

Methodology for GB Commercial Arrangements relating to Interconnector Capacity Calculation

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Introduction

Context

Net Transfer Capacity (NTC) is a value used by System Operators (SOs), including the National Energy System Operator (NESO), in order to set the maximum capacity that an interconnector can import and/or export to that SO's grid for a given Market Time Unit (MTU). Commercial compensation is available for the NTC restrictions set by NESO, using calculations based on relevant and quantifiable data sources.

NTC restrictions are applied for system security reasons. Details of those system security reasons, and the process for the calculation of NTC restrictions, can be found in the separate 'GB NTC Calculation Policy' document.

Purpose

This document outlines the GB methodology for commercial arrangements for payments relating to interconnector capacity restrictions resulting from NTC restrictions set by NESO.

It is a reference for all parties to use to understand the calculations and processes involved in determining compensation value and settlement.

The commercial arrangements in this document should be applied to:

- All interconnector projects (existing and future) that are connected to the GB transmission system
- Capacity calculations made both before and after the FIRMNESS DEADLINE (definitions for capitalised terms can be found in the 'Applicable Terminology' section)

This methodology should be applied in full to ensure consistency of NTC compensation arrangements across all interconnectors.

Material changes, resulting in fundamental changes to the operation of interconnectors to cross-border market coupling or the submission of the Capacity Calculation technical procedure under the Trade and Cooperation Agreement (TCA) will trigger a subsequent review of this methodology. In lieu of either of these major events occurring, NESO will review this methodology in line with any recommended frequency from Ofgem.

Ongoing feedback on the methodology should be communicated through the Interconnector Operating Panel (IOP) meetings or relevant account managers.

Commercial Principles

Where NTC restrictions submitted by NESO result in interconnector capacity being restricted, NESO will make compensation payments for the NTC restriction as follows.

The GB commercial arrangements for payments relating to NTC restrictions by NESO comply with the following principles:

- (A) This methodology covers the commercial arrangements between the interconnector owner and NESO. It does not deal with the terms either between the interconnector owner and the holders of transmission capacity through the interconnector capacity auction processes or the Connected SO.
- (B) To ensure cost neutrality, payments to an interconnector owner:
 - For reduction to ALLOCATED capacity, should reflect the cost to the interconnector owner of remunerating transmission capacity holders as set out in the relevant interconnector owner's Access Rules
 - For reduction to UNALLOCATED capacity, should reflect the likely cost to the interconnector owner with the NTC restriction applied, compared to a scenario where the NTC restriction had not been applied
 - Will be considered on a case-by-case basis to reflect any other cost impacts external to capacity auctions (EXPLICIT or IMPLICIT)–. Any such additional impacts can and should be raised, and evidenced, via IOP meetings
- (C) Any payments should recognise that an interconnector owner may generate additional income through a reduction in capacity (e.g., as capacity becomes scarce this may increase the price of capacity and congestion income may increase, see Calculation Method #4 in the Appendix). Payments should account for instances where an interconnector owner receives congestion income via implicit auctions. This may result in an interconnector owner paying, rather than receiving, payments if congestion revenue exceeds calculated compensation (please refer to the Calculation Method #2 in the Appendix). Any payments made by interconnector owners are via invoices from NESO (see the Invoicing section of this document) and are returned to the consumer via the Balancing Services Use of System (BSUoS) process.

(D) Any payment must only cover the volume of reduced interconnector capacity resulting from NESO's NTC restriction. No payment will be due if the capacity reduction is the result of any other factor, e.g. reduced interconnector capability or NTC restrictions by the Connected SO (unless concurrent in which case see point F). In the case of loss of access resulting from the interconnector owner's assets (such as an interconnector fault/trip by the interconnector), there will be no further compensation to the interconnector owner via this mechanism.

(E) Ex-ante capacity reductions resulting from planned maintenance or works on the National Electricity Transmission System (NETS) shall not result in any compensation between NESO and the interconnector owner if the Bilateral Connection Agreement (BCA) for that interconnector describes a reduction of the Transmission Entry Capacity (TEC) for that specific planned outage condition.

