WESTERN POWER DISTRIBUTION
Serving the South West and Wales

WESTERN POWER DISTRIBUTION (SOUTH WEST) PLC

Modification Proposal

Amendment Proposal: WPD/WEST/003

Charges for Reinforcement of the Existing Distribution System:
1) Separation of Supply and Install Elements
2) Interpretation of New WPD Network Capacity

Date of Issue: 11 September 2006

For Approval by the Authority

This Modification Proposal sets out Western Power Distribution (South West) plc's ("WPD") proposals to amend WPD's Connection Charging Methodology contained within its Statement of the Connection Charging Methodology and Basis of Charges for Connection to Western Power Distribution (South West) plc's Electricity Distribution System (the "Statement").

Issue Record

Issue Date	Issue No.	Author	Amendment Details
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1.0 Introduction

1.1 In accordance with Condition 4B, paragraph 10(a) of WPD's Distribution Licence, we request a modification to our connection charging methodology.

1.2 This Modification Report sets out:

i) the terms proposed for the modification;

ii) how the modification would better achieve the relevant objectives; and

iii) a date with effect from which the modification is to take effect.

1.3 The relevant objectives in Licence Condition 4B, paragraph 3 state:

(a) that compliance with the connection charging methodology facilitates the discharge by the licensee of the obligations imposed on it under the Act and by this licence;

(b) that compliance with the connection charging methodology facilitates competition in the generation and supply of electricity, and does not restrict, distort, or prevent competition in the transmission or distribution of electricity;

(c) that compliance with the connection charging methodology results in charges which reflect, as far as is reasonably practicable (taking account of implementation costs), the costs incurred by the licensee in its distribution business; and

(d) that, so far as is consistent with sub-paragraphs (a), (b) and (c), the connection charging methodology, as far as is reasonably practicable, properly takes account of developments in the licensee's distribution business.

1.4 This modification proposal addresses changes to better meet objective (c) above. There are two distinct changes proposed which both relate to the application of the Apportionment Rules. The first relates to the separation of the "Supply" and "Install" element of the cost of an asset and the second relates to interpretation of the term, "New WPD System Capacity".

2.0 Separation of "Supply" and "Install" elements under application of Apportionment Rules

2.1 Proposals for Modification

2.1.1 Under paragraph 1.2.2 of WPD's Statement, reinforcement of the existing WPD System (which in this context means works occasioned by the new or augmented connection, but not for its sole use) will be charged for by allocating costs under a proportionate method ("the Apportionment Rules"). This means that the connecting parties, both demand and generation, are required to contribute to reinforcement costs on a sliding scale basis.

2.1.2 The Apportionment Rules provide a locational signal within the Connection Charge but equally recognise the benefit that other users will get from the assets installed.

2.1.3 The costs associated with the reinforcement of existing WPD System assets are split with a share attributed to the connecting party based on their requirements as part of their Connection Charge and the remainder nominally recovered through Use of System tariffs.

2.1.4 Under current WPD policy when applying the Apportionment Rules both the "supply" and "installation" component costs are apportioned. For the avoidance of doubt the supply component relates to the cost of procuring the asset itself and the installation component relates to the labour element involved in installing the asset.

2.1.5 WPD proposes that in future the Apportionment Rules shall apply only to the supply component of the cost of reinforcement. The installation component cost shall be funded wholly by the connecting party.

2.2 Justification for Proposed Modification

2.2.1 The Apportionment rules recognise the benefit that other users may get from the assets installed under reinforcement. There are two important features of such work:

i) Were the new user not to be connecting to the network, no reinforcement works would be taking place and hence WPD would not be incurring expenditure;

ii) The installation costs are largely fixed irrespective of the size of the asset e.g. it costs the same to install a cable with a capacity of 5MVA as it does to install one of 8MVA.

2.2.2 It is cost reflective that works that will only occur due to the addition of a new connection should be borne by that new connectee and hence the fixed installation costs should be borne by the new connectee. Where the new asset has surplus capacity, this may benefit existing or future customers and hence should continue to be apportioned.

2.3 Proposed Changes to the Statement

2.3.1 Under Section 1.2.2 – "Reinforcement of the existing distribution system" the third paragraph shall be amended as follows:

"The costs associated with ~~the~~ *supplying the new assets to* reinforce~~ment of~~ *the* existing WPD System ~~assets~~ will be split with a share attributed to the connecting party based on their requirements as part of their Connection Charge and the remainder nominally recovered through Use of System tariffs."

