

EHV Distribution Charging Methodology (EDCM)

Appendix 2 - Report on other changes to the
EDCM since 1 April 2011
November 2011



EDCM other changes since 1 April 2011

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Introduction

1. The electricity Distribution Network Operators (DNOs), through the Energy Networks Association (ENA), jointly developed proposals for a new use of system charging methodology for higher voltage network users (the EDCM).
2. These DNOs' proposals for the EDCM were submitted by the ENA to Ofgem on 1 April 2011. This submission relates to the calculation of import and export charges for eligible customers. Documents relating to the submission and previous consultations are available to download from the website of the ENA.¹
3. On 6 September 2011, Ofgem published its decision to approve these proposals for import charges only, subject to several conditions.²
4. Subject to approval by Ofgem, EDCM import charges will apply to customers connected at extra high voltage (EHV), or connected at high voltage (HV) and metered at a primary substation from 1 April 2012.
5. Revisions to the EDCM methodology that was submitted on 1 April 2011 reflect:
 - a) Changes made by the DNOs to comply with conditions 1 and 2 of Ofgem's approval of the EDCM for demand only.
 - b) Changes necessitated by Ofgem's decision to delay the implementation of the EDCM for export charges.
 - c) Changes made to remove ambiguities or improve clarity in the original submission.
6. This document focuses on (b) and (c) above. The rest of this document is structured as follows:
 - a) An overview of the changes made to the methodology statements following Ofgem's decision to approve the part of the proposed EDCM methodology for calculating import charges, and to delay the approval of the methodology for calculating export charges and credits.
 - b) An overview of the changes made to the methodology statement to remove ambiguities and improve clarity, and correct inconsistencies detected since 1 April 2011.

Approval of EDCM for demand charges only

7. The DNOs' original proposals for the EDCM submitted to Ofgem on 1 April 2011 included methodologies for calculating charges for eligible import and export customers.
8. However, in their decision document of 6 September 2011, Ofgem have only approved the part of the methodology that relates to the calculation of import

¹ <http://2010.energynetworks.org/structure-of-charges-edcm/>

² Ofgem (2011) Electricity distribution charging: decision on the methodology for higher voltage import charges, ref 116/11

charges. The implementation of the EDCM for the calculation of export charges is postponed to “April 2013 (or possibly later)”.

9. The approval of the part of the methodology that relates to demand (import) tariffs only meant that the portions of the original statements that relates to the calculation of generation (export) tariffs would not be useful for charging purposes.
10. The FCP and LRIC methodology statements would form part of the formal DCUSA contract, and the DNOs believe that it is not desirable to retain aspects of the methodology that have not been formally approved by Ofgem, and therefore would not be used for charging.
11. Consequently, the FCP and LRIC EDCM methodology statements have been amended. The overwhelming majority of these changes involve the removal of text relating to the calculation of charges for export tariffs. Changes of this nature include:
 - a) Removal of the section titled “Application of FCP charge 1 to generation” and “Application of FCP charge 2 to generation”
 - b) Removal of the section titled “Application of LRIC charge 1 to generation” and “Application of LRIC charge 2 to generation”
 - c) Removal of the section on the calculation of charges for sites with generation side management (GSM).
 - d) Removal of the section titled “Transmission connection (exit) credits for generators”.
 - e) Removal of the section titled “Generation scaling”.
 - f) Removal of the section titled “Network unavailability rebates”.
12. There is one change to the methodology to calculate charges for import tariffs as a result of the decision to delay the approval of the EDCM for export tariffs. This relates to the calculation of the “residual revenue contribution rate (per cent)”.
13. The “residual revenue” in the original proposal was calculated as follows:
$$\text{Residual revenue contribution rate (per cent)} = (\text{AR} - \text{DOC} - \text{INDOC} - \text{NR} - \text{GCN}) / (\text{Total site-specific shared assets} + \text{EHV assets} + \text{HV and LV network assets})$$

Where:

GCN is the total forecast net revenue from the application EDCM charges and credits to EDCM generation.
14. Now that generation charges are no longer calculated within the EDCM model, GCN has been replaced by the expected net revenue from the application of charges to non-EDCM generation tariffs. This will be an input data item in the new demand-only EDCM model.

Other changes to the methodology statements

15. We have made some changes to the methodology statements following the 1 April 2011 submissions. These changes fall into one or both of the following types:
- a) Changes to simplify the calculation, to remove ambiguities or improve clarity.
 - b) Changes to correct inconsistencies or omissions.
16. There are a number of changes that fall under (a) above. These changes are not strictly necessary, in that they do not affect the results of the model. Nevertheless, we have chosen to go ahead with these changes.
- a) Some of these changes make the calculations simpler. This is good given the overall complexity of the model.
 - b) As part of the testing process following submission in April, we identified a number of sections in the document that were ambiguous, unclear and open to interpretation. We think that removing these ambiguities and adding clarity has made the methodology statement more robust, and would aid stakeholders trying to understand the calculations.
17. The rest of this section describes each of these changes.

