# DCP 226 Draft Legal Text

## Housekeeping 66/72/73/77/80

### Correcting of Formatting - Double Spacing

Where there is one or more double spaces in the following provisions, the second space will be deleted:

- Schedule 16, paragraph 68;
- Schedule 16, paragraph 71;
- Schedule 16, paragraph 78;
- Schedule 17, paragraph 15.14;
- Schedule 17, paragraph 15.15;
- Schedule 17, paragraph 16.1;
- Schedule 17, paragraph 16.3;
- Schedule 17, paragraph 16.7;
- Schedule 17, paragraph 18.4;
- Schedule 17, paragraph 18.10;
- Schedule 17, paragraph 18.11;
- Schedule 17, paragraph 18.17;
- Schedule 17, paragraph 19 (title);
- Schedule 17, paragraph 19.3;
- Schedule 17, paragraph 23.2;
- Schedule 17, paragraph 23.3;
- Schedule 17, paragraph 23.5;
- Schedule 17, paragraph 29.1;
- Schedule 17, annex 2, 1st paragraph;
- Schedule 18, paragraph 15.14; and
- Schedule 18, paragraph 25.3.

**Amend the following definition in Clause 1 as follows:**

| | |
|---|---|
| **Gas Supplier Party~~ies~~** | means a Party that holds a Gas Supply Licence (whether or not that Party is also a Supplier Party and/or a DG Party). |

**Amend Clauses 21.5 and 21.6 as follows:**

~~21.5 Not Used~~

21.~~6~~5 For the purposes of this Clause 21, the following terms shall have the following meanings:

"electronic invoice" means an account providing the data items set out in data flow D2021 (as amended from time to time) sent using the Data Transfer Network.

**Unmetered Supplies**

21.~~7~~6 This Clause 21 is to be interpreted in accordance with Clauses 19.4A and 19.4B.

**Amend paragraph 41A of Schedule 16 as follows:**

41A. The DNO Party may only change distribution time bands with effect from 1 April and must provide a minimum of 15 months prior notice of such changes. However, where a change to distribution time bands is caused by the implementation of a change to this methodology, the requirement to provide a minimum of 15 months' notice prior notice will not apply.

**Amend the following row in the table in paragraph 101 of Schedule 16 as follows:**

| | | | |
|---|---|---|---|
| System Mapping ~~-~~ – Cartographical | MEAV | 52.57% | |

**Amend paragraph 147 of Schedule 16 as follows:**

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

**Amend paragraph 1.9 of Schedule 17 and the heading for the subsequent diagram as follows:**

1.9 Figure ~~2~~1 provides a diagrammatic overview of the steps involved for import charges.

**Figure ~~2~~ 1 Diagrammatic overview of the EDCM for import**

**Amend paragraph 3.4 of Schedule 17 and the heading for the subsequent table as follows:**

3.4 The EDCM charge components for import are listed in table ~~4~~1.

**Table ~~4~~ 1 Charge components for import**

**Amend paragraph 3.6 of Schedule 17 and the heading for the subsequent table as follows:**

3.6 The EDCM charge components for export are listed in table ~~5~~2.

**Table ~~11~~ 2 Charge components for export**

**Amend the heading for the table following paragraph 15.6 in Schedule 17 as follows:**

**Table ~~5~~ 3 Categorisation of EDCM Customers**

**Amend paragraphs 18.6 to 18.8 of Schedule 17 as follows:**

18.6 The network use factor (NUF) caps and collars for 2011/2012 and each network level were calculated using this methodology and are set out in table ~~6~~ 4 below. The NUF caps and collars using 2015/2016 data for each network level have also been determined, and are set out in table ~~6A~~ 4A below.

**Table ~~6~~ 4 Network use factor caps and collars (2011/2012)**

| Network levels | Collar | Cap |
|---|---|---|
| 132kV | 0.273 | 2.246 |
| 132kV/EHV | 0.677 | 1.558 |
| EHV | 0.332 | 3.290 |
| EHV/HV | 0.631 | 2.380 |
| 132kV/HV | 0.697 | 2.678 |

**Table ~~6A~~ 4A Network use factor caps and collars (using 2015/16 data)**

| Network levels | Collar | Cap |
|---|---|---|
| 132kV | 0.192 | 1.859 |
| 132kV/EHV | 0.674 | 1.551 |
| EHV | 0.367 | 2.366 |
| EHV/HV | 0.635 | 1.616 |
| 132kV/HV | 0.808 | 1.652 |

18.7 The caps and collars in table ~~6~~ 4 above were fixed for three years, and were used to calculate charges for the Charging Years 2012/2013 and 2013/2014. The caps and collars are to be re-calculated for the subsequent Charging Years. From Charging Year 2017/2018 onwards the caps and collars are to be calculated using the methodology described in paragraph 18.5 based on the NUFs described in paragraph 18.8. The NUFs themselves are calculated in accordance with paragraphs 29 and 30 below.

18.8 Table ~~7~~ 5 below sets out the schedule for the calculation of the NUF caps and collars for each Charging Year.

**Table ~~7~~ 5 NUF cap and collar calculation timeline**

| Charging Year | Caps and collars |
|---|---|
| 2011/2012 Submission | 2011/2012 caps/collars (as per table ~~6~~4) |
| 2012/2013 | 2011/2012 caps/collars (as per table ~~6~~4) |
| 2013/2014 | 2011/2012 caps/collars (as per table ~~6~~4) |
| 2014/2015 | Average of 2011/2012, 2012/2013, 2013/2014 NUFs |
| 2015/2016 | Average of 2011/2012, 2012/2013, 2013/2014 NUFs |
| 2016/2017 | Average of 2011/2012, 2012/2013, 2013/2014 NUFs |
| 2017/2018 | 2015/2016 caps/collars (as per table ~~6A~~4A) |
| 2018/2019 | 2015/2016 caps/collars (as per table ~~6A~~4A) |
| 2019/2020 | 2015/2016 caps/collars (as per table ~~6A~~4A) |
| 2020/2021 | Average of 2015/2016, 2016/2017, 2017/2018 NUFs |
| 2021/2022 | Average of 2015/2016, 2016/2017, 2017/2018 NUFs |
| 2022/2023 | Average of 2015/2016, 2016/2017, 2017/2018 NUFs |
| 2023/2024 | Average of 2017/2018, 2018/2019, 2019/2020, NUFs |
| 2024/2025 | Average of 2017/2018, 2018/2019, 2019/2020, NUFs |
| 2025/2026 | Average of 2017/2018, 2018/2019, 2019/2020 NUFs |

