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The Exit Capacity Substitution and Revision Methodology Statement

Effective from 1 June 2013

EXIT CAPACITY SUBSTITUTION AND REVISION METHODOLOGY STATEMENT

Document Revision History

Version/ Revision Number	Date of Issue	Notes
0.1	June 2010	First draft issued for informal consultation.
0.2	November 2010	Formal consultation; updated following informal consultation. Substitution to apply for capacity releases from Y+4 only (see para 19l) Capacity covered by a financial commitment excluded from Substitutable Capacity (see para 19k) Recipient exit point order changed. Highest revenue driver selected first (see para 27). Additional flow diagrams added – Annex 1 Exchange rate collar removed. Clarification of process to set initial flows in substitution analysis (see paras 44 and 45). Partial substitution included subject to suitable revenue driver. Criteria clarified. National Grid discretion to override methodology in case of unsatisfactory outcomes removed. Clarification on availability of capacity whilst substitutions are being considered (see paras 19j and 71).
0.3	January 2011	Submission draft. Modification to paragraph 19k to widen scope for financial commitment to exclude capacity from being substitutable. New paragraph 24 added to clarify availability of substituted capacity at the donor exit point until the effective date of the substitution.
1.0	31 March 2011	v0.3 Approved by the Authority. Implementation date 1 July 2011 Consistent with the Authority's approval letter, National Grid will temporarily exclude capacity at GB interconnectors from exit substitution.

1.1	February 2012	Annual Review. General updates; Reference to overriding EU Directive added; New criteria for defining “Substitutable Capacity” at Interconnector exit points added (see paragraph 19m); Criteria for selecting Recipient NTS Exit Point added (see paragraph 28); Clarifications added to network analysis steps following lessons learned with initial application of the methodology in 2011; Annex 1 – Diagrams updated.
1.2	April 2012	No material changes following consultation.
2.0	May 2012	Approved by the Authority without change
2.1	February 2013	Updated for RIIO-T1. New terminology and Licence references General Updates Annex1 – Diagrams updated
2.2	March 2013	Minor changes from 2.1 to correct typing, referencing and formatting errors. Link in paragraph 70 amended. Paragraph 26, Licence reference changed. Submitted for Approval

About this Document

This Statement describes the methodology that National Grid Gas plc (“National Grid”) in its role as holder of the Gas Transporter Licence in respect of the NTS (“the Licence”) will utilise to determine proposals for:

- the substitution of unsold Non-incremental Obligated Exit Capacity from one NTS Exit Point to another in response to the demand for Incremental Obligated Exit Capacity; and/or
- the revision to Licence Baseline Exit Capacity at NTS Exit Points in response to the release of Funded Incremental Obligated Entry Capacity.

In particular, it defines:

- under what circumstances National Grid will consider such substitutions and revisions; and
- the process to be undertaken by National Grid to determine its proposals to substitute capacity and/or revise baselines.

This Statement is one of a suite of documents that describe the release of NTS capacity by National Grid and the methodologies behind them. The other documents are available on our website at:

<http://www.nationalgrid.com/uk/Gas/Charges/statements/>

This Statement is effective from 1 June 2013.

This Statement has been published by National Grid in accordance with Special Condition 9A of the Licence. National Grid believes the content is consistent with its duties under the Gas Act and is consistent with the Licence.

This Statement of the exit capacity substitution methodology applies in respect of Incremental Obligated Exit Capacity released as a result of valid applications for Enduring Annual NTS Exit (Flat) Capacity made in accordance with the Uniform Network Code (“UNC”) and the Exit Capacity Release (“ExCR”) methodology statement. The timing of the release of any Incremental Obligated Exit Capacity will be in accordance with the ExCR methodology statement. Where such Incremental Obligated Exit Capacity is to be made available and is met via exit capacity substitution, capacity will be made available from a date consistent with this Statement.

This Statement of the exit capacity revision methodology applies in respect of Funded Incremental Obligated Entry Capacity released as a result of valid bids made in the auctions for Long Term System Entry Capacity (the “QSEC auctions”). The effective date for the release of any Exit Capacity made available as a result of exit capacity revision will be in accordance with this Statement.

Due to the high degree of similarity between the exit capacity substitution and revision methodologies National Grid has prepared this single document to satisfy the Licence requirements outlined above.

It should be noted that this Statement does not provide the methodology by which, and from when, Exit Capacity will be made available. The processes for Users to obtain, and for National Grid to release, Exit Capacity can be found in the UNC and the ExCR methodology statement.

In the event that the application of the methodology detailed in this Statement results in a proposal to revise the level of Non-incremental Obligated Exit Capacity at one or more NTS

Exit Points which is approved by the Authority, National Grid will publish such revisions in the Exit Capacity release obligation summary report.

If you require further details about any of the information contained within this document or have comments on how this document might be improved please contact our NTS Gas Charging and Access Development team at:

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GENERAL INTRODUCTION

Background

1. National Grid is the owner and the operator of the gas National Transmission System (NTS) in Great Britain.
2. The NTS plays an important role in facilitating the competitive gas market and helping to provide the UK with a secure gas supply. It is a network of pipelines, presently operated at pressures of up to 95 barg, which transports gas safely and efficiently from coastal terminals and storage facilities to exit points from the system. Exit points are predominantly connections to Distribution Networks (DNs), but also include storage sites, and direct connections to large industrial consumers, power stations, and other systems, such as interconnectors to other countries.
3. These operations are carried out to meet the needs of the companies that supply gas to domestic, commercial and industrial consumers and to power stations.
4. This Statement sets out the methodology that applies for the substitution of Substitutable Capacity (as defined in paragraph 18) from one or more NTS Exit Points to meet demand for Incremental Obligated Exit Capacity (i.e. capacity to be made available above the prevailing level of Obligated Exit Capacity) at other NTS Exit Points thereby reducing the need for investment to meet that incremental demand for Exit Capacity. The methodology is only applicable in respect of the allocation of Enduring Annual NTS Exit (Flat) Capacity in the long term, i.e. beyond investment lead times, in response to signals received from Users through processes described in the UNC.
5. This Statement also sets out the methodology that applies for the revision to Licence Baseline Exit Capacity where the release of Funded Incremental Obligated Entry Capacity (i.e. capacity above the prevailing level of Obligated Entry Capacity), in accordance with the Incremental Entry Capacity release ("IECR")¹ methodology statement, creates additional NTS exit capability.
6. Details of National Grid and its activities can be found on its internet site at www.nationalgrid.com. An electronic version of this Statement, along with other related statements can be found on the following web page: "<http://www.nationalgrid.com/uk/Gas/Charges/statements/>".

National Grid's Licence Obligations

7. New and existing Users of the NTS are able to request to purchase Exit Capacity products defined in the UNC for any NTS Exit Point defined in the Licence. Such capacity requests will be considered against the provisions of National Grid's statutory and Licence obligations and in accordance with its published methodologies.
8. Overriding obligations applicable to this statement are set out in the Gas Act, Regulation (EC) No. 715/2009 of the European Parliament and the Council² and the Licence.

¹ The IECR will be renamed the Entry Capacity release methodology statement when next updated. This is to ensure compliance with revised Licence obligations.

² Dated 13 July 2009 and concerning conditions for access to the natural gas transmission networks.

9. Specific obligations in respect of the release of Exit Capacity and relevant to this Statement are set out in Special Condition 9B of the Licence. Under this condition, National Grid must prepare a capacity release methodology statement setting out the methodology by which National Grid will determine whether to make Exit Capacity available for sale. The current ExCR methodology statement can be found on National Grid's website.
10. The specific obligations applicable to this Statement set out in the Licence in respect of the Substitution of Exit Capacity and the revision of Licence Baseline Exit Capacity are:
 - *Special Condition 9A.5(a) - ensuring that each of Exit Capacity Substitution and Exit Capacity Revision are effected in a manner consistent with National Grid's duties under the Act and, in particular, the duty to develop and maintain an efficient and economical pipeline system and its obligations under the Licence;*
 - *Special Condition 9A.5(b)(ii) - Exit Capacity Substitution is effected in a manner which seeks to minimise the reasonably expected costs associated with Funded Incremental Obligated Exit Capacity, taking into account the Exit Capacity that Shippers and DN Operators have indicated that they will require in the future through making a financial commitment.*
11. Special Condition 9A also sets out the capacity objectives that the methodologies should seek to meet. In addition to the criteria in paragraph 10 these objectives are:
 - 5(c) Ensuring that exit capacity substitution / revision is effected in a manner which is compatible with the physical capability of the NTS;
 - 5(d) Avoiding material increases in the costs (including Entry Capacity and Exit Capacity Constraint Management costs in respect of Obligated Entry Capacity and Obligated Exit Capacity previously allocated) that are reasonably expected to be incurred by National Grid as a result of Exit Capacity Substitution or Exit Capacity Revision; and
 - 5(e) In so far as is consistent with the above objectives, facilitating effective competition between relevant Shippers, DN Operators and relevant Suppliers