2.3.2 Examples 5), 6) and 7) of Section 6 of the Statement shall be amended to reflect the revised method of apportioning costs. Appendix A of this Modification Report shows the amended examples.

3.0 Change to interpretation of "New WPD System Capacity"

3.1 Proposals for Modification

3.1.1 WPD's methodology for apportioning costs for reinforcement of the existing Distribution System is described under Part A, section 1.2.2 of its Statement. The following formula is used to determine the proportion of the reinforcement costs that should be paid by a person where those reinforcement works are driven by either thermal capacity or voltage or both and will be assessed against Engineering Recommendation P2/5.

$$\textbf{Cost Apportionment Factor} = \frac{\textbf{Required Capacity x 100 (max.100\%)}}{\textbf{New WPD System Capacity}}$$

3.1.2 The New WPD System Capacity is the secure network capacity following reinforcement of the relevant assets.

3.1.3 Example 5 of Section 6 of the Statement currently interprets the total capacity of the new transformer as the New WPD System Capacity. For example;

Customer Required Capacity = 200 kVA. The existing 500 kVA network transformer is loaded to 350 kVA and must be replaced by an 800 kVA unit, so the New WPD System Capacity = 800 kVA; therefore:

$$\textbf{Cost Apportionment Factor} = \frac{\textbf{200 kVA x 100}}{\textbf{800 kVA}}$$

$$= \textbf{25\%}$$

3.1.4 WPD's revised interpretation will take the New WPD System Capacity as the spare capacity created following reinforcement of the transformer which is additional to the existing load requirements of other customers fed from the transformer and may be used for the customer's benefit and for other customers of WPD. For example;

Customer Required Capacity = 200 kVA. The existing 500 kVA network transformer is loaded to 350 KVA and must be replaced by an 800 kVA unit, so the New WPD System Capacity = 800 kVA – 350 kVA (existing load) = 450 kVA; therefore:

$$\textbf{Cost Apportionment Factor} = \frac{\textbf{200 kVA x 100}}{\textbf{450 kVA}}$$

$$= \textbf{44.4\%}$$

3.1.5 Example 6 of Section 6 of the Statement currently interprets the total capacity of the reinforced cable as the New WPD System Capacity. For example;

Customer Required Capacity = 3,000 kVA. The existing HV cable has a secure capacity of 7,000 kVA and must be replaced by a larger cable having a secure capacity of 12,000 kVA, so the New WPD System Capacity = 12,000 kVA; therefore:

$$\textbf{Cost Apportionment Factor} = \frac{\textbf{3,000 kVA x 100}}{\textbf{12,000 kVA}}$$

$$= \textbf{25\%}$$

3.1.6 WPD's revised interpretation will take the New WPD System Capacity as the spare capacity created on the relevant part of the distribution system following reinforcement of the cable which is additional to the existing load requirements of other customers fed from that part of the distribution system and may be used for the customer's benefit and for other customers of WPD. For example;

Customer Required Capacity = 3,000 kVA. The existing HV cable has a capacity of 7,000 kVA and must be replaced by a larger cable having a capacity of 12,000 kVA. The additional capacity created by overlaying the cable is 5,000 kVA, therefore:

$$\textbf{Cost Apportionment Factor} = \frac{\textbf{3,000 kVA x 100}}{\textbf{5,000 kVA}}$$

$$= \textbf{60.0\%}$$

3.2 Justification for Proposed Modification

3.2.1 The existing interpretation does not provide a true reflection of the benefit to other users. Whilst the Cost Apportionment Factor is calculated as a percentage based on the new connectee's utilisation of the total capacity installed it does not account for any capacity already utilised by existing customers. The Apportionment Rules should recognise the benefit that other users will receive from the assets installed but it is inappropriate to expect the existing customer base to fund again the portion of capacity already being used by them. The existing customer base should only be expected to fund the spare capacity created following reinforcement of the assets that may be used for their benefit or future customers benefit.

3.3 Proposed Changes to the Statement

3.3.1 Under Section 1.2.2 – "Security requirements" the last sentence shall be amended as follows:

"The New WPD System Capacity is the ~~secure~~ *spare* network capacity *created* following reinforcement of the relevant assets."

