

## DCP 425 – Cost Apportionment Factor methodology when the High-Cost Project Threshold is exceeded at the Voltage Level of the Point of Connection for a Generation Connection

### Legal Text

#### **In Schedule 22 (CCCM), amend Paragraph 1.16 as follows:**

- 1.16 Reinforcement costs for the Minimum Scheme in excess of the High-Cost Project Threshold, shall be charged to you in full as a Connection Charge. For the avoidance of doubt, where Paragraph 1.36 applies, the High-Cost Project Threshold will not apply. The calculation of this charge will include all costs for Reinforcement carried out at the same Voltage Level and one Voltage Level above the Point of Connection to the existing Distribution System. For Generation Connections the High-Cost Project Threshold is £200/kW; for Demand Connections the High-Cost Project Threshold is £1,720/kVA. Reinforcement costs up to and including below the High-Cost Project Threshold will follow the methodology outlined under paragraphs 1.17 to 1.27. For Generation Connections, where the Reinforcement costs at the same Voltage Level as the Point of Connection are greater than the High-Cost Project Threshold then the methodology outlined under paragraphs 1.17 to 1.27 will be applied to Reinforcement costs up to and including the High-Cost Project Threshold only. The table below illustrates the application of the High-Cost Project Threshold.

#### **In Schedule 22 (CCCM), amend Paragraph 1.18 as follows:**

- 1.18 For Generation Connections, where the Reinforcement is at the same Voltage Level ~~as of~~ the voltage at the POC to the existing Distribution System, then the costs of Reinforcement shall be apportioned between you and us, unless other exceptions apply which take precedence. The methods used to apportion the costs of Reinforcement are set out in paragraphs 1.28 – 1.33. Where the Reinforcement costs at the Voltage Level of the POC are greater than the High-Cost Project Threshold, then those Reinforcement costs, for each CAF, shall be scaled down by the ratio of the High-Cost Project Threshold to the total Reinforcement costs at the Voltage Level of the POC in accordance with the following formula (see Examples 32 and 33):

$$\text{Reinforcement cost} \times \frac{\text{High-Cost Project Threshold}}{\text{Total Reinforcement cost at the Voltage Level of the POC}}$$

**In Schedule 22 (CCCM), add two new rows to the index of examples as follows:**

Example	Description	Purpose
<u>32</u>	<u>A new Generation Connection that has Reinforcement costs above the High-Cost Project Threshold at the Voltage Level of the POC (single asset to be cost apportioned).</u>	<u>To show how a Generation Connection that triggers the Generation High-Cost Project Threshold at the Voltage Level of the POC is charged when the Reinforcement required is for a single asset at the same Voltage Level of connection.</u>
<u>33</u>	<u>A new Generation Connection that has Reinforcement costs above the High-Cost Project Threshold at the Voltage Level of the POC (multiple assets to be cost apportioned).</u>	<u>To show how a Generation Connection that triggers the Generation High-Cost Project Threshold at the Voltage Level of the POC is charged when the Reinforcement required is for multiple assets at the same Voltage Level of connection.</u>

**In Schedule 22 (CCCM), add two new examples as follows:**

**Example 32: A new Generation Connection that has Reinforcement costs above the High-Cost Project Threshold at the Voltage Level of the POC (single asset to be cost apportioned).**

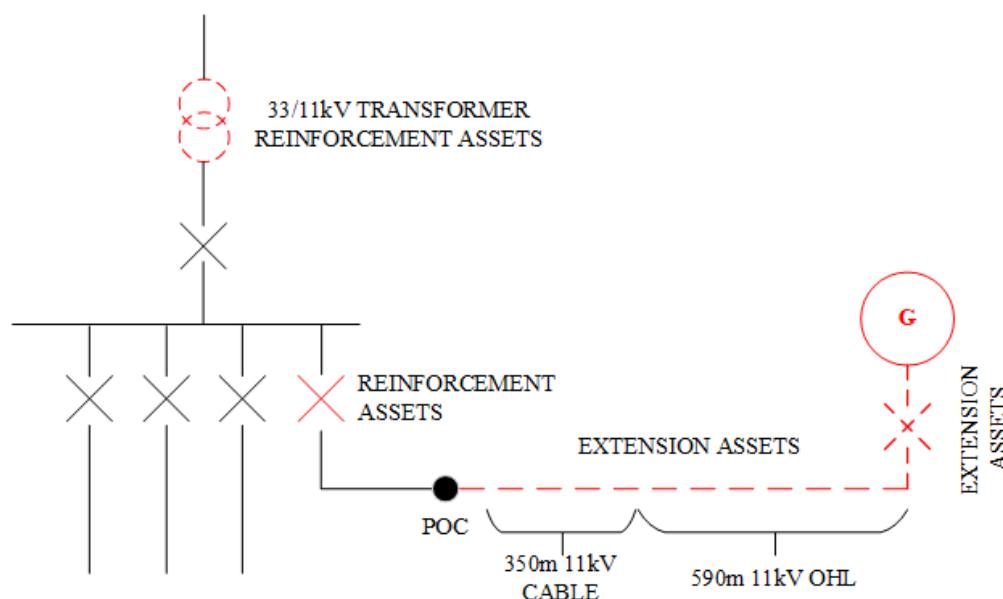
**Purpose:** To show how a Generation Connection that triggers the Generation High-Cost Project Threshold at the Voltage Level of the POC is charged when the Reinforcement required is for a single asset at the same Voltage Level of connection.

As in Example 30, a Customer wishes to connect a 225kW wind farm (a Generation Connection).

To connect the wind farm, the Minimum Scheme involves the installation of 590m of 11kV overhead line, 350m of 11kV cable and associated jointing and install switchgear into the substation. In addition, Reinforcement is required to replace the 33/11kV transformer to facilitate reverse power flow and the 11kV circuit breaker in the primary substation. The New Network Capacity following Reinforcement is 19,700 kVA. The total cost of the Reinforcement is £525,400.

The High-Cost Project Threshold is exceeded for this connection. The HCPT is £200/kW (£45,000) and costs in excess of this threshold will be charged in full to the Customer (£480,400).

The cost of Reinforcement at the Voltage Level of the POC (£50,000) exceeds the High-Cost Project Threshold. The cost of Reinforcement to be apportioned at the Voltage Level of the POC is therefore scaled down by the amount over the High-Cost Project Threshold at that Voltage Level.



**Reinforcement:**

Security CAF calculation: the numerator in the CAF calculation is the Required Capacity of the Customer, i.e. 225kW. The denominator is the New Network Capacity following Reinforcement, this being the maximum generation that could be connected whilst keeping the voltage rise within acceptable limits. This is 19,700kVA.

The High-Cost Project Threshold for a Generation Connection is £200/kW.

The Reinforcement required to provide the connection is:

- 33/11kV transformer; and
- 11kV circuit breaker.

The 33/11kV transformer Reinforcement is one Voltage Level above the POC and not subject to the Security CAF. The work is covered by the High-Cost Project Threshold of £200/kW.

HCPT: £200 x 225 = £45,000

£525,400 - £45,000 = £480,400 Customer Contribution

The 11kV circuit breaker Reinforcement of £50,000 is at the Voltage Level of the POC and is subject to the Security CAF, however, the cost of the work is over the High-Cost Project Threshold of £45,000. To avoid any double charging, the Reinforcement cost at the Voltage Level of the POC is scaled down using the formula below.

The cost to be apportioned for the 11kV circuit breaker is therefore:

$$\begin{aligned} & \text{Reinforcement cost} \quad \times \quad \frac{\text{High-Cost Project Threshold}}{\text{Total Reinforcement cost at the Voltage Level of the POC}} \\ & = \quad £50,000 \quad \times \quad \frac{£45,000}{£50,000} \\ & = \quad £45,000 \end{aligned}$$

Security CAF: (225/19,700) x 100 = 1.14%

£45,000 x 1.14% = £513 Customer Contribution

The Connection Charge for this Scheme is calculated as follows:

Reinforcement Over High-Cost Project Threshold:	Cost	Apportionment/H CPT	Customer Contribution
33/11kV Transformer Replacement	£475,400	£525,400-£45,000= £480,400	£480,400
11kV circuit breaker	£50,000		
<b>Total Reinforcement Cost</b>	<b>£525,400</b>		<b>£480,400</b>

Reinforcement Under High-Cost Project Threshold:	Cost	Apportionment/H CPT	Customer Contribution
11kV circuit breaker	£45,000 (£50,000 x (£45,000 / £50,000))	225/19,700 = 1.14%	£513
<b>Total Reinforcement Cost (to be apportioned)</b>	<b>£45,000</b>		<b>£513</b>

Extension Assets:	Cost	Apportionment	Customer Contribution
Electrical substation works	£34,500	n/a	£34,500
Install 590m of 11kV Overhead Line	£53,500	n/a	£53,500
Install 350m of 11kV XLPE cable	£14,000	n/a	£14,000
<b>Total Extension Asset Cost</b>	<b>£102,000</b>		<b>£102,000</b>

**Total cost of the work** = £525,400 + £102,000 = **£627,400**

**Total Connection Charge to Customer** = £480,400 + £513 + £102,000 = **£582,913**

**Example 33** A new Generation Connection that has Reinforcement costs above the High-Cost Project Threshold at the Voltage Level of the POC (multiple assets to be cost apportioned).

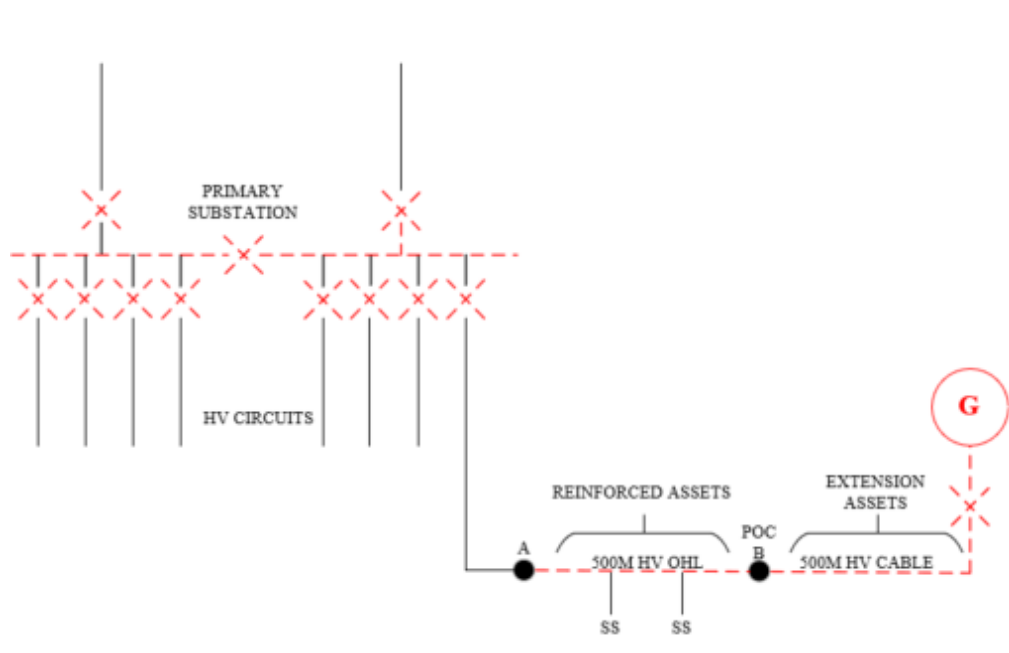
**Purpose:** To show how a Generation Connection that triggers the Generation High-Cost Project Threshold at the Voltage Level of the POC is charged when the Reinforcement required is for multiple assets at the same Voltage Level of connection.

Like Example 13, a Customer requests a connection to a generator with a Required Capacity for export purposes of 3MW (6MW in Example 13). The Fault Level contribution at the primary substation from the generation connection is 10MVA.

The POC is to the existing 11kV network at point B and it is proposed to install 500m of 11kV underground cable from the POC to the Customer's installation. This is treated as Extension Assets.

The connection requires the Reinforcement of 500m of 11kV overhead line between points A and B for a thermal capacity requirement and the Security CAF applies. The connection also requires the replacement of the existing 11kV switchboard at the primary substation in order to increase its fault level rating from 150MVA to 350MVA and the Fault Level CAF applies. However, the new fault level will be limited by the fault level rating of the local network of 250MVA. The total cost of the Reinforcement is £820,000.

The High-Cost Project Threshold is exceeded for this connection. The HCPT is £200/kW (£600,000) and costs in excess of this threshold will be charged in full to the Customer (£220,000). The cost of Reinforcement all relates to the Voltage Level of the POC. The cost of Reinforcement to be apportioned at the Voltage Level of the POC is therefore scaled down by the amount over the High-Cost Project Threshold at that Voltage Level.



**Reinforcement:**

The Relevant Section of Network is the 11kV network from the primary substation to Point B.

Security CAF calculation: the numerator in the CAF calculation is based upon the Required Capacity of the Customer, i.e. 3MW. The denominator is based on the New Network Capacity following Reinforcement, which is 7.6MVA, i.e. after Reinforcement, in this particular case, the section of cable with the lowest rating.

The Relevant Section of Network is the 11kV switchboard at the primary substation.

Fault Level CAF calculation: The numerator in the CAF calculation is based upon the Fault Level contribution from the Customer's new generator connection, in this Example 10MVA. The denominator is based upon the

New Fault Level Capacity, which is the lower of the Fault Level capacity of the new 11kV switchboard, 350MVA or of the local system, 250MVA in this Example.

The High-Cost Project Threshold for a Generation Connection is £200/kW.

The Reinforcement required to provide the connection (£820,000) is:

- Re-conductor of 500m of 11kV overhead line (£20,000); and
- Replacement 11kV switchboard (£800,000).

HCPT: £200 x 3,000 = £600,000

£820,000 - £600,000 = £220,000 Customer Contribution

The Reinforcement of £820,000 is at the Voltage Level of the POC and is subject to both the Security CAF and Fault Level CAF, however, the aggregate cost of the work is over the High-Cost Project Threshold of £600,000. To avoid any double charging, the Reinforcement costs at the Voltage Level of the POC are scaled down using the formula below.

The cost of Reinforcement to be apportioned for the re-conductor of 500m of 11kV overhead line is:

$$\begin{aligned}
 & \text{Reinforcement cost} \quad \times \quad \frac{\text{High-Cost Project Threshold}}{\text{Total Reinforcement cost at the Voltage Level of the POC}} \\
 & = \quad £20,000 \quad \times \quad \frac{£600,000}{£820,000} \\
 & = \quad £14,634
 \end{aligned}$$

Security CAF: (3,000/7,600) x 100 = 39.47%

£14,634 x 39.47% = £5,776 Customer Contribution

The cost of Reinforcement to be apportioned for the replacement 11kV switchboard is:

$$\begin{aligned}
 & \text{Reinforcement cost} \quad \times \quad \frac{\text{High-Cost Project Threshold}}{\text{Total Reinforcement cost at the Voltage Level of the POC}} \\
 & = \quad £800,000 \quad \times \quad \frac{£600,000}{£820,000} \\
 & = \quad £585,366
 \end{aligned}$$

Fault Level CAF: 3 x (10/250) x 100 = 12.00%

£585,366 x 12.00% = £70,244 Customer Contribution

The Connection Charge for this Scheme is calculated as follows:

Reinforcement Over High-Cost Project Threshold:	Cost	Apportionment/H CPT	Customer Contribution
Re-conductor of 500m of 11kV overhead line	£20,000	£820,000- £600,000= £220,000	£220,000
Replacement 11kV switchboard	£800,000		
<b>Total Reinforcement Cost</b>	<b>£820,000</b>		<b>£220,000</b>

Reinforcement	Cost	Apportionment	Customer Contribution
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Re-conductor of 500m of 11kV overhead line	£14,634 (£20,000 x £600,000 / £820,000)	3/7.6 x 100% = 39.47% Security CAF	£5,776
Replacement 11kV switchboard	£585,366 (£800,000 x £600,000 / £820,000)	3x (10/250) x 100% = 12.0% Fault Level CAF	£70,244
<b>Total Reinforcement Cost (to be apportioned)</b>	<b>£800,000</b>		<b>£76,020</b>

Extension Assets	Cost	Apportionment	Customer Contribution
Installation of 500m 11kV cable	£150,000	n/a	£150,000
11kV circuit breaker at Customer's substation	£12,000	n/a	£12,000
11kV pole top termination	£2,500	n/a	£2,500
<b>Total Extension Asset Cost</b>	<b>£164,500</b>		<b>£164,500</b>

**Total cost of the work:** = £820,000 + £164,500 = **£984,500**

**Total Connection Charge to Customer** = £220,000 + £76,020 + £164,500 = **£460,520**