CHAPTER 1: PRINCIPLES

Purpose of the Methodology Statement

12. The methodology detailed in this Statement is intended to promote the economic and efficient development of the NTS. For the purposes of this methodology this objective is achieved by seeking to minimise the amount of investment that is required to satisfy incremental demand for Exit Capacity. Specifically, the methodology describes:
 - how capacity could be identified as suitable for substitution from locations where there is no long term demand for capacity (as defined by the absence of Exit Capacity allocations) to other locations where Funded Incremental Obligated Exit Capacity would otherwise be required to be released as a result of accepted applications for Enduring Annual NTS Exit (Flat) Capacity. Subject to the further provisions of this Statement, any unsold Non-incremental Obligated Exit Capacity that is not allocated will be deemed available for substitution; and
 - how additional Exit Capacity is to be made available at locations on the NTS as a result of the release of Funded Incremental Obligated Entry Capacity.
13. This Statement has been produced to meet the requirements of Special Condition 9A of the Licence in respect of the preparation of Capacity Methodology Statements setting out the methodologies by which National Grid will determine its proposals for the substitution & revision of Non-incremental Obligated Exit Capacity pursuant to the obligations in paragraphs 2(a) and (b) of the above stated condition. National Grid believes the content is consistent with its duties under the Gas Act and Regulation (EC) No 715/2009 of the European Parliament and the Council and is consistent with the Licence. National Grid will, through exit capacity substitution:
 - make additional Obligated Exit Capacity available at the recipient NTS Exit Point, and
 - reduce the quantity of Obligated Exit Capacity available at the donor NTS Exit Point,

in quantities determined in accordance with this Statement. The obligation to provide Exit Capacity at the donor NTS Exit Point is reduced by the quantity determined and such substituted capacity will not be available for sale in future at the donor NTS Exit Point.
14. The methodology described in this Statement seeks to ensure that the NTS is efficiently sized by avoiding or minimising investments where possible, and to reduce the risk of sterilisation of capacity, by the development of proposals for consideration by the Authority to substitute or revise Non-incremental Obligated Exit Capacity levels. This may occur under the following circumstances:
 - where Users at an NTS Exit Point have requested additional Enduring Annual NTS Exit (Flat) Capacity in accordance with UNC processes that in aggregate exceed the existing Obligated Exit Capacity level, National Grid will consider whether it would be efficient and economic to seek to release the additional Exit Capacity required at that NTS Exit Point by the **substitution** of unsold Non-incremental Obligated Exit Capacity from other NTS Exit Points. This is described in Chapter 2;
 - where the release of Funded Incremental Obligated Entry Capacity (in accordance with the IECR methodology statement) increases the exit capability of the NTS, National Grid will consider whether it would be efficient and

economic to seek to increase the availability of Exit Capacity by the **revision** of Licence Baseline Exit Capacity at one or more NTS Exit Points. This is described in Chapter 3.

15. Consistent with the Licence and UNC, Exit Capacity is a commercial right that may be offered on a daily basis or multiples thereof: it does not reflect a commitment or obligation upon National Grid to undertake any investment on its network, including, but not limited to the provision of a physical connection to the NTS.

CHAPTER 2: EXIT CAPACITY SUBSTITUTION

Introduction

16. This section explains the step by step approach that National Grid will undertake in order to develop proposals for submission to, and approval by, the Authority to reduce the level of Non-incremental Obligated Exit Capacity at one or more NTS Exit Points to facilitate an increase to the level of Non-incremental Obligated Exit Capacity elsewhere so as to avoid the need to release Funded Incremental Obligated Exit Capacity and hence to minimise the need for investment in the NTS.
17. Before application of the Exit Capacity Substitution methodology demand for Incremental Obligated Exit Capacity must be established. This will occur where Users apply for Enduring Annual NTS Exit (Flat) Capacity in excess of the prevailing Obligated Exit Capacity in accordance with UNC processes and the ExCR methodology statement.
18. In applying the Exit Capacity Substitution methodology the following rules will be applied to determine the quantity of Exit Capacity that will be made available for substitution, the “Substitutable Capacity”. Under no circumstances will capacity be substituted from an NTS Exit Point in quantities greater than the Substitutable Capacity. Subject to the following rules, Substitutable Capacity at an NTS Exit Point shall be equal to the unsold quantity of Non-incremental Obligated Exit Capacity (as defined in the Licence)
 - a. Capacity currently allocated (see i) as Enduring Annual NTS Exit (Flat) Capacity³ will not be available for substitution, i.e. sold capacity will not be Substitutable Capacity.
 - b. Capacity currently reserved (see i) under the terms of an Advanced Reservation of Capacity Agreement (“ARCA”) will not be Substitutable Capacity.
 - c. Capacity currently allocated (see i) as Annual NTS Exit (Flat) Capacity for any Day after the proposed date of release of the relevant Incremental Obligated Exit Capacity will not be Substitutable Capacity⁴.
 - d. Capacity that has previously been substituted to an NTS Exit Point may be Substitutable Capacity where future quantities of that capacity are unsold at that recipient NTS Exit Point.
 - e. Because substitution of capacity is indefinite, capacity that has already been substituted from an NTS Exit Point will not be available as Substitutable Capacity in respect of the donor NTS Exit Point on subsequent occasions.
 - f. Any unsold Incremental Exit Capacity released as a result of long term signals received in accordance with UNC and the ExCR methodology statement will not be Substitutable Capacity until that incremental capacity is re-classified, for the purposes of the Licence, as Non-incremental Obligated Exit Capacity.
 - g. For each NTS Exit Point the quantity of Substitutable Capacity will be the lowest value, determined in accordance with this paragraph, for any Day following the proposed date for the substitution to be effective, i.e. the date of release of the relevant Incremental Obligated Exit Capacity.

³ The ExCR defines circumstances where Users can reduce their registered capacity holding to facilitate substitution. This “allocated” capacity will become Substitutable Capacity if the reduction request is accepted.

⁴ As Annual NTS Exit (Flat) Capacity is only available for years Y+1, Y+2 and Y+3, and substitution only applies from Y+4 (see sub-paragraph l). sub-paragraph c has no relevance. It has been retained to protect against the consequences of future changes, if any, to the rules for release of Annual NTS Exit (Flat) Capacity.

- h. Any Exit Capacity at a notional exit point created as a result of Exit Capacity Revision (see Chapter 3) shall be Substitutable Capacity.
 - i. Where there are valid⁵ applications for capacity received in the same application period as the application(s) for which capacity substitution is being considered any Exit Capacity identified as being required to be allocated to Users to satisfy those applications shall not be Substitutable Capacity. This ensures that any capacity requested, but not allocated at the time of the substitution analysis, is not considered as Substitutable Capacity if it is required at that NTS Exit Point.
 - j. Consistent with paragraph 72, and subject to paragraph 18i, where valid ad-hoc and ARCA applications are received, any unsold Non-incremental Obligated Exit Capacity required to satisfy the application shall, except where paragraph 18k applies, be Substitutable Capacity. This ensures that capacity required for substitution cannot be sterilised by an ad-hoc or ARCA application unless backed up by a financial commitment as detailed in paragraph 18k.
 - k. Any Exit Capacity at NTS Exit Points in respect of which a User or Reservation Party has made a financial commitment shall not be Substitutable Capacity. The financial commitment must be in respect of works to provide incremental capacity or a new exit connection and must be in respect of an on-going project at a potential donor NTS Exit Point. A project will be “on-going” where either the works are being undertaken at the time of the capacity application, or as determined solely by National Grid.
 - l. Except in respect of sub-paragraph h, any capacity available for use before 1st October Y+4 will not be Substitutable Capacity.
 - m. In respect of Interconnector exit points (as identified as such in Table 7 of Special Condition 5G of the Licence) the Technical Capacity⁶ of the downstream connected system at the interconnection point shall not be Substitutable Capacity. Technical Capacity is taken from the Connected System Operators’ published information. Where suitable data is not explicitly published National Grid will use any other appropriate source which reasonably correlates to Technical Capacity.
19. Following each application for Exit Capacity, demand for Incremental Obligated Exit Capacity will be identified. If Incremental Obligated Exit Capacity is not required then no further action need be taken by National Grid.
20. If, in accordance with the ExCR methodology statement, National Grid considers that it is necessary to release Incremental Obligated Exit Capacity then this methodology shall apply to see whether the quantity of Incremental Obligated Exit Capacity required to be released can be reduced through Exit Capacity Substitution. For the avoidance of doubt, the User Commitment (as defined in the ExCR methodology statement) shall apply to all capacity increases (except as specified in the ExCR methodology statement) irrespective of whether the increase is satisfied through investment, substitution and/or existing capability.
21. In respect of any application, capacity will only be considered available for substitution after all applications for unsold Exit Capacity have been satisfied, i.e.

⁵ i.e. for an application from a User, in accordance with UNC and the ExCR methodology statement, and for an application from a Reservation Party, following receipt by National Grid of a written request for an ARCA.

⁶ “Technical Capacity” is as defined in Article 2 of Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and means “the maximum firm capacity that the transmission system operator can offer to the network users, taking account of system integrity and the operational requirements of the transmission network”.

capacity will be allocated at the NTS Exit Point where applications are received before being substituted to another NTS Exit Point.

22. National Grid will consider information received and will determine whether additional Exit Capacity requests can be satisfied by the substitution of Substitutable Capacity from other NTS Exit Points. The overriding factor in such consideration will be to minimise the investment required, without increasing the assessed risk of incurring other costs, e.g. operational costs or capacity buy-back costs, to meet National Grid's capacity obligations in respect of other NTS Exit Points and of NTS Entry Points.
23. Where Exit Capacity Substitution is applied the Non-Incremental Obligated Exit Capacity at the donor NTS Exit Point shall be reduced by the quantity, determined in accordance with this methodology, from the date when Incremental Obligated Exit Capacity is available for use at the recipient NTS Exit Point. In the period prior to this date the substituted capacity will be available to Users at the donor NTS Exit Point, but this will not be "enduring" capacity.

