December 2023

Connections Reform

Summary of final recommendations

ESO

Foreword

We are reforming Great Britain's electricity transmission network and connection process

I opened our initial recommendations consultation in June by saying that there is a clear and urgent need to reform Great Britain's electricity transmission connection process. The case for this is stronger than ever, with over 77GW of contracted generation capacity entering the contracted background since we published our consultation. We now have over 420GW of generation projects seeking to connect to the transmission network (including embedded generation projects this number increases to 573GW) and 11GW of demand projects. Renewable project developers continue to wait too long to connect to the network and this continues to hinder our progress to deliver net zero.

But the size and mix of the connections queue is also not likely to be reflective of an efficient trajectory to net zero. This raises wider questions that we intend to take seriously with Government, Ofgem and industry, in parallel to taking forward these final recommendations for reforming the connections process.

In addition to the material increases in connection applications, a lot has changed since we published our June consultation. The Energy Bill was recently made law and paves the way for the creation of a Future System Operator (FSO) from mid-2024. In mid-November, Ofgem also published its decision that the FSO will be the delivery body responsible for introducing Regional Energy Strategic Planners (RESPs), to ensure there is appropriate accountability and effective coordination for strategic planning at a sub-national level.

More specifically with regards transmission networks and connections, in late November, Government published the Transmission Acceleration Action Plan (TAAP). This was in response to the Electricity Network Commissioner's August recommendations. This set out Government's plan to halve the timeline for building new transmission network infrastructure from 14 years to 7 years. It also set out the intention to support a holistic approach, looking at every part of the design and delivery of transmission infrastructure, seeking to reduce timelines to a minimum, while engaging communities effectively and mitigating impact on the environment.

Government and Ofgem also published their joint Connections Action Plan (CAP) in late November. This set out their short and medium-term vision for future connections, which includes an ambition for transmission connection dates offered to be on average no more than six months beyond the date requested by the customer, for viable, net zero aligned projects. This followed Ofgem's decision in mid-November to approve our proposals to better manage the connections queue by inserting delivery milestones into connections contracts. The action plan also set out a range of other actions for industry, including the Electricity System Operator (ESO) / FSO, over the coming year, which we cover within these final recommendations.

All of these are hugely significant and welcome developments. Together they will introduce fundamental improvements to the way network infrastructure is planned and delivered at a regional and national level, and the way projects can connect to that network to transition efficiently to net zero. Each of those areas interacts with and aligns with our final recommendations and builds on the improvements to the connections process introduced over the last year through our 5-Point Plan and the Energy Network Association's (ENA) 3-Point Plan.

I strongly believe that our final recommendations will significantly reduce times to connect and materially improve the connections experience and journey for customers. But just as importantly, they will also closely align the connections process with wider Government and Ofgem policy and ensure the process is flexible and future-proofed, thereby delivering material benefits to consumers.

We commit to continue to work closely with industry over the coming year to develop and finalise the detailed policies and processes required with a view to go live with the reformed process in January 2025.

Julian Leslie
Head of Networks
Electricity System Operator

Executive Summary

Executive Summary

Context and Purpose

Timely grid connections are one of the key challenges facing our energy system today. These grid pressures are a direct result of our rapidly decarbonising energy system, and similar pressures are being experienced across the world as we transition from fossil fuels to renewables-based energy systems

As the ESO, we are responsible for the process by which generators, interconnectors and large-scale demand users connect into the electricity transmission system in Great Britain.

We recognise and share in the frustration of many in the energy sector that there is a long and slow-moving queue of projects seeking to connect. The outdated design of the regulatory and industry framework means that many of those projects are stuck behind projects that will never progress.Those frameworks also drive an incremental approach to network design, which is preventing us from introducing the coordinated approaches across Great Britain that we have used for offshore wind, delivering significant value for consumers[2].

As we transition into becoming an independent public body as the FSO from mid-2024, responsible for cross-vector strategic network planning (at a national and regional level), this incremental approach will also prohibit us from creating a whole-systems Centralised Strategic Network Plan (CSNP)[3] and a Strategic Spatial Energy Plan (SSEP) as envisaged within Government's recent TAAP [4].

[2] *A Holistic Network Design for Offshore Wind | ESO (nationalgrideso.com)*
[3] *Network Planning Review (NPR) | ESO (nationalgrideso.com)*
[4] *https://www.gov.uk/government/publications/electricity-networks-transmission-acceleration-action-plan.* Government set out in the TAAP that it will commission the ESO in early 2024 to work with government to develop the SSEP in line with the Electricity Network Commissioner's recommendations.

Executive Summary

In June we consulted on our initial recommendations for longer-term reform of the connections process. This followed intensive engagement with industry and wider stakeholders since October 2022 to fully understand and articulate the case for change, and to explore a wide range of possible solutions that will not only address the challenges with connections today, but will future proof the connections process for wider developments in the sector over at least the next 5 years.

This document summarises the key aspects of the c80 responses we received to our consultation[5], how we have considered these and adapted our proposals for a set of final recommendations for longer-term connections reform.