3.3.2 Example 5) and example 6) of Section 6 of the Statement shall be amended to reflect the revised method of apportionment of the costs. The example shall be amended as shown as Appendix B of this Modification Report.

4.0 Implementation Date

4.1 This modification is proposed for implementation on 10th October 2006 or, in any event, as soon as possible thereafter.

Note:

For clarity, the following examples attached as Appendices A and B consider the proposals for separation of the "Supply" and "Install" element and the change to interpretation of the New System Capacity in isolation of one another.

Appendix C considers both proposals for amendment in unison.

Appendix A Separation of "Supply" and "Install" elements

5) Example of a new low voltage connection requiring reinforcement to WPD's System.

A customer requires a connection to a new distribution warehouse and has indicated the Nominated Supply Capacity required will be 200 kVA. The customer has provided sufficient information for WPD to design a suitable connection arrangement to satisfy the customer's requirements.

It is proposed to lay 100 metres of underground LV cable from an existing HV/LV network substation, along a footpath and to terminate at an Exit Point located within the distribution warehouse, as agreed between the customer and WPD.

The transformer at WPD's HV/LV substation needs changing to accommodate the customer's capacity requirements. The existing transformer has a capacity of 500 kVA. The new transformer will have a capacity of 800 kVA.

Dedicated assets:-

using Table 6.9, the normal estimated cost of the connection is:-

£

(a) LV cable in footpath……..……..100m x £(between 45 & 60)/m;
(b) Termination at substation (LV joint)…..……..…£(between 145 & 450;
(c) design……..…£(between 50 & 275);
(d) Terminate LV at the Exit Point……..……..£(between 100 & 8,200)

The estimated cost of the assets for the sole use of the customer is between £4,795 and £14,925.

Reinforcement assets: using Table 6.9, the normal estimated cost of the transformer change is:-

£

HV/LV transformer……..……..……..……£(between 7,200 & 23,000); and

Existing WPD System Secure Capacity = 500 kVA
Required Capacity = 200 kVA
New WPD System Secure Capacity = 800 kVA

Using the Apportionment Rule:-

Cost Apportionment Factor = Required Capacity x 100 , (maximum 100%)
New WPD System Secure Capacity

Cost Apportionment Factor = 200 x 100, = 25% of the Supply element
800

~~Reinforcement Charge = 25% of cost from £7,200 = £1,800~~
~~Up to £23,000 = £5,750~~

Reinforcement Charge based on £7,200 = 25% of Supply element = £4,470 x 0.25 = £1,117
+ 100% of Install element = £2,730
= £3,847

Reinforcement Charge based on £23,000 = 25% of Supply element = £18,131 x 0.25 = £4,533
+ 100% of Install element = £4,869
= £9,402

This is added to the cost of the Dedicated assets to determine the resultant Connection Charge, therefore:-

Dedicated assets between £4,795 and £14,925, plus
Proportion of Reinforcement assets between ~~£1,800~~ £3,847and ~~£5,750~~ £9,402

The resultant Connection Charge that will be applied to the above example is therefore estimated to be between ~~£6,595~~ £8,642 and ~~£20,675~~ £24,327 plus VAT.

6) Example of a new high voltage connection requiring reinforcement to WPD's System.

A customer requires a connection to a new factory and has indicated the Nominated Supply Capacity required will be 3,000 kVA. The customer has provided sufficient information for WPD to design a suitable connection arrangement to satisfy the customer's requirements.

It is proposed to lay 250 metres of underground HV cable from the existing WPD System, along a footpath to a new HV intake position on land provided by the customer. A new HV ring main unit with metered circuit breaker will be established at the Exit Point, at a location within the factory, as agreed between the customer and WPD.

WPD's HV underground cable network also needs reinforcing by overlaying in footpath, 500 metres of cable upstream of the point of connection. It has a secure capacity of 7,000 kVA. The new HV cable will have a secure capacity of 12,000 kVA.

Dedicated assets:-

using Table 6.9, the normal estimated cost of the connection is:-

£

(a) HV cable in footpath……....……....250m x £(between 57 & 65)/m;
(b) HV joints…....……..……2 x £(between 790 & 1,630);
(c) HV substation for supply at HV……..……£(between 17,000 & 22,000)
(d) Design……..……..£(between 220 & 535)

The estimated cost of the assets for the customer's sole use is between £33,050 and £42,045.