**Amend paragraph 19.7 of Schedule 17 as follows:**

19.7 If the EDCM import capacity charge (p/kVA/day) calculated above is negative and the Connectee's average kW/kVA (adjusted for part year) is not equal to zero, the final EDCM super-red unit rate is adjusted as follows:

Adjusted FCP super-red unit rate in p/kWh = [FCP super-red rate in p/kWh] + ([EDCM import capacity charge (p/kVA/day)] * ([Days in the Charging Year] – [Days for which not a customer]) / [Average kW/kVA] / ([hours in the super-red time band] - [Hours in super-red for which not a customer]))

**Amend paragraph 21.1 of Schedule 17 and the heading for the subsequent table as follows:**

21.1 Table ~~8~~ 6 summarises the method of application of import charge components.

**Table ~~8~~ 6 Application of EDCM import charge components**

**Amend paragraph 21.2 of Schedule 17 and the heading for the subsequent table as follows:**

21.2 Table ~~9~~ 7 summarises the method of application of export charge components.

**Table ~~9~~ 7 Application of EDCM export charge components**

**Amend the heading for the table following paragraph 24.8 in Schedule 17 as follows:**

**Table ~~10~~ 8 Categorisation of designated EHV IDNO Parties**

**Amend the following row in the table following paragraph 25.15A of Schedule 17 as follows:**

| | |
|---|---|
| 66kV underground cable, non-pressurised ~~Pressurised~~ | EHV |

**Amend paragraph 4.9 of Annex 1 to Schedule 17 as follows:**

4.9 As an example, if Figure 2 represents the actual network, the approach described above to produce the EHV network model would reduce it to a nodal model representation as shown in Figure ~~3~~2. Table ~~7~~ 9 shows an example of the data held relating to Figure 2 with the individual subsections being cross referenced to each Branch; Table ~~8~~ 10 lists the parameters used for the nodal model shown in Figure 3.

Figure ~~3~~ 2 - An example of a section of network to be converted into a nodal model.

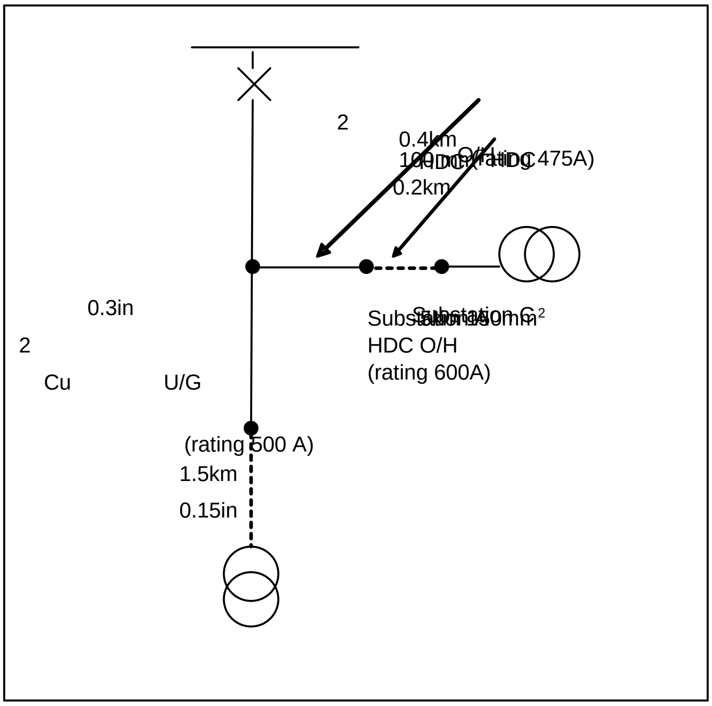



Figure ~~4~~3 - The resultant nodal model representative of the example network in Figure 2.

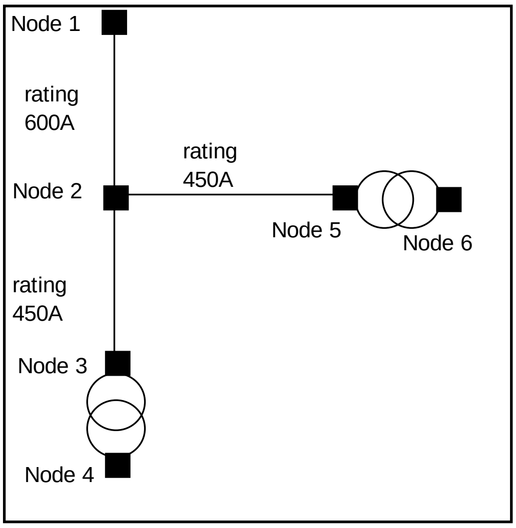



Table ~~11~~ 9 - An example of the information held separately relating to Figure ~~1~~ 2 which is used to provide the composite Branch parameters.

| Branch | Line Section | Type | Length | Rating | R(p.u.)[1] | X(p.u.) |
|---|---|---|---|---|---|---|
| Node 1 to Node 2 | 1 | 150mm2 HDC | 5km | 600A | 0.001 | 0.01 |
| Node 2 to Node 3 | 1 | 0.15in2 HDC O/H | 6km | 450A | 0.0018 | 0.0054 |
| Node 2 to Node 3 | 2 | 185mm2 Cu U/G | 0.2km | 550A | 0.00003 | 0.0003 |
| Node 2 to Node 5 | 1 | 100mm2 HDC | 0.4km | 475A | 0.00004 | 0.0004 |
| Node 2 to Node 5 | 2 | 0.3in2 Cu U/G | 0.2km | 500A | 0.00003 | 0.0001 |
| Node 2 to Node 5 | 3 | 0.15in2 HDC O/H | 1.5km | 450A | 0.00045 | 0.00135 |