(F) A reduction of capacity can only be paid once and the application of NTC restrictions will be co-ordinated between relevant SOs. Should NTC restrictions by the two SOs result in an equal capacity reduction, in order to avoid duplication of compensation, the GB commercial arrangements shall cover half of the shared NTC restriction. Any additional capacity reduction beyond the shared NTC restriction, will be wholly picked up by the respective SO. For example, if NESO's NTC restriction reduces capacity by 100MW and the Connected SO's NTC restriction reduces capacity by 125MW, the GB commercial arrangements shall be applicable to 50MW only (half of the shared amount). Whereas, if NESO's NTC restriction reduces capacity by 125MW and the Connected SO's NTC restriction reduces capacity by 100MW, the GB commercial arrangement shall be applicable to 75MW (half of the shared amount plus all of the remaining unshared amount, i.e. $(100/2)+25$).

(G) All parties (the interconnector owner, NESO and the Connected SO) will be responsible for ensuring that the working mechanism for calculating capacity ahead of allocation at the relevant timeframes is carried out as agreed. This can be achieved via any agreed party (or a third party) fulfilling the calculating party role.

(H) This methodology will be implemented via changes to relevant interconnector Bilateral Ancillary Service Agreements (BASA)/System Operation Agreements (SOA) and relevant settlement agreements, reflecting the NTC compensation processes.

Methodology for GB Commercial Arrangements

Applicable Terminology

NOMINATED

Capacity that has been sold by an interconnector owner in an auction at any timescale and nominated by the capacity holder before the relevant nomination gate and declared in any corresponding (Final) Physical Notification. Or under an implicit coupling mechanism, the resulting flow as an output from the coupling algorithm and declared in any corresponding (Final) Physical Notification.

ALLOCATED

Capacity that has been sold to a capacity holder(s) through auctions in any timescale and the nomination gate has not closed. Or capacity that has been implicitly allocated and nominated as a result of an implicitly coupled auction (and therefore scheduled a flow).

UNALLOCATED

Capacity that either:

- Has not been sold in prior rounds of market activity
 - May have previously been allocated but the nomination gate has passed and the capacity has not been nominated
- Has not been nominated under an implicit coupling mechanism

IMPLICIT

Implicit allocation is in accordance with the market coupling mechanisms where capacity is not bought directly but is implicitly bought with the energy product through a coupled auction and therefore the flow is directly allocated (and nominated).

EXPLICIT

Explicit allocation is where capacity rights are bought directly by parties and are nominated afterwards to produce a flow (but nomination is not mandatory).

FIRMNESS DEADLINE (FD)

The point in time after which cross-zonal capacity becomes firm for each interconnector, in accordance with their respective Access Rules.

CURTAILMENT

When an NTC restriction results in ALLOCATED and/or NOMINATED capacity being restricted in the final round of market activity (this is usually the intraday phase), which therefore means curtailing the final NOMINATED flow.

GB Commercial Arrangements

Tables 1 & 2 illustrate the GB commercial arrangements for explicit and implicit auctions respectively, whether restricted in the day ahead (DA) or intraday (ID) timeframes.

These tables represent the different trading arrangements that exist (or will exist) across GB borders, and therefore each table references the relevant mechanism for clarity. The principles of the commercial methodology are consistent across the different trading arrangements. This document will be updated when these arrangements change.

For a more in-depth explanation of the settlement methods in each box (labelled 1, 2, 3, 4a, 4b), please see the calculation methods in Appendix 1.

Table 1: GB Commercial Arrangements matrix for EXPLICIT DA, and EXPLICIT ID

For example, IFA, BritNed, Nemo Link, IFA2, ElecLink and Viking Link

Timing of NTC & type of capacity affected	Allocated capacity restricted	Unallocated capacity restricted
Capacity management feeds into day ahead auctions (i.e. before DA FD)	(1) See relevant Access Rules	2) The loss adjusted (day ahead) market spread
Capacity management feeds into intraday auctions (i.e. after DA FD, before ID auction opening)	(3) Net imbalance charge from both markets	(4a) Net capacity revenue loss/gain calculated from unrestricted marginal price (4b) For 0MW auctions; the median marginal price relating to the specific hour and direction for each ¹ of the previous 31 days.*

**Where 31 days of data are not available the number of days data that is available will be utilised. However, in the event that this is 0, then agreement will be reached with the affected interconnector to utilise a number of days in the future.*

¹ Any auctions which produced a null result (due to having 0 capacity available) will be removed from the rolling average calculation so as to not skew the results.

