

Evaluation of Transmission Impact Product Document

January 2022

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1

Background & Summary

Industry Background

The electricity industry is made up of many parties but the four key parties for this document are;

- **Generators (including Storage)** - Generation is the production of electricity from coal, gas, oil, nuclear, wind and many other sources. For the purposes of this document, storage is also considered as a Generator. A Generator can be connected to either the Transmission Network or a Distribution Network. A Generator connected to the distribution network will be called a 'Distributed Generator' (DG).
- **Transmission Network** - Britain's electricity transmission network transmits high-voltage electricity from where it is produced to where it is needed throughout the country. The system is made up of high voltage equipment that extend across Britain and nearby offshore waters. It is owned and maintained by regional Transmission Owners (TOs), whilst the whole transmission network is operated by a single Electricity System Operator (NGESO).
- **Distribution Network** - Electricity distribution networks carry electricity from the transmission network and Distributed Generators to industrial, commercial and domestic users. There are 14 licensed distribution network operators (DNOs) in Britain and each is responsible for a regional distribution services area. In addition, there are also a number of smaller networks owned and operated by Independent Network Operators (IDNOs). These are located within the areas covered by the DNOs.
- **Electricity System Operator (NGESO)** – The NGESO manages the real-time operation of the Transmission Network by balancing the amount of demand and generation on the Transmission System to ensure that power flows across the network safely and reliably,

The below maps show the areas covered by each TO and DNO.

Transmission Owners



GB System Operator

nationalgridESO



Distribution Network Operators



A point of connection between a distribution network and the transmission network is called a Grid Supply Point (GSP). A DNO will have multiple GSPs across their network providing multiple points of connection between the Distribution and Transmission Networks. Each GSP will have a 'Bilateral Connection Agreement' between NGESO and the DNO that contains the commercial arrangements and technical requirements for the GSP.

A Distributed Generator is a generator who is connected (or planning to connect) to a DNO or IDNO. A connection application by a Distributed Generator will trigger a series of processes which involve all four parties stated above, however the exact process will depend on various factors including the size of the Distributed Generator and the expected location. Changes to the Bilateral Connection Agreement between the NGESO and DNO may also be required as a result of a Distributed Generator's connection to the DNO's network. Before a Distributed Generator can be allowed to connect to the DNO's network, the DNO must consult the NGESO (who will consult all affected TOs) to understand the impact of that Distributed Generator on the Transmission System. This document will provide more information on the impact assessment processes between the NGESO and DNOs. Each generator is given a size classification based on its location and output as per the table below;

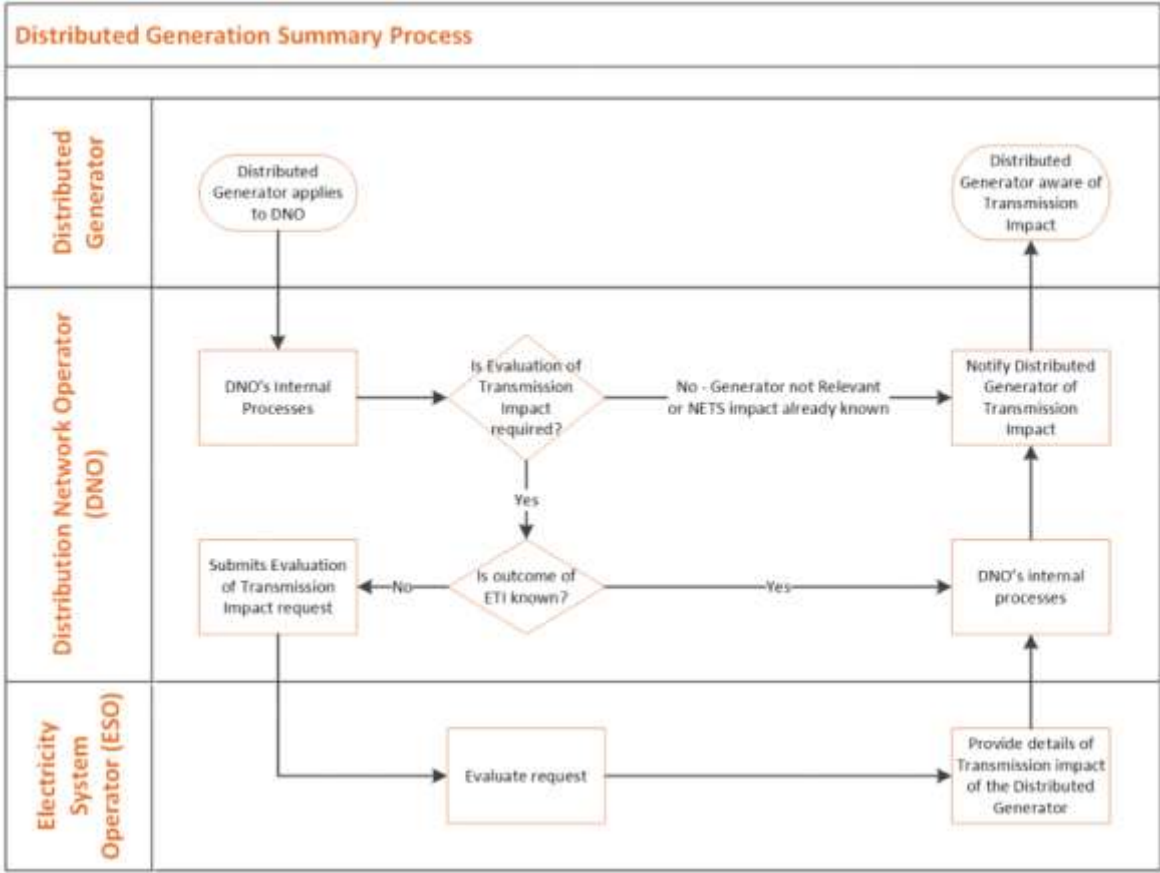
Transmission Owner	Small	Medium	Large
National Grid Electricity Transmission	<50MW	50MW to <100MW	=>100MW
SP Transmission	<30MW		=>30MW
Scottish Hydro Electric Transmission	<10MW		=>10MW

Document & Product Overview

Document Overview

Under section 6.5 of the Connection and Use of System Code (CUSC)¹, Distribution Network Operators (DNOs) have an obligation to not connect Distributed Generators (DG) where they determine the Distributed Generator to be Relevant and may have an impact on the National Electricity Transmission System (NETS). This obligation is managed between the DNO and the Electricity System Operator (NGESO) through an Evaluation of Transmission Impact (ETI).