Table ~~12~~ 10 - Composite Branch parameters used for the nodal model shown in Figure 3 above.

| Branch | Branch Rating | R(p.u.) | X(p.u.) |
|---|---|---|---|
| Node 1 to Node 2 | 600A | 0.001 | 0.01 |
| Node 2 to Node 3 | 450A | 0.00183 | 0.0057 |
| Node 2 to Node 5 | 450A | 0.00052 | 0.00185 |

**Amend the heading following paragraph 5.10 of Annex 1 to Schedule 17 as follows:**

**Figure ~~5~~ 4 - Example model for the calculation of Diversity Factors.**

[1] For the sake of simplicity ratings, resistance (R) and reactance(X) values given above are assumed and should be used only for illustrative purposes such as the given example to calculate equivalent Branch ratings and parameters for a composite Branch.

**Amend the heading to the table at paragraph 5.14 of Annex 1 to Schedule 17 as follows:**

**Table ~~13~~ 11 - Calculation of Net Diversity Factors - Hierarchical Diversity Factors.**

**Amend the heading to the table at paragraph 5.18 of Annex 1 to Schedule 17 as follows:**

**Table ~~14~~ 12 - Calculation of Net Diversity Factors – Single Diversity Factors**

**Amend the headings following paragraph 5.29 of Annex 1 to Schedule 17 as follows:**

**Figure ~~6~~ 5 - Network schematic showing Primary Substations loaded with maximum demands and the network assets monitored for overloads.**

**Figure ~~7~~6 - Network schematic showing Primary Substations loads removed and BSP loads added, also showing the network assets monitored for overloads.**

**Amend paragraph 5.30 of Annex 1 to Schedule 17 as follows:**

5.30 Where networks are comprised of a mix of radial and meshed sections (such as shown in Figure ~~7~~6), it may not be appropriate to consider all substations as being loaded to their maximum demands. This implementation involves the application of hierarchical Diversity Factors to loads on meshed sections while the loads on the radial sections remain unchanged. The procedure is described below.

**Amend the heading following paragraph 5.33 of Annex 1 to Schedule 17 as follows:**

**Figure ~~8~~ 7 - Implementation of Diversity Factors using multiple load sets**

**Amend the heading to the table in paragraph 5.34 of Annex 1 to Schedule 17 as follows:**

**Table ~~15~~ 13 - Calculation of Diversity Factors – Multiple load sets (meshed and radial mix).**

**Amend paragraphs 6.6 and 6.7 of Annex 1 to Schedule 17 as follows:**

6.6 Figure ~~9~~8 shows an example network broken down into a number of Network Groups. This example shows how individual Network Groups may include multiple source substations. This is illustrated by the Level 2 group shown as BSP Group 1. In this example both BSP1 and BSP2 are Source Substations which are encompassed within a single Network Group, due to operation of an interconnected 33kV network between these substations under Normal Running Arrangements.

6.7 Separate Network Groups may be physically connected by circuits but under Normal Running Arrangements there are no flows between the Network Groups either by means of a normally open switch or normally open circuit breaker. Figure ~~10~~9 shows the same example network as seen in Figure ~~9~~8 except now the 33kV circuit interconnection between BSP 1 and BSP 2 is run open, creating two level 2 BSP Network Groups, where previously there was only one, with their own separate Source Substations.

**Amend the diagram headings following paragraph 6.8 of Annex 1 to Schedule 17 as follows:**

**Figure ~~9~~ 8 - Example network showing three levels of Network Groups.**

**Figure ~~10~~ 9 - Example network similar to Figure ~~7~~ 8 showing that the addition of the Normally Open Point (NOP) has created two level 2 BSP Network Groups.**

**Amend the diagram heading following paragraph 7.2 of Annex 1 to Schedule 17 as follows:**

**Figure ~~11~~10 - Flowchart of the FCP pricing model.**

**Amend paragraph 7.6 of Annex 1 to Schedule 17 as follows:**

7.6 The N-1 and N-2 Contingency Analyses are repeated for each year of the specified 10 year planning period as shown in Figure 11. The timing for each overloaded Branch is determined from these analyses as described in Figure ~~11~~ 10 (see Demand (Load) Analysis block). The overloaded Branches are identified by running the appropriate N-1 or N-2 Contingency Analyses on the networks populated by Maximum Demand Data or Maintenance Demand Data, respectively. If any of these two analyses cause a Branch overload for the considered year u, the time to reinforcement of the Branch is set to Y=u. If a Branch overload is identified in both analyses the time to reinforcement is set to the earliest year the overload is found.

**Amend the diagram heading following paragraph 7.8 of Annex 1 to Schedule 17 as follows:**

**Figure ~~12~~ 11 - Reinforcements considered over the 10-~~-~~year planning period.**

**Amend paragraph 8.1 of Annex 1 to Schedule 17 as follows:**

8.1 The calculation of Network Group incremental charges for demand (load/) is based on the outputs obtained from the power flow analysis process which is discussed in the section 9 (Calculation of Network Group incremental charges) below (see Figure ~~10~~12).

**Amend paragraph 1 of Attachment 1 to Schedule 17 as follows:**

1. A small network example is shown below (Figure ~~15~~12) to illustrate the calculation of Network Group incremental charges for demand (load).