Table 2: GB Commercial Arrangements matrix for IMPLICIT DA and/or ID

For example, Moyle, EWIC, Greenlink and NSL (where applicable)

Timing of NTC & type of capacity affected	ALLOCATED capacity restricted	UNALLOCATED capacity restricted
Capacity management feeds into day-ahead auctions (i.e. before DA FD)	(1) See relevant Access Rules	(2) Where practicable, the difference in congestion rent from a re-run of the coupling algorithm without restriction OR, the loss adjusted (day ahead) market spread
Capacity management feeds into intraday auctions (i.e. after DA FD, before ID auction opening)	(3) Net imbalance charge from both markets	(2) Where practicable, the difference in congestion rent from a re-run of the coupling algorithm without restriction OR, the loss adjusted (intraday) market spread

Implementation Method

Tripartite discussions between the interconnector, NESO and the Connected SO shall be needed to include the relevant NTC processes in the trilateral Operating Protocol (OP).

In addition, the applicable interconnector specific settlement agreements shall be updated accordingly to align with the processes outlined in the OP.

Future Developments

- **ITL Transition:** Remaining legacy interconnector agreements which reference ITLs are expected to be updated to NTCs to be consistent with this methodology.
- **Trade and Co-operation Agreement (TCA):** NTC restrictions shall be used in parallel to the development of the Capacity Calculation arrangements envisaged within the TCA. This document shall be revisited, if needed, following

the finalisation of the day ahead and/or intraday Capacity Calculation technical procedure(s).

- **Market coupling:** this methodology shall be updated should a form of implicit coupling between GB and connected markets and/or a Coordinated Capacity Calculation Methodology with neighbouring TSOs be developed.

The Calculation Process

Considering the number of variables involved between interconnector owners, auction regimes and various scenarios, calculating any settlement becomes complex. Below, NESO outlines the process that will be undertaken to run this calculation.

For the avoidance of doubt, the formulae set out in Appendix 1 is illustrative and generalised for all interconnectors. While specific data sources may vary between interconnectors, they represent the same data referenced in the generic formulae in Appendix 1. The final formula will be set out and agreed in the interconnector settlement agreements.

Where necessary, sign convention may be reversed to indicate credit or debit payment direction.

Where restricted volumes are concerned, losses will be accounted for as appropriate according to each interconnector owner's Access Rules.

A. "Build the Picture"

Before calculating any settlement data, NESO must build the picture of the volume of each type of capacity restricted at each horizon. This uses the auction data, Interconnector Nominated Flow and Outages/Commercial Availability sources detailed below.

With this data, NESO can calculate the volume of UNALLOCATED and ALLOCATED capacity restricted through NTC restrictions at both the DA and ID stages, for each settlement period.

Data Sources Required:

NESO and Connected SO NTC restriction data

The first step is to ascertain what NTC restrictions have been submitted by both system operators. This data is provided either by the Final NTC Calculating party

or by the interconnector owner (as detailed in the individual Interconnector Operating Protocol and settlement agreement).

Outages/Commercial Availability

To know how much capacity was restricted through NTC restrictions, NESO cannot assume the interconnector could have been available to run at maximum import/export – NESO must account for this by considering the commercial availability/capability of the interconnector at the time of auction. NESO utilises Elexon's BM Reports/REMIT data, filtered as appropriate, to determine the maximum capability for the interconnector for each auction. For some interconnectors, this information is provided by the Final NTC Calculating party or by the interconnector owner.

- <https://bmrs.elexon.co.uk/remit> provides a user interface for exporting data as needed. Elexon also has an API feature which can be used to fetch this data.

Interconnector Nominated Flow

In order to distinguish what capacity was ALLOCATED, UNALLOCATED, NOMINATED and unnominated across DA and ID timescales, the Total Nominated Flow is needed.

