

STC Amendment Proposal Form

CA023

<p>1. Title of Amendment Proposal Exchange of Best View Investment Planning Data Outside the Boundary of Influence</p>
<p>2. Description of the Proposed Amendment <i>(mandatory field)</i> This amendment proposes changes to Schedule 3 and Schedule 14 of the STC. The changes would allow National Grid to release the full GB Investment Planning models, including the Investment Planning Ranking Orders and Investment Planning network models, to the TOs for the purposes of investment planning.</p>
<p>3. Description of Issue or Defect that Proposed Amendment seeks to Address <i>(mandatory field)</i> As part of the investment planning process it is necessary to transfer investment planning 'best view' generation ranking orders and network models between the TOs and National Grid. Currently this data exchange is restricted to each TO's Boundary of Influence, which has resulted in a hybrid investment planning generation ranking order and network models being created for each TO. The hybrid model contains GB investment planning details within the affected TO's Boundary of Influence and publicly available Seven Year Statement details outside the Boundary of Influence.</p> <p>Whilst producing the hybrid models it has become apparent that the power flows differ significantly from those in the full GB Investment Planning Model. If the hybrid models are used for investment planning decisions, this inconsistency may result in incorrect investment decisions being made and as a consequence over or under investing in the GB Transmission System.</p>
<p>4. Impact on the STC <i>(information should be given where possible)</i> Changes to Schedule 3 paragraph 2.4.2 and the deletion of 2.4.3 are required. Minor changes to paragraph 1 of Schedule 14 are also proposed.</p> <p>Consequential changes to STCP16-1 and STCP22-1 will be necessary.</p>
<p>5. Impact on other frameworks e.g. CUSC, BSC <i>(information should be given where possible)</i> None</p>
<p>6. Impact on Core Industry Documentation <i>(information should be given where possible)</i> None</p>
<p>7. Impact on Computer Systems and Processes used by STC Parties <i>(information should be given where possible)</i> Internal National Grid modelling and data creation process.</p>
<p>8. Details of any Related Modifications to Other Industry Codes <i>(where known)</i> None</p>
<p>9. Justification for Proposed Amendment with Reference to Applicable STC Objectives <i>(mandatory field)</i> Amending the STC in this manner would mean that Transmission Owners would continue to be able to efficiently discharge the obligations imposed on them by transmission licences and the Act. It would allow the development of an efficient, economical and coordinated system of electricity transmission.</p>

Details of Proposer Organisation's Name	National Grid Electricity Transmission plc
Capacity in which the Amendment is being proposed (i.e. STC Party or other Party as designated by the Authority pursuant to STC section B7.2.2.1 (b))	STC Party
Details of Proposer's Representative Name Organisation Telephone Number Email Address	Bec Thornton National Grid Electricity Transmission plc 01926 656386 Bec.Thornton@uk.ngrid.com
Details of Representative's Alternate Name Organisation Telephone Number Email Address	John Zammit-Haber National Grid Electricity Transmission plc 01926 655389 John.Zammir-Haber@uk.ngrid.com
Attachments (Yes/No): Yes If yes, title and number of pages of each attachment: (i) Indicative Legal Text (3 pages) (ii) JPC Evaluation Paper (5 pages)	

Notes:

1. Those wishing to propose an Amendment to the STC should do so by filling in this "Amendment Proposal Form" that is based on the provisions contained in Section 7.2 of the STC.
2. The Committee Secretary will check that the form has been completed, in accordance with the requirements of the STC, prior to submitting it to the Committee. If the Committee Secretary accepts the Amendment Proposal form as complete, then she/he will write back to the Proposer informing them of the reference number for the Amendment Proposal and the date on which the Committee will consider the Proposal. If, in the opinion of the Committee Secretary, the form fails to provide the information required in the STC, then he/she may reject the Proposal. The Committee Secretary will inform the Proposer of the rejection and report the matter to the Committee at their next meeting. The Committee can reverse the Committee Secretary's decision and if this happens the Committee Secretary will inform the Proposer.

