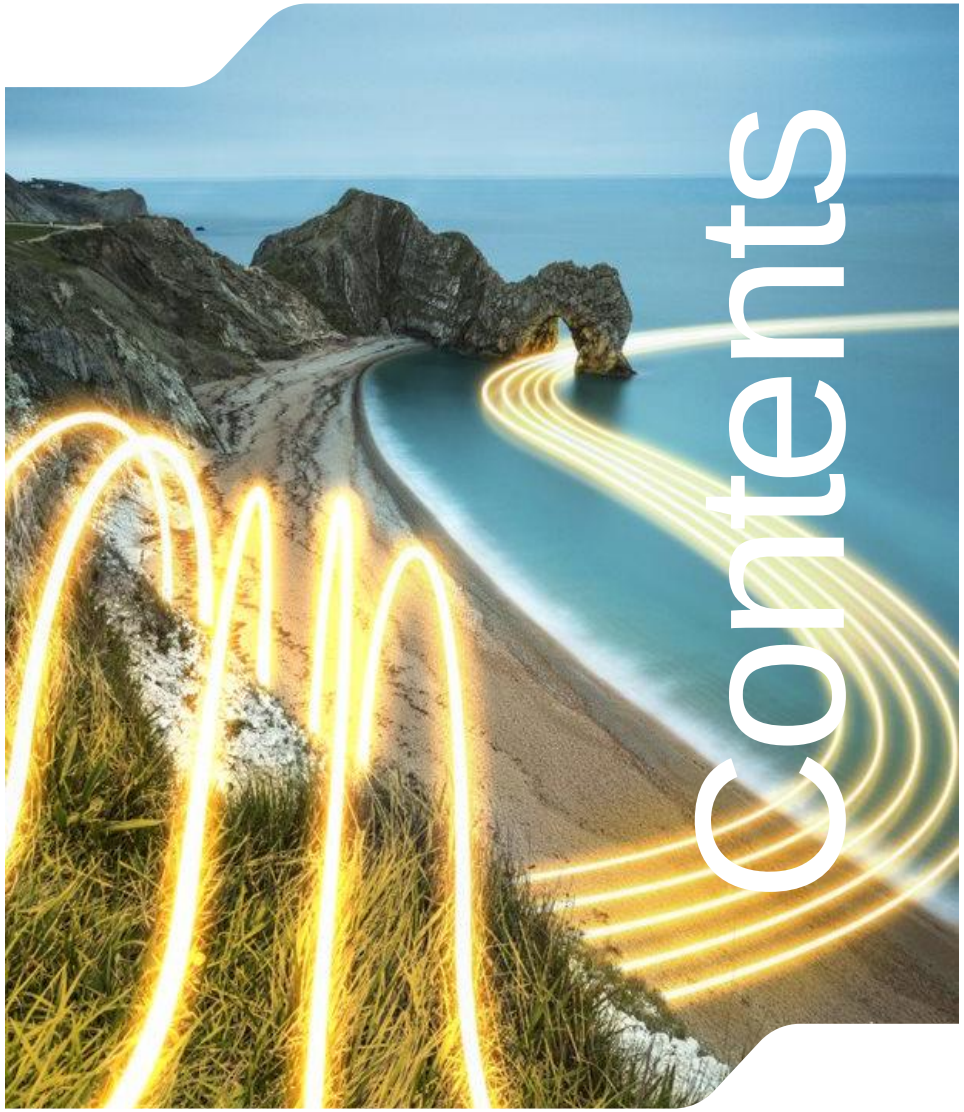
June 2023

Connections Reform

Consultation

ESO



1. Current Issues, Phase 1 Overview and Wider Context

Current Issues

The current connections process, which was originally focused on connecting a small number of large fossil fuel plants every year, has not kept pace with the rapid changes occurring in the energy sector. As a result, the current process is not likely to enable the connection of the necessary volume of renewable generation and other associated technologies quickly or efficiently enough – both from the perspective of project developers and in terms of securing best value for consumers and meeting Net Zero targets.

Our Future Energy Scenarios (FES)[1] suggest that delivering Net Zero will require connecting new capacity and new types of customers more quickly than at any time since the current process was established.

Incorporating this new generation and demand will give rise to an increasing volume of connections, as well as significant shifts in the nature of connecting customers and their needs. The current connections process was not designed to accommodate these changing market needs.

We have seen a major increase in new connections applications volumes in the past five years, but in 2022 and 2023 we are seeing a more accelerated growth trend that is exceeding the FES growth projections. As shown in Figure 1.1, between 2019/20 and 2022/23 the volume of new connection applications[2] submitted per year grew nearly fivefold, and the total volume of applications (including project progression applications[3] and modification applications[4]) grew over threefold.

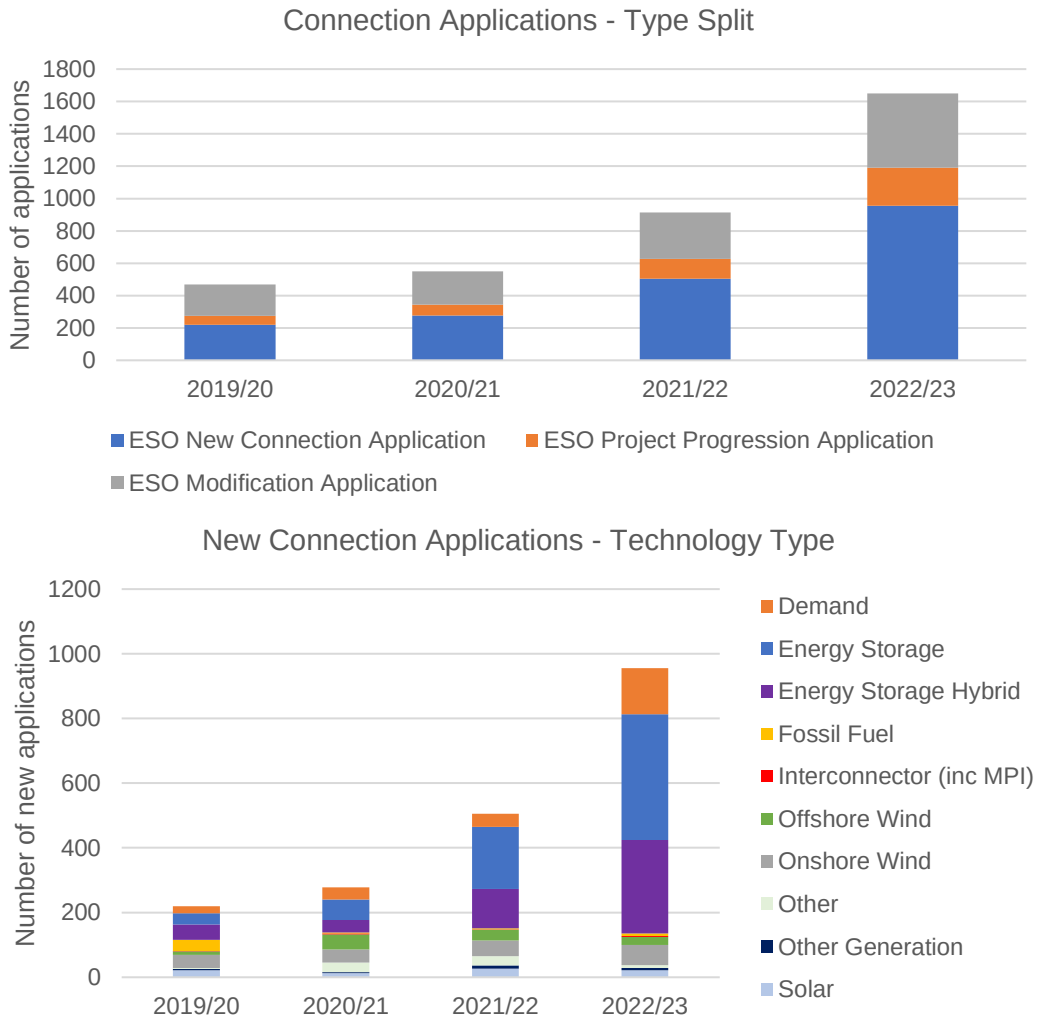


Figure 1.1: Number of applications by type and number of new connection applications by technology

1. Future Energy Scenarios | ESO (nationalgrideso.com)
2. New connection application: a new request to connect to and/or use the transmission system
3. Project Progression: A request from a DNO on behalf of embedded generators that impact on or use the transmission system
4. Modification Application: A request to change an existing connection contract

Current Issues

In addition, increasing numbers of connection contract offers are being signed by developers, as can be seen in Figure 1.2. However, over the same period we had a decline in the percentage of offers being signed for all application types. Table 1.1 below shows that the percentage average conversion rate from application to contract offer acceptance fell from 82.9% in 2020/21 to 65% in 2022/23, despite growing application rates. This indicates that there is increasing volume but also increasing wasted effort.

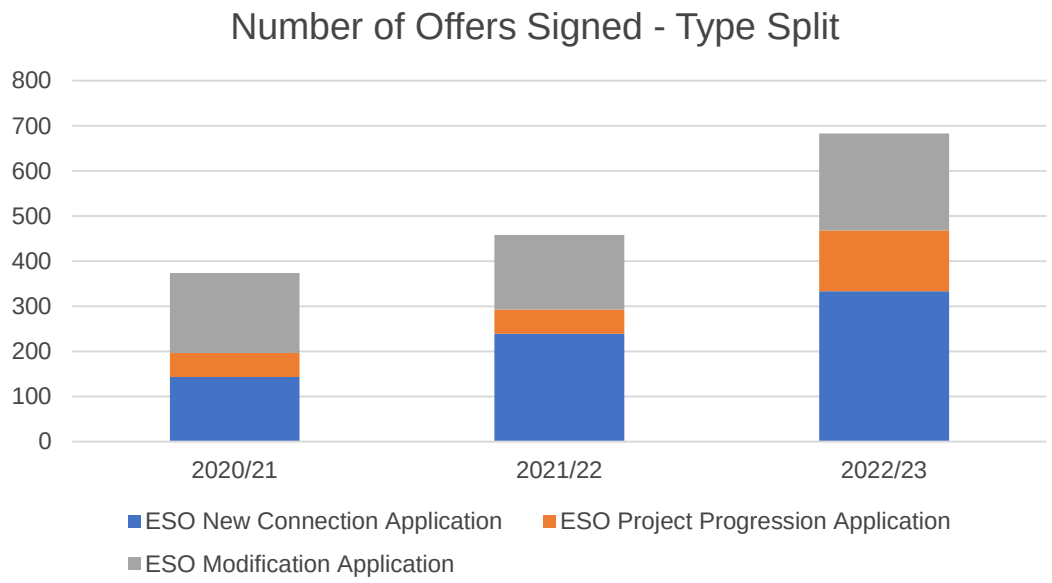


Figure 1.2: The number of signed contracts by application type between 2020/21 and 2022/23

Percentage of offers being accepted			
Application Type	**Year and Percentage**		
	2020/21	2021/22	2022/23
New Connection Application	79.9%	68.5%	59.4%
Project Progression Application	81.5%	73.0%	70.7%
Modification Application	86.0%	75.0%	72.1%
Average	**82.9%**	**71.2%**	**65.0%**

Table 1.1: Application to contract acceptance conversion rate

Current Issues

Figure 1.3 shows that there is a growing disconnect between what connection date is asked for in an application, what date is provided in the subsequent offer and how this is then reflected in future connection dates. Figure 1.3 also shows how the difference between requested and provided connection dates has grown. Figure 1.4 shows the capacity per Transmission Owner (TO) that is connected and due to be connected in future – this shows that significant capacity is due to connect over the next 16-year period.

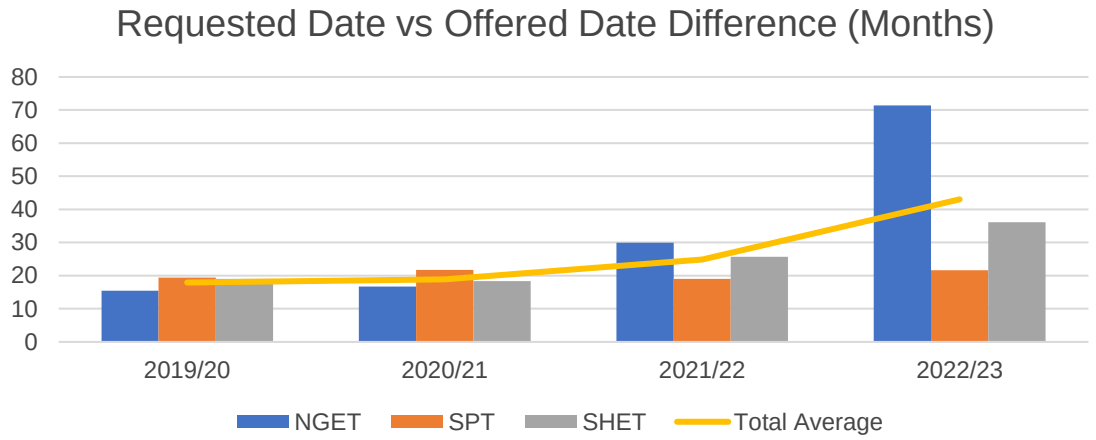


Figure 1.3: Comparison of requested date vs offer date.

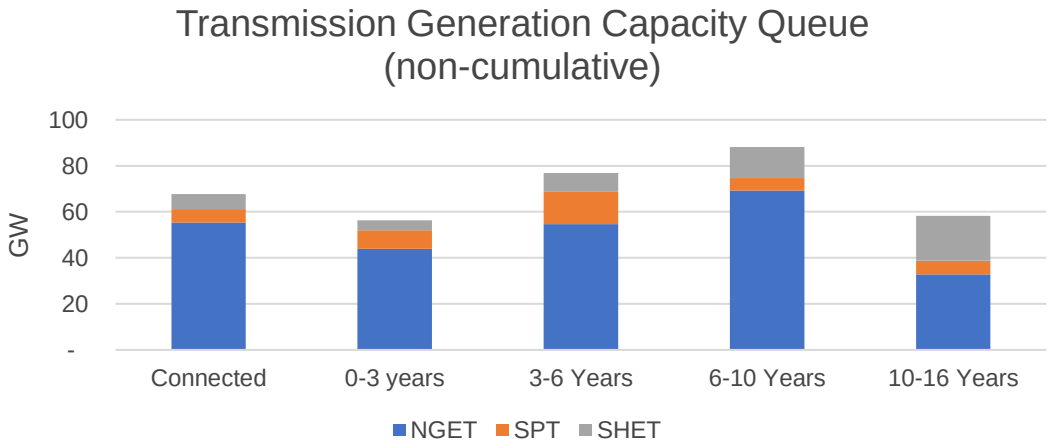


Figure 1.4: Transmission generation capacity queues

Phase 1 Overview

Connections Reform Phase 1 Overview

We launched the connections reform project in October 2022. The aim of the project is to design and deliver a reformed connections process that facilitates quicker connection to and use of the electricity transmission system, and in a more coordinated and efficient way, in order to help meet Great Britain's Net Zero ambitions and targets.