Our final recommendations need to be considered in the context of significant other changes to both the connections process (at transmission and distribution level) and the wider energy system.

In terms of changes to connections, since June we and the ENA, working closely with Transmission Owners (TOs) and Distribution Network Operators (DNOs), have made significant improvements to the connections process as part of our tactical initiatives.

[5] We summarise the feedback to our consultation on a question-by-question basis in Annex 1 and highlight key feedback within Chapter 2 and 3 of the main document in relation to each of the key themes.

These are allowing significant numbers and capacities of projects to connect more quickly, as summarised on the next page.

Ofgem and the Department for Energy Security and Net Zero also recently published their CAP, which set out their vision for the future of connections and the key actions they propose are taken forward over the next year to speed up connections to the electricity network.

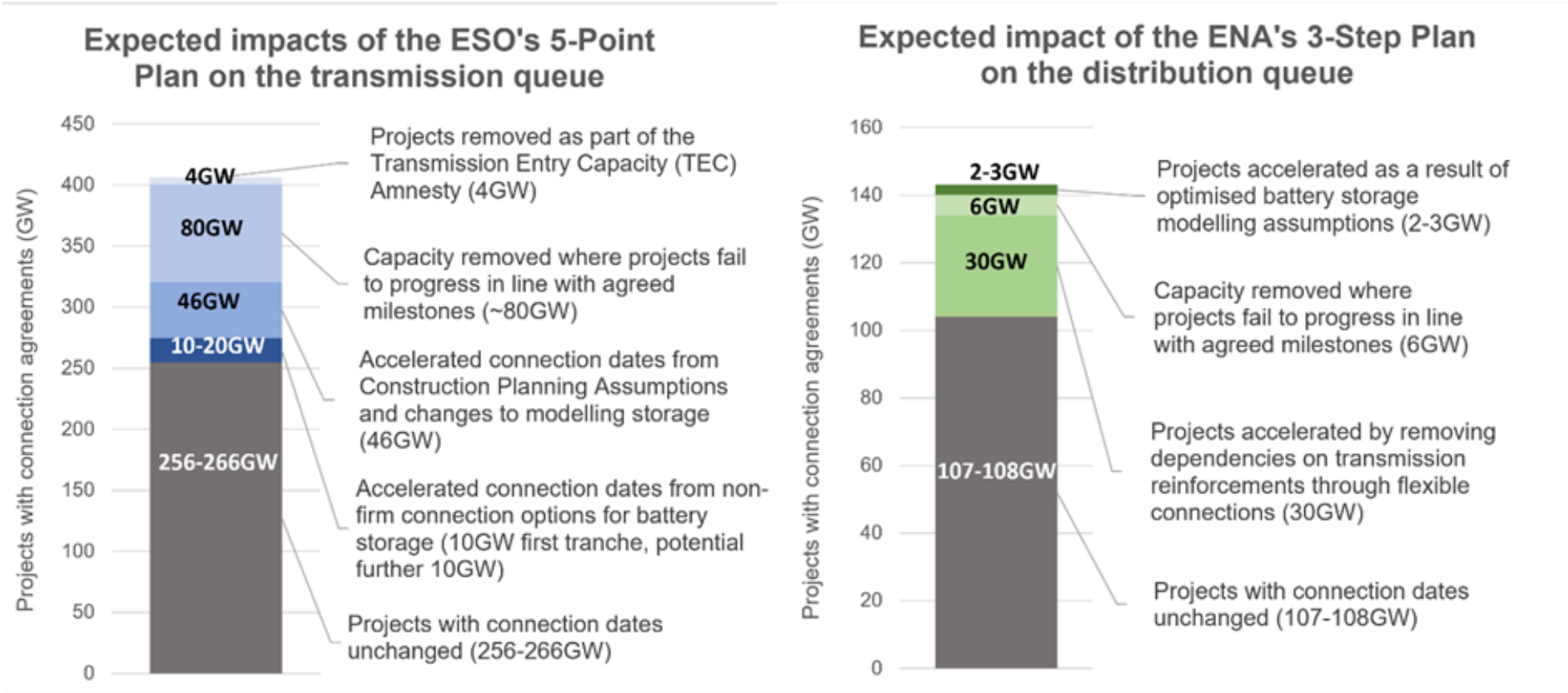
Many of those actions are currently underway and will conclude in Q1 or Q2 2024, but there is much still to do. Our final recommendations for reform address most of the remaining actions within the CAP, with additional actions sitting with the ENA (working with DNOs), TOs, Ofgem and Government.

This document also sets out our initial views on a range of additional actions that could be taken with a view to ensuring greater and quicker progress towards strategically planned networks, as well as a strategically planned energy system, as recommended within Government's TAAP. Any additional actions we take will need to be approved by the new Connections Delivery Board (CDB) being set up by Ofgem. They will also need to be accompanied by the wider reforms envisaged within the TAAP, which sets out steps to halve the amount of time it takes to build new transmission infrastructure.