Process

User Applications

24. In accordance with the UNC and the ExCR methodology statement, Users can apply for additional Enduring Annual NTS Exit (Flat) Capacity at the Annual Application Window (July) or via an ad-hoc application. Reservation Parties can reserve capacity via an ARCA. In addition, Users are able to apply for a reduction in its registered Enduring Annual NTS Exit (Flat) Capacity either during the Annual Application Window or in response to an ad-hoc reduction invitation from National Grid.
25. If Users request (or Reservation Parties reserve) additional Enduring Annual NTS Exit (Flat) Capacity at any NTS Exit Point that in aggregate exceeds the level of unsold Obligated Exit Capacity, considering any valid reduction requests, National Grid will undertake the following process for each such NTS Exit Point. Where there is more than one such NTS Exit Point these may be grouped according to their location on the NTS in order to minimise substitution analysis requirements, i.e. NTS Exit Points generating the requirement for similar investment projects can be grouped together. For each group or individual NTS Exit Point the process described below under "Substitution Analysis" will be repeated by iteration to identify the optimum Non-incremental Obligated Exit Capacity decreases to maximise the reduction in required investment. The objective is, therefore, to reduce investment, not to reduce exchange rates (ratio of Non-incremental Obligated Exit Capacity decrease to Incremental Obligated Exit Capacity release avoided)

Recipient NTS Exit Point Order

26. Subject to paragraph 25, where Exit Capacity applications result in a requirement for National Grid to release Incremental Obligated Exit Capacity at more than one NTS Exit Point, analysis of substitution opportunities will commence by considering recipient NTS Exit Points with no Revenue Driver⁷ ("RD"), (see Special Condition 5G Part D of the Licence), followed by the NTS Exit Point with the highest RD.
27. Where there are two or more potential recipient NTS Exit Points with the same RD, either as separate RDs or through grouping, NTS Exit Points will be selected as

⁷ The adjustment to Totex allowances that results from triggering the incremental capacity uncertainty mechanism is more commonly known as the "Revenue Driver".

recipient NTS Exit Points on the basis of best exchange rate from available donor NTS Exit Points.

28. Notwithstanding the objective stated in paragraph 25, NTS Exit Points which have no RD⁸ will be considered before those with a RD because only Incremental Exit Capacity made available through release of Funded Incremental Obligated Exit Capacity (i.e. where investment is needed) receive additional funding. Hence the process minimises the quantity of Incremental Obligated Exit Capacity at NTS Exit Points without an agreed level of funding by maximising Exit Capacity Substitution to these NTS Exit Points. Continuing the process by selecting the NTS Exit Point with the highest RD, i.e. the NTS Exit Point expected to require the most investment, will maximise the avoided investment that can be achieved through the first substitution opportunities considered. However, any residual investment will be in respect of a greater number of smaller NTS Exit Points.

Donor NTS Exit Point Order

29. Substitution from notional exit points created as a result of Exit Capacity Revision shall be considered before substitution from NTS Exit Points.
30. Substitutions from individual donor NTS Exit Points will commence by reducing the capacity at the most favourable NTS Exit Point that has Substitutable Capacity. The most favourable NTS Exit Point will normally be the furthest downstream NTS Exit Point from the recipient NTS Exit Point as measured by pipeline distance. The furthest downstream is selected as it is assumed to provide the lowest exchange rate so should result in the most efficient outcome.
31. Due to the complexity of the NTS and the range of supply/demand scenarios assessed as part of the substitution analysis, it may not always be apparent:
- which NTS Exit Point is the furthest downstream. In order to simplify analysis, potential donor NTS Exit Points on the same pipeline as the recipient NTS Exit Point will be considered before those on adjacent connected pipelines; or
 - whether NTS Exit Points are downstream or upstream of the recipient NTS Exit Point. This will be determined by network analysis at each stage of the substitution process, e.g. an NTS Exit Point may move from being upstream to downstream as a result of substitution of capacity at a previous donor NTS Exit Point.

To provide an indication of the relative position of NTS Exit Points the diagrams in Annex 1 have been produced. These show the direction of gas flow in the NTS for each LDZ under typical high demand conditions, i.e. the supply / demand scenario used to determine NTS Transmission Transportation Charges. This scenario is not necessarily representative of the supply / demand scenario that will be used for substitution analysis.

32. Potential donor NTS Exit Points shall be ignored where they are too far downstream (or upstream) to provide a benefit to the recipient NTS Exit Point. This will be determined by the application of the exchange rate cap (see paragraph 37)
33. In the event of two or more potential donor NTS Exit Points being an equal distance from the recipient NTS Exit Point then the donor NTS Exit Point providing the lowest calculated exchange rate will be selected. In the event that exchange rates are

⁸ In accordance with the ExCR methodology statement National Grid may reject an application for capacity at an NTS Exit Point for which a revenue driver has not been included in the Licence.

equal, capacity shall be reduced at each relevant donor NTS Exit Point, in proportion to the available Substitutable Capacity at each of these donor NTS Exit Points.

34. Where there is insufficient capacity at the first donor NTS Exit Point to fully satisfy the Incremental Exit Capacity required at the recipient NTS Exit Point the quantity of capacity that can be substituted will be substituted and further donor NTS Exit Points will be considered:
 - in accordance with paragraphs 29 to 33; then
 - upstream of the recipient NTS Exit Point, starting with the nearest and extending upstream until either a compressor or beach ASEP is reached.
35. Upstream donor NTS Exit Points will be selected on the same basis of, pipeline, pipeline distance, exchange rate, then pro-rating, as for downstream donor NTS Exit Points.
36. When considering the second, and subsequent, donor NTS Exit Points consideration shall be given to possible changes in gas flow direction as a result of substitutions already identified. This may change the sequence of potential donor NTS Exit Points.
37. The exchange rate for each donor / recipient NTS Exit Point pairing shall be determined. Where this exceeds 3:1 the substitution, or part thereof, shall not be permitted. Substitution at 3:1 and below will be made to the extent⁹ that this is possible. As subsequent donor NTS Exit Points, for that recipient NTS Exit Point, are unlikely to be possible at less than or equal to 3:1 further analysis will not be necessary except to verify that this is the case.
38. Subject to the above criteria and the objective to reduce necessary investment, donor NTS Exit Points shall be selected in the sequence:
 - Notional exit points¹⁰;
 - Downstream NTS Exit Points on the same feeder;
 - Downstream NTS Exit Points on adjacent connected feeders;
 - Upstream NTS Exit Points on the same feeder;
 - Upstream NTS Exit Points on adjacent connected feeders.

Investment Analysis

39. For each recipient NTS Exit Point, National Grid will carry out network analysis to identify a network model (the “enhanced network”) that meets existing obligations. This analysis shall be undertaken consistent with the process outlined in (paragraphs 42 to 45). Substitution and investment proposals to satisfy requests for Incremental Exit Capacity shall be incremental to this base network.
40. For any NTS Exit Point at which all Incremental Exit Capacity requests can be met without undertaking NTS investment¹¹ (and/or giving rise to increased operational costs), i.e. within the capability of the enhanced network, National Grid will propose the release of Incremental Obligated Exit Capacity consistent with the new aggregate level of capacity allocations. Where such requests cannot be met without investment (and/or giving rise to increased operational costs), National Grid will investigate exit capacity substitution opportunities.

⁹ Assuming partial substitution is allowed.

¹⁰ As defined in Chapter 3.

¹¹ Or contractual alternative.

41. Potential capacity substitutions shall be validated through network analysis. The objective shall be to avoid incremental increase in risk. Hence National Grid will not propose capacity substitution where this would result, under planning scenarios, in the capability of the NTS to meet existing obligations being reduced.
42. The Exit Capacity Substitution objective is to minimise investment that would otherwise be required to satisfy demand for Incremental Exit Capacity. Substitution opportunities shall be assessed against criteria defined within the Transmission Planning Code which is the basis for National Grid's investment decisions. This shall include existing commitments, including NTS Exit (Flat) Capacity, NTS Exit (Flexibility) Capacity and Assured Offtake Pressures (as defined in UNC), on the network. Substitutions shall not be accepted if this reduces National Grid's ability to deliver its existing commitments. These commitments will be taken from regulatory and commercial agreements and statutory instruments and are additional to the conditions set out in the National Grid annual planning procedures.
43. The supply and demand scenarios used for the analysis will be consistent with the Transmission Planning Code a copy of which can be found on the National Grid website at: <http://www.nationalgrid.com/uk/Gas/TYS/TPC/>.
44. The analysis shall primarily be undertaken at high demand levels. Ideally the flow at all NTS Exit Points should be set at the obligated level. However, this would be impracticable because to do so would result in total exit flow being much greater than previously experienced peak demand and available entry supplies. Hence, normally flows at NTS Exit Points shall be set:
 - for NTS Exit Points that have a reasonable probability of being donor NTS Exit Points,¹² at the Obligated Exit Capacity level; and
 - for all other NTS Exit Points, to the appropriate level for the demand condition, but no lower than the sold capacity level.
45. Where the process outlined in paragraph 44 is inconsistent with the scenario being assessed, e.g:
 - at off-peak¹³ demand levels; and
 - in consideration of NTS Exit Points, such as storage sites, not expected to normally off-take gas at peak demand levels,supply and demand flows shall be adjusted consistent with analysis for the determination of revenue drivers, and, where appropriate, off-peak load behaviour. Any adjustment shall be consistent with the capacity objectives stated in paragraph 11.

Substitution Analysis

46. The substitution analysis will be assessed in accordance with the physical capability of the enhanced network including that of the recipient NTS Exit Point local infrastructure. For example, where physical limits exist on the maximum flows that may be achieved at an NTS Exit Point, no substitution that could take flows above this physical maximum will be allowed.

¹² This would include NTS Exit Points that have a high degree of interactivity with, and those located downstream of, the recipient NTS Exit Point. Hence, in order to ensure a supply / demand match, these points will be determined individually for each recipient NTS Exit Point.

¹³ For the avoidance of doubt, in this paragraph "off-peak" refers to gas demand at levels below peak requirement and should not be confused with Off-peak Daily NTS Exit (Flat) Capacity.

