BritNed Interconnector between Holland and Great Britain

Methodology Statement for Determination of System-to-System Flows

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1.   Requirement for Methodology Statement

1.1   This Methodology Statement is produced for the purposes of paragraph 7.5 of Section R of the Balancing and Settlement Code (BSC).

2.   Objective of Methodology

2.1   The methodology given in section 3 below describes the basis on which the system-to-system flow will be determined for the purposes of paragraph 7.5.3 of Section R of the BSC. This description is supported by the information on implementation of the methodology set out in section 4.

3.   Methodology

3.1   The system-to-system flow will be determined from Interconnector instructions issued by the System Operator (NGESO) or the Externally Interconnected System Operator (TenneT TSO B.V.), or issued automatically by equipment armed by NGESO to respond to events on the Total System or the External System. The acceptance by the Transmission Company of any Bid or Offer submitted by an Interconnector User in respect of an Interconnector BM Unit does not constitute an Interconnector instruction in this Methodology.

3.2   The system-to-system flow will be determined in a manner consistent with paragraph 7.5 of Section R of the BSC. Accordingly any system-to-system flow on the Interconnector will not affect, or form part of, the Interconnector Scheduled Transfer (IST). If the difference between the IST and the physical capability of the Interconnector is reduced after an Interconnector instruction has been issued the system-to-system flow may be reduced as necessary.

4.   Implementation

4.1   The implementation of this methodology is agreed between NGESO and BDL. For information purposes an outline of the current plans to implement this methodology is given in Appendix A. However NGESO recognises that any material changes to the way in which the methodology is implemented (as described in Appendix A) will require a revised Statement to be resubmitted to the Authority for further approval.

5.   Definitions

5.1.1   Unless stated otherwise, terms and expressions used in this methodology statement shall have the same meanings given to them in the BSC.

Appendix A

Operational Process for Determining the System-System Flow on the BritNed Interconnector

A1 Calculate the Interconnector Scheduled Transfer (IST)

The Interconnector Scheduled Transfer is based on BritNed Nominations (BN) submitted by Interconnector Users. BN data will be consistent with Physical Notifications submitted to NGESO by BritNed acting on behalf of Interconnector Users, and must be within the Net Transfer Capability (NTC) as defined in the Operating Protocol.

A2 Calculate the Scheduled BritNed Reference Program (BNRP)

The Scheduled BritNed Reference Program (BNRP) is based on the same data that is used to determine the IST. The BNRP will, as far as possible, give the same energy transfer in each trading period as the BNRP data used to determine the IST, within the agreed dynamic characteristic for the Interconnector.

There will be a day-ahead BritNed Reference Program (BNRP) sent to NGESO at 13:00, intraday revisions to which can be submitted following intraday auctions. Updated BNRPs from Intraday auctions are expected to be received every hour between H-70 and H-50 as per the GB Grid Code. The times given here are all in UK time. The Final BritNed Reference Program (FBNRP) is the day ahead BNRP as adjusted by intraday auctions and this is the base against which System-System Flows (SSF) will be calculated.

A3 Variations to the FBNRP

After the FBNRP has been agreed it may be necessary to vary the BritNed Reference Program (BNRP). When this occurs for reasons other than those specified in paragraph 7 of section R of the BSC this will constitute a system-to-system flow (which may for example be recorded as Emergency Assistance, Emergency Instruction or Constraint).

A4 Volume of System-to-System Changes

Where the instruction to change the BNRP has been given for a reason that will give rise to a system-to system flow, then the change to the BNRP will be a system-to-system change. The volume associated with a system-to-system change will be calculated from the previous BNRP as described below:

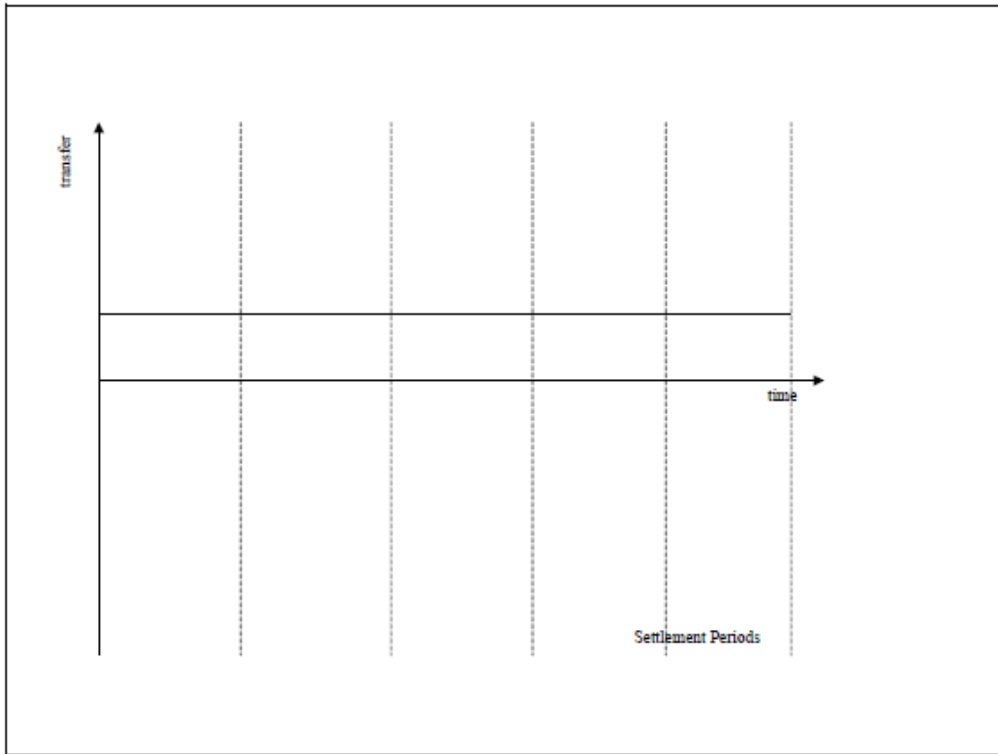Consider the simple FBNRP shown in figure 1.