Summary

Impact of actions we are taking now

Figure 1: Expected impact of ESO's 5-Point Plan and ENA's 3-Point Plan on the transmission and distribution connection queues respectively as of November 2023



Source: Ofgem and Department for Energy Security and Net Zero: CAP, November 2023

Summary

Actions we are taking in our 5-Point Plan:

1

Transmission Entry Capacity Amnesty:
We are currently processing c4GW of applications that had accepted termination or reduction, and we anticipate concluding that process by September 2024 - this is the length of time that it can take to finalise the Final Sums process that is associated with a Termination.

2

Modelling of Battery Energy Storage Systems (BESS):

The Construction Planning Assumptions (CPAs) include updated modelling of the network impacts of BESS. The key new assumptions are that BESS projects would not export at times of peak generation and import at times of peak demand; that not all BESS projects in an area will operate in exactly the same way and at the same time; and recognising that BESS operates for relatively short periods. This will allow many BESS projects to connect faster while increasing network capacity for other projects.

We currently estimate that the combined effect of initiatives 2 and 3 to accelerate connection dates of c46GW of projects.

3

CPAs:
The CPAs are the baseline assumptions we and TOs make around volume and attrition for different technologies which will be connecting to the transmission system. These assumptions are important as they directly inform how we design the network and transmission reinforcements that are necessary to connect projects, and that ultimately drive the dates and costs of connections. We are finalising a Transmission Works Review with the TOs that uses the new CPAs.

We expect that the completion of this review will confirm the transmission works that will no longer be required, which can then be used to accelerate eligible projects that responded positively to our Expression of Interest process to secure earlier connection dates. As a result, we aim to issue updated contracts (with earlier connection dates) to relevant projects by Summer 2024.

Summary

Actions we are taking in our Five-Point Plan:

4

Queue management:

On 13 November 2023 Ofgem approved our Code Modification Proposal (‘CMP376’) to introduce progression milestones into connection agreements to ensure projects progress to set milestones or face termination. Terminations of projects that are not progressing should free up capacity that can be allocated to projects that are progressing, thereby accelerating their connection. We published substantial guidance on implementation of the new contractual milestones on 27 November 2023.

5

Non-firm connection options for BESS projects:

We are accelerating the connection of BESS projects by removing the need for non-critical enabling works to be complete before they connect, under an interim non-firm connection.

We recently launched Tranche 1 for c20 customers (c10GW) of transmission connected BESS in England and Wales. These customers will be connecting on an interim non-firm basis an average of four years ahead of their firm connection date. Further tranches will be taken forward across England and Wales, and across Scotland, over the coming months, which we expect will accelerate a further 10GW of BESS projects.

Finally, through our work with the ENA and DNOs under their 3-Point Plan, a further c30GW of distribution-connected projects have had their connections accelerated by connecting them non-firm on a temporary basis, until all relevant transmission reinforcements are complete, when the connection will become firm and non-firm restrictions will be removed.

Summary

Our final recommendations for the reformed connections process

Our overall final recommendation is for the reformed connections process to be based on an **early application window** (with an indicative frequency and duration of 12 months) and **two formal gates**. This corresponds with **Target Model Option 4 (TMO4)**, which was our initially recommended connections process model within our June consultation.

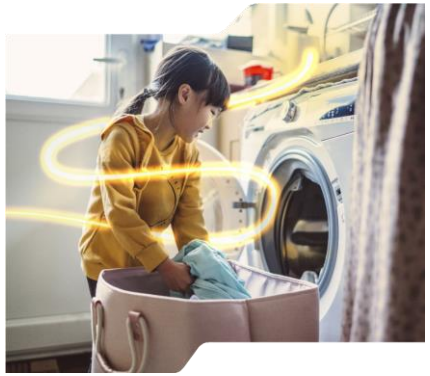
Gate 1 would provide connection offers based on a co-ordinated network design connection date[7]. Gate 2 would be used to determine queue position for projects within the application window and to accelerate viable and robust 'priority projects'[8], thereby enabling a 'First Ready, First Connected' approach.

The new reformed process (TMO4) should apply to all new generation and demand connection applications (or relevant Modification Applications) received after the go live date for the new process. This includes the connection of all offshore projects, including interconnectors and (in future) offshore hybrid assets, and for determining the connection dates of embedded generation projects (i.e. projects connected to the distribution network) that have an impact on or require use of the transmission system.

However, relevant new embedded generation projects would not need to wait for the application window as each DNO would reserve firm capacity for those projects, with that reserved capacity incorporated into the network modelling assumptions and methodology we would use to issue connection offers at Gate 1.

To enter into the connection application process and to receive a connection offer at Gate 1, we intend to introduce the requirement for developers to provide a Letter of Authority (LoA) from the local landowner relevant to the location of their proposed project.

Before 'go live' of the reformed connections, where capacity in the current queue is freed up (via the queue management arrangements referred to earlier), we intend to allocate that capacity to either priority projects or projects identified via an Expression of Interest process[9].