The completed form should be returned to:

Lilian Macleod
STC Committee Secretary
Commercial Frameworks
National Grid
National Grid House
Warwick Technology Park
Gallows Hill
Warwick, CV34 6DA

Or via e-mail to: STCTeam@uk.ngrid.com

Changes to STC Legal Text to Facilitate Exchange of “Best View” Investment Planning Data Outside of the Boundary of Influence

Amend Schedule Fourteen, paragraph 1 as follows:

1. Pursuant to Schedule Three, sub-paragraph 2.4.32, NGET may disclose to a Transmission Owner information submitted to or by NGET under Schedule 1 of the Data Registration Code in respect of any User, with the exception of the data items specified in the below extract:

Amend Schedule Three, paragraph 2.4 as follows:

2.4 User Data

2.4.1 A Party may Disclose the following User Data to a Transmission Owner:

- (a) numbering or nomenclature information;
- (b) information which has been made available in accordance with the CUSC to all CUSC Parties (including where such information is made available pursuant to the Grid Code);
- (c) information which has been made available in accordance with the BSC to all BSC Parties; and
- (d) information for the purpose of safety co-ordination including, without limitation, Safety Rules, Site Responsibility Schedules and Local Safety Instructions.

2.4.2 A Party may Disclose to a Transmission Owner:

- (a) where the Disclosing Party is NGET:
 - (i) information submitted to or by NGET under Appendix A to the Planning Code or OC2.4.2.1(a) in respect of any Relevant Unit;
 - ~~(ii) information specified in Schedule Fourteen in respect of any User;~~
 - (iii) NGET's forecast(s) of which Users will be connected to the ~~Receiving Transmission Owner's Transmission System or connected within the Boundary of Influence of such GB~~ Transmission System at any time or times during the current or following six Financial Years;
 - ~~(iv#)~~ NGET's forecast(s) of the Ranking Order for the GB Transmission System, specifying:
 - ~~a. relevant individual Generation Units connected to the Receiving Party's GB~~ Transmission System ~~or~~

~~connected within the Boundary of Influence of such Transmission System; and~~

~~b. relevant aggregations of Generation Units connected outside of the Boundary of Influence of such Transmission System,~~

at any time or times during the current or following six Financial Years;

~~(iv) the Ranking Order of all Generation Units which are Relevant Units and which NGET forecasts will be synchronised at the point in time when Demand on the GB Transmission System is at the forecast minimum in the current and following six Financial Years;~~

(v) the high level results of any economic studies undertaken for the purpose of assessing options for investment planning or Construction Projects, in each case involving the Receiving Transmission Owner, but not including the detailed content or analysis in such studies; and

(b) any changes which the Disclosing Party is planning to undertake to its Transmission System in the current or following six Financial Years and which will materially affect the planning or development ~~of those parts of the Receiving Transmission Owner's Transmission System as are located within the Boundary of Influence of the Disclosing Party's Transmission System.~~

~~2.4.3 Without prejudice to sub-paragraph 2.4.2, a Party may Disclose to a Transmission Owner:~~

~~(a) where the Disclosing Party is NGET:~~

~~(i) information specified in Schedule Fourteen in respect of any User;~~

~~(ii) lists of all Generation Units which NGET forecasts will be synchronised to meet specified levels of Demand on the GB Transmission System in the current and following six Financial Years, including, but not limited to:~~

~~a. the forecast minimum Demand;~~

~~b. 60% of the forecast peak Demand;~~

~~c. the forecast peak Demand; and~~

~~(b) any changes which the Disclosing Party is planning to undertake to its Transmission System in the current or following six Financial Years and~~

~~which will materially affect the planning or development of the Receiving Transmission Owner's Transmission System.~~

2.4.43 A Party may Disclose to a Transmission Owner any information which is submitted to NGET pursuant to OC2.4.1.2.1(a)(i) or OC2.4.1.2.1(e) of the Grid Code, provided that such information relates only to Relevant Units.

2.4.54 A Party may Disclose to a Transmission Owner any part(s) of:

- (a) the Final Generation Outage Programme for Years 3 to 5 agreed pursuant to OC2.4.1.2.1(j) of the Grid Code;
- (b) any updated proposed Generation Outage Programme submitted to NGET under OC2.4.1.2.2(a) of the Grid Code; or
- (c) the revised Final Generation Outage Programme for Year 1 and Year 2 agreed pursuant to OC2.4.1.2.2(i) of the Grid Code,

which relates to outages or proposed outages of Relevant Units.

2.4.65 A Party may Disclose to a Transmission Owner information about outages or proposed outages of Relevant Units submitted to NGET under OC 2.4.1.3.2(a) or (b) and OC 2.4.1.3.3 of the Grid Code.