**Amend the diagram heading following paragraph 3 of Attachment 1 to Annex 1 to Schedule 17 as follows:**

**Figure ~~13~~ 12 - Example of charging by Network Groups**

**Amend paragraphs 4 and 5 of Attachment 1 to Annex 1 of Schedule 17 as follows:**

4. The calculation of Network Group incremental charges is summarised in (Table ~~21~~14) for demand connected to 132 kV and in Table ~~17~~ 15 for demand connected within BSP_A and BSP_D. The calculation is based on the formula given in paragraph 1.16 of the Authority's Decision Document (ref: 90/09, Annex 2):

$$FCP = i\left(\frac{A}{C}\right)\left(\frac{D}{C}\right)^{\frac{2i}{g}-1}/(1-e^{-iT}) = 0.134786*\left(\frac{A}{C}\right)\left(\frac{D}{C}\right)^{\frac{2i}{g}-1}$$

Where:

***i*** is a discount rate,

***T*** = 10 years,

***A*** is the Branch reinforcement cost (£),

***C*** is demand (MVA) of the Network Group at which each reinforcement would be required,

***D*** is initial demand (MVA) in the Network Group and

***g*** is demand growth rate calculated from the formulae given in Attachment 1 – Calculation of Network Group Load incremental charges – A simple Example, specifically $\frac{\ln(\frac{C}{D})}{Y}$

where ***Y*** is the number of years into the future when reinforcement is required.

5. The implementation of the formula given above is described in a number of steps in Tables ~~21~~ 14 and ~~22~~ 15 below.

**Amend the diagram headings following paragraph 8 of Attachment 1 to Annex 1 to Schedule 17 as follows:**

**Table ~~16~~ 14 – Network Group incremental charge for Level 1 Network Group.**

**Table 15 - Network Group incremental charge for Level 2 Network Group.**

**Amend the diagram heading following paragraph 3 of Attachment 3 to Annex 1 to Schedule 17 as follows:**

**Table 1~~8~~6 – Output information required to calculate final EDCM Use of System Charge.**

**Amend paragraph 1.5 of Schedule 18 as follows:**

1.5 Step 1 is the application of load flow techniques and the LRIC or FCP methodologies to determine an EDCM tariff element, known as Charge 1, which represents costs associated with demand-led reinforcement, estimated by reference to power flows in the maximum demand scenario.~~:~~

**Amend paragraph 1.9 of Schedule 18 and subsequent heading to diagram as follows:**

1.9 Figure 14 provides a diagrammatic overview of the steps involved for import charges.

**Figure 14 Diagrammatic overview of the EDCM for import**

**Amend paragraph 3.4 of Schedule 18 and subsequent heading to diagram as follows:**

3.4 The EDCM charge components for import are listed in ~~t~~Table 1~~9~~.

**Table 1~~9~~ Charge components for import**

**Amend paragraph 3.6 of Schedule 18 and subsequent heading to diagram as follows:**

3.6 The EDCM charge components for export are listed in ~~t~~Table 2~~0~~.

**Table 2~~0~~ Charge components for export**

**Amend paragraph 13.6 of Schedule 18 as follows:**

13.6 EDCM charge elements are determined using allocation drivers. The following allocation drivers are used in the EDCM:

- The value of assets that are for the sole use of a Connectee (sole use assets). This is relevant to import and export charges.
- The value of site-specific shared network assets used by the Connectee. This is relevant to import charges only. The sum of historical consumption at the time of system peak and 50 per cent of Maximum Import Capacity. This is relevant to import charges only.
- Chargeable Export Capacity. This is relevant to export charges only.

**Amend the heading of the table at paragraph 15.6 of Schedule 18 as follows:**

**Table ~~21~~ 3 Categorisation of EDCM Customers**

**Amend paragraphs 18.6 to 18.8 of Schedule 18 as follows:**

18.6 The network use factor (NUF) caps and collars for 2011/2012 and each network level were calculated using this methodology and are set out in ~~t~~Table ~~22~~ 4 below. The NUF caps and collars using 2015/2016 data for each network level have also been determined, and are set out in ~~t~~Table ~~22A~~ 4A below.

**Table ~~22~~ 4 Network use factor caps and collars (2011/2012)**

| Network levels | Collar | Cap |
|---|---|---|
| 132kV | 0.273 | 2.246 |
| 132kV/EHV | 0.677 | 1.558 |
| EHV | 0.332 | 3.290 |
| EHV/HV | 0.631 | 2.380 |
| 132kV/HV | 0.697 | 2.678 |

**Table ~~22A~~ 4A Network use factor caps and collars (using 2015/16 data)**

| Network levels | Collar | Cap |
|---|---|---|
| 132kV | 0.192 | 1.859 |
| 132kV/EHV | 0.674 | 1.551 |
| EHV | 0.367 | 2.366 |
| EHV/HV | 0.635 | 1.616 |
| 132kV/HV | 0.808 | 1.652 |

18.7 The caps and collars in T~~t~~able ~~22~~ 4 above were fixed for three years, and were used to calculate charges for the Charging Years 2012/2013 and 2013/2014. The caps and collars are to be re-calculated for the subsequent Charging Years. From Charging Year 2017/2018 onwards the caps and collars are to be calculated using the methodology described in paragraph 18.5 based on the NUFs described in paragraph 18.8. The NUFs themselves are calculated in accordance with paragraphs 29 and 30 below.

18.8 Table ~~23~~ 5 below sets out the schedule for the calculation of the NUF caps and collars for each Charging Year.

**Table ~~23~~ 5 NUF cap and collar calculation timeline**

| Charging Year | Caps and collars |
|---|---|
| 2011/2012 Submission | 2011/2012 caps/collars (as per table ~~22~~4) |
| 2012/2013 | 2011/2012 caps/collars (as per table ~~22~~4) |
| 2013/2014 | 2011/2012 caps/collars (as per table ~~22~~4) |
| 2014/2015 | Average of 2011/2012, 2012/2013, 2013/2014 NUFs |
| 2015/2016 | Average of 2011/2012, 2012/2013, 2013/2014 NUFs |
| 2016/2017 | Average of 2011/2012, 2012/2013, 2013/2014 NUFs |
| 2017/2018 | 2015/2016 caps/collars (as per table ~~22A~~4A) |
| 2018/2019 | 2015/2016 caps/collars (as per table ~~22A~~4A) |
| 2019/2020 | 2015/2016 caps/collars (as per table ~~22A~~4A) |
| 2020/2021 | Average of 2015/2016, 2016/2017, 2017/2018 NUFs |
| 2021/2022 | Average of 2015/2016, 2016/2017, 2017/2018 NUFs |
| 2022/2023 | Average of 2015/2016, 2016/2017, 2017/2018 NUFs |
| 2023/2024 | Average of 2017/2018, 2018/2019, 2019/2020, NUFs |
| 2024/2025 | Average of 2017/2018, 2018/2019, 2019/2020, NUFs |
| 2025/2026 | Average of 2017/2018, 2018/2019, 2019/2020 NUFs |