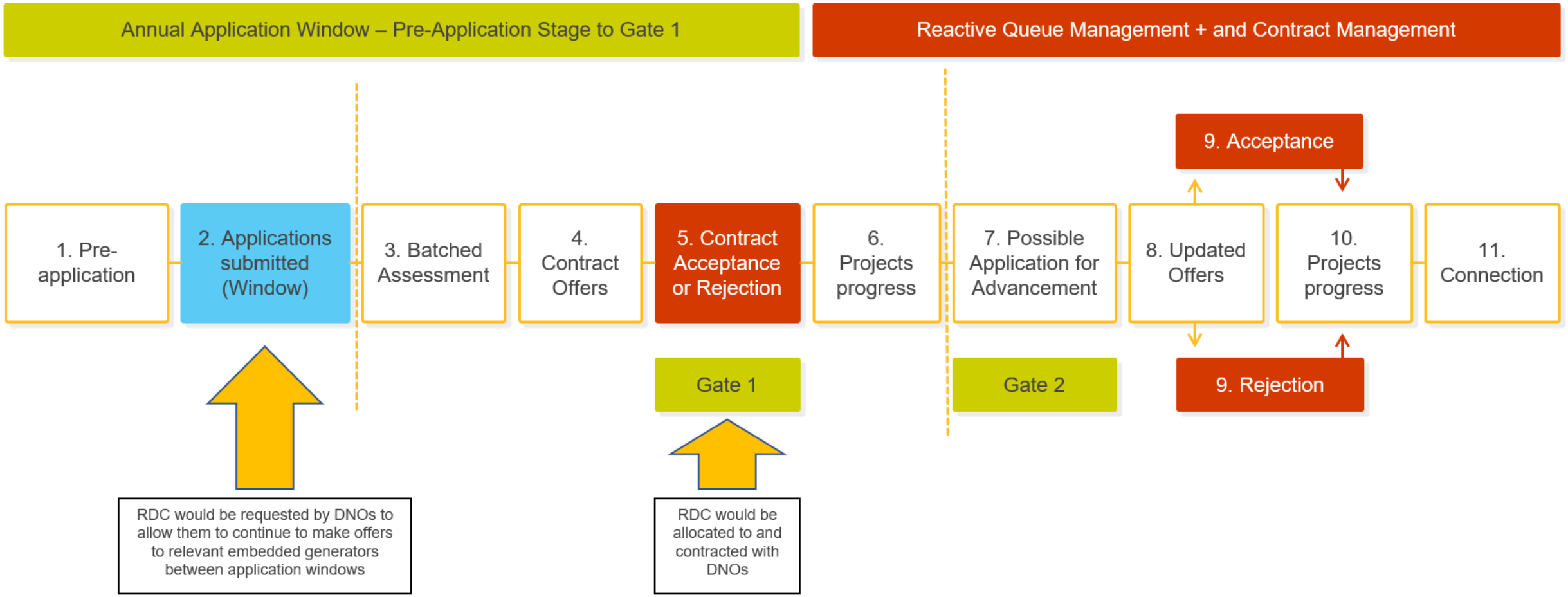
[7] This is the confirmed connection date for each project, unless that connection date is accelerated at Gate 2.

[8] We define priority projects as projects either: i) officially designated as strategic priorities by Government; or ii) that demonstrate significant additional consumer / economical / societal benefit, as identified by the ESO or the FSO in future; or iii) that have met the delivery milestones required by Gate 2 and have therefore demonstrated that they are ready(ier) to connect.

[9] The Expression of Interest process would apply until such time as Gate 2 arrangements are in place.

Summary

Figure 2: High-level visualisation of the future end-to-end connections process



Summary

Benefits of our proposed reformed connections process

We continue to consider that TMO4 best meets our design criteria and objectives and remains the most beneficial model for customers and consumers, as it:

- will provide the greatest opportunity for earlier connection dates for generation and demand projects across Great Britain, on a first ready first connected basis;
- will lead to more efficient and coordinated future planning of the network (i.e. onshore, offshore, and across transmission / distribution), thereby delivering savings to project developers and consumers;
- supports more efficient delivery of network infrastructure, by building out the network more efficiently in anticipation of need;
- better facilitates competition, innovation and the introduction of non-build solutions; and
- is most future-proofed and aligned to facilitate the TAAP and introduction of a SSEP, and best aligns to (and allows synergies with) the CSNP and strategic planning of offshore networks.

A majority of stakeholders (who provided a view in response to our consultation) agreed that TMO4 should be the preferred option, from what stakeholders generally agreed were a reasonable range of options presented within the consultation. However, some of this support was conditional on making some refinements or improvements to the model in several areas. Table 1 on the next page sets out more detail on each of these areas and our final recommendations on each, including how we will address consultation feedback as part of detailed design of the reformed connections process (Phase 3 of the connections reform programme) in 2024.

