Greenlink Interconnector between Ireland and Great Britain
Methodology Statement for Determination of System-to-System Flow

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 (NESO) or the Externally Interconnected System Operator (EirGrid – System Operator of Southern Ireland) or issued automatically by equipment armed by EirGrid 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 NESO and Greenlink Interconnector Limited (GIL). For information purposes an outline of the current plans to implement this methodology is given in Appendix A. However, NESO 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 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 Greenlink Interconnector

A1 Calculate the Interconnector Scheduled Transfer (IST)

There currently is no mechanism for interconnector users to register for Greenlink's capacity, as a result there are no modified interconnector user nominations. The Interconnector Scheduled Transfer is based on the implicit allocation in two coupled intraday auctions between the SEM and GB, resulting in an Interconnector reference programme (ICRP) this will be consistent with Physical Notifications submitted to NESO by the Interconnector Operator, acting on behalf of the Interconnector Owner, and must be within the Net Transfer Capability (**NTC**) as defined in the Operating Protocol.

A2 Calculation of the Greenlink Reference Program (GLRP)

The GLRP is based on the same ICRP data that is used to determine the IST. The GLRP will, as far as possible, give the same energy transfer in each trading half hour period as the ICRP data used to determine the IST, within the agreed dynamic characteristic for the Interconnector.

The GLRP is delivered to NESO at 1809 day ahead and on the day by 0940, after market closures.

The GLRP will become firm 2 ½ hours before real time, becoming the Firm Greenlink Reference Program (**FGLRP**).

A3 Variations to the FGLRP

After the FGLRP has been agreed it may be necessary to vary it. 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, Constraint, or Cross Border Balancing).

A4 Volume of System-to-System Changes

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

Consider the simple FGLRP shown in figure 1.

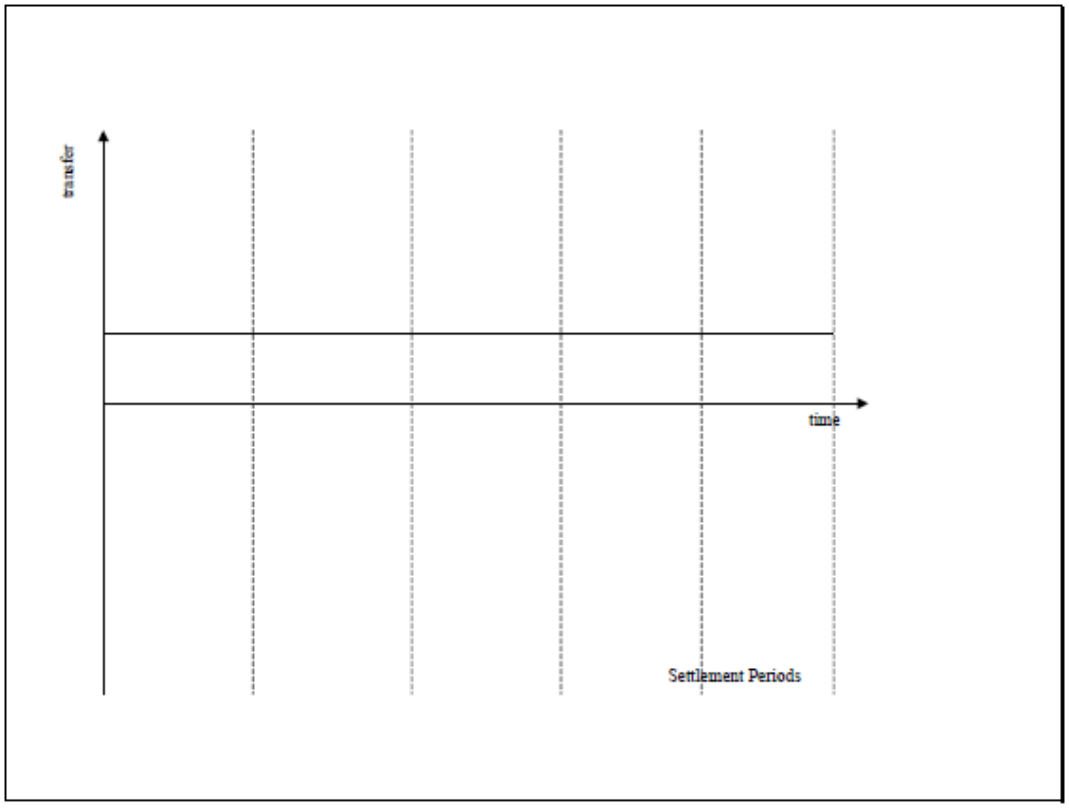

Figure 1 Firm Greenlink Reference Programme

NESO or EirGrid makes a request to vary the FGLRP (this request being accepted by the other party) or issued automatically by equipment armed by GIL to respond to events on the Total System or the External System.