Phase 1 of the project provided us with an opportunity to speak to all those involved in the connections process e.g. Customers, TOs, Distribution Network Operators (DNOs) and internal ESO stakeholders to fully understand the challenges highlighted above. We spoke to over 100 people across 32 bilateral and multilateral workshops and asked them about their experience of the connections journey, their needs across that journey and areas of importance to them. During this engagement activity, five key themes emerged, which we included in our Case for Change report[5] at the conclusion of Phase 1 in December 2022:

1. Options need to be collaboratively developed throughout the connections' lifecycle;

2. Rapid connections need to be progressed on their merits;

3. A simple, transparent and coordinated approach to connections;

4. Easy access to self-service tools, consistent data and quality insight; and

5. Consistent, skilled and well-resourced engagement.

In the sessions with customers, we carried out a prioritisation exercise to determine the most pressing points. The most common feedback across all segments was that:

- Connecting quickly was the top priority across all sessions; and
- Cost, ease of ability to change their offer and the speed of providing the offer were lower priority.

The detailed results of the polls can be found in Appendix D of the Case for Change report. Also, details around stakeholder issues and needs from each of the internal and external workshops held are available in Appendix B of the Case for Change report.

Design Criteria

The five key themes above formed the core of our Phase 2 design criteria and objectives and have been further developed in Phase 2.

The current design criteria now being used in Phase 2, which we tweaked slightly following engagement with the Steering Group, can be found in Appendix 2.

5. https://www.nationalgrideso.com/document/273021/download

Wider Context

We are not waiting for implementation of connections reform in order to improve the connections process. We are working with TOs and DNOs to progress a number of tactical changes to address some of the issues highlighted within our Case for Change report.

There are also other major reform projects that are progressing both within the ESO and across wider industry that will have an impact on connections.

Tactical Changes to the Transmission Connections Process and Other Recent Reforms

We have been implementing a range of tactical initiatives since September 2022 to address some of the issues with the current connections process in the short to medium term. These are tactical changes that can be made within the scope of the existing regulatory and wider industry frameworks (e.g. industry codes) and therefore they cannot address some of the wider issues highlighted within this consultation. However, we think that these tactical changes should provide improvements to the connections process and connection dates, especially where (in some places) they are in combination with the proposals within the consultation.

On 22 February 2023 we launched the 5-Point Plan, which is a number of tactical initiatives developed to try to improve the time it takes to connect to the electricity transmission system in the shorter term, ahead of connections reform driving longer term changes.

The five projects that form the 5-Point Plan are shown in Figure 1.5 and an overview of each is provided as follows.

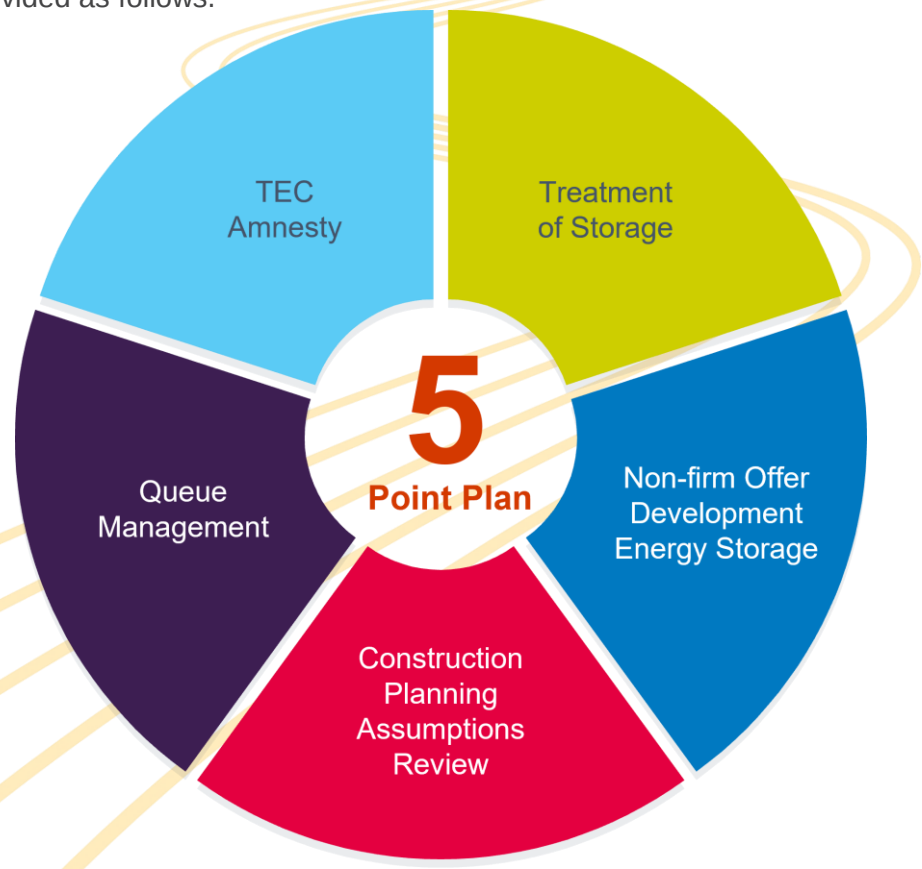


Figure 1.5: 5-Point Plan

Wider Context

Transmission Entry Capacity (TEC) Amnesty

The TEC amnesty was announced in September 2022 as a process run by the ESO, in partnership with the TOs. The ESO invited all parties with connections agreements listed on the TEC register (i.e. generation developers) to confirm whether they would be willing to terminate their connection agreement at minimal or no cost, or reduce their TEC. This was the first TEC Amnesty since 2013. We received a total of 8.1GW of applications and are currently working with Ofgem to confirm how the costs associated with the projects to date will be recovered before starting the termination/reduction of TEC process of connection agreements.

Construction Planning Assumption (CPA) Review

The ESO along with the TOs have identified the need to review the CPAs to reflect current connection rates and reducing the assumption that most projects in the queue will connect. The CPAs are the baseline assumptions made around volume and attrition for different technologies which shall connect to the transmission system. Currently, when making a connection offer, we assume that most projects in the queue are capable of delivery, whereas, in reality only 30 – 40% of projects connect. By updating the CPAs, the ESO can free up capacity in the queue. The ESO intends to ensure CPAs are reflective of the knowledge gained over recent years on behaviours, combined with the enhanced understanding of renewable generation technologies. Furthermore, in support of the revised CPAs, the ESO has recently launched an expression of interest to establish whether some completion dates could be brought forward to aid the CPA development.

Treatment of Storage

The ESO has been reviewing, in conjunction with the TOs, the way that storage connections are modelled as the current process takes a conservative view of what the assumed behaviours of storage could be, instead of how they may now respond to the needs of the energy market. It is proposed that by better reflecting a broader range of potential behaviours, the ESO may be able to connect storage projects faster, to free up capacity for other projects and support the delivery of Net Zero.

Two-Step Offers

In order to implement the revised CPAs review and the storage modelling methodology and to address the increasing number of applications received by the ESO, a new two stage offer process was implemented as of 1 March 2023 for those receiving offers in England and Wales. Those applying in Scotland are continuing to receive offers as per the existing process. The new process sees applicants receiving two offers. The first stage offer is issued to customers within the Connection and Use of System Code (CUSC) timeframes. This provides standard terms, albeit it with additional clauses inserted into the connection agreements to reflect that this is an initial offer and will need to be updated if accepted. This initial offer will identify a connection site/point reflecting the requested connection point in the application. It also provides a completion date based on the existing TEC queue and current Transmission Reinforcement Works reflecting the general scale of works to enable connection for projects applying now against the current contracted background. However, it will not include detailed works, programme or indicative costs and charges that would normally be included within the offer.

Wider Context

Queue Management

Working with industry, the ESO are proposing to update industry codes via CUSC Modification CMP376[6] so that the ESO can actively manage the queue of projects. Queue Management describes the process to manage contracted connections enabling fair and effective use of available network capacity. There is currently no mechanism in the CUSC to terminate projects that are not progressing. If CMP376 is approved, the code modification would allow the ESO to terminate projects that are not progressing against their contracted milestones and agreed timescales, in order to free up capacity for other projects that can progress. The proposals have now been consulted on, and we recently submitted our final report to Ofgem who will make a decision on whether these principles should be put into the CUSC.

Non-Firm Offers

Our analysis suggests that storage technologies can support the operability needs of the system during times of stress. This reduces the carbon and cost impact of running the system. In addition, we have engaged storage developers to better understand their commercial models. This engagement supports our assumption that the operating modes of storage projects will generally align with system needs. This has resulted in our recent 'Accelerating Energy Storage Connections Policy Update'.[7] The policy aims to accelerate the connection of energy storage projects by removing the non-critical enabling works to be complete before they connect under a non-firm connection agreement. This means that the only transmission works storage customers will need to wait for are those that are essential to enable a physical connection to the network (such as building a substation or a bay), those needed to mitigate fault level issues or those needed to meet safety-based requirements.

We are progressing this change as our analysis shows that storage projects can be beneficial for system operation. However, it also highlights a potential risk that under certain conditions, the real-time behaviour of projects increases operational costs.

We will mitigate this risk by having the ability to restrict their output under specific network conditions. Similar to traditional 'non-firm' transmission connections, these restrictions will be uncompensated. This is something we will keep under review as our knowledge and understanding increases on the impact of storage on the system. This will inform our strategy to enable moving storage providers to a firm connection.

6. CMP376: Inclusion of Queue Management process within the CUSC | ESO (nationalgrideso.com)
7. https://www.nationalgrideso.com/document/281171/download

Wider Context

In addition to the ESO led tactical changes, industry are also seeking to develop workstreams to complement and support the ESO initiatives. The key one being the Energy Networks Association's (ENA) Strategic Connections Group (SCG), which has membership from DNOs, TOs and the ESO.

Improvements to the Distribution Connection Process, via the ENA's SCG

The SCG has highlighted, in much the same way as the ESO, a problem statement which articulates the demands on the network and the scale of the issue due to the volumes trying to connect. The SCG proposes several themes that it believes need collective action to resolve including:

- Transparency and equitability of queue position;
- Treatment of storage; and
- Making the connections applications process simpler and faster.

The SCG has identified short- and medium-term improvements including:

- A simplified approach to managing the Connections Queue across Transmission and Distribution (T/D);
- Increased visibility of planning and operational data across the T/D boundary, including contracted services; and
- The use of more dynamic technical limits to further optimise system capacity.

Leading on from this, and alongside the ESOs 5-Point Plan, the SCG has released an action plan[8] outlining three immediate improvements to be made in accelerating customer connections. These include:

- Reforming the distribution network connections queue:
  - Allocating earlier connections for 'shovel ready' projects; and
  - Transitioning pre-2017 connection offers to include milestones.
- Changing how T/D networks coordinate connections:
  - Creating clear and consistent technical boundaries between T/D; and
  - Co-ordinating queue management between T/D networks for small scale generation and battery storage.
- Greater flexibility for storage customers connected at distribution level:
  - Offering battery storage operators a standardised 'non-firm' connection.

8. Improving and accelerating customer connections – Energy Networks Association (ENA)

Wider Context

We set out in Chapter 8 our view on the key considerations and proposals for managing the T/D interface in the longer-term under the reformed connections process. Those proposals provide our view of the high-level process and policy framework under which the SCG proposals might ultimately sit in future. Our proposals deliberately do not seek to address the detail of the current SCG proposals or delay their implementation where they can provide short to medium term benefits. As such we are not specifying in this consultation any of the more detailed arrangements for managing the T/D interface, so that those details can be developed further through the SCG (subject to ESO agreement), and also subject to agreement with Ofgem and other key decision makers over the coming months.

Holistic Network Design (HND)

In 2020, Government launched the Offshore Transmission Network Review, to make sure that transmission connections for offshore wind generation are delivered in the most appropriate way, taking into consideration the environment, cost to consumers, local communities and deliverability.

In July 2022 we published the first HND to facilitate the connection of 50GW of offshore wind by 2030. Our recommended design showed that the improved network power flow capacity it provides will significantly reduce the operational costs associated with curtailing and re-dispatching generation. As a result, the design is forecast to provide a net saving of £5.5 billion to consumers.

We subsequently published (in November 2022) the methodology for the HND follow-up exercise. Work on this HND follow-up exercise is ongoing, leading up to our future recommendations for the additional offshore wind which is within scope.

The learnings from the HND and HND follow-up exercise are relevant to the reformed connections process, and we have worked to ensure that we have considered the lessons and best practice within the future design options.

Ofgem Open Letter / Consultation[9]

Ofgem have launched a policy review to speed up low carbon energy schemes connecting to the electricity transmission system. Their recent letter to industry, published on 16 May 2023, sets out the challenges of the current first come, first served queue methodology, increased application volumes and long connection times. Ofgem also noted ongoing reform options for the short-, medium- and long-term required in respect of connections.

Regarding short term actions, Ofgem confirmed that they will continue to provide regulatory guidance and direction to ensure substantive progress in the reforms currently being progressed by the ESO and the ENA.

Medium term improvements noted were the ESO connections reform project and the ENA's SCG, as well as wider considerations of other options are to be explored. Substantial shifts in the quality and transparency of data available to connecting parties are also expected through these reforms.

In the longer term, projects noted were the Review of Electricity Market Arrangements (REMA), the introduction of the Future System Operator (FSO), network charging and access reforms, work on Regional System Planners (RSPs) and evolving strategic planning approaches.