**Amend paragraph 21.1 of Schedule 18 and the heading for the subsequent table as follows:**

21.1 Table ~~24~~ 6 summarises the method of application of import charge components.

**Table ~~24~~ 6 Application of EDCM import charge components**

**Amend paragraph 21.2 of Schedule 18 and the heading for the subsequent table as follows:**

21.2 Table ~~25~~ 7 summarises the method of application of export charge components.

**Table ~~25~~ 7 Application of EDCM export charge components**

**Amend the heading to the table following paragraph 24.8 of Schedule 18 as follows:**

**Table ~~26~~ 8 Categorisation of designated EHV IDNO Parties**

**Amend paragraph 4.9 of Annex 1 to Schedule 18 as follows:**

4.9 Table ~~27~~ 9 below shows an example of the data held relating to Figure 2 with the individual subsections being cross referenced to each Branch. Table ~~28~~ 10 lists the parameters used for the Nodal model shown in Figure 3.

**Figure ~~15~~ 2 - An example of a section of network to be converted into a model.**

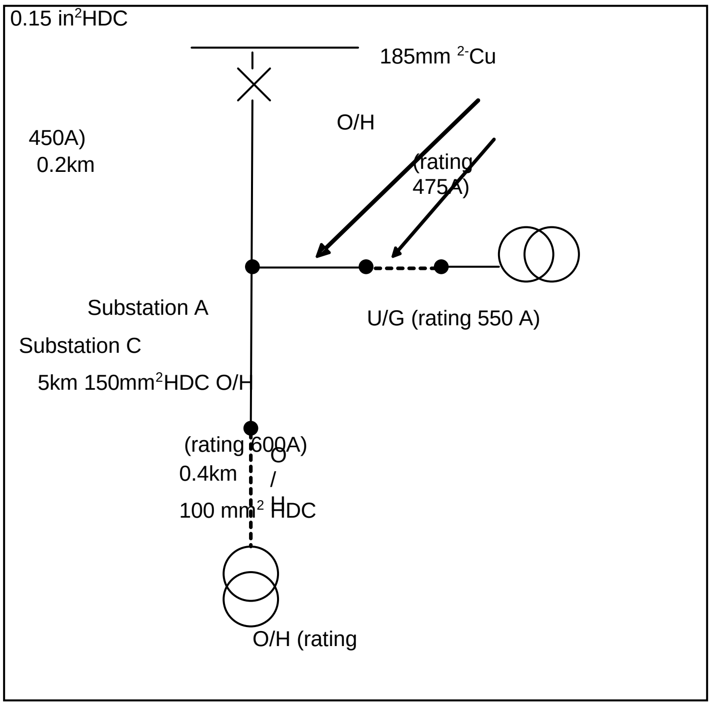



**Figure ~~16~~ 3 - The resultant Nodal model which represents the example network in Figure 2.**

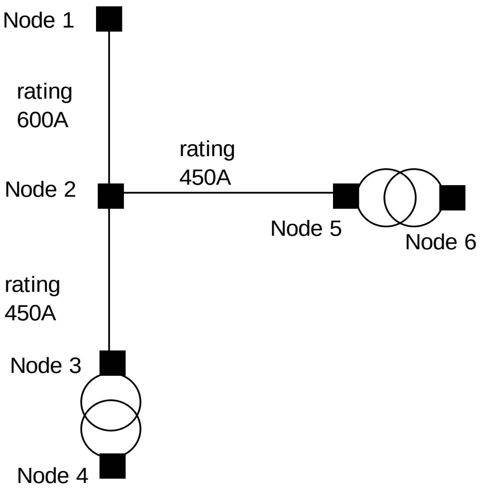



**Table ~~27~~ 9 - An example of the information held separately relating to Figure 2 which is used to provide the minimum composite branch rating.**

| Branch | Line Section | Type | Length | Rating | R(p.u.)[2] | X(p.u.) |
|---|---|---|---|---|---|---|

[2] For the sake of simplicity ratings, resistance and reactance values given above are assumed and may be used only for illustrative purposes such as the given example to calculate equivalent ratings and parameters for a composite Branch.

| | | | | | | |
|---|---|---|---|---|---|---|
| Node 1 to Node 2 | 1 | 150mm$^2$ HDC O/H | 5km | 600A | 0.001 | 0.01 |
| Node 2 to Node 3 | 1 | 0.15in$^2$ HDC O/H | 6km | 450A | 0.0018 | 0.0054 |
| Node 2 to Node 3 | 2 | 185mm$^2$ Cu U/G | 0.2km | 550A | 0.00003 | 0.0003 |
| Node 2 to Node 5 | 1 | 100mm$^2$ HDC O/H | 0.4km | 475A | 0.00004 | 0.0004 |
| Node 2 to Node 5 | 2 | 0.3in$^2$ Cu U/G | 0.2km | 500A | 0.00003 | 0.0001 |
| Node 2 to Node 5 | 3 | 0.15in$^2$ HDC O/H | 1.5km | 450A | 0.00045 | 0.00135 |

**Table ~~28~~ 10 - Parameters used for the Nodal model shown in Figure 3.**

| Branch | Line Section | Rating | R(p.u.) | X(p.u.) |
|---|---|---|---|---|
| Node 1 to Node 2 | 1 | 600A | 0.001 | 0.01 |
| Node 2 to Node 3 | 1 | 450A | 0.00183 | 0.0057 |
| Node 2 to Node 5 | 3 | 450A | 0.00052 | 0.00185 |

