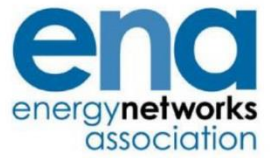


The Voice of the Networks



Energy Networks Association

**Open Networks Project
Workstream 2, Product 5**

**Interactivity &
Queue Management**

**Consultation
Document**

November 2018

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1 Introduction

1.1 The ENA and Open Networks Project

Energy Networks Association (ENA) represents the “wires and pipes” transmission and distribution network operators for gas and electricity in the UK and Ireland. Our members control and maintain the critical national infrastructure that delivers these vital services into customers’ homes and businesses.

The Open Networks Project is a key initiative to deliver Government policy set out in the Ofgem and BEIS Smart Systems and Flexibility Plan, the Government’s Industrial Strategy and the Clean Growth Plan. The Open Networks Project is working in collaboration with Ofgem, BEIS, 10 of UK and Ireland’s electricity network operators and other key stakeholders.

1.2 Background

As part of the Open Networks project, Workstream 2 Product 5 has been reviewing processes for interactivity and queue management. As part of this review, it has also become clear that there are gaps in the current processes, which need new processes to be developed. As such, this consultation seeks your feedback on the current processes and provides some background into the processes to be developed in 2019. Figure 1 below shows the network connection stages that interactivity and queue management cover.



Figure 1 – network connection processes covered by this consultation

This consultation links closely with the work being undertaken by Open Networks Workstream 1 Product 11 looking at options available to optimise the movement of flexible resources such as energy storage through the connections process, and Workstream 2 Product 2 on Management of Capacity. Workstream 1 Product 11 (Treatment of Flexibility) has been developed in alignment with Issue 1.6 of the Smart Systems and Flexibility Plan:

- *Network connection rules were not designed with storage in mind, which can lead to a number of issues including a lack of understanding of how storage connections should be treated (by both network operators and connecting customers) and the cost and time of connecting.*

While the issue focuses specifically on energy storage, Open Networks has widened to include all flexible resources in order to be technology agnostic. This should enable the findings to be applicable to energy storage and any other technology which could provide flexible services in a DSO world.

The consultation has been developed to ensure it complements Ofgem's 'Getting more out of our electricity networks by reforming access and forward-looking charging arrangements' consultation. This document is split into two sections, with the first section on interactivity and the second section on queue management. The concepts developed within the Treatment of Flexibility work (WS1 Product 11) have been woven into both these sections for consideration in question responses and detailed examples can be found in the associated report on the ENA Open Networks Workstream 1 webpage.

Information on how to engage with this consultation is included at the end.

2 Interactivity

2.1 Overview

There are occasions where network companies receive two or more connection applications that will make use of the same part of the existing network and where not all the applicants can be connected without a material impact on the connection offers made in respect of such applications. The resulting connection offers are referred to as interactive connection offers. Interactivity can be in relation to a number of different aspects, including network capacity, point of connection, application of constraints (such as those managed by an active network management scheme), etc.

Every network has a limit to the level of capacity it can accommodate without intervention (such as reconfiguration, reinforcement or procurement of a service), both for demand or generation. As such, interactivity is an issue that will remain, regardless of the absolute capacity of the network. Interactivity processes were developed in order to have a fair way of allocating the capacity to customers, but to be simple enough for a network company to administer in a consistent way across a large customer base. The interactivity principles in this document apply to demand and generation.

Any interactivity process will follow three main stages: identification of interactivity, the actual interactivity period, and then an assessment period.

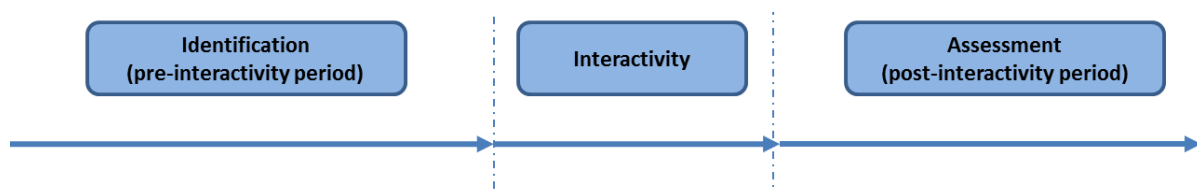


Figure 2: the three stages of interactivity

2.1.1 Identification period

In this stage, a network operator will assess all applications it has received against the capacity of the network (in terms of thermal rating, voltage, fault level, protection, etc). If there is sufficient capacity, connection offers will be made to the customers without the need for interactivity. It is possible for many offers to be issued and live without triggering interactivity, depending on the size and location of each customer. It is worth noting that the longer a customer leaves an offer before accepting it, the greater chance there is it will become interactive.

2.1.2 Interactivity period

At some point, an application will be received which, when added to all other offers issued at the time, will exceed the capacity of the network. Interactivity is then triggered by the issuing of the offer which causes the capacity of the network to be exceeded. The interactivity period is a defined period of time in which all offers which have been issued but not yet accepted are now dependent on whether the other offers are accepted or not, as not all offers will be able to proceed.

2.1.3 Assessment period

This is the stage after the defined interactivity period, during which the network company will need to assess the offer acceptances and decide which of those customers who has accepted an offer will be successful or unsuccessful.

2.2 Current processes

All DNOs and the ESO use an interactivity process, although with a number of variations, but there are two main processes. All companies (except UKPN) use a moratorium period and UKPN uses a method of reducing outstanding offer acceptance periods to 30 days. These two processes are outlined below.

Moratorium period

With a process that uses a moratorium period, at the point interactivity is triggered all offer acceptances are suspended until after a defined period of time, i.e. the moratorium period, which is typically 5-10 business days. After this period, customers can accept their offers and all acceptances are then assessed on the basis of the interactive queue order, which is based on the clock start date of the customer's original application. For example, if all customers in the interactivity queue accepted their offers on the first day after the interactivity period, then the available network capacity would be allocated to those customers in queue order. This is shown in Figure 3 below, where customers 2, 3 and 4 accepted their offers after the moratorium period, but customer 1 didn't, so customer 1 was unsuccessful.

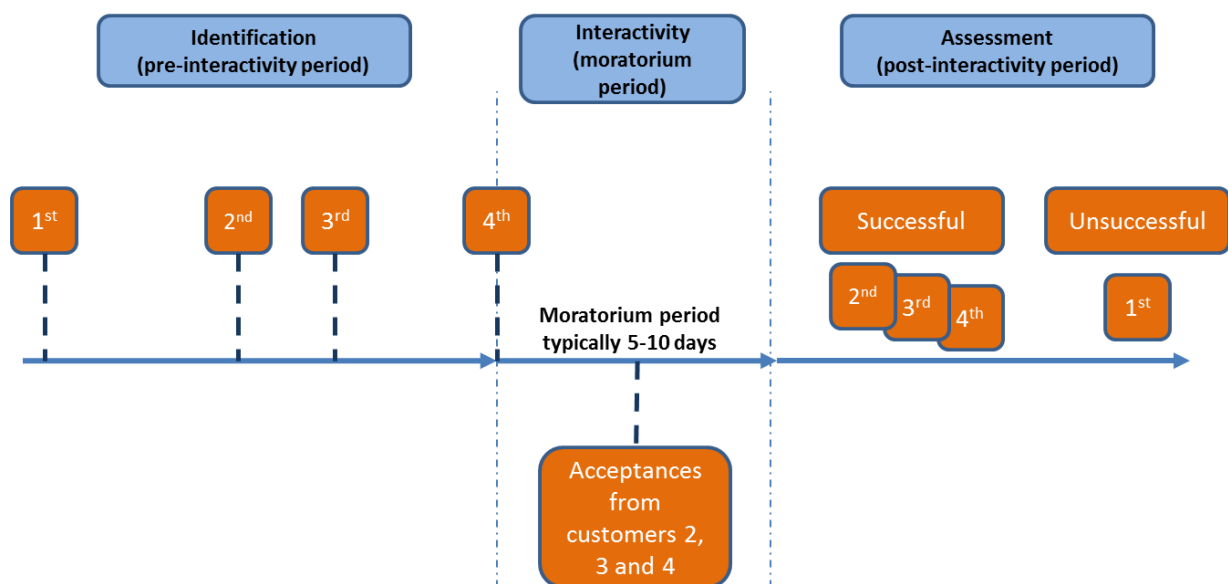


Figure 3: interactivity using a moratorium process

30-day acceptance period process (used by UKPN)

UKPN has chosen to use a different approach to interactivity and doesn't use a moratorium period. When interactivity is triggered, they will reduce the offer acceptance period of all offers to 30 days (unless there is less than 30 days left, in which case it remains unchanged). All acceptances are then conditional upon whether the customers ahead of them in the interactive queue accept their offers or not. So the first customer in the interactive queue is not conditional on the action of any other customer. This means that all offers are assessed in strict queue order and the outcome of interactivity is not dependent on the day the offer is accepted (provided the offer is accepted within the 30 day allowed acceptance period).

Figure 4a below shows the situation in the identification stage where three offers have been issued and are not yet interactive, with their offer acceptance period at the usual 90 days.