The below chart provides a summary of how a Distributed Generator would trigger an Evaluation of Transmission Impact.



This document provides visibility and information on the range of products available to a DNO to meet its obligations under CUSC to complete an Evaluation of Transmission Impact. NGESO will publish updates to this document to reflect changes to this range of products as required following consultation with industry. This document also provides a summary of each of these products to assist DNOs in making an informed choice; more information on these products is available by contacting transmissionconnections@nationalgrid.com.

¹ The CUSC is available to view here - <https://www.nationalgridNGESO.com/codes/connection-and-use-system-code-cusc?code-documents>

Product Summary

This section provides a short summary of the products available to a DNO to meet the requirements of an Evaluation of Transmission Impact as well as briefly comparing these products.

Product	Statement of Works & Project Progression	Transmission Impact Assessment (TIA)
Status	Finalised	Finalised
Meets requirements of ETI	Yes	Yes
Applicable CUSC Section	6.5.5	6.5.8
Availability	GB Wide	GB Wide except northern Scotland
Capacity Governing Mechanism	Project Specific	Planning Limit

The Transmission Impact Assessment product is not currently available in Northern Scotland due to concerns on the treatment of large generators and how they cannot use the TIA process. This is a known discrepancy as the TIA is designed to be an alternative to the Statement of Works & Projects Progression product which also restricts large generators from the process due to the need to bilaterally contract with NGESO. Should this change, this document will be updated. NGESO have published a list of Grid Supply Points with ETI thresholds and what product is currently in use, this is available [here](#)².

Interactivity

There are occasions where network companies receive two or more applications for connection which make use of the same part of the network but where not all the applicants can be connected. The resulting connection Offers are referred to as interactive connection Offers and interactivity is the process through which network companies determine which application will be able to connect to the network. Interactivity can occur:

- within the Transmission network
- within a DNO's network (intra-DNO) - which will be managed by the DNO's interactivity processes,
- between DNO networks (inter-DNO) and
- between Distributed and Transmission Generators (both of which will be managed by the NGESO's interactivity processes).

All the products in this document can be affected by interactivity and so NGESO, as well as all DNOs, have processes to manage interactive offers. The Energy Networks Association has published guidance that DNOs and NGESO follow when resolving interactivity, this guidance can be found on the Energy Networks Association website³.

Likely Transmission Impact

The Evaluation of Transmission Impact process, and the associated products in this document, will provide information of the likely effect of a Distributed Generator on the NETS and the requirements

² [\[insert link when created and published\]](#)

³ <https://www.energynetworks.org/assets/images/Resource%20library/ON20-WS2-P3%20Interactivity%20Process%20Guide-PUBLISHED.24.12.2020.pdf>

to mitigate this effect. These requirements could apply to the DNO, the Distributed Generator or both and could consist of site-specific technical conditions and/or reinforcement works. Examples of site-specific technical conditions include;

- Power Factor/Voltage control
- Emergency de-energisation

The exact requirements for a Distributed Generator will not be known until the results of the Evaluation of Transmission Impact process are known and should be discussed with the DNO in the first instance, who will discuss with NGESO if required.

Associated Fees and Methods of Payment

The ETI is subject to a fee payable by the DNO to NGESO to process the ETI; delays in payment will likely result in a delay in the NGESO starting the ETI assessment. The value of this fee is dependent upon various factors and so each chapter has a heading which describes the fees associated with that particular product along with links to our Use of System Charges statement. These fees can be paid for in a variety of ways;

1. Bank transfer before invoice is provided – please contact your DNO and NGESO contact beforehand to ensure the funds are correctly allocated to the invoice once it is created. Payment will be deemed to have taken place when the funds are successfully received.
2. Payment upon invoice – NGESO's standard payment terms are 28 days but this can be reduced if needed to support the DNO's finance processes; invoices can also be sent with or without a Purchase Order from the DNO. Payment will be deemed to have taken place when the funds are cleared in to ESO's bank account.
3. Creation and use of a 'funding pot' – this involves the DNO sending NGESO a lump sum which NGESO will draw down from as and when the DNO makes ETI applications. This is similar to option 1 listed above but avoids the need to transfer funds for individual ETI requests. Please contact your NGESO contact if you would like to set up this method. When payment is deemed to have taken place will depend on if there are sufficient funds to cover the requested works;
 - should the 'funding pot' have sufficient credit in place, the payment will be deemed to have being received with the application (i.e. immediately).
 - Should the 'funding pot' have insufficient funds, payment will be deemed to have taken place when the funds are successfully received.

Details of any payments required to be made by DG to the DNO will be confirmed by the DNO and are out of scope of this document.



A

Statement of Works and Project Progression

Product Description and Applicability

Description

The Statement of Works and Project Progression product consists of two main components and can be used for single or 'bulk' applications of specific Distributed Generators at a GSP;

1. **Statement of Works** – a process to determine **if** a Distributed Generator (or Generators) has a transmission impact. It provides a letter which states a 'yes' or 'no' answer and does not provide detail as to what the impact is or how the impact can be managed.
2. **Confirmation of Project Progression** – a process to determine **what** impact a Distributed Generator (or Generators) has on the transmission network. Project Progression provides details of how the transmission impact can be managed with any associated costs and timescales for delivery provided via a Construction Agreement, or where a technical requirement only, the variation of the existing Bilateral Connection Agreement and associated technical Appendices.

It is possible for the DNO to request a Statement of Works followed by a Project Progression if a NETS impact is identified. The DNO could also progress straight to Project Progression and skip Statement of Works, where the NETS impact of Distributed Generation is expected but not known.