Figure 1 Final BritNed Reference Programme

NGESO makes a request to vary the BNRP (this request being accepted by the other party) or a request is issued automatically by equipment armed by NGESO or BritNed to respond to events on the Total System or the External System.
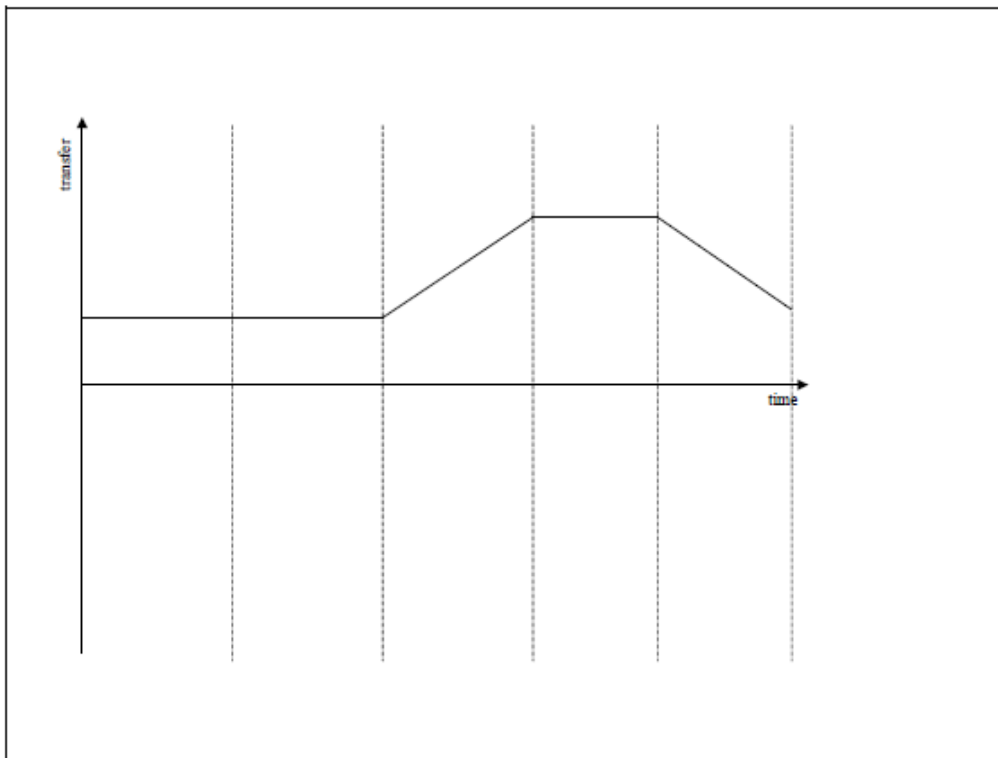

**Figure 2 BNRP revised for system-to-system flow**

Labelling the Revised reference programme as RPn,s and the Reference programme prior to revision as RP(n-1),s then the change in the instructed transfer per settlement period is calculated as the difference between the revised reference programme and the previous reference programme calculated each second /revision and summated over the settlement period as derived by the equation below:

$$T_{n,j} = \sum_{s,n,j} \left(\int_0^1 \frac{\max\left(ICMIN_s, \min\left(ICMAX_s, RP_{n,s}\right)\right) -}{\max\left(ICMIN_s, \min\left(ICMAX_s, RP_{(n-1),s}\right)\right)} \partial t \right)$$

Where

$T_{n,j}$	Is the change in transfer volume resulting from the acceptance of the revised Reference programme in respect of settlement period j.
$ICMAX_s$	Is the import value in MW to Great Britain expressed as a positive value effective at second s.
$ICMIN_s$	Is the export value in MW from Great Britain expressed as a negative value effective at second s.
$RP_{n,s}$	Is the programmed instantaneous transfer as at second s for the reference programme n. A positive value denotes a flow from Ireland to Great Britain.
$RP_{(n-1),s}$	Is the programmed instantaneous transfer at second s for the reference programme immediately prior to reference programme n. A positive value denotes a flow from Ireland to Great Britain.
$\sum_{s,,n,j,}$	Sum over all seconds, and reference programme changes following the submission of the final reference programme, within settlement period j