47. Where an application is received for capacity at an NTS Exit Point that would take the total Exit Capacity allocated, to all Users in aggregate, no higher than the quantity of the Obligated Exit Capacity at that NTS Exit Point, this application will be satisfied by utilising existing system capability determined after consideration of any accepted reduction requests. Capacity substitution and/or funded investment will not be considered as a means to satisfying existing Obligated Exit Capacity obligations.
48. Where an application is received that requires the release of capacity in excess of the Obligated Exit Capacity, i.e. Incremental Obligated Exit Capacity, analysis is undertaken to determine what capacity exchange rate would be required to satisfy the Incremental Exit Capacity requirement without the need for investment. Capacity substitution will be determined by assessing the flow patterns that can be accommodated by the enhanced network; i.e. without increasing the risk of capacity constraint management actions being required.
49. Substitution analysis will commence by increasing the flow (in the assessment scenario) at the recipient NTS Exit Point to the level of the prevailing Obligated Exit Capacity.. This shall be repeated for all NTS Exit Points as identified in paragraph 44.
50. Flow will be adjusted at the least interactive ASEP to maintain a supply / demand balance.
51. Substitution analysis will continue by increasing the flow (in the assessment scenario) at the recipient NTS Exit Point by the level of the required Incremental Obligated Exit Capacity rounded up to the nearest 0.01GWh/d.
52. The Non-incremental Obligated Exit Capacity will be reduced at the donor NTS Exit Point. Where this impacts on flow, rebalancing will be undertaken as in paragraph 50.
53. The Non-incremental Obligated Exit Capacity at the donor NTS Exit Point will progressively be reduced until either:
 - the Incremental Obligated Exit Capacity requirement is satisfied; or
 - all Substitutable Capacity has been substituted; or
 - further capacity cannot be substituted without exceeding an exchange rate of 3:1.
54. After all Substitutable Capacity has been used, any unsatisfied Incremental Obligated Exit Capacity will be considered with the next donor NTS Exit Point. Donor NTS Exit Points will be considered in accordance with paragraphs 29 to 38. Further donor NTS Exit Points will be considered until the criteria in paragraph 53 is satisfied at which point the next recipient NTS Exit Point shall be considered.
55. The reduction step sizes in paragraphs 52 and 53 will be determined by the individual analyst bearing in mind the need to minimise the number of analysis steps and to identify the optimum reduction quantity to satisfy the incremental request, e.g. in respect of a large increment, all the Substitutable Capacity at one or more donor NTS Exit Points may be reduced in one step. The reduction quantity will be a multiple of 0.01GWh/d¹⁴.

¹⁴ 0.01 GWh/d is the lower limit to which network analysis tools can meaningfully be applied.

56. At each stage of the process, e.g. when moving to an additional donor NTS Exit Point the individual donor NTS Exit Point to recipient NTS Exit Point exchange rate will be determined to ensure compliance with the criteria in paragraph 37.
57. Hence all substitutions shall be subject to a limit on the maximum permitted exchange rate of 3:1. The limit specified in paragraph 53 ensures that the cap is maintained. However, to the extent that some capacity can be substituted from a donor NTS Exit Point at, or lower than, 3:1, substitution will be permitted for that quantity of capacity.
58. To validate results, National Grid may consider further donor NTS Exit Points. As donor NTS Exit Points are considered in order of potential benefit to the recipient NTS Exit Point it is unlikely that any subsequent donor NTS Exit Points will satisfy the exchange rate limits.
59. The revised Obligated Exit Capacity and remaining Incremental Obligated Exit Capacity (and hence flows) for all potential capacity substitutions shall be verified by network analysis. Where such analysis is deemed to result in a “failed” network, the flow at the donor NTS Exit Point(s) (and hence the quantity of capacity substituted from the donor NTS Exit Point(s)) shall be adjusted until the network does not fail or there is no more Substitutable Capacity available. In this event the residual investment¹⁵ needed to facilitate the release of the remaining Incremental Obligated Exit Capacity shall be identified. Any such remaining Incremental Obligated Exit Capacity shall be Funded Incremental Obligated Exit Capacity.
60. Where residual investment is identified and the associated cost of this investment is not, in National Grid’s sole estimation, adequately covered by the return on such investment, potential capacity substitutions will be adjusted. The most economic solution will be proposed taking into account minimum economic investment and substitution quantities.
61. Scenarios where National Grid may regard the return on investment to be inadequate will include, but not be limited to, where the residual investment:
- is for a small quantity requiring investment below economic pipeline sizes;
 - is for a quantity requiring investment at non-standard pipeline/infrastructure sizes or to unsatisfactory connection points to the existing NTS.
62. Where paragraph 60 applies potential substitutions shall be disregarded to the extent necessary to avoid sub-optimal investment and/or partial substitution where a satisfactory revenue driver has not been approved by the Authority and included in the Licence for the residual investment.
63. The appropriate level and combinations of substitution and investment (considering all potential Incremental Obligated Exit Capacity releases) will be confirmed by network analysis. This will be achieved by updating the network model for the revised, post-substitution, Non-incremental Obligated Exit Capacity and Funded Incremental Obligated Exit Capacity levels and residual investment. The final step in the substitution analysis that was undertaken shall be reversed, by 0.01GWh/d, (i.e. by increasing the Obligated Exit Capacity at the relevant donor NTS Exit Point and where this impacts on flow, rebalancing will be undertaken) and this shall be validated through network analysis.

¹⁵ Residual investment is the investment remaining (if any) after all substitution opportunities have been exhausted in accordance with Exit Capacity Substitution. National Grid may consider alternatives to investment.

- If the network fails, e.g. network pressures or plant operating conditions cannot be maintained then the proposed substitutions are deemed to be appropriate.
 - If the network passes further 0.01GWh/d increments shall be added to the donor NTS Exit Point flow until the network fails and the cut-off point is identified. Substitutions shall be proposed consistent with the last network model that did not fail.
64. A final adjustment shall be made to the quantities substituted to correct for rounding up the quantity at the recipient NTS Exit Point in paragraph 51. The quantity substituted shall be reduced to the actual level of the Incremental Obligated Exit Capacity to be released. The quantity substituted from the last (and if necessary earlier) donor NTS Exit Point shall be reduced using the exchange rate determined through the substitution analysis.

Partial Substitution

65. The process detailed above can result in the requirement for residual investment. This residual investment will be necessary in respect of the release of Incremental Obligated Exit Capacity at one or more NTS Exit Points and is classified as Funded Incremental Obligated Exit Capacity.
66. National Grid will expect to be funded in respect of the release of Funded Incremental Obligated Exit Capacity and this will normally be achieved through the application of revenue drivers.
67. Where the residual investment relates, in part or whole, to less than the whole quantity of Incremental Obligated Exit Capacity required at an NTS Exit Point and a satisfactory revenue driver has not been approved by the Authority and included in the Licence¹⁶ prior to the relevant capacity application then the final step(s) of the substitution analysis shall be reversed. These reversal of substitution proposals shall extend until the level of residual investment is sufficient to meet the whole quantity of Incremental Obligated Exit Capacity required at one or more NTS Exit Points. This means that substitution will not be permitted where the whole quantity of Incremental Obligated Exit Capacity required at an NTS Exit Point cannot be met fully by substitution, i.e. partial substitution / partial investment for a single NTS Exit Point will only be permitted where a revenue driver has been agreed and is stated in the Licence for that NTS Exit Point for the incremental capacity required to be met through partial investment.
68. For the avoidance of doubt, where residual investment relates to the whole quantity of Incremental Obligated Exit Capacity required at an NTS Exit Point and a satisfactory revenue driver has not been approved by the Authority and included in the Licence prior to the relevant capacity application National Grid reserves the right (in accordance with Part B paragraph 37 of the ExCR methodology statement version 8.3) to reject that application.

Analysis Output

69. On completion of the above analysis the effects of the exit capacity applications and accepted exit capacity substitutions will be reviewed. Where National Grid considers that an accepted substitution is inappropriate, e.g. the proposed reduction in Non-incremental Obligated Exit Capacity at an NTS Exit Point would create difficulties for

¹⁶ An agreed (between National Grid and the Authority) methodology for the determination of partial revenue drivers will constitute "a satisfactory revenue driver".

the downstream operator to meet their statutory and / or regulatory obligations, National Grid will discuss with the Authority whether:

- such accepted substitutions should be reversed (notwithstanding that they were determined by following the approved methodology);
- the level of residual investment increased (consistent with the other provisions of this chapter) accordingly; and
- the accepted substitution excluded from National Grid's proposals.

70. On completion of the above analysis (and any adjustments pursuant to paragraph 69) the effects of the exit capacity applications and accepted Exit Capacity Substitutions will be recorded and proposed to the Authority. Specifically National Grid shall submit:

- An Exit Capacity notice setting out:
 - the NTS Exit Points where Incremental Obligated Exit Capacity is proposed to be released;
 - The quantity of Incremental Obligated Exit Capacity; and the quantities proposed to be treated as:
 - Funded Incremental Obligated Exit Capacity; and
 - Non-incremental Obligated Exit Capacity
 - The effective date for when the capacity is first made available for use;
 - The NTS Exit Points (which for the purpose of this paragraph shall include notional exit points) to which Exit Capacity Substitution proposals relate;
 - The proposed quantities by which National Grid is proposing the Non-incremental Obligated Exit Capacity shall be increased or decreased as a result of Exit Capacity Substitution; and
 - The effective date(s) where different to that above, plus
 - Any additional information required in accordance with Licence Special Condition 5G(8)

These notices will be placed on National Grid's website at
<http://marketinformation.natgrid.co.uk/Gas/ExitCapacityReports.aspx>

71. The proposed adjustments to Obligated Exit Capacity as a result of Exit Capacity Substitution will be implemented subject to the Authority not vetoing the proposal in accordance with Special Condition 5G of the Licence. In the event that the proposal is vetoed National Grid will not revise the Obligated Exit Capacity and will undertake such investment as National Grid deems, at its sole discretion, appropriate.