Calculation of FCP charge 1 to demand

18. Formula for the calculation of the FCP charge 1 capacity charge and super-red unit charge has been changed.
19. The formula in the April FCP submission was as follows:

$$[\text{p/kWh super-red rate}] = [\text{parent and grandparent network group charge 1 } \text{£/kVA/year}] * (\text{PF} + [\text{average kVA} / \text{kVA}] * \text{SQRT}(1 - \text{PF}^2)) / [\text{average kW} / \text{kVA}] / [\text{number of hours in the super-red time band in a year}] * 100$$

$$[\text{p/kVA/day capacity charge}] = [\text{network group charge 1 } \text{£/kVA/year}] / [\text{days in charging year}] * 100$$

20. This formula in the FCP methodology has been changed to:

For customers with zero average kW/kVA:

$$[\text{p/kWh super-red rate}] = ([\text{parent charge 1 } \text{£/kVA/yr}] * (\text{abs}[A1] / (\text{SQRT}(A1^2 + R1^2))) / [\text{Super-red hours}] * 100) + ([\text{grandparent charge 1 } \text{£/kVA/yr}] * (\text{abs}[A2] / (\text{SQRT}(A2^2 + R2^2))) / [\text{Super-red hours}] * 100)$$

$$[\text{p/kVA/day capacity charge}] = ([\text{network charge 1 } \text{£/kVA/year}] / [\text{days in charging year}] * 100) + ([\text{parent charge 1 } \text{£/kVA/yr}] * (-R1 * \text{Average kVA} / \text{kVA}) / (\text{SQRT}(A1^2 + R1^2))) / [\text{days in charging year}] * 100) + ([\text{grandparent charge 1 } \text{£/kVA/yr}] * (-R2 * [\text{Average kVA} / \text{kVA}]) / (\text{SQRT}(A2^2 + R2^2))) / [\text{days in charging year}] * 100)$$

For all other customers:

$$[p/kWh \text{ super-red rate}] = [\text{parent charge } 1 \text{ £/kVA/yr}] * (\text{abs}[A1] - (R1 * ([\text{Average kVAr/kVA}] / [\text{Average kW/kVA}])) / (\text{SQRT}(A1^2 + R1^2))) / [\text{Super-red hours}] * 100 + ([\text{grandparent charge } 1 \text{ £/kVA/yr}] * (\text{abs}[A2] - (R2 * ([\text{Average kVAr/kVA}] / [\text{Average kW/kVA}])) / (\text{SQRT}(A2^2 + R2^2))) / [\text{Super-red hours}] * 100)$$

$$[p/kVA/\text{day capacity charge}] = [\text{network group charge } 1 \text{ £/kVA/year}] / [\text{days in charging year}] * 100$$

Where:

A1 and R1 are the values of the active power flow and reactive power flow modelled through the parent network group in the maximum demand scenario.

A2 and R2 are the values of the active power flow and reactive power flow modelled through the grandparent network group in the maximum demand scenario.

If both A1 and R1 are equal to zero, in respect of that network level in the formulas above, the term $(\text{abs}[A1] / (\text{SQRT}(A1^2 + R1^2)))$ is set equal to 1, $(-R1 * \text{Average kVAr/kVA}) / (\text{SQRT}(A1^2 + R1^2))$ is set equal to zero, and $([\text{Average kVAr/kVA}] / [\text{Average kW/kVA}]) / (\text{SQRT}(A1^2 + R1^2))$ is also set to zero.

If both A2 and R2 are equal to zero, in respect of that network level in the formulas above, the term $(\text{abs}[A2] / (\text{SQRT}(A2^2 + R2^2)))$ is set equal to 1, $(-R2 * \text{Average kVAr/kVA}) / (\text{SQRT}(A2^2 + R2^2))$ is set equal to zero, and $([\text{Average kVAr/kVA}] / [\text{Average kW/kVA}]) / (\text{SQRT}(A2^2 + R2^2))$ is also set to zero.

Super red hours are the number of hours in the DNO's super-red time band.

The average kW/kVA and average kVAr/kVA figures are forecasts for the charging year, based on data from the most recent regulatory year for which data were available in time for setting charges for the charging year. Specifically, active and reactive power consumptions are averaged over a super-red time band, which is a seasonal time of day period determined by the DNO to reflect the time of peak, and then divided by import capacity (averaged over the same financial year). 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. The average kVAr divided by kVA is restricted to be such that the combined active and reactive power flows cannot exceed the maximum import capacity. Should the restricted kVAr divided by kVA be negative, then it is set to zero.

21. There are two reasons for this change:
 - a) In the original formula, the method for calculating power factors was not described. The new formula explicitly sets out how power factors have been calculated.
 - b) The formula in the methodology statement did not describe the calculations to be made if the "average kW/kVA" for any tariff is zero. The new formula describes these calculations.
22. This change did not have any impact on the results of the Excel model.

Calculation of LRIC charge 1 to demand

23. The formula for calculating LRIC charge 1 to demand has not changed. However, the text surrounding this formula has been amended:
- a) to bring more clarity to the treatment of customers connected to a cluster of linked locations; and
 - b) to better specify the formula to calculate power factors.
24. These changes have no impact on the results of the Excel model.

Transmission exit charges

25. The section describing the calculation of transmission exit charges for demand has been changed.
26. The formula to be used has been explicitly set out, instead of being described in words. The formula also specifies the adjustment for part-year connected customers and loss adjustment factors.
27. This change has no impact on the results of the Excel model.

Site-specific shared network assets

28. The formulae for the calculation of “Average network asset value for capacity at level L (£/kVA)” and “Average network asset value for demand at level L (£/kVA)” have been clarified by the addition of a table setting out the relevant network levels for loss adjustment factors.
29. The formula for the calculation of the total value of the site-specific shared assets required to serve each demand user (“TNA”) was missing a description of the adjustment for customers connected for part of the charging year (rather than the full year). The calculation was originally described as:

$$\text{TNA} = \text{NAC} + \text{NAD}$$

Where:

TNA is the total site-specific network assets in £/kVA required to serve a demand user.

