COMMON DISTRIBUTION CHARGING METHODOLOGY (CDCM)

CDCM MODEL USER GUIDE

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GLOSSARY

Term	Meaning
Allowed revenue	The DNO Party's Allowed Distribution Network Revenue
All-the-way tariff	A tariff applicable to an end user of a DNO Party's network
Annual Review Pack (ARP)	A model completed by each DNO Party that calculates forecast CDCM use of system tariffs for the next five years
Authority	The Gas and Electricity Markets Authority
Common Distribution Charging Methodology (CDCM)	The methodology used for calculating charges to Designated Properties as required by standard licence condition 13A of the Electricity Distribution Licence
CDCM model	The model used in the calculation of CDCM use of system charges
Coincidence factor	Aggregate load for a customer category at the time of the DNO Party's system simultaneous maximum load divided by maximum aggregate load for that customer category
Cost Information Review Pack (CIRP)	A model completed by each DNO party to illustrate multi-year forecasts of CDCM use of system tariffs; to provide greater detail on the calculation of Allowed Revenue; and to allow interested parties to explore their own sensitivities.
Customer contribution	Capital charges payable by customers under the DNO Party's connection charging policy
Distribution and Connection Use of System Agreement (DCUSA)	A multi-party contract between licensed electricity distributors, suppliers and generators in Great Britain concerned with the use of the electricity distribution system
DCUSA text	The text of the DCUSA
DCUSA Ltd	The company established, owned, and funded by parties to the DCUSA. The main activity of DCUSA Ltd is to administer the governance of the DCUSA
DCUSA Change Proposal (DCP)	A proposal to change the DCUSA text
Distribution losses	Units lost while being transported through the Distribution System
Distribution services area (DSA)	The specified area within which a DNO Party must provide specified distribution services
Distribution system	The system consisting (wholly or mainly) of electric lines owned or operated by a distributor
Distribution network operator (DNO)	A company licensed to distribute electricity in Great Britain by the Authority
Diversity allowance	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

Term	Meaning
DNO party	An electricity distributor who operates one of the 14 DSAs and in whose Electricity Distribution Licence the requirements of Section B of the standard conditions of that licence have effect
DRM	Distribution Reinforcement Model
EHV	Nominal voltages of at least 22kV and less than 132kV
EHV Distribution Charging Methodology (EDCM)	The methodology used for calculating charges to Designated EHV Properties as required by standard licence condition 13B of the Electricity Distribution Licence
EDCM model	The model used in the calculation of EDCM use of system charges
Embedded network	An electricity distribution system operated by an LDNO and embedded within the DNO Party's network
End user	A user that is not a LDNO
Extended Method M	The name for a model previously used to calculate LDNO discounts for application in the EDCM
Forecast Business Plan Questionnaire (FBPQ)	The questionnaire that the DNO Party is required to submit in line with Regulatory Instructions and Guidance issued by the Authority
Forward cost pricing (FCP) methodology	A methodology used in the EDCM to set locational charges based on annual incremental charges for EDCM connectees. A fundamental principle of the FCP model is that the revenue recovery generated from its incremental charges is equal to the expected cost of reinforcement.
GSP	Grid Supply Point - where the distribution network is connected to a transmission network
GWh	A gigawatt hour of electricity
HV	Nominal voltages of at least 1kV and less than 22kV
IDNO Party	A Party that holds a Distribution Licence in which Section B of the standard distribution licence conditions does not have effect
kV	Kilovolt (1,000 Volts): a unit of voltage
kVAr	Kilo Volt Ampere reactive: a unit of reactive power flow
kVArh	Kilo Volt Ampere reactive hour: a unit of total reactive power flow over a period of time
kW	Kilowatt (1,000 Watts): a unit of power flow
kWh	Kilowatt hour: a unit of energy
Licensed distribution network operator (LDNO)	An IDNO Party or DNO Party operating an electricity distribution system outside of its DSA
LDNO boundary	The point at which electric lines or electrical plant that form part of the DNO Party's network are connected to an embedded network that is not owned or operated by the DNO party

Term	Meaning
LDNO discount	Percentage discounts calculated in the PCDM applied to a DNO Party's all-the-way tariffs
Long-run incremental cost (LRIC) methodology	A methodology used in the EDCM to set locational charges based on nodal incremental costs. These costs represent the brought forward (or deferred) reinforcement costs caused by the addition of an increment of demand or generation at each network node
LV	Nominal voltages of less than 1kV.
LV Mains	LV distributing mains where: a) the upper boundary is at the secondary side (LV) of a distributor transformer; and b) the lower boundary is the point of connection associated with the LV service
LV Services	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
Method M	The name for a model previously used to calculate LDNO discounts for application in the CDCM
Modern equivalent asset value (MEAV)	An estimate of replacement cost
MPAN	The unique number identifying a particular Metering Point or Metering System
Network	The DNO Party's Distribution System within the DNO Party's Distribution Services Area
Network level	A circuit or transformation level between supplies at LV and the transmission network
Nominated Calculation Agent	The provider of specified input values under the DCUSA text
PCDM	The Price Control Disaggregation Model used to calculate LDNO discounts for application in the EDCM and CDCM
Peaking probability	Probability, expressed as a percentage, that a given level of network assets will experience peak load during a given timeband
Power factor	Ratio of energy transported (kW) to network capacity used (kVA)
Regulatory reporting pack (RRP)	A dataset produced each year by each DNO Party for the Authority
Service model	A costed design for the typical dedicated assets of a category of network users
Standing charge factors	A set of numbers (in percentage terms) specified in DCUSA Schedule 16 paragraph 74 which determine the proportion of unit costs allocated to capacity or fixed charges rather than unit rates
Unit	A kilowatt hour of electricity

Term	Meaning
Use of system charges	Demand Use of System Charges and Generation Use of System Charges
User	Customers (whether demand customers or generators) and (where relevant) LDNOs

1. INTRODUCTION

This section explains the background to this model user guide; presents a change control log; and sets out the structure of the document.

1.1. Background and purpose of this document

CEPA and TNEI have been appointed as service providers to DCUSA Ltd to re-develop and maintain the charging models used to set electricity distribution use of system tariffs in line with the Distribution and Connection Use of System Agreement (DCUSA). This encompasses the following models and their corresponding methodologies:

- Common Distribution Charging Methodology (CDCM) model.
- Two EHV Distribution Charging Methodologies (EDCM) models.
- Price Control Disaggregation Model (PCDM).
- Cost Information Review Pack (CIRP).

This document provides an accompanying user guide for the CDCM v12 release of the 2028/29 model, as provided by CEPA/TNEI to DCUSA Ltd. on 5th November 2026, and based on the "Attachment A_DCUSA Charging Methodologies Pre-Release for 2028-29" version of the DCUSA text, which was issued to CEPA/TNEI on 7th October 2026.

The purpose of this document is to provide additional information to users with regards to the CDCM model. This includes operating instructions, interpretations of the DCUSA text, and explanations of the implementation of the DCUSA text in the model.

This document also provides some economic and engineering background on concepts used in the model to aid understanding of the charging methodologies. However, the scope of this guide is limited to the implementation of the DCUSA methodologies in the model. Therefore, it does not, for example, include any guidance on any assumptions that should be used when developing input data.

This document also serves as a guide to the CIRP v2 release, as provided by CEPA/TNEI to DCUSA Ltd. on 5th November 2026. The CIRP contains a version of the latest CDCM model, plus additional inputs and outputs as required by DCUSA Schedule 20. Any additional functionality in the CIRP, compared to the CDCM, is described in Annex A of this document.

1.2. Important notice

This user guide, and the model referenced above, have been developed in line with:

- Schedule 16 of the "Attachment A_DCUSA Charging Methodologies Pre-Release for 2028-29" version of the DCUSA text;
- the following (if any) DCUSA change proposals (DCPs), where not yet reflected in the abovementioned DCUSA text specification: none; and
- any additional assumptions specified in Annex B to this user guide.

The content of this user guide should in no way be interpreted to take precedent over the DCUSA text. However, in preparing this user guide and the model referenced above, we have assumed, with approval from DCUSA Ltd, that any assumptions set out in Annex B take precedence over the abovementioned DCPs and DCUSA legal text. We have also assumed that any abovementioned DCPs take precedence over the abovementioned DCUSA text. Revisions to this document over time are summarised in the change control table in the next section.

This document is applicable only to the version of the model, DCUSA text and DCPs referenced herein and should not be used as a guide to any other models or versions of the DCUSA legal text or DCPs.

1.3. Change control

Table 1.1 records which version of the DCUSA text and charging models this document was written for, and how it differs from previous user guide versions. This document corresponds to the most recent publication referred to in the end row of Table 1.1.

Table 1.1: Change control log

Document version	Date delivered to DCUSA Ltd.	Corresponding version of DCUSA text and DCPs	Corresponding charging models	Updates from previous version
1.0	30/05/2018	1 April 2019 pre-release (received 05/03/2018)	CDCM_v1_20180530.xlsx (provided 30/05/2018) ARP_v1_20180530.xlsx (provided 30/05/2018)	Original version
1.1	04/06/2018	1 April 2019 pre-release (received 05/03/2018)	CDCM_v1_20180530.xlsx (provided 30/05/2018) ARP_v1_20180530.xlsx (provided 30/05/2018)	Edits made to Annex B to clarify assumptions made with respect to Schedule 16, para 70 c iv and Schedule 16, para 71.
2.0	20/07/2018	DCUSA v10.3 (released 28/06/2018)	CDCM_v2_20180720.xlsx (provided 20/07/2018) ARP_v2_20180720.xlsx (provided 20/07/2018)	References to DCUSA text updated to comply with version 10.3 (released 28/06/2018).
3.0	16/10/2018	01 April 2020 DCUSA Charging Methodologies Pre-Release (released 09/10/2018)	CDCM_v3_20181016.xlsx (provided 16/10/2018) ARP_v3_20181016.xlsx (provided 16/10/2018)	Updated references to legal text version and edit made to Table B.1.
4.0	08/11/2019	01 April 2021 DCUSA Charging Methodologies Pre-Release (issued to CEPA/TNEI 10/10/2019)	CDCM_v5_20191108.xlsx (provided 08/11/2019) ARP_v5_20191108.xlsx (provided 08/11/2019)	Updated references to legal text version and edits throughout to reflect DCP268, DCP332, DCP333 and DCP356.

Document version	Date delivered to DCUSA Ltd.	Corresponding version of DCUSA text and DCPs	Corresponding charging models	Updates from previous version
5.0	06/11/2020	01 April 2022 Charging Methodologies Pre-Release – October 2020 (Schedules 16, 17, 18, 20 and 29) DCP 361 (issued to CEPA/TNEI 15/10/2020)	CDCM_v7_20201106.xlsx (provided 06/11/2020) ARP_v7_20201106.xlsx (provided 06/11/2020)	Updated references to legal text version and edits throughout to reflect DCP361.
6.0	23/02/2021	01 April 2022 Charging Methodologies Pre-Release – October 2020 (Schedules 16, 17, 18, 20 and 29) DCP 361 (issued to CEPA/TNEI 15/10/2020); and Attachment A_DCP 379 Draft Legal Text" (issued to CEPA/TNEI on 16/02/2021)	CDCM_v8_20210223.xlsx (provided 23/02/2021) 2021/22 charging model also updated to reflect DCP 379: CDCM_v6(379)_20210223.xlsx (provided 23/02/2021)	Updated to reflect DCP 379.
6.0	22/11/2021	Attachment A_Charging Methodologies Pre-Release_01042023 (issued to CEPA/TNEI 15/11/2021)	CDCM_v8_20211122.xlsx (provided 22/11/2021) ARP_v7_20211122.xlsx (provided 22/11/2021)	Cover sheet, version control and annotation changes only.
6.0	27/10/2022	Attachment A_2024-25 Charging Methodologies Pre-Release (issued to CEPA/TNEI 6/10/2022)	CDCM_v9_20221027.xlsx (provided 27/10/2022) ARP_v7_20221027.xlsx (provided 27/10/2022)	Cover sheet, version control and annotation changes only.
6.0	06/11/2023	Attachment A_2025-26 Charging Methodologies Pre-Release (shared on 09/10/2023)	CDCM_v10_20231106.xlsx (provided 06/11/2023) ARP_v8_20231106.xlsx (provided 06/11/2023)	Cover sheet, version control, and some tariff names changed for DCP 414.