Reinforcement assets: using Table 6.9, the estimated cost of the reinforcement assets is:-

£

(a) HV cable in footpath……....…….....……..500m x £(between 57 & 65)/m;
(b) HV joints……..……2 x £(between 790 & 1,630)

The estimated cost of the 500m HV cable overlay is between £30,080 and £35,760, and

Existing WPD System Secure Capacity = 7,000 kVA
Required Capacity = 3,000 kVA
New WPD System Secure Capacity = 12,000 kVA

Using the Apportionment Rule:-

$$\text{Cost Apportionment Factor} = \frac{\text{Required Capacity} \times 100}{\text{New WPD System Secure Capacity}}, \quad \text{(maximum 100\%)}$$

$$\text{Cost Apportionment Factor} = \frac{3000 \times 100}{12000}, \quad = 25\% \text{ of the Supply element}$$

~~Reinforcement Charge = 25% of cost from £30,080 = £7,520~~
~~Up to £35,760 = £8,940~~

Reinforcement Charge based on £30,080 = 25% of Supply element = £7,794 x 0.25 = £1,949
+ 100% of Install element = £22,286
= £24,235

Reinforcement Charge based on £35,760 = 25% of Supply element = £12,820 x 0.25 = £3,205
+ 100% of Install element = £22,940
= £26,145

This is added to the cost of the Dedicated assets to determine the resultant Connection Charge, therefore:-

Dedicated assets between £33,050 and £42,045, plus
Proportion of Reinforcement assets between ~~£7,520~~ £24,235 and ~~£8,940~~ £26,145

The resultant Connection Charge that will be applied to the above example is therefore estimated to be between ~~£40,570~~ £57,285 and ~~£50,985~~ £68,190 plus VAT.
Note: The estimated cost assumes no consents were required. Add £150 to £1,000 to the estimated cost where a consent is required.

7) Example of a new embedded generator connection requiring reinforcement to WPD's System.

A customer wishes to connect a generator to WPD's System and has Supply Capacity for export purposes will be 3,000 kVA. The customer has provided sufficient information for WPD to design a suitable connection arrangement to satisfy the customer's requirements.

It is proposed to install a new circuit breaker at WPD's 33/11kV substation, erect 3km of HV overhead line, 500m of underground HV cable in unmade ground to a new HV intake position on land provided by the customer. A new HV metered circuit breaker will be established at the Exit Point, at a location within the generation site, as agreed between the customer and WPD.

WPD's existing HV switchboard, comprising 11 circuit breakers also needs reinforcing. It has a fault level capacity of 250,000 kVA. The new switchboard will have a secure capacity of 350,000 kVA.

Dedicated assets:- using Table 6.9, the normal estimated cost of the connection is:-

£

(a) HV cable in unmade ground…....……....500m x £(between 29 & 36)/m;
(b) HV overhead line construction……..……3,000m x £(between 35 & 50)/m;
(c) HV substation for supply at HV……£(between 17,000 & 22,000)
(d) HV switchgear at 33/11kV substation…….£(between 10,300 & 40,000)/unit;
(e) design……..……..£(between 220 & 535)

The estimated cost of the assets for the customer's sole use is between £147,000 and £230,535.

Reinforcement assets:

using Table 6.9, the estimated cost of the reinforcement assets is:-

£

HV switchgear at 33/11kV substation..…….....…….£(between 10,300 & 40,000)/unit;

The estimated cost of changing 11 x circuit breakers is between £113,300 and £440,000, and

Existing WPD System Fault Level Capacity	= 250,000 kVA
Fault level contribution due to customer's installation	= 24,000 kVA
New WPD System Fault Level Capacity	= 350,000 kVA

Using the Apportionment Rule:-

$$\text{Cost Apportionment Factor} = \frac{3 \times \text{fault level contribution from Connection} \times 100}{\text{New Equipment Fault Level Capacity}}, \text{ (max 100\%)}$$

$$\text{Fault Level Cost Apportionment Factor} = \frac{3 \times 24{,}000 \times 100}{350{,}000} = 20.6\% \text{ of the Supply element}$$

~~Fault level Reinforcement Charge = 20.6% of cost from £113,300 = £23,340~~
~~Up to £440,000 = £90,640~~