Summary

Area	Stakeholder view	Final recommendation	Further comments
Application window duration and/or frequency	Some stakeholders were concerned that an application window with an indicative frequency and duration of 12 months would result in them having to wait too long for a connection offer.	We recommend that the future reformed connections process includes an application window. We propose to work with industry and other key stakeholders during Phase 3 to further consider the frequency and/or duration of application windows, both for the first window following 'go live' and for future windows once the reformed process is more established.	We set out within our main recommendations document greater detail of the activities that would need to take place within an application window, including in relation to coordinated connections network design. At a high level we think that it will be challenging to run more than one application window a year, particularly the first time we run an application window under the new process, but we will consider this further as we develop the detailed design during Phase 3.
The process / methodology for small and medium embedded projects to receive a connection offer.	There were concerns from some stakeholders that the reserved firm capacity would not be forecast accurately by DNOs and so would run out, resulting in these projects needing to wait for the next application window.	We recommend the introduction of Reserved Developer Capacity (RDC) to allow DNOs to reserve 'firm' capacity within each application window, for allocation to certain projects to be connected to the distribution network. RDC would be incorporated into the network modelling assumptions and methodology used to create the coordinated network design. We recommend that RDC is forecast robustly and efficiently and that sufficient RDC is available so that Embedded Generation (EG) that is able to benefit from RDC will only need to await an application window in exceptional circumstances. From now on we will use the term Distribution Forecasted Transmission Capacity (DFTC) instead of RDC, as this is a more accurate description of the concept. We will finalise detailed design of DFTC during Phase 3.	The threshold range for EG which can utilise RDC will initially be set at: • Scottish Hydro Electric Power Distribution 1MW - <10MW • Scottish Power Distribution 1MW - <30MW • England and Wales 1MW - <100MW We expect that DNOs would submit RDC forecast requirements for up to ten years ahead. This ensures that there will be sufficient future capacity available to allocate to EG projects within the above threshold ranges in the inter-window period as and when they apply to the DNO for a connection. This further mitigates the risk raised by some stakeholders that DNOs will not have sufficient RDC available to allocate to such EG. Where such EG meets the Gate 2 milestone there is potential for an accelerated firm connection date. This ensures that transmission and distribution projects are treated on an equitable basis in respect of access to earlier connection dates where firm capacity is or becomes available i.e. in accordance with our broader TMO4 proposals. DNOs can offer earlier non-firm connections (e.g. via technical limits) to such EG projects in line with those arrangements, even where Gate 2 has not been met.
Confirmation of the milestone(s) a project needs to reach (Gate 2) in order to secure an accelerated connection date and the appropriate gate for the allocation of queue position.	There were concerns from some stakeholders that the milestone we initially suggested for Gate 2 (i.e. submit planning consent) was either too early or too late, and that there could be an improved approach to the allocation of queue position.	We recommend developing a series of network modelling assumptions and an associated network design methodology to create a coordinated network design as an output of each application window, to be used as the basis for issuing connections contracts at Gate 1 (and Gate 2). We recommend two formal stage gates (Gate 1 and Gate 2) for issuing and managing connections contracts, including queue position and capacity allocation.	During Phase 3 we propose to determine the most appropriate timing of capacity and queue position allocation i.e. whether to allocate queue position at Gate 1, or retain the initial recommendation for the 'co-ordinated network design connection date' approach that allocates queue position at Gate 2. During Phase 3 we also intend to determine the most appropriate timing and milestone for Gate 2, noting the interaction with the preferred approach to capacity and queue position allocation, as above.

Table 1: Our final recommendations in areas where there was conditional stakeholder support

Summary

Overall, we think that the improvements raised by stakeholders in relation to TMO4 are resolvable matters of detail that can be addressed throughout Phase 3 in 2024. We do not think these matters detract materially from the overall qualitative cost and benefit case for TMO4 compared to other potential models (as set out in Annex 3 to our main document).

We intend to work with industry and other key stakeholders during Phase 3 to develop the detailed design of the new reformed connections process on the basis of our final recommendations. The new reformed connections process will include the following additional key features:

- improvements to the pre-application stage, including access to various new self-service tools and data; and improved pre-application meetings;
- amended application fees and financial security arrangements to align with the new end-to-end process;
- specific amendments for offshore projects (e.g. to the LoA) to reflect interactions with The Crown Estate and the Crown Estate Scotland and their offshore leasing processes;
- a fast track process to address any disputes;
- consideration of how to ensure efficient and appropriate interactions with other key processes, such as the Capacity Market regime and our Network Services Procurement (Pathfinders); and
- consideration of the most appropriate arrangements for future strategically important demand projects, including whether there should be a case for capacity being reserved by a central body (with the identity of such central body to be confirmed) in a process akin to the approach to relevant embedded projects or for offshore projects.

We also intend to introduce a number of further improvements via the reformed connections process, which are set out in our main document. These include a better definition of Transmission Import Capacity; and a ‘use it or lose it’ mechanism for connected projects, which will ensure more efficient capacity reallocation where projects are no longer using their contracted capacity but are yet to relinquish it. These improvements are lower priority and will therefore be taken forward to a slower timescale than the key features referred to above.