72. In the period following allocation of capacity to Users, and before substitution proposals are approved or vetoed, there will be uncertainty as to the quantity of unsold Exit Capacity available to Users and Reservation Parties via the ad-hoc and ARCA application processes. During this period National Grid will determine such quantities to be unavailable for applicants until a decision has been made by the Authority on National Grid's substitution proposals. The quantity unavailable shall be equal to the quantity proposed to be substituted away from donor NTS Exit Points or likely, in National Grid's opinion, to be included in National Grid's substitution proposals. Except where paragraph 18k applies, ad-hoc and ARCA capacity applications received during this period shall be considered only after capacity at the relevant NTS Exit Point has been confirmed (by National Grid's substitution analysis or by Authority veto of National Grid's substitution proposals) as not being required for substitution.

CHAPTER 3: EXIT CAPACITY REVISION.

Introduction

73. This section explains the approach that National Grid will undertake in order to develop proposals to revise the Licence Baseline Exit Capacity at NTS Exit Points due to investments undertaken on the NTS as a result of the release of Funded Incremental Obligated Entry Capacity.
74. Before application of the Exit Capacity Revision methodology, demand for Incremental Obligated Entry Capacity must be established. This will occur where Users obtain Entry Capacity in excess of the prevailing level of Obligated Entry Capacity through the QSEC auction in accordance with UNC processes and the IECR methodology statement.
75. As exit capability is dependent upon entry gas flows, and not entry capacity bookings, Exit Capacity Revision will be driven by confidence over gas flows rather than release of Entry Capacity and/or commissioning of related infrastructure. Dependent upon the nature of the connected operations at an ASEP, it is unlikely that sufficient confidence can be obtained until gas has flowed against the incremental capacity signalled for two years.
76. Where the release of Incremental Obligated Entry Capacity is satisfied through substitution of entry capacity from one ASEP to another ASEP (see Entry Capacity Substitution methodology statement) National Grid will not apply this Exit Capacity Revision methodology and Licence Baseline Exit Capacity will not be revised, i.e. Exit Capacity Revision will only apply in respect of the release of Funded Incremental Obligated Entry Capacity.
77. In addition, where the release of Incremental Obligated Entry Capacity is satisfied through the release of Funded Incremental Obligated Entry Capacity and National Grid pursues alternatives to investment in new infrastructure, National Grid will not apply this Exit Capacity Revision methodology and Licence Baseline Exit Capacity will not be revised, i.e. Exit Capacity Revision will only apply in respect of the release of Funded Incremental Obligated Entry Capacity where investment in new infrastructure occurs.
78. Following the process described below, National Grid will determine whether, considering its statutory and other obligations, a revision to Licence Baseline Exit Capacity can be justified to the Authority. National Grid will after completion of the process provide to the Authority its proposals for Exit Capacity Revision in the Entry Capacity notice and the Exit Capacity notice.

Process

User Applications

79. In accordance with the UNC and the IECR methodology statement, Users can apply for additional Entry Capacity at the Long Term System Entry Capacity Auction (QSEC auction)
80. If Users request additional NTS Entry Capacity at any ASEP that in aggregate exceeds the existing Obligated Entry Capacity level, and these applications satisfy the user commitment (NPV) test detailed in the IECR methodology statement,

National Grid will undertake the following process for each such ASEP. Where there is more than one such ASEP these may be grouped according to their location on the NTS in order to minimise Exit Capacity Revision analysis requirements.

81. For each group or individual ASEP the process described below under “Revision Analysis” will be repeated to identify the Exit Capacity increases that can be accommodated as a result of the release of Funded Incremental Entry Capacity. The objective is, therefore, to minimise exit driven investment.

Recipient NTS Exit Point

82. National Grid shall create a notional exit point near to the relevant ASEP which shall be the only recipient NTS Exit Point.
83. Where there is an existing NTS Exit Point at an ASEP, the notional exit point shall not be an existing NTS Exit Point.
84. A notional exit point shall be an exit point solely for the purpose of Exit Capacity Revision in accordance with this methodology.
85. Any exit capacity placed at a notional exit point shall be available for Exit Capacity Substitution in respect of future Incremental Obligated Exit Capacity requirements. Substitution from the notional exit point may occur in the same analysis period as capacity is placed at the notional exit point.

Investment Analysis

86. Potential Exit Capacity Revisions shall be validated through network analysis. The objective shall be to reduce investment that would otherwise be required to satisfy demand for Incremental Obligated Exit Capacity whilst avoiding incremental increase in risk.
87. Revision opportunities shall be assessed against criteria defined within the Transmission Planning Code which is the basis for National Grid’s investment decisions. This shall include existing commitments, including NTS Exit (Flat) Capacity, NTS Exit (Flexibility) Capacity and Assured Offtake Pressures (see UNC defined terms), on the network. Revisions shall not be accepted if this puts at risk National Grid’s ability to deliver its existing commitments plus those commitments created as a result of Exit Capacity Revision. These commitments will be taken from regulatory and commercial agreements and statutory instruments and are additional to the conditions set out in the National Grid annual planning procedures.
88. The supply and demand scenarios used for the analysis will be consistent with the Transmission Planning Code. Of primary importance will be the establishment of entry gas flows. A key factor in the establishment of supply / demand scenarios is identification of the range of realistic and reliable gas supply flow rates. In regard to new ASEPs or incremental capacity at existing ASEPs future flows will not be known at the time that the Incremental Entry Capacity is released.

89. The analysis shall primarily be undertaken at high demand levels. Flows shall be set:
- for NTS Exit Points in the vicinity of the relevant ASEP¹⁷, at the Obligated Exit Capacity level ; and
 - for all other NTS Exit Points, to the appropriate level for the demand condition;
 - for the relevant ASEP, at the level demonstrated consistently on days of high demand.

Revision Analysis

90. Where Funded Incremental Obligated Entry Capacity has been released (and in accordance with paragraph 77) analysis is undertaken to determine how much additional Exit Capacity can be released as a result. This means that at an existing ASEP, Exit Capacity Revision will only be applied when consistent flows are established in excess of the Obligated Entry Capacity level before the relevant Incremental Obligated Entry Capacity release. Capacity revision will be determined by assessing the flow patterns that can be accommodated by the NTS; i.e. without increasing the risk of capacity constraint management actions being required.
91. Revision analysis will commence by increasing the flow (in the assessment scenario) at the relevant ASEP to that which National Grid is confident will, in normal circumstances, be delivered on high demand days.
92. Flow will be increased (in the assessment scenario) at all NTS Exit Points that have a high level of interactivity with the relevant ASEP to the level of the prevailing Obligated Exit Capacity.
93. Revision analysis will continue by increasing the flow at the notional NTS exit point by the level of increase as was made at the ASEP (step 91)
94. Where the above steps impact on flow, rebalancing will be undertaken at the least interactive ASEP.
95. Revision analysis in respect of each release of Funded Incremental Obligated Entry Capacity shall be undertaken annually following the July annual application window for Exit Capacity.
96. In respect of a specific release of Funded Incremental Obligated Entry Capacity, the first Exit Capacity Revision analysis shall be undertaken two winters after the commissioning of relevant infrastructure built to support the release of the Funded Incremental Obligated Entry Capacity. This should ensure that certainty of entry flows has been established. However, in the event that consistent flows have not been established the increase in flow in paragraph 91 may be zero (in which case no further analysis is required for that year)
97. In respect of a specific release of Funded Incremental Obligated Entry Capacity, Exit Capacity Revision analysis shall be undertaken annually until the earlier of:
- Demonstration of consistent flows at the Obligated Entry Capacity level and all capacity placed at the notional exit point has been substituted to an NTS Exit Point; or
 - Two years after the initial revision analysis, i.e. three years in total.

¹⁷ i.e. where there is a high degree of interaction between the NTS Exit Point and ASEP.

98. Where Incremental Obligated Entry Capacity has been signalled for release in phases, paragraph 97 shall apply in respect of each phase.
99. In respect of revision analysis undertaken in accordance with paragraph 97 the adjustment in flow at the notional exit point, in accordance with paragraph 93 may be an increase, where consistency of flows is progressively increasing, or a decrease if consistency of flows has declined.

Analysis Output

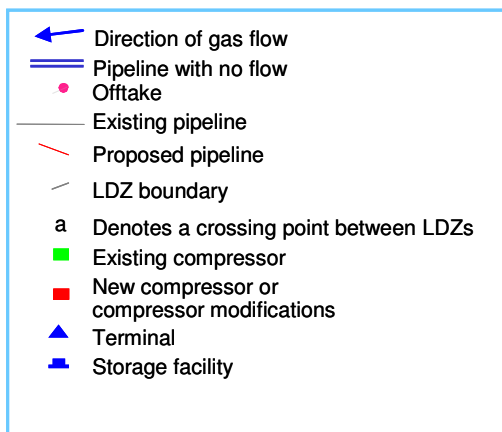
100. On completion of the above analysis the effects of the Exit Capacity applications and accepted Exit Capacity Revisions will be recorded and proposed to the Authority. Specifically National Grid shall submit:
- An Exit Capacity notice as detailed in paragraph 70
 - An Entry Capacity notice setting out:
 - The notional exit points and ASEPs to which Exit Capacity Revision proposals relate;
 - The proposed quantities by which National Grid is proposing the exit capacity shall be adjusted at notional exit point(s)¹⁸ as a result of Exit Capacity Revision; and
 - The effective date(s)
101. Any proposed adjustments to Obligated Exit Capacity as a result of Exit Capacity Substitution from notional exit points (i.e. as a result of Exit Capacity Revision) will be implemented subject to the Authority not vetoing the proposal in accordance with Special Condition 5F and 5G of the Licence. In the event that any of the proposals are vetoed National Grid will not revise the Obligated Exit Capacity (nor place exit capacity at notional exit points) and will undertake such investment as National Grid deems, at its sole discretion, appropriate.
102. In the period following allocation of capacity to Users and before revision proposals are approved or vetoed there will be uncertainty as to the quantity of unsold Exit Capacity available to Users and Reservation Parties via the ad-hoc and ARCA application processes. During this period National Grid will determine such quantities to be withheld from applicants until a decision has been made by the Authority on National Grid's revision proposals. The quantity withheld shall be equal to the proposed substitution quantities, if known, at recipient NTS Exit Points.

