kV to a co-located GSP with no use of any 132kV circuits.
1110	Point of common coupling at a voltage of 22kV or more, but less than 132kV, not at a transformation substation, fed from a transformation substation whose primary side is attached to a 132kV distribution circuit.
0110	Point of common coupling at a voltage of 22kV or more, but less than 132kV, not at a transformation substation, fed from a transformation substation whose primary side is attached at 132kV to a co-located GSP with no use of any 132kV circuits.
0010	Point of common coupling at a voltage of 22kV or more, but less than 132kV, fed from a GSP with no intermediate transformation.
0001	Point of common coupling at a voltage of less than 22kV at a transformation substation whose primary side is attached at 132kV to a co-located GSP with no circuit.
0002	Point of common coupling at a voltage of less than 22kV at a transformation substation whose primary side is attached at 22kV or more but less than 132kV, to a co-located GSP with no circuit.
1001	Point of common coupling at a voltage of less than 22kV at a transformation substation whose primary side is attached to a 132kV distribution circuit.
0011	Point of common coupling at a voltage of less than 22kV at a transformation substation whose primary side is at a voltage of 22kV or more, but less than 132kV, fed from a GSP with no intermediate transformation.
0111	Point of common coupling at a voltage of less than 22kV at a transformation substation whose primary side is at a voltage of 22kV or more, but less than 132kV, fed through a distribution circuit from a substation whose primary side is attached at 132kV to a co-located GSP with no circuit.
0101	Point of common coupling at a voltage of less than 22kV at a transformation substation whose primary side is at a voltage of 22kV or more, but less than 132kV, fed from a co-located transformer whose primary side is attached at 132kV to a co-located GSP with no circuit.

Category	*Definition of category*
1101	Point of common coupling at a voltage of less than 22kV at a transformation substation whose primary side is at a voltage of 22kV or more, but less than 132kV, fed from a co-located transformer whose primary side is attached to a 132kV distribution circuit.
1111	Point of common coupling at a voltage of less than 22kV at a transformation substation whose primary side is at a voltage of 22kV or more, but less than 132kV, fed through a distribution circuit from a transformation substation whose primary side is attached to a 132kV distribution circuit.

117. Figure 1, taken from the EDCM methodology document, provides an illustration.

Figure 1 Illustration of customer categories for demand scaling



Network use factors

118. These columns contain the network use factors applicable to each network level. Blank cells will be treated as zeros.

119. In the case of a site which the DNO considers to be generation-dominated, default values for network use factors equal to the minimum network use factors in table 1134 must be entered for each relevant network level.

Super red kW import divided by kVA capacity

120. This column contains a forecast for each customer that should be calculated using historical consumption and maximum import capacity for that customer. Historical refers to the last full regulatory year for which data are available.

121. If [super-red active import] denotes active power import for each half hour in the super red time band in kWh, and average kVA is the average of the maximum import capacity over the last regulatory year for which data are available, then the formula for this item is:

Sum([super-red active import])/[super red hours]/[average kVA]

122. If the customer is new or its circumstances have changed since the last regulatory year for which data are available, an estimate of the current value should be entered.

Super red kVAr import divided by kVA capacity

123. Data in this column are not used by a LRIC workbook.

124. This column contains a forecast for each customer that should be calculated using historical net reactive power import (reactive import minus reactive export) and agreed import capacity for that customer. Historical refers to the last full regulatory year for which data are available.

125. If [super-red reactive net import] denotes net reactive power import (RI minus RE) for each half hour in the super red time band in kVArh, and average kVA is the average of the agreed import capacity over the last regulatory year for which data are available, then the formula for this item is:

Sum([super-red active import])/[super red hours]/[average kVA]

126. In the case of sites with both import and export, only reactive flows in half hours with active power import are taken into account.

127. If the DNO considers that the reactive consumption data relates to export rather than import (e.g. the average kVAr figure exceeds half of the import capacity) then the import capacity in the denominator should be replaced by the export capacity of the same customer.