Summary

Our proposed implementation strategy and timeline for go live

We recommend that the key aspects of TMO4 are developed on an expedited basis during Phase 3 as part of the Minimum Viable Product (MVP) for the reformed connections process.

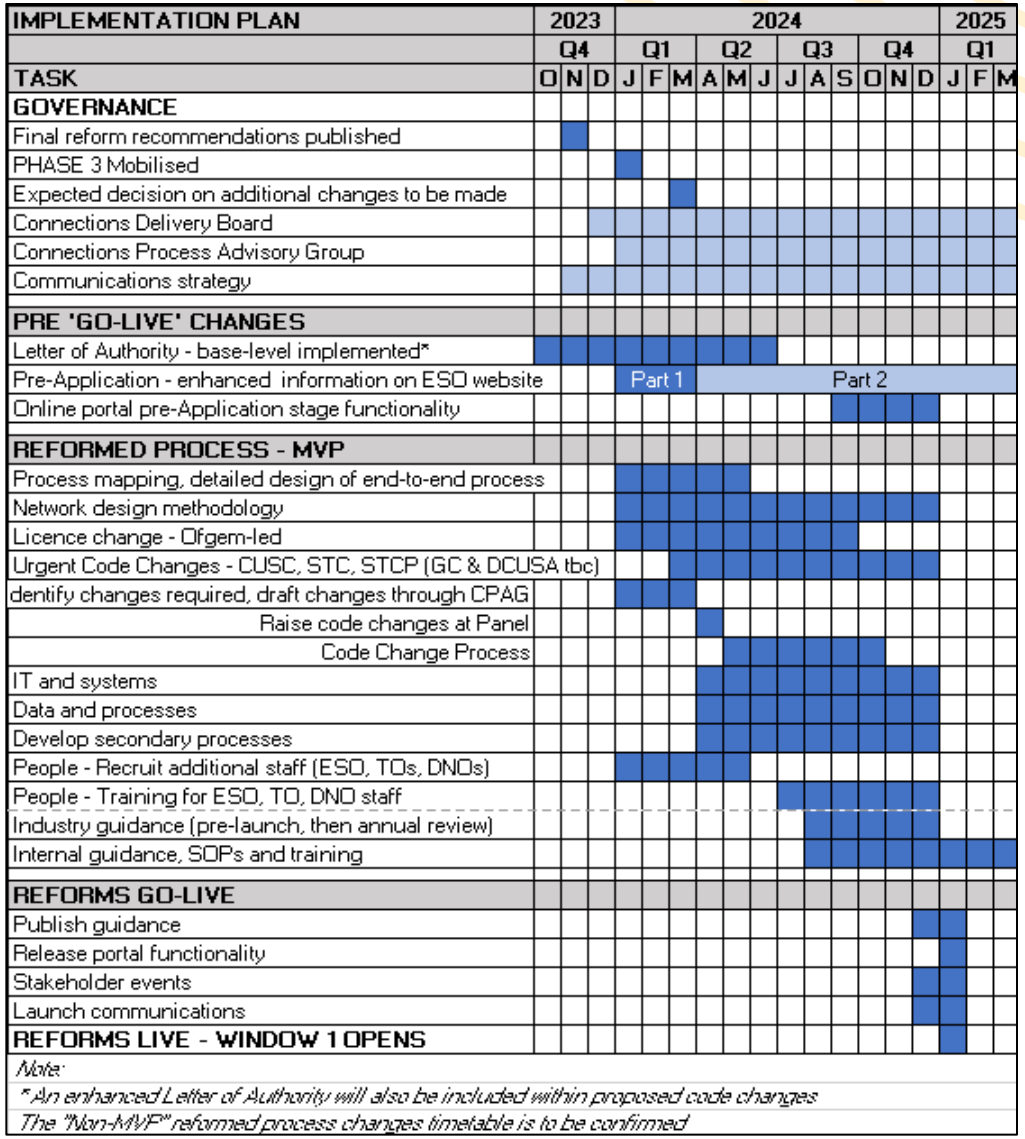
We are aiming for **go live of the reformed connections process by 1 January 2025.**

This timeline is based on progressing the necessary code modifications related to the MVP under the urgency criteria for code modifications. This would be with a view to submitting these modifications for approval by Ofgem in mid to late 2024.

An indicative high-level implementation plan is included here and in the final recommendation report. This also shows the other workstreams that will be taken forward to allow go live, including licence changes, detailed process design, process/guidance/methodology development and changes, and key data and technology changes, including our IT platform.