9. Open letter on future reform to the electricity connections process | Ofgem

Wider Context

Whilst Ofgem's immediate focus is on the short- and medium-term reforms, the letter proposes a series of incremental stages through which all these potential solutions may progress over time, and the central role we can expect Ofgem to take in these to ensure coordinated and effective progression of reforms overall. As such, the open letter supports the tactical initiatives set out in this chapter and paves the way for further long-term reforms to ensure that the pace of connections can deliver the transition to the Net Zero energy system.

Long Term Major Reforms

Further to the above, there are other longer-term initiatives which the connections reform project must be mindful of as it develops its proposals.

FSO

Government and Ofgem have both recognised that in order meet Great Britain's energy ambitions – whether on Net Zero, energy independence, or cost of living – it requires new technical roles and a body with the remit and expertise to fulfil them. These roles are needed to help plan and shape the electricity and gas systems, drive competition and innovation, and ensure Government and Ofgem decisions are based on robust technical advice. The FSO will bring together the strategic planning for the electricity and gas systems, and potentially systems for new technologies like hydrogen and carbon capture and storage, into a single institution to enhance our ability to transition to a zero-carbon energy system and reduce the costs involved.

The FSO will build on the existing capabilities and functions of the ESO, managing the electricity system in real time, as well as supporting its future development. It will also be responsible for gas strategic network planning, long-term forecasting and market strategy functions. As a new public body, the FSO will be a trusted and expert institution providing independent advice to Government and Ofgem.

At present, the Energy Security Bill which will establish the FSO in law, is progressing through the House of Commons with the expected intention of establishing the FSO in 2024. The Bill will require the FSO to carry out various functions and activities in a way it considers will best achieve three objectives – 'Net Zero', 'Security of Supply' and 'Efficiency and Economy'.

We have considered the creation of the FSO in the proposals set out within this consultation to ensure that the proposals are future proofed for electricity transmission. Therefore, we have considered not just the current needs for the electricity transmission connections process but also the future for electricity transmission connections as we transition into the FSO. Although the FSO will have responsibilities for gas systems, please note that for the purposes of this consultation, we are focusing on connections to and use of the electricity transmission system and we are not considering connections to the gas transmission system.

It should be noted that Government has also recently published a consultation related to the Strategy and Policy Statement for Energy Policy in Great Britain[10], which has potential interactions with the FSO, including in relation to connections, in future. At present, we believe our proposals are future proof in respect of this consultation.

10. Strategy and Policy Statement for energy policy in Great Britain - GOV.UK (www.gov.uk)

Wider Context

REMA

The REMA consultation is a major review into Great Britain's electricity market design, considering what market reform (excluding retail) is required to achieve Net Zero cost effectively whilst maintaining system security. The initial consultation, which closed in October 2022, consulted on a range of issues and options related to electricity market reform across a number of market dimensions, including wholesale markets, mass low carbon power, flexibility, capacity adequacy, and system operability, as well as on several programme design and cross-cutting issues. In March 2023, Government released the summary of responses to the initial consultation and also detailed the next steps of the review which include a further consultation later this year. In response to the initial consultation, Government eliminated a small number of market reform options from further consideration. Within the consultation, Government also advised that they will look at incremental reforms as well as transformational ones, establish a new end-user forum to invite input from consumers and consumer groups on the market reform whilst also further mapping key interdependencies between wholesale and retail reform. In addition, Government will continue to review both zonal and nodal pricing as alternatives to national pricing for the market structure as well as keeping an optimised Capacity Mechanism in future considerations whilst also considering a centralised reliability option for capacity adequacy.

We have considered interactions with REMA in the proposals set out within this consultation in order to ensure, as far as possible, that these are future proofed against the range of potential outcomes. Specifically, we have considered the interactions between the connections process and the siting of generation and large demand, and the relationship between connections and capacity, as discussed within Chapter 3.

Network Planning Review (NPR)

The NPR is a major project which will fundamentally change the way we undertake network planning, to ensure it is fit for the future, and able to facilitate the transition to a Net Zero system through strategic and anticipatory investments. It will support the delivery of strategic network planning capabilities envisaged by Ofgem's Electricity Transmission Network Planning Review project and will undertake a general review of network development and planning processes.

In addition, Ofgem announced in November 2022 that the FSO would deliver a new electricity transmission network planning output called a Centralised Strategic Network Plan (CSNP). We will publish the second Transitional CSNP at the end of 2023.

From 2024, we will publish the first plans under the CSNP approach. The NPR has been a key consideration in this consultation as it is important that planning and delivery of connections aligns with and informs/is informed by our wider network planning process, in order to deliver efficiencies through coordination.

Wider Context

Future of local energy institutions and governance

On 1 March 2023 Ofgem launched a consultation into the effectiveness and responsibility for planning local energy networks and delivering local energy flexibility markets. Ofgem stated that the current governance arrangements are not fit for purpose, given the energy system changes that are needed to deliver Net Zero. Ofgem proposed to introduce RSPs to work with other industry actors to accelerate the transition to zero carbon at least cost to the consumer. Ofgem are looking for the regional energy system planning to be fully 'whole system', leading to coordinated development of the system across multiple vectors including hydrogen, etc. The proposals would see the FSO given new powers to carry out whole system RSPs as well as carrying out a flexibility 'market facilitation' function. The FSO flex market facilitation would include data standards for product, asset and market data and standardised products amongst other requirements.

We have considered potential interactions between the local energy institutions and governance consultation and the proposals within this consultation to ensure that we are future proofing the design, particularly with regards arrangements for the T/D interface, as set out in Chapter 8.

Access and Forward-Looking Charges Significant Code Review (Access SCR)

In December 2018, Ofgem launched the Access SCR as part of a package of reforms into how different parties access and pay charges for the electricity network. The objective of the Access SCR is to ensure that electricity networks are used efficiently and flexibly, reflecting users' needs and allowing consumers to benefit from new technologies and services while avoiding unnecessary costs on energy bills. Following publication of Ofgem's final decision on the Access SCR in May 2022, a number of code modifications have been raised, progressed by industry through working groups and voting parties, approved by Ofgem, and implemented to facilitate their decisions.

We have considered potential interactions between this and connections reform and at this stage we do not believe that there are any direct interactions.

Wider Context

Energy Code Reform

Following an initial joint consultation between Ofgem and Government in 2019, and a subsequent consultation in 2021, Government then provided a further update in December 2022. Reforms, including the following, were subsequently set out in the Energy Security Bill:

- Ofgem will have a new strategic role in the codes, publishing an annual strategic direction to set out our vision of how codes should evolve in the coming year;
- Code managers, selected and licenced by Ofgem, will be responsible for governance of the codes;
- Ofgem will have new powers to change the codes in a limited range of circumstances (where the normal processes would not be appropriate), and to issue directions to central system delivery bodies; and
- To facilitate implementation of the new framework, the Energy Security Bill sets out transitional powers for Ofgem which will enable the new governance framework to be established.

Ofgem, working with Government, is now developing the regulatory framework required to implement the reforms. Subject to legislation, Ofgem will also develop proposals for use of the transitional powers set out in the Energy Security Bill, including potential code consolidation (i.e. to merge two or more codes together).

The reforms to the codes process have been considered in this consultation, in particular in reference to potential approaches to implement code modifications that will be required under our preferred option for connections reform, as discussed in Chapter 10.

Please note, the initiatives and reforms outlined above were correct at the time of writing but due to the developing nature of these initiatives there may have been further amendments which could not be captured at the time of publication.

2. Phase 2 Approach

Phase 2 Approach

In Phase 1 we listened to stakeholders to understand their issues and to determine the overall Case for Change.

Phase 2 has built on this work, taking those issues and wider objectives (as set out within the design objectives) and exploring them in depth with industry experts. As such we have, as far as possible, sought to co-create potential solutions and prioritise them ahead of proposing these solutions to wider industry. This is illustrated in Figure 2.1.

Our stakeholder approach has been driven by the needs of industry and consumers and we have continuously engaged with the wider energy sector collaboratively to pull together the recommendations within this consultation.

The main objectives of our engagement were to:

- Ensure all stakeholder groups are actively engaged through regular updates;
- Involve all relevant parties at the right levels;
- Integrate communications and look for opportunities to deliver communication aligned to other connections changes;
- Track, monitor engagement and continuously improve; and
- Provide opportunities for feedback and interaction.

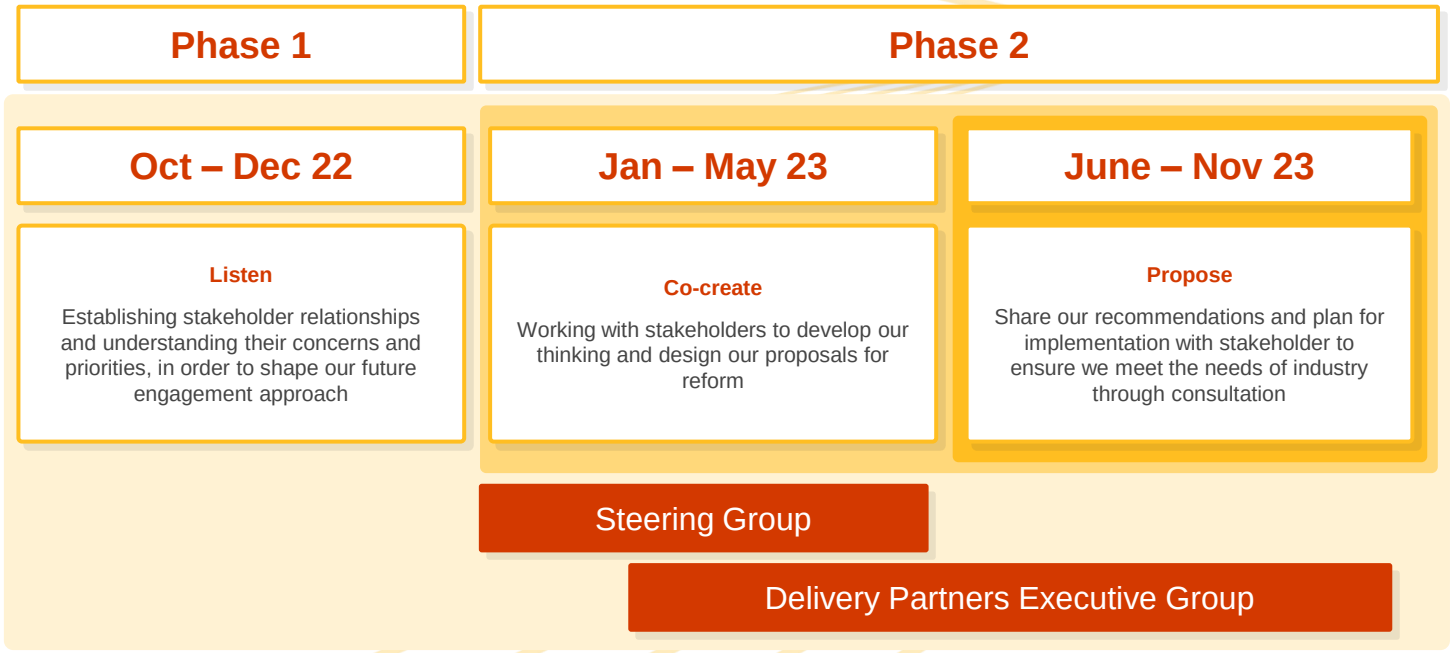


Figure 2.1: Phase 2 Approach Overview

Phase 2 Approach

We recognise we are not always the experts and have worked hard to ensure we are reaching all parties that are impacted by the connections process, particularly as the outputs of connections reform could have a material impact on industry. As such and in order to ensure industry segments have a voice we have created and run:

- A **Design Workstream;**
- A **Steering Group** with broad industry membership and independently chaired by Merlin Hyman, Chief Executive of Regen; and
- A **Delivery Partners Executive Group (DPEG)**, chaired by Julian Leslie, Head of Networks and Chief Engineer from the ESO.

In order to ensure that connections reform is robust and fair we have strived to engage with a wide range of stakeholders during Phase 2.

We had four months of intensive engagement with stakeholders across industry to identify and test potential solutions. We ran 8 design sprint sessions, with 229 stakeholders attending from across 42 organisations. We also created a new external steering group, with an independent chair and 25 different member organisations, that met 6 times over the course of the design phase. We would like to thank industry for their commitment and constructive approach to this engagement.

Our engagement structure is illustrated in Figure 2.2.

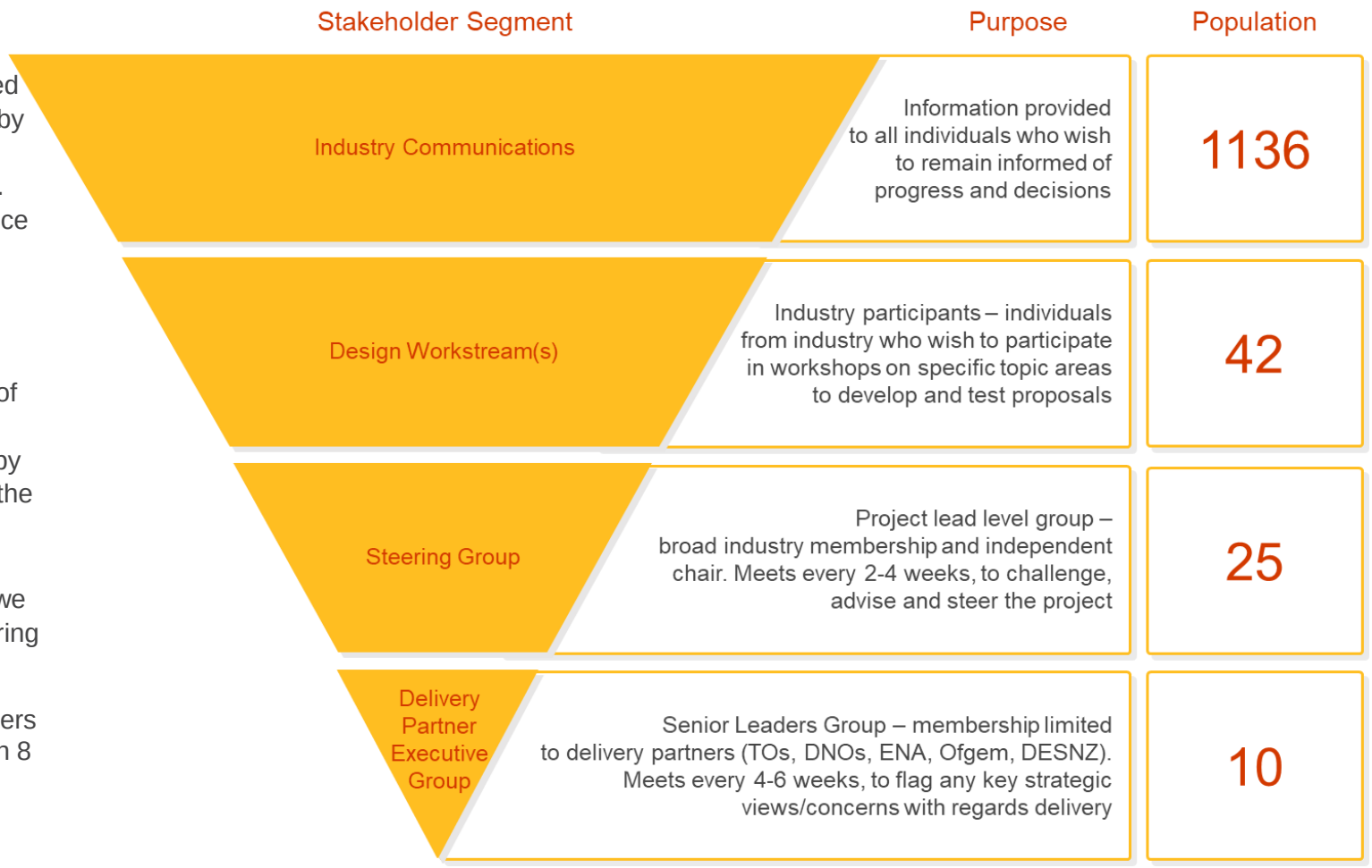


Figure 2.2: Engagement Structure

More detail on the stakeholder approach, who participated in sessions and at each level of the stakeholder pyramid can be found in Appendix 1.