For DA Auctions:

- The NOMINATED capacity is the sum of nominations made separately across import and export. This value can either be provided directly or derived from the auction specifications (offered capacity) and the commercial availability/capability of the interconnector
- The ALLOCATED but unnominated capacity can be calculated as the difference between the volume of capacity sold across all Long Term auctions and the nominated capacity

For ID auctions, ENTSO-E's transparency platform can be used to see nominations at Long Term, day ahead and intraday timeframes – <https://transparency.entsoe.eu/market/energyPrices>

B. Gather Commercial Data

The next step is to gather auction data, day ahead prices and imbalance/system prices, for each settlement period. NESO can now calculate the day ahead spreads, the net imbalance costs and recalculate explicit auction clearing prices. These calculations are explained in Appendix 1.

C. Apply the Settlement Calculation Formulae

Depending on the interconnector's specific auction profile (see tables 1 & 2), different calculations apply for different types of capacity restrictions. These calculations are captured by four methods, labelled 1, 2, 3 or 4 (a/b) in their respective tables in the 'GB Commercial Arrangements' section above.

Please see Appendix 1 for the illustrative and generalised formulae examples of these four methods.

Reminder: the final formulae (and data sources) will be set out and agreed in the interconnector settlement agreements.

D. Apply Cost-Sharing Principles

Once we have calculated the settlement figures for each relevant scenario, for each settlement period, we must then consider Commercial Principle F – for each settlement period, the proportion of the total settlement figure that NESO is responsible for. In practice this involves repeating the calculations in Step A (in the Calculation Process) but calculating how much capacity was restricted individually by NESO and the Connected SO, rather than just using the lower value.

Settlement

Payments between the interconnector and NESO will only commence following:

- i) agreement for this between the interconnector and NESO, that is in line with the arrangements and principles within this document.
- ii) A two-month period to create and test the calculation documentation with the specific data sources for that interconnector.

The detail of the settlement and payment arrangements shall also be outlined in each party's bilateral agreements.

To support the invoicing arrangements, NESO will collect the available data required to support the settlement of the commercial arrangements outlined in this document. Should the data not be able to be retrieved, interconnector owners are requested to provide the data.

There is no set cap to compensation values settled by NESO as compensation is based on the restrictions applied and calculation methods outlined in this document.

Currency

NESO will look to settle NTC restrictions in Euros where appropriate using HMRC's² published monthly GBP:EUR exchange rate for the settlement month (refer to this link: https://www.trade-tariff.service.gov.uk/exchange_rates). Imbalance costs from GB will remain in GBP.

Invoicing process

NESO will produce a preliminary statement followed by either Self-Billing invoices (for payment to an interconnector owner) or Sales invoices (requesting payment from an interconnector), based on the net value of transactions for the month.

Multiple invoices may be raised in a month if more than one currency is involved:

- Settlement for any incurred GB imbalance from Calculation Method 3, in GBP
- Settlement for all other compensation formulae, in EUR

The invoice will be added, in PDF format, to the corresponding NESO SharePoint site for a provider. The standard timescales shall be as follows or as otherwise detailed in respective settlement agreements:

- By the eighth business day from the first day of the month, the preliminary statement for the previous month shall be issued by NESO to the interconnector owner.

For example, by 10 June 2026, a preliminary statement will be issued for the NTC transactions which occurred between 01 May 2026 to 31 May 2026.

- Data shall be reviewed by the two parties between the issue of the preliminary statement and the issue of the invoice.

² https://www.trade-tariff.service.gov.uk/exchange_rates

- By the eighteenth business day from the first day of the month, an invoice will be issued. For example, by 24 June 2026, an invoice will be issued.
- From 6 business days from the issue of the invoice, payment will be made. For example, the payment outlined on the invoice will be made from 02 July 2026.

The standard payment calendar is available on the [Settlements page](#) of the NESO website.

Disputes

Any dispute relating to NTC compensation will be resolved as per the terms of the interconnector's BASA or SOA.

For example, on a monthly basis, the interconnector is able to flag, after the preliminary statement or invoice has been raised, where fair value has not been experienced by one or both parties. This may be due to additional market activity not considered as part of the calculation in the methodology. Data can be provided by the interconnector to be managed as part of the Settlements dispute process and used in exception to create overriding values where relevant. The assessment will be documented by NESO and approval to override the relevant settlement period value will be provided by senior management.

Appendix 1 – Settlement Calculation Formulae

Calculation Method 1: ALLOCATED Capacity restricted before FD

See the relevant Access Rules for the details of how capacity holders are remunerated.