128. In the case of import tariffs associated with a site which operates subject to grid code requirements for generation, this ratio should be set to zero.

129. If the customer is new or its circumstances have changed since the last regulatory year for which data are available, an estimate of the current value should be entered.

Proportion exposed to indirect cost allocation and fixed adder

130. Data in this column determines the proportion of the indirect cost allocation to demand that is charged to this tariff.

131. This column should be set to 0.5 if the tariff relates to an end-user connected to an embedded network, and 1 otherwise.

Capacity subject to DSM constraints (kVA)

132. This is usually zero. Where it is nonzero, it represents the part of the customer's maximum import capacity that is subject to constraints under a demand side management agreement.

133. For example, if the customer has a maximum import capacity of 50MVA, and an agreement exists so that the customer may be constrained down to 20MVA, the column should set to 30,000kVA.

Super red units exported (kWh)

134. This column contains the forecast active power generation over the super-red time band. It only matters where a nonzero unit credit is included in the export tariff.

Capacity eligible for GSP generation credits (kW)

135. This is usually zero. Where it is nonzero, it represents the generation capacity (kW) that would be eligible for transmission connection (exit) credits to generation. Eligibility requires an agreement with the DNO, the terms of which require the generator, for the purposes of P2/6 compliance, to export power during supergrid transformer (SGT) outage conditions.

Proportion eligible for charge 1 credits

136. This column should be set to zero if the F factor that is assigned to the customer as described in the FCP/LRIC methodology is equal to zero, and 1 otherwise.

137. The F factor to be assigned to each customer represents the percentage of the generator's declared net capacity that can be considered when assessing network security. ER P2/6 also uses the term 'Persistence' to reduce the F factor for intermittent generation, as the time period (in hours) for which its contribution to security is being assessed increases. Table 2-4 of ER P2/6 recommends values of 'Persistence'; these values are dependent on the demand class being assessed. The value of 'Persistence' to be used for intermittent generation will be as stated in Table 2-4 of ER P2/6 for 'Other outage', using the maximum GSP (or GSP groups') demand instead of the demand class of the demand group.

138. Engineering Recommendation P2/6 defines intermittent generation to be "Generation Plant where the energy source of the prime mover can not be made available on demand" and non-intermittent generation to be "Generation Plant where the energy source for the prime mover can be made available on demand".

Days for which not a customer

139. This column should be zero for customers who are expected to remain connected and energised for the whole charging year.

140. For customers who are expected to be on stream for part of the year only, this column should contain the number of days in the charging that the customer is not on.

Hours in super red for which not a customer

141. This column is set to zero for customers who are expected to remain connected and energised for all the hours in the DNO's super red time band.

142. For customers who are expected to be on stream for part of the year only, this column should contain the number of hours in the super red time band that the customer is not on.

Import charge in previous charging year (£/year)

143. This column contains the total import use of system charge that was expected to have been paid by the customer over the charging year. It is only used to display year-on-year comparisons and does not affect any tariff calculations.

Export charge in previous charging year (£/year)

144. This column contains the total export use of system charge that was expected to have been paid by the customer over the charging year. It is only used to display year-on-year comparisons and does not affect any tariff calculations.

LLFC import and LLFC export

145. These items are for labelling purposes only and do not affect any calculations.

Customer-specific tariffs (sheet Results)

146. This shows the tariffs in a format similar to Annex 2 of a DNO charging statement.

Customer-specific charge analysis (sheet HSummary)

147. This sheet provides estimates of annual charges and some analysis of the different charging elements. Most DNOs are willing to provide the relevant data in the equivalent sheet of their EDCM workbook to individual customers on request, which provides a route to validating tariff calculations in more detail.

DNO-wide input data (sheet DNO totals)

148. This summarises all the non-confidential DNO-wide aggregates used in calculations. The first three tables in this sheet, numbered 4791 to 4793, provide aggregates calculated in the model, in a format consistent with the aggregate input data in tables 1191 to 1193.