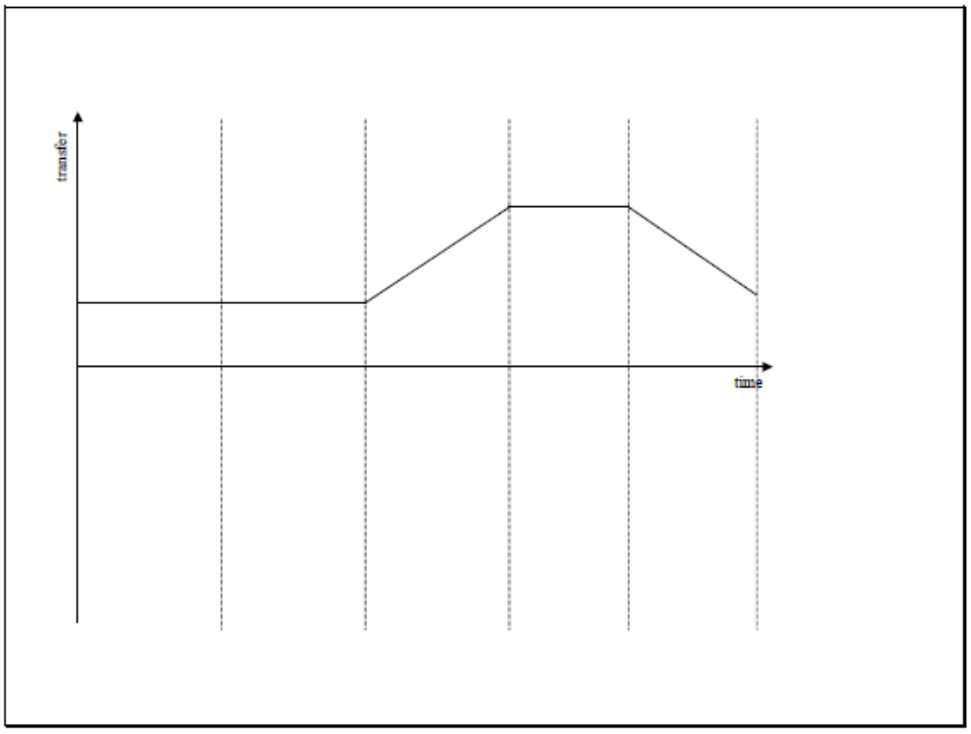

Figure 2 FGLRP revised for system-to-system flow

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:

$$T_{n,\,j} = \sum_{s,n,\,j} \left(\int_{0}^{1} \max\left(ICMIN_s, \min\left(ICMAX_s, RP_{n,s}\right)\right) - \max\left(ICMIN_s, \min\left(ICMAX_s, RP_{(n-1),s}\right)\right) \partial t \right)$$

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:

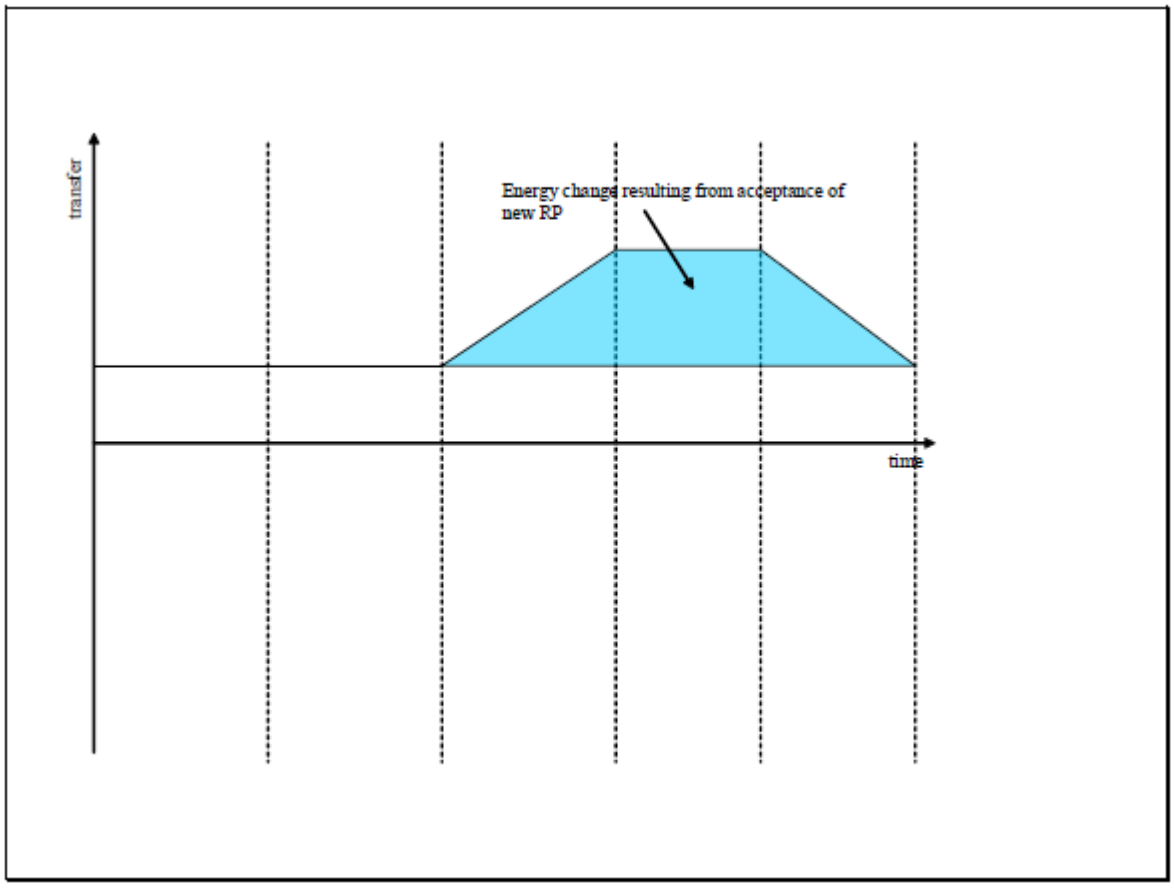

Figure 3: Change in instructed transfer volume arising from change in GLRP

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 GLRP and total volume of system-to-system changes is calculated at the operational reference point, i.e. the NESO Pembroke 400kv substation.

GIL are responsible for accounting for any loss factors applicable to Greenlink operation up to the operational reference point.

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:

If direction of SSF is from Ireland to GB, SSF = T_j

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

If direction of SSF is from GB to Ireland, 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 Greenlink Interconnector, then this appendix will be revised accordingly.