¹⁸ Where Exit Capacity Revision leads to increases in the Licence Baseline Exit Capacity at actual NTS Exit Points, this will be included in the notice made pursuant to paragraph 70.

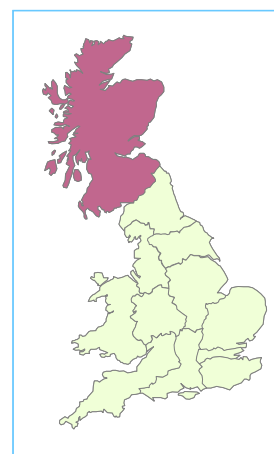
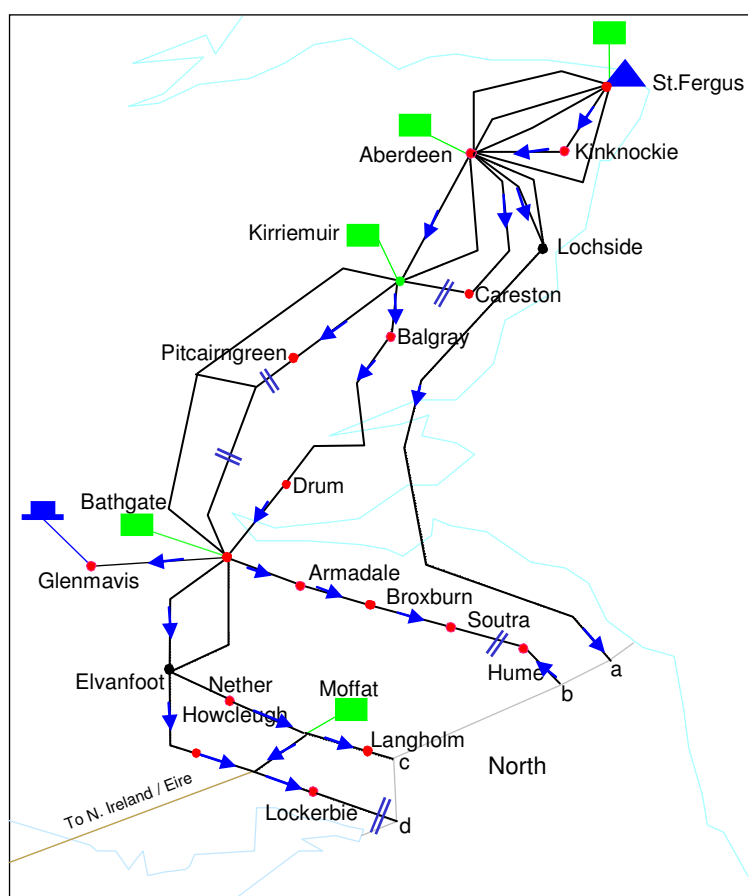
Annex 1: Indicative Gas Flow Direction in the NTS for each LDZ.

Note: The direction of gas flow in the NTS for these diagrams was determined from the gas charging model based on 2015/16 network. Substitution analysis may be undertaken for a range of supply/demand scenarios which could result in different flow patterns. The following diagrams are not definitive and should be used for indicative guidance only.

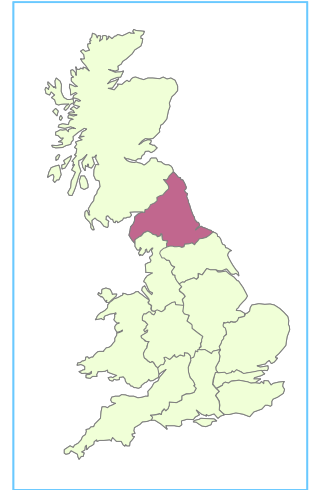
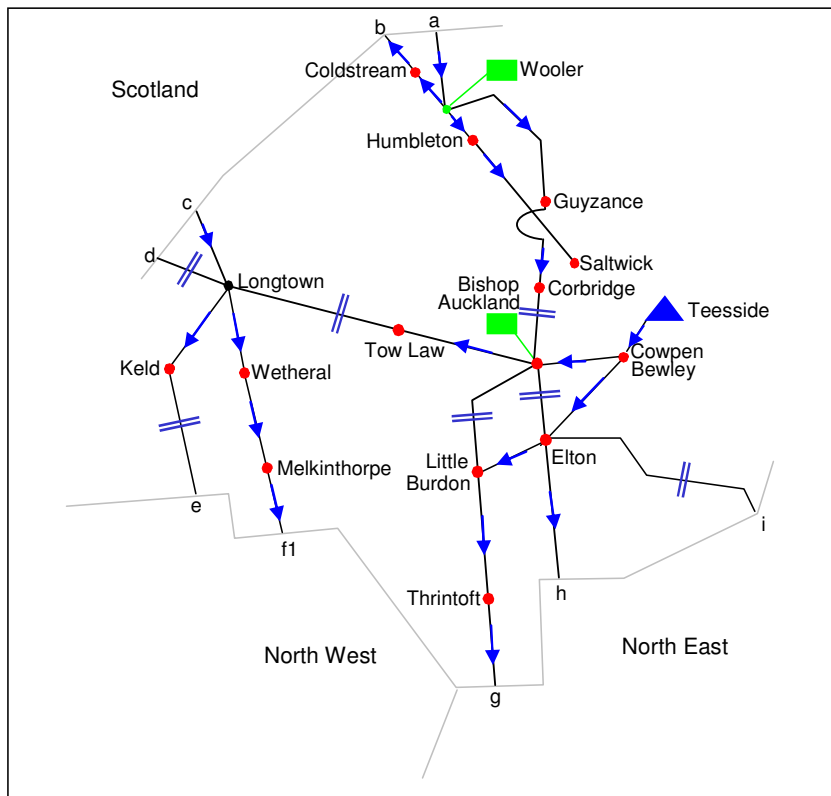
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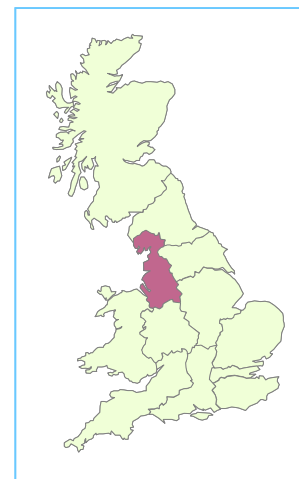
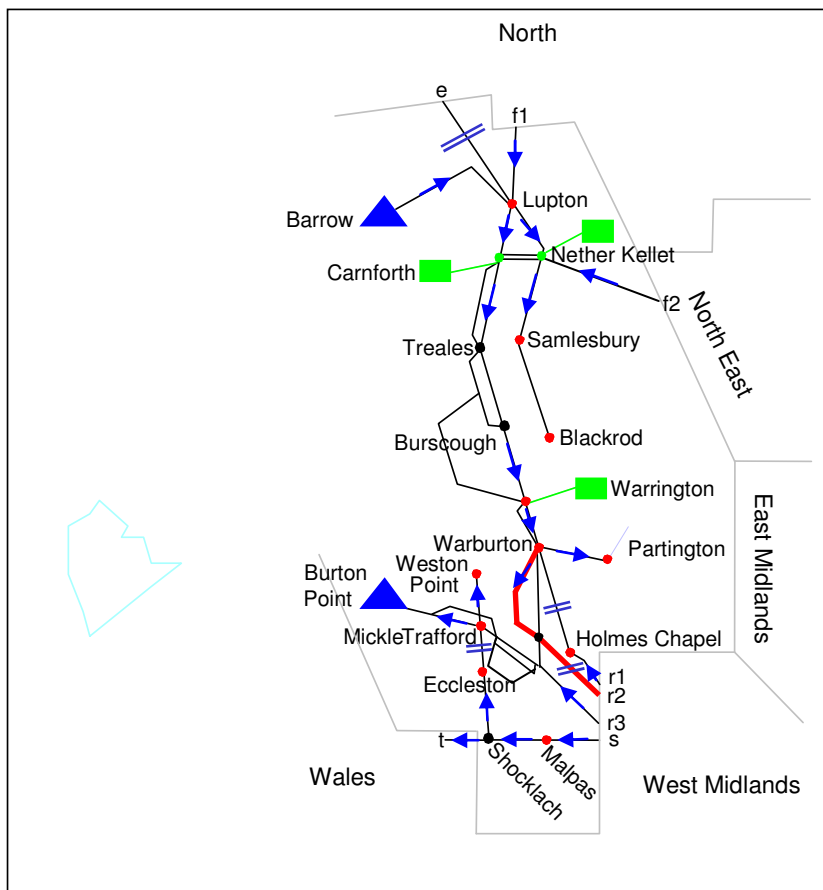
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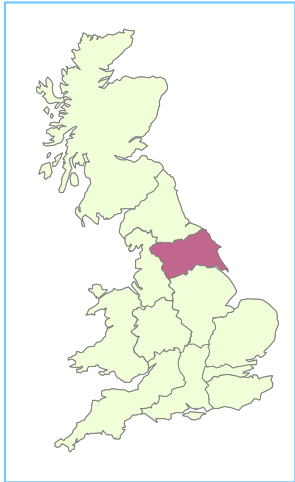
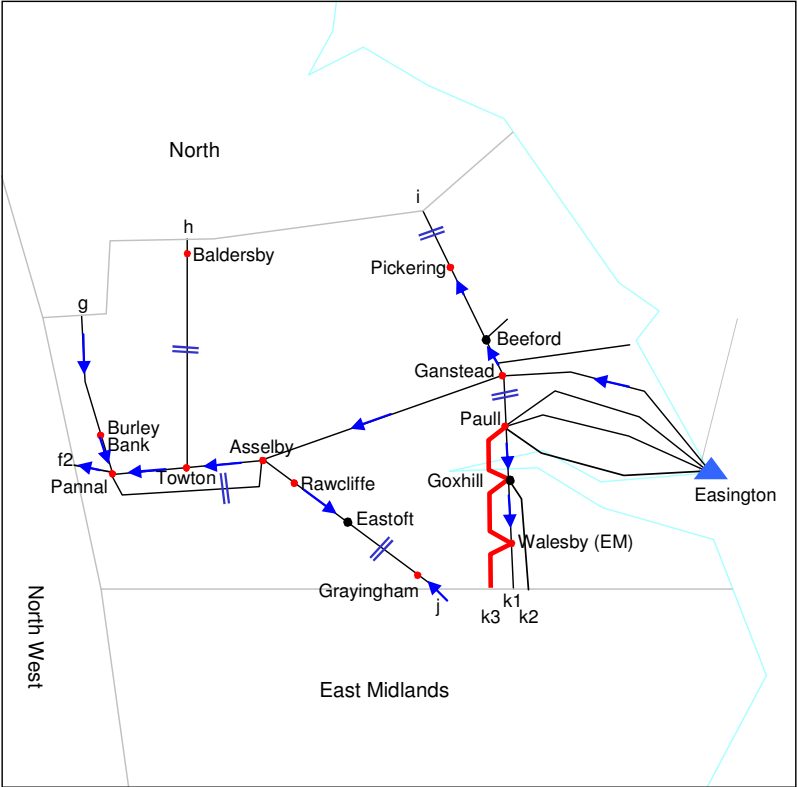
North (NO) – NTS