Document version	Date delivered to DCUSA Ltd.	Corresponding version of DCUSA text and DCPs	Corresponding charging models	Updates from previous version
6.0	25/10/2024	Attachment A_2025-26 Charging Methodologies Pre-Release (shared on 03/10/2024)	CDCM_v11_20241025.xlsx (provided 25/10/2024) ARP_v9_20241025.xlsx (provided 25/10/2024)	Cover sheet, version control, and implemented DCP421.
7.0	06/11/2025	Attachment A_DCUSA Charging Methodologies Pre-Release for 2027-28 (issued to CEPA/TNEI on 08/10/2025)	CDCM_v11_20251106.xlsx (provided 06/11/2025) CIRP_v1_20251106.xlsm (provided 06/11/2025)	Release for charge setting. Cover sheet and version control updated. Legal text reference updated for DCP 325. CIRP developed to replace previous requirement for DNOs to publish "Cost Information Templates" and "Annual Review Pack" separately.
8.0	05/11/2026	Attachment A_DCUSA Charging Methodologies Pre-Release for 2028-29 (issued to CEPA/TNEI on 07/10/2026)	CDCM_v12_20261105.xlsx (provided 05/11/2026) CIRP_v2_20261105.xlsm (provided 05/11/2026)	Release for 2028/29 charge setting. Cover sheet, version control and legal text references updated. User guide updated to reflect DCP479, including the Connections Reform Costs pass-through item, and the current CIRP operating requirements.

1.4. Structure of the user guide

The remainder of this document is set out as follows:

- Section 2 explains some of the **background to the CDCM model** - including an explanation of the DCUSA charging methodologies, and how the CDCM model relates to the other models used to produce distribution use of system charges;
- Section 3 summarises the **structure of the CDCM model**;
- Section 4 issues instructions on **how to operate the CDCM model**;
- Sections 5-8 each correspond to part of the CDCM model:
    - Section 5 explains the purpose of the **information sheets**;
    - Section 6 provides a commentary on the **model input sheets**;
    - Section 7 walks through each of the **calculation sheets** - explaining their purpose, how they correspond to the DCUSA text, what further assumptions are made in the way the model implements the text, and providing further explanation on the economic and/or engineering rationale where necessary;
    - Section 8 explains the contents of the **output sheets**;
- Annex A contains a supplementary **user guide to the CIRP**; and
- Annex B contains a **log of assumptions** used to clarify or amend the DCUSA legal text.

2. BACKGROUND TO THE CDCM MODEL

This section explains some of the background to the CDCM model for users who are not familiar with the broader set of DCUSA charging models. It introduces the suite of charging models (2.1); describes how they interact with each other (2.2); summarises the overall rationale of the CDCM approach (2.3); and lists the outputs that it produces (2.4).

2.1. Background to the DCUSA charging methodologies

A key part of the DCUSA is the common framework it sets out for calculating charges paid by users of DNO systems. The objectives of the charging methodologies, set out in the Schedules of the DCUSA, are namely that compliance with the charging methodologies promotes competition in the value chain and that charges are cost reflective.

The DCUSA charging methodologies cover use of the system but not connection, which is governed by a separate Common Connection Charging Methodology.

Charging methodologies are split by voltage level and are implemented by DNOs through a set of standardised charging models published by DCUSA Ltd:

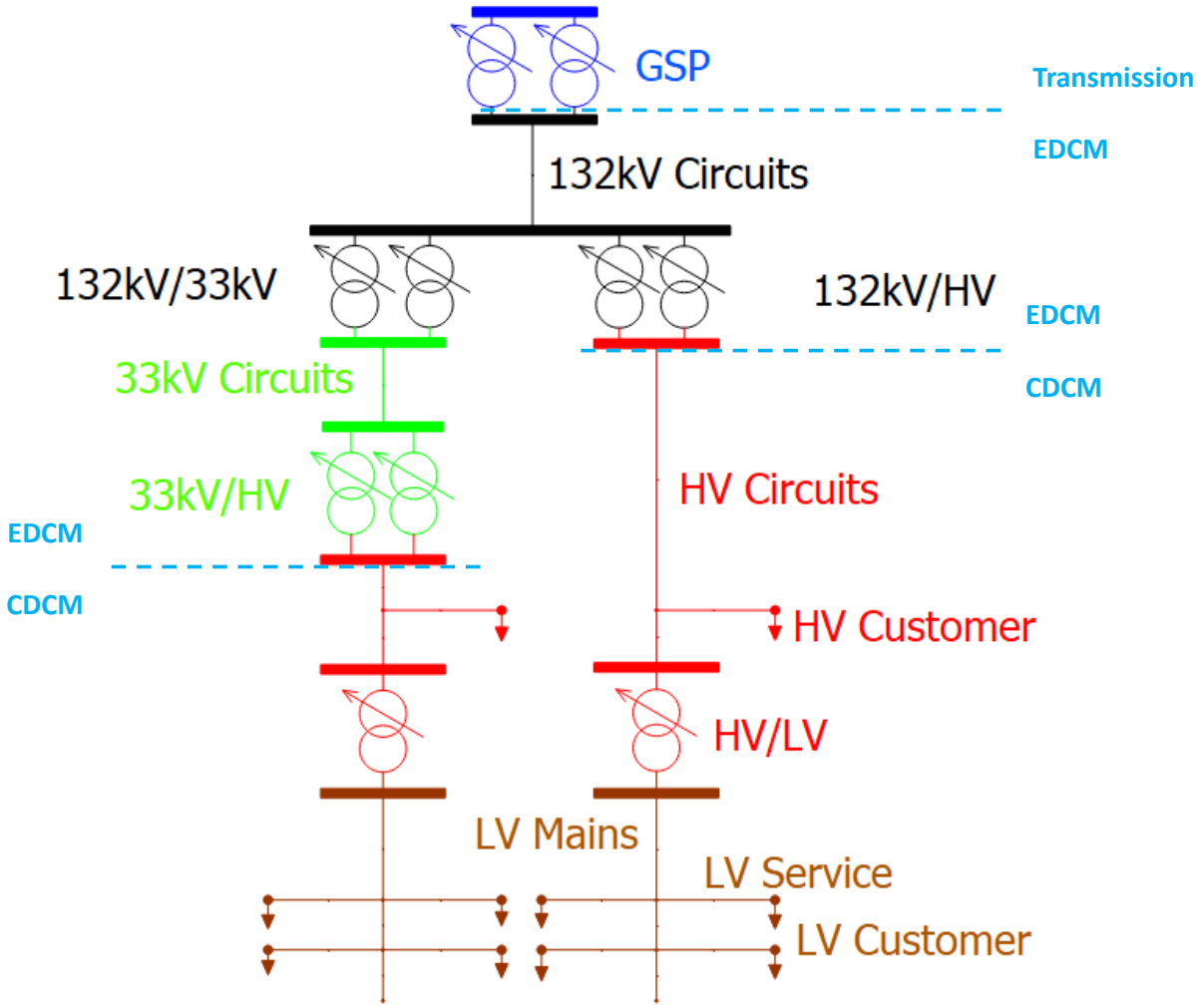
- **Common Distribution Charging Methodology (CDCM)** set out in Schedule 16 covers the calculation of tariffs for customers connected to high voltage (1-22kV) and low voltage (sub-1kV) networks.
- **Extra high voltage Charging Methodology (EDCM)** covering the calculation of site-specific charges for users connected to the distribution network above 22kV or within the boundary of an HV primary substation. The EDCM is further separated into two methodologies and corresponding models:
    - Forward cost pricing (FCP) method, set out in Schedule 17.
    - Long-run incremental cost (LRIC) method, set out in Schedule 18.
- **Price Control Disaggregation Model (PCDM)**, the specification of which is set out in DCUSA Schedule 29, calculates discounts applied to tariffs for LDNOs in the CDCM and EDCM models.

In other words, customers are split between the EDCM and CDCM based on the voltage level of their connection, as summarised in Table 2.1, and in Figure 2.1, which represents the boundary on a single line diagram.

Table 2.1: Charging models used based on voltage of customer connection

Voltage of customer connection	132kV	132kV/ EHV	EHV	EHV/ HV	HV	HV/LV	LV
Charging model used	EDCM				CDCM		

Figure 2.1: Single line diagram showing charging methodology boundaries

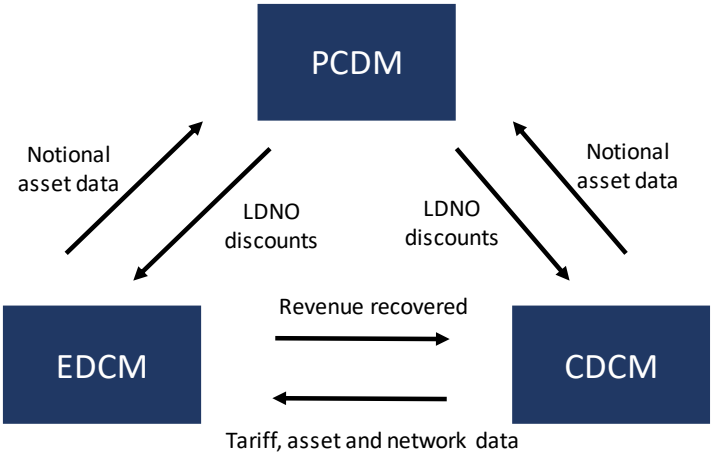


In addition to the four core charging models which correspond directly to a charging methodology, DNOs also produce a **Cost Information Review Pack (CIRP)** which forecasts CDCM tariffs over multiple years. The requirements of the CIRP are set out in DCUSA Schedule 20. The CIRP is an extension of the CDCM model and contains all of its sheets other than "Outputs to other models". A user guide for the CIRP is provided in Annex A.

2.2. Model interactions

The four core charging models are used by DNOs to produce distribution tariffs each year, with each DNO using either the FCP or the LRIC version of the EDCM. Tariffs produced by the models are calibrated to allow DNOs to recover the revenue allowances set by Ofgem based on the terms of their price control settlement. In order to achieve this, there are interactions between the models (see Figure 2.2 below).

Figure 2.2: Interactions between models



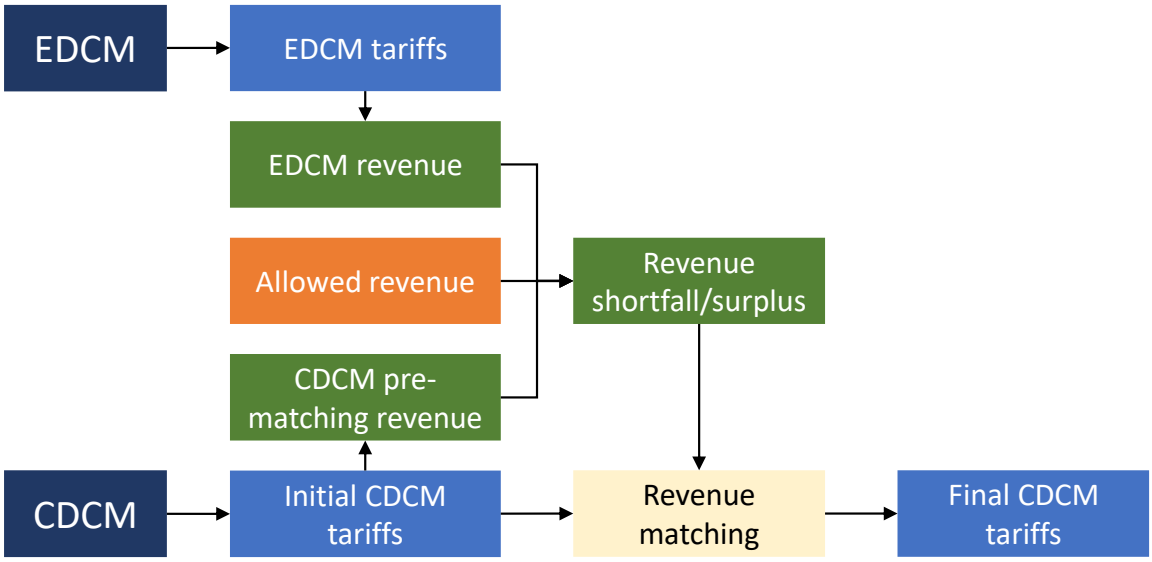
The PCDM requires data on network assets from the EDCM and CDCM in order to calculate discounts applied to LDNO tariffs. In turn, the EDCM and CDCM require the LDNO discounts from the PCDM to calculate LDNO tariffs. The EDCM and CDCM interact by exchanging information on network characteristics, revenues recovered through tariffs, and tariffs and pass-through costs for LV/HV-connected end-users.