**Amend the heading following paragraph 5.12 of Annex 1 to Schedule 18 as follows:**

**Figure ~~17~~ 4 - Example model for the calculation of Diversity Factor.**

**Amend the heading of the table at paragraph 5.17 of Annex 1 to Schedule 18 as follows:**

**Table ~~29~~ 11 - Calculation of Net Diversity Factors - Hierarchical Diversity Factors.**

**Amend the heading of the table at paragraph 5.21 of Annex 1 to Schedule 18 as follows:**

**Table ~~30~~ 12 - Calculation of Net Diversity Factors - Single Diversity Factors.**

**Amend the heading of the table at paragraph 6.2 of Annex 1 to Schedule 18 as follows:**

**Figure ~~18~~ 5 - Flowchart of the LRIC pricing model.**

**Amend the heading following paragraph 6.11 of Annex 1 to Schedule 18 as follows:**

**Table ~~31~~ 13 - Application of increments.**

**Amend paragraph 6.17 of Annex 1 to Schedule 18 as follows:**

6.17 The process is undertaken in Incremented Flow analysis for both the Maximum Demand Scenario and the Minimum Demand Scenario in turn. This is described below:

(a) Step 1 - the Base Case Analysis is performed initially (see the Base Case Analysis section). The results of this analysis are Base Case Flows;

(b) Step 2 - the power flows across each of the network Branches are determined for the condition where the relevant increment (see Table ~~31~~13) is applied to a Node. The results are referred to as Incremented Flows;

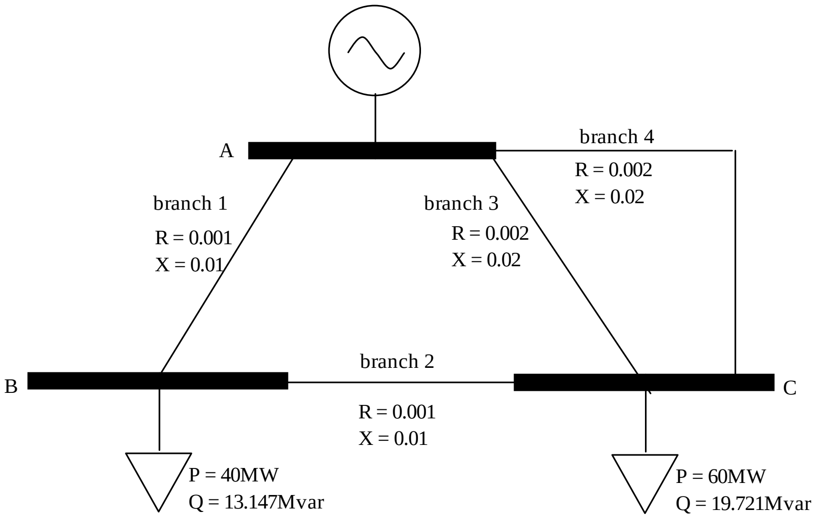
(c) Step 3 - the differences between the Incremented Flows and the Base Case Flows are evaluated. For those Branches where the difference is smaller than either 1kVA or 0.01% of the Base Case Flow then the Incremented Flow for that Branch is set to the Base Case Flow for that Branch; and

(d) Step 4 - steps 2 and 3 are repeated for each Node in turn until they have been completed for each Node in the Authorised Network Model.

**Amend paragraph 6.30 and 6.31 of Annex 1 to Schedule 18 as follows:**

6.30 To illustrate the outputs from the power flow analysis the example network is shown in Figure 6 and the power flow analysis results (from the application of 0.1MW increments, in the direction of demand (load), to Nodes in the Maximum Demand Scenario) is shown in Table ~~32~~14.

**Figure ~~19~~ 6 - Example network.**




6.31 Table ~~32~~14 shows the Base Case Flow, Contingency Flow, Incremented Flow, the power factor of the applied demand increment and the Security Factor for each Branch per Node for Maximum Demand Scenarios.

**Amend the heading of the table at paragraph 6.32 of Annex 1 to Schedule 18 as follows:**

**Table ~~32~~ 14 - An example set of output results from Maximum Demand Scenario**

**Amend paragraph 7.1 of Annex 1 to Schedule 18 as follows:**

7.1 The calculation of Nodal incremental costs is based on the outputs obtained from the power flow analysis process (see Figure 5 in section 6, Power flow analysis process).

**Amend paragraph 8.12 of Annex 1 to Schedule 18 as follows:**

8.12 For Nodes where demand (load) is located:

(a) Table ~~33~~15 describes the comparison performed for Branch reinforcements identified by application of increments to a Node where demand (load) is located.

(b) For the Maximum Demand Scenario the increment is applied in the demand (load) direction. If such an increase in demand (load) accelerates the reinforcement ($\Delta \boldsymbol{C_i}^{\boldsymbol{peak}} > 0$) the demand should be charged (Table ~~33~~15, the first row, column 'Credit/Charge'). For the Minimum Demand Scenario the increment is applied in the generation direction (a reduction of demand). If such reduction of demand (load) would accelerate the reinforcement ($\Delta \boldsymbol{C_i}^{\boldsymbol{off-peak}} > 0$) than the demand charge takes the form of a credit (Table 33 the third row, column 'Credit/Charge').

(c) It should be pointed out that each Branch incremental cost is considered in just one out of two charge periods (Peak or Off-Peak but not both) based on the scenario that drives the maximum absolute value of Branch incremental cost, as shown in Table ~~33~~15. A calculation of Nodal incremental costs and Nodal marginal charges for a simple network example is given in Attachment 2 below.

(d) To calculate the Peak Nodal incremental cost, a sum of all peak incremental costs $\Delta \boldsymbol{C_i}^{\boldsymbol{peak}}$, each scaled by the appropriate Recovery Factor $\boldsymbol{S}_i$, over all Branches where the Maximum Demand scenario drives reinforcements, associated with the application of an increment at the Node, should be determined. To calculate the Off-Peak Nodal incremental cost a sum of all offpeak incremental costs $\Delta \boldsymbol{C_i}^{\boldsymbol{off-peak}}$, each scaled by the appropriate Recovery Factor $\boldsymbol{S}_i$, over all Branches where the Minimum Demand scenario drives the reinforcements, associated with the application of an increment at the Node, should be determined.