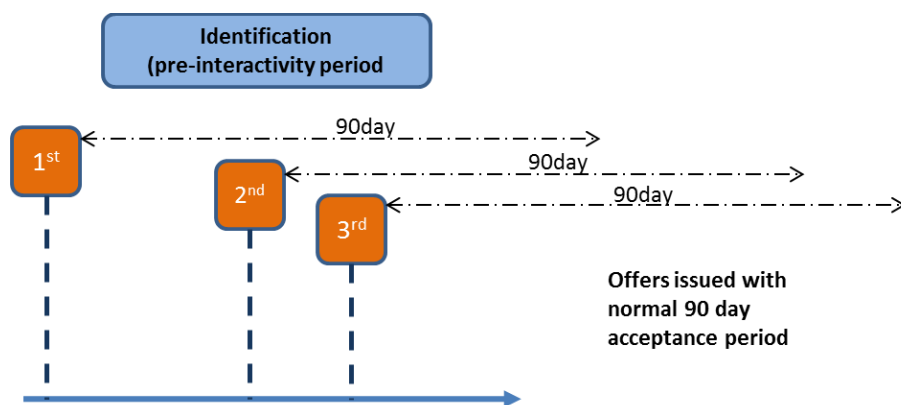


Figure 4a: initial issue of offers – no interactivity triggered

Figure 4b below shows that a fourth offer is issued which triggers interactivity and also shows the standard number of days left to accept the offers at the point interactivity is triggered.

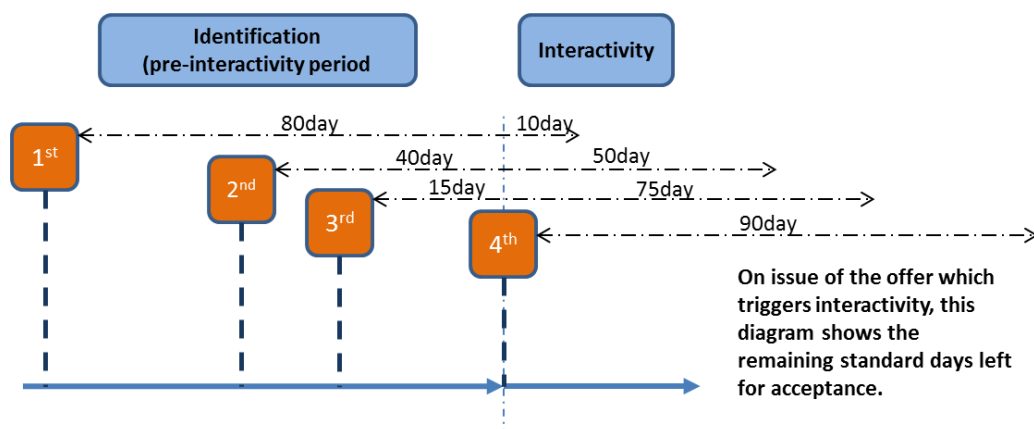


Figure 4b: issue of offer which triggers interactivity

Figure 4c below shows that the offer acceptance periods for customers 2, 3 and 4 is reduced to 30 days, whereas customer one is still left with only 10 days.

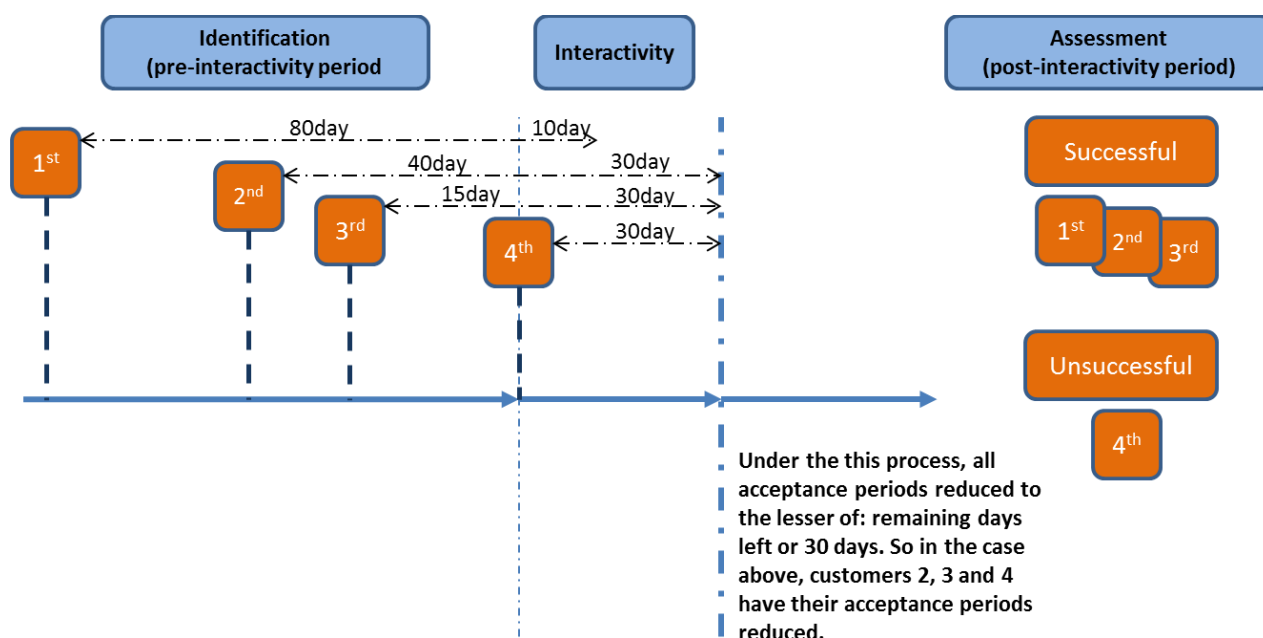


Figure 4c: acceptance periods reduced to 30 days

The remainder of this section is to consider some of the key differences between these processes. It is split to look at the Identification, Interactivity and Assessment periods. The information for these differences comes from responses a questionnaire issued to all DNOs and the ESO about their interactivity processes. Table 2 at the end of this section provides a summary.

2.2.1 Identification period

Guide to interactivity

All companies have some information available to customers on their website about their interactivity process. As a minimum, all DNOs have an outline of their process contained with their connection charging methodology. Some companies provide an additional, more detailed guide on their process. The table below provides a link to the information on each company's website.

Company name	Link to interactivity information on website
ENWL	https://www.enwl.co.uk/get-connected/new-connection/common-charging-methodology/
NG ESO	https://www.nationalgrideso.com/connections/applying-connection .
NPG	In Charging Methodology
SPEN	https://www.scottishpower.com/userfiles/document_library/SPEN_Connection_Methodology_Sept_2018.pdf
SSEN	https://www.ssen.co.uk/Sse_Components/Views/Layouts/PageBuilder/StandardContent/NoBase.aspx?pageid=16006
UKPN	Search for "Interactivity" on website
WPD	https://www.westernpower.co.uk/my-connection/guide-prices/budget-estimates-and-feasibility-studies

Table 1: interactivity information available on websites

Notification of interactivity prior to issue of the offer

Most companies will not inform a customer they are interactive until their offer is issued, although some companies may have informal conversations about this if a customer asks, or may put information in a point of connection information letter, etc. UKPN has a formal process whereby it notifies customers in writing that their application is likely to be interactive prior to issuing the customer with an offer. However, it is possible that at the point an offer is issued the potential interactivity no longer applies (e.g. the customers ahead in the interactive queue have withdrawn), rendering the initial notification void.

Triggering interactivity and combining queues

All companies aim to trigger interactivity on the issue of the offer which takes the network beyond its capacity. No companies trigger interactivity on receipt of an application (although as noted above UKPN will issue a notification to a customer after application).

It is possible for separate interactive queues on a lower voltage network to combine into a one queue for a constraint on a higher voltage network. For example, two separate interactive queues on different 11kV feeders on a primary substation could combine if the total capacity of offers issued in

both queues exceeded the capacity of the primary substation transformers. In circumstances where this could happen, all network companies would combine the queues and would reassign queue positions to make a 'super queue'. Each customer would retain their relative interactive queue position for the lower voltage constraint, but would be given a queue position for the higher voltage constraint relative to all other customers in that larger queue. Whilst network companies will endeavour to undertake the combining of interactive queues on the issue of the offer that exceeds the network capacity, the complexity of networks can lead to higher voltage network constraints being identified after offers have been issued. In this case, customers would be made interactive once the higher voltage constraint was identified.

Interactive terms in connection offers

All companies have a reference to interactivity in their connection offer letter or general terms and conditions, which allows them to make the offer interactive should the need arise. Each company has its own set of paragraphs explaining what the interactivity process involves and will write to each customer at the appropriate time with notifications of each stage of the process. Each set of wording is tailored to the specific process operated by each company.

2.2.2 Interactivity period

Process used

As explained above, all companies use a moratorium period except UKPN. All DNOs which use a moratorium period have a length of 10 business days, with the ESO using 5 business days.

Question 1: Which of the processes do you prefer and why?

Interactive queue position

All companies use the clock start dates of the customers' original applications to determine the interactive queue positions, with the earliest date being the 1st in the queue. Application clock start for all DNOs is on receipt on minimum information (which is typically when the application is received, although sometimes additional information is required), and for the ESO is minimum information plus payment.