Phase 2 Approach

Industry Communications

Through our annual customer satisfaction survey we heard from stakeholders that they wished us to be clearer with our connections communications. We have worked to coordinate our communications across connections and ensure we are being clear on what is being asked of stakeholders.

Challenges in connections have increased the level of interest in our newsletters. Connections reform has encouraged the use of the connections newsletter as the primary channel for communication in this space and all parties we have engaged receive these updates regularly. This distribution list is now over 1100 subscribers – a 137% increase since the beginning of Phase 1. This forms the base for our engagement and we engage a wide population through this channel.

Other media has been used to reach our target audience including webinars, dedicated webpages and bilateral meetings. For a detailed view of our engagement for this group see Appendix 1.

To date 915 people from 133 organisations have dedicated 875 hours to help us shape our proposals

Design Sprints

Three main themes from our Phase 1 Case for Change report formed the basis of our design sprints in Phase 2:

1. Options are collaboratively developed through the connections lifecycle – mostly considered within Sprint 1 of Phase 2;
2. Rapid Connections are progressed on their merits – mostly considered within Sprint 2 of Phase 2; and
3. A simple transparent and coordinated approach to connections – mostly considered within Sprint 3A and 3B of Phase 2.

The two other main themes from Phase 1 i.e. easy access to self-service tools, consistent data and quality insight; and consistent, skilled and well-resourced engagement, are considered across all design sprints, all as illustrated in Figure 2.3.

Phase 2 Approach

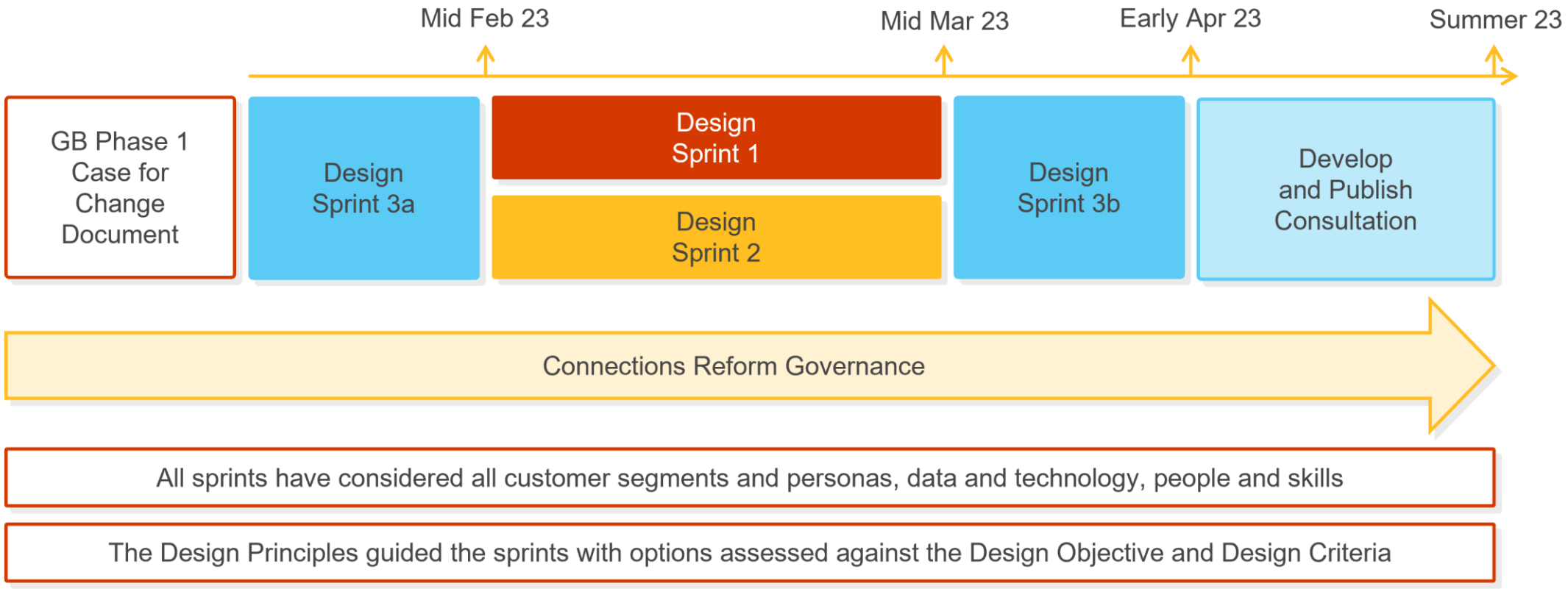


Figure 2.3: Phase 2 Sprint Approach

Each sprint took one of these three themes and explored them further with the stakeholder groups to identify options which address a broad range of design objectives and customer priorities. Sprint 3b brought together the outputs of Sprint 1, Sprint 2 and Sprint 3a by tying them together with wider considerations e.g. any refinements needed for particular customer segments.

For the issues raised in Phase 1 and their outcome see Appendix 1. There are some process issues that we have considered during this phase that fall in the scope of another piece of work which may be owned by another stakeholder; these are all documented for reference.

Phase 2 Approach

Sprint Approach

For the design workstream we took a standard approach to developing options and ensuring ideas from all parties were captured and considered. We broke the external sessions into 2 parts as follows.

Workshop 1 – focused on brainstorming and capturing ideas; and

Workshop 2 – playing back these ideas and testing them for strengths and weaknesses.

This approach is further illustrated within Figure 2.4.

Stakeholders told us connections reform is a priority for them. But due to the accelerated timescales not everyone was able to dedicate time/resource; therefore we facilitated sessions remotely. We heard feedback from Phase 1 that said some voices were dominant in sessions, so we used a virtual whiteboard to maximise participation and interaction for all. The objective was to include as much co-creation as possible in a limited timeframe. The feedback on the sessions was very positive and provided a strong channel for engagement on these topics.

More detail on the detailed stakeholder approach, who participated in sessions and at each level of the stakeholder pyramid can be found in Appendix 1.

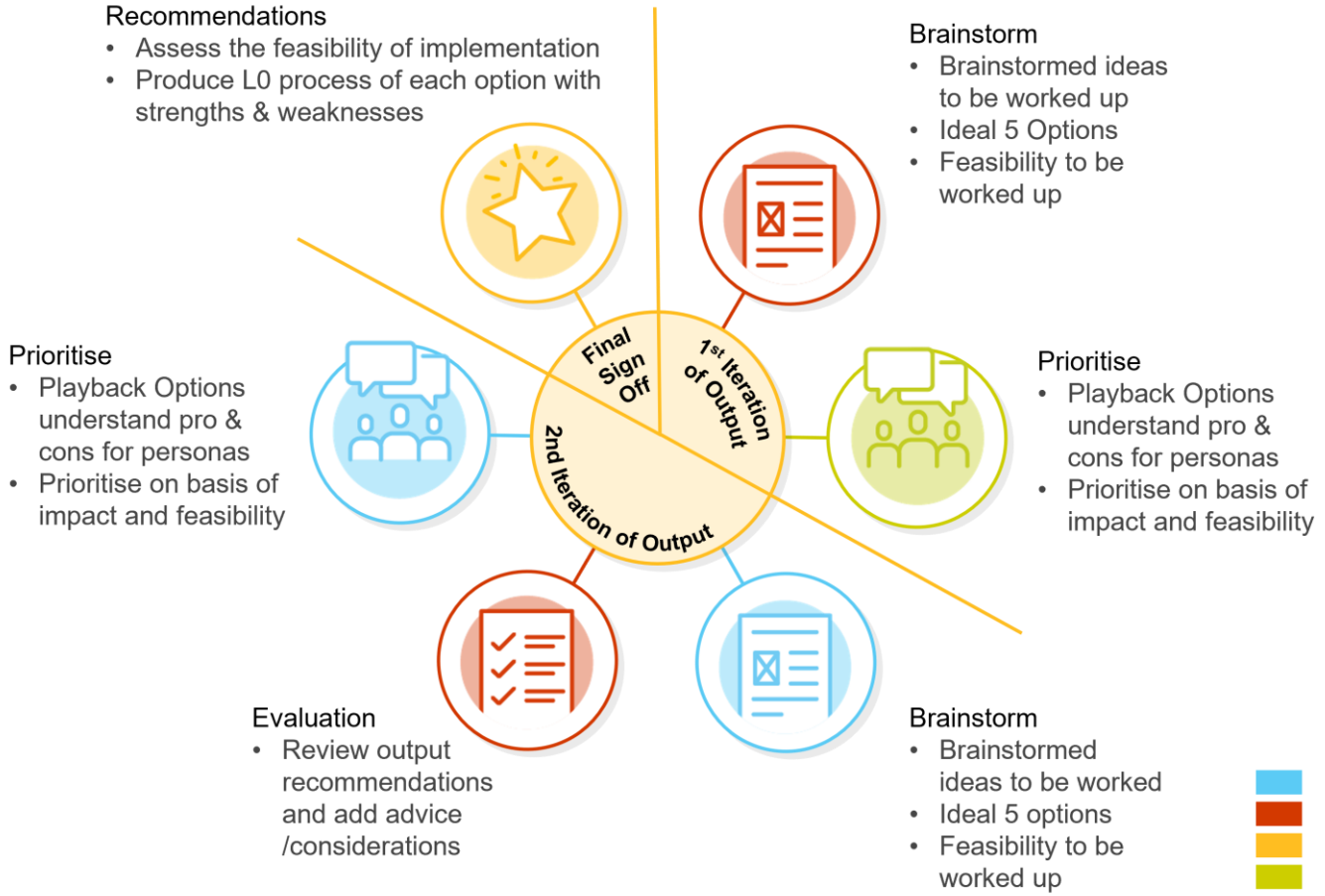


Figure 2.4: Phase 2 Sprint Approach

Phase 2 Approach

Governance Approach

The output of each sprint was taken to both the Steering Group and the DPEG to seek their feedback. This is illustrated in Figure 2.5.

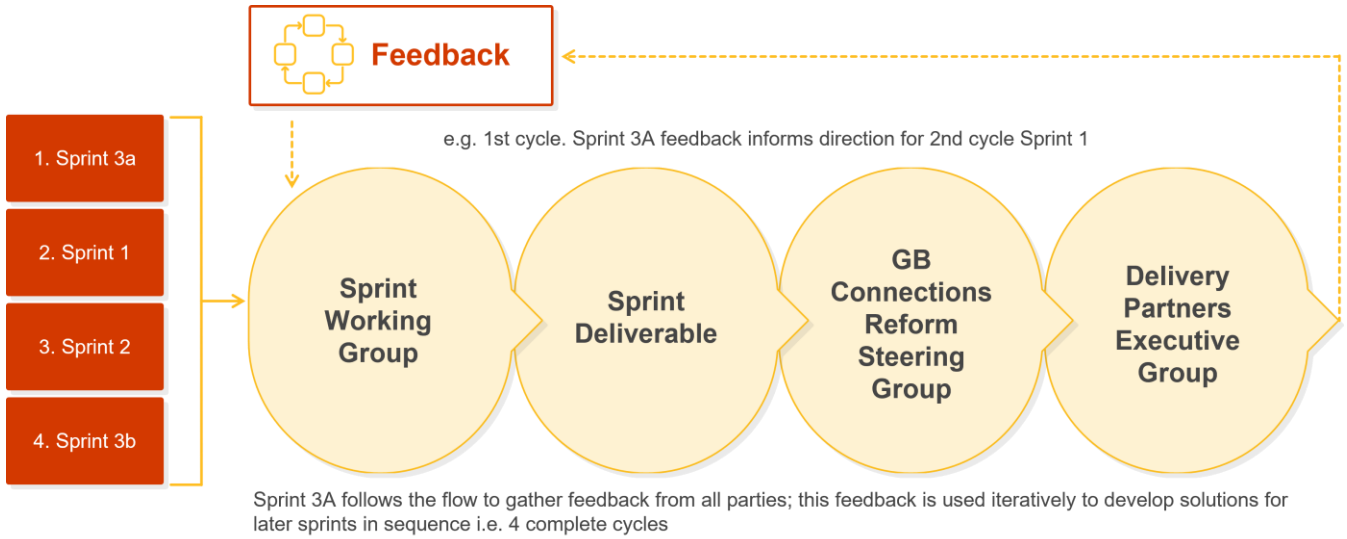


Figure 2.5: Governance Approach

Each sprint working group has informed content which has been taken through the Steering Group and the DPEG in sequence with all solutions iterated and evolved prior to publication. The final options we present in this consultation have been assessed against the design criteria in Appendix 2 and these scores were shared at both Steering Group and the DPEG.