(e) To calculate the £/kVA/annum Peak and Off-Peak Nodal marginal charges the obtained sums should be divided by the corresponding kVA increment (using 0.1 MW at 0.95 power factor). A calculation of Nodal incremental costs and Nodal marginal charges for a simple network example is given in Attachment 2 below.

(f) The Peak and Off-Peak Nodal marginal charges are the main output results that will be used for the calculation of the total Use of System Charges. The other outputs are discussed in Attachment 3 below.

(g) The adopted sign convention with respect to Peak Charges and Off-Peak Charges (output values) is given in the last column of Table ~~33~~15. It should be noted that the convention follows the sign of $\Delta C_i$.

**Amend the heading of the table following paragraph 8.12 of Annex 1 to Schedule 18 as follows:**

**Table ~~33~~ 15 - Scenarios that drive reinforcement and the rules for the calculation of Branch reinforcement charges/credits for a demand (load) located at a Node.**

**Amend paragraph 8.13 of Annex 1 to Schedule 18 as follows:**

8.13 For Nodes where generation is located:

(a) To decide which scenario drives the Branch reinforcement for a Node where a generator is located Table ~~34~~ 16 should be used.

(b) For the Maximum Demand Scenario the increment is applied in the demand direction (a reduction of generation). If such reduction of generation delays the reinforcement ($\Delta \boldsymbol{C_i}^{\boldsymbol{peak}}$ <the generator should be charged (the second row, column 'Credit/Charge'). For the Minimum Demand Scenario the increment is applied in the generation direction (an increase in generation). If such increase in generation delays the reinforcement ($\Delta \boldsymbol{C_i}^{\boldsymbol{off-peak}}$ <0) the generator should be credited (the fourth row, column 'Credit/Charge').

(c) It should be pointed out that each Branch incremental cost is included in one of two charge periods (Peak or Off-Peak but not both) based on the scenario that drives the maximum absolute value of Branch incremental cost as shown in Table ~~34~~16.

(d) To calculate the Peak Nodal incremental cost a sum of Peak incremental cost $\Delta \boldsymbol{C_i}^{\boldsymbol{peak}}$, each scaled by the appropriate Recovery Factor $s_i$, over all Branches where the Maximum Demand scenario drives reinforcements, associated with the application of an increment at the Node, should be determined. To calculate the Off-Peak Nodal incremental cost a sum of offpeak incremental cost $\Delta \boldsymbol{C_i}^{off-peak}$, each scaled by the appropriate Recovery Factor $s_i$, over all Branches where the Minimum Demand scenario drives the reinforcement, associated with the application of an increment at the Node, should be determined.

(e) To calculate the £/kVA/annum Peak Off-Peak Nodal marginal charges the obtained sums should be divided by the corresponding kVA increment (using 0.1 MW at unity power factor). The last column given in Table ~~34~~ 16 indicates the sign convention adopted for the output values. It should be noted that the convention follows the sign of $\Delta \boldsymbol{C_i}$.

**Amend the heading of the table following paragraph 8.13 of Annex 1 to Schedule 18 as follows:**

**Table ~~34~~ 16 - Scenarios that drive reinforcement and the rules for the calculation of Branch reinforcement charges/credits for a generation located at a Node.**

**Amend paragraph 8.19 of Annex 1 to Schedule 18 as follows:**

8.19 'Hybrid Customer' Nodes will, for either Demand (load) or Demand (generation) as appropriate for each individual Connectee:

(a) combine the (Charge 1) charges associated with each of the Nodes through the use of a weighted average based on the proportion of the Connectee's demand observed at each of the Nodes in the Maximum Demand Scenario, under Normal Running Arrangements;

(b) combine the (Charge 2) charges associated with each of the Nodes through the use of a weighted average based on the proportion of the Connectee's demand observed at each of the Nodes in the Minimum Demand Scenario, under Normal Running Arrangements; and

(c) aggregate Active Power and Reactive Power data for either Demand (Load) or Demand (Generation) as appropriate, relating to all relevant Nodes (Items 5 to 8 of Table ~~40~~ 22 in Attachment 3 below).

**Amend the heading to the diagram at paragraph 2 of Attachment 2 to Schedule 18 as follows:**

**Figure ~~20~~ 7 - Branch reactances, resistances and ratings.**

**Amend the headings to the diagrams at paragraph 5 of Attachment 2 to Schedule 18 as follows:**

**Figure ~~21~~ 8 - Base Case Flows- Maximum Demand Scenario.**

**Figure ~~22~~ 9 - Base Case Flows- Minimum Demand Scenario.**

**Amend the headings to the diagrams at paragraph 6 of Attachment 2 to Schedule 18 as follows:**

**Figure ~~23~~ 10 - Maximum Demand Scenario - Contingency Case 1.**

**Figure ~~24~~11 - Maximum Demand Scenario - Contingency Case 2.**

**Figure ~~25~~ 12 - Maximum Demand Scenario - Contingency Case 3.**

**Figure ~~26~~ 13 - Minimum Demand Scenario - Contingency Case 1.**

**Figure ~~27~~ 14 - Minimum Demand Scenario - Contingency Case 2**

**Figure ~~28~~ 15 - Minimum Demand Scenario - Contingency Case 3.**

**Amend paragraph 7 of Attachment 2 to Schedule 18 as follows:**

7. The calculation of Security Factors is summarised in Table ~~35~~ 17 and Table ~~36~~ 18 for the Maximum Demand Scenario and Minimum Demand Scenario, respectively. Each table contains information (for all Branches and both Maximum Demand and Minimum Demand Scenario) related to:

- Base Case Flows.
- Maximum Contingency Flow.
- Security Factor which is a ratio of Maximum Contingency Flow and Base Case Flow.
- Contingency Case referring to the contingency case that causes the Maximum Contingency Flow.
- Branch Winter/Summer Rating.
- Branch Capacity which is a ratio of the corresponding Branch Rating and Security Factor.
- Years to Reinforcement (base) - which is a year when the corresponding Branch will reach its Branch Capacity assuming annual Branch flow growth of 1% based on an exponential growth function. For, example Branch B5 will reach its Branch Capacity after 35.49 years for Maximum Demand Scenario because:
    - $34.70 = 24.38 * (1 + 0.01)^{35.49}$