NAC is the site-specific asset value in £/kVA for capacity for that demand user aggregated across all levels.

NAD is the site-specific asset value in £/kVA for demand for that demand user aggregated across all levels.

30. This formula has now been amended as follows:

$$\text{TNA} = \text{NAC} + (\text{NAD} * (1 - (\text{Hours in super-red for which not a customer}/\text{Annual hours in super-red})) * (\text{Days in year}/(\text{Days in year} - \text{Days for which not a customer})))$$

Where:

TNA is the total site-specific network assets in £/kVA required to serve a demand user.

NAC is the site-specific asset value in £/kVA for capacity for that demand user aggregated across all levels.

NAD is the site-specific asset value in £/kVA for demand for that demand user aggregated across all levels.

31. These changes have no impact on the results of the Excel model.

Calculation of the demand revenue target

32. The explanatory notes following the formulae to calculate the network rates contribution rate (in per cent), direct cost contribution rate (in per cent), indirect cost contribution rate (in per cent) and residual revenue contribution rate (in per cent) referred to “Total site-specific assets”, when they should have said “Total site-specific shared assets”. This has now been corrected.

33. The formula for the calculation of the “Import capacity based contribution for each user” has been decomposed for computational convenience.

34. The original formula:

Import capacity based contribution for each user = $TNA * (NR \text{ rate} + DOC \text{ rate} + INDOC \text{ rate} + \text{residual revenue rate}) * \text{import capacity}$

35. The new formula:

Import capacity based network rates contribution for each user = $TNA * NR \text{ rate} * \text{import capacity}$

Import capacity based direct operating costs contribution for each user = $TNA * DOC \text{ rate} * \text{import capacity}$

Import capacity based indirect costs contribution for each user = $TNA * INDOC \text{ rate} * \text{import capacity}$

Import capacity based residual revenue contribution for each user = $TNA * \text{residual revenue rate} * \text{import capacity}$

36. The formula for the “Sole use asset based contribution” has also been decomposed in a similar way for computational convenience.

37. The original formula:

Sole use asset based contribution = $S * (NR \text{ rate} + DOC \text{ rate} + INDOC \text{ rate})$

38. The new formula:

Sole use asset based network rates contribution = $S * NR \text{ rate}$

Sole use asset based direct operating costs contribution = S * DOC rate

Sole use asset based indirect costs contribution = S * INDOC rate

39. An inconsistency has also been corrected in the explanatory notes to the formulae for the sole use asset based contributions. The words “network rates charge rate” should have said “network rates contribution rate” (and similarly for direct operating costs contribution and indirect costs contribution).
40. These changes have no impact on the results of the Excel model.

Demand scaling

41. The formula for the calculation of the total value of the adjusted site-specific shared assets required to serve each demand user (“TNAa”) was missing a description of the adjustment for customers connected for part of the charging year (rather than the full year). The calculation was originally described as:

$$TNAa = NACa + NADa$$

Where:

TNAa is the total adjusted site-specific network assets in £/kVA required to serve a demand user.

NACa is the adjusted site-specific asset value in £/kVA for capacity for that demand user aggregated across all levels.

NADa is the adjusted site-specific asset value in £/kVA for demand for that demand user aggregated across all levels.

42. This formula has now been amended as follows:

$$TNAa = NACa + (NADa * (1 - (\text{Hours in super-red for which not a customer} / \text{Annual hours in super-red})) * (\text{Days in year} / (\text{Days in year} - \text{Days for which not a customer})))$$

Where:

TNAa is the total adjusted site-specific network assets in £/kVA required to serve a demand user.

NACa is the adjusted site-specific asset value in £/kVA for capacity for that demand user aggregated across all levels.

NADa is the adjusted site-specific asset value in £/kVA for demand for that demand user aggregated across all levels.

43. The formulae for calculating the “Network rates charging rate (per cent)” and “Direct operating costs charging rate (per cent)” have been simplified for computational convenience. The April submission contained the following formulae:

Network rates charging rate (per cent) = $NR / (\text{Total adjusted site specific assets} + \text{Total EDCM sole use assets} + \text{EHV assets} + \text{HV and LV network assets} + \text{HV and LV service model assets})$

Where:

NR is the total DNO expenditure on network rates.

Total adjusted site-specific assets is the aggregate value (in £) of all adjusted site-specific assets for EDCM demand users.

Total EDCM sole use assets is the aggregate sole use asset MEAVs of all EDCM users (demand and generation).

EHV assets is the aggregate EHV assets in the CDCM model.

HV and LV network assets from the the CDCM model.

HV and LV service model assets from the CDCM model.

Direct operating costs charge rate (per cent) = $DOC / (\text{Total adjusted site-specific assets} + \text{Total EDCM sole use assets} + \text{EHV assets} + (\text{HV and LV network assets} + \text{HV and LV service model assets}) / 0.68)$

Where:

DOC is the total DNO expenditure on direct operating costs.

Total adjusted site-specific assets is the aggregate value (in £) of all adjusted site-specific assets for EDCM demand users.

Total EDCM sole use assets is the aggregate sole use asset MEAVs of all EDCM users (demand and generation).

EHV assets is the aggregate EHV assets in the CDCM model.