The typical flow of information was from the Design Workstream into the Steering Group and then into the DPEG. The DPEG also received key papers and minutes from the Steering Group, which in turn received papers derived through the Design Workstream. The DPEG also received additional papers drafted by the ESO or by other members that were relevant to the DPEG's purpose e.g. in relation to implementation / delivery considerations.

Steering Group

The Steering Group was established to ensure our key stakeholders and consumers have a formal voice as we developed options for connections reform.

The role of the Steering Group was to advise on and constructively challenge the connections reform project, including outputs (strategic options, potential solutions and recommendations) developed during Phase 2 (January to June 2023). This helped ensure that the project appropriately took account of, and was appropriately shaped by, industry and wider stakeholder views, in addition to input via the ESO's wider approach to stakeholder engagement on connections.

Phase 2 Approach

Steering Group responsibilities were to:

- Provide a steer on key strategic options for reform and overall strategic direction of the connections reform project;
- Provide a steer on options and proposals proposed by the design workstreams (as developed internally by the ESO and/or by the ESO with external design groups), including design and implementation options;
- Challenge whether the views of all stakeholder groups have been fairly considered in developing proposed reforms; and
- Challenge whether proposals meet the design objectives and design criteria.

The group met 6 times between February and the end of May 2023, the outputs of which can be found here.

DPEG

The DPEG is comprised of organisations and representatives responsible for delivery of changes to regulatory, legal, industry and commercial frameworks as a result of the connections reform project.

The role of the DPEG is to help inform and support efficient delivery of changes to the connections process and propose and agree practical and deliverable actions necessary to support the implementation of connections reform.

The DPEG responsibilities are to:

- Identify key opportunities, risks and blockers associated with delivering options and proposals considered or recommended through the connections reform project;
- Identify approaches / mechanisms to efficiently address those key risks or blockers or efficiently realise those key opportunities; and
- Inform how to best implement agreed changes to the connections process efficiently and consistently, both within their own organisations and more broadly within regulatory, legal, industry and commercial frameworks.

The DPEG will continue to meet following the publication of this consultation in order to help inform delivery of the connections reform plan. The group met 4 times from March until June 2023.

3. Foundational Design Options

ESO

Foundational Design Options

Introduction and background

Once the Phase 2 approach was defined the next step was to identify some foundational building blocks on which to base and develop the thinking about the design of a reformed connections process. We did this early in order to provide a clear basis upon which to proceed later in Phase 2 with more detailed design of potential options for reform. As such, the purpose of this step was to take an early view on a range of strategic, high level, design options.

As described in Chapter 2, we held a series of design sprint workshops to flesh out the challenges we were looking to resolve and to gain industry input and steer as to the focal points of Phase 2. These sessions led to the creation of three foundational design options and the consideration of several key variations. These are introduced here as context for what is presented in Chapter 6 i.e. what went on to be further developed and what was deprioritised at this stage given the direction of travel in the sprint sessions and following feedback from the Steering Group and the Delivery Partners Executive Group.

During the initial stages of foundational design, we also investigated approaches taken by other System Operators around the world to understand at a high-level how they had / were planning to approach their own connections reform programmes.

We engaged with the Energy Systems Integration Group about the reforms being conducted in the USA, which have been proposed by the Federal Energy Regulatory Commission. In addition, we engaged with EirGrid about their previous connection reforms and their ongoing work in this area.

The engagement with EirGrid was particularly useful to help us to understand benefits and lessons learnt from a connections process which has similarities to some of the foundational options we have developed and built upon throughout this consultation.

We also investigated the reforms ongoing in Australia to understand their proposals and the methodologies they were putting in place during their connections reform process.

An overview of each can be found within Appendix 3.

Foundational Design Options

Foundational Design Option 1 – Status Quo type process

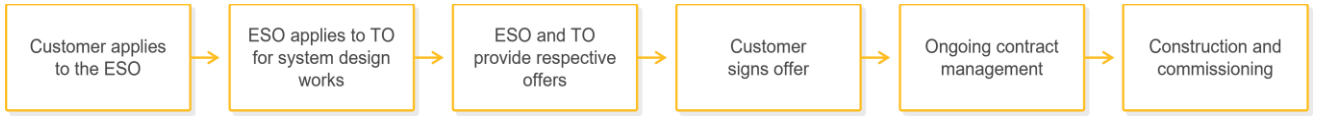


Figure 3.1: Foundational Design Option 1 – Status Quo type process

This option, illustrated in Figure 3.1, is the same core process as is currently used and was included for two main reasons. Firstly, to use as a baseline when comparing other options and their merits and potential challenges. Secondly, to understand to what extent the current process, with some improvements, could solve the connections challenges without potentially needing more significant process and/or policy changes. This option was therefore designed to be considered alongside potential “add-ons”, which would provide the process improvements.

Foundational Design Options

Foundational Design Option 2 – Gated Process

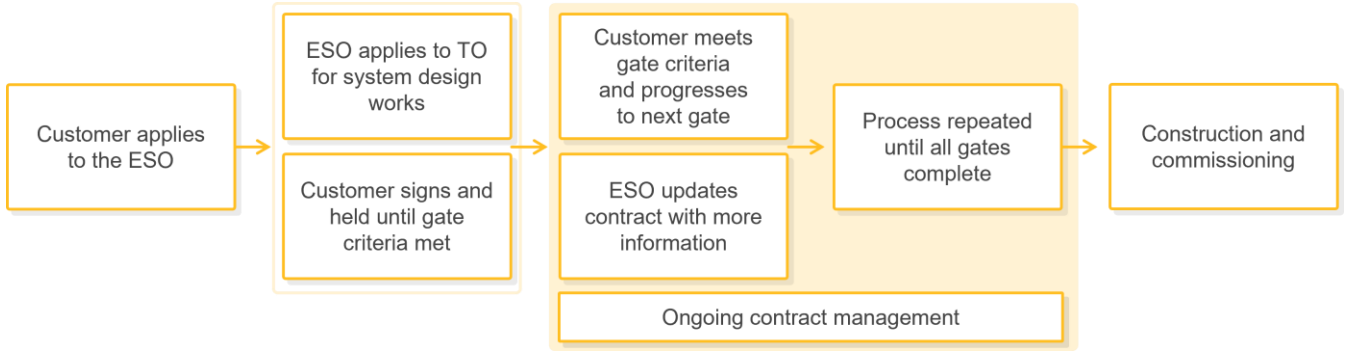


Figure 3.2: Foundational Design Option 2 – Gated Process

This option builds on the previous option by introducing at least one additional formal process gate into the connections process, as shown in Figure 3.2. This is in comparison to Foundational Design Option 1, which effectively has a single gate at the start of the connections process.

The purpose of the gate(s) would be to identify more realistic or well-defined projects as customers would need to demonstrate that their project meets certain criteria in order to proceed beyond a gate. Projects that proceeded beyond gate(s) could be provided with earlier connection dates compared to projects that did not proceed through the gates. This could alleviate some of the challenges with the current process e.g. in relation to capacity allocation and queue.

At this foundational level we did not define the number of gates or what would occur at any new gate. The purpose was to explore whether the concept of gate(s) could be beneficial and should be further considered in later sprints.

Our conclusion was that there were sufficient potential benefits in a gated process to support developing the concepts further in later design sprints. Therefore, gated processes are included in some of the Target Model Options (TMOs) in Chapter 6.

Foundational Design Options

Foundational Design Option 3 – Central Planning

Figure 3.3: Foundational Design Option 3 – Central Planning

This option would represent a more significant change to the current process. It would involve moving away from the current market-led approach, where project developers can apply to connect any type of technology, in any location, at any time, and instead move to a more centrally-planned approach for deployment of generation and large demand. This is illustrated in Figure 3.3. Under such an approach connection applications would need to align with some deployment plan developed and mandated by a central planning entity or perhaps a range of planning entities. For example, the Future System Operator (FSO), Government and/or (in relation to offshore projects) The Crown Estate and Crown Estate Scotland. Such an approach could potentially deliver connection of specific technologies faster than currently possible, as well as potentially supporting more efficient overall network design and improving network operability. However, the wider benefits and risks of such an approach on investment appetite, cost and deployment efficiency compared to our current largely market-based approach would need careful consideration. For example, any centrally planned approach across technology types would need to take account not just of energy system costs and benefits, but wider factors that impact on deployment of generation and large demand such as land availability, availability of other natural resources (e.g. wind, sun), and national or local government targets. Project developers we engaged with also had concerns that such an approach would risk significantly undermining investment confidence or appetite in their projects, would stifle innovation and ultimately delay or otherwise hinder delivery of Net Zero.

As such, there was some agreement as part of our stakeholder engagement that the future reformed connections process should be designed flexibly to facilitate efficient connection of new generation and large demand projects, irrespective of whether these projects are developed in future in a way which is:

- purely in response to market-based locational signals;
- in response to 'centralised' deployment decisions made by Government or other appropriately designated organisations, where this was in the overall interests of consumers; or
- in response to an approach somewhere between the two i.e. one where central planning may play a greater role than it currently does, but in a way which does not constitute fully 'centralised' deployment and still involving market based locational signals.

In other words, the future reformed connections process should facilitate and enable efficient connection under either a more market-based or a more centralised deployment approach, or a hybrid of the two, but not mandate which approach to follow.

These are really important and significant decisions, which we think require further consideration with Government, Ofgem and other key decision makers. We do not think it would be appropriate to make such decisions solely in the context of connections reform, particularly in the context of wider upcoming decisions on locational signals through the Review of Electricity Market Arrangements (REMA). As such we have not included any options that assume or mandate a centrally planned approach for deployment of generation and large demand.

Foundational Design Options

As a final point, offshore wind deployment was cited as an example of where the future reformed connections process should facilitate the connection of offshore wind projects that secure seabed leases through the Crown Estate Scotland and/or The Crown Estate in line with targets set by Government. Such an approach could then potentially be extended to the connection of other projects/technologies where Government (or some other appropriately competent organisation) made specific deployment decisions in the overall interests of consumers e.g. Carbon Capture Usage and Storage, nuclear, or hydrogen electrolysers.

The TMOs described in Chapter 6 allow for potential central planning in relation to specific technology types e.g. offshore wind. This allows some of the benefits of Foundational Design Option 3 to potentially be introduced efficiently within the future reformed connections process, although the level of efficiency differs across the TMOs.

Key variations

We considered several key variations, which could either change key roles and responsibilities or introduce additional process steps into the above foundational design options.

Variation 1 – Application to the Transmission Owner (TO) rather than the ESO

The first variation looked at the merits of a project developer applying directly to a TO for their connection, rather than to the ESO. Whilst some stakeholders felt that one less entity in the process / contractual chain may enable quicker delivery of connections contracts, it became apparent that the ESO would still need to be involved e.g. for design operability aspects. Therefore, information flows between the ESO and TOs related to the connections process would still need to take place.

In addition, there would also be a question of which entity co-ordinates information flows (e.g. ESO or TO) in this variation. Overall, it was felt that the issues in the current process were not necessarily due to which entity a developer applies to but due to broader challenges that exist in the process. As a result, we decided not to include this variation as an area of focus for future sprints or as a core element of the TMOs.

Variation 2 – ESO responsibility for Connections Design

The second variation looked at the ESO taking on the current TO responsibility for designing transmission reinforcements which are related to connections offers. Similar to Variation 1, initial feedback was that the issues in the current process were not necessarily due to which entity undertakes such connections design works but due to broader challenges that exist in the process. As a result, we did not consider this variation as an area of focus for future design sprints.

However, whilst this variation is not the subject of additional focus in this consultation, it is worth noting that other reform programmes (e.g. the Holistic Network Design, the Centralised Strategic Network Plan and the creation of the FSO) are introducing potential for changes to roles and responsibilities between the TOs and the ESO/FSO. Therefore, we think that it would be appropriate to keep this area under review as we move towards implementation of a reformed connections process. This is because there may be synergies with other processes the ESO/FSO may be taking on in future, which could then be relevant to (or include) any additional responsibilities in relation to the connection process e.g. in relation to network design.

Any additional responsibilities in future for the ESO/FSO in this area is subject to the outcome of a number of reform programmes, but our initial view is that as a minimum our role in connections would likely focus on providing a ’guiding hand’ and coordination of network modelling activities used by the TOs.

Foundational Design Options

Variation 3 – Scope of Customer Delivered Works

This variation considers whether and to what extent customers should have greater ability to elect to design and construct contestable works associated with their connection offer e.g. in relation to sole use transmission assets. Once built, such assets could then be adopted by the relevant TO, or, perhaps for assets over a certain value, a very late onshore competition model could be introduced. However, a very late onshore competition model would be subject to more general views from Ofgem on competition and progress of any enabling legislation. This could for example be akin to the generator build very late competition model offshore and transfer ongoing ownership of the assets to a Competitively Appointed TO.

It is worth noting that there is a live code modification considering contestability, namely CMP330/374[11]. As such, generally speaking, the benefits and challenges around this topic are relatively well discussed as a result of CMP330/374 and the related proposals e.g. greater programme control for developers, and potentially quicker and more economically efficient connections versus safety and security considerations for what would eventually become TO assets.

After engaging with the design sprint and the Steering Group, we decided not to place further focus on this variation. The first reason being that it would be beneficial to know the outcome of the existing code modifications, where there has been considerable debate to date. The second reason being it is relatively difficult to discuss contestability, and how it may work, in any detail without first understanding the reformed connections process. Once both things are known, we can reflect on whether and how contestability would be a part of a reformed connections process.

We think that this is appropriate as we do not believe contestability, by itself, (while potentially helping deliver connections more efficiently if implemented robustly) would address the main underlying issues with the current connections process such as allocating capacity to projects likely to progress, or ensuring efficient, coordinated overall network design. Therefore, we concluded that as long as the reformed connections process is future proof in relation to allowing contestability to occur efficiently, the presence or absence of additional contestability should not materially affect the design of the reformed connections process.

Variation 4 – Application Windows

This variation considers the introduction of a time restrictive element to the submission and/or assessment of connection applications. This would be where applications would be processed and assessed on a “batched basis” rather than the developer triggered year-round process currently in place.

We identified in sprint design groups that there are likely benefits (e.g. allowing Construction Planning Assumptions to be updated between each window) in a batched approach that prevents connection applications being submitted and assessed at any time. This would allow greater co-ordination of the design of the network required as a result of connection applications. However, we noted that this may cause industry stakeholders some challenges e.g. reduced flexibility for submission of connection applications and greater time to receive a connection offer than under the current arrangements.