Notification of interactivity

All companies notify customers that an interactivity period has started. A notification of interactivity (letter or e-mail) will be sent to customers who already have a live offer. The offer that triggers interactivity will usually contain interactive terms within the offer. This notification letter, or the terms within the offer for the customer triggering interactivity, will inform the customer of their interactive queue position.

Additional offers issued during the interactivity period

It is possible that additional offers need to be issued once an interactivity period has started. Most companies will endeavour to issue as many offers as they can prior to starting interactivity, to prevent having to issue offers once interactivity has been triggered. However, this is not always possible to achieve, especially with high volumes of applications. There are four separate methods of dealing with this, two of which relate to the moratorium period process and one relating to the 30-day acceptance process of UKPN.

NG ESO

Due to the relatively low volume of applications on the transmission system, NG ESO would work with the TO to co-ordinate the issuing of all offers prior to the moratorium period.

UKPN (30-day acceptance process)

In this process, every new offer is issued with a 30-day acceptance period and is conditional on all offers before them being accepted or not. No customer has to wait more than 30 days to know the outcome of the interactivity, as all previous offers will have been concluded within 30 days.

ENWL, NPG, SPEN, SSEN

Most DNOs using a moratorium period will extend or reset the moratorium period if a new offer is issued during the moratorium period. This is shown in Figure 5 below.

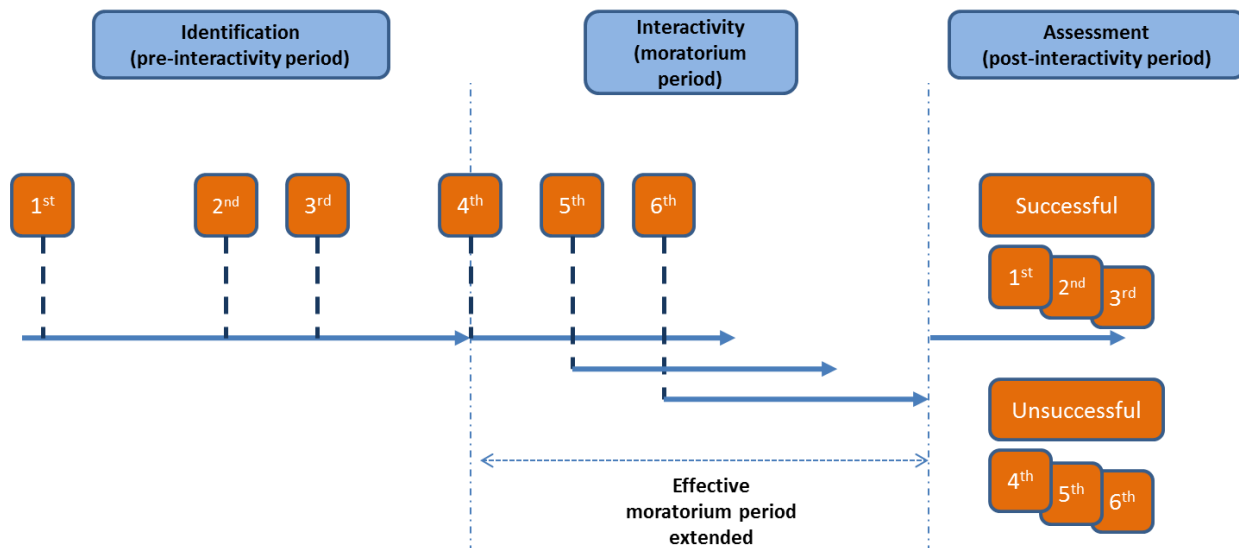


Figure 5: extending or resetting the moratorium period

The advantage of this process is that every customer has the full length of time available to assess whether they wish to accept the offer or not. The disadvantage is that the moratorium period could effectively be extended without end if there were a sufficient volume of applications. This would be very frustrating for the first customer in the interactive queue who was prepared to accept the offer, because they are guaranteed the capacity but can't be officially told this until the end of the moratorium period. The risk of high volume of applications is now reduced with the introduction of A+D fees, but is still possible. This method is not in keeping with trying to provide the fastest route to connection. To overcome this issue, ENWL is looking to limit extensions if some customers in the queue have accepted and SEPD has trialed using separate moratoria for offers issued during the interactivity period.

WPD

Due to issues with high volumes of applications in the solar rush starting in 2012 and issues with continually extending moratorium periods, WPD decided to move to a process whereby the moratorium period is not extended for additional offers issued during the moratorium period. This is shown in Figure 6 below.

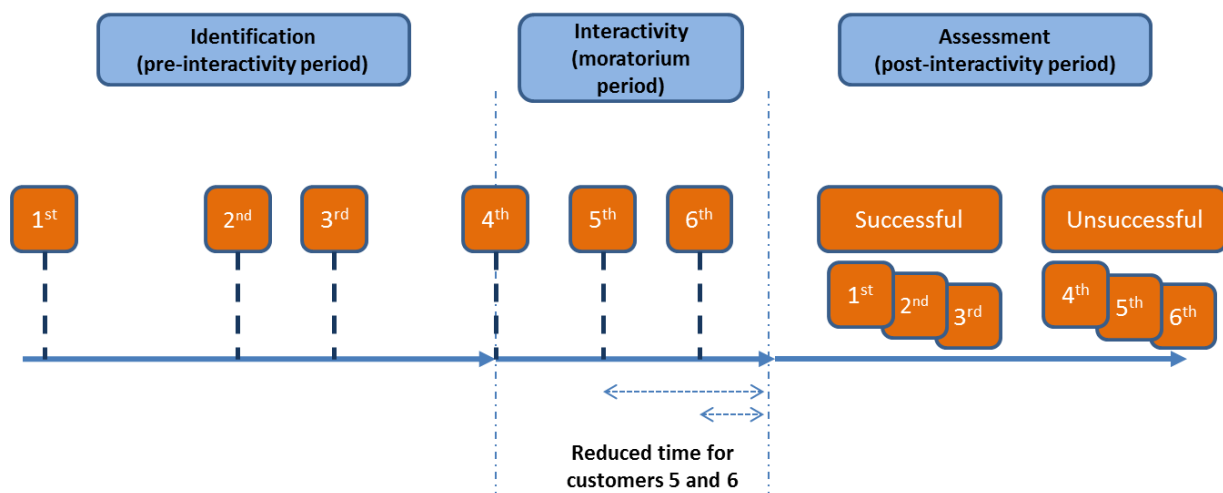


Figure 6: not extending the moratorium period for new offers

The advantage of this process is that all customers in the moratorium period, including those who joined part way through, know the outcome at the end of the 10 day period. The disadvantage is that some customers have only a short time to consider whether to accept the offer or not, although WPD has not seen this to be an issue. On balance, this option seems to contribute best to providing the fastest route to connection.

Question 2: What is your preferred method for network companies to handle additional offers issued during the interactivity period, and why?

2.2.3 Assessment period

Offers which expire during a moratorium period

All companies using a moratorium period will extend the validity of the acceptance period until the end of the moratorium. This effectively means that a customer has to have accepted their offer by the end of day ten of the moratorium period or their offer has expired.

Timing of offer acceptances

There are three separate approaches to offer acceptances during interactivity.

UKPN

Acceptances can only be made prior to the end of the 30 day offer acceptance period, but all offers are conditional on whether offers ahead of them in the interactive queue are accepted or not.

NG ESO

Acceptances can only be made after the moratorium period, so from day six after the five days of the moratorium period. This tends to put pressure on customers to issue an acceptance on a specific day.

All other DNOs

All DNOs (except UKPN) take the approach that any acceptances of interactive offers during moratorium period are treated as if received at 9.00am on the first business day after the end of the moratorium, so received on day 11 after the 10 day moratorium. (If necessary, the validity period of the offer is extended to accommodate this.)

All companies allow an electronic acceptance, with some specifying that the paper copy follows on in the post.

Payment following offer acceptances in an interactivity queue

UKPN

Payment is required from everyone who accepts, whether they are part of an interactivity queue or not, and payment is a condition of acceptance.

NPG, SPEN

Payment is required from all customers who are successful in the interactivity queue and is a condition of acceptance. If the payment is not made within a specified time period (typically 10 working days), then the acceptance defaults and the capacity would be offered to the next customer. This could potentially cause delays and could cause complications with other queues that had started, or with offers issued after the close of a moratorium period.

NG ESO, WPD

Whilst an initial payment may be a condition of the offer, it is not a condition of acceptance of an offer. So an offer can be accepted without payment and a successful customer would not be required to pay any money to secure their connection. However, an invoice for the initial payment is then raised within a short period and the customer has to pay that invoice within a certain time period. This process ensures that payment does not form part of the interactivity process and avoids associated delays.

SHET

No payment is required on acceptance, but is required against a pre-defined profile.

Multiple offer acceptances during an interactivity period

Most companies allow multiple acceptances during an interactivity period up to the capacity of the network. With the moratorium period processes, the capacity is allocated on the basis of interactive queue order of any schemes which have accepted on a particular day, so is a combination of queue order and acceptance date. The following examples show how this works. Figure 7a below shows that five customers are in an interactive queue, where customer 3 triggered the interactivity and customers 4 and 5 were added to the interactivity queue.

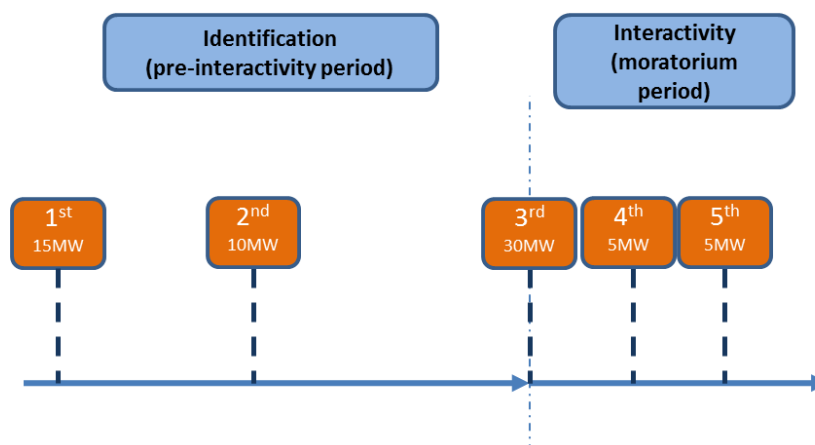


Figure 7a: five customers in an interactive queue

This is shown in Figure 7b below in a stack, with the size of the boxes proportional to the capacity of the customers. The remaining capacity on the network is 40MW.

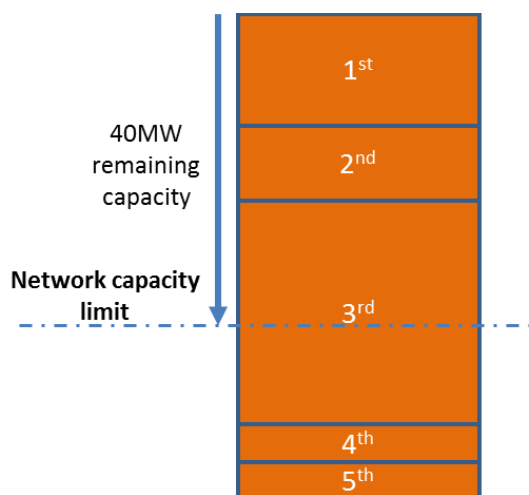


Figure 7b: interactive queue shown as a stack

If all five customers accepted their offers, as per Figure 7c below, then customers 3, 4 and 5 would be unsuccessful. It is important to note that, whilst there is sufficient capacity for customers 4 and 5, customer 3 is effectively blocking them from proceeding and customers 4 and 5 are not permitted to 'jump over' customer 3. Customers 3, 4 and 5 would be invited to reapply.

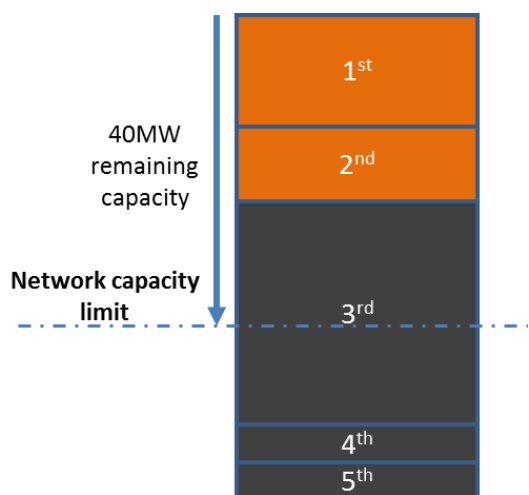


Figure 7c: all customers accept their offers, customers 3-5 unsuccessful

If customers 1, 2, 4 and 5 all accept their offers, they would all be able to proceed, as per Figure 7d below, and customer 3 would be unsuccessful and would be invited to reapply.

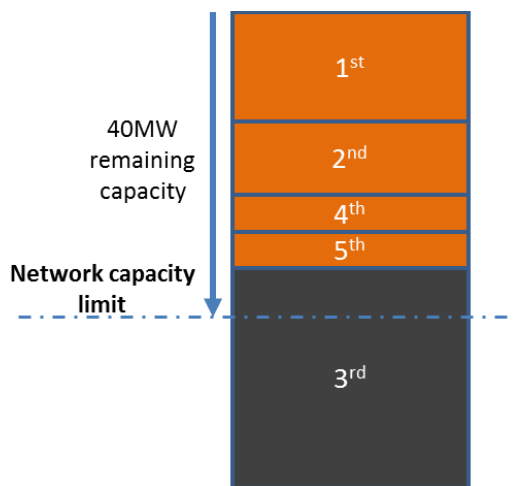


Figure 7d: customers 1, 2, 4 and 5 accept their offers, customer 3 unsuccessful

Open Networks Workstream 1 Product 11 has been looking at options available to optimise the movement of Flexible Resources (including but not limited to energy storage), considering the scenario in Figure 7c above, where customers 4 and 5 are effectively blocked by customer 3. When invited to reapply, customers 4 and 5 may think that their scheme cannot financially accommodate network reinforcement and so may choose not to reapply. However, if all customers were to be informed about the available capacity, then customers 4 and 5 may be more inclined to reapply, taking a view that not all customers ahead of them may choose to reapply. So if customer 3 chooses not to reapply, customers 4 and 5 would then be able to proceed on the basis of their original offer. However, if customer 3 does choose to reapply, then customers 3, 4 and 5 will all receive revised offers and will be interactive again, as per usual.

Question 3: What is your view on allowing multiple acceptances, provided that there is sufficient network capacity? Should the reapplication process be improved as per the suggestion above from Workstream 1 Product 11 and if so should this only be available to customers opting for a flexible connection offer?

With the UKPN process, acceptances are treated in strict interactive queue order (subject to the acceptances being made within the 30 day acceptance period) and multiple acceptances would be allowed up to the network capacity.

No acceptances or limited acceptances following the end of the interactivity period

It is possible that no customers have accepted their offers by the end of the interactivity period. It is equally possible that only a limited number of customers have accepted their offers and that there is remaining network capacity available for other customers in the interactive queue.

For moratorium period processes

All companies operate on the basis that if there are no acceptances during the moratorium period, then all offers remain live for as long as the offer is within its validity period. Any acceptances thereafter are assessed in relation to available network capacity and are treated in interactive queue order for any acceptances received on the same day (i.e. first come, first served). The same applies to interactivity periods where there have been a limited number of acceptances and there is remaining network capacity, such that acceptances will be successful until such time that there have been enough acceptances to use all available capacity.

For the UKPN process

With the UKPN process, if a customer has not accepted their offer during the 30 day acceptance period, then the offer has expired and they would need to re-apply if they wished to proceed. The capacity of any lapsed offers is made available to the next customers in the queue.

Notification of the outcome of the interactivity

All companies aim to respond to customers as soon as possible after the end of the moratorium period to inform them of the outcome, with most companies aiming to provide a response with 5 days.

Unsuccessful applications

All companies (except NG ESO) using a moratorium period will invite unsuccessful applicants to reapply, usually within a defined period (typically 10 working days). If reapplications are received within this period, the customer will keep their original place in the interactive queue; if not, any application the customer makes will go to the back of the queue. All reapplications need to be on the same basis as the original application, so the same import or export capacity, same premises, etc. If the customer wishes to change anything, a new application would usually be required¹. The same rules are applied whether the unsuccessful customer has accepted the offer or not. It is possible that this approach could be modified, whereby only customers who accept their offers during the moratorium period are invited to reapply and keep their original place in the interactive queue.

NG ESO will automatically issue a revised offer within 3 months for unsuccessful applicants. The customer will retain their original clock start date for any new interactivity queue.

With UKPN's process, unsuccessful applicants lose their place in the interactive queue and need to make a new application if they wish to proceed. If, for example, there were two unsuccessful customers following an interactivity period and they both wanted to proceed with a new offer, the speed with which they make their new application would then dictate their new relative place in the queue. So if customer 3 in the original interactive queue reapplied before customer 2, their respective queue positions would change. It is also possible that a customer who wasn't in the original interactive queue could make their application prior to customers 2 and 3 making their new applications, putting customers 2 and 3 further down in the interactive queue than the new applicant.

Open Networks Workstream 1 Product 11 is also considering a change to the post moratorium process for unsuccessful applications, giving them the opportunity to progress with a reapplication on a different basis to the original application, working around the constraint where viable. Changes would likely be limited to only those which facilitate progression and could therefore only be available to customers opting for a flexible connection, such as energy storage. For example, if there was an unsuccessful customer, they could choose to revise their request to work around the constraint without putting them to the back of the queue. If there were two unsuccessful applicants who altered their requirements to work around the constraint, the capacity would be offered to the party with the earliest original application date.

Question 4: What is your view on how unsuccessful customers should be treated, and why?

Offers issued immediately following a moratorium period

One feature of using a moratorium period is the complexity of how an offer is issued to a new customer (who was not part of the moratorium period) immediately after the moratorium has finished. See Figure 8 below. Indeed, it is apparent that this is the least well defined area of process. The issue is that all companies have guaranteed standards in which to issue an offer, the effect of which is that connection offers have to be issued, even if the outcome of a moratorium period isn't yet known. This means that if the offer to the new customer can't be deferred, it needs to be

¹ <http://energynetworks.org/assets/files/electricity/ENA%20Allowable%20Change%20Good%20Practice%20Guide.pdf>

developed either with multiple options (to cater for the various outcomes of the moratorium period), or with modified terms and conditions in the offer. (It is worth highlighting that the UKPN approach doesn't have this complexity, as all offers are subject to the outcome of customers ahead of them in the queue, and unsuccessful applicants effectively lose their place in the queue and have to reapply.)

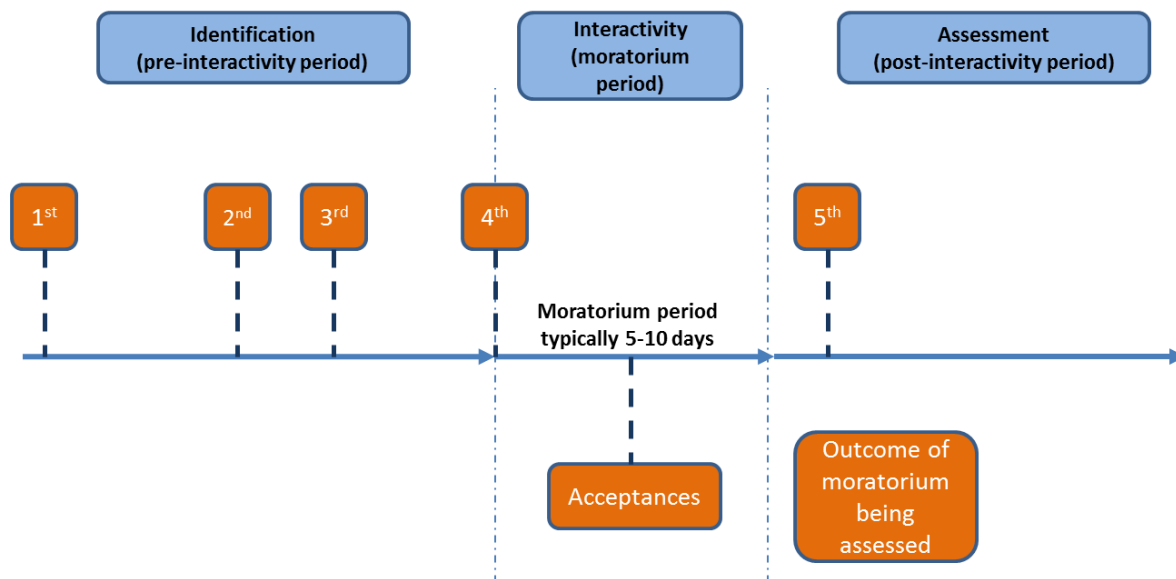


Figure 8a: an offer issued immediately after a moratorium

In the example in Figure 8a above, customer 4 is unsuccessful. The ideal scenario is that the re-offer for customer 4 is completed prior to issuing the offer to customer 5, as in Figure 8b below, and a new interactive queue for customers 4 and 5 can begin.

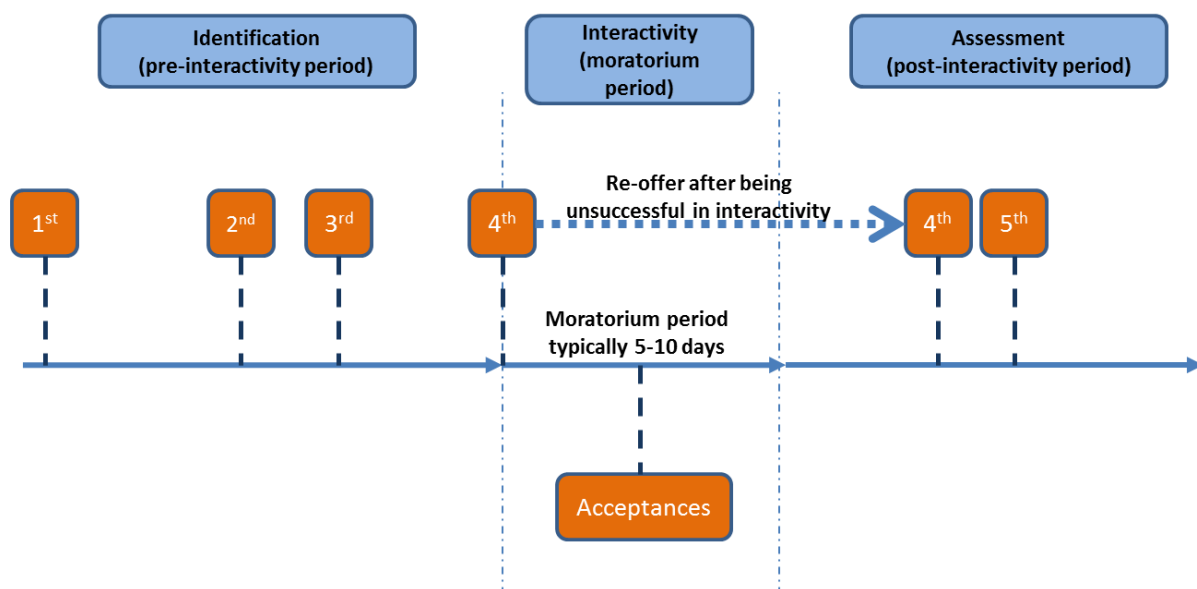


Figure 8b: ideal scenario, where re-offer for customer 4 is issued before the offer for customer 5

However, circumstances will often dictate that the offer for customer 5 needs to be issued before the re-offer for customer 4 can be completed, as per Figure 8c below.

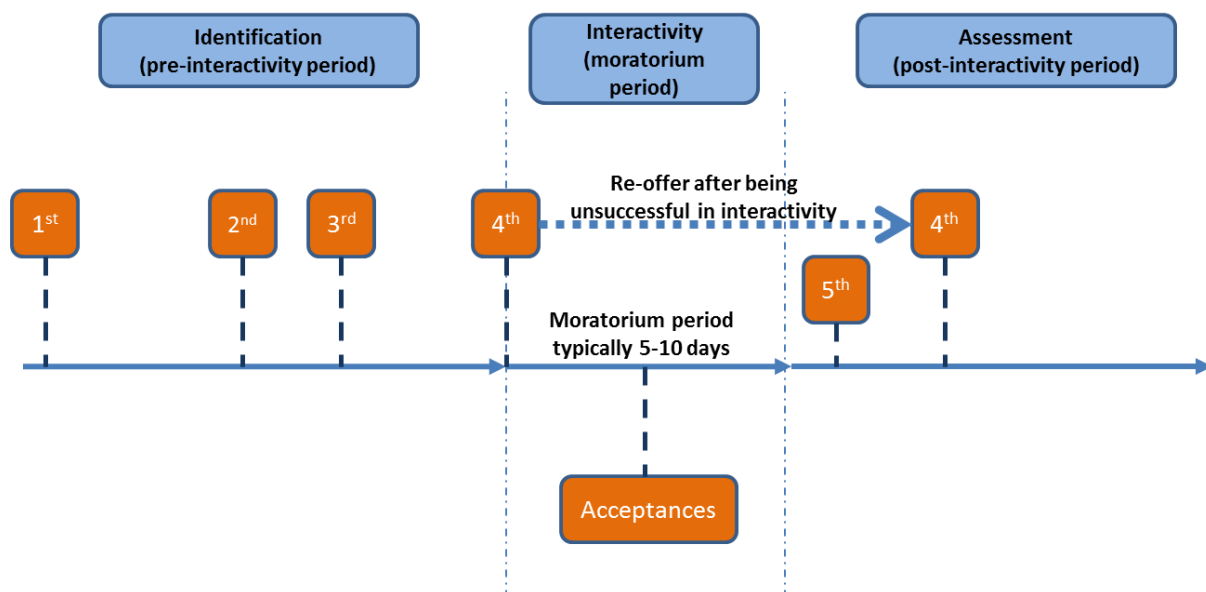


Figure 8c: likely scenario, where re-offer for customer 4 is issued after the offer for customer 5

Listed below are the various approaches adopted to handle these situations, but most companies will attempt to issue offers prior to the end of a moratorium period so that this situation doesn't occur.

ENWL

ENWL will attempt to push back the date of issuing the new offer as long as possible in order to be able to re-offer the unsuccessful customers first. But failing this, they would look to issue the offer subject to the outcome of the moratorium period (although this is not a currently defined process).

NG ESO

NG ESO would seek to start another round of interactivity for any new offers issued after the first moratorium period has finished.

NPG

NPG would not wish to make offers conditional on the outcome of the moratorium period, so would accelerate the issuing of offers to try and avoid this situation.

SPEN / SSEN

Both these companies would look to develop different connection solutions to cover all outcomes of the moratorium period.

WPD

WPD has published a detailed process document as to how to handle this situation, including new terms like Post-Moratorium Acceptance Period and New Offer Period. The essential part of this process is that offers would become conditional on the outcome of the moratorium period. Whilst it is well documented, it is still complex to administer and not straightforward for customers. (See link in section 1.2.1 above to access this document).

Question 5: Which of the processes do you prefer for offers issued after the moratorium period and why?

2.2.4 Specific case: allocation of Appendix G headroom

The Appendix G process allows distribution companies to inform the ESO of generation connections on their networks. In essence it is a list of generators that are either connected or have an accepted connection offer. Distribution companies will submit an Appendix G document for each GSP on a monthly basis.

At present, each Appendix G has a materiality headroom, which allows the distribution company to manage the generation connections within that limit. However, it is possible for the distribution company to issue enough offers to exceed this headroom. This is effectively a network constraint for a distribution company and therefore could potentially become interactive.

To improve and formalise the Appendix G process, has been modified and is now called the Transmission Impact Assessment (TIA) process and will be included in CUSC modification CMP298. It provides a materiality trigger, which gets away from the need for interactivity in most cases. This is due to happen over the next 12 – 18 months. In the meantime, distribution companies will need to continue to use the existing Appendix G process and there are two main approaches that have been used in respect of the materiality headroom.

Making the materiality headroom interactive

A number of companies have chosen to make the materiality headroom interactive. Connection offers are issued which are not subject to the outcome of the Appendix G process, but if the capacity of issued offers exceeds the materiality headroom, then all live offers on that GSP are made interactive.

No interactivity with respect to the materiality headroom

Some companies have not chosen to make the materiality headroom interactive. In this case, all offers are made subject to the Appendix G process. The available materiality headroom on a GSP is allocated to customers on a first to accept basis, so is entirely dependent on acceptance date.

Question 6: What is your view on the proposed approaches for allocation of Appendix G headroom, as an interim solution before the TIA process is introduced?

2.2.5 Summary of existing processes

The table below summarises the main differences between the current processes used by each company as described above.

Company name	Notification prior to issue of offer	Process	Length of moratorium period	Offers issued during interactivity	Timing of offer acceptances	Multiple acceptances allowed?	Unsuccessful applications	Offers issued after moratorium	Appendix G headroom
ENWL	Informal	MP*	10	Extension	During or after MP*	Yes	All invited to reapply	Offer subject to MP outcome	In development
NG ESO	Informal	MP*	5	N/A – all offers issued prior to MP*	After MP*	Yes	By default are reissued with an offer	New MP* triggered	N/A
NPG	Informal	MP*	10	Extension	During or after MP*	Yes	All invited to reapply	No process	In development
SPEN	Informal	MP*	10	Extension	During or after MP*	Yes	All invited to reapply	Develop multiple options	N/A
SSEN	Informal	MP*	10	Extension	During or after MP*	Yes	All invited to reapply	Develop multiple options	Not interactive
UKPN	Yes – formal process	30-day acceptance period	N/A	30-day acceptance	Before 30-day acceptance	Yes	New application	N/A	Interactive
WPD	Informal	MP*	10	No extension	During or after MP*	Yes	All invited to reapply	Formal defined process	Not interactive

Table 2: summary of main differences in interactivity processes used by each network company

*Moratorium period

2.3 Proposed development of interactivity processes in 2019

The following work is proposed to be undertaken in 2019:

- Publication of the good practice guide on current interactivity practices, based on the responses from this consultation.
- Publication of the Treatment of Flexibility report and updated roadmap based on the feedback received through this consultation and that undertaken by the Charging Futures Forum.
- Figure 9 below shows an example of the complex links between different networks than could occur with interactivity, which the work in 2019 will cover.
- Develop interactivity processes where gaps have been identified, as follows:
 - Interactivity between transmission and distribution. This will include interactivity for both transmission-led and distribution-led problems, for both generation and demand. Key issues include:
 - Clock start date and interactive queue position.
 - General process, e.g. moratorium period.
 - Methods to assess interactivity.
 - Agreed timescales and formats for sharing data.
 - Alignment with existing processes, such as Appendix G and the new Transmission Impact Assessment, Statement of Works, Project Progressions, Modification Applications, BEGAs, BELLAs, etc.
 - Interactivity between customers on different distribution networks, for both upstream and downstream networks, and for both generation and demand. This will include:
 - The process for notification of applications from one distribution network to another
 - Connection agreements between distribution networks
 - Identification of the geographical areas where such interactivity could occur
 - Interactivity with customers connecting to IDNOs
 - All issues identified above for transmission – distribution interactivity
 - Interactivity between customers across multiple networks, for example between transmission, an upstream DNO and a downstream DNO
 - The biggest issue is perhaps which clock start date to use, balancing fairness and practicality of implementation.

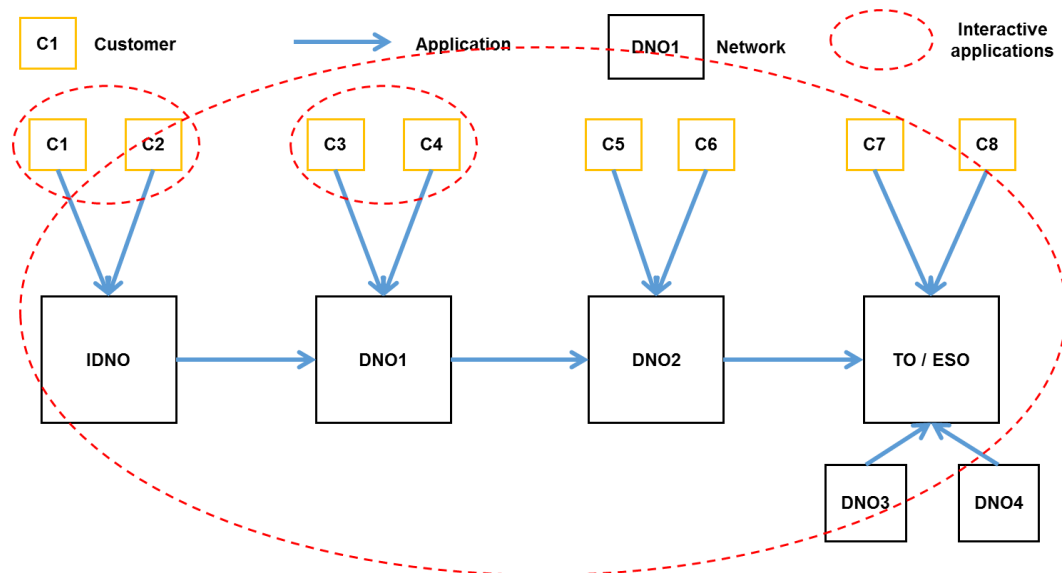


Figure 9: an example of possible complex network interactions for interactivity

Question 7: What is your view on the proposed developments of interactivity processes for 2019? Are there other elements you would like to be developed? Are there certain aspects you would prioritise?

3 Queue management

3.1.1 Overview of queue management

Queue management as referred to here is different from the interactivity queue that was discussed in section 1. As can be seen in Figure 1 at the beginning of this document, queue management is the period from when a customer accepts an offer to the time when a customer's site is connected. Once a connection offer is accepted, it is often referred to as being contracted, as a connection offer is effectively a contract containing terms for connection. So a 'contracted customer' in this document refers to a customer who has accepted a connection offer but whose site is not yet connected or energised.

There are two general issues to consider with queue management:

1. Monitoring. The progress of a contracted customer needs to be carefully monitored, to ensure that a customer proceeds with their connection in a timely manner. This is dealt with by the use of milestones that can be tracked and is already in use with distribution contracts.
2. Management. In areas of the network where capacity is limited, queue management will involve taking action to move customers up and down the queue based on a defined set of rules, to ensure that customers ready to connect are able to do so. It is closely linked to and dependent on the milestones. This is something that is currently in development.

Figure 10 below shows the stack of contracted customers where the network capacity limit hasn't yet been exceeded. As none of the customers in this example are affected by any reinforcement works (in terms of cost or timescale), then the order of the stack doesn't have much bearing on the ability of the customers to proceed with their connection and no queue has formed.



Figure 10: commercial order of the queue of contracted customers

However, no network has unlimited capacity, so eventually the total capacity of the contracted customers will exceed the capacity of the network. When this happens, the last customer to have accepted an offer will have triggered network reinforcement or will have additional curtailment, and all subsequent accepted offers will also contain reinforcement and/or additional curtailment, as per Figure 11 below.

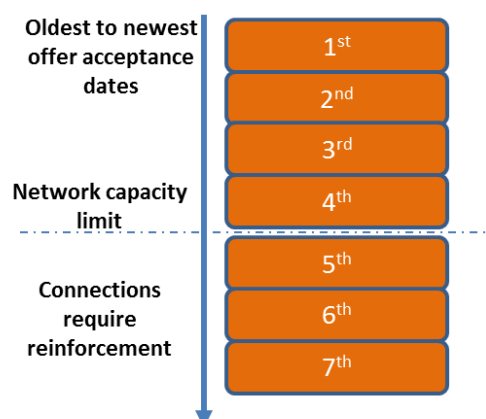


Figure 11: commercial order of the queue of contracted customers with reinforcement

A commercial order will always be applied to customer connections (as per Figure 10), however it is only when the available network capacity is limited (as per Figure 11) that this queue order is used to enable decision making. With this in mind, a queue forms where the combined capacity of contracted customers is greater than the capacity that is available on the network. Established industry practice to date, although not outlined in any industry codes, has generally followed the principle that the first customer to contract is able to choose their connection date. This often leads to 'first to contract, first to connect,' as per the two diagrams above, as many customers wish to connect as soon as possible. This means that available capacity is allocated to projects based on the order of acceptance of their connection offers.