This is shown graphically below:
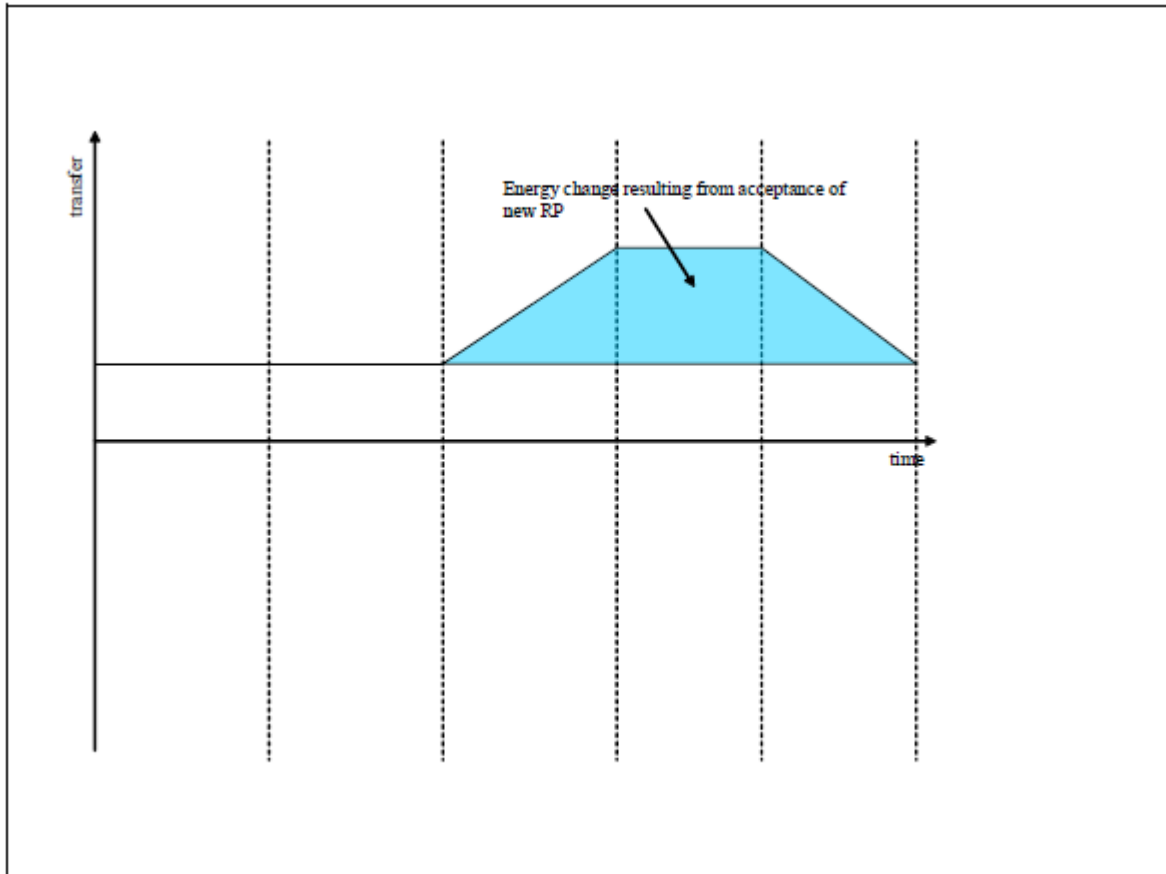
Figure 3: Change in instructed transfer volume arising from change in BNRP

The total volume of system-to-system change (T_j) will be the sum of all changes in instructed transfer volume arising due to system-to-system flows.

A5   Volume of System-to-System Flow (SSF)

The BNRP and the total volume of system-to-system change are calculated at the English end of the BritNed Interconnector. Hence interconnector losses have already been accounted for in these values and no adjustments for interconnector losses are required.

A6   Metered Volume for Transmission Company Interconnector BM Units

The system-to-system flow is calculated and the Metered Volume allocated to the Transmission Company Interconnector BM Units (TCIBMU) as shown below:

(SSF=System to System Flow)
If direction of SSF is from Holland to England SSF = T_j

TCIBMU(Production) = SSF   TCIBMU(Consumption) = 0

If direction of SSF is from England to Holland SSF = T_j

TCIBMU(Production) = 0   TCIBMU(Consumption) = SSF

A7   Revisions to Appendix A

This appendix is provided for information purposes only. If material changes occur to the planned operational process for determining the system-to-system flow on the BritNed Interconnector then this appendix will be revised accordingly to show the revisions.

Revision No. 1 (effective from 1ˢᵗ April 2019)

Section A2 – re-worded the definition of FBNRP for increase in clarity.

Section A4 – Standardised formulae to provide further clarity and more accurately.

The acronyms of NGESO has been replaced with NGESO to reflect legal separation planned for 1 April 2019.

Revision No. 2 (effective from 1ˢᵗ April 2020)

Section A2 – the timings have been updated to reflect the changes made in BritNed Access Rules regarding the intraday model.