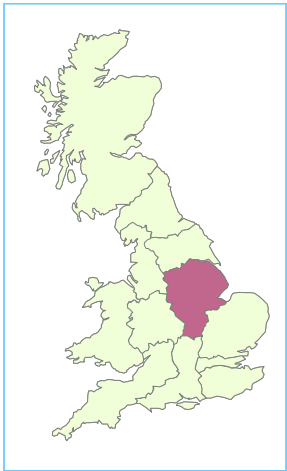
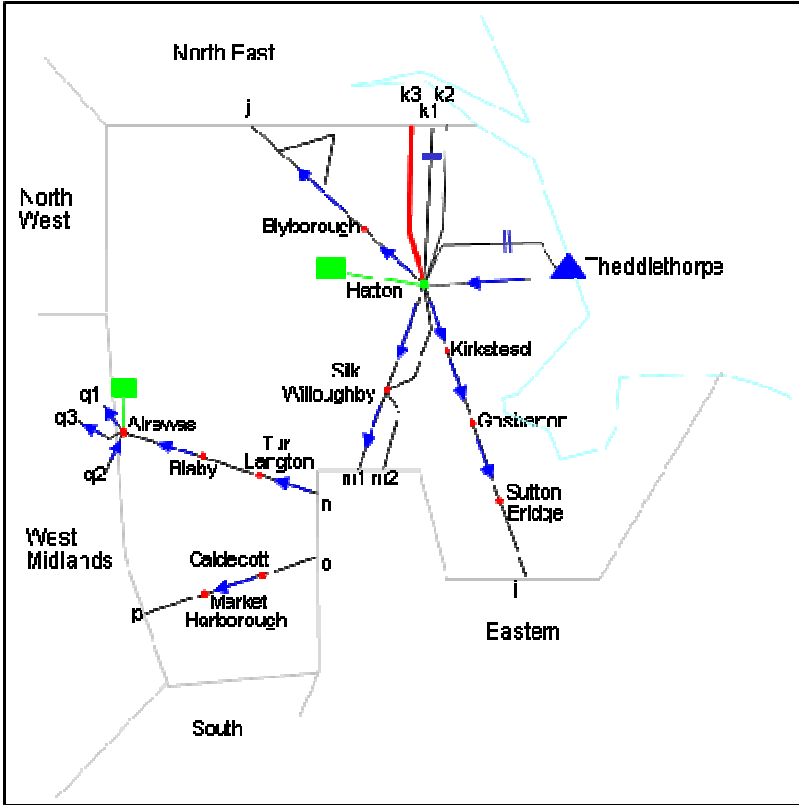
North West (NW) – NTS



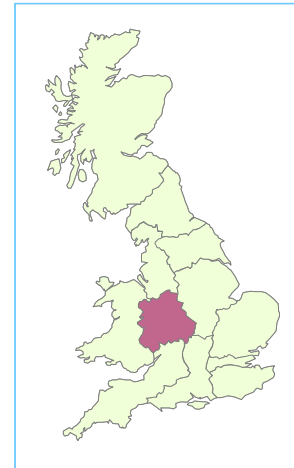
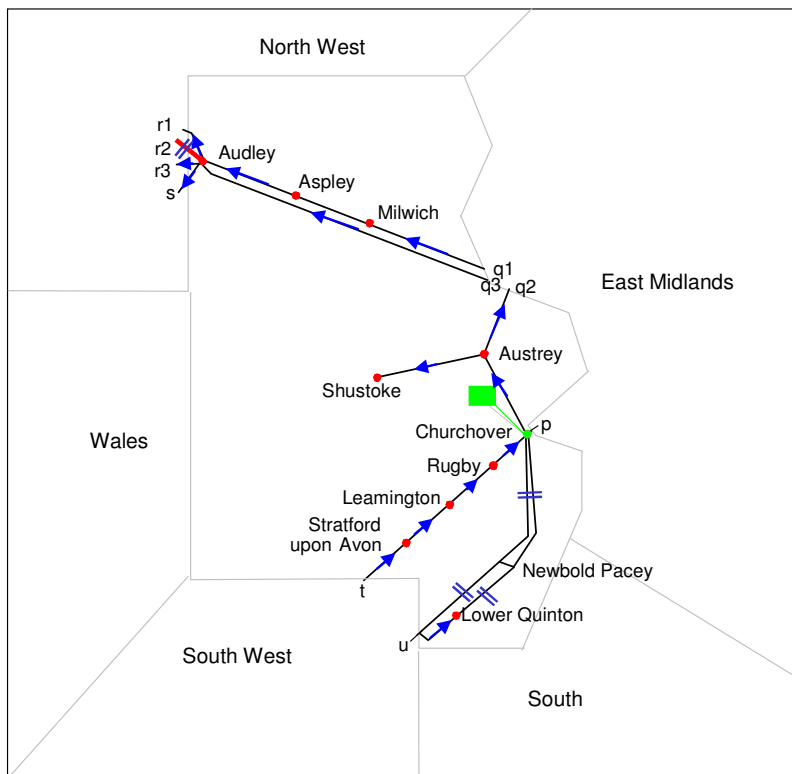
North East (NE) – NTS



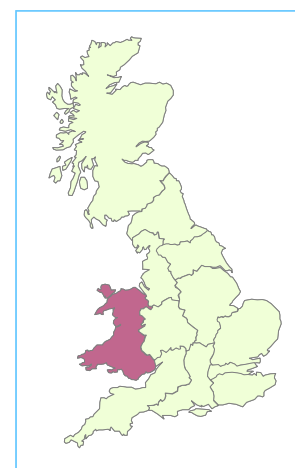
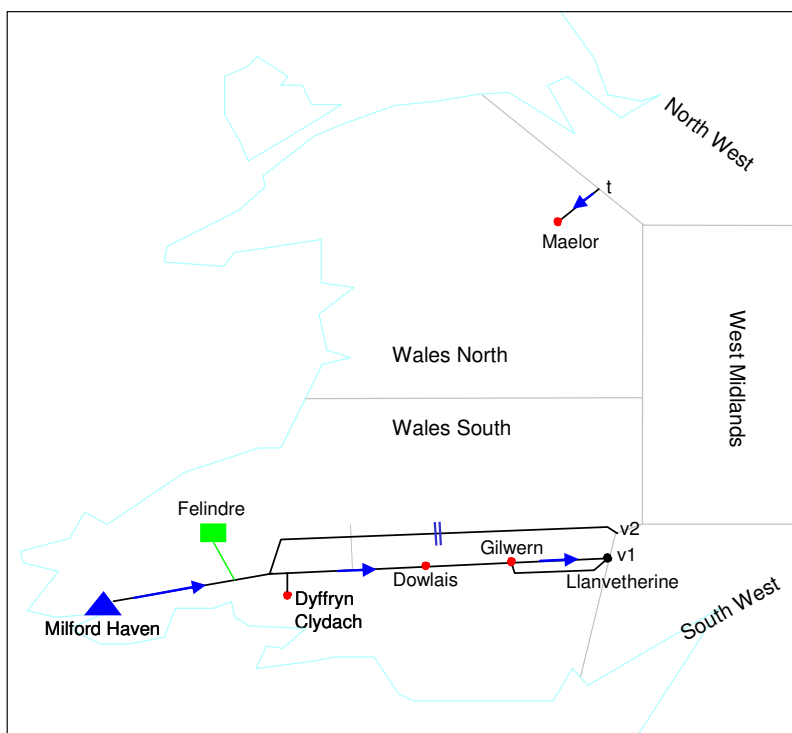
East Midlands (EM) – NTS



