



Statement of Methodology for Calculating Charges for Use of System for premises connected at EHV

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Preface

The Electricity Network Company Limited (ENC) and Independent Power Networks Limited (IPNL) own and operate distribution systems under electricity distribution licences granted by the Gas and Electricity Markets Authority (GEMA). Typically (but not exclusively¹), ENC and IPNL networks connect to the distribution systems owned and operated by incumbent DNOs, who, in turn, connect their distribution systems to the transmission system. Often described as Independent Distribution Network Operators (IDNOs), ENC and IPNL are independent of the incumbent regional Distribution Network Operators (DNOs) established when the electricity industry was privatised and compete with DNOs for the provision ownership and operation of last mile networks.

Use of system charges for premises designated to be connected to ENC's and IPNL's distribution system at voltages designated as High Voltage (HV) or Low Voltage (LV), is set out in a separate methodology statement, Statement of Charges for Use of System for The Electricity Network Company's/ Independent Power Networks Limited's Distribution Network, available on GTC's website.

Introduction

This Charging Statement is prepared in accordance with the provisions of Standard Licence BA2 of ENC's and IPNL's distribution licences and sets out the methodology used to determine the use of system charges for premises designated to be connected to IPNL's and ENC's distribution systems at Extra High Voltage (EHV); (directly, or indirectly through the distribution system of another licensed distributor).

Prior to publishing it, this methodology was submitted to GEMA, who has approved it on the basis that it fulfils all the relevant objectives. The Use of System Charging Methodology for EHV Sites will be reviewed annually and any updated version will be published on GTC's website, subject to the Authority's approval.

Details of GTC and its activities can be found on GTC's website at www.gtc-uk.co.uk.

Queries related to the contents of this methodology, the application of this methodology, or paper copies of the publication itself, can be obtained from:

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¹ It is possible that in time ENC or IPNL may connect directly to the transmission system

EHV Customer

For the purpose of this methodology, to ensure equivalence of the definition of EHV Customer between IDNOs and DNOs, we use the definition for an Extra High Voltage (EHV) Customer as set out in the definition of Designated EHV Properties in Standard Condition 13B.6 of the Electricity Distribution Licence, i.e.:

“Distribution Systems connecting to licensee’s Distribution System at 22 kilovolts or more;

Premises connected to the licensee’s Distribution System at 22 kilovolts or more;

Distribution Systems connected directly to the substation assets that form part of the Distribution System at 1 kilovolt or more and less than 22 kilovolts where the primary voltage of the substation is 22 kilovolts or more and the Metering Point is situated at the same substation; and

Premises connected directly to the substation assets that belong to the licensee’s Distribution System at 1 kilovolt or more and less than 22 kilovolts where the primary voltage of the substation is 22 kilovolts or more and where the Metering Point is located at the same substation.”.

Charges

In connecting to DNO distribution systems, DNOs charge IDNOs use of system charges for the conveyance of electricity across their distribution system to (and in the case of generation from) the IDNO network. IDNO licensees charge customers a bundled use of system charge to connect to the IDNO distribution system which is comprised of:

- The use of system charge made by the DNO to the IDNO in respect of electricity conveyed to (and/ or from) the consumer; and
- The use of system charge for the use of the IDNO’s distribution system.

Together, these charges make up the All-The-Way charge (or ATW charge) levied in respect of such customers:

$$\begin{array}{l} \textit{All-The-Way} \\ \textit{DUoS charge} \end{array} = \begin{array}{l} \textit{DUoS Charge for use of} \\ \textit{DNO network} \end{array} + \begin{array}{l} \textit{DUoS Charge for use of} \\ \textit{IDNO network} \end{array}$$

DUoS Charge for the use of DNO network

The DNO charge to the IDNO for the use of the DNO upstream network to convey electricity to the end consumer (the DNO ‘Boundary Tariff’) will be charged as a pass-through cost. GTC will not charge an administrative fee or uplift for processing the payment of this charge beyond the allocated Indirect Costs set out in this statement.

DUoS Charge for the use of IDNO network

The charge for the use of the IDNO network is set to recover the costs of providing, maintaining, and operating the connection to the EHV Customers’ premises and will include (where appropriate):

- Network rates;
- Direct costs;
- Indirect costs;
- Depreciation;
- Return; and
- Transmission charges.

For the avoidance of doubt, although not listed above, as per the previous section the charge for use of the IDNO network will include any costs which the upstream DNO levies on GTC for use of its network.