The DCUSA text does not stipulate how DNOs have to solve these interactions.

The amount of revenue expected to be recovered through EDCM tariffs is an important input into the CDCM model. Both EDCM and CDCM models calculate charges which are intended to be 'cost-reflective' (see discussion of CDCM approach below), but then adjust those charges upwards or downwards to allow DNOs to recover the amount of revenue allowed to them (as determined through their price control settlements).

The difference between allowed revenue and the revenue that would be recovered through cost-reflective tariffs (CDCM plus EDCM tariffs) is called 'residual revenue'. Some residual revenue is recovered from EDCM tariffs, but the majority is recovered from customers connected to the HV and LV networks by 'scaling' tariffs in the CDCM such that they result in recovery of the full revenue allowance. Figure 2.3 illustrates how 'residual revenue' is recovered through the interaction of the EDCM and CDCM models.

Figure 2.3: Recovery of residual revenue



Note: revenue scaling in the EDCM has been excluded from the diagram for simplicity

2.3. CDCM approach

The CDCM model calculates a set of charges for each category of HV and LV connected customer (demand and generation) to allow each DNO to recover the amount of revenue allowed to it under its price control determination.

While the total revenue recovered by DNOs is constrained by the price control, the tariffs and tariff structures in the CDCM are intended to reflect the costs and cost drivers of providing distribution services. The CDCM model charges are based on a 500 MW network reinforcement referred to as the "Distribution Reinforcement Model" (DRM).

Under this DRM model, the distribution network is designed to accommodate 500 MW simultaneous (i.e. diversified) maximum demand at each voltage level. The CDCM model identifies capital (asset) costs and network operating costs at each network voltage level, annuitizes the DRM asset costs and then allocates asset and operating costs to customer groups in accordance with their estimated contributions to system simultaneous peak load. Unit costs for DRM assets and CDCM operating costs are then used to create initial tariffs for each customer group (see CDCM outputs below).

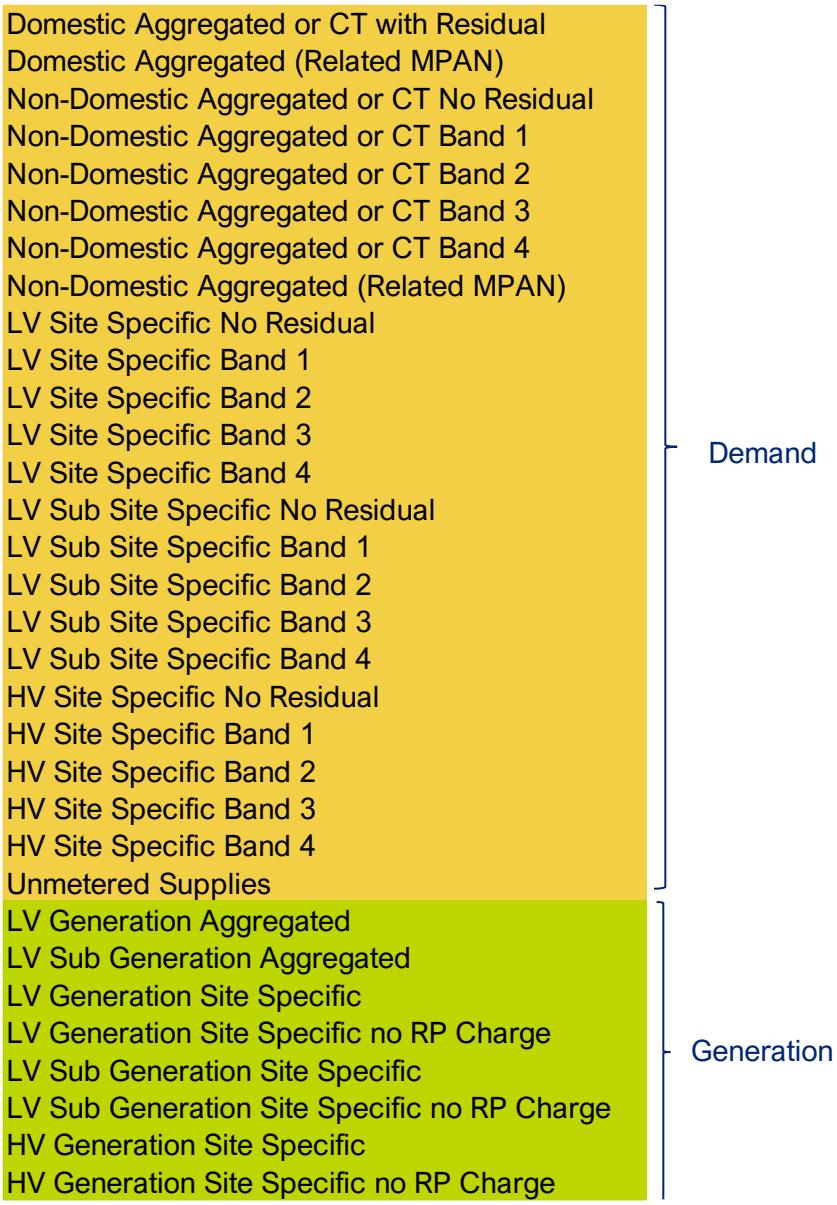
Since the CDCM model is based on modelled DRM asset costs, there will inevitably be some difference between the amount of revenue that would be recovered by the initial 'cost-reflective' charges calculated in the CDCM and the amount that a DNO is allowed to recover under its price control determination. Therefore, as discussed above, CDCM charges are adjusted upwards or downwards to remove this difference through the process of revenue matching. A second adjustment is made to spread specific socialised costs across charges in a least-distortionary way.

2.4. CDCM outputs

The CDCM model groups customers into banded customer categories, each of which receives a different tariff. A customer category is defined by a set of common size, metering, technical and other characteristics. Banding is used to apportion the residual between groups of customers in the same category based on their historic volumes or agreed capacity. This is distinct from the EDCM model, which calculates a bespoke tariff for each user.

Figure 2.4 below summarises the different customer categories in the current CDCM model for "all the way" tariffs, i.e. excluding LDNO charges.

Figure 2.4: CDCM customer categories



A tariff consists of up to seven types of charge, though not all customers receive all types:

- Unit rate 1 (p/kWh)
- Unit rate 2 (p/kWh)

- Unit rate 3 (p/kWh)
- Fixed charges (p/day)
- Capacity charges (p/kVA/day)
- Exceeded capacity charges (p/kVA/day)
- Reactive power charges (p/kVArh)

The three unit rates correspond to the three normal distribution and special distribution timebands. Time-variant tariffs include multiple unit rates.

LDNO tariffs are calculated by applying discounts to the tariffs for all the way customers depending on the network level of the boundary between the LDNO and the host DNO. The level of LDNO discounts are calculated in the PCDM, further detail on which is provided in DCUSA Schedule 29 and the PCDM user guide.

3. MODEL STRUCTURE

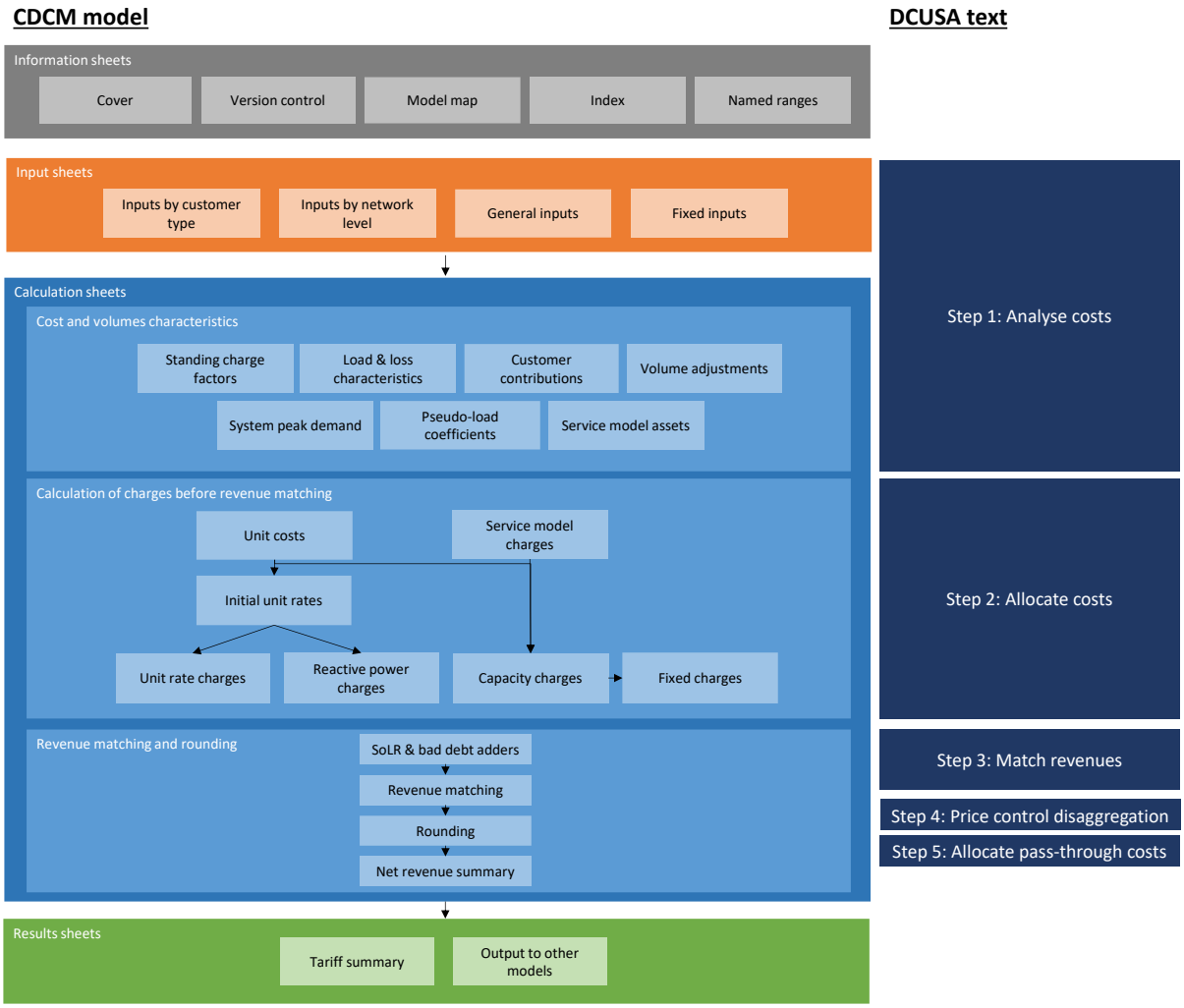
The CDCM model is split into four main sections: information sheets, input sheets, calculation sheets and output sheets. The structure of the model can also be linked to the four steps set out in paragraph 6 of DCUSA schedule 16 as shown in the model map below. The first section of the model is for information purposes, containing the cover sheet, version control sheet, and navigational aids. Inputs are then split into five separate sheets. The 'Fixed inputs' sheet contains inputs that should not be altered by users, while the other sheets contain tables for users to input financial, network, load and other inputs.

The calculations section of the model is split into three steps:

1. Cost and volume characteristics, which makes adjustments to model inputs and calculates values used in allocating costs.
2. Calculation of unit costs and tariffs before revenue matching.
3. Revenue matching and rounding.

The final CDCM model outputs are tariffs for all the way customers and LDNOs. A separate output sheet is also included that summarises the outputs from the CDCM that are used in the other charging models.

Figure 3.1: CDCM model map



Within the sheets of the charging models, input, calculation and output sections are labelled following a consistent convention, summarised as follows:

- Separate labels are generated for inputs, calculations (labelled as "Section") and outputs.
- The first number represents the model number, set out in Table 3.1 below.
- The second and third numbers represent the order of sheets within the model. The first input, calculation or output sheet will have a value of 01, and so on.
- The letter (separated from the numbers with a hyphen) represents the order within a sheet, from top to bottom.

For example, a section with the label of "Input 502-E" would represent the fifth input section, on the second input sheet in the CIRP; a label of "Section 104-B" would represent the second calculation section on the fourth calculation sheet of the CDCM.

Table 3.1: Model numbers

Model	Number
CDCM	1
EDCM (LRIC)	2
EDCM (FCP)	3
PCDM	4
CIRP	5

A list with clickable hyperlinks to each labelled section is provided on the “Index” sheet.