Reinforcement Charge based on £113,300 =20.6% of Supply element =£63,250 x .206 = £13,030
+ 100% of Install element = £50,050
= £63,080

Reinforcement Charge based on £440,000 =20.6% of Supply element =£385,000 x .206 =£79,310
+ 100% of Install element = £55,000
= £134,310

This is added to the cost of the Dedicated assets to determine the resultant Connection Charge, therefore:-

Dedicated assets between £147,000 and £230,535, plus
Proportion of Reinforcement assets between ~~£23,340~~ £63,080 and ~~£90,640~~ £134,310

The resultant Connection Charge that will be applied to the above example is therefore estimated to be between ~~£170,340~~ £210,080 and ~~£321,175~~ £364,845 plus VAT. Note: The estimated cost assumes no consents were required. Add £150 to £1,000 to the estimated cost where a consent is required.

Appendix B Change to interpretation of WPD System Capacity

5) Example of a new low voltage connection requiring reinforcement to WPD's System.

A customer requires a connection to a new distribution warehouse and has ~~indicated the Nominated~~ requested an Agreed Supply Capacity ~~required will be~~ of 200 kVA. The customer has provided sufficient information for WPD to design a suitable connection arrangement to satisfy the customer's requirements.

It is proposed to lay 100 metres of underground LV cable from an existing distribution HV/LV network substation, along a footpath and to terminate at an Exit Point located within the distribution warehouse, as agreed between the customer and WPD.

The existing 500 kVA transformer at WPD's HV/LV substation is already loaded to 350 kVA and needs changing to accommodate the customer's capacity requirements. ~~The existing transformer has a capacity of 500 kVA.~~ The new transformer will have a capacity of 800 kVA but the spare capacity created following reinforcement, which is additional to the existing load requirements of other customers already fed from the substation and that may be used for the new customer's benefit and for other customers of WPD, is 450 kVA.

Dedicated assets:-

using Table 6.9, the normal estimated cost of the connection is:-

£

(a) LV cable in footpath……..……..100m x £(between 45 & 60)/m;
(b) Termination at substation (LV joint)…..……..…£(between 145 & 450;
(c) design……..…£(between 50 & 275);
(d) Terminate LV at the Exit Point……..……..£(between 100 & 8,200)

The estimated cost of the assets for the sole use of the customer is between £4,795 and £14,925.

Reinforcement assets:

using Table 6.9, the normal estimated cost of the transformer change is:-

£

HV/LV transformer……..…….……..…£(between 7,200 & 23,000); and

~~Existing WPD System Secure Capacity = 500 kVA~~
Required Capacity = 200 kVA
New WPD System ~~Secure~~ Capacity = 800 kVA – 350 kVA = 450 kVA

Using the Apportionment Rule:-

Cost Apportionment Factor = Required Capacity x 100 , (maximum 100%)
New WPD System ~~Secure~~ Capacity

Cost Apportionment Factor = ~~200 x 100, = 25%~~ ~~800~~ 200 x 100 = 44.4%
450

Reinforcement Charge = ~~25%~~ 44.4% of cost from £7,200 = ~~£1,800~~ £3,197
Up to £23,000 = ~~£5,750~~ £10,212

This is added to the cost of the Dedicated assets to determine the resultant Connection Charge, therefore:-

Dedicated assets between £4,795 and £14,925, plus
Proportion of Reinforcement assets between ~~£1,800~~ £3,197 and ~~£5,750~~ £10,212

The resultant Connection Charge that will be applied to the above example is therefore estimated to be between ~~£6,595~~ £7,992 and ~~£20,675~~ £25,137 plus VAT.

6) Example of a new high voltage connection requiring reinforcement to WPD's System.

A customer requires a connection to a new factory and has ~~indicated the Nominated~~ requested an Agreed Supply Capacity ~~required will be~~ of 3,000 kVA. The customer has provided sufficient information for WPD to design a suitable connection arrangement to satisfy the customer's requirements.

It is proposed to lay 250 metres of underground HV cable from the existing WPD System, along a footpath to a new HV intake position on land provided by the customer. A new HV ring main unit with metered circuit breaker will be established at the Exit Point, at a location within the factory, as agreed between the customer and WPD.