These processes are based on individually named generator(s) and so the Evaluation of Transmission Impact is specific to the stated generator(s) and must be redone for new generators.

Applicability

This product is;

- Available across all Great Britain to all DNOs.
- Only suitable for 'small' or 'medium' sized generators, please see Industry Background section for the size classification table;
 - Small generators can progress through Statement of Works and/or Project Progression.
 - Medium generators must progress through Project Progression (as their impact as a minimum will require contractual and technical Appendices to be updated and so a Statement of Works will always state there is an impact).
 - Large generators will need to apply directly to NGESO for a connection agreement in conjunction with a Modification Application from the relevant DNO.
- More suited to areas with infrequent connection applications as the product is generator specific.

Associated Fees

The fees associated with a DNO's Statement of Works and/or Project Progression applications are dependent on geography. Schedule 12 of The Statement of Use of System Charges provides a range of tables which document these fees, The Statement of Use of System Charges document is available on our website⁴. Please contact your ESO representative or transmissionconnections@nationalgrideso.com for further information.

How to request this product

There are no changes to Bilateral Connection Agreements required to request this product as the requirements are documented directly in section 6.5.5 of the CUSC. A CUSC Exhibit U needs to be submitted by the DNO to the NGESO to request a Statement of Works. A Project Progression

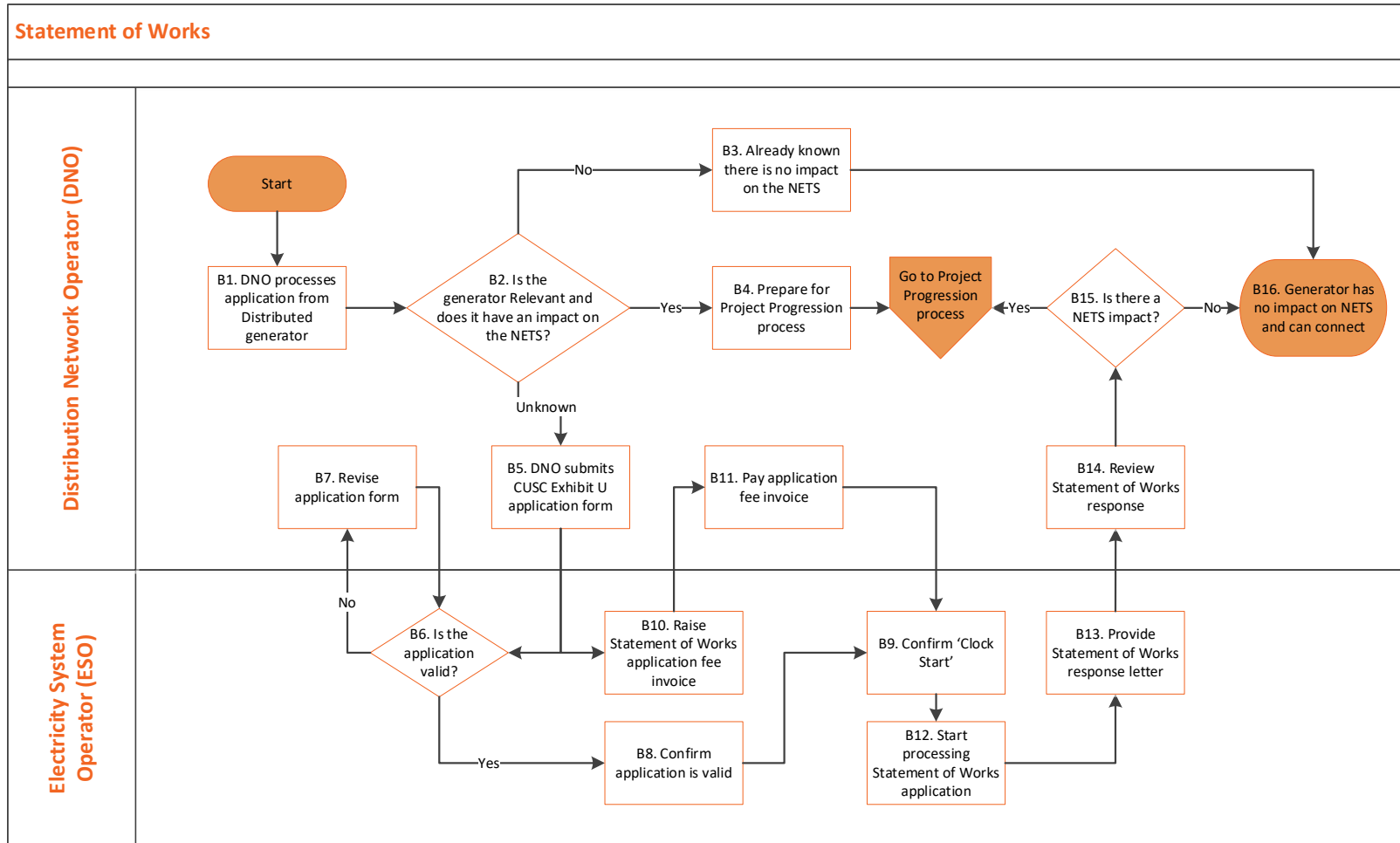
⁴ <https://www.nationalgrideso.com/industry-information/charging/charging-statements>

requires a CUSC Exhibit U, technical data⁵ as well as a 'Confirmation of Project Progression' (a letter from the DNO) to be submitted by the DNO to the NGESO.

⁵ [Insert Link to tech data template that needs to be completed to review Materiality Trigger – same as TIA]

Product Process, Terms and Timescales

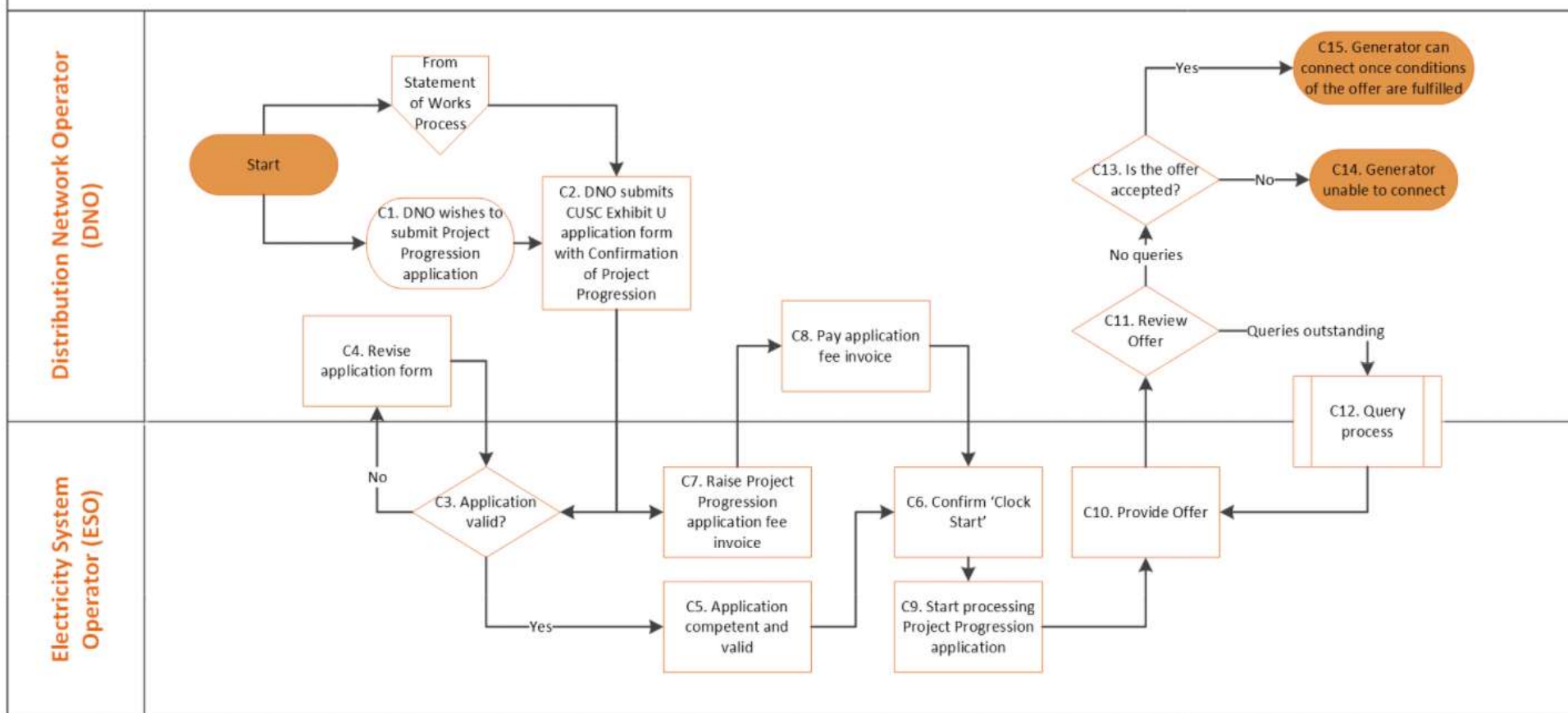
The terms and conditions associated with a Statement of Works and Project Progression are detailed in CUSC section 6.5.5 – there are no additional terms and conditions contained within the Bilateral Connection Agreement. The application form for this product is also available in CUSC as Exhibit U whilst an example Statement of Works response and Confirmation of Project Progression template is available as Exhibit V. The high-level processes for this product are documented below, with the start and end shown in orange. For simplicity, interactions between the Electricity System Operator and Transmission Owner are not shown.



The timescales associated with the Statement of Works process are;

- Reviewing the validity of a Statement of Works application (step B6) is generally 5 business days.
- 28 calendar days from clock start to provision of the Statement of Works (step B9 to B13) response. Clock start shall only occur, when both B8 (application competency) and B11 (payment of application fee) have being completed.
- Once provided, the Statement of Works is valid for 90 business days (from step B14) where an impact is identified, or where no impact the response will state that the process is concluded and the DNO need take no further action.

Project Progression



The timescales associated with the Project Progression process are;

- Reviewing the validity of a Project Progression application (step C3) is generally 5 business days.
- 3 months from clock start to provision of the offer (step C6 to C10). Clock start shall only occur when both C5 (application competency) and C8 (payment of application fee) have being completed.
- Once provided, the offer is valid for 3 months (from step C10) but could possibly be extended if all parties agree.

A nighttime photograph of a city skyline, likely London, featuring the Gherkin building (30 St Mary Axe) prominently in the center. The building is illuminated with warm yellow lights, and its distinctive conical shape is clearly visible. Other skyscrapers are visible in the background, also lit up. In the foreground, a large, dark, multi-story building with a grid-like window pattern is visible. A street with a few cars and pedestrians is visible on the right side of the image. A large, semi-transparent grey circle is overlaid on the bottom left of the image, containing the letter 'B' and the text 'Transmission Impact Assessment'.

B

Transmission Impact Assessment

Product Description and Applicability

Description

The Transmission Impact Assessment product is based on the concept of a Planning Limit that describes the physical capability of part of the transmission network to accommodate generation connections, whether connected directly to the transmission or distribution networks. It creates a framework where information on the capability of the NETS is determined in advance (taking into account the contracted position on both the transmission and distribution networks), allowing complete offers to be accepted by DNOs for DG connections, setting out the transmission impact, within the DNO offer licence timescales. This provides visibility to the DNO of works and/or Site-Specific Technical requirements that are required in order to use the capacity identified for each GSP. The DNO can then allocate and reallocate this capacity to DG on its network in line with documented processes and principles agreed between NGESO and the DNO.

The product consists of three parts;

1. Initial setup of Transmission Impact Assessment where NGESO provides a Planning Limit, a 'Materiality Trigger' point and indicative works.
2. Regular 'Appendix G' updates (normally monthly or as otherwise agreed) from the DNO to the NGESO on the utilisation of the Materiality Trigger.
3. Technical Study Review. The 'Materiality Trigger' set at GSP level require submission of updated technical data⁶ from the DNO to the ESO to facilitate a technical review of the status of the NETS by the ESO. The DNO can submit a technical review request for a GSP at any point (i.e. the DNO does not need to wait for the Materiality Trigger to be fully used to request an uplift/increase) subject to accepting any associated BCA variation or CUSC Offer from the ESO where applicable.

Through this approach, it is possible for the NETS impact of a generator to be known by the DNO and so allow the DNO to proactively manage the Distributed Generation capacity at a specific GSP, whilst ensuring that the NETS capacity remains equally accessible for both distribution and transmission customers.

Materiality Trigger & Planning Limits

The Planning Limit relates to the maximum power export that the NETS can accept (for the avoidance of doubt including export from all currently connected and currently contracted export). Visibility and understanding of the Planning Limit and known transmission constraints provides the DNO with the ability to make offer to Generators (which can then be accepted by the DG) at each GSP, without the need for referral to the ESO. This provides DG customers with certainty of the transmission impact. When the 'Materiality Trigger' is reached the DNO provides updated technical data to the NGESO and continues to make offers under existing limits until NGESO advise of changes or the Planning Limit is reached. Should the DNO reach the Planning Limit, all subsequent offers must become subject to an ETI.

Several different network issues may give rise to a restriction on the generation that can be accommodated without new reinforcement works, and this may require several limits to describe, rather than a single number at a GSP. The Planning Limit that will be made available by the NGESO to the DNO will be the amount that can be provided without triggering additional reinforcement over and above what has already been agreed. In very constrained areas of the network, the headroom between this Planning Limit and Contracted generations' probable peak utilisation may be nothing until reinforcement works are completed to create additional capacity. The amount of capacity created by the reinforcement will be known and contracted with the DNO so that they can provide offers and connections made once the reinforcement works are completed.

Once NGESO and the DNO agree revised contract terms, the Planning Limits and associated NETS works required are updated and the 'Materiality Trigger' is set. As the Planning Limit refers to the

⁶ [\[Insert Link to tech data template that needs to be completed to review Materiality Trigger\]](#)

absolute maximum the NETS can accommodate (without further reinforcement), the Materiality Trigger acts as a checkpoint to monitor progress before the Planning Limit is reached and the safety/security of the NETS is placed at risk.

How and when a DNO assigns, reassigns or manages capacity granted by NGESO to DGs connecting to its network is within the gift of the DNO. For example, the DNO may assign capacity to DGs on application (of the DG to the DNO) or on acceptance (by the DG of the DNO's offer). This does mean the DNO may need to use interactivity and/or queue management processes to assign capacity to DG if the DNO has insufficient capacity for all the offers the DNO has open – please speak to your DNO contact to discuss. The ESO will not approve the data provided by the DNOs (such as how available capacity is assigned) but will review the regular updates to ensure the rules agreed between NGESO and DNOs are followed.

The capacity identified as part of the Planning Limit study is not for the DNO's exclusive use, NGESO will not be able to use or reduce any of the available capacity given to the DNO without first approaching the DNO and triggering an interactivity process. If NGESO triggers interactivity (for example, as a result of connections/disconnections or works on the Transmission network), the DNO will assess if any DG are affected and notify NGESO within 10 working days. If there is no impact on any DG (i.e. there is no interactivity), then the Planning Limits are updated. If there is an impact on any DG, then the interactivity process will be used to determine Transmission/Distribution queue positions.

Example 1 – Update Materiality Trigger

In this example, 4 Distributed Generators apply to a DNO which assigns capacity on acceptance. The time periods are dynamic and so could represent any length of time (hours, days, months etc).

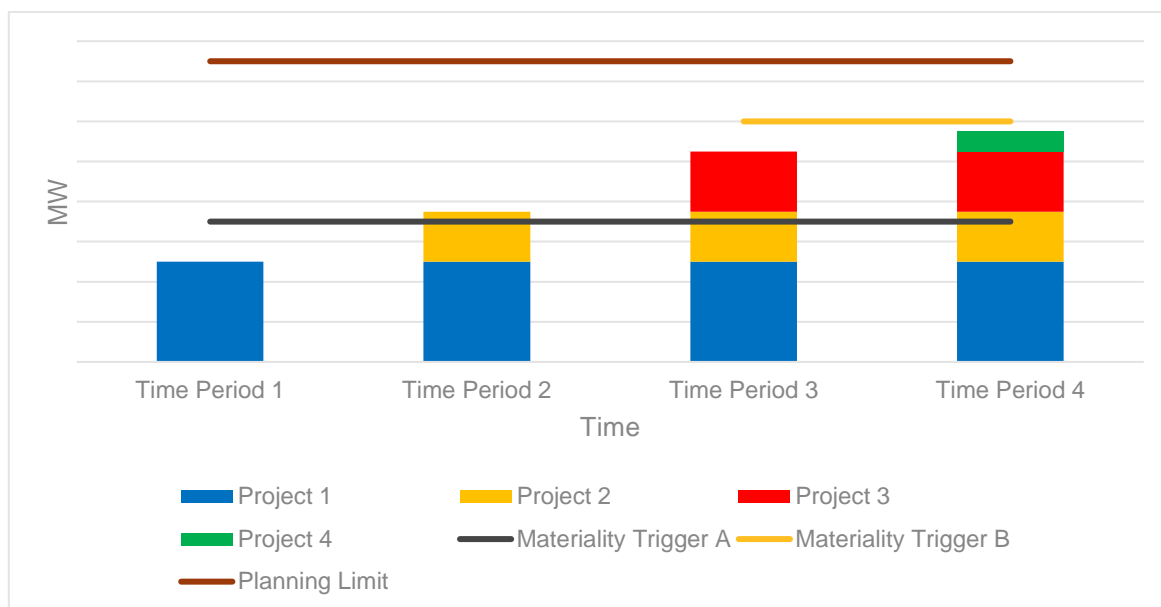
In Time Period 1, the DNO receives an acceptance from Project 1. The NETS impact was known at the time of making the DNO offer and the relevant Site-Specific Technical requirements were included in the DNO offer. Materiality Trigger A has not been reached hence, ESO are notified of Project 1's contracted position via the regular update process.

In Time Period 2, the DNO receives an acceptance from Project 2 whose offer was made in Time Period 1. Although the combined capacities of Project 1 and 2 is greater than Materiality Trigger A, Project 2 is still able to connect under the technical requirements/conditions contained in the DNO offer since the total capacity is still below the Planning Limit. DNO notifies ESO of Project 2's contracted position via the regular update process. Since the Materiality Trigger is breached, a Technical Study Review is triggered hence, the DNO prepares and submits updated technical data to the ESO within a set timeframe to facilitate a technical review of the status of the NETS by the ESO.

In Time Period 3, during the ESO's technical review, the DNO makes an offer to Project 3 based on the known technical requirements/conditions (same as those for Project 1 and 2) and Project 3 subsequently accepts the DNO offer. Although, the ESO technical review is still underway, Project 3 is still able to connect under the technical requirements/conditions contained in the DNO offer since capacity is still below the Planning Limit. The ESO is notified of Project 3's contracted position via the regular update process.

In Time Period 3, the ESO completes their technical review, which shows no change in applicable technical requirements/conditions and notifies the DNO of the new Materiality Trigger B.

In Time Period 4, the DNO makes an offer to Project 4 and subsequently receives an acceptance from Project 4. The DNO notifies the ESO of Project 4's contracted position via the regular update process. As the combined capacities of Projects 1, 2, 3 and 4 are below Materiality Trigger B; no further action is required from the DNO.



The above chart is indicative and for illustrative purposes only

The table below shows when each of the 4 projects will know their Site-Specific Technical requirements/conditions and what they will consist of;

Project	Reinforcement Works	Time Period known
Project 1	None	1
Project 2	None	1
Project 3	None	3
Project 4	None	4

Example 2 – Increase Planning Limit

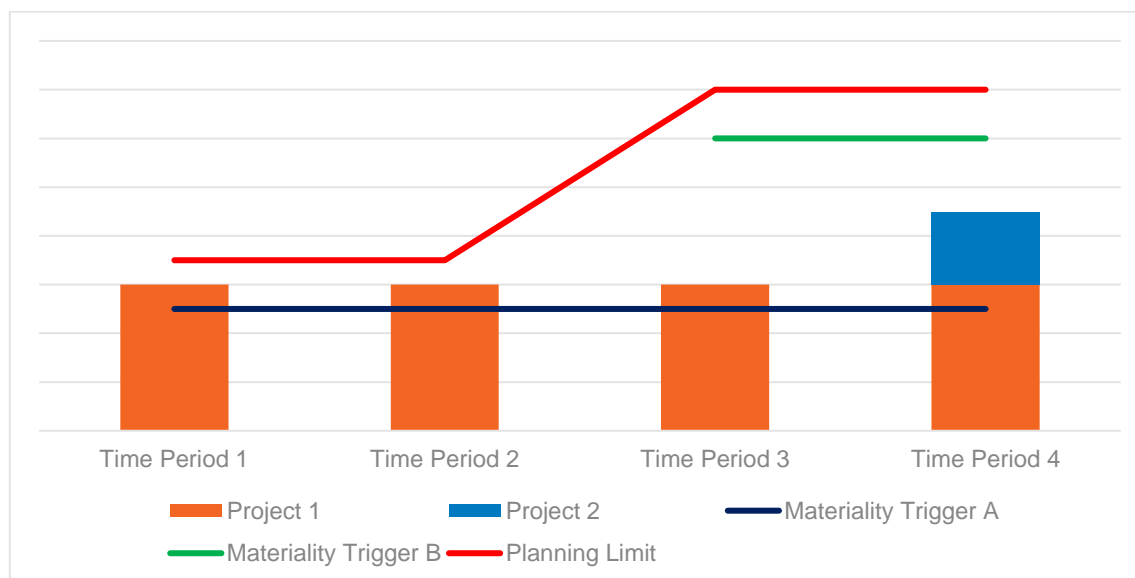
In this second example, 2 Distributed Generators apply to a DNO which assigns capacity on acceptance. The time periods are dynamic and so could represent any length of time (hours, days, months etc).

In Time Period 1, the DNO receives an acceptance which goes beyond the remaining capacity available (Materiality Trigger A) and so the DNO triggers a modification application to revise the Materiality Trigger. As the Materiality Trigger is very close to the Planning Limit, it will not be possible to provide additional capacity without reinforcement works.

In Time Period 2, the DNO, NGESO and relevant Transmission Owner are still working together to find the best reinforcement solution to increase the Planning Limit. During this time, the DNO can still make offers to its customers, and these offers will be subject to the same works as Time Period 1 until NGESO notifies the DNO of the works needed. From this notification, any further offers will be subject to an Evaluation of Transmission Impact.

In Time Period 3, the DNO has agreed to reinforcement works on the transmission system and so the Planning Limit is increased and a new Materiality Trigger value (Materiality Trigger B) is provided. The DNO can now start providing offers to its customers that include these transmission works.

In Time Period 4, the DNO has received an acceptance and begins to use some of the capacity identified by Materiality Trigger B. This project may be subject to reinforcement before it can connect depending on what works were agreed between the DNO, NGESO and the Transmission Owner.



The above chart is indicative and for illustrative purposes only

The table below shows when each of the 2 projects will know their Site-Specific Technical requirements/conditions and what they will consist of;

Project	Reinforcement Works	Time Period known
Project 1	None	1
Project 2	Yes	4

Example 3 – Transmission Application

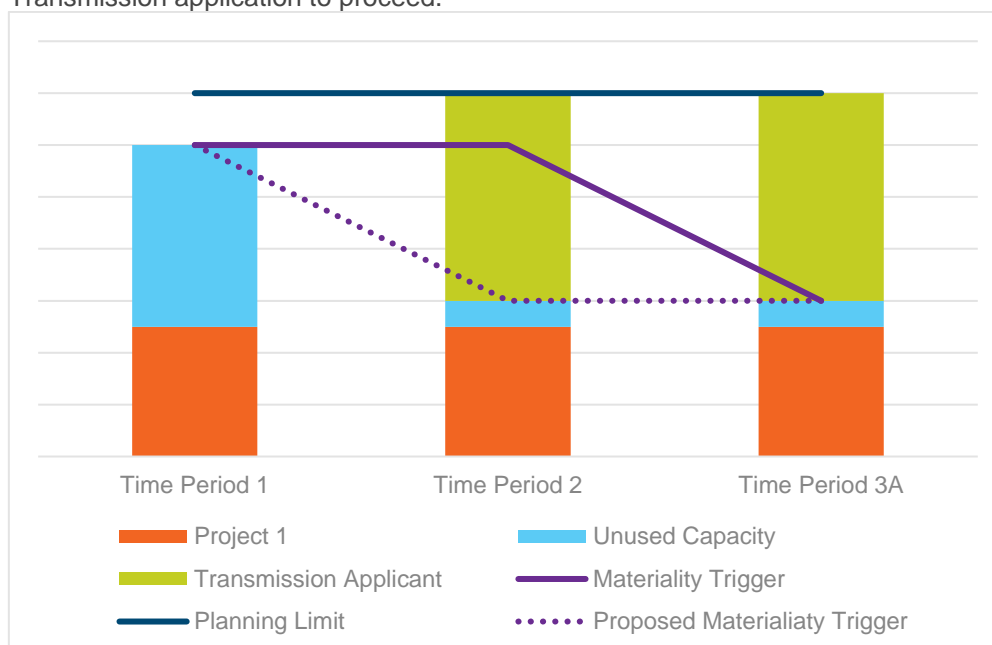
This example describes what would happen in the event of an application to the transmission system that would impact upon the Materiality Trigger provided to a DNO; again the time periods are dynamic and so could represent any length of time (hours, days, months etc).

In Time Period 1, the DNO has an established list of projects and Materiality Trigger

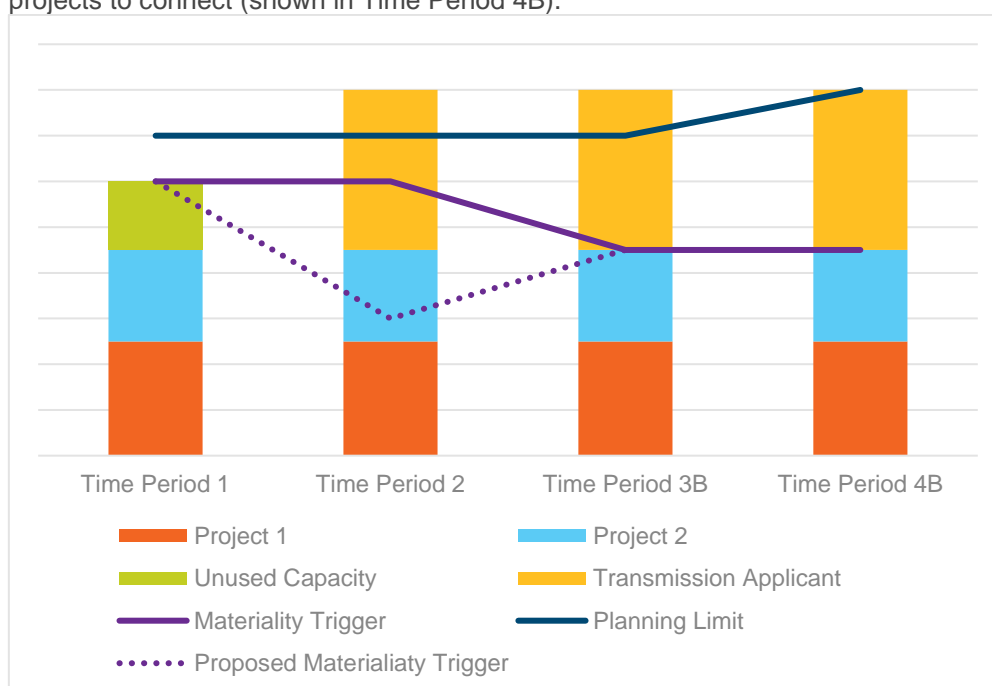
In Time Period 2, NGESO receives an application to connect to the Transmission system and notifies the DNO. This notification confirms that as a result of the transmission application, the DNO's Materiality Trigger would need to be reduced to the Proposed Materiality Trigger level. The DNO undertakes an impact assessment to determine if any of its customers would be affected by this.

Time Period 3 is split in two to show two possible outcomes from the DNO impact assessment;

- a) Time Period 3A shows if there is no impact on the DNO's customers. In this instance, the DNO confirms there is no impact and so the Materiality Trigger is reduced to allow the Transmission application to proceed.



- b) Time Period 3B shows if there is an impact on the DNO's customers. In this instance, the DNO confirms there would be an impact on Project 2 with the proposed reduction in the Materiality Trigger and so the Interactivity process is used to determine a queue order between Project 2 and the Transmission applicant. As Project 2 has already accepted a connection offer (in this example), they win the Interactivity process and so the Materiality Trigger is reduced to a level that would not impact Project 2 whilst maximising the capacity available to the Transmission applicant. The Transmission applicant (instead of Project 2) may then be subject to reinforcement works to increase the Planning Limit to allow all projects to connect (shown in Time Period 4B).



Applicability

This product is;

- Only available to DNOs situated in an area where the Transmission Owner supports this product, currently this is all areas except northern Scotland.
- Only suitable for 'small' or 'medium' sized generators, please see Industry Background section for the size classification table;
 - Small and Medium sized generators can be allocated capacity via this product (please note that Medium sized generators will require the DNO to submit a modification application to the NGESO for Site Specific Technical Requirements).
 - Large generators cannot utilise the Transmission Impact Assessment process and will need to apply directly to NGESO for a Connection Agreement in addition to their application to the DNO. The DNO must also submit a Modification Application to the NGESO.
- More suited for areas with higher numbers of applications.

Associated Fees

The fees associated with Transmission Impact Assessment are linked to the two parts listed in the Description;

1. Initial creation of Transmission Impact Assessment or request for to increase the Materiality Trigger – this may be subject to a 'Modification Application' fee for the application.
2. Review of updated data on the utilisation of Materiality Trigger and potential provision of contracts to increase the Materiality Trigger – NGESO will review the DNO's data to ensure the requirements of the Transmission Impact Assessment are met. A fee may be payable by the DNO should these requirements not be met or to modify contracts to revise the Materiality Trigger, details of these potential fees (if any) will be detailed in the Statement of Use of System Charges linked below.

Any fees can be found in Schedule 12 of The Statement of Use of System Charges available on our website⁷. Please contact your ESO representative or transmissionconnections@nationalgrideso.com for further information.

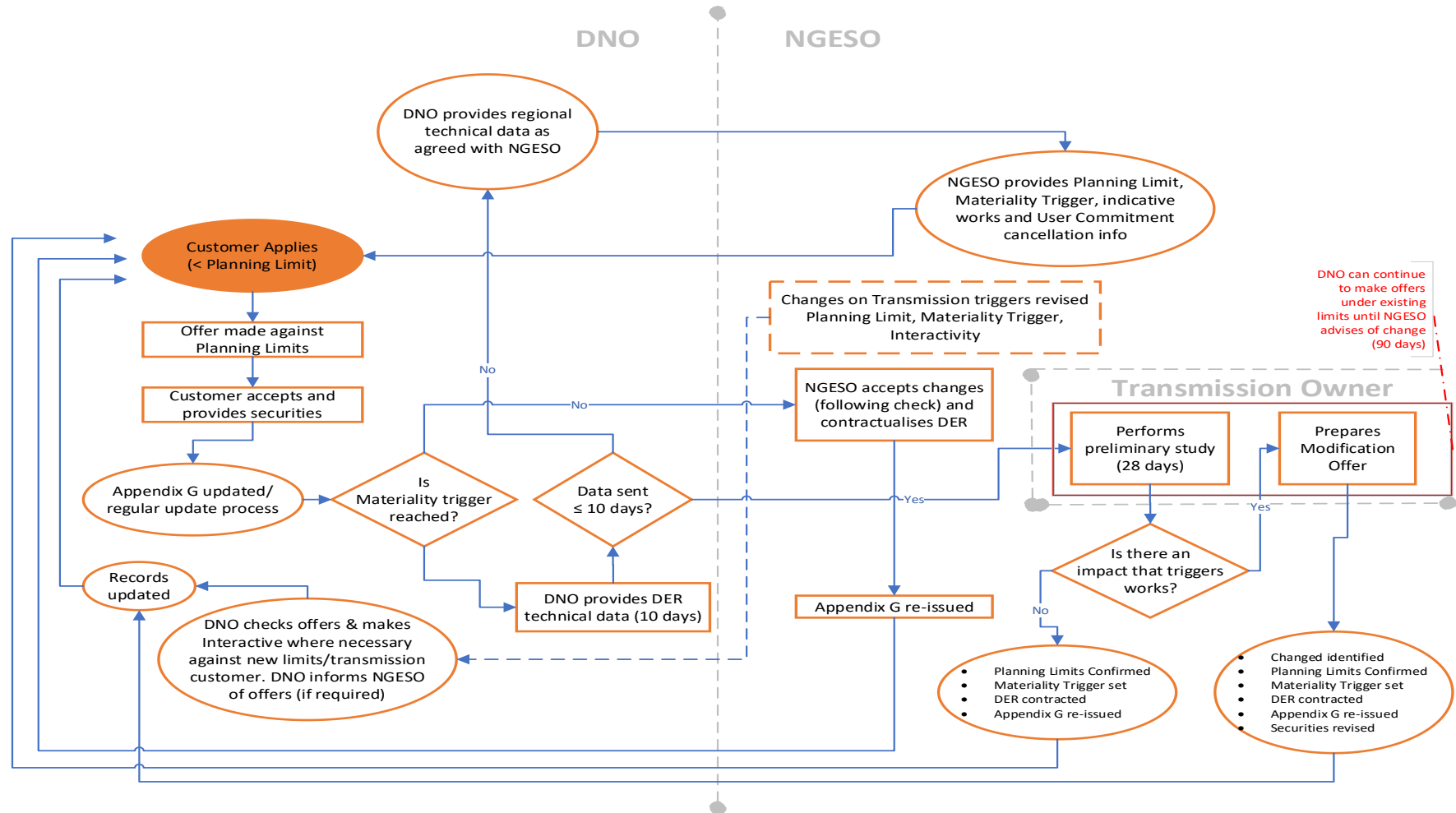
How to request this product

This product can be requested by a DNO by submitting a Modification Application using a CUSC Exhibit I to NGESO requesting that the BCA is updated to incorporate the additional terms and conditions associated with this product.

⁷ <https://www.nationalgrideso.com/industry-information/charging/charging-statements>

Product Process, Terms and Timescales

To accommodate Transmission Impact Assessment, revisions to the Bilateral Connection Agreement are required to add new terms and conditions and a new Appendix G to the GSP Bilateral Connection Agreement; an example of these can be found in CUSC as Schedule 2, Exhibit 1A. The high-level processes for this product are documented below. For simplicity, interactions between the Electricity System Operator and Transmission Owner are not shown.





C

Abbreviations

Abbreviations

Abbreviation	Meaning
CUSC	Connection and Use of System Code
DG	Distributed Generator (including storage)
DNO	Distribution Network Operator
NGESO	Electricity System Operator
ETI	Evaluation of Transmission Impact
NETS	National Electricity Transmission System
TIA	Transmission Impact Assessment

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