Calculation Method 2: UNALLOCATED Capacity restricted on an IMPLICIT auction

Any volume of capacity restricted under these conditions will be paid either according to the net loss/gain in congestion rent as determined by the coupling algorithm (Option 1) or the Loss Adjusted, market spread from the relevant auction (Option 2).

Should NTCs be applied to an IMPLICIT interconnector, Option 1 below is the preferred option, providing NESO are given access to the relevant order books.

Option 1:

NESO re-run the IMPLICIT market coupling algorithm with the restriction removed. This provides a simulated congestion revenue, which can be calculated using the formula below.

$$\text{Settlement}_{2, \text{OPTION1}} = (((P_{GB, \text{RERUN}}^{\text{CP}} \times R_{\text{GBP_EUR}}) - P_{\text{RE, RERUN}}^{\text{CP}}) \times V_{\text{RERUN}}^{\text{CP}}) - (((P_{GB, \text{ACT}}^{\text{CP}} \times R_{\text{GBP_EUR}}) - P_{\text{RE, ACT}}^{\text{CP}}) \times V_{\text{ACT}}^{\text{CP}})$$

Where:

$P_{GB, \text{ACT}}^{\text{CP}}$ = The Coupling Algorithm's "Live Outcome" Clearing Price in GB

$R_{\text{GBP_EUR}}$ = The exchange rate to convert GBP to EUR (see the 'Currency' section of this document for more information)

$P_{\text{RE, ACT}}^{\text{CP}}$ = The Coupling Algorithm's "Live Outcome" Clearing Price in the Remote-End region

$P_{GB, \text{RERUN}}^{\text{CP}}$ = The Coupling Algorithm's "Rerun Outcome" Clearing Price in GB

$P_{RE,RERUN}^{CP}$ = The Coupling Algorithm's "Rerun Outcome" Clearing Price in the Remote-End region

V_{ACT}^{CP} = The Interconnector Flow determined by the Coupling Algorithm's "Live Outcome"

V_{RERUN}^{CP} = The Interconnector Flow determined by the Coupling Algorithm's "Rerun Outcome"

Option 2:

Should access to the coupling algorithm prove impracticable, we will pursue the following method.

The Loss Adjusted spread will be used to approximate a value of the capacity restricted by NESO. Losses will be applied from the relevant end of the interconnector, e.g., the high price zone*.

$$\text{Settlement}_{2, \text{OPTION 2}^*} = ((P_{GB,LA}^{CP} \times R_{GBP_EUR}) - P_{RE,LA}^{CP}) \times V_{UNALLOCATED}^{CP}$$

Where:

$P_{GB,LA}^{CP}$ = The Loss Adjusted clearing Wholesale Price in GB (volume-weighted between EPEX and NordPool)

R_{GBP_EUR} = The exchange rate to convert GBP to EUR

$P_{RE,LA}^{CP}$ = The Loss Adjusted clearing Wholesale Price in the Remote-End region

*losses applied to the respective high price zone only

$V_{UNALLOCATED}^{CP}$ = The Volume of UNALLOCATED Capacity restricted through NTC restrictions

Data Sources Required:

Market Prices (spread):

The Wholesale Price is needed in each relevant region to calculate the difference between them – the spread. The published prices from the relevant auction platform

hosting the coupled auction should be used – ensuring the final settlement figure is fully cost-reflective and fair across parties. For countries neighbouring GB, ENTSO-E serves as a common source for the DA Prices. For specific auctions the relevant host should be used, e.g. Nordpool or EPEX.

- Transparency Platform provides the user interface for exporting this data using ENTSO-E's transparency platform. NESO will be using ENTSO-E's API to automate the gathering of this data as needed.
- <https://eu.data.energy/#eu> provides EPEX day ahead price and volume data (as well as some imbalance data covered below). This source requires paid membership.
- Market data | Nord Pool (nordpoolgroup.com) provides historical data on N2EX day ahead Prices and Volumes.