WPD's HV underground cable network also needs reinforcing by overlaying in footpath, 500 metres of cable upstream of the point of connection. It has a secure capacity of 7,000 kVA. The new HV cable will have a secure capacity of 12,000 kVA, therefore the additional capacity created by overlaying the cable is 5,000 kVA.

Dedicated assets:-

using Table 6.9, the normal estimated cost of the connection is:-

£

(a) HV cable in footpath…….....……....250m x £(between 57 & 65)/m;
(b) HV joints…..……..……..……..2 x £(between 790 & 1,630);
(c) HV substation for supply at HV……£(between 17,000 & 22,000)
(d) Design……..……..£(between 220 & 535)

The estimated cost of the assets for the customer's sole use is between £33,050 and £42,045.

Reinforcement assets: using Table 6.9, the estimated cost of the reinforcement assets is:-

£

(a) HV cable in footpath……..…….....……..500m x £(between 57 & 65)/m;
(b) HV joints……2 x £(between 790 & 1,630)

The estimated cost of the 500m HV cable overlay is between £30,080 and £35,760, and

Existing WPD System ~~Secure~~ Capacity = 7,000 kVA
Required Capacity = 3,000 kVA
New WPD System ~~Secure~~ Capacity = 12,000 kVA - 7,000 kVA = 5,000 kVA

Using the Apportionment Rule:-

Cost Apportionment Factor = Required Capacity x 100 , (maximum 100%)
New WPD System ~~Secure~~ Capacity

Cost Apportionment Factor = 3,000 x 100, = ~~25%~~ 60.0%
~~12000~~ 5,000

Reinforcement Charge = ~~25%~~ 60% of cost from £30,080 = ~~£7,520~~ £18,048
Up to £35,760 = ~~£8,940~~ £21,456

This is added to the cost of the Dedicated assets to determine the resultant Connection Charge, therefore:-

Dedicated assets between £33,050 and £42,045, plus
Proportion of Reinforcement assets between ~~£7,520~~ £18,048 and ~~£8,940~~ £21,456

The resultant Connection Charge that will be applied to the above example is therefore estimated to be between ~~£40,570~~ £51,098 and ~~£50,985~~ £63,501 plus VAT.
Note: The estimated cost assumes no consents were required. Add £150 to £1,000 to the estimated cost where a consent is required.

Appendix C Separation of "Supply and "Install" elements and revised interpretation of WPD System Capacity

5) Example of a new low voltage connection requiring reinforcement to WPD's System.

A customer requires a connection to a new distribution warehouse and has ~~indicated the Nominated~~ requested an Agreed Supply Capacity ~~required will be~~ of 200 kVA. The customer has provided sufficient information for WPD to design a suitable connection arrangement to satisfy the customer's requirements.

It is proposed to lay 100 metres of underground LV cable from an existing distribution HV/LV network substation, along a footpath and to terminate at an Exit Point located within the distribution warehouse, as agreed between the customer and WPD.

The existing 500 kVA transformer at WPD's HV/LV substation is already loaded to 350 kVA and needs changing to accommodate the customer's capacity requirements. ~~The existing transformer has a capacity of 500 kVA.~~ The new transformer will have a capacity of 800 kVA but the spare capacity created following reinforcement, which is additional to the existing load requirements of other customers already fed from the substation and that may be used for the new customer's benefit and for other customers of WPD, is 450 kVA.

Dedicated assets:- using Table 6.9, the normal estimated cost of the connection is:-

£

(a) LV cable in footpath……..……..100m x £(between 45 & 60)/m;
(b) Termination at substation (LV joint)…..……..…£(between 145 & 450;
(c) design……..…£(between 50 & 275);
(d) Terminate LV at the Exit Point……..…….£(between 100 & 8,200)

The estimated cost of the assets for the sole use of the customer is between £4,795 and £14,925.