4. OPERATING INSTRUCTIONS

The charging models use a consistent set of formats to help users operate and understand the models. These are reproduced in Figure 4.1 below.

Figure 4.1: CDCM cell formats and sheet tab colours

Format	Description
	Cell intentionally blank
Value	Hardcoded input
Value	User input
Value	Model output
Value	Calculation
Value	Value from another worksheet
Value	Value used on another worksheet
Value	Issue identified in a check
Text	Label
Text	Annotation
Text	Column heading
Text	Level 1 heading
Text	Level 2 heading
Text	Level 3 and 4 heading
Sheet tab colour	Information sheet
Sheet tab colour	Input sheet
Sheet tab colour	Calculation sheet
Sheet tab colour	Output sheet

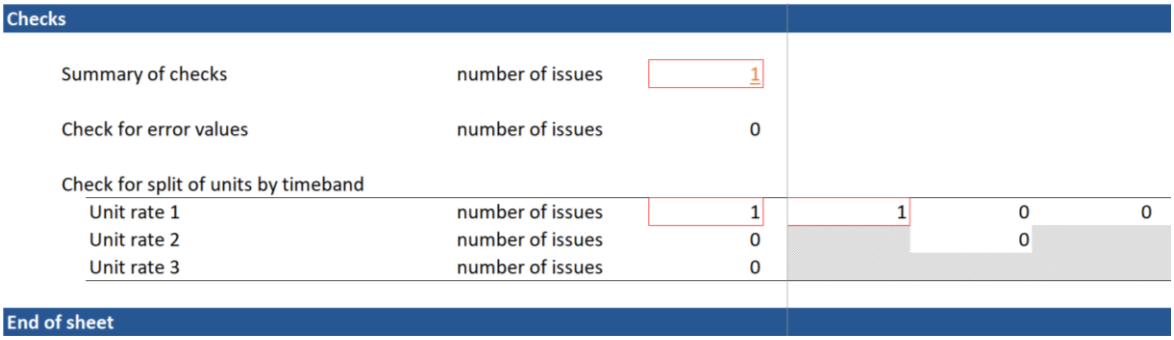
To operate the CDCM model users should ensure that they have filled in all user input cells (shaded yellow) in the following model input sheets:

- Cover
- General inputs
- Inputs by customer type
- Inputs by network level

Where users do not have data of a particular type (e.g. where volumes for a certain customer class are zero), users should input zero instead of leaving cells blank. This helps to differentiate between missing inputs and inputs which are intentionally zero.

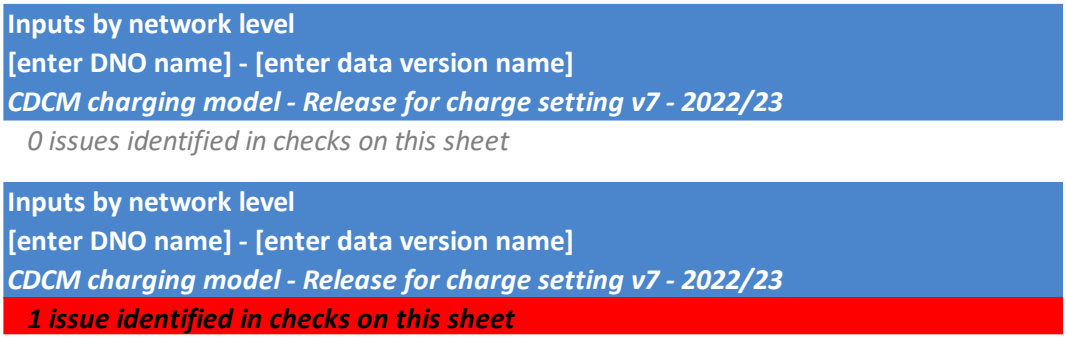
Model checks are included at the bottom of each input, calculation and output sheet (an example is shown in Figure 4.2 below). These checks will create a flag (value of one or higher) when certain criteria have been broken. Checks are particularly relevant for users entering inputs. When flags take a value other than zero, this indicates that inputs have been incorrectly specified. These flags are not intended to capture all types of potential input errors and, consequently, users should also undertake their own input validation procedures.

Figure 4.2: Example of error check flags



If any checks flag an issue, Row 4 of the relevant sheet will display with a red background, and the total number of issues will be given. This is illustrated in Figure 4.3, using an example from the CDCM model.

Figure 4.3: Example of highlighting Row 4 for warning messages



The CDCM model contains a variety of other in-built checks throughout the model, summarised at the end of each sheet. All model checks are summarised on the "Version control" sheet, near the bottom of the sheet (an example is shown in Figure 4.4 below). Once all relevant data has been inputted to the model, users should check the summary of in-built model checks to ensure that no issues have been identified.

Figure 4.4: Summary of in-built model checks

Model checks

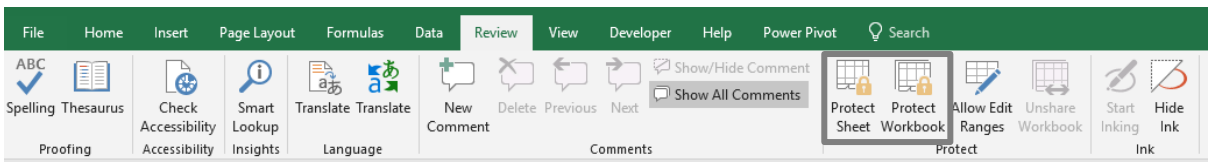
Issues identified by in-built model checks, by sheet

Fixed inputs	Input 101	number of issues	0
Inputs by customer type	Input 102	number of issues	0
Inputs by network level	Input 103	number of issues	1
General inputs	Input 104	number of issues	0
Standing Charge Factors	Section 101	number of issues	0
Load & loss characteristics	Section 102	number of issues	0
Customer contributions	Section 103	number of issues	0
Volume adjustments	Section 104	number of issues	0
Pseudo-load coefficients	Section 105	number of issues	0
System peak demand	Section 106	number of issues	0
Service model assets	Section 107	number of issues	0
Unit costs	Section 108	number of issues	0
Initial unit rates	Section 109	number of issues	0
Service model charges	Section 110	number of issues	0
Unit rate charges	Section 111	number of issues	0
Capacity charges	Section 112	number of issues	0
Reactive power charges	Section 113	number of issues	0
Fixed charges	Section 114	number of issues	0
SoLR & bad debt adders	Section 115	number of issues	0
Revenue matching	Section 116	number of issues	0
Rounding	Section 117	number of issues	0
Net revenue summary	Section 118	number of issues	0
Tariff summary	Output 101	number of issues	0
Output to other models	Output 102	number of issues	0
Total		number of issues	1

Given the input data specified, the CDCM will produce a set of use of system tariffs on the "Tariff summary" sheet. To facilitate running the full suite of charging models, outputs to other models are summarised on the "Output to other models" sheet.

By default, the structure of the workbook and all the sheets within it are protected, so that users can only change inputs cells, fixed inputs cells, filters and cell formats. The model can easily be 'unlocked' by unprotecting the sheets and unprotecting the workbook through Excel's "Review" tab. By default, there is no password for this protection.

Figure 4.5: Protecting and unprotecting the workbook



5. INFORMATION SHEETS

The CDCM contains five information sheets that provide information and aid with model navigation. These are:

- **Cover**, which sets out the DNO and charging year to which the model applies, as well as model data version. Cover also summarises the model publication date and version of DCUSA text to which the model corresponds.
- **Version control**, setting out the version of the model published by DCUSA Ltd, and any changes from the previous model version. This sheet also provides a summary of in-built model checks.
- **Model map**, providing an interactive schematic of the model.
- **Index**, providing a list and hyperlinks of all major section headings throughout the model, plus input and output tables.
- **Named ranges**, setting out the list, description and location of all named ranges used in the model.

In addition to the information sheets, each sheet in the workbook contains a description of the worksheet and annotations to tables and section headings where appropriate. References to the DCUSA text are also provided throughout the model in the right-hand column (and indicated with a chevron in column I). All references to paragraphs and tables in that column are made with reference to the Schedule and version of the DCUSA text noted in Section 1 of this document.

6. INPUTS

The CDCM model contains **four input sheets** as summarised in the following subsections.

INPUT SHEET 1 - Fixed inputs

The "Fixed inputs" sheet contains pre-populated inputs that should not be altered by the user. These inputs are constant across companies and either specified explicitly in the DCUSA text (e.g. in the case of standing charge factors), enable model functionality (e.g. in the case of model flags) or are identities (e.g. hours per day).

INPUT SHEET 2 - Inputs by customer type

This sheet contains inputs by customer type (see Figure 2.4 in Section 2), including load characteristics (load factor and coincidence factor) and volume forecasts. It is also necessary to input the number of "designated property" MPANs with EDCM-level LDNOs, by customer type.

INPUT SHEET 3 - Inputs by network level

The "Inputs by network level" sheet contains inputs specified by the core network levels set out in the DCUSA text. This includes network and load inputs (e.g. diversity allowances and loss adjustment factors), customer contributions, 500MW model asset costs, and asset peaking probabilities for distribution timebands.

For the peaking probabilities, the sum across Red, Amber and Green timebands should either equal 100% - or zero for a non-existent network level (e.g. 132kV). No adjustments are made for incorrect inputs within the model, so there is a check that this condition is satisfied at the bottom of the sheet.

The peaking probabilities for the Yellow timeband (applied for UMS customers) is not specified as an input, as it is calculated within the model in the "Pseudo-load coefficient" sheet.

INPUT SHEET 4 - General inputs

The "General inputs" sheet contains revenue and expenditure data, cost of capital assumptions and LDNO discounts. This sheet also has tables where users can specify the number of hours per distribution timeband and number of days in the charging year.

For the number of hours per distribution timeband, the total number of hours should match the total number of hours in the charging year. No adjustments are made for incorrect inputs within the model, so there is a check that this condition is satisfied at the bottom of the sheet. "Hours in charging year" are calculated and defined on this sheet for this purpose.

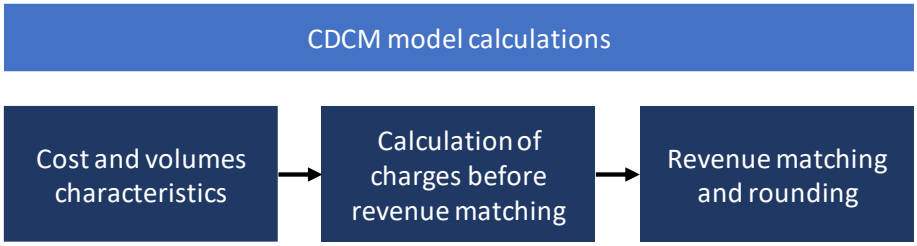
This sheet also contains a cell to input the amount of revenue recovered from EDCM tariffs, which is calculated in the EDCM models.

CDCM target revenue (Input 104-C) includes several rows of inputs which are used to calculate a forecast of CDCM Revenue, which is an exception to the model's usual separation of inputs and calculations The structure of this table is defined by Appendix A, Table 1 of DCUSA Schedule. The pass-through subsection includes Connections Reform Costs, alongside the other pass-through items. Supplier of Last Resort and Eligible Bad Debt costs continue to be subject to the separate allocation arrangements described in Section 7.3.

7. CALCULATIONS

The calculations in the CDCM model can be split into three high-level steps - as described in DCUSA Schedule 16, paragraph 6.

Figure 7.1: CDCM model calculations, high-level steps



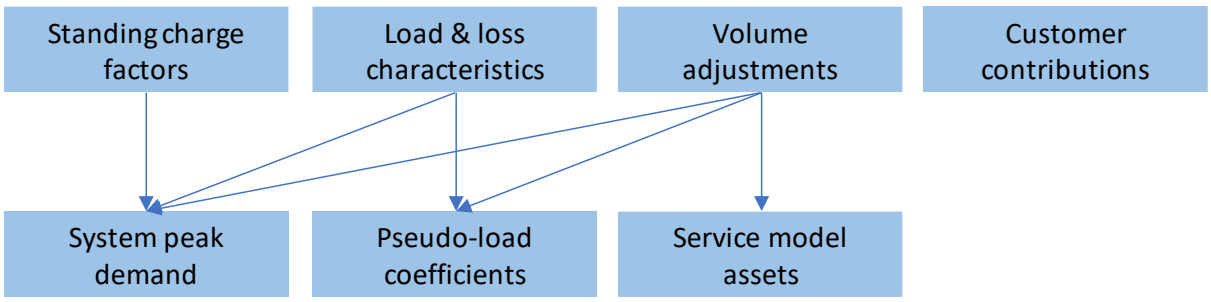
The subsections below describe the calculations and assumptions used in each calculation sheet.