The work being progressed under the Treatment of Flexibility product (Open Networks Workstream 1 Product 11) is looking at the post acceptance queue to look at the opportunities flexible resources such as energy storage bring to the scenario outlined in Figure 10. When in a DSO world, there will be more opportunities for peer to peer trading and use of flexibility to manage constraints. Therefore, there could be a flexibility service contracted to facilitate the connection of the 5th customer (potentially also the 6th and 7th customers depending on the constraint and service procured). One method of procuring this service is to go out to market, but it may be more economic and or timely to go to the other customers ahead in the construction queue.

Question 8: What are your views on the concept of liaising with customers in the connections queue to alleviate a constraint? Could it be used when there is no mature market available or as a temporary solution?

This commercial order practice, although simple, has the potential to act as a barrier to projects that are 'ready to connect' which can find themselves behind projects that are not ready but have secured capacity at an earlier time. For example, from Figure 11, it is possible that the customer in 6th place may be ready to connect but has to wait for two years for reinforcement works to be completed; whereas the customer in 2nd place, who doesn't need reinforcement works, will not be ready to connect for some time, perhaps due to planning or funding issues, etc.

3.1.2 Monitoring – the use of milestones

Milestones act as the foundation to robust queue management policy and are used to measure the progress of a contracted customer to meet their connection date. The electricity connection process typically follows the following key stages:

1. Concept
2. Site purchase / lease
3. Application
4. Acceptance
5. Planning and design
6. Construction and Compliance
7. Connection

Monitoring and management of the connection queue is required in the period between step 4 (Application) and step 7 (Connection). This is due to the variability in time taken to move a project from the application stage to connection, for example:

- Project development timetables can vary for a number of reasons, for example obtaining planning permission, which will vary dependent on the size and technology of a project;
- The delivery of a network connection will generally require connection assets to be constructed, and potentially reinforcement of the network will be required.
- Funding arrangements can take time to put in place and with a shift towards more competitive allocation of government support there is less certainty in projects securing necessary support, which can lead to requests to change connection dates in line with government auctions.

The standard 'first to contract, first to connect' methodology gives no consideration to the risks beyond step 4, and can result in projects that are ready to connect being unable to secure capacity (for example due to large reinforcement requirements) and projects that are not ready to connect (for example due to lack of funding) holding capacity to the detriment of others.

Following extensive stakeholder engagement in 2016, the Energy Networks Association Distributed Energy Resource working group developed new milestones for distribution network customers that reflect this critical period between application and connection. In November 2016, the Energy Networks Association published best practice guidance² to provide a consistent set of milestones that can be used by all DNOs in their connection offers. The milestones introduced by the ENA are:

1. Initiated Planning Permission;
2. Secured Planning Permission;
3. Land rights;
4. TSO interface;
5. Contestable works design submission;
6. Commence and progress works; and
7. Project construction.

Since this guidance was published the ENA milestones have been adopted by all GB DNO's. A DNO will monitor these milestones, even if there is no immediate network capacity restriction, to ensure a customer is making progress with their connection. If a milestone is missed, then currently the only options available to a DNO are to allow an extension to the milestone (if believed appropriate) or to terminate the customer's offer (as the milestones form part of the connection offer contract).

3.1.3 Monitoring – transmission milestones

² <http://www.energynetworks.org/assets/files/news/publications/Reports/ENA%20Milestones%20best%20Practice%20Guide.pdf>

At present, connection offers on the transmission system don't include the ENA milestones as above. Existing transmission contracts contain a small number of milestones around securing necessary consents, which have limited scope for action.

All three transmission owners (SPEN, SSEN, NGET) and NG ESO, have looked to the ENA milestones as a starting point for transmission queue management policy. Consistency between transmission and distribution milestones is important in the development of a queue management process, to assist the management of queues across multiple networks. In order to implement a robust GB queue management policy it will be necessary to agree a consistent set of milestones that can apply across transmission and distribution. A number of options have been developed by UK TO's and the SO to date and the section below gives an overview of how milestones are being developed for transmission connections and will form the basis of proposals in 2019.

SPEN

SPEN's queue management policy³ largely replicates the milestones developed by the ENA with the exception of 'Contestable works design submission' being replaced with 'Progress Adoption Agreement'. The SPEN Policy has also further categorised milestones to determine when to be 'flexible', when to terminate and when to treat projects as 'stalled.'

SSEN

SSEN's queue management policy has been developed as part of its 'alternative approach to unlocking Orkney's renewable potential'⁴. In order to ensure that the proposed milestones reflected the obstacles to connection faced by customers on Orkney, a number of changes to the ENA milestones have been applied. However, SSEN's milestones remain closely in line with the ENA principle that 'Milestones should be spaced out across the timescales for the project where possible' and could equally be applied to projects across GB. SSEN included a new milestone of 'project studies start' and 'order placed for plant' in response to stakeholders' feedback for the Orkney trial.

NG ESO

To manage the transmission queue issue, NG ESO has taken various actions to help. These include interim restrictions on availability, project progression clauses within construction agreements, waivers and indemnity agreements. More recently, NG ESO has reviewed the contractual framework to identify changes that can help facilitate queue management. After actively engaging with customers and stakeholders, NG ESO has developed a queue management approach⁵ that proposes to move stalled projects behind projects that are ready to connect, based on a set of contractual milestones and principles. The milestones developed by NG ESO are based on the ENA milestones with the addition of 'Confirmation no outstanding EMR⁶ requirement', 'Evidence of financial commitment' and 'Confirmation of intention to proceed with programme' to make them more relevant to the GB transmission network. NGET is supportive of NG ESO's approach on milestones and associated rules for managing the connections queue.

A consistent set of milestones that works across Transmission and Distribution will be necessary to deliver a robust industry queue management policy. The ENA Open Networks Project intends to take lessons from the work taken forward to date and agree industry milestones for consultation in 2019.

³ https://www.spenergynetworks.co.uk/userfiles/file/Queue_Mgt_Policy_Communication_Dec_2016v3.pdf

⁴ <https://www.ssen-transmission.co.uk/projects/orkney/>

⁵ <https://www.nationalgrideso.com/connections/registers-reports-and-guidance>

⁶ Electricity Market Reform (EMR) contracts, such as Capacity Market and Contracts for Difference

Question 9: What is your view on the proposals for more consistent milestones between transmission and distribution developed so far? Your comments will help to develop an agreed approach during 2019.

3.1.4 Management and scope to flex milestones

Once suitable milestones are in place so that the progress of a scheme can be monitored, it is then possible to put in place systems to effectively manage the queue of contracted customers. As was mentioned above, at distribution the only current option to manage customers is to extend milestones or to terminate the connection offer. Extension is a form of scope to flex a milestone and termination of the offer is an example of an approach to management of the queue, but the two elements go hand in hand.

All three transmission owners (SPEN, SSEN and NGET) and the Electricity System Operator (ESO) have begun to develop approaches to flex milestones, because there will often be circumstances that can cause delay that are outside of a developer's control. A number of approaches to allow milestones to flex have been trialled, or are under development, and will be further developed in 2019.

SPEN

SPEN has taken the approach of identifying under what circumstances it will be appropriate to classify projects as 'stalled', when to be flexible and when to terminate. For example, if a project misses the first milestone to initiate planning permission, it would be terminated. However, flexibility over securing planning permission following initiation of the planning process would be allowed, as it is outside the customer's control; whereas a scheme would be classified as stalled if the customer had chosen to delay the start of their works.

SSEN

SSEN's approach has been to introduce a 'tolerance period' which allows projects to delay any milestone by a prescribed total period of time or allowance (12 months). This tolerance would cover all circumstances, such as delays in receiving planning permission, or delaying the start of works. Once the total tolerance period has been used the project will be subject to queue management and its position in the queue will be adjusted. Within this tolerance, queue position will not be changed. This tolerance period can be used across any progression milestones, in any circumstance, but can only be fully used once per project i.e. if a developer has exceeded its tolerance period and is subsequently moved down the queue a new tolerance period will not be provided for the new queue position.

NG ESO

Customer feedback indicates that circumstances can change during the lifetime of a project and there is a need for some flexibility to meet such unforeseen situations to ensure the project remains viable. Allowing a project to modify its connection date without being queue managed is one way of achieving this. Keeping this in mind, NG ESO's proposal for providing some scope to flex milestones is to allow a project two opportunities to modify its connection date prior to each milestone due date before being subject to queue management rules. Additionally, when a stalled project misses a milestone, it will be allowed to remain in the queue up to two times per milestone (albeit with a loss of queue position) before being terminated.

NGET

Whilst NGET supports incorporating scope to flex milestones into queue management, there needs to be a balance between the number of times it is acceptable for a project to stall against milestones and the length of time of the delay. NGET proposes having a maximum

period of customer driven delay of up to twenty-four months against the original contracted programme before being subject to termination. This should provide network owners with a way of mitigating the risk of exposure to significant investment spend. In addition, the project would only be deemed stalled if a third milestone is more than three months delayed, after which a modification application would be required. This can happen multiple times as long as the cumulative delay is not greater than twenty-four months. This should provide developers with an appropriate level of being able to flex their milestones.

Question 10: To guide the further development of queue management in 2019, what is your view on the scope to be able to flex milestones?

Once any scope to flex the milestones has been used, a scheme will then need to be managed out of (termination) or down the queue.