HV and LV network assets from the the CDCM model.

HV and LV service model assets from the CDCM model.

0.68 is the operating intensity factor.

44. These formulae have been changed to:

Network rates charging rate (per cent) = $\text{EDCM NR contribution} / (\text{Total adjusted site specific shared assets})$

Where:

EDCM NR contribution is the sum of the import capacity based network rates contribution from each EDCM demand user.

Total adjusted site-specific shared assets is the aggregate value (in £) of all adjusted site-specific shared assets for EDCM demand users.

Direct operating costs charging rate (per cent) = EDCM DOC contribution / (Total adjusted site-specific shared assets)

Where:

EDCM DOC contribution is the sum of the import capacity based direct costs contribution from each EDCM demand user.

Total adjusted site-specific shared assets is the aggregate value (in £) of all adjusted site-specific shared assets for EDCM demand users.

45. An inconsistency has also been corrected in the explanatory notes to the formulae for the “Fixed charge on sole use assets in p/day”. The words “network rates charge rate” should have said “network rates contribution rate” (and similarly for direct operating costs contribution and indirect costs contribution).
46. The explanatory notes accompanying the formula for calculating the “Indirect cost charging rate in p/kVA/day” has been expanded to clearly specify the method to calculate the “volume for scaling”. The formula now explicitly includes a reference to an “LDNO factor”, which was previously only described in words in the LDNO charging section of the document.
47. The explanatory notes accompanying the formula for calculating the “Import capacity based INDOC charge in p/kVA/day” has also been expanded to clearly specify the method to calculate the “coincidence factor”. The “LDNO factor” has also been explicitly included.
48. Changes to simplify the computation have also been made to the formulae for the calculation of:
 - a) Residual revenue charging rate (per cent).
 - b) Single fixed adder in p/kVA/day
49. These calculations were expressed in the original submission as follows:

Residual revenue charging rate (per cent) = $0.8 * (\text{EDCM demand revenue target} - \text{DOC recovery} - \text{INDOC recovery} - \text{NR recovery} - \text{SU recovery} - \text{FCP recovery}) / \text{Total site-specific assets}$

Where:

0.8 is the proportion of the residual revenue that is allocated to customers on the basis of asset values.

DOC recovery is the forecast notional recovery from the application of capacity based charges relating to direct operating costs to EDCM demand customers.

INDOC recovery is the forecast notional recovery from the application of capacity based charges relating to indirect costs to EDCM demand customers.

NR recovery is the forecast notional recovery from the application of capacity based charges relating to network rates to EDCM demand customers.

SU recovery is the forecast notional recovery from the application of fixed charges for sole use assets relating to EDCM demand customers.

Total site-specific assets is the aggregate value (in £) of all notional shared assets for EDCM demand users.

Single fixed adder in p/kVA/day = $100 / DC * 0.2 * (\text{EDCM demand revenue target} - \text{DOC recovery} - \text{INDOC recovery} - \text{NR recovery} - \text{SU recovery} - \text{FCP recovery}) / \text{Volume for scaling}$

Where:

DC is the number of days in the charging year.

EDCM demand target is the EDCM demand revenue target calculated as described in the previous section.

DOC recovery is the forecast notional recovery from the application of capacity based charges relating to direct operating costs to EDCM demand customers.

INDOC recovery is the forecast notional recovery from the application of capacity based charges relating to indirect costs to EDCM demand customers.

NR recovery is the forecast notional recovery from the application of capacity based charges relating to network rates to EDCM demand customers.

SU recovery is the forecast notional recovery from the application of fixed charges for sole use assets relating to EDCM demand customers.

FCP recovery is the forecast notional recovery from the application of FCP charges to all EDCM demand users only.

Volume for scaling is the sum of forecast consumption at the time of peak and 50 per cent of maximum import capacity of all EDCM demand users (based on historical data).

50. These calculations are now expressed as:

Residual revenue charging rate (per cent) = $0.8 * (\text{EDCM demand revenue target} - \text{EDCM NR and DOC capacity contribution} - \text{Aggregate indirect cost contribution} - \text{SU recovery} - \text{FCP/LRIC recovery}) / \text{Total adjusted site-specific assets}$

Where:

EDCM NR and DOC capacity contribution is the sum of the import capacity based network rates and direct costs contribution from each EDCM demand user.

Aggregate indirect cost contribution is the sum of the import capacity based and sole use asset based indirect cost contribution from each EDCM demand user.

SU recovery is the forecast notional recovery from the application of fixed charges for sole use assets relating to EDCM demand customers.

Total adjusted site-specific shared assets is the aggregate value (in £) of all adjusted site-specific shared assets for EDCM demand users

Single fixed adder in p/kVA/day = $100 / DC * 0.2 * (\text{EDCM demand revenue target} - \text{EDCM NR and DOC capacity contribution} - \text{Aggregate indirect cost contribution} - \text{SU recovery} - \text{FCP/LRIC recovery}) / \text{Volume for scaling}$

Where:

DC is the number of days in the charging year.

EDCM demand target is the EDCM demand revenue target calculated as described in the previous section.

EDCM NR and DOC capacity contribution is the sum of the import capacity based direct costs contribution from each EDCM demand user (from annex 3).

Aggregate indirect cost contribution is the sum of the import capacity based and sole use asset based indirect cost contribution from each EDCM demand user.