Calculation Method 3: ALLOCATED Capacity restricted after FD

$$\text{Net Imbalance Settlement}_3 = (P_{IMB_{GB}} \times V^{ID}_{ALLOCATED} \times S_{GB}) + (P_{IMB_{RE}} \times V^{ID}_{ALLOCATED} \times S_{RE})$$

Where:

$P_{IMB_{GB}}$ = The imbalance price in GB

$V^{ID}_{ALLOCATED}$ = The Volume of ALLOCATED Capacity restricted through NTC restrictions

S_{GB} = A binary value (either -1 or +1) to describe if the GB system was either in surplus or deficit

$P_{IMB_{RE}}$ = The imbalance price in the Remote-End region

S_{RE} = A binary value (either -1 or +1) to describe if the Remote-End system was either in surplus or deficit

Any volume of capacity restricted under these conditions will be paid such as to hold the relevant interconnector whole on imbalance, netted across both market zones. By doing this, NESO holds the cost/risk for such restrictions.

Data Sources Required:

Imbalance/System Prices and Volumes

There is no single source for System Prices across Europe (ENTSO-E is inconsistent in this area). Some sources have been outlined:

- EnAppSys (<https://eu.data.energy/#fr/elec/pricing>) - FR, NO
- TenneT (<https://www.tennet.eu/nl-en/grids-and-markets/transparency-data-netherlands/settlement-prices>) - NL
- Elia Open Data (<https://opendata.elia.be/explore/dataset/ods161/information/>) - BE
- SEM-O (<https://www.sem-o.com/market-data/dynamic-reports>) - ISEM

Calculation Method 4: UNALLOCATED Capacity restricted on an EXPLICIT auction

4a. Unrestricted vs restricted revenues

Restricting the capacity going into an EXPLICIT auction introduces scarcity in that auction. To compensate for these restrictions, NESO will look to calculate the unrestricted clearing price– NESO looks at answering the question “without the restriction, what would the auction have cleared at?”

The amount to be paid for capacity restricted under these conditions will be equal to the difference in the restricted and unrestricted auction revenue. It could be positive or negative – the settlement looks to hold the interconnector financially whole.

$$\text{Settlement}_{4a} = (P_{CLEAR_{WITH\ NTC}} \times V_{WITH\ NTC}) - (P_{CLEAR_{WITHOUT\ NTC}} \times V_{WITHOUT\ NTC})$$

Where:

$P_{CLEAR_{WITH\ NTC}}$ = The Auction Clearing Price, when the NTC restriction is applied,

$P_{CLEAR_{WITHOUT\ NTC}}$ = The Auction Clearing Price, when the NTC restriction is not applied,

$V_{WITH\ NTC}$ = The volume of capacity ALLOCATED in the auction with the NTC restriction applied

$V_{WITHOUT\ NTC}$ = The volume of capacity that would have been ALLOCATED if the NTC restriction had not been applied. This can be calculated as: $=\text{MINIMUM}((\text{Requested Capacity}), (V_WITH_NTC + \text{NTC Restriction}))$

This value is essentially the sum of $V_{WITH\ NTC}$ and the volume of capacity restricted due to the NTC restriction (calculated as part of “Build the Picture”).

To further visualise this, please see the example plot below. This is an EXPLICIT auction bid ladder, with intercept lines to highlight volumes and clearing prices both with and without NTC restrictions.

AUCTION CHART



4b. 0MW auctions

Restrictions on capacity under these conditions may result in 0MW capacity being offered in the auction – in other words, the auction doesn't take place. NESO will assess the historical clearing prices in both the import and export directions for the relevant hour of the day. NESO will look at the previous 31 days' auction data and calculate the median clearing price.

$$\text{Settlement}_{4b} = \text{MEDIAN}(P_{CLEAR}) \times V_{WITHOUT\ NTC}$$

Where:

P_{CLEAR} = A list of the previous 31 days' hourly, directional auction clearing prices, excluding any 'null' results. For example, if 5 of the 31 days had 'null' results, the median will be taken from 26 days' values.

$V_{WITHOUT\ NTC}$ = The volume of capacity that would have been sold, had no NTC restriction been applied.

Data Sources Required:

EXPLICIT Auction and Bid Data:

Auction specifications, bid ladders and results for EXPLICIT capacity auctions. The exact source of this data varies across each interconnector, but JAO serves as a publicly available source of the data, covering data for IFA, IFA2 and Nemo Link

- <https://www.jao.eu/auctions#/> provides a user interface to export data manually from JAO. NESO will be using JAO's new API tool to import this data automatically as needed.