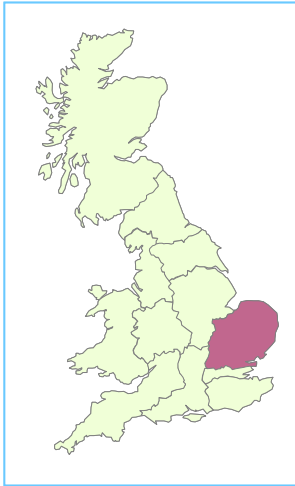
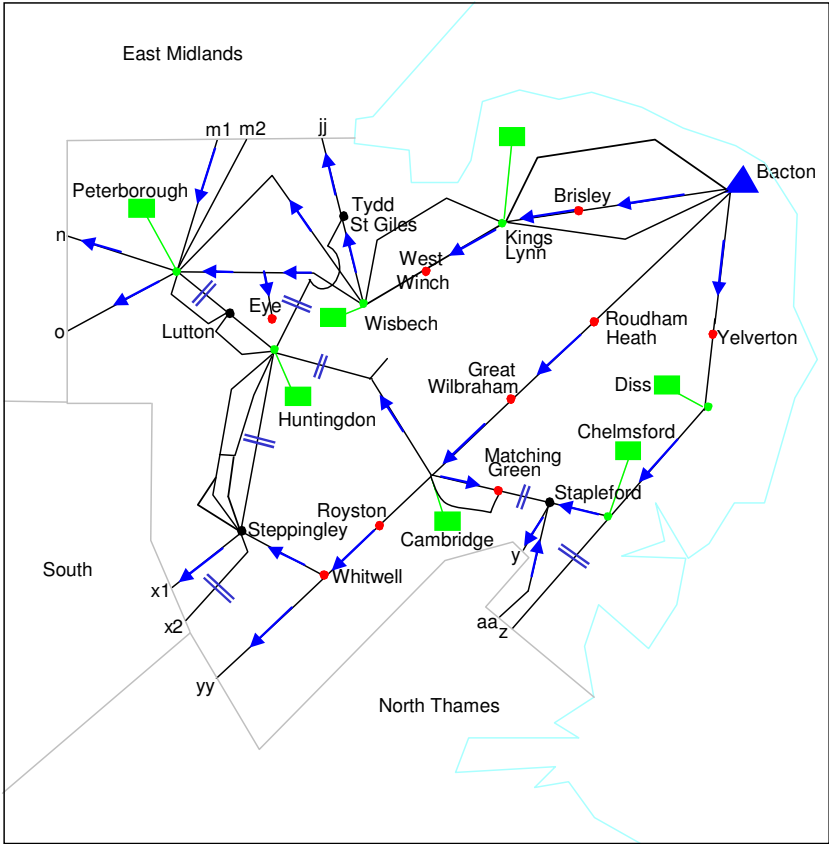
West Midlands (WM) – NTS



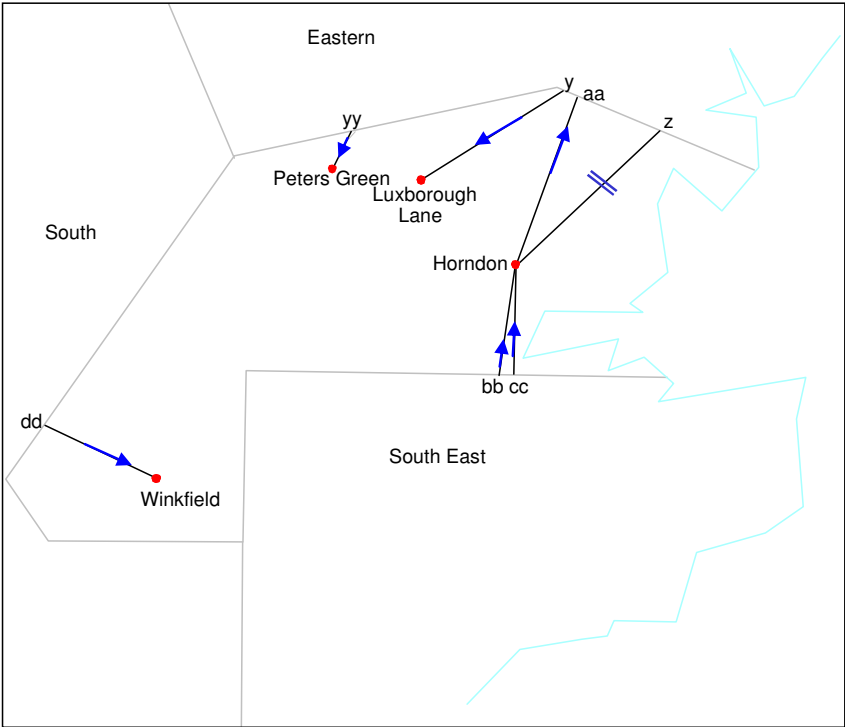
Wales (WN & WS) – NTS



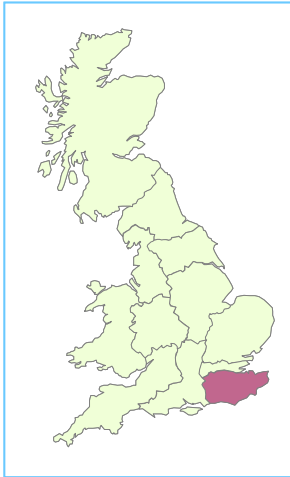
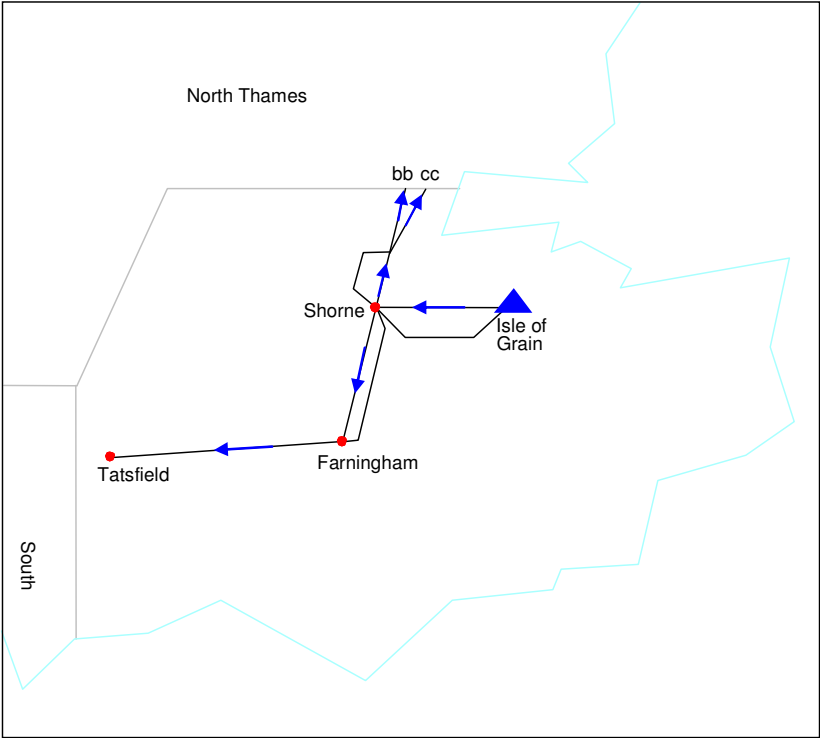
Eastern (EA) – NTS



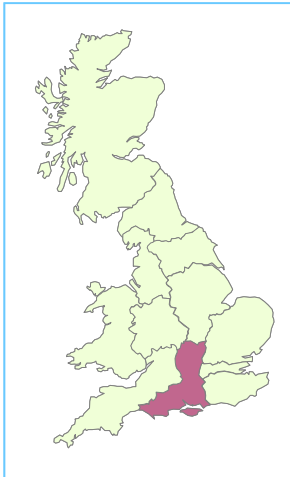
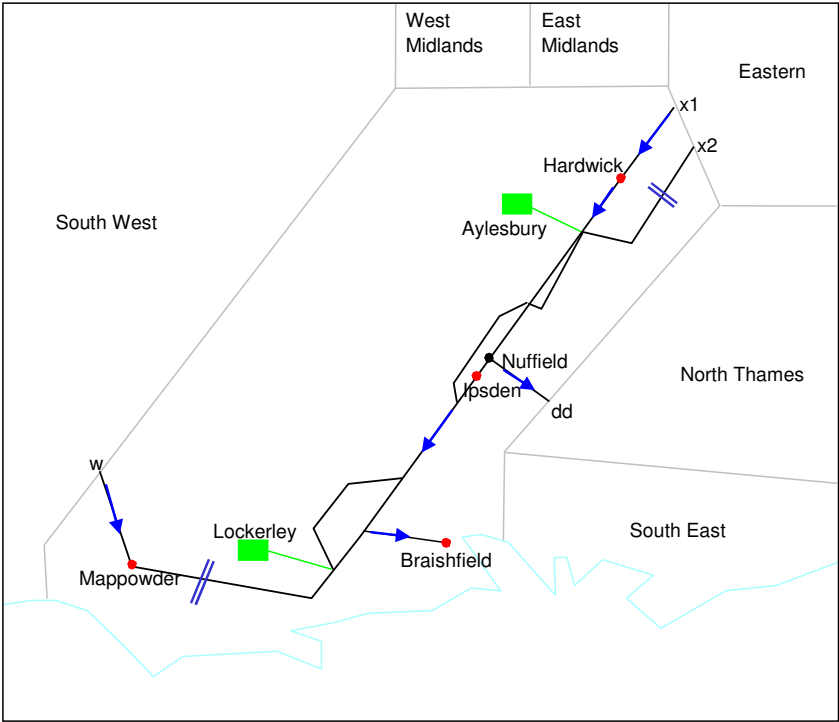
North Thames (NT) – NTS



South East (SE) – NTS



South (SO) – NTS



South West (SW) – NTS