51. The explanatory notes accompanying the formula for calculating the “Import capacity based fixed adder in p/kVA/day” has also been expanded to clearly specify the method to calculate the “coincidence factor”.
52. These changes have no impact on the results of the Excel model.

Exceeded capacity charges

53. The April submission only explained the calculation of the exceeded capacity charge in words. The calculation has now been set out in detail as a formula.

Total import capacity charge

54. The April submission did not explicitly set out how the total import capacity charge in p/kVA/day would be calculated. It merely described how each of the constituent elements would be calculated.
55. The document has now been amended to explain how the total import capacity charge is calculated. It also explains the process by which negative import capacity charges or super-red unit rates are set to zero.

Changes to the EDCM Excel model

56. We have made changes to the Microsoft Excel model following the 1 April 2011 submissions. These changes fall into one or both of the following types:
- a) Changes to remove calculations relating to generation tariffs
 - b) Changes to correct inconsistencies or omissions.
 - c) Presentational changes to the results of the model, i.e. tables that are not used to calculate tariffs, but simply report them or calculate summaries and other presentational aggregates.

Changes to remove generation calculations

57. The vast majority of changes to the Excel model relate to (a) above, i.e. changes to remove calculations relating to generation tariffs. These include:
- a) The worksheet titled “Gen” has been removed from the model.
 - b) Table 1144 in the input data sheet 11 has been removed. This table contained several input data parameters that were used to compute generation tariffs.
 - c) Table 1114 has been added to the input data sheet 11 to include “Net forecast income from non-CDCM generation (£/year)”. This is used to compute demand tariffs. In the absence of calculated generation charges within the model, this item is now required as an input data item.
 - d) A number of generation tariff calculation tables are no longer required, and have been deleted from the model.
58. A full list of tables that have been removed is provided in Annex 1 to this report.
59. The rest of this section discusses the changes made to the model to correct inconsistencies or omissions.

Transmission exit charge

60. In the April 2011 models tables 4245 (LRIC) and 4251 (FCP) contained the calculation of the transmission exit element of the import capacity charge. This formula contained an inconsistency. It did not adjust the super-red kW/kVA for losses to transmission, as it should have.
61. This inconsistency has now been corrected in the demand-only models – table 4170 (FCP) and table 4193 (LRIC).

Super-red unit rate

62. The formula for calculating the super-red unit rate (p/kWh) in the April 2011 models contained a bug. The bug caused the super-red unit rate for any tariff that had a value of zero in column J of Sheet 953 (Peak-time kW/kVA capacity) to be reported as zero.

63. This bug has now been corrected so that the actual values for the super-red unit rate are reported in the results sheet.

Import capacity charge

64. Tables 4250 (LRIC) and 4256 (FCP) in the April 2011 submission contained the calculation of the import capacity charge. This formula also contained the inconsistency of not adjusting the super-red kW/kVA for losses to transmission, as it should have.
65. This inconsistency has now been corrected in the demand-only models – table 4174 (FCP) and table 4197 (LRIC).

Loss factor to transmission

66. The formula used to calculate the “loss factor to transmission” in tables 4173 (LRIC) and 4128 (FCP) in the April 2011 submissions used a wrong mapping of customer category to the network level.
67. This inconsistency did not affect any tariffs, but that is purely coincidental. This inconsistency has now been corrected.

Changes to the results and “information-only” tables

68. There are a small number of tables in the model that present the results of the tariff calculations, and compute summary information. These tables are not used to calculate tariffs.
69. The April 2011 version of the EDCM model contained the following worksheets to present the results of the model:
- a) “Tariff”, which contained Table “4301. Results”. This table set out the final EDCM tariffs for each demand and generation tariff.
 - b) “Miscellaneous”, which contained tariff-by-tariff breakdowns and summaries.
70. The new model replaces this structure with a single worksheet called “Results”. This worksheet contains:
- a) “Table 4301. EDCM charge”. This table contains the final EDCM tariffs for each demand tariff.
 - b) Tables 4302, 4303 and 4304 contain information on charges expressed in £/year, broken down into different levels of granularity.
71. The DNOs believe that the new format provides better information on the final charges to customers, and therefore aids transparency and facilitates the understanding of the make-up of the EDCM charge.
72. A description of the method used to create the information in tables 4302, 4303 and 4304 is contained in Annex 2 of this document.

Changes to the LDNO charging methodology (extended Method M)

73. In the original EDCM submitted to Ofgem on 1 April 2011, discounts for LDNOs in respect of CDCM end users were to be calculated as follows:

Discount percentage = [the sum of the percentages for network levels not provided or bypassed by the DNO] / ([the sum of the percentages for all network levels that would be provided by the DNO for an equivalent end user on its network] + [Percentage of unallocated DNO revenue])

Where:

Discount percentage is the discount applicable for each combination of boundary category and end user type.

Network levels not provided or bypassed by the DNO are all network levels below the network level of boundary up to and including the network level of the end user.

Percentage of unallocated DNO revenue is the ratio of the sum of the DNO's total incentive revenue and the transmission exit charge, and the DNO's total allowed revenue including any incentive revenue and transmission exit charge.

74. The EDCM report from the ENA that accompanied the original submission on 1 April 2011 included the following text:

421. The DNOs are working on a DCUSA change proposal under the CDCM (DCP071) that would potentially extend these elements to all LDNO tariff combinations. We do not expect this proposal to be approved before 1 April 2011, i.e. the date of submission of this document to Ofgem.