Where the GTC distribution system assets to which an EHV Customer connects also distribute electricity to other premises or distribution systems, the costs listed above will be apportioned between the EHV Customer and other customers using the relevant assets. The Non-EHV charges will be subtracted from the above costs before calculating the EHV tariff, based on their network capacity.

Maximum Import Capacity and Maximum Export Capacity

When allocating the charges for each EHV Customer, GTC will look individually at the Maximum Import Capacity (MIC) and the Maximum Export Capacity (MEC) of each EHV Customer. As the load agreed to import and/or export by the EHV Customer is essential in determining the asset usage and types of assets required for the connection, it serves as a principal factor in the cost allocation process. In instances where an EHV Customer is both importing electricity as well as exporting it, GTC will choose the higher capacity between the MIC and the MEC for allocating the appropriate cost. The higher capacity of each property will be referred to as the 'Predominant Capacity' (PC) and if the two capacities are equal, the predominant one for the respective EHV Customer will be the Maximum Import Capacity.

Cost Allocation

This section sets out how each of the cost elements constituting the final tariff to the customer are allocated to EHV Sites. The section "Tariff elements" details how each of those allocated costs are converted into a chargeable tariff.

Sole Use Assets and Joint Use Assets

Sole Use Assets

Where assets are provided for the purpose of a single customer connected to a network, these assets are known as a Sole Use Assets (SUA). When establishing the SUA costs, GTC will consider the assets used by that single customer.

The costs incurred by GTC in owning the Sole Use Assets (SUA) will be attributed entirely to the EHV Customer which utilises them. These costs include all of those listed above.

The costs associated with the SUA will be converted from a total £/year figure into a p/day figure and be represented in the fixed tariff component.

Joint Use Assets

Joint Use Assets (JUA) are defined as those assets which are utilised by more than one customer as an integral part of providing an electricity connection to that customer in line with design standards and principles. The costs associated with JUA will be apportioned between all customers who use them based on each customer's capacity. The JUA Contribution Rate will be determined using the following calculation:

$$\mathbf{JUA\ Contribution\ Rate\ (\%)} = \frac{\mathbf{PC}}{\mathbf{JUA_{TP}}}$$

where:

PC is the Predominant Capacity of the EHV Customer; and

JUA_{TP} is the Total Predominant Diversified Capacity of all customers connected to the JUA.

In case of a JUA, the predominant capacities of all properties connected to a particular voltage level will be summed in order to determine the total predominance (TP) required for that particular network. This will be measured in MW.

$$\mathbf{TP} = \sum_1^n \mathbf{PC_n\ MW}$$

In order to calculate the cost per MW, measured in £/MW, GTC will divide the overall asset cost by the total capacity.

$$\mathbf{Capacity\ cost} = \frac{\mathbf{Asset\ cost}}{\mathbf{TP}} \mathbf{\text{£/MW}}$$

The price of 1MW capacity will then be multiplied by the predominant capacity of each site in order to determine the cost allocated to that particular customer.

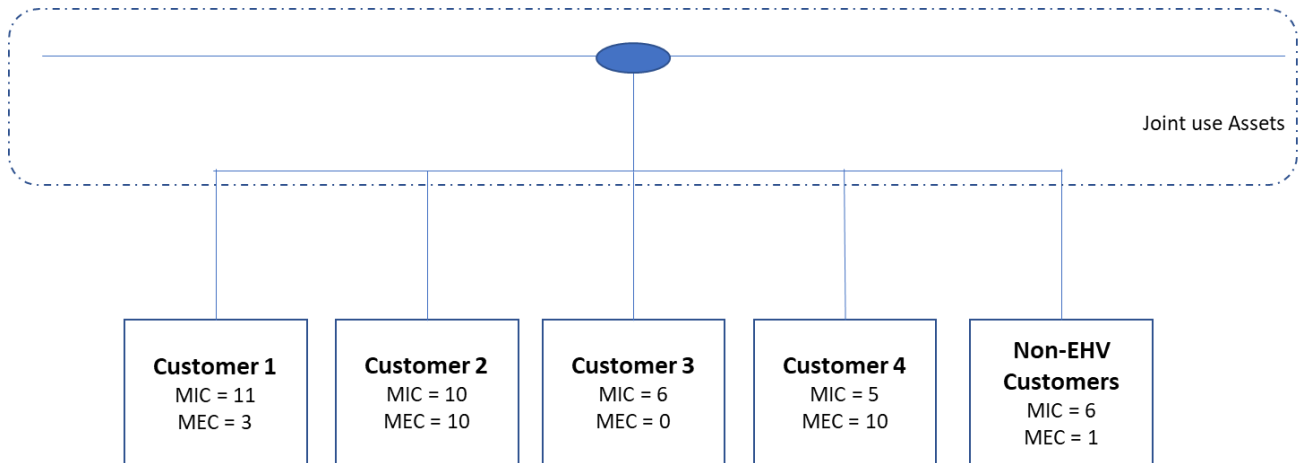
$$\mathbf{Allocated\ cost}_x = \mathbf{PC}_x * \mathbf{Capacity\ cost\ \text{£/MW}}$$