We did not consider that a windowed approach, in and of itself, should be a standalone option and hence we presented this as a key variation rather than as a foundational design option. However, we felt that it would be a beneficial variation to consider alongside the foundational design options and that there are natural synergies with Foundational Design Option 2 and Foundational Design Option 3. Therefore, application windows are included in some of the TMOs in Chapter 6.

11. With related code modifications CMP414 and CM079. All can be found at the following links:
CUSC Modifications | ESO (nationalgrideso.com)
STC Modifications | ESO (nationalgrideso.com)

Foundational Design Options

Variation 5 – Separation of Connection and Capacity

We reflected on whether capacity should no longer be allocated as part of the connection contract, including whether some separate process (e.g. an auction) should be used to determine the capacity that each project is entitled to. This approach is used in the gas industry where their version of connection and capacity can (but do not have to) be directly linked. The approach in gas relies on auctions for a project to have capacity to provide the service it is to provide, after which time this capacity expires, and the process restarts.

The potential benefits of such an approach could be articulated relatively clearly e.g. the potential for quicker connection dates as enduring firm capacity would not need to be assumed when designing connections, as well as a more efficient use of capacity as capacity would only be allocated to project developers for providing a service. This contrasts with the current process where capacity is “evergreen” and matches the capacity applied for by the project developer, irrespective of whether the developer is either generating or taking from the system at any given time.

However, several significant challenges were noted by stakeholders. Project developers set out that introducing capacity auctions would significantly undermine the investment case for their projects as they would not have certainty on capacity until fairly late in the project development process. Some stakeholders also set out their view that the current gas capacity auction process is overly complex and inefficient and that any process in electricity would be even harder to implement due to the more complex design of the electricity system and the wider range of technologies and products.

Further questions were raised around whether it would be fair to apply capacity auctions only to connection of new projects or whether all existing connected projects should also participate in order to secure their capacity on an ongoing future basis.

Therefore, we decided not to include these features in our shortlisted models as we think the current issues with the connections process could potentially be addressed through other, less radical, and lower risk means on an enduring basis. Our initial view is that any decision to introduce capacity auctions or permanently change transmission system access arrangements should be taken once the direction of travel on REMA is clear in terms of how transmission system access arrangements will work in future. For example, if there were any moves away from firm access as standard.

As a result, we decided not to include this variation as an area of focus for future sprints or as a core element of the TMOs. However, as referenced above, there is the possibility it could be subject to future consideration within other reform programmes.

Foundational Design Options

Initial Conclusions

The development of and engagement on these foundational design options and key variations provided us with early insights into stakeholder sentiment and direction of travel within the earlier stages of Phase 2. This allowed us to set out at a high level what the benefits and challenges could be of various high-level design options whilst directing our focus for the remainder of Phase 2. Our overall positions on each of the foundational design options and key variations are set out in Table 3.1 below.

Foundational design option / key variation	Our initial position
Foundational Design Option 1 - Status Quo type process	Include within TMOs
Foundational Design Option 2 - Gated process	Include within TMOs
Foundational Design Option 3 - Central Planning	The reformed connections process should facilitate and enable efficient connection under either a market-based (locational signals) or centralised deployment approach, but not mandate which approach to follow. The TMOs allow for more central planning in relation to specific technology types e.g. offshore wind.
Variation 1 - Application to the TO rather than the ESO	This is not an area of focus for the TMOs as it was felt that the issues with the current process were not necessarily due to which entity a developer applies to but due to broader challenges present in the process.
Variation 2 - ESO responsibility for Connections Design	This is not an area of focus for the TMOs as it was felt that the issues with the current process were not necessarily due to which entity undertakes connections design but due to broader challenges present in the process. However, this variation will be kept under review outside of this consultation.
Variation 3 - Scope of Customer Delivered Works	This is not an immediate area of focus for the TMOs as, so long as the reformed connections process is future proof in relation to allowing contestability to occur efficiently, the presence or absence of additional contestability should not materially affect the design of the reformed connections process.
Variation 4 - Application Windows	This is thought to be a beneficial variation to consider in the TMOs as there are natural synergies with Foundational Design Option 2 and Foundational Design Option 3. Therefore, applications windows are included in some of the TMOs, but this is not considered as a standalone option.
Variation 5 - Separation of Connection and Capacity	This is not an area of focus for the TMOs given potential challenges of implementation and given current issues with the connections process could be addressed through other, less radical, and lower risk means. There is the possibility this area could still be subject to future consideration through other reform programmes.

Table 3.1: Our overall positions on each of the foundational design options and key variations

Foundational Design Options

Chapter 6 sets out how we have used these foundational design options and key variations to create viable reformed connections process TMOs. For example, by creating a mix of gates and windows, or the potential for different style windows to be used for a different technology type or need such as where a more centrally planned reservation of capacity may be appropriate.

For the key variations we have not included within TMOs in this consultation, these could potentially be included within the overall design of the preferred option at a later point if a subsequent decision was made that there would be value in introducing them in future. The extent to which this would be possible would depend on the TMO chosen. In general, we think that TMO4 would be more efficient at accommodating any such changes without fundamental redesign.

Consultation Questions – Please explain your rationale

1 Do you generally agree with our overall initial positions on each of the foundational design options and key variations? Are there any foundational design options or key variations that we should have also considered?

2 Do you agree with our initial view that the current issues with the connections process could potentially be addressed on an enduring basis through other, less radical, and lower risk means than the introduction of capacity auctions?

3 Do you agree with our initial view that the reformed connections process should facilitate and enable efficient connection under either a market-based (i.e. locational signals) or ‘centralised’ deployment approach (or an approach somewhere between the two), but not mandate which approach to follow?

4. Pre-Application Stage

Pre-Application Stage End-to-End Process

As described in Chapter 2, the primary focus of Sprint 1 was on the Pre-Application Stage, which is seeking to support customers with data, tools and engagement to improve application quality and to reduce the speculative volume of connection applications. This thinking builds on solutions already deployed by Distribution Network Operators (DNOs) from which we have taken lessons learnt to develop a proposed solution built on strong foundations. The elements of collaborative option development in the post-application stage can be found in Chapter 6 e.g. the role of developers in connection offer development once an application has been submitted, but prior to a connection offer being made.

This chapter explores the Target Model Add-ons (TMAs) which are related to the Pre-Application Stage, and which are initially considered as key components of all of the Target Model Options (TMOs). By TMAs we refer to additional processes or policies that could apply to any of the TMOs we present in Chapter 6. This chapter provides an overview of the Pre-Application Stage TMAs considered, whilst Chapter 5 and Chapter 9 consider all other TMAs. Due to the standalone nature of these Pre-Application Stage TMAs we have worked aspects of these up into more detail in this chapter, including noting the key stakeholder feedback received during the design sprint workgroups, including a Stakeholder Score (SS)[12].

Through internal and external brainstorming sessions we initially identified 12 potential TMAs related to the Pre-Application Stage. We further considered and engaged through workgroups upon potential strengths and weaknesses related to each of those potential TMAs, as well as where they might have a material positive or negative impact on the design objectives and design criteria. Based on that stakeholder engagement a potential strawman process started to emerge from Sprint 1 for a reformed Pre-Application Stage. We then refined this further through discussion in Sprint 3B. This has led to 3 TMAs related to the Pre-Application Stage (collated from the initial 12 and subsequent discussions) that are set out below.

The feedback on all of these Pre-Application Stage TMAs at every stage was that these should be a priority and could be applied in any TMO, so we have specifically separated them out from wider process considerations due to their standalone nature.

Overall, we consider that the Pre-Application Stage TMAs have advantages in all of the TMOs and should be considered an important part of a reformed connections process to address some of the issues which were identified in the Case for Change. Some of these changes could be potential quick wins, which we consider further in Chapter 10.

However, whilst we believe these TMAs will make improvements on the current process, there are outstanding questions as to how much impact the TMAs will have on the quality or nature of connection applications submitted by project developers. Our initial view is that the TMAs are not likely to materially address many of the fundamental issues with the current process and should therefore be considered as part of a wider range of changes.

Pre-Application Stage Objectives

We feel that the objectives of the Pre-Application Stage are to better inform parties of when and where they are able to connect, manage expectations of all parties about network constraints and potential timeframes for connection and enable access to information and engagement in a timely manner to support investment decisions.

12. During the later stage of the sprints, attendees were given the ability to choose their top 5 and bottom 5 add-ons. The SS is the difference between these top and bottom scores. As an example, if an add-on received 3 ‘top’ votes and 1 ‘bottom’ vote its stakeholder score would be +2. If another addon only received 1 ‘bottom’ vote its stakeholder score would be -1.

Pre-Application Stage End-to-End Process

This stage comprises TMAs related to provision of information and engagement prior to connection application submission, as shown in Figure 4.1.

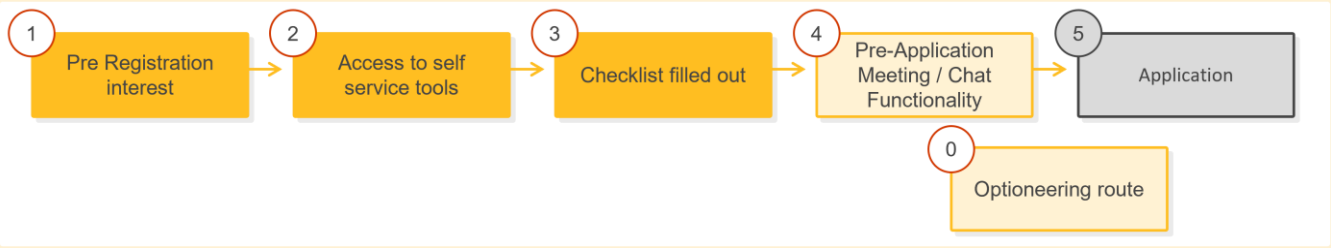


Figure 4.1: Pre-Application Stage End-to-End Process[13]

Ref	Title	Description	Stakeholder Score
TMA A	Access to self-service tools	Provision of greater information accessed through providing some indicative information	5
TMA B	Getting the best out of Pre-Application Meetings	Ensuring the Pre-Application Meeting is structured and there is a checklist filled out prior to booking a meeting so that all parties maximise the use of the meeting	7
TMA C	Appropriate use of optioneering route	Signpost more clearly that where the checklist for Pre-Application Meeting is not met an optioneering route is a way to offer more support to the applicant	1

Table 4.1: Summary of TMAs relating to the Pre-Application Stage

There were some general comments in the context of all of the TMAs related to the Pre-Application Stage:

- There was universal support that any improvements would be of benefit as soon as available and even if introduced in stages;
- That shining a light on relevant data may enhance/improve its accuracy, including where existing data issues could be due to resourcing of the process by network companies;
- That group industry sessions can be beneficial and much of the knowledge is out the somewhere, but it may not be easily accessible to all parties; and
- That there is some concern that frequency of update of data and information could be an issue as this drives its benefits.

We explore TMA A through TMA C in greater detail and set out views on fees for the Pre-Application Stage as follows.

TMA A: Access to self-service tools

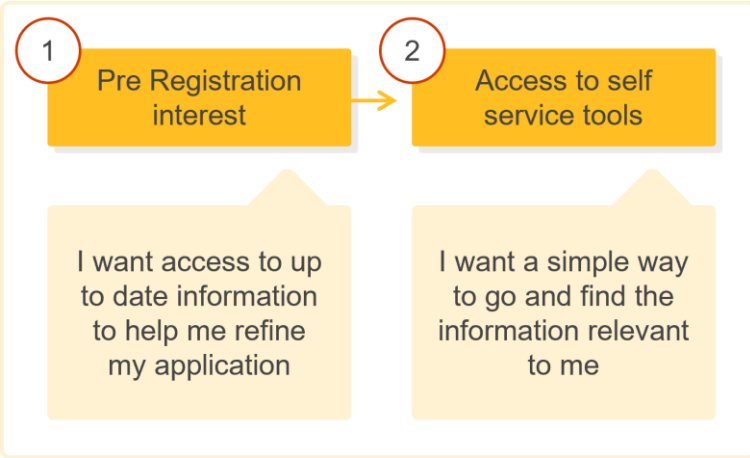


Figure 4.2: Access to self-service tools

13. For the avoidance of doubt, in Figure 4.1 TMA A is comprised of both '1' and '2', TMA B is comprised of both '3' and '4' and TMA C is comprised solely of 'O'.

Pre-Application Stage End-to-End Process

The TMA A vision would be to use the existing Connections Portal as a central point for connection applicants to register their interest and be provided with relevant information to help inform their application. This information should be up to date and accurate. This should be easy to access and provide help and support where needed to enable high quality applications to be submitted i.e. complete with the relevant information and without the need to submit what might be considered to be duplicate applications as a means to accessing network information.

Some external stakeholders mentioned the obligation on all network companies to provide data according to best practice guidelines and assume that all data held in the connections process can be shared unless there is a specific reason not to do so. There was a strong desire to release information, even if there were concerns about its accuracy, as this would drive improvements in the data quality in the longer term. Some stakeholders commented that the self-service tools would be less valuable if the data was not updated or inaccurate.

TMA A - Key Data

Below we list the key data we envisage being released and being accessed via the self-service tools introduced in Figure 4.2 on the previous page, and include an overview of some of the considerations in relation to this data:

1) Capacity information at the most granular level possible with a view on future capacity i.e. additional capacity created and then available upon completion of transmission reinforcement works.

It was noted that even if data could be provided in an excel format this would be a step forward compared to today's information. It has been noted that capacity information has two different dimensions i.e. import capacity and export capacity.

2) Capacity information published (as above) to include both applied for and offered capacity in addition to signed capacity, as is currently published on Transmission Entry Capacity Register by the ESO.

3) Enabling works[14] dependencies and visualisation of the transmission queue for connections to the extent that this is practicable.

It should be noted that transmission queue visibility is not a simple concept and there were many discussions around visualisation of the transmission queue. Some of this discussion centred around a misunderstanding of how the transmission queue forms. We elaborate further on the formation of the transmission queue as follows.

Due to the level of constraints on some key geographic boundaries there are now significant enabling works which may be driving a party's ultimate connection date. The concept of applying and having a single queue position as you would be given in a traditional first in first out system is too simplistic. A party will have a list of enabling works that it is dependent on, with the last delivered enabling work determining their connection date. If several parties are all dependant on this same enabling work, then there is a sequence or 'queue' on that enabling work. This queue position is currently dependent on the connection contract counter-signature date.

However, if there are several different enabling works all delivered with different completion milestones, the critical path for a party may change (depending on the sequencing, timing and progress of the enabling works by the party delivering the enabling works) and there are essentially a set of queues for each of the contracted enabling works. Despite the complexity it was agreed that visualising the enabling works and the capacity waiting to connect against each of the enabling works would be helpful, and that detailed design should explore the best ways of visualising this information so that it is clear and helpful to prospective customers.

14. Please note that for the purpose of this consultation the term 'enabling works' is used for simplicity. In instances where enabling works (as a defined term in the codes/contracts) is not formally applicable to a particular customer type (such as where the Connect and Manage arrangements do not apply to that customer type) then this should instead simply be read as 'works required before a compliant connection', if the context allows i.e. if the point is a more general one rather than being specific to generation.

Pre-Application Stage End-to-End Process

4) Support guides and access to sources of support

It was suggested that many of the online materials produced are useful but better signposting where it can be found at the point of need, would be beneficial. It was suggested that often the ESO runs helpful events that can support developers but better links to these and what they are would reduce individual queries. Case studies of indicative costs under particular scenarios were noted by developers as something that would be of benefit, and this could include simple calculations for frequently occurring scenarios.

TMA A - Other Longer-Term Suggestions

As these all require coordinated industry data across all network organisations and a Geographical Information System based solution to drive them, these suggestions are likely to take considerably longer to design and deliver than those proposals above. As such, it is too early to put a timescale of the delivery of these longer-term suggestions:

- Detailed asset level data;
- A full connectivity model to allow an understanding of which assets impact connections, potentially including Transmission and Distribution interactions; and
- Ability to visualise the nearest applicant and connection date.

TMA B: Getting the best out of Pre-Application Meetings

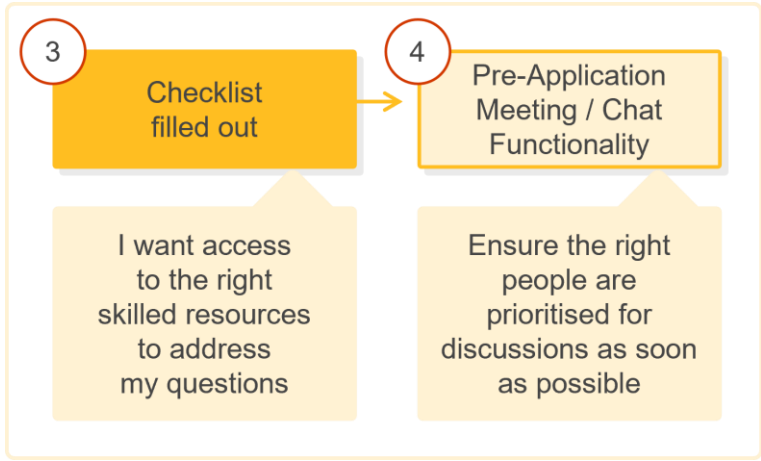


Figure 4.3: Getting the best out of Pre-Application Meetings

It was proposed that ensuring all parties maximise the opportunities of a Pre-Application Meeting with the ESO and Transmission Owner (TO) would be a key improvement as introduced in Figure 4.3. Many developers were unhappy with waiting for a Pre-Application Stage meeting for long periods of time and felt that this led to unnecessary or duplicated applications. Resourcing these discussions within set timescales would form part of a reformed process but there would also need to be obligations on parties booking these to ensure they are ready and able to get the most from a discussion. As part of this we propose developing a defined checklist to ensure a party is ready for a Pre-Application Meeting and this step would be mandatory to confirm that they are ready to apply. They would be able to decline a Pre-Application Meeting if they felt it was unnecessary, but there would still be a requirement to complete the checklist to indicate that they have declined a meeting.

Pre-Application Stage
End-to-End Process

Examples of potential requirements within the checklist would be:

- Identified a clear location, capacity and technology to discuss (assuming improvements to self-service tools to facilitate);
- Used self-service tools to access the available information in relation to the network/process; and
- Documented key discussion points they want addressed in advance to enable these to be answered effectively.

Following successful completion of a Pre-Application Meeting the notes from the session would be available to the customer, including answers to their questions. There could also be the potential for some elements of the checklist to feed through into the application form resulting in a time saving for applicants and a potential for a reduction in errors.

An alternative or additional route in place of a Pre-Application Meeting would be access to a Chat Functionality. Stakeholders raised concerns with this if it were to be in place of personal interaction, but we confirmed that is not what is being proposed. Whilst detailed design would be required to define this functionality, it could be a combination of Chat Functionality with an expert and some form of automated FAQ for any simpler requests where interaction with an expert is not required. Those continuing to need support beyond the scope of a Pre-Application Meeting would be directed towards another channel (see TMA C).

TMA C: Appropriate use of optioneering route

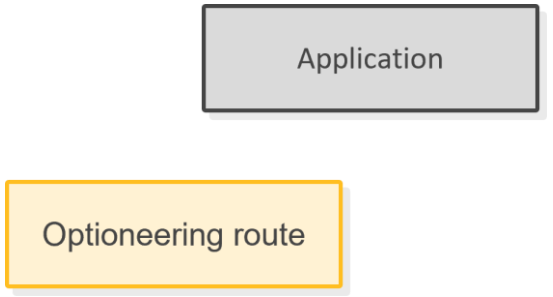


Figure 4.4: Appropriate use of optioneering route

This option was discussed and is being proposed to reflect that some projects need a greater level of advice prior submitting an application, including help selecting a potential area, capacity and technology type. In this case applicants who want to explore options would have the option to engage a formal Feasibility Study via an optioneering route prior to an application (shown in Figure 4.4). Like today, this would be an optional paid-for service for those that require additional support. This would ensure these projects get the support they require without reducing the Pre-Application Meeting capacity for those ready for application. It should be noted that this option is already available under the current arrangements, but it is little used by applicants. In part this is because there is a market for such support services elsewhere and this route does not provide a queue position.

Pre-Application Stage End-to-End Process

While most of the stakeholders we engaged with on TMA C did not feel it was a route they required, we believe that it should form part of the Pre-Application Stage landscape to support those less experienced in applying for connections and in certain project specific circumstances. However, with TMA A and TMA B in place, and the continued availability of the market to provide applicants with similar services, we expect that this route (whilst remaining available) may remain little used by potential applicants.

Pre-Application Stage fee

The Pre-Application Stage is a vital part of the customer experience and we are initially recommending the introduction of a nominal Pre-Application Stage fee. However, we expect that a customer who applies within a reasonable time period of their Pre-Application Stage engagement would then have this fee discounted from their application fee. Therefore, the total a customer would pay for an application would not change overall, but they would need to pay a relatively small amount up front to ensure that there is an appropriate requirement for parties in respect of the Pre-Application Stage. We received feedback during stakeholder engagement that a separate Pre-Application Stage fee would not be popular as considered within TMA H1 (detailed within Chapter 9) but consider that staging the overall fee in this way would represent a more cost-reflective approach overall. The detailed design of this Pre-Application Stage fee and its terms would need to be confirmed during the next phase of detailed design.

Key Challenges to Implementation

We identified the following key challenges to implementation of TMA improvements to the Pre-Application Stage:

- Clear and defined roles and responsibilities prior to and during the Pre-Application Stage, including overall ownership of the customer experience;
- The potential costs and complexities of technology required across multiple organisations i.e. the ESO and the TOs initially and potentially DNOs in the future;
- The dynamic nature and frequency of update of information, especially data;
- The resource required to keep the information up to date and ability to ensure it remains meaningful; and
- Geographical visualisation of the queue and information on available capacity across the network at substation or grid supply point level is not only challenging due to the complexity and availability of the data, but also the fact the data is owned by multiple different parties across the ESO, TOs and DNOs. There are currently no code obligations for parties to exchange this data and therefore no agreed data points or common format. This would be essential to be able to provide industry with granular Pre-Application Stage information that can be kept up to date.

It is critical that information shared through the Pre-Application Stage is high quality and can be relied upon by all parties to support their thinking, noting any information provided at Pre-Application Stage likely remains subject to the connection application process. The nature of some of this data is open to frequent change and adjustment by the TOs, ESO and in some cases other parties. We expect to work collaboratively with relevant parties, including networks companies, the Energy Networks Association, Ofgem and others to deliver the best results for the connections process. At present we do not currently possess an ability to compel parties to provide data and (as above) there are no clear obligations to do so. However, we expect that as the transition to a Future System Operator takes place these issues could be addressed, although action could be required in the meantime. We will explore this further during detailed design, including in relation to roles and responsibilities.

Pre-Application Stage
End-to-End Process

Initial Recommendations

Our initial recommendation is to implement all Pre-Application Stage TMAs (and the Pre-Application Stage fee) irrespective of the TMO selected and to then prioritise any quick wins.

We propose that TMA A and TMA B would be mandatory process stages prior to the submission of an application, albeit the Pre-Application Meeting / Chat Functionality stage could be bypassed via checklist completion, if that is not required. TMA C would be an optional process stage.

Our initial view is that these TMAs could be delivered without licence changes and would be able to be delivered through existing licence conditions on ESO and TOs regarding Digitisation (e.g. Special Licence Condition 2.11 and 9.5 respectively for ESO and TOs) and Whole System Cooperation (i.e. Standard Licence Conditions D17 and 7A).

Code changes would be required to formalise some of the elements of these solutions e.g. publication of data about projects which have applied but are yet to accept a connection offer, or data provision obligations and timescales more generally, as considered in the implementation challenges sub-section above.

We would suggest that TMA A and TMA B are prioritised as potential quick wins and are delivered at the earliest possible date with some of it, where possible, delivered by the existing Connections Portal Phase 2 Project. Timing of information supplied by TOs would be subject to their own assessment of delivery and could feature in their Digital Action Plans with updates every 6 months.

Consultation Questions – Please explain your rationale

4 Do you agree with our initial recommendation that TMA A to TMA C should all be progressed, irrespective of the preferred TMO?.

5 Do you agree with our initial recommendation on the introduction of a nominal Pre-Application Stage fee, discounted from the application fee for customers which go on to submit an application within a reasonable time period?

6 Do you agree with the importance of the TMA A ‘Key Data’? Please provide suggestions for any other key data that you suggest we consider publishing at Pre-Application Stage.

5. Key Target Model Add-ons

Key Target Model Add-ons

In order to complement the foundational design options and key variations considered in Chapter 3, we developed a series of Target Model Add-ons (TMAs) that can used with and are essential for understanding the Target Model Options (TMOs) described in Chapter 6. This chapter provides both an overview of, and an initial recommendation related to, each of these key TMAs. In Chapter 6 we then set out how the key TMAs would work in the context of each TMO. Chapter 9 then provides an overview and initial recommendation in relation to those 'supplementary TMAs' which we consider are less integral to the design and understanding of the TMOs. Appendix 6 provides more information about each of the TMAs including:

- A full list of potential options related to the TMAs, including those not progressed;
- A summary of strengths and weaknesses of the TMAs;
- Any stakeholder feedback received during the design sprint workgroups, including a Stakeholder Score (SS);[15] and
- Any TMO specific considerations.

The only difference between the key and supplementary TMAs is that some are better described prior to considering the TMOs and others are better described after considering the TMOs.

TMA D – Requirements to apply

We considered what the minimum criteria should be for the ESO to accept a connection application, assuming all information is complete and accurate.

These minimum criteria are currently (i) provision of an application form, (ii) provision of Data Registration Code template and (iii) payment of an application fee. The add-on options considered related to this TMA revolve around providing additional information or revising materials required at the application stage.

It is worth noting that less developed and speculative applications within the application process have a detrimental effect on the overall process such as:

i) having an opportunity cost, where time is spent on projects to the potential detriment of others;
ii) potentially inefficiently allocated network capacity, resulting in potentially later connections dates for others and higher network costs; and
iii) making efficient network design more challenging, potentially adversely affecting consumers in terms of higher network costs or adverse environmental or community impact.

15. During the later stage of the sprints, attendees were given the ability to choose their top 5 and bottom 5 add-ons. The SS is the difference between these top and bottom scores. As an example, if an add-on received 3 'top' votes and 1 'bottom' vote its stakeholder score would be +2. If another addon only received 1 'bottom' vote its stakeholder score would be -1.

Key Target Model Add-ons

Our initial recommendation is therefore:

- The introduction of a requirement for a Letter of Authority[16] to enter into the connections process (TMA D1).[17] The specifics of how this is implemented would need to be determined in detailed design. For example, how this needs to be adjusted for some customer and technology types (see Chapter 8).
- The introduction of a duplication check against that Letter of Authority and other aspects of the application (TMA D4).[18]
- The standardisation and simplification of terms and conditions in the connection offer (TMA D5).
- The introduction of a requirement to accept a standard form contract as part of the connection application process (TMA D6).

These would all be in addition to the current requirement to submit an administratively and technically competent application and to pay the appropriate application fee.

We think that coupled with changes to the Pre-Application Stage these changes would improve the quality of applications and reduce speculative applications. We considered setting significantly higher / more onerous requirements (e.g. evidence of having secured major planning consents) in order to deliver further improvements, but we concluded that the disadvantages of such an approach outweighed the benefits – see Appendix 6 for further information.

A facilitative action to enable TMA D6 is a set of standardised and simplified connections contracts between ESO and Transmission Owners (TOs), and ESO and developers. The standard elements of these contracts would need to be identifiable and incorporated into a form which is capable of acceptance upon application.

Our initial recommendation is for a review of connection contracts to simplify and standardise (TMA D5) prior to the implementation of a reformed connections process.

It is worth clarifying that this review would not be to introduce new rights and obligations on any party (except for any which directly relate to the preferred TMO) and would instead be to standardise and simplify, and to identify the standard elements.

Irrespective of what happens with regards TMA D6, TMA D5 would likely still be desirable from an administrative efficiency and rework risk perspective i.e. as a potentially considerable portion of the contracts would no longer be created, negotiated and accepted on a project specific basis, and only non-standard and project-specific elements would be in future.

16. A Letter of Authority is an early-stage agreement in respect of land to demonstrate that land has been identified by a project developer and that there has been formal engagement with the landowner in respect of the project development.
17. For offshore projects, such as offshore wind or interconnectors, we would instead expect some form of letter from The Crown Estate and/or Crown Estate Scotland (as appropriate) although exactly what this letter looks like remains to be confirmed, but it could be a letter to acknowledge that there is a known potential for that project to be awarded rights over that seabed in future.
18. In the event multiple Letters of Authority exist for the same land in relation to different projects (if allowed), there would need to be some sort of conditional offer/acceptance in relation to those projects.

Key Target Model Add-ons

TMA E – Determination of enabling works[19]

At present, the connection date offered as part of the application process is the product of three factors:

1. The Construction Planning Assumptions (CPAs);
2. The Connect and Manage regime;[20] and
3. Compliance with the SQSS.

The CPAs[21] set out the network background against which network studies should be undertaken and this identifies, in combination with Connect and Manage (for generation projects) and the SQSS, the enabling works required for each application prior to connection and so, the connection date.

Transmission system access granted from the connection date is viewed to be compliant with the SQSS (i.e. the enabling works are completed) and is often called a 'firm' connection. It is sometimes possible for developers to seek a non-compliant connection, which is often called a design variation or a 'non-firm' connection. This is where developers are connecting without some of (or prior to the completion of) the enabling works associated with a compliant connection, but at their own cost and risk.

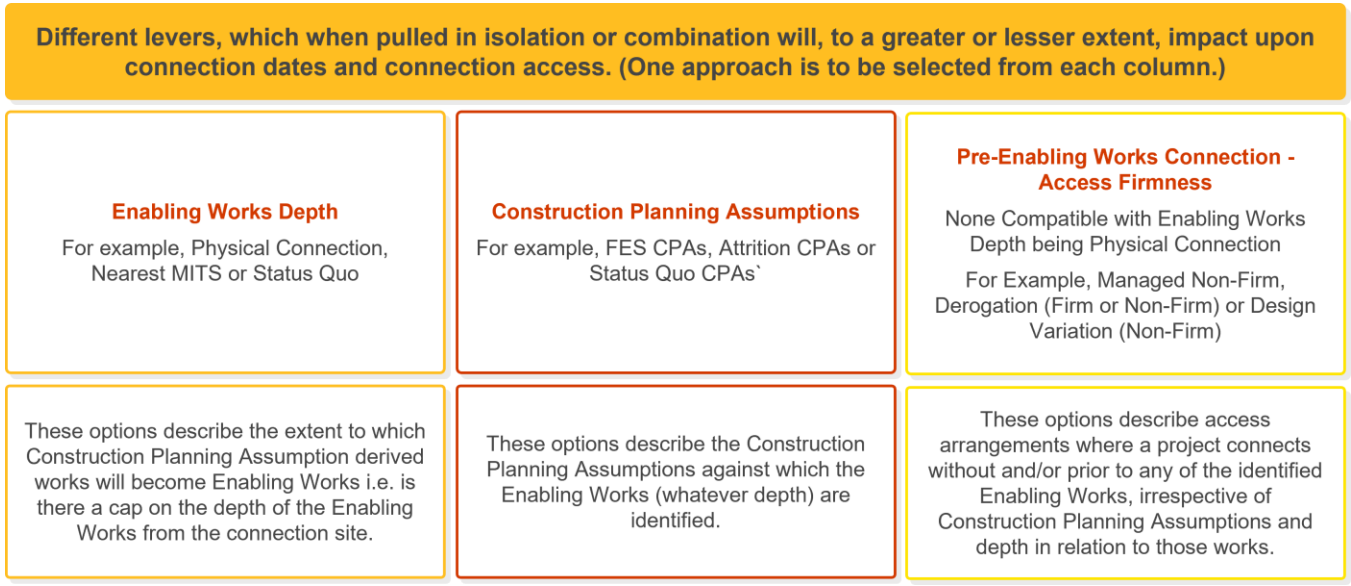


Figure 5.1: Connection Levers

CPAs, Connect and Manage and firm/non-firm access can be viewed as three levers, which when pulled in isolation or combination, will to a greater or lesser extent impact upon the extent of enabling works, connection dates and connection access. We provide a visualisation of these options in Figure 5.1 and expand upon this for each in the following sections.

19. Please note that for the purpose of this consultation the term 'enabling works' is used for simplicity. In instances where enabling works (as a defined term in the codes/contracts) is not formally applicable to a particular customer type (such as where the Connect and Manage arrangements do not apply to that customer type) then this should instead simply be read as 'works required before a compliant connection', if the context allows i.e. if the point is a more general one rather than being specific to generation.
20. Connect and Manage arrangements, set out within Transmission Licences and codified through the Connection and Use of System Code, set out the extent to which enabling works should be set when considering in relation to the Security and Quality of Supply Standards (SQSS) and the CPAs provided for within the System Operator Transmission Owner Code. Historically the expectation was that the enabling works would not ordinarily be expected to extend beyond the Main Integrated Transmission System (MITS) Node, but due to the volume of projects within the contracted background it is very common to see enabling works extending beyond the MITS Node. Please note that 'Connect and Manage' arrangements solely relate to generation connections - other connection types have more works required prior to a compliant connection.
21. Other data may also be used for specific reasons (e.g. in relation to fault levels) but for simplicity throughout this consultation we solely refer to the CPAs as being the relevant data set in relation to connections related network studies. However, in the detailed design and implementation stage we will need to work with the TOs to explore how the recommendations could interact with all relevant existing data sets and processes, to ensure we agree on how they would need to be amended for use within a reformed connections process.

Key Target Model Add-ons

Connect and Manage (TMA E1)

It might be possible to seek to limit the depth of the enabling works e.g. to the nearest MITS Node, or to the physical connection to the system, and then seek to manage the resulting non-compliance risk, potentially through a Derogation. This could be done either as standard or only where a positive cost-benefit analysis has shown it to be beneficial for consumers. The result of this could be fewer enabling works within some connection contracts and potentially earlier connection dates.

CPAs (TMA E2)

Before the introduction of our 5-Point Plan and the associated changes being made to the CPAs, the CPAs were materially based upon the contracted background with a small assumed level of project attrition, meaning that they assumed that not all contracted projects ultimately connect to the transmission system.

It is possible to seek to change this approach to become a more probabilistic and risk-based approach to the CPAs. For example, by further reducing the number of projects or the capacity associated with those projects within the CPAs based upon historic and/or forecast attrition rates and managing the attrition risk. We are doing this already within our 5-Point Plan (as described in Chapter 1) to review existing contracted connections, which should lead to fewer enabling works within connection contracts and potentially earlier connection dates.

It is worth noting that this lever and the TMA E1 Connect and Manage lever are not mutually exclusive and could result in compounded connection date benefits, but also compounded risks to manage.

Non-Firm Connections (TMA E3)

Once the enabling works and a connection date have been identified, it might be possible, with some form of contracted operational arrangement (such as an intertripping scheme), to connect before the completion of all enabling works. This has generally been at the cost and risk of the developer, with terms included in the connection agreement to set out where and when the restrictions to access apply. However, in theory, it could also be possible to limit or remove the developer's exposure to this cost and risk, effectively resulting in an earlier firm(er) connection. This would however transfer that cost and risk exposure to consumers, so the level of cost and risk would need to be quantified and there would need to be an overall cost benefit case to making such a change.

Interim non-firm connections (i.e. where the period of contractual non-firmness for a developer is temporary) are a possibility where there is the option of an operational arrangement which suitably manages the operational risk associated with the 'non-firmness' until the remainder of the enabling works have been completed.

Anticipatory Investment (TMA E4)

The ability to include network design and associated investment that goes beyond the needs of the immediate network (i.e. anticipating future network need) is currently limited for connections works due to the incremental and ad-hoc nature of connection applications. This makes designing anticipatory investment technically challenging and risks significant additional costs for consumers and delays to connection of projects through inefficient network design. Some of the TMOs have an ability to include an amount of anticipatory investment as part of a coordinated network design based on a batched assessment of connection applications.

Key Target Model Add-ons

This means that works can be progressed before they are needed, resulting in lower overall costs and earlier connections. We also note that anticipatory investment need not be limited to traditional network build solutions – efficient anticipatory investment could also include more innovative, technological solutions to address network constraints (as for example are being procured through some of our Network Options Assessment (NOA) Pathfinders[22]) and so this may also create interactions with other TMAs, such as undertaking anticipatory investment for a priority project (TMA F) alongside using queue management (TMA G).

Initial TMA E recommendations

Due to the interacting and compounding effect of pulling levers TMA E1 to E3, and associated impact on balance of risk between developers and consumers, we are not recommending making any further reductions to the scope of works required for connection at this stage. This is because further changes may introduce significant additional balancing cost and/or system operation risk for consumers and could have material network safety and compliance implications. We first intend to assess the impact of the 5-Point Plan over the coming months before deciding whether further action is required.

With regards to anticipatory investment, if our preferred TMO is taken forward once final recommendations have been made, we consider that it would be beneficial to develop criteria and processes for robustly determining anticipatory investment to be included in a network design process related to connections.

We expect that the most recent Centralised Strategic Network Plan (CSNP) outputs could also be considered and incorporated into the CPAs to ensure that as well as attrition, there is consideration of anticipatory investment in relation to the design of the connections works (TMA E4). Creating strong links between the CSNP and the connections processes should ensure that anticipatory investment is determined robustly and efficiently in line with future generation and demand scenarios.

22. Pathfinders | ESO (nationalgrideso.com)

Key Target Model Add-ons

TMA F – Criteria for accelerating 'priority' projects

Stakeholder feedback has been clear that the ability to prioritise specific projects for acceleration, in terms of securing an earlier contracted connection date, would be a significant benefit. However, there were some concerns raised about the approach for and impact of project acceleration (see TMA G). Under TMA F we explored whether there should be criteria and processes to identify specific projects for acceleration i.e. which projects should be accelerated. Under TMA G below we explored how they could be accelerated.

The criteria and processes for identifying such projects would need to be developed carefully, but our initial thinking is that we could use the following high-level criteria to determine which projects should be accelerated:

- Official designation by Government (TMA F1);
- Demonstration of significant additional consumer and/or wider economy / societal benefit (TMA F2);
    - Our initial thinking is that such projects would need to be limited to critical operability assets since the value of these is less transparent in market signals. For example, related to assets which might be procured via our NOA Pathfinders.
- Demonstration that the project is ready(ier) to connect e.g. it has reached a key delivery milestone such as submission of major planning consents (TMA F3);[23] and
- using a price-based mechanism (e.g. auctions) to allow parties to pay for a quicker connection (TMA F4).

Our initial recommendation is that a reformed connections process is able to accelerate projects that are ready(ier) to connect (TMA F3) as this helps allocate capacity to those projects that are most ready to use it.

Our initial recommendation also proposes that projects in categories TMA F1 and F2 should also be capable of being accelerated under the reformed connections process due to the significant consumer and wider economic benefits this could provide. However, we consider that further work would be required to determine the appropriate authority for designating such projects, and the methodology and criteria for doing so. Discussion will also be required with the Department for Energy Security and Net Zero and Ofgem to consider whether there could potentially be legislative and/or regulatory considerations in relation to any aspect of TMA F1 and TMA F2.

We do not recommend that a price-based mechanism (TMA F4) is progressed at this time due to its potential to favour larger or more established developers and/or certain types of technologies as accelerated connection dates would be determined based on an ability to pay. As such we think that such an approach might negate or significantly reduce the ability to accelerate projects in TMA F1 to TMA F3.

TMA G – Queue Management

Queue management was a popular topic of discussion during our Phase 2 stakeholder engagement. During sprint discussions, it was identified there are different types and meaning behind the term 'queue management' so we have further defined these terms.

23. Exactly what evidence is required for this milestone would need to be defined; however, our initial thinking is that we would look to align with the approach for defining the milestone under CMP376 and we may seek some publicly available evidence. For example, evidence of submission to a public planning portal. We will also need to consider further how the milestone can be most efficiently applied to projects that have already progressed beyond this milestone or that do not require planning consents.

Key Target Model Add-ons

- Reactive Queue Management (RQM) is where capacity needs to first be released by a project[24] before that capacity is made available to accelerate other projects into the 'capacity gap' that has been created. Such an approach should not have a detrimental impact on other projects that are not accelerated as their connection contracts would be unaffected. We consider that there are two types of RQM:
    i. An approach where a 'capacity gap' is theoretically[25] filled by the next project in the queue on a first come first served basis – we simply continue to refer to this as 'RQM'; and
    ii. An approach where a 'capacity gap' is allocated to a 'priority project' as per TMA F, rather than on a first come, first served basis – we instead refer to this as 'RQM+'
- Proactive Queue Management (PQM) is where a project can be accelerated without capacity first being released by another project. Under this approach there is no 'capacity gap' so the risk of this acceleration sits either with consumers (in terms of additional constraint costs or reduced system operability) and/or other developers (in terms of potentially pushing back their connection date as a result of an accelerated project taking their place in the queue).

As set out in Chapter 1, queue management is part of an ongoing code modification (i.e. CMP376) and is part of our 5-Point Plan. For the purposes of this document and the design of the TMOs, we have assumed that one of our options proposed within CMP376 (or a similar alternative option) is approved by Ofgem and implemented, as we consider it a fundamental building block for the reformed connections process. However, if this is not the case then we will need to carefully consider the reasons in order to determine if and how queue management arrangements would apply in future.

The changes proposed under CMP376 can be considered as RQM i.e. developers have a queue position and in the event that they do not meet project development milestones, their connection agreement may be terminated, creating (in theory) the opportunity for other projects behind them in the queue, on a first come first served basis, to benefit from potentially earlier connection.

It is not possible to show the relative impact of these different queue management approaches quantitively due to the impact being situation specific. However, conceptually, as you move through RQM, RQM+ and PQM, there is greater potential for project advancement due to greater ability to utilise capacity. However, whilst there are no additional drawbacks as you move from RQM to RQM+ (as no projects are worse off as a result of a 'capacity gap' being filled by another project), there are several drawbacks when you then move from RQM+ to PQM.

For example, several concerns were highlighted by stakeholders with regard to PQM. These included: i) project investment risk if connection dates could be delayed even where a developer was meeting their own delivery milestones, and ii) potential for projects with inherently quicker delivery timetables to be perpetually advanced ahead of projects with inherently longer delivery timetables. In combination this could inadvertently lead to a rebalance of the technology mