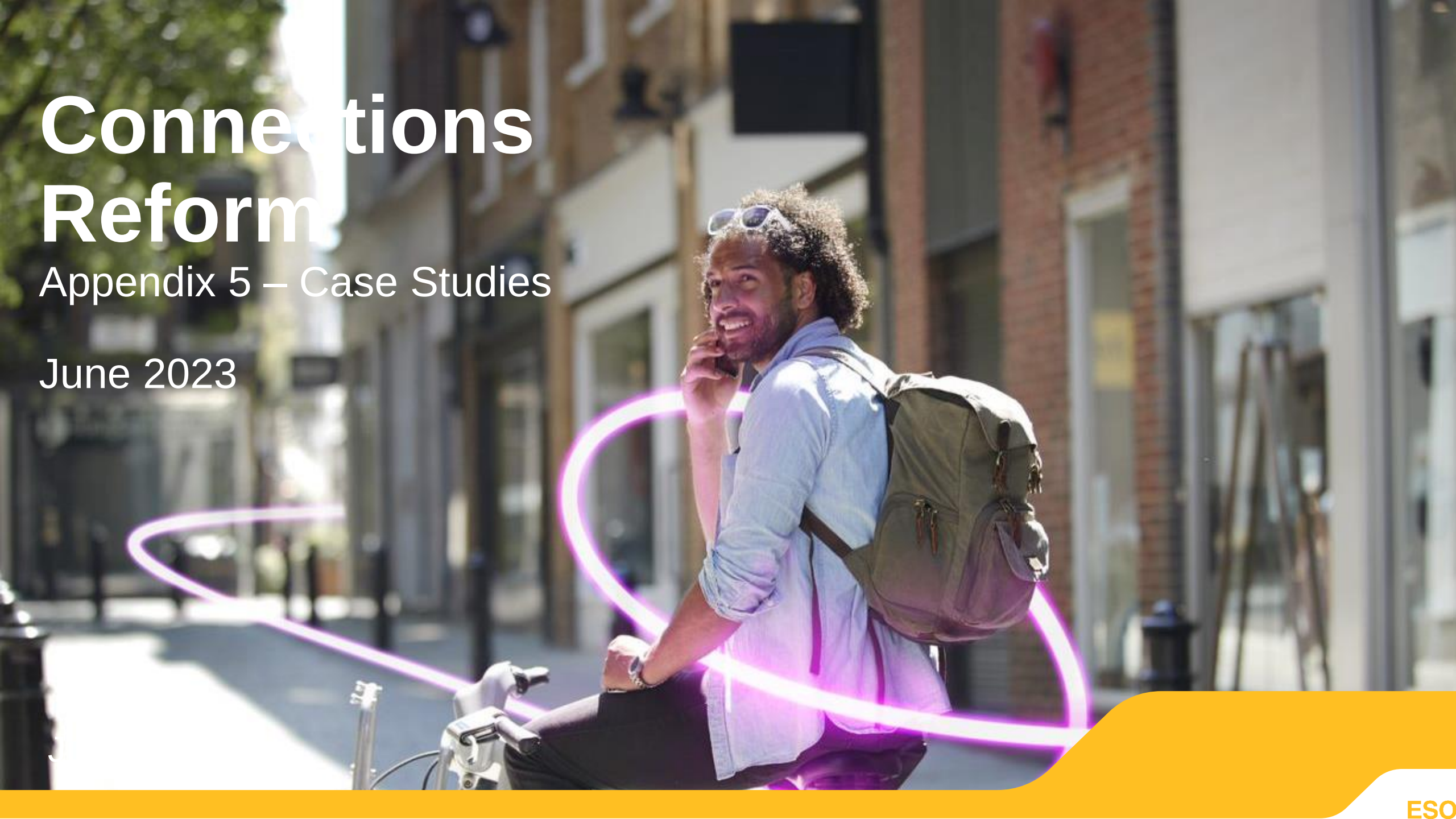


Connections Reform

Appendix 5 – Case Studies

June 2023

ESO

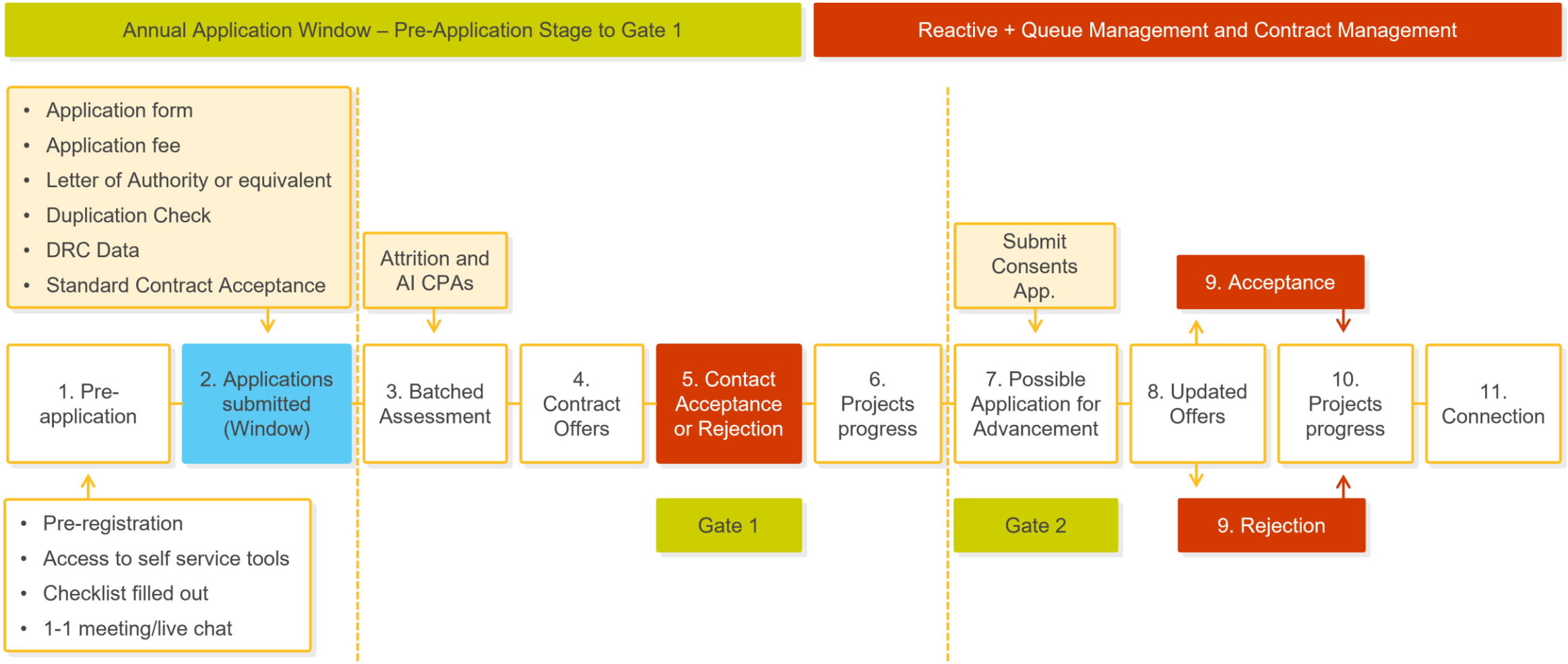
Target Model Option (TMO) 4 – Hypothetical Case Studies

The following diagram shows an example of an annual application window, and what would follow on from an application window under TMO4.

We have developed hypothetical case studies which show how TMO4 could work for different customer/applicant types. Some of the case studies refer to the period of time before and/or after an application window has been undertaken, so please keep this in mind when reading the case studies. We have tried to cross-refer to the numbers within the process flow where possible to show where there are links between the process flow and the case studies.

Additionally, some of the case studies make assumptions about changes to processes outside of the scope of connections reform. We have done this as we want to bring some of the end-to-end process to life with broader examples of how the process could work in future for connections customers. However, please keep in mind that other broader changes would be required for the processes to develop in the way described in relation to those areas which are outside of the scope of this project.

TMO4 Process Diagram



Case Study 1 – Onshore Generation Connections (Directly Connected[1])

A new 200MW onshore wind farm is seeking to apply to connect to the transmission system. The next application window Pre-Application Stage does not open for three months so there is a waiting period which they use to further develop their plans and obtain Letters of Authority for a couple of potential sites. Once the Pre-Application Stage opens **(1)** they submit the relevant pre-registration information and utilise the new self-service tools to further develop their project plans. This results in them deciding to progress with one of those two sites over the other on this occasion, as they can see that there is considerable network constraint and reinforcement requirements at one of their site options, due to there being a considerable level of interest there as part of the previous application window. They complete the pre-application checklist and as experienced developers they decide to bypass the need for a 1-1 discussion. They have also paid a nominal pre-application stage fee, which is to be deducted from the application fee.

When the application window formally opens **(2)** a few weeks later they submit their connection application, which involves a properly completed application form with relevant technical data, the payment of an application fee (minus the deduction), the provision of a Letter of Authority, which undergoes a duplication check (against the requests from the onshore wind farm and from other applicants), and the acceptance of the standard terms and conditions within the connection contracts. This application goes into a co-ordinated network design process **(3)** with all other accepted applications,[2] resulting in firm connection offers being made to all those accepted applications, including a confirmed connection site and a backstop connection date **(4)**.

Project developers who receive their connection contracts (i.e. project specific and non-standard terms) either accept or reject those offers **(5)** and that results in **Gate 1** being passed for that application window i.e. all projects accepting their offers formally pass **Gate 1**.

Whilst this is the end of that application window, all projects within this window remain as part of the same 'tranche' as their projects progress **(6)**.

No queue position is allocated to projects within this window (i.e. the least works connections in each window are reserved for those who first submit planning consents, rather than on a 'first come, first served' basis), but projects in this tranche are behind projects from the previous window, and ahead of projects in later windows.

Over the next couple of years, many projects terminate their contracts of their own accord whereas others are terminated via the reactive+ queue management arrangements. Many projects submit their planning consents applications which allows them to apply to ESO with an advancement application **(7)**. The 200MW onshore wind farm applicant happens to be the first project in their tranche to demonstrate this, so they request an advanced connection date to improve their backstop connection date. Whilst the option is open to also request an earlier non-firm connection date they decide against this option. After ESO/TO assessment of the request their queue position is allocated (i.e. first in this tranche in this case) at **Gate 2** and an earlier connection date is offered **(8)** and accepted **(9)** allowing this project to progress **(10)** to connection **(11)**.

It is worth noting that the earlier connection date offered was even earlier than it might have been due to the reactive+ queue management arrangements, as a project from the previous application window of the same size and in the same connection location had been terminated recently for non-progression towards their contracted milestones. The 200MW onshore wind farm was therefore able to leapfrog into their vacated position, considering there were no other projects at the **Gate 2** stage within that earlier application window. This did not impact any of the other projects in the earlier application window.

1. Please note that Directly Connected Demand would materially follow the same process.
2. Noting some applications have been rejected for a variety of reasons e.g. some have not paid their application fee whereas others did not have a Letter of Authority or failed the duplication check.

Case Study 2 – Relevant Embedded Generator (EG) Connection

The EG Perspective

A 10MW Solar Farm in the North-East wants to connect to the Distribution Network as soon as possible. The project developer looks at the high-quality information about the Distribution Network connections process published by the local Distribution Network Operator (DNO) and speaks to one of the team. It becomes apparent there may be an impact on the Transmission System which needs to be addressed before the project can connect. The project developer also takes a look at the high-quality network information which is published by the ESO and the local Transmission Owner to see that there are significant Transmission reinforcements ongoing and planned in the North-East related to the connection of new generation. This might affect the project's connection date.

The project developer applies to the local DNO, which confirms that the project has an impact on the transmission system and identifies the Grid Supply Point (GSP) for the purpose of a transmission assessment. The DNO provides the project developer with a contract which includes the distribution work and connection date (2027) and also confirms at the same time that there are transmission works which may delay the connection date to 2030. The DNO confirms that 2030 is a backstop connection date for the Transmission works and if the project developer returns when it submits its planning consents, it might be able to secure a transmission connection date earlier than 2030. However, the DNO confirms that it cannot promise this as it depends on what spare capacity is available when the project submits planning consents. The project developer accepts the contract and continues to develop its project and work on its planning application.

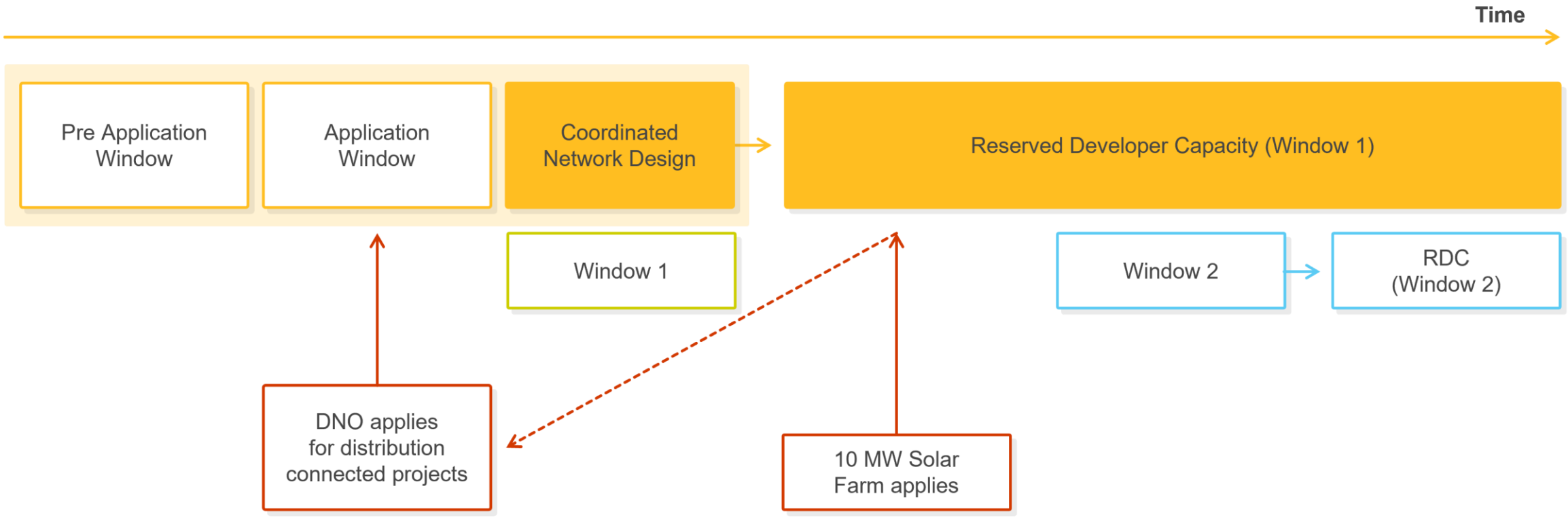
A few months later the project developer submits its planning application, which is accepted by the local authority and notifies the local DNO. The DNO engages with the ESO and comes back a few weeks later to confirm that the project connection date can move forward to 2028 because the project has proceeded quickly through the ESO's **Gate 2** and there is capacity available within the transmission system. The DNO also confirms that the project could connect in 2027 on a 'non-firm' basis until some transmission works are completed in 2028. The project developer accepts the contract change as it allows it to connect in 2027 when the distribution works are done, assuming the project's planning request is approved.

The DNO Perspective

The local DNO is constantly managing connections and forecasting generation and demand on its system. When the ESO introduced a reformed connections process last year (to replace the Statement of Works and Project Progression processes) the DNO got on the front foot and (supported by network information available in the Pre-Application Stage) **(1)** started to use its forecasts to apply through the ESO's annual application windows for Reserved Developer Capacity (RDC) at relevant GSPs **(2)**.

This allowed the DNO to continue to make firm offers to new applications which impact the transmission system so long as it has sufficient RDC at the relevant GSP. This means that most of the DNO's customers did not need to await the next ESO application window for the DNO to be able to confirm their transmission works and their backstop connection date when the DNO provided them with their distribution connection contracts.

RDC Process Diagram



Case Study 2 – Relevant Embedded Generator (EG) Connection (cont.)

This approach is possible as in the prior application window the DNO's RDC request was analysed through a co-ordinated design process, and at **Gate 1** the DNO was offered a backstop connection date for all projects within the tranche submitted within that window, plus the requested RDC **(3-5)**. In some cases, the backstop connection dates provided at **Gate 1** were not what the DNO's customers wanted (although they are better than they used to be) but the DNO was able to secure an earlier connection date (and offer even earlier non-firm access) when the projects submitted their planning consent application **(7)** at **Gate 2**.

If a project only applied to the DNO when it had already submitted its planning consent application, the DNO could approach the ESO immediately (as the DNO has RDC; if it did not, the DNO would need to await the next application window) and could go straight to **Gate 2**.

In relation to the 10MW Solar Farm specifically, since it was allocated its backstop connection date it has made considerable progress and submitted its planning consents and provided the DNO with that evidence. The DNO approaches the ESO with the relevant information and an advancement request **(7)** and the ESO checks what window the project (and the associated RDC given to them for their firm 2030 connection date) relates to. As the solar project reached **Gate 2** later that some of the other projects within their tranche there is a risk that the backstop date cannot be bettered. However, they also reached **Gate 2** earlier than some of the others so there is still spare capacity available, and the connection date can be brought forward to 2028 i.e. they no longer need to wait for the other in 2030 (associated with the backstop date).

The DNO also has arrangements in this area for non-firm access which means the solar farm's connection date can be advanced to 2027 if the project developer is willing to accept some non-compensable curtailment risk. This is what is offered by the ESO to the DNO **(8)** to pass through to the solar farm in respect of their use of the transmission system.

Case Study 3 – Future Offshore Leasing Rounds and Connections

Through strategic, iterative engagement between Government, the Future System Operator (FSO), Marine Scotland, Crown Estate Scotland and The Crown Estate, the most recent Centralised Strategic Network Plan (CSNP) and the strategic seabed leasing plan in relation to planned future leasing rounds are all well aligned.

Based on various factors being considered, including network factors and advice from the FSO in an advisory capacity, it was decided that 'XGW' would be leased in 'Region X' by The Crown Estate and 'YGW' would be leased in 'Region Y' by Scottish Government and Crown Estate Scotland and as a result the impact of this new capacity on the Transmission System of these future leasing rounds has been factored into the enhanced Future Energy Scenarios (FES) and the subsequent CSNP. As a result, strategic wider network reinforcements identified by the FSO commenced on an anticipatory basis in advance of the outcome of these future offshore wind leasing rounds.

Offshore wind connections seeking to apply to connect in anticipation of these leasing rounds are held in the Pre-Application Stage **(1)** until the next application window opens **(2)**. When the application window opens The Crown Estate and Crown Estate Scotland reserve bulk capacity for their future leasing rounds, aligned with the agreed strategic approach and CSNP.

Government has also designated (through a newly defined process) those who are to be successful in these leasing rounds as 'priority projects'. These offshore wind developers are still able to apply individually, but the capacity reservation process via application windows **(2)** with The Crown Estate and Crown Estate Scotland is used for network planning purposes. Offshore wind applications not aligned with this capacity reservation process do not have their connection applications accepted as they are considered to be speculative applications.

All other projects submit their connection applications **(2)** within the application window too, such as those applying onshore. There are a mixture of projects which submit connection applications, ranging from speculative projects to consented projects. There are also some other projects which have been designated as 'priority projects' too i.e. two new nuclear power plants. Many of the more speculative projects onshore are unsuccessful in submitting their connection application (mostly as they do not have a Letter of Authority).

The ESO updates the Construction Planning Assumptions (CPAs) in relation to the application window to i) apply a suitable attrition rate based on applicant composition and ii) to include anticipatory capacity in alignment with the enhanced FES and most recent CSNP.[3]

Leading up to **Gate 1** a co-ordinated network design process commences **(3)** based on the CPAs to identify the connection works and enabling works for the application window projects and this concludes by identifying the additional reinforcement works triggered by this tranche of applications and so the latest connection date for such applicants in each region/location.

All applicants (including The Crown Estate and Crown Estate Scotland in respect of the reserved offshore capacity) are then provided with connection contracts (although the offshore connections contracts are held back until the leasing round outcome is known so they can be provided to the winners) setting out their maximum works and backstop connection dates based on the CPAs, alongside an indication of their possible advancement options in the event that in future they successfully reach **Gate 2** i.e. the point at which they submit planning consents. Projects which then each **Gate 2** may be able to advance their connection date and/or connect earlier through non-firm access arrangements, and it is at this point they are given a formal queue position **(7)**.

3. See the following anticipatory investment Case Study for further information on the potential impact of this changes.

Case Study 3 – Future Offshore Leasing Rounds and Connections (cont.)

Those projects that had already met the **Gate 2** criteria at the point of application at **Gate 1**, and those designated as ‘priority projects’ are given a queue position, advanced connection date and/or earlier non-firm access arrangements, as part of the co-ordinated network design process, to avoid them having to subsequently go through **Gate 2**.

Therefore, ‘XGW’ in ‘Region X’ for The Crown Estate, ‘YGW’ in ‘Region Y’ for Crown Estate Scotland, the two nuclear power plants and all other applications from those projects that had already submitted planning consents at **Gate 1** are given the best possible connection dates from the outset (due to the co-ordinated network design process for their connections and their project status at application) whereas the others in the application window need to work towards **Gate 2** prior to submitting their own advancement application **(7)**.

Case Study 4 – Anticipatory Investment for Connections

Within an application window, prior to the commencement of the co-ordinated network design process **(3)** the ESO updates the CPAs to reflect the applications submitted **(2)** and to include attrition assumptions. This could (and should) also include anticipatory capacity in alignment with the enhanced FES and the most recent CSNP.

As a result, some anticipatory investment could be recommended within the co-ordinated network design related to that application window, as well as the network investment which is directly associated with the connection of the projects included within that window i.e. the works associated with the backstop connection date for those projects.

Once an application window concludes at **Gate 1 (5)**, two notable things happen as follows.

- The first is that the resulting transmission reinforcement works are apportioned and then progressed accordingly through the appropriate regulatory delivery model e.g. some may be designated as anticipatory investment and separately flagged as potentially being suitable for network competition, some may be designated as being on the critical path to connections and require acceleration (whether anticipatory investment or not) and exemption from network competition, some may be flagged for derogation rather than for construction, etc.
- The second is that the start of the subsequent application window process commences. As the (now previous) application window CPAs included anticipatory capacity aligned with the enhanced FES and the most recent CSNP, this subsequent application window includes heat maps and data in the Pre-Application Stage which have been updated to show considerable spare future capacity in certain regions in future compared to other regions, resulting in better potential connection dates for projects which have submitted planning consents and priority projects in some areas compared to others. Therefore, when the subsequent application window opens, whilst developers with competent applications can continue to apply where they wish, a change in applicant behaviour could potentially be seen i.e. developers may then seek to apply in the areas where anticipatory investment has been identified and where there could be a benefit to future connections. For example, where an ‘anticipatory investment connections hub’ is being developed in anticipation of there being considerable interest to connect in that area in future, even though there were few applications in that area within the most recent application window i.e. the anticipatory investment elements of the CPAs drove these investments, rather than the applicant (and attrition) elements.