Termination

The option to terminate is well understood as it is the method of queue management currently used. Termination brings with it a number of issues for customers, the most significant of which is the need to re-apply if the customer still wants to proceed with the connection. The new application would be at the bottom of the queue and would then potentially pick up additional reinforcement or curtailment. It is even possible that the point of connection to the network could change. Another consideration with termination is in relation to cancellation charges for transmission works, because upon termination any cancellation charges would need to be paid by the customer.

Managed up and down the queue

An alternative option being developed is to manage a customer down the queue of contracted customers if they have missed a milestone (once all scope to flex milestones has been used). The precise rules as to how this happens needs further development, but the essence is that a customer will retain their connection offer, but will now require any reinforcement applicable to their new queue position. The corresponding action to this is that another customer could potentially be promoted up the queue, provided that they have made sufficient progress on their scheme.

Figure 12 below gives an example of how queue management could work. Note that this is not meant to describe an exact process, but is there to illustrate a general principle. In the original queue on the left, the customers are ordered by their acceptance date, as per the standard 'first to accept, first to connect' process. However, customer 1 has missed a milestone (with all scope to flex milestones having been used), whereas customers 2-5 are progressing in line with their milestones. Under queue management, customer 1 could be managed down the queue, behind those customers who are progressing, and customer 5 could be promoted up the queue, as they are progressing. This clearly benefits customer 5, who is in a position to proceed with their scheme and can now begin building without waiting for reinforcement. Customer 1, on the other hand, now picks up additional reinforcement requirements due to their revised queue position.

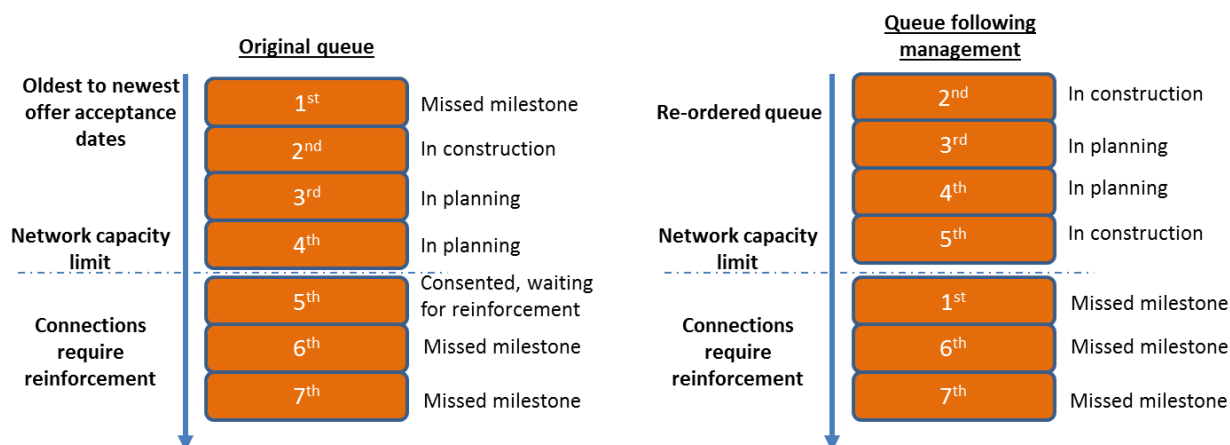


Figure 12: example of queue management

Securities and cancellation charges

Another implication of queue management is regarding the cancellation charges and securities required in relation to transmission works. Wider transmission reinforcement works are not directly charged to customers, but are recovered through the transmission use of system charge (TNUOS). To ensure that the financial risk of undertaking these works is suitably covered, customers in zones where transmission works are needed are required to pay a cancellation charge. This is a £/MW figure for each zone and is payable by the customer only if their scheme is cancelled. Therefore the cancellation charge is of significance where a scheme is terminated.

In zones where a cancellation charge is applicable, customers will be required to put up security against the cancellation charge, which is typically 45% of the cancellation charge for embedded customers and 42% for directly connected customers. This security (which can take the form of a direct payment, money into an escrow account, etc) is refundable once a scheme is connected. Securities become a concern in relation to queue management, as different positions in the queue may be subject to different levels of cancellation charge and therefore different requirements for securities.

If developers are not ready to connect they will move down the queue which could result in a change of transmission works required and therefore a change (likely to be an increase) in securities to be provided. If developers are able to move up the queue then this could result in a change to the securities to be provided, likely to be a reduction. Ensuring that liabilities and associated securities can be varied is therefore a crucial element to queue management. As it stands the current securities methodology allows developers to opt for fixed or variable securities. Fixing liabilities will provide a degree of certainty for developers over the predicted risk. Variable liabilities will expose the developer to actual spend over the security period. From the work completed to date, variable liabilities are essential to enable active queue management.

Question 11: What other comments would you like to make in relation to different approaches to queue management? Your comments will help to develop an agreed approach during 2019.

3.2 Proposed development of queue management in 2019

The following work is proposed to be undertaken in 2019:

- The development of consistent milestones across transmission and distribution
- The development of approaches to flex milestones as part of a queue management process
- Options for managing customers up and down the queue
- A further consultation on these options
- Publication of the Treatment of Flexibility report and updated roadmap based on the feedback received through this consultation and that undertaken by the Charging Futures Forum.

4 How to engage with the consultation

This consultation closes on 25 January 2019. If you would like to respond to the questions asked in this consultation, please send your responses to opennetworks@energynetworks.org. We intend to publish all responses on the ENA website, therefore if your response is confidential and not for publication, please clearly notify us or if elements are confidential, please provide us with a full version for consideration and a non-confidential version for publication.

All are welcome to respond. Feedback on this paper is welcomed from all stakeholders, including (but not exclusively): network users, energy market participants; network operators, independent distribution network operators, aggregators, suppliers, DER, consumers, community energy schemes, new and existing business models and technologies.

A summary of the questions asked in this document is below:

Question 1: Which of the processes do you prefer and why?
Question 2: What is your preferred method for network companies to handle additional offers issued during the interactivity period, and why?
Question 3: What is your view on allowing multiple acceptances, provided that there is sufficient network capacity? Should the process be improved as per the suggestion above from Workstream 1 Product 11?
Question 4: What is your view on how unsuccessful customers should be treated, and why?
Question 5: Which of the processes do you prefer for offers issued after the moratorium period and why?
Question 6: What is your view on the proposed approaches for allocation of Appendix G headroom, as an interim solution before the TIA process is introduced?
Question 7: What is your view on the proposed developments of interactivity processes for 2019? Are there other elements you would like to be developed?
Question 8: What are your views on the concept of liaising with customers in the connections queue to alleviate a constraint? Could it be used when there is no mature market available or as a temporary solution?
Question 9: What is your view on the proposals for milestones developed so far? Your comments will help to develop an agreed approach during 2019.
Question 10: To guide the further development of queue management in 2019, what is your view on the scope to be able to flex milestones?
Question 11: What other comments would you like to make in relation to different approaches to queue management? Your comments will help to develop an agreed approach during 2019.

Next steps:

- Following the close of the consultation, the responses will be considered and used to inform the production of the good practice guide on interactivity and queue management by the end of Q1 2019.
- Further work to develop new interactivity and queue management processes to address the gaps identified will be undertaken during 2019.

5 Glossary

Term	Definition
Workstream 1, Product 11	Facilitating Connections: Develop gap analysis and action plan for flexible resources in connection queues (including storage as per action 1.6 from the Smart Systems and Flexibility Plan) and publish to stakeholders.
Workstream 2, Product 2	Management of capacity
Workstream 2, Product 5	Good Practice Following Connection Applications: Review approaches for handling customer connections in the post-application phase and agree good practice.
BEGA	Bilateral Embedded Generation Agreement. A BEGA is an agreement type for embedded generators that require access to the transmission network. A BEGA will provide a generator with Transmission Entry Capacity (TEC) and allow it to operate in the balancing market.
BELLA	Bilateral Embedded Licence exemptible Large power station Agreement. BELLAs are an agreement type for generators that are classed as 'large' and are smaller than 100MW. For this reason it only applies in Scotland, because generators smaller than 100MW but greater than or equal to 50MW in England and Wales are 'medium'.
CUSC	Connection and Use of System Code. The CUSC is the contractual framework for connection to, and use of, the transmission system in Great Britain.
Customer	A person who is the owner or occupier of premises that are connected to the Distribution System or Transmission System.
Distribution Network Operator (DNO)	The person or legal entity named in Part 1 of the Distribution Licence and any permitted legal assigns or successors in title of the named party.
ENWL	Electricity North West Limited
IDNO	Independent Distribution Network Operator
Modification Application / Project Progression	Processes defined in CUSC for making applications to NG ESO
NGET	National Grid Electricity Transmission
NG ESO	National Grid Electricity System Operator. NG ESO is responsible for ensuring the stable and secure operation of the whole transmission system.
NPG	Northern Power Grid
SHET	Scottish Hydro Electric Transmission, part of SSEN
SPEN	Scottish Power Energy Networks
SSEN	Scottish and Southern Electricity Networks
Statement of Works (SoW)	Transmission Operators (TOs) are licensed to develop, operate and maintain the high voltage system within their own distinct onshore transmission areas.
UKPN	UK Power Networks
WPD	Western Power Distribution