(Continued on slide 15)

Figure 3: High level implementation plan



Summary

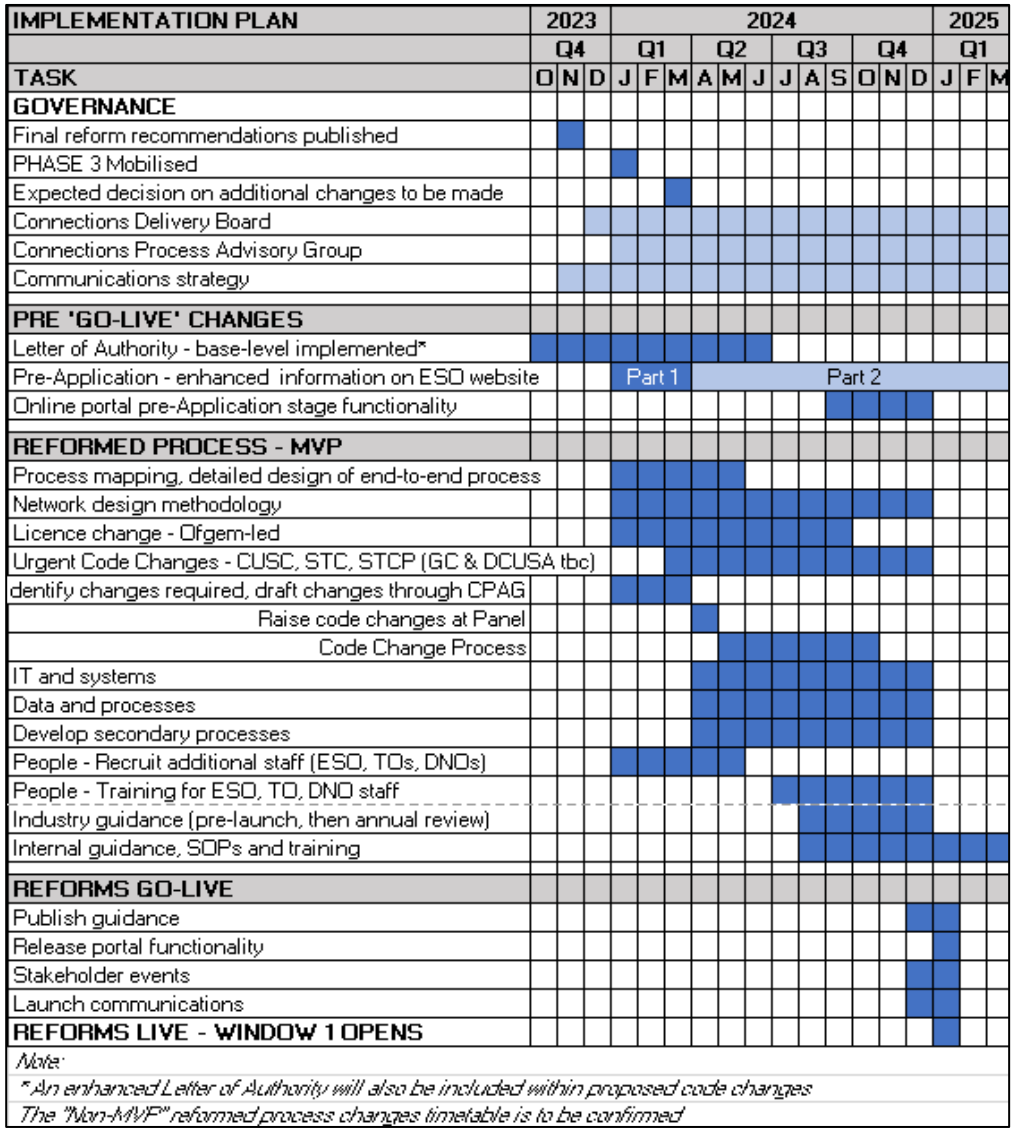


Figure 3 (repeated): High level implementation plan

Due to overwhelming support from consultation respondents, we will be progressing the introduction of the LoA and the pre-application process improvements to an even quicker timescale. From mid-December, we intend to request LoAs on a voluntary basis from new and existing applicants. In parallel we expect to raise code modifications for the introduction of the LoA under the urgency criteria for code modifications in December 2023, with a view to provision of an appropriate LoA being a mandatory requirement for new applicants from Q2 2024. We also intend to provide access to significantly improved self-service tools by end March 2024.

We will create a new Connections Process Advisory Group (CPAG) from January 2024, with an independent chair, to enable industry to steer the detailed process design and code modifications within the parameters set out in our final recommendations.

In addition, we will engage closely with the new CDB announced by Ofgem and the Department for Energy Security and Net Zero in the CAP. The CDB will provide strategic direction on changes to the connections process and hold organisations to account for timely and coordinated delivery of these changes.

We consider that the 1 January 2025 proposed go-live date is challenging, but achievable with substantial input and commitment from delivery bodies and industry, particularly those involved in the CPAG and code modification work groups. We look forward to working collaboratively with industry to deliver changes robustly and at pace.

Summary

Additional changes we could make before or in parallel with ‘go live’ of the reformed process

Ofgem and the Department for Energy Security and Net Zero set out in the CAP that while the actions being taken now via the 5-Point Plan and the 3-Point Plan are reducing connection timescales, in their view, these do not go far enough. The CAP therefore sets out where Ofgem and the Department for Energy Security and Net Zero think that more is needed. This includes a list of actions for the ESO and network companies in 2024 and beyond. We consider that our final recommendations, as summarised in this document, address most of these actions. However, the CAP includes some actions for us to consider that go above and beyond our final recommendations. These actions mainly relate to further potential steps to address the size and mix of the current queue, to further accelerate connection dates and ensure a pipeline of expected projects and connection dates that is consistent with net zero.