422. Once the proposals under DCP071 are finalised and approved, the DNOs would work with LDNOs to review the method proposed above for LDNOs with a boundary at 132 kV or 33 kV and, if necessary, develop an appropriate methodology to calculate additional discount elements.

423. These additional discount elements might apply to the following tariff combinations:

a) 132 kV boundary: HV, HV/LV and LV end users

b) 33 kV boundary: HV, HV/LV and LV end users

424. For each combination of end user network level and boundary network level, the relevant discount for demand end users would then be calculated as follows:

Discount percentage = ([the sum of the percentages for network levels not provided or bypassed by the DNO] + ([percentage for 33kV or 132 kV] * [network length split] * [direct cost proportion])) / ([the sum of the percentages for all network levels that would be provided by the DNO for an equivalent end user on its network] + [Percentage of unallocated DNO revenue])

Where:

Discount percentage is the discount applicable for each combination of boundary category and end user type.

The sum of the percentages for network levels not provided or bypassed by the DNO are all network levels below the network level of boundary up to and including the network level of the end user. This does not include the 132 kV or 33 kV network levels where the boundary is at 132 kV or 33 kV respectively.

Percentage for 33 kV or 132 kV is the discount percentage applicable to the 33 kV or 132 kV network level. For a 33 kV boundary LDNO, we would use the discount percentage for the 33 kV network level.

Network length split is the ratio of the length of circuits on relevant network level (33 kV or 132 kV) that is deemed to be provided by the LDNO to that provided by the host DNO.

Direct cost proportion is the percentage share of direct costs in the sum of direct costs and indirect costs (excluding IT and telecoms and property management costs) at EHV. Negative costs will be excluded from the calculation.

Percentage of unallocated DNO revenue is the ratio of the sum of the DNO's total incentive revenue and the transmission exit charge, and the DNO's total allowed revenue including any incentive revenue and transmission exit charge.

75. Ofgem has now approved an amended version of DCP071 (DCP071A). Consequently, we have changed the extended Method M methodology to make it consistent with the revised methodology approved by Ofgem for the Method M model. We have also corrected inconsistencies, including a misplaced bracket, in the April 2011 EDCM report (see formula above).

76. The new formula is:

For discount categories 0000, 132kV/EHV and HVplus

$$\text{Discount percentage} = P / (S + U)$$

For discount category 132kV

$$\text{Discount percentage} = (P + ([\text{percentage for 132kV}] * (1 - ([\text{network length split for 132kV}] * [\text{direct cost proportion}])))) / (S + U)$$

For discount category EHV

$$\text{Discount percentage} = (P + ([\text{percentage for EHV}] * (1 - ([\text{network length split for EHV}] * [\text{direct cost proportion}])))) / (S + U)$$

Where:

Discount percentage is the discount applicable for each combination of discount and end user type.

P is the sum of the percentages for all network levels below the network level of the LDNO-DNO boundary up to and including the network level of the end user.

S the sum of the percentages for all network levels in the distribution network above and including the network level of the end user

U is the ratio of the sum of the DNO's total incentive revenue and the transmission exit charge, and the DNO's total allowed revenue including any incentive revenue and transmission exit charge.

Network length split is equal to 1 minus the ratio of the average length of circuits on relevant network level (EHV or 132kV) that is deemed to be provided by the LDNO to that provided by the host DNO. The values for the "network length split" for 132kV and EHV are currently set to 100 per cent.

Direct cost proportion is the percentage share of direct costs in the sum of direct costs and indirect costs (excluding IT and telecoms and property management costs) at EHV. Negative costs will be excluded from the calculation.

77. The Excel models implementing this methodology have also been changed accordingly. Until more precise estimates exist, the values for the "network length split" for 132kV and EHV have been set to 100 per cent in the models.
78. The change has increased the applicable discounts for LDNOs that fall into categories 132kV and EHV, relative to those calculated using the models submitted in April 2011.

Annex 1: List of generation tables removed from the April 2011 model

LRIC model

Table number	Table name
4104	Minimum demand scenario kVA
4108	Minimum demand run kVA at Linked location 2
4112	Network charge 2 £/kVA/year at Linked location 5
4113	Network charge 2 £/kVA/year at Linked location 3
4114	Network charge 2 £/kVA/year at Linked location 4
4116	Minimum demand run kVA at Linked location 6
4117	Minimum demand run kVA at Linked location 3
4119	Network charge 2 £/kVA/year at Linked location 7
4120	Minimum demand run kVA at Linked location 5
4121	Network charge 2 £/kVA/year at Location
4122	Minimum demand run kVA at Linked location 4
4123	Minimum demand run kVA at Linked location 1
4124	Network charge 2 £/kVA/year at Linked location 1
4125	Network charge 2 £/kVA/year at Linked location 6
4126	Minimum demand run kVA at Linked location 7
4127	Minimum demand run kVA at Location
4128	Network charge 2 £/kVA/year at Linked location 2
4129	Average network charge 2 (£/kVA/year)
4130	Transmission exit charge 2 £/kVA/year
4131	Local charge 2 £/kVA/year at Linked location 5
4132	Local charge 2 £/kVA/year at Linked location 3
4133	Local charge 2 £/kVA/year at Linked location 4
4134	Local charge 2 £/kVA/year at Linked location 7