2.4.76 A Party may Disclose to a Transmission Owner information related to the past or present physical properties, including both actual and designed physical properties, of Plant and Apparatus forming part of any Relevant Units including, but not limited to:

- (a) the voltage of any part of such Plant and Apparatus;
- (b) the electrical current flowing in or over such Plant and Apparatus;
- (c) the configuration of any part of such Plant and Apparatus;
- (d) the temperature of any part of such Plant and Apparatus;
- (e) the pressure of any fluid forming part of such Plant and Apparatus
- (f) the electromagnetic properties of such Plant and Apparatus; and
- (g) the technical specifications, settings or operation of any Protection Systems forming part of such Plant and Apparatus.

2.4.87 NGET may Disclose to a Transmission Owner the Export and Import Limits of a Relevant Unit as part of the implementation of a Local Joint Restoration Plan or De-synchronised Island(s) procedure.

Investment Planning Hybrid Model Creation Proposed STC Changes

Background Information for STC Committee

Background:

As part of the investment planning process it is necessary to transfer investment planning “best view” generation ranking orders and network models between the TOs and National Grid. Future infrastructure investment decisions will be based on results obtained from analysis performed using the models.

Initial concerns about commercially sensitive data being transferred to the Scottish TOs, with affiliated generation, gave rise to late changes to the STC, which restricted the amount of investment planning model data and generation ranking order data to that within each TO's Boundary of Influence (BoI). BoI are defined boundaries outside of which future changes to the system should not affect the TO's network in the short term. It should be noted that the concept of BoI was originally created to restrict the amount of information Scottish TOs received about new applications during the application process (3-6 months) and not for long term investment planning activities.

The application of the BoI restrictions meant that a hybrid investment planning generation ranking order and network models has to be created for each TO. The hybrid model contains GB investment planning details within the affected TO's BoI and publicly available Seven Year Statement (SYS) details outside the BoI.

STC Schedule 3 and STCP 16-1 specify the use of hybrid models for investment planning purposes. STCP 22-1 gives the procedure for creating the hybrid models and their transfer to TOs.

To plan and develop the GB electricity transmission network in an economic and efficient manner National Grid and each of the TOs would need to base their studies on a consistent base model. However, while producing the hybrid models it has been found that power flows in these models differ significantly from those in the full GB Investment Planning Model held by National Grid.

STCP22-1 does not specify that any comparison should be performed between the hybrid models and the full GB Investment Planning Model. In STCP22-1 the only consistency checks specified are those to ensure correct conversion of the model between the National Grid and Scottish TO file formats. Despite this it is felt necessary to verify the hybrid models against the full GB Investment Planning Model to ensure consistent results across the three Licensees.

Hybrid model testing:

To ensure consistent results between hybrid models and the full GB Investment Planning Model a power flow study has been performed on all three models by National Grid and the results from each compared (see Appendix A)

The aim was to ensure that the difference in the power flows from the different models were within the tolerances limits specified in the GB Investment Planning Guidelines. The limits specified that the difference in power flows should be within 3% for boundaries between the Licensees' areas and BoI boundaries and 5% for any circuit in the network.

Considerable effort has been expended trying to improve consistency between the models by scaling generation in the SYS part of the hybrid models to give equal transfers across the major boundaries. By scaling different zones the power flows across different circuits can be varied; however despite this it has been found that it is not possible to bring all circuit flows within the tolerances specified.

Due to not being able to create hybrid models for the TOs that are consistent with the full GB Investment Planning Model in terms of power flows, National Grid has been unwilling to release the models to the TOs for the purposes of investment planning. National Grid believe that if these models were used for investment planning purposes then it would result in the wrong investment decisions being made, either over investing or under investing in the system.

Possible Solutions:

A number of possible solutions exist which would facilitate release of the models to the TOs for the Investment Planning process specified in STCP16-1 to continue. These are outlined below:

1. Relax the tolerances

The tolerances currently specified in the GB Investment Planning Guidelines could be widened to match the differences between the power flows of the different models. The degree to which these tolerances are to be widened will depend on scaling of the different zones and will differ for all the hybrid network models for the different years. The results from the analysis of the hybrid models could be significantly different from those of the full GB Investment Planning model. This would lead to each Licensee producing different network investment requirements that would be difficult to co-ordinate. It could also mean that the TOs could be in breach of the Electricity Act 1989 section 9. This could then lead to National Grid being in breach of its Transmission License section C16 paragraph 1.