Reinforcement assets:- using Table 6.9, the normal estimated cost of the transformer change is:-

£

HV/LV transformer……..……..……..……£(between 7,200 & 23,000); and

~~Existing WPD System Secure Capacity = 500 kVA~~
Required Capacity = 200 kVA
New WPD System ~~Secure~~ Capacity = 800 kVA – 350 kVA = 450 kVA

Using the Apportionment Rule:-

Cost Apportionment Factor = $\frac{\text{Required Capacity x 100}}{\text{New WPD System Secure Capacity}}$, (maximum 100%)

Cost Apportionment Factor = $\frac{200 \times 100}{800\ 450}$, = ~~25%~~ 44.4% of the Supply element

~~Reinforcement Charge = 25% of cost from £7,200 = £1,800 Up to £23,000 = £5,750~~

Reinforcement Charge based on £7,200 = 44.4% of Supply element = £4,470 x 0.444 = £1,985
+ 100% of Install element = £2,730
= £4,715

Reinforcement Charge based on £23,000 = 44.4% of Supply element = £18,131 x 0.444 = £8,050
+ 100% of Install element = £4,869
= £12,919

This is added to the cost of the Dedicated assets to determine the resultant Connection Charge, therefore:-

Dedicated assets between £4,795 and £14,925, plus
Proportion of Reinforcement assets between ~~£1,800~~ £4,715 and ~~£5,750~~ £12,919

The resultant Connection Charge that will be applied to the above example is therefore estimated to be between ~~£6,595~~ £9,510 and ~~£20,675~~ £27,844 plus VAT.

6) Example of a new high voltage connection requiring reinforcement to WPD's System.

A customer requires a connection to a new factory and has ~~indicated the Nominated~~ requested an Agreed Supply Capacity ~~required will be~~ of 3,000 kVA. The customer has provided sufficient information for WPD to design a suitable connection arrangement to satisfy the customer's requirements.

It is proposed to lay 250 metres of underground HV cable from the existing WPD System, along a footpath to a new HV intake position on land provided by the customer. A new HV ring main unit with metered circuit breaker will be established at the Exit Point, at a location within the factory, as agreed between the customer and WPD.

WPD's HV underground cable network also needs reinforcing by overlaying in footpath, 500 metres of cable upstream of the point of connection. It has a secure capacity of 7,000 kVA. The new HV cable will have a secure capacity of 12,000 kVA, therefore the additional capacity created by overlaying the cable is 5,000 kVA.

Dedicated assets:-

using Table 6.9, the normal estimated cost of the connection is:-

£

(a) HV cable in footpath…….....……....250m x £(between 57 & 65)/m;
(b) HV joints…..……..……2 x £(between 790 & 1,630);
(c) HV substation for supply at HV…….£(between 17,000 & 22,000)
(d) Design……..……..£(between 220 & 535)

The estimated cost of the assets for the customer's sole use is between £33,050 and £42,045.

Reinforcement assets: using Table 6.9, the estimated cost of the reinforcement assets is:-

£

(a) HV cable in footpath……..…….....……..500m x £(between 57 & 65)/m;
(b) HV joints……2 x £(between 790 & 1,630)

The estimated cost of the 500m HV cable overlay is between £30,080 and £35,760, and

Existing WPD System ~~Secure~~ Capacity = 7,000 kVA
Required Capacity = 3,000 kVA
New WPD System ~~Secure~~ Capacity = 12,000 kVA - 7,000 kVA = 5,000 kVA

Using the Apportionment Rule:-

$$\text{Cost Apportionment Factor} = \frac{\text{Required Capacity} \times 100}{\text{New WPD System Secure Capacity}}, \quad \text{(maximum 100\%)}$$

$$\text{Cost Apportionment Factor} = \frac{3{,}000 \times 100}{12000\ 5{,}000} = 25\%\ \ 60.0\%$$

~~Reinforcement Charge = 25% of cost from £30,080 = £7,520~~
~~Up to £35,760 = £8,940~~
Reinforcement Charge based on £30,080 = 60% of Supply element = £7,794 x 0.60 = £4,676
+ 100% of Install element = £22,286
= £26,962

Reinforcement Charge based on £35,760 = 60% of Supply element = £12,820 x 0.60 = £7,692
+ 100% of Install element = £22,940
= £30,632

This is added to the cost of the Dedicated assets to determine the resultant Connection Charge, therefore:-

Dedicated assets between £33,050 and £42,045, plus
Proportion of Reinforcement assets between ~~£7,520~~ £26,962 and ~~£8,940~~ £30,632

The resultant Connection Charge that will be applied to the above example is therefore estimated to be between ~~£40,570~~ £60,012 and ~~£50,985~~ £72,677 plus VAT.
Note: The estimated cost assumes no consents were required. Add £150 to £1,000 to the estimated cost where a consent is required.