4135	Local charge 2 £/kVA/year at Location
4136	Local charge 2 £/kVA/year at Linked location 1
4137	Local charge 2 £/kVA/year at Linked location 6
4138	Local charge 2 £/kVA/year at Linked location 2
4139	Average local charge 2 (£/kVA/year)
4140	Export capacity charge before scaling p/kVA/day
4143	Export capacity charge adjusted for GSM (p/kVA/day)
4144	Prepare data for generation scaling
4145	Total revenue from generation charges (£/year)
4146	Generation capacity data
4147	Generation capacity totals
4148	EDCM generation charges revenue target (£/year)
4149	Generation revenue shortfall (£/year)
4150	Constraint-free solution
4151	Starting point
4152	Solve for General generation adder rate (£/kVA/year)
4153	General generation adder rate (£/kVA/year)
4154	Generation scaling
4180	Transmission exit charge 1 £/kVA/year
4190	Generation credit p/kWh
4191	Capacity eligible for GSP credits adjusted for part-year (kVA)
4192	Generation credit p/kVA/day

FCP model

Table number	Table name
4106	Parent location charge 2 £/kVA/year
4107	Transmission exit charge 2 £/kVA/year

4108	Location charge 2 £/kVA/year
4110	Grandparent location charge 2 £/kVA/year
4111	Export capacity charge before scaling p/kVA/day
4114	Export capacity charge adjusted for GSM (p/kVA/day)
4115	Prepare data for generation scaling
4116	Total revenue from generation charges (£/year)
4117	Generation capacity data
4118	Generation capacity totals
4119	EDCM generation charges revenue target (£/year)
4120	Generation revenue shortfall (£/year)
4121	Constraint-free solution
4122	Starting point
4123	Solve for General generation adder rate (£/kVA/year)
4124	General generation adder rate (£/kVA/year)
4125	Generation scaling
4135	Transmission exit charge 1 £/kVA/year
4137	Generation credit p/kWh
4138	Capacity eligible for GSP credits adjusted for part-year (kVA)
4139	Generation credit p/kVA/day
4140	Export capacity charge p/kVA/day

Annex 2: Methodology statement for tables 4302, 4303 and 4304

4302. Summary information part 1

79. This table is for information only, and is not used for the calculation of tariffs.
80. Annual charges associated with the components for the demand tariffs and measures of usage are calculated as:

$$\text{Capacity charge for demand (£/year)} = [\text{Import capacity charge p/kVA/day}] * ([\text{DC}] - [\text{Days for which not a customer}]) * [\text{Maximum import capacity (kVA)}] / 100$$

Super red charge for demand (£/year) = [Super-red unit charge p/kWh]*([Super-red hours] – [Hours in super-red for which not a customer])*[Peak-time kW divided by kVA capacity] *[Maximum import capacity (kVA)]/100

Fixed charge for demand (£/year) = [Fixed charge p/day]*([DC]- [Days for which not a customer])/100

Exceeded capacity charge for demand (£/year) = [Exceeded import capacity charge p/kVA/day]*([DC]- [Days for which not a customer])* [Exceeded capacity (kVA)]/100

4303. Summary information part 2

81. This table is for information only, and is not used for the calculation of tariffs.

82. The summaries in this table are calculated as follows:

Annual charge (£/year) = Super red charge for demand (£/year) + Fixed charge for demand (£/year) + Capacity charge for demand (£/year) + Exceeded capacity charge for demand (£/year)

Income from previous charging year (£/year) = [Income under previous charging policy (£/year)]

Change (£/year) = (Annual charge (£/year) – [Income from previous charging year (£/year)])

Change (%) = (Annual charge (£/year) / [Income from previous charging year (£/year)]) – 1

Super red units (kWh) = [Peak-time kW divided by kVA capacity]*[Maximum import capacity (kVA)]*([Super-red hours]- [Hours in super-red for which not a customer])

Chargeable capacity (kVA) =[Maximum import capacity (kVA)] – [Capacity subject to DSM/GSM constraints (kVA)]

where:

DC is the number of days in charging year, an input data to the model.

Income under previous charging policy (£/year) is the income associated with user under previous charging year, an input data to the model

Capacity subject to DSM constraints (kVA) is the capacity subject to demand side management constraints, an input data to the model.

Other terms are as defined earlier.

4304. Summary information part 3

83. This table is for information only, and is not used for the calculation of tariffs.

84. The “Annual charge (£/year)” can be allocated into the following set of components:

- a) Sole use asset charge (£/year)
- b) Transmission exit charge (£/year)
- c) Direct cost allocation (£/year)
- d) Indirect cost allocation (£/year)
- e) Network rates allocation (£/year)
- f) FCP/LRIC charge (£/year)
- g) Demand scaling fixed adder (£/year)
- h) Demand scaling asset based (£/year)

85. The text below describes how each of these eight components are calculated. In all cases, they draw on terms calculated earlier.

86. Three of these eight components can be calculated directly from terms derived earlier:

Sole use asset charge (£/year) = Fixed charge for demand (£/year)

Transmission exit charge (£/year) = [Transmission exit charge p/kVA/day]/100 * ([DC] – [Days for which not a customer])* [Maximum import capacity (kVA)]

Demand scaling fixed adder (£/year) = [Single fixed adder in p/kVA/day]/100 * ([DC] – [Days for which not a customer])* [Maximum import capacity (kVA)]

where

DC is the number of days in the charging year, an input data.

Fixed charge for demand (£/year) is the annual revenue from fixed charges, as defined above.

Transmission exit charge p/kVA/day is the transmission exit charge applied to demand tariffs, defined earlier.