**Amend the headings to the tables following paragraph 7 of Attachment 2 to Schedule 18 as follows:**

**Table ~~35~~ 17 - Calculation of Maximum Contingency Flow, Security Factors and Years to Reinforcement (Base Case) - Maximum Demand Scenario.**

**Table ~~36~~ 18 - Calculation of Maximum Contingency Flow, Security Factors and Years to Reinforcement (Base Case) - Minimum Demand Scenario.**

**Amend the heading to the table at paragraph 8 of Attachment 2 to Schedule 18 as follows:**

**Table ~~37~~ 19 - Incremented Flow Analysis – Studies**

**Amend the headings to the figures following paragraph 9 of Attachment 2 to Schedule 18 as follows:**

**Figure ~~29~~ 16 - Node G incremented power flow analysis for Maximum Demand Scenario.**

**Figure ~~30~~ 17 - Node G incremented power flow analysis for Minimum Demand Scenario.**

**Amend paragraphs 10 to 13 of Attachment 2 to Schedule 18 as follows:**

10. Using the following Table ~~38~~ 20 of Branch reinforcement cost and the algorithm in Attachment 1, Branch incremental cost is calculated for both Maximum and Minimum Demand Scenarios. The critical scenario that drives the Branch reinforcement is then identified as the scenario with the highest absolute value of associated Branch incremental cost. For example, for Branch i, if $|\Delta C_i^{peak}| > |\Delta C_i^{off-peak}|$, the scenario that drives the reinforcement of the Branch is Peak; otherwise it is Off-Peak.

**Table ~~38~~ 20 - Branch Reinforcement Cost**

| Branch | Reinforcement Cost (£) |
|---|---|
| B1 | 1156250 |
| B2 | 946500 |

| | |
|---|---|
| B3 | 2312000 |
| B4 | 1156250 |
| B5 | 946500 |
| B6 | 2312000 |
| B7 | 946500 |
| B8 | 1156250 |
| B9 | 946500 |

11. Summaries of the Incremented Flow Analysis and the Branch incremental cost calculation are given in Table ~~45~~20. The following columns are given in the table:

(1) Generation/Demand identifier.

(2) Node where the corresponding increment was applied.

(3) Branch ID – only for Branches which kVA flow increment is larger than 1 kVA and 0.01% of the Base Case Flow.

(4) Base Case Flow (MVA) of the Branch for the scenario that drives reinforcement of the Branch. The scenario (either Maximum Demand Scenario-Peak, or Minimum Demand Scenario -Off-Peak) that drives reinforcement of the Branch is the one with the highest absolute value of associated Branch incremental cost.

(5) Branch Capacity (MVA) of the Branch (see previous section – Contingency Analysis).

(6) Branch Incremented Flows (MVA) for the scenario that drive reinforcement of the Branch.

(7) Years to Reinforcement (base) in years - is the time to reinforcement of the Branch calculated under Base Case conditions as discussed in the previous section (see previous section – Contingency Analysis).

(8) Years to Reinforcement (inc) in years - is the time to reinforcement of the Branch calculated under incremental conditions as discussed in Attachment 1 above.

(9) A product of Net Present Value (base) and annuity rate for the scenario that drives reinforcement of the Branch.

(10) A product of Net Present Value (inc) and annuity rate for the scenario that drives reinforcement of the Branch.

(11) Branch incremental cost $\Delta C_i$ is the difference between the values given in the columns 10 and 9.

(12) The last column identifies the scenario that drives the reinforcement of the Branch.

12. Using the information provided in Table ~~45~~ 20 the Peak Nodal incremental cost and Off-Peak Nodal incremental cost for the generator connected to Node D can be calculated:

- The Peak Nodal incremental cost is the sum of 294.87, -1278.73 and -328.68 which gives the total of -1312.54 £/annum.

- The Off-Peak Nodal incremental cost is the sum of all Off-Peak Branch incremental costs which is -18.77 £/annum.

13. For the demand located at Node C the corresponding costs are the sum of all Peak Branch incremental costs which based on Table ~~45~~ 20 the Peak Nodal incremental cost and Off-Peak Nodal incremental cost for the generator connected to Node D can be calculated: Table ~~45~~ 20 gives 2777.8 £/annum; and the sum of all Off-Peak Branch incremental costs which gives -10.52 £/annum.

**Amend the heading to the table following paragraph 14 of Attachment 2 to Schedule 18 as follows:**

**Table ~~39~~ 20 - Incremented flow analysis**

**Amend the heading to the table following paragraph 3 of Attachment 3 to Schedule 18 as follows:**

**Table ~~40~~ 21 - Output information required to calculate final EHV charge**

**Amend the heading to the figure following the first paragraph of Annex 2 to Schedule 18 as follows:**

**Figure ~~31~~ 18 - Concept of marginal (a) and incremental costs (b)**

**Amend the Introduction to Appendix 2 of Schedule 23 as follows:**

**Introduction**

This Appendix ~~3~~ 2 sets out guidance regarding the statutory powers of suppliers and distributors to discontinue the supply of electricity which may arise where a person is suspected of unlawfully abstracting electricity. In some instances, powers arise when a specific offence has been committed. In other instances, no specific offence is required.

For the avoidance of doubt, this Appendix ~~3~~ 2 does not seek to grant additional rights to signatories to this Code of Practice. This Appendix ~~3~~ 2 is for guidance only.

This Appendix ~~3~~ 2 draws upon some of the guidance set out by Ofgem in its open letter on the topic of theft of energy dated 20 October 2010.

For the avoidance of doubt, parties may have additional statutory powers to discontinue supply which are not set out below, for example in relation to unpaid charges for the supply of electricity.

**Gowling WLG (UK) LLP**
**13 September 2017**