This is particularly relevant in the context of the recent rapid growth to the current connections queue, with over 175GW of capacity added over the last year. Furthermore, the total capacity currently in the connections queue is materially higher than even the Leading the Way scenario in our Future Energy Scenarios (FES) 2023, even factoring in historical project attrition rates. In addition, the current mix of capacities of project technologies in the queue deviates very materially in a number of technology areas from the mix anticipated in this same scenario in the FES 2023.

The introduction of queue management milestones (CMP376) should start removing non-viable projects from the queue and may help reduce application rates. However, it will take time to start terminating any material number of projects (potentially into 2025 depending on whether/how customers modify their connections). Depending on the technology of projects that are terminated via CMP376, it may also have little or no impact on the mix of technology capacity.

It is important that we therefore consider other opportunities to maximise the benefits of the reformed connections process, in a coherent way across the system, and with a clear view and alignment to longer term policy. Any additional actions we take to improve connections need to align with our final recommendations. They also need to be agile and responsive to the market and to wider policy changes as described earlier in this document, for example the TAAP, including the potential introduction of the SSEP, and Government’s Review of Electricity Market Arrangements (REMA).

Ofgem and the Department for Energy Security and Net Zero set out in the CAP that they expect recommendations on further beneficial actions, based on well-developed proposals, to be taken forward and shared with the CDB as soon as possible, and in time to enable decision the end of Q1 2024, or earlier where possible, moving swiftly to implementation. Any further actions would therefore need to be introduced either before or alongside go live of the reformed connections process (TMO4), to reduce connection dates for as many projects as possible and to deliver the benefits of the reformed connections process as soon as possible.

We have therefore been working with network companies, the ENA, Ofgem and the Department for Energy Security and Net Zero to seriously consider additional actions to supplement the benefits of the connections reform initiatives underway. These include steps to significantly reduce or reorder the current connections queue or create more capacity on the network more quickly so that projects that are readier to connect are able to connect more quickly.

Summary

We set out within our full final recommendations document further detail on a shortlist of possible further actions, most of which are also referenced as possible options within the CAP. These are a mix of one-off actions (e.g. to materially reduce or reorder the current queue) that would be introduced before or in parallel to go live of the reformed process; and enduring actions that could be easily incorporated into the design of the reformed connections process at or following go live, as they would be compatible with the overall design of TMO4.

We have grouped the actions into the following sets of indicative packages, to reflect coherent themes or combinations of actions that would provide additional impact if taken forward together:

1. A package of low regret or enabler actions;
2. A package of actions that focus on whether and/or how to change network modelling tools to reduce amount of network reinforcement that needs to be built;
3. A package of actions that may support a transition towards strategic energy system planning, by designing network connections based on a more central view of what the system needs;
4. A package of actions that focus on using the power of markets to try to re-order and reduce the queue so that the most viable projects are prioritised; and
5. A hybrid of packages 3 and 4.

Packages 1 and 2 could be taken forward alongside any of packages 3, 4 or 5. Packages 3, 4 or 5 would be mutually exclusive.

Finally, although not included as a specific package, we also consider a grouping of potential additional actions to support the efficient transition towards implementation of the reformed connections process. These include for example a brief moratorium on new connection applications to allow more time for network companies and customers to become accustomed to and transition towards the new processes and arrangements that will be used after ‘go live’.

We propose to further engage closely with Ofgem, the Department for Energy Security and Net Zero and network companies, including DNOs and the ENA on package 1, with a view to taking forward those actions as quickly and efficiently as possible, ideally from Q1 2024. Although, we note that implementing some of the actions is dependent on decisions from Ofgem, and the other actions are dependent on close collaborative working with TOs and DNOs and delivery of processes, data and assets by those parties.

We plan to investigate the cost benefit case of package 2 and communicate our views to the CDB in Q1 2024, as requested within the CAP. In our view any decision on package 2 needs to be taken in the context of any decision on packages 3, 4 and 5.

Given their impact, risk and relationship to wider policy areas such as SSEP and REMA, we consider that any ultimate decision on whether to implement packages 3 or 4 (and as a result potentially also package 5) would need to be made by Ofgem or Government. As requested within the CAP, we intend to provide further information on how each package could work to CDB in Q1 2024, to help facilitate any decisions.

Finally, as also requested within the CAP, we intend to discuss the potential additional actions to support an efficient transition towards implementation of the reformed connections process at the CDB in Q1 2024. This is so that a decision can be made on these in good time before ‘go live’ of the reformed connections process.

Thank you for reading our 2023 GB Connections Reform Summary of Final Recommendations Report

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For further details on the ESO Connections Reform, please visit our website at [Connections Reform | ESO (nationalgrideso.com)]