Single fixed adder in p/kVA/day] is the charge associated with the fixed adder, defined earlier.

Other terms are as defined earlier.

87. The remaining five components are calculated following a series of preliminary computations.

88. First, calculate an import capacity based charge associated with direct operating costs and one associated with network rates that is expressed in p/kVA/day for each EDCM demand user. These charges are calculated as:

Network rates charge in p/kVA/day = (100 / DC) * TNAa * (NR rate)

DOC rates charge in p/kVA/day = (100 / DC) * TNAa * (DOC rate)

where:

DC is the number of days in the charging year.

TNAa is the total adjusted site-specific assets (£/kVA) for that demand user, defined earlier.

NR rate is the network rates charge rate in per cent, defined earlier.

DOC rate is the direct operating costs charge rate in per cent, defined earlier.

89. Second, for each EDCM demand user calculate the revenue (£/year) associated with super-red tariffs on the basis of super-red tariffs set at the level prior to the adjustment that is made if the EDCM import capacity charge (p/kVA/day) is negative. This is calculated as:

Super-red demand charge (pre-adjustment) (£/year) = FCP super-red rate in p/kWh * ([Super-red hours] – [Hours in super-red for which not a customer]) * [Peak-time kW divided by kVA capacity] * [Maximum import capacity (kVA)] / 100

where

[FCP super-red rate in p/kWh] is the super-red rate prior to the adjustment made in the case that the EDCM import capacity charge (p/kVA/day) is calculated to be negative (prior to it being set to zero); the adjustment to the super-red rate is described above.

Other terms are as defined earlier.

90. Third, for each EDCM demand user, calculate two “blocks” of revenue: first, the sum of revenue associated with the import capacity fixed adder charge, the indirect costs capacity charge, the FCP/LRIC local capacity charge and the transmission exit capacity charge; second, the revenue associated with the import capacity direct operating cost charge, the network rates charge and the asset based scalar charge:

Charge from Block 1 (£/year) = ([Single fixed adder in p/kVA/day] + [Indirect costs charge in p/kVA/day] + [FCP p/kVA/day capacity charge] + [Transmission exit charge p/kVA/day]) * [Maximum import capacity (kVA)] * ([DC] – [Days for which not a customer]) / 100

Charge from Block 2 (£/year) = ([Asset based residual revenue charges in p/kVA/day] + DOC rates charge in p/kVA/day + Network rates charge in p/kVA/day) * [Maximum import capacity (kVA)] * ([DC] – [Days for which not a customer]) / 100

where

Terms are as defined earlier.

91. Fourth, for each EDCM demand user, define a term, denoted by “Ratio”, which takes the value of 1 except where the sum of [Charge from Block 1 (£/year)], [Charge from

Block 2 (£/year)] and [Super-red demand charge (pre-adjustment) (£/year)] is negative. In that case, the value of “Ratio” is calculated as:

$$\text{Ratio} = -([\text{Charge from Block 1 (£/year)}] + [\text{Super-red demand charge (pre-adjustment) (£/year)}]) / [\text{Charge from Block 2 (£/year)}]$$

92. Fifth, use the computed [Ratio] to calculate adjusted values for the asset based, direct operating costs and network rates charges:

$$\text{Adjusted asset based residual revenue charges in p/kVA/day} = [\text{Asset based residual revenue charges in p/kVA/day}] * [\text{Ratio}]$$

$$\text{Adjusted network rates charge in p/kVA/day} = [\text{Network rates charge in p/kVA/day}] * [\text{Ratio}]$$

$$\text{Adjusted DOC rates charge in p/kVA/day} = [\text{DOC rates charge in p/kVA/day}] * \text{Ratio}$$

where

Terms are as defined earlier.

93. Sixth, using the set of terms just derived, calculate the remaining five components as:

$$\text{Direct cost allocation (£/year)} = [\text{Adjusted DOC rates charge in p/kVA/day}] * ([\text{DC}] - [\text{Days for which not a customer}]) * [\text{Maximum import capacity (kVA)}] / 100$$

$$\text{Network rates allocation (£/year)} = [\text{Adjusted network rates charge in p/kVA/day}] * ([\text{DC}] - [\text{Days for which not a customer}]) * [\text{Maximum import capacity (kVA)}] / 100$$

$$\text{Demand scaling asset based (£/year)} = \text{Adjusted asset based residual revenue charges in p/kVA/day} * ([\text{DC}] - [\text{Days for which not a customer}]) * [\text{Maximum import capacity (kVA)}] / 100$$

$$\text{FCP charge (£/year)} = [\text{FCP p/kVA/day capacity charge}] * ([\text{DC}] - [\text{Days for which not a customer}]) * [\text{Maximum import capacity (kVA)}] / 100 + [\text{Super-red demand charge (pre-adjustment) (£/year)}]$$

94. The difference between “Annual charge (£/year)” and the sum of the eight components listed and of “Exceeded capacity charge for demand (£/year)” can be computed. This acts as a check on the calculations carried out earlier.

$$\text{Check (£/year)} = \text{“Annual charge (£/year)”} - (\text{Direct cost allocation (£/year)} - \text{Network rates allocation (£/year)} + \text{FCP charge (£/year)} + \text{Sole use asset charge (£/year)} - \text{Transmission exit charge (£/year)} + \text{Demand scaling fixed adder (£/year)} + [\text{Exceeded capacity charge for demand (£/year)}])$$