2. Revise the Boundary of Influence

The current BoI could be revised so power flows across the major area and BOI boundaries are within the tolerances. This would mean that each TO would see more of the full GB Investment Planning model and the boundaries may need to be moved a significant distance and may reach such an extent that the whole of GB would be covered. Revision of the boundary of influence would require significant study work.

3. Release the full GB Investment Planning Model to the TOs

Instead of using hybrid models National Grid could release the full GB Investment Planning Model to the TOs. This would mean that the base model used by each of the Licensees would be consistent and remove a considerable amount of time taken to create each of the hybrid models. It should also be noted that the full GB Investment Planning network models are already released to the TOs for the purpose of stability analysis. The only additional information the TO would require is the full GB Investment Planning Ranking Order.

Recommendation:

It is the view of the Joint Planning Committee (JPC) that the STC and associated STCPs be revised to allow National Grid to release the full GB Investment Planning models, including the Investment Planning Ranking Orders and Investment Planning network models, to the TOs for the purposes of investment planning.

Based on this recommendation, National Grid, on behalf of the JPC, proposes to submit a STC Amendment Proposal to the STC committee, with the full support of Scottish Power Transmission and Scottish Hydro-Electric Transmission Limited.

Appendix A - Technical Details of hybrid model testing:

METHODS APPLIED:

1. Compare thermal flows (both MW and MVA_r) across nominated major and minor boundaries between the full GB IP dataset and hybrid GB dataset without applying any scaling to the generation.
2. Compare thermal flows across boundaries as (1) with scaling applied to generation to address tolerance issue in (1) – to observe effects on flows cascading across the other boundaries.
3. Compare thermal flows across boundaries as (1) with scaling applied to SYS part of Scottish generation to address tolerance issue in (1) – to observe effects on flows cascading across the other boundaries.
4. Compare thermal flows across inter-connectors between Scotland and England with scaling applied to neighbouring England and Wales generation zones (L to R) to address tolerance issue – to observe effects on flows cascading across the other boundaries.
5. Apply scaling factors to SYS part of Scottish generation and England and Wales generation to match specified generation between the full GB IP dataset and hybrid GB IP dataset.
6. Repeat (5) for various scaling factors by skewing the factors between Scottish generation and England and Wales generation while maintaining the same total specified generation between the full IP and hybrid datasets.

NT: The results of the various comparisons applying the methods above are tabulated in a spreadsheet – sent with this document.

CONSIDERATIONS:

1. Only generation in SYS part of dataset can be scaled.
2. No adjustments can be made to equipments to control/effect the flows (i.e. transformers, compensation equipments etc.).
3. The demands are not a hybrid dataset and the demands as in the full GB IP dataset are used in the hybrid IP dataset.
4. No scaling is applied to imports across external inter-connectors.

RESULT COMPARISONS:

1. Without any scaling being applied to the hybrid datasets, the flows calculated in the major and minor boundaries are outside the required tolerances.
2. Scaling of generation in SYS part of Scottish generation to address the tolerance issue at the boundary between the Scottish TOs further increases the tolerance issue across the SP to NGET boundaries.
3. Scaling of generation in England and Wales local to the Scotland to England inter-connectors to address the tolerance issue across the SP to NGET

boundaries has the effect of increasing the tolerance issue in the SHETL to SP border.

4. Applying a single scaling factor for the SYS part of the hybrid dataset (inclusive Scottish and England and Wales) to obtain the same specified generation for full GB IP and hybrid dataset – the flows across the observed boundaries are outside the tolerances.
5. By applying a different scaling factor for the SYS part of Scottish generation and a different scaling factor for the England and Wales generation to the hybrid dataset (whilst maintaining the specified total generation matched that of the full GB IP model) has improved the tolerance issue. But this still falls outside the required tolerance.
6. By repeating (5) for different scaling factors (scaling in Scotland and England and Wales) will be opposite directions when applied. Various attempts have been made to address the tolerance issues across the boundaries but have not achieved the required tolerance.

CONCLUSIONS:

1. While the attempts is by no means exhaustive, it is clearly extremely time consuming with minimal gain. This effort has been spent on producing a single SHETL hybrid model for only one year (2008).
2. Clearly, the difference in flows is a function of the different network configuration and this would only increase as this difference increases. This problem will only exacerbate towards the later years when the difference in GB generation capacity between the full GB IP dataset and the hybrid IP dataset further widens.
3. Even if this iteration successfully achieves the required tolerance for a hybrid dataset, the same attempt would have to be made on every other hybrid datasets for the remaining years.