7.1. Cost and volumes characteristics

This section captures Step 1 of the DCUSA Schedule 16 and is focussed on processing inputs to derive interim values that are used in cost allocation and the calculation of the various customer tariffs. There are **seven calculation sheets** in this part of the model. Each sheet is generally focussed on a particular type of input.

Some sheets in this section feed into one another, while others are used directly in later stages of the CDCM calculations. Figure 7.2 below shows a schematic of the worksheets in this section.

Figure 7.2: Cost and volumes characteristics, flow of calculations



The subsections which follow describe each of the seven worksheets in this part of the model in turn.

CALCULATION SHEET 1 - Standing charge factors

Standing charge factors are a set of numbers (in percentage terms) specified in DCUSA Schedule 16 paragraph 74 which determine the proportion of unit costs allocated to capacity or fixed charges rather than unit rates. Standing charge factors are specific to each customer category and vary by network level.

This sheet adjusts the standing charge factors specified in DCUSA Schedule 16 paragraph 74 to account for the share of load distributed through the 132kV/EHV transformation, missing out the EHV level. This is done in line with the descriptions in DCUSA Schedule 16 paragraph 76. Standing charge factors are later used to adjust unit rate tariffs in order to allocate costs to be recovered through capacity and fixed charges.

CALCULATION SHEET 2 - Load & loss characteristics

Model inputs include various network load and loss characteristics. This sheet makes adjustments to that raw input data.

The first section of this sheet has two functions:

1. To calculate cumulative diversity allowances, by network level.
2. To adjust coincidence, diversity, loss adjustment and network use factors for the share of load going through 132kV/HV transformation, by network level and customer category.

The second section of the sheet then uses network use factors (NUFs), adjusted for the share of load going through 132kV/HV, and loss adjustment factors to calculate:

- user loss factors (i.e. the loss adjustment factor based on the network level at which customers are connected); and
- the ratio of user loss factor to network loss factor (used to adjust load measured at a user's entry/exit point to an equivalent load at each network level).

The CDCM model calculates two sets of user loss factors and NUFs:

1. One set assumes generation users make no contribution (i.e. have a NUF of zero) at the network level at which they are connected. These are used in the calculation of unit rates and capacity charges.
2. The other set assumes a non-zero NUF for generation at the network level which it is connected. These are used only in the calculation of reactive power charges.

CALCULATION SHEET 3 - Customer contributions

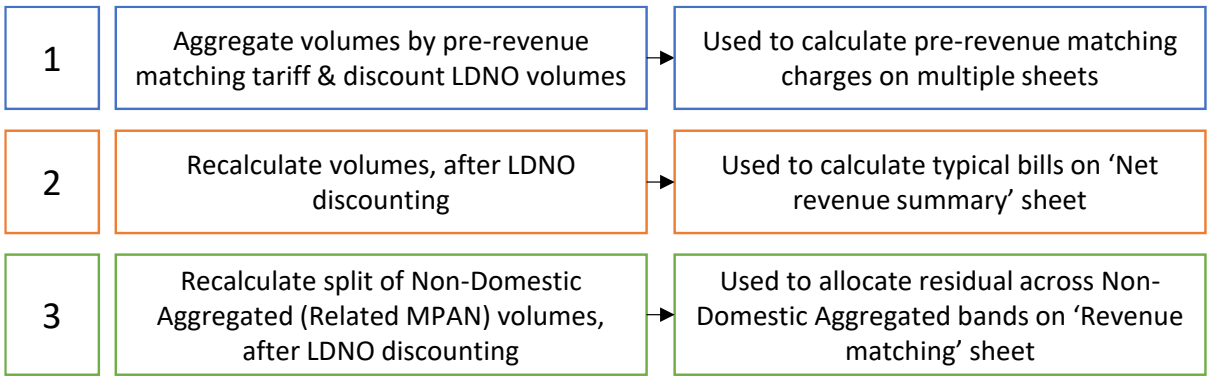
The Customer contributions sheet calculates the extent to which the assets at each network level used by each category of users would have been expected to be covered by customer contributions had they been constructed under the charging year's connection charging policy (DCUSA Schedule 16 paragraph 29). The worksheet maps each customer category to the network level at which they are supplied, then maps customer contributions by network level of supply (under the charging year's connection polices) and finally maps estimated customer contributions for each customer group by network level.

CALCULATION SHEET 4 - Volume adjustments

The Volume adjustments sheet adjusts volumes for LDNO discounts, and aggregates across bands to give a single set of volumes for each tariff before revenue matching. These steps allow pre-revenue matching calculations to be carried out uniformly for all customers on the same pre-revenue matching tariff, and not including volumes associated with network levels served by LDNOs, before being split out again on the 'Revenue matching' sheet. This sheet also adjusts the split of volumes used to allocate the residual associated with Non-Domestic Aggregated (Related MPAN) volumes, but which must be recovered from Non-Domestic Aggregated or CT tariffs – as per Schedule 16, paragraph 92 (a).

Figure 7.3 summarises the three main volume adjustments and how they are used.

Figure 7.3: Volume adjustment steps



Demand customers are mapped to LDNO discount categories specified in the Fixed inputs sheet. For generation, volumes (e.g. kWh and MPANs) are discounted using the fixed discount rates described in DCUSA Schedule 16, paragraph 99.

CALCULATION SHEET 5 - Pseudo-load coefficients

This sheet calculates pseudo-load coefficients in line with the description in paragraph 70c of Schedule 16. The sheet is split into four steps:

- Step 1: calculate ratio of coincidence to load factor assuming units evenly spread within time bands, and peak falls in Red period
- Step 2: calculate correction factor
- Step 3: ratio of coincidence factor (to network asset peak) to load factor, given peaking probabilities, multiplied by correction factor

  → *Adjustment for domestic and non-domestic charge equalisation*
- Step 4: Results of Step 3

The first three steps follow the structure laid out in the sub-paragraphs (i), (ii) and (iii); and the fourth step summarises final outputs. There is no section dedicated to the last step

specified in the DCUSA text (paragraph 70 c iv), as these calculations are carried out simultaneously for these customers in the first three steps.

For the purposes of Step 2, forecast volumes for the Domestic Aggregated (Related MPAN) and Non-Domestic Aggregated (Related MPAN) tariffs are added to forecast volumes for Domestic Aggregated or CT and Non-Domestic Aggregated or CT tariffs as required by Paragraph 52A of Schedule 16. This implies that "Related MPAN" tariffs and their equivalent "Aggregated or CT" tariffs have the same unit rates (but "Related MPAN" tariffs have no fixed charge). See ANNEX B for a log of the assumptions used to implement this requirement.

CALCULATION SHEET 6 – System peak demand

The System peak demand sheet calculates system peak load that is used to allocate other operating costs and calculate unit costs in other parts of the model. This sheet also contains an interim output, estimated maximum load, which is used in the calculation of fixed charges.

System peak load is calculated in line with paragraph 62 of the DCUSA. Paragraph 62 specifies that system peak load used to allocate other operating expenditure should match estimated load subject to charges:

> *"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."*** *[emphasis added]*

'Volumes subject to charges' is interpreted to mean the kWh that are charged to unit rates, the kVA that is charged to capacity/exceeded capacity charges, and the estimated maximum load used to calculate fixed charges. Therefore, the calculation of system peak load is split into three steps:

1. Calculation of peak load based on kWh charged to unit rates.
2. Calculation of peak load based on kVA charged to capacity and exceeded capacity charges.
3. Calculation of peak load based on estimated maximum load used to calculate fixed charges.

CALCULATION SHEET 7 – Service model assets

The service model assets sheet calculates the total notional value of service model assets – split by LV and HV customers. This is done by simply multiplying service model values per unit by the equivalent volumes for each customer category (e.g. per MPAN or per MWh for UMS customers).

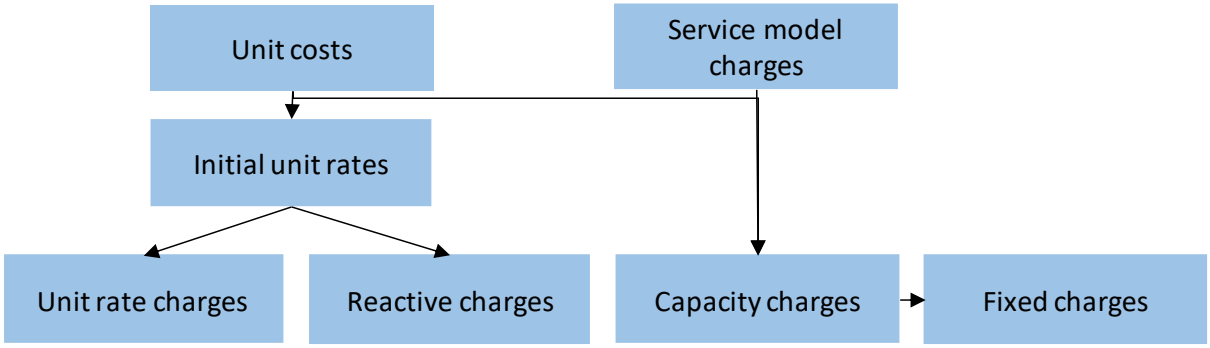
Total service model notional asset values are exported to the 'Unit cost' sheet.

7.2. Calculation of charges before revenue matching

This section of the CDCM model generally captures Step 2 of the DCUSA Schedule 16 and is focused on calculating the full set of tariffs before revenue matching takes place.

There are three initial steps included in this section of the model, which calculate unit costs, an initial set of unit rates, and costs allocated to service models, comprising in total, **seven calculation worksheets**. There is then one sheet for each different type of tariff, as shown in Figure 7.4 below.

Figure 7.4: Charges before revenue matching, flow of calculations



CALCULATION SHEET 8 – Unit costs

The unit cost sheet calculates the two main unit costs used throughout the rest of the model:

- Asset costs (£/kW/year), based on the annuitized cost of assets required for reinforcing the network to meet a 500 MW increment of demand.
- Other operating costs (£/kW/year), captures the cost of other operating expenditure and transmission exit charges.

The first section of the sheet calculates **asset unit costs** using three basic steps:

1. Calculate the incremental system peak demand, based on the diversity of GSPs to GSP group, loss adjustments factors and the incremental 500 MW of demand assumption underpinning the DNO's 500 MW DRM model.
2. Divide the cost of assets required to meet the 500 MW of incremental demand (specified as inputs) by incremental system peak demand at each network level.
3. Multiply the result of step 2 by the annuity factor, which is based on assumptions of the DNOs' allowed real rate of return and an assumed network asset life (specified in DCUSA Schedule 16).

For DNOs that have a share of load going through 132kV/EHV transformation, adjustments are made to account for that share.

To calculate unit costs for **other operating unit costs**, the model follows paragraphs 63-66 of Schedule 16 of the DCUSA. The first step is to calculate a notional asset value for each network

level based on estimated system peak demand and annuitized asset costs for each network level. Notional asset values are then combined with service model asset values.

Operating costs are then allocated based on the share of total notional asset value at each network level, and divided by system peak demand, to give a £/kW cost for other operating costs. The intuition behind this is that the cost of operating the network is related to the size of the network, which can be proxied by the notional asset value of network assets.

CALCULATION SHEET 9 – Initial unit rates

The Initial unit rates sheet calculates unit rate 1, unit rate 2 and unit rate 3 for demand and generation customers based on the formulae in DCUSA Schedule 16, paragraph 68 and 71 respectively.

> **[p/kWh from network model assets]** = 100*[network level £/kW/year]*[user loss factor]/[network level loss factor]*[pseudo load coefficient]*(1 – [contribution proportion])/[days in charging year]/24
>
> **[p/kWh from operations]** = 100*[transmission exit or other expenditure £/kW/year]*[user loss factor]/[network level loss factor]*[pseudo load coefficient] /[days in charging year]/24

The formula used in the model for generation customers deviates from the legal text in order to include the pseudo load coefficient, which allows for the calculation of multiple unit rates (where these are applicable).