The MIC/ MEC unit rate will be calculated based on the proportion of Predominant Capacity and Capacity cost, as follows:

$$\mathbf{MIC/ MEC\ Unit\ Rate}_x = \frac{\mathbf{PC}_x}{\mathbf{MIC}_x + \mathbf{MEC}_x} * \mathbf{Capacity\ cost\ \text{£/MW}}$$

For a full example of how this is applied in practice, please see the Appendix.

Where the Joint Use Assets also serve customers, which are not defined as EHV Customers, the Total Capacity of those customers shall be determined by reference to the After Diversity Maximum Demand (ADMD) for the Non-Half-Hourly Customers; and Agreed Capacity for the Half-Hourly Customers connected at LV or HV. The below example illustrates how the Joint Use Asset Contribution Rate is calculated:



Customer	MIC	MEC	Predominant Capacity	Joint Use Asset Contribution Rate
1	11	3	11	25.58%
2	10	10	10	23.26%
3	6	0	6	13.95%
4	5	10	10	23.26%
Non-EHV	6	1	6	13.95%
Total	38	24	43	100%

The Joint Use Asset Contribution Rate shall be amended each year based on changes in Customers' capacities.

The Joint Use Asset Contribution Rate will be applied to the total costs of the JUA in the following areas:

- Network Rates;
- Direct Costs;
- Return; and
- Depreciation.

In each instance the total cost attributable to an EHV Customer shall be converted from a total cost £/year to a p/kVA/day figure to be included in the final tariff.

Network Rates

A single contribution rate for network rates will be applied on all EHV connections operated by GTC. The network rates contribution rate for each EHV Customer will be calculated as follows:

$$\text{Network Rates Contribution Rate (\%)} = \frac{NR}{\text{Total MEAV of assets}}$$

where:

NR is GTC's total expenditure on network rates within the United Kingdom; and

Total MEAV (Modern Equivalent Asset Value) of assets is the aggregate value of all assets operated by GTC within the United Kingdom.

For Sole Use Assets the Network Rates Contribution Rate will be applied to the MEAV of the SUA to determine the annual cost which will be converted into p/day and added to the fixed tariff component.

For Joint Use Assets the Network Rates Contribution Rate and JUA Contribution Rate will both be applied to the MEAV of the JUA to determine the annual cost. This will be converted into a p/kVA/day charge and added to the capacity and exceeded capacity tariff elements.

Direct Costs

The non-capital, direct costs attributable to the EHV Customer's SUA will be directly allocated to those assets to determine the annual, £/year cost. This will be converted into p/day and allocated to the fixed tariff component of the EHV Customer's tariff.

The non-capital, direct costs, which relate to the JUA will be apportioned to the EHV Customer based on the EHV Customer's JUA Contribution Rate. The total contribution, in £/year, will be converted into a p/kVA/day charge, which will be added to the capacity and exceeded capacity tariff elements.

Direct costs include, but are not limited to, costs associated with:

- Inspection and maintenance;
- Faults; and
- Transmission Exit charges (where applicable).

Where Direct Costs are considered capital expenditure, they shall be treated in accordance with the "Return and Depreciation" section of this methodology.

In calculating the direct costs GTC will consider the anticipated direct costs of the operation of the network based on a 10 year forward-looking view of the network and will average these costs to reduce volatility in tariffs.

Indirect Costs

GTC will allocate Indirect costs to EHV Customers based on the following formula:

$$\text{Indirect Costs per EHV Customer} = \frac{TIC}{TC}$$

where:

TIC is the Total Indirect Costs incurred by GTC in operating its electricity distribution business;

TC is the total number of energised customers connected to GTC's electricity distribution system across Great Britain.

Return and Depreciation

Where GTC incurs capital expenditure for providing connections, including non-operational capital costs not recovered directly as part of a Connection Charge, then this will be recovered through a Depreciation charge to the customer. For the purposes of calculating this cost, GTC will depreciate all assets on a 45-year straight-line basis.

GTC will also include a Return on the undepreciated capital expenditure, which will be charged to the customer.

Where a customer makes a contribution to the cost of the assets required for their connection, this contribution shall initially be deducted from the value of the Sole Use Assets and any remainder shall be deducted from the value of the Joint Use Assets. GTC will calculate the return and depreciation resulting from the reduced value of the cost of assets. In case the contribution is greater than the asset charges assigned to that particular customer, the surplus contribution will be distributed between the rest of the properties proportionate to their capacities.

For SUA, the Return and Depreciation costs will be included, in full, in the fixed charge element of the tariff, measured in pence/day. For JUA the Return and Depreciation costs will be charged, in full, in the capacity charge element.

After calculating the Depreciation and/ or Return, in case the outcome is negative, the value assigned for that calculation will be zero.

$$\mathbf{Return}_t = [(JUA_0 - \mathbf{Contribution}) - (\mathbf{Depreciation}_{JUA} * t)] * \mathbf{RoR} \text{ £}$$

$$\mathbf{Depreciation}_t = \frac{(JUA_0 - \mathbf{Contribution})}{t_{JUA}} \text{ £}$$

where:

Return_t = The Return at time t;

JUA₀ = The Overall Cost originally invested to install the JUA;

Contribution = The Sum of all Customer Contributions towards the JUA;

Depreciation_{JUA} = The Annual Depreciation Cost for the JUA;

t = The Total Number of Years that the Joint Use Assets had already been depreciated for;

RoR = The Rate of Return;

Depreciation_t = The Depreciation at time t; and

t_{JUA} = The Total Number of Years that the JUA are estimated to fully depreciate over.

Transmission Charges

Where GTC connects directly to the transmission network and are charged transmission costs, ENC and IPNL will treat such costs in the same way as JUA and charged to customers based on their Predominant Capacity, in line with the section in this methodology titled "Joint Use Assets". Additionally, in any case where GTC is not directly connected to the transmission

network, any supplementary costs will be allocated to the upstream DNO. The DNO may consequently include the extra costs when calculating the 'Boundary Tariff' for the EHV Customers. These costs will be treated consistently with our 'Boundary Tariff' costs.

Excess Capacity

Unless there are site specific reasons or it has been agreed in advance with the EHV Customer, GTC will not intentionally build spare capacity into its network.

Where excess capacity exists on the network as a result of standard sized equipment, the cost of any such excess capacity will be recovered from all customers connected to those assets. Where an EHV Customer exceeds their agreed MIC/MEC then they will be charged for excess capacity at the same, p/kW rate as their capacity

If, during the development stages, there is a belief that future consumption will change for different reasons, such as new properties being connected to the network at a later date, GTC may provide additional capacity in anticipation of future higher consumption demand. In this scenario, the EHV customer connected to the GTC's network will not be charged the additional cost of providing the additional capacity.

Tariff Elements

The four tariff components that GTC will include when determining the Distribution Use of Systems (DUoS) charges for an EHV Customer are the following:

1. Fixed charge

- It recovers the costs association with the SUA including the return, depreciation, direct and indirect costs, and network rates;
- It is pro-rated across the demand and generation in respect to the MIC and/ or MEC;
- It can include a pass-through of the 'Boundary Tariff' fixed cost; and
- It expressed in pence per day (p/day).

2. Super-red unit rate

- It consists of a pass-through of the upstream DNO's unit rate and it corresponds with the DNO's timeband; and
- It is expressed in pence per kilowatt-hour (p/kWh).

3. Capacity charge

- It recovers the costs associates with the JUA including the return, depreciation, direct and indirect costs, and network rates;
- It includes a pass-through of the 'Boundary Tariff' capacity charge; and
- It is expressed in pence per kilovolt-ampere per day (p/kVA/day).

4. Excess Capacity charge

- It is charged for the duration of the month in which the capacity is breached at the peak capacity imported/exported for that month;
- It is set at the same rate as the capacity charge; and
- It is expressed in pence per kilovolt-ampere per day (p/kVA/day).

Please note some of the elements listed above within the tariff components might not be applicable in some connections.

Super-Red charges

GTC will not undertake a powerflow charging approach and calculate the unit rate based on the Super-Red timeband. Instead, it will use the capacity or fixed costs when determining the tariff. However, if the DNO charges a unit rate for importing, exporting or both for their network, GTC will pass through those charges to the end consumer, including the time band based Super-Red charges. If the DNO provides a credit, it will be passed through by the GTC to the customer.

GLOSSARY

DIRECT COSTS	The predominant proportion of the non-capital direct costs includes the operations and maintenance charges, such as the costs for non-load new or replacement assets; inspections and maintenance; faults and the transmission exit charge, where applicable.
EHV CUSTOMER	<p>An Extra High Voltage (EHV) Customer as set out in the definition of Designated EHV Properties in Standard Condition 13B.6 of the Electricity Distribution Licence, i.e.:</p> <ul style="list-style-type: none"> • <i>“Distribution Systems connecting to licensee’s Distribution System at 22 kilovolts or more;</i> • <i>Premises connected to the licensee’s Distribution System at 22 kilovolts or more;</i> • <i>Distribution Systems connected directly to the substation assets that form part of the Distribution System at 1 kilovolt or more and less than 22 kilovolts where the primary voltage of the substation is 22 kilovolts or more and the Metering Point is situated at the same substation; and</i> • <i>Premises connected directly to the substation assets that belong to the licensee’s Distribution System at 1 kilovolt or more and less than 22 kilovolts where the primary voltage of the substation is 22 kilovolts or more and where the Metering Point is located at the same substation.”.</i>
HALF-HOURLY (HH) CUSTOMERS	Customers connected to Half-Hourly electricity meters use an advanced type of metering system where the consumption is automatically read to provide a more accurate electricity reading. The system sends electronic updated meter reads to the energy supplier every 30 minutes.
<ul style="list-style-type: none"> • NON-HALF-HOURLY (NHH) CUSTOMERS 	Non-Half-Hourly Customers, on the other hand, represent the smaller sites which are supplied on monthly or quarterly tariffs.
INDIRECT COSTS	The indirect costs mainly consist of operating the business costs, such as network policy, design and engineering; IT and telecoms; engineering and property management; and control centre.
JUA	Joint Use Assets (JUA) are defined as those assets which are utilised by more than one customer as an integral part of providing an electricity connection to that customer in line with design standards and principles.
SUA	Where assets are provided for the purpose of a single customer connected to a network, these assets are known as a Sole Use Assets (SUA).

Appendix – Determining and Calculating the Predominant Capacity Example

For the purpose of this exercise, it is assumed that there are five sites connecting to GTC's network, forming a Joint Use Assets (JUA). The total assets cost is £2.1 millions. Each site's MIC and MEC are as follows:

	Site 1	Site 2	Site 3	Site 4	Site 5
MIC	40 MW	75 MW	150 MW	1 MW	25 MW
MEC	0 MW	15 MW	0 MW	46 MW	25 MW

Please note the above values circled in red emphasise the Predominant Capacity for that respective site.

$$\text{TP} = 40 \text{ MW} + 75 \text{ MW} + 150 \text{ MW} + 46 \text{ MW} + 25 \text{ MW} = 336 \text{ MW}$$

$$\text{Total MIC} = 40 \text{ MW} + 75 \text{ MW} + 150 \text{ MW} + 1 \text{ MW} + 25 \text{ MW} = 291 \text{ MW}$$

$$\text{Total MEC} = 0 \text{ MW} + 15 \text{ MW} + 0 \text{ MW} + 46 \text{ MW} + 25 \text{ MW} = 86 \text{ MW}$$

$$\text{Capacity Cost} = \frac{\text{£2.1 mil}}{336 \text{ MW} * 1000} = \text{£6.25}$$

For **Site 1**, with a predominant capacity of 40 MW, the cost allocated is: 40 MW * £6.25 = 250 £/kW

Its corresponding MIC Unit Rate is: £6.25, whereas given there is no generation of energy, Site 1's MEC Unit Rate does not exist.

However, for **Site 2**, the Allocated Cost and Unit Rates for MIC and MEC are:

$$\text{Allocated Cost} = 75 \text{ MW} * \text{£6.25} = 468.75 \text{ £/kW}$$

$$\text{MIC / MEC Unit Rate} = \frac{75 \text{ MW}}{75 \text{ MW} + 15 \text{ MW}} * \text{£6.25} = 5.21 \text{ £/kW}$$

Following the same approach, the costs allocated for each site, with their corresponding MIC and MEC Unit Rates are:

	Site 1	Site 2	Site 3	Site 4	Site 5
Allocated Cost:	250 £/kW	468.75 £/kW	937.5 £/kW	287.5 £/kW	156.25 £/kW
MIC Unit Rate:	6.25 £/kW	5.21 £/kW	6.25 £/kW	6.12 £/kW	3.125 £/kW
MEC Unit Rate:	-	5.21 £/kW	-	6.12 £/kW	3.125 £/kW