This sheet also calculates a 'yardstick' unit rate, which is a unit rate based purely on customers' estimated contribution to peak demand and is not adjusted to reflect peaking probabilities of assets in each network level in periods outside of the peak period. Therefore, the yardstick unit rate uses a load coefficient instead of a pseudo load coefficient for each customer group's unit rate calculations.

CALCULATION SHEET 10 – Service model charges

The 'Service model charges' sheet calculates charges at the LV customer and HV customer network levels to reflect operating and maintenance costs associated with dedicated service model assets. Service model charges are calculated by multiplying service model asset value by the overall ratio of "other operating costs for allocation" to "notional asset value". The cost of the assets themselves are not charged for, as they are assumed to be entirely customer-contributed.

Service model costs are recovered through the fixed charge for all customer categories which have one. In the case of unmetered supplies, service model costs are recovered through unit rate charges, as stated in DCUSA Schedule 16 paragraphs 85-86.

CALCULATION SHEET 11 – Unit rate charges

This sheet adjusts unit rates 1, 2 and 3 to account for costs that will be recovered through fixed or capacity charges instead. This is done by multiplying unit rates by (1 – [standing charge factors]) as set out in paragraph 74 of DCUSA Schedule 16. If a standing charge factor is greater than zero, unit charges are reduced; if it is equal to one, unit charges will be zero.

Initial unit rates are sourced from the 'Initial unit rates' sheet for all network levels except LV customers. This network level includes operating costs associated with service model assets for unmetered supply customer categories, as stated in paragraph 86.

Unit rates 1, 2 and 3 (pre revenue matching) are summarised at the bottom of the sheet for each customer category, aggregating over network levels.

CALCULATION SHEET 12 – Reactive power charges

This sheet calculates reactive power charges (p/kVArh) in line with the approach described in DCUSA Schedule 16, paragraphs 87-88. Reactive charges are based on yardstick unit rates.

Paragraphs 141 and 146 of DCUSA Schedule 16 state which customer categories do and do not face reactive power charges. This distinction is implemented through a row of TRUE/FALSE flags. For the purpose of calculating reactive power unit charges, generation users are taken to make a full contribution at the network level to which they are connected and all levels above that, as described in DCUSA Schedule 16, paragraph 88.

Reactive power charges (pre revenue matching) are aggregated over network levels at the bottom of the sheet.

CALCULATION SHEET 13 – Capacity charges

For demand users (other than UMS), this sheet allocates unit rates to capacity charge elements (p/kVA/day) in line with the formulae in DCUSA Schedule 16 paragraph 78. As per DCUSA Schedule 16 paragraphs 81-82, non-half-hourly settled tariffs recover capacity-related costs through a fixed charge (p/MPAN/day). For these tariffs, the elements calculated here are further transformed into fixed charges on a separate calculation sheet (see below).

The 'Capacity charges' sheet also calculates exceeded capacity charges (p/kVA/day) for half-hourly settled tariffs in accordance with DCUSA Schedule 16 paragraph 153.

CALCULATION SHEET 14 – Fixed charges

This sheet calculates fixed charges (p/MPAN/day) for non-half-hourly settled demand users in accordance with DCUSA Schedule 16 paragraphs 82-86. This sheet also brings in fixed charges that were calculated on the 'Service model charges' sheet with respect to the LV customer and HV customer network levels as described in paragraph 85.

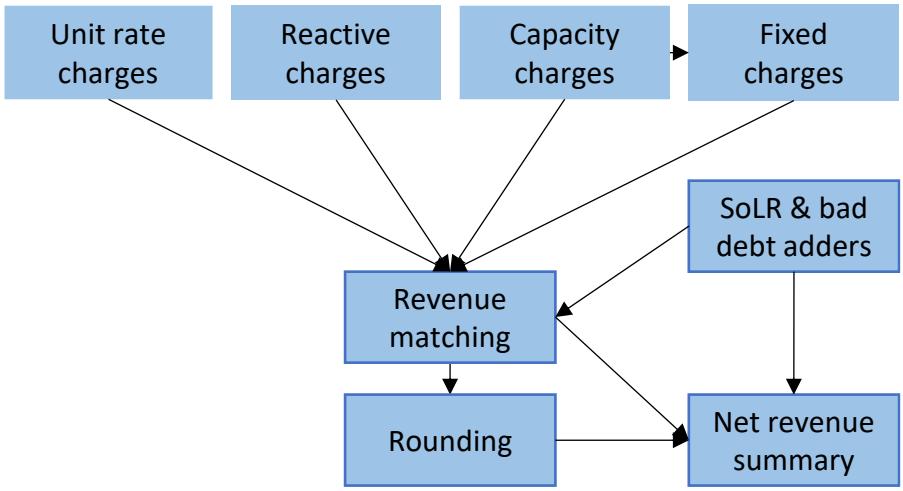
Fixed charges are aggregated over network levels at the bottom of the sheet to be pulled onto the 'Revenue matching' sheet for calculating expected net revenue.

7.3. Revenue matching, rounding and calculation of non-tariff outputs

This section describes Step 3 of the DCUSA Schedule 16 "Match revenues" as well as the application of adders, LDNO discounts and rounding to produce the final set of user tariffs. It also covers the calculation of non-tariff outputs which are not required by the legal text, but are produced for DNOs' and IDNOs' internal uses.

As illustrated in Figure 7.5, initial unit rates; reactive, capacity and fixed charges; and fixed charge adders for supplier of last resort (SoLR) payments and bad debt pass-through costs are pulled into the 'Revenue matching' sheet then subsequently the 'Rounding' worksheet which directly populates the 'Final tariffs' sheet. The 'Net revenue summary' sheet draws from several locations and feeds through to 'Output to other models'.

Figure 7.5: Revenue matching, rounding and calculation of non-tariff outputs: flow of calculations



The calculations in the 'SoLR & bad debt adders', 'Revenue matching', 'Rounding' and 'Net revenue summary' sheets are described in the subsections below.

CALCULATION SHEET 15 – SoLR & bad debt adders

This sheet calculates an adder, to be applied to fixed charges in order to recover any pass-through adjustment revenue associated with SoLR payments and bad debt. This calculation apportions pass-through adjustment revenue between all customers that have to pay this charge – which is defined within the legal text and in the model's fixed inputs. This considers customers whose charges are set in the CDCM as well as those whose charges are set in the EDCM.

CALCULATION SHEET 16 – Revenue matching

This sheet adjusts fixed and/or unit rate charges for demand customers, such that expected revenue to be collected through the CDCM and EDCM matches the DNO's allowed revenue.

Before this sheet, calculations are carried out for each *"tariff before revenue-matching"*. At the revenue-matching stage, tariffs before revenue-matching are translated into *"all-the-way"* tariffs, which have the same forward-looking charges but different residual charges according to their residual charging band.

Paragraphs 89-95 state that the residual should be recovered from final demand users' fixed charges (p/MPAN/day) such that expected revenue and allowed revenue match – except for users on an Unmetered Supplies tariff or where a negative residual would result in the fixed charge becoming negative, in which case the remainder should be recovered from unit rate charges (p/kWh).

The residual is apportioned between banded tariff groups according to their contribution to total net consumption (kWh) for all final demand sites. The residual apportioned to the "Related MPAN" tariffs is recovered from the corresponding "Aggregated or CT" tariff, as directed by paragraph 92 (a).

The Revenue matching sheet also applies a step to group residual bands where a single band has too few eligible customers. This is designed to avoid situations in which a residual charge is based on a single customer, which would mean making their information public.

In situations where the residual is negative and would cause the fixed charge to become negative overall, the Revenue Matching sheet determines a unit rate adder to recover the remainder for that tariff band – subject to the constraint that unit rates must also be non-negative. In principle, it is possible that a negative residual could be too large to be recovered without breaking non-negative charge constraints. In this (rare) case, the model would flag an error.

CALCULATION SHEET 17 - Rounding

This sheet pulls in pre-match tariffs; fixed charge and unit rate charge adders calculated in 'Revenue matching'; the fixed charge adders rate calculated in 'SoLR & bad debt adders', LDNO discounts calculated on the 'Volume adjustments' sheet; and the decimal places for rounding defined in DCUSA Schedule 16, paragraph 14.

The pre-match tariffs and adder rates are added together to give "all the way tariffs" for end-users. LDNO LV tariffs and LDNO HV are calculated by multiplying all the way tariffs by LDNO discount factors. All tariffs are then rounded to the suitable number of decimal places.

These outputs are transposed onto the 'Final tariffs' sheet with no further adjustments.

CALCULATION SHEET 18 - Net revenue summary

The 'Net revenue summary' sheet calculates several non-tariff outputs which are not strictly required by the DCUSA text, but which are made available for users' information and DNO/IDNOs' internal use.

For instance, some DNOs publish “tariff movement explanation reports” to demonstrate the impact of a specific change on typical bills for all-the-way customers (per MPAN and per kWh).

IDNOs have also reported that they find it useful to see the difference between LDNO and all-the-way charges expressed as a proportion of the typical bill. This is calculated using all-the-way volumes so that LDNO margins only capture the difference in charges and not usage profiles.

The sheet also presents a summary of total net revenue and any deviations from target net revenue due to rounding. This is calculated for information only, and is not used in any further calculations.

8. OUTPUTS

The CDCM model has two output sheets.

Figure 8.1: CDCM output sheets



OUTPUT SHEET 1 - Tariff summary

The 'Tariff summary' sheet presents the set of final tariffs for 'all the way' customers and LDNO LV/HV customers. Figure 8.2 displays an example set of tariffs. A dash indicates that a charge does not apply for that customer category.

Figure 8.2: Example set of final all-the-way CDCM tariffs, as displayed in the model

	Identifier	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/kVArh
All the way tariffs								
Domestic Aggregated or CT with Residual	All the way	12.407	2.516	0.160	14.23	-	-	-
Domestic Aggregated (Related MPAN)	All the way	12.407	2.516	0.160	-	-	-	-
Non-Domestic Aggregated or CT No Residual	All the way	12.325	2.499	0.159	6.34	-	-	-
Non-Domestic Aggregated or CT Band 1	All the way	12.325	2.499	0.159	18.03	-	-	-
Non-Domestic Aggregated or CT Band 2	All the way	12.325	2.499	0.159	24.86	-	-	-
Non-Domestic Aggregated or CT Band 3	All the way	12.325	2.499	0.159	47.37	-	-	-
Non-Domestic Aggregated or CT Band 4	All the way	12.325	2.499	0.159	122.49	-	-	-
Non-Domestic Aggregated (Related MPAN)	All the way	12.325	2.499	0.159	-	-	-	-
LV Site Specific No Residual	All the way	8.106	1.519	0.101	24.49	4.06	6.03	0.178
LV Site Specific Band 1	All the way	8.106	1.519	0.101	256.06	4.06	6.03	0.178
LV Site Specific Band 2	All the way	8.106	1.519	0.101	400.32	4.06	6.03	0.178
LV Site Specific Band 3	All the way	8.106	1.519	0.101	644.77	4.06	6.03	0.178
LV Site Specific Band 4	All the way	8.106	1.519	0.101	1,355.50	4.06	6.03	0.178
LV Sub Site Specific No Residual	All the way	6.470	1.110	0.078	78.10	4.20	7.02	0.133
LV Sub Site Specific Band 1	All the way	6.470	1.110	0.078	309.67	4.20	7.02	0.133
LV Sub Site Specific Band 2	All the way	6.470	1.110	0.078	453.93	4.20	7.02	0.133
LV Sub Site Specific Band 3	All the way	6.470	1.110	0.078	698.38	4.20	7.02	0.133
LV Sub Site Specific Band 4	All the way	6.470	1.110	0.078	1,409.11	4.20	7.02	0.133
HV Site Specific No Residual	All the way	4.549	0.660	0.051	171.22	4.18	7.37	0.083
HV Site Specific Band 1	All the way	4.549	0.660	0.051	1,327.49	4.18	7.37	0.083
HV Site Specific Band 2	All the way	4.549	0.660	0.051	3,556.05	4.18	7.37	0.083
HV Site Specific Band 3	All the way	4.549	0.660	0.051	7,299.04	4.18	7.37	0.083
HV Site Specific Band 4	All the way	4.549	0.660	0.051	18,667.14	4.18	7.37	0.083
Unmetered Supplies	All the way	24.960	6.310	3.973	-	-	-	-
LV Generation Aggregated	All the way	-8.346	-1.692	-0.108	-	-	-	-
LV Sub Generation Aggregated	All the way	-6.959	-1.327	-0.088	-	-	-	-
LV Generation Site Specific	All the way	-8.346	-1.692	-0.108	-	-	-	0.164
LV Generation Site Specific no RP Charge	All the way	-8.346	-1.692	-0.108	-	-	-	-
LV Sub Generation Site Specific	All the way	-6.959	-1.327	-0.088	-	-	-	0.140
LV Sub Generation Site Specific no RP Charge	All the way	-6.959	-1.327	-0.088	-	-	-	-
HV Generation Site Specific	All the way	-5.271	-0.871	-0.063	11.50	-	-	0.107
HV Generation Site Specific no RP Charge	All the way	-5.271	-0.871	-0.063	11.50	-	-	-

OUTPUT SHEET 2 - Output to other models

The 'Output to other models' sheet sets out values from the CDCM that are used in the PCDM and EDCM.

Exports to the PCDM include:

- CDCM notional EHV asset values (£), by network level;
- Smart meter communication licence costs (£), taken directly from the 'General inputs' sheet.

Exports to the EDCM include:

- Diversity allowance between level exit and GSP Group (%);
- System simultaneous maximum load (MW);
- Assets in CDCM model (£);
- Loss adjustment factor to transmission (scalar);
- CDCM final tariffs for all the way customers; and
- CDCM fixed charge adders for supplier of last resort and bad debt pass through adjustments.

The sheet also provides the outputs for users' internal use - namely LDNO margins and results used by some DNOs to populate "tariff movement explanation reports".

ANNEX A COST INFORMATION REVIEW PACK GUIDE

This annex presents a guide to the "Cost Information Review Pack" (CIRP) model.

The guide is applicable to the CIRP v2, which is based on the 2028/29 CDCM model, as provided by CEPA/TNEI to DCUSA Ltd on 5th November 2026. It was developed in accordance with Schedule 20 of the "Attachment A_DCUSA Charging Methodologies Pre-Release for 2028-29" version of the DCUSA text, which was issued to CEPA/TNEI on 7th October 2026.

This guide is provided in an annex to the CDCM model guide because the CDCM is included within the CIRP, and many of the sheets are common to both.

It introduces the CIRP and explains how it relates to the CDCM (A.1); summarises the model's functionality (A.2) and structure (A.3); and issues instructions on using the model(A.4).

A.1. Introduction to the CIRP

DCUSA Clause 35A requires DNO Parties to complete a copy of the CIRP by the final day of May, September and the month of final publication of tariffs in each year, and to provide it to DCUSA Secretariat for publication. **DCUSA Schedule 20** specifies the CIRP's content.

The purpose of the CIRP is to help interested parties – particularly Supplier Parties and IDNO Parties – to understand the detail behind published and future CDCM charges, and how changes affecting DNOs' Allowed Revenues may affect tariffs and typical bills in future years.

The CIRP contains historical CDCM inputs and forecasts of CDCM inputs for multiple years – from the Regulatory Year prior to the current year (t-1), to four years after the current year (t+4) – and produces forecasts of tariffs and typical bills for the upcoming years for which CDCM charges have not yet been published (t+2 to t+4).

The CIRP is published several times a year so that DNOs may update their input projections and explain their effects on tariffs to interested parties.

Detailed information on the calculation of DNOs' Allowed Revenues is provided in a sheet called 'Table 1 – Detailed', which feeds through to the core model. The values in this Table are often revised to account for DNOs' regulatory performance, over/under-recoveries in previous years, re-openers to the DNOs' price control, out-turn inflation, or other factors.

Every time DNOs update the CIRP they can explain differences against the previous values in Table 1 on the 'Table 1 – Delta from Previous' sheet, which includes fields in which to record a written commentary overall and against individual items. Users can also explore how further changes to Calculated Revenue or Recovered Revenue may affect Allowed Revenue and Recovered Revenue in future years on the 'Table 1 – Sensitivities' sheet. This includes changes in Connections Reform Costs where the value differs from the previous CIRP publication.

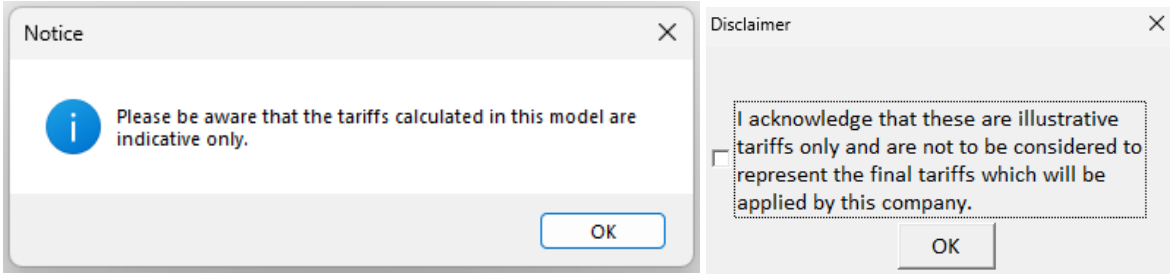
The DCUSA text references in the CIRP refer to Schedule 16 unless otherwise stated (e.g. when referring to Schedule 20).

A.2. Functionality

The CIRP uses macros to run. Users must ensure that they open it as "**macro-enabled**".

When the CIRP is opened, users will see a **pop-up message** warning them that tariffs calculated in the CIRP are indicative only. Likewise, the first time that they navigate to an output sheet another pop-up box will require them to acknowledge a **disclaimer** stating that tariffs are illustrative only and are not to be considered to represent final tariffs which will be applied.

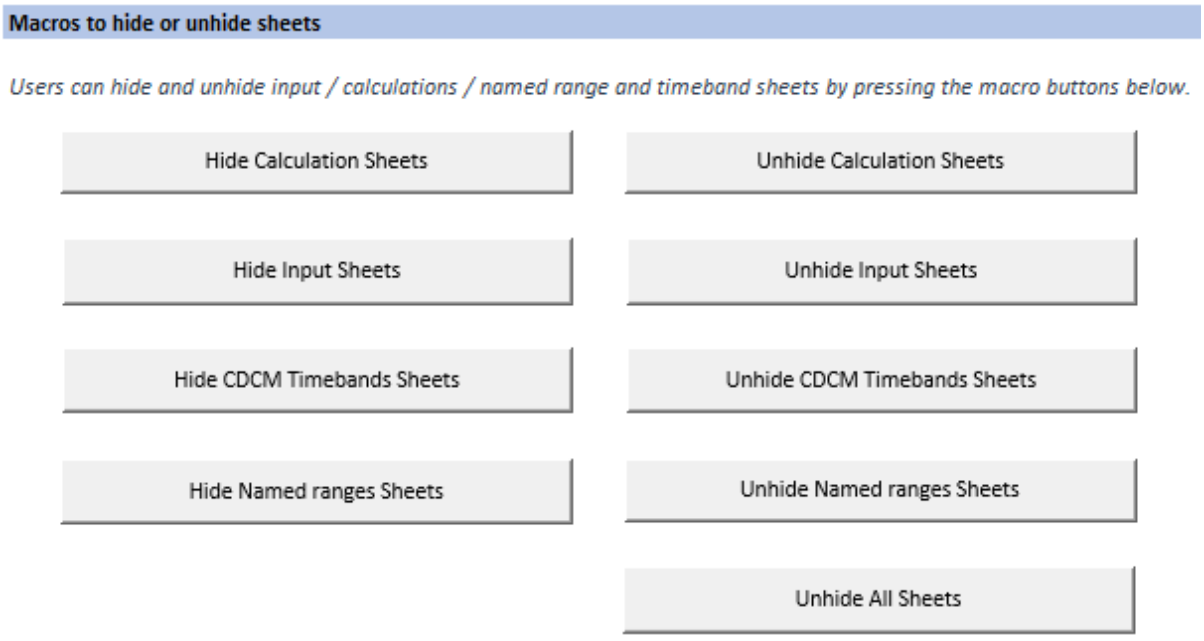
Figure A.1: Pop-up messages that appear on opening the CIRP (left); and navigating to output sheets (right)



Because the CIRP is used to forecast the tariffs that will be produced by the CDCM, it is built as an **extension to the CDCM model**. All sheets in the CDCM model are also present in the CIRP except 'Output to other models'. 'Tariff summary' is altered such that it presents results for each year of the forecast period.

The **core CDCM sheets are hidden by default** in the CIRP to focus attention on the key input / output / information sheets. They may be unhidden by pressing the **hide/unhide buttons** at the bottom of the 'CIRP_User control' sheet.

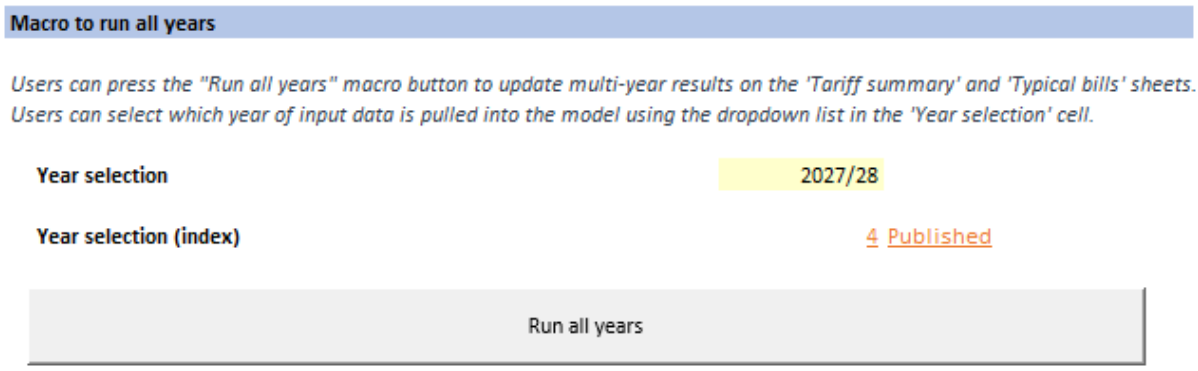
Figure A.2: Macro buttons for hiding / unhiding sheets



The key functionality introduced by the CIRP is to forecast CDCM tariffs and typical bills for each tariff in each year of the forecast period - as required by Schedule 20, paragraph 2.1. The CIRP achieves this by introducing **multi-year input sheets** from which one year of 'live' data is pulled into the CDCM input sheets at any one time. The CDCM sheets calculate a set of tariffs for that 'live' year.

The model includes a **macro button** which puts each year of data through the CDCM input / calculation sheets and records the tariffs and typical bills calculated for each year on the output sheets. The drop-down above the macro button will determine which year of inputs is pulled into the CDCM sheets at one moment, but the 'Run all years' button will record results for years t+2 to t+4 and reset the year selection to its previous value.

Figure A.3: Macro button for updating CIRP projections



A.3. Model structure

The CIRP is split into information, input, calculation and results sheets in the same way as the CDCM model. A map of the model is provided in Figure A.4 overleaf.

The **information** section includes a commentary on changes made against the previous publication of 'Table 1 – Detailed' on the 'Table 1 – Delta from Previous' sheet; and a 'Table 2 – Sensitivities' sheet to explore how changes to Table 1 might affect Allowed and Recovered Revenue in future years. It also includes instructions for DNOs on how to update the CIRP on the 'CIRP_Instructions sheet'.

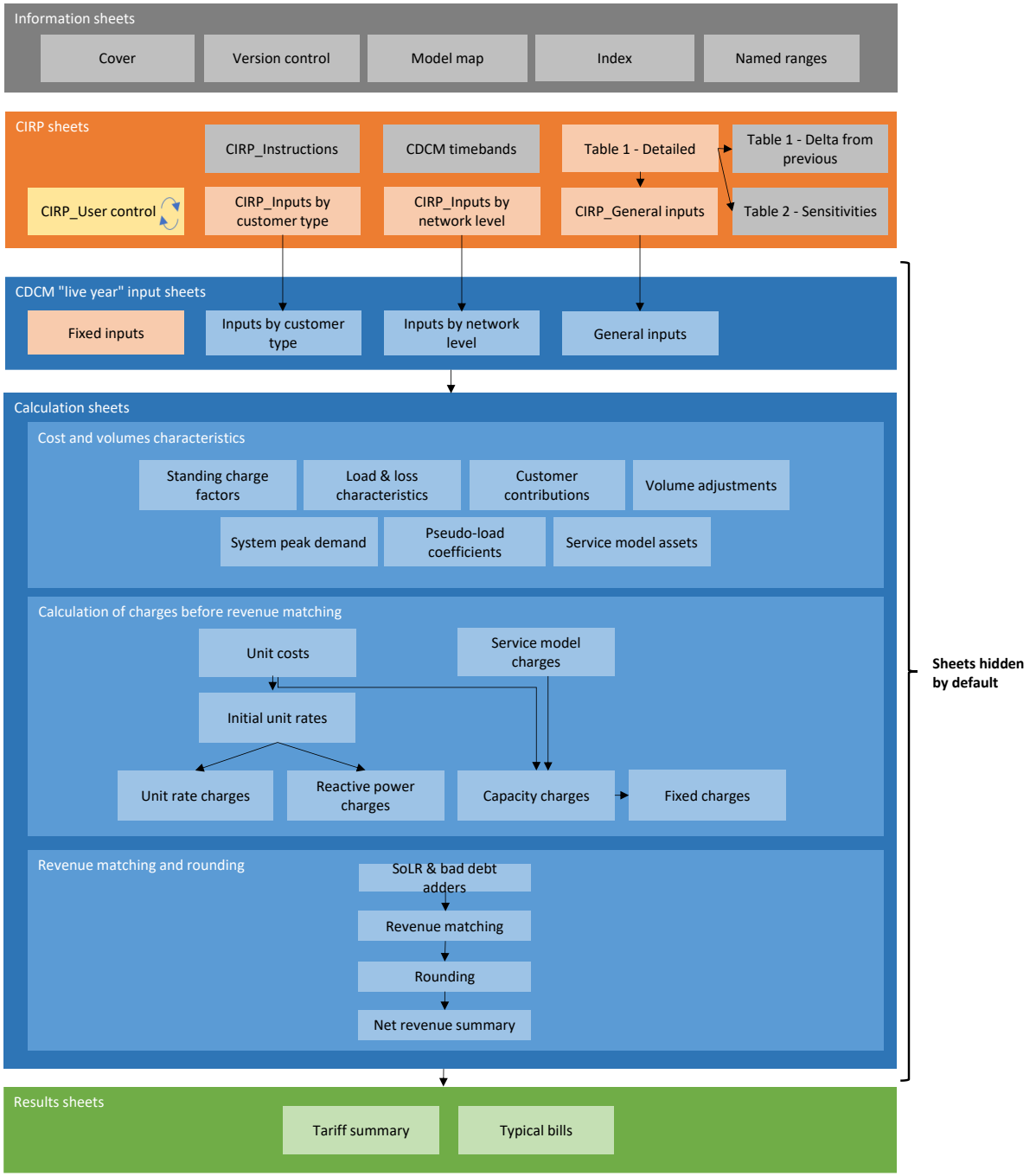
The **inputs** section is split between CIRP inputs sheets which are used to house input data for multiple years, and CDCM inputs sheets which hold input data for just one year at a time and have the same setup as in the CDCM itself. CDCM input sheets draw data from the CIRP sheets for the year chosen on the 'CIRP_User control' sheet.

The **calculation** section is identical to the CDCM calculation section, except for the 'Revenue summary' sheet which is specific to the CIRP and is used to calculate typical bills.

The **results** section contains a version of the CDCM's 'Tariff summary' sheet with results for all forecast years, as well as a sheet presenting 'Typical bills'. Tariffs and typical bills are presented for all the way customers and LDNOs.

The CIRP does not have an 'Output to other models' sheet.

Figure A.4: CIRP model map



A.4. Operating instructions

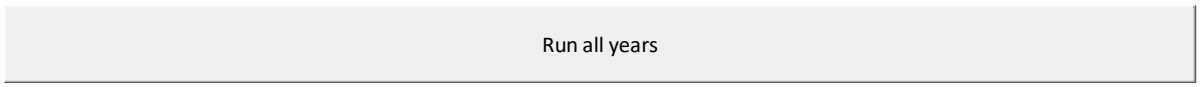
When updating the CIRP, DNOs should refer to the step-by-step instructions given on the 'CIRP_Instructions' sheet and the annotation provided on individual input sheets.

DNOs should ensure that they have filled in all user input cells (shaded yellow) in the following model input sheets:

- Cover
- Table 1 – Detailed

- CIRP_User control
- CIRP_Inputs by customer type
- CIRP_Inputs by network level
- CIRP_General inputs

The 'CIRP_User control' sheet is especially important. Users can select the 'live' year for which data will be pulled into the calculations through **"year selection"**. This sheet also houses a button labelled:



Clicking this button will run a macro[1] to update the results sheets for each of the forecast years covered by the CIRP. The macro automates the process of selecting a year, calculating tariffs and typical bills, hard-copying the results into a table, and repeating for all forecast years. To view the code that the macro uses, press Alt+F11 and navigate to the module named *"Run all years"*. This button should be pressed before the CIRP is published.

DNOs should also complete the following Information sheets for the benefit of their customers, as required by DCUSA Schedule 20:

- CDCM Timebands
- Table 1 – Delta from Previous
- Table 2 – Sensitivities

These sheets are not formatted as input sheets because they do not affect any other model calculations and are not necessary to produce valid results.

As in the CDCM model, sheet checks can be found at the bottom of each sheet. These flags are not intended to capture all types of potential input errors and, consequently, users should also undertake their own input validation procedures.

[1] A macro is a saved sequence of commands that can be stored and then recalled with a single command or keyboard stroke.

ANNEX B ASSUMPTIONS LOG

The following table sets out a series of assumptions that have been made to produce the current version of the CDCM. The assumptions here help to clarify or serve to amend the DCUSA legal text. Each of these assumptions takes precedence over the DCUSA legal text. It is assumed that each of these assumptions will ultimately be reflected in the DCUSA legal text through a housekeeping change. Each assumption has been approved by DCUSA Ltd with the consent of DNOs.

Table B.1: Assumptions

DCUSA text reference	Assumption	Worksheet reference	Description
-	132kV/EHV adjustment to NUFs	Load & loss characteristics	An adjustment has been applied to NUFs based on the share of load going through 132kV/EHV. This is not specified in the DCUSA, but has been implemented to reflect that some load from customers at the HV and LV levels will go through 132kV/EHV transformation and, consequently, not all customers use the EHV part of the network. This adjustment helps to avoid double counting volumes throughout the model. The legal text would benefit from clarification on how the charges should be adjusted for the share of load going through 132kV/HV.
Schedule 16, para 26	Diversity allowance for 132kV/EHV	Load & loss characteristics	It has been assumed that the diversity allowance for 132kV/EHV network level is equal to that for EHV/HV.
Schedule 16, para 32-37; 64; 66	Direct input of service model asset values	Inputs by customer type	It has been assumed that DNOs will calculate service model asset values by customer category internally, to be entered as an input to the CDCM.
Schedule 16, para 47	Loss adjustment factor for 132kV/EHV	Load & loss characteristics	It has been assumed that the loss adjustment factor for 132kV/EHV network level is equal to that for EHV/HV.
Schedule 16, para 53	Reactive power discounts	Volume adjustments	It has been assumed that reactive power charges are not discounted for LDNO discounts, despite not being explicitly

DCUSA text reference	Assumption	Worksheet reference	Description
			mentioned as being treated in this way in the legal text (e.g. paragraph 99 does not mention reactive power).
Schedule 16, para 62	Volumes subject to charges	System peak demand	It has been assumed that peak load that matches 'volumes subject to charges' is comprised of three elements: 1. Calculation of peak load based on kWh charged to unit rates. 2. Calculation of peak load based on kVA charged to capacity and exceeded capacity charges. 3. Calculation of peak load based on estimated maximum load used to calculate fixed charges. This would benefit from a clarification of the legal text.
Schedule 16, para 70 c ii	Correction factor for customers with 0 coincidence to peak, or no load characteristic data.	Pseudo-load coefficients	The correction factor calculated in Section 106-G (row 118) makes an assumption that if either the result of step 1 or coincidence factor is zero, then a correction factor of 1 should be used. This is done to control for missing data (which results in step 1 being zero) and for customers that have zero coincidence (which would result in the correction factor being zero). Both cases would result in a pseudo-load coefficient of zero (and therefore unit rates of zero) if not controlled for. This modelling assumption this imposes is that these customers are assumed to have a flat load during the red period.
Schedule 16, para 70 c iv	Aggregation of pseudo-load coefficient for UMS customers	Pseudo-load coefficients	It has been assumed that the aggregation of pseudo load coefficients for UMS customers applies only to steps 1 and 2 of paragraph 70 c. That is, step 3 (which is described in Schedule 16, paragraph 70 c iii), is not subject to aggregation with respect to UMS customer categories. This interpretation was approved by a majority of DNOs. It was noted that this part of the DCUSA text was vague and should be clarified.

DCUSA text reference	Assumption	Worksheet reference	Description
Schedule 16, para 71	Unit rates for generation	Initial unit rates	Paragraph 71 does not include a term to transform average load into load at system peak. The principle of the methodology is that users are charged based on their contribution to peak demand. Based on equivalent formulae elsewhere in the DCUSA text (e.g. Schedule 16, paragraph 68), it would be reasonable to suspect that the pseudo load coefficient should be applied at this point: also reflecting the fact that assets peak at times other than when the system peaks. It has therefore been assumed that the pseudo load coefficient should be included in the formulae in paragraph 71. This treatment was approved by a majority of DNOs. It was implemented under the understanding that a change proposal would be raised at a future date to address the omission in the legal text.
Schedule 16, para 80	LV diversity factor	System peak demand	In undertaking the calculation described in paragraph 80, the following assumptions have been used: • Where the legal text refers to 'agreed import capacity' forecast import capacity plus exceeded capacity has been used. It has been assumed that the legal text will be updated to reflect this. • "Domestic Aggregated (related MPAN)" and "Non Domestic Aggregated (related MPAN)" have been excluded from the calculation of maximum demand. This is because these are related MPAN categories whose maximum demand would be captured under other customer categories. • System peak load has been calculated using the pseudo-load coefficient, instead of a standard load coefficient as this is consistent with the treatment of system peak load in the rest of the model.

DCUSA text reference	Assumption	Worksheet reference	Description
Schedule 16, paragraphs 85-86	Service model replacement costs	Service model	It has been assumed that service model asset values should not be charged for, and should only be used as a proxy for allocating operating and maintenance expenditure. In general, the text could benefit from better explanation of how costs should be allocated to service models.
Schedule 16, Paragraph 87a	Reactive power charge "unrestricted unit rate"	Reactive power charges	The legal text should clarify what "unrestricted unit rate" should mean. Discussions with DNO Parties suggested that this implies using the formulae set out in paragraphs 68 and 71, except using a load coefficient rather than a pseudo load coefficient.
Schedule 16, Paragraph 99	Reactive power charge discount for generation	Volumes adjustments	Paragraphs 99 do not state whether reactive power charges should be discounted for generation. It has been assumed that they are not discounted and that the legal text should be updated to reflect this.
Schedules 17/18	Outputs to other models	Outputs to other models	Schedule 16 does not define which parts of the CDCM should be taken as inputs to the EDCM and PCDM. Some of these inputs are defined in Schedules 17/18 - namely paragraphs 9.2 and 15.11 with respect to system simultaneous maximum load and the Diversity Allowance. Where these are defined, they are identified using table numbers from the existing models. We assume firstly that these table references will be updated in Schedules 17/18 to reflect the current table reference numbers, and secondly that the outputs exported to the EDCM and PDCM should match the outputs used by the existing models. For instance, system simultaneous maximum load should be exported to the EDCM before adjusting for standing charges (as per existing CDCM table 2506) and not after adjusting for standing charges (as per existing CDCM table 2611).
Schedule 16, paragraph 52A	"Related MPAN" tariffs aggregation	Pseudo-load coefficients	The wording of Paragraph 52A requires adding "(Related MPAN)" volumes to the equivalent "Aggregated or CT" volumes. It has been

DCUSA text reference	Assumption	Worksheet reference	Description
			assumed that aggregating these volumes is only necessary while calculating pseudo-load coefficients – giving the effect that "Aggregated or CT" and "(Related MPAN)" tariffs have the same unit rates.
Schedule 16, paragraph 74	"Related MPAN" tariffs aggregation	Fixed inputs	Standing charge factors are not stipulated for "Related MPAN" tariffs (which have no standing charges). It has therefore been assumed that standing charge factors of 100% should be applied at the LV circuit level to "Domestic Aggregated (Related MPAN)" and "Non-Domestic Aggregated (Related MPAN)" tariffs in the same way as for the equivalent "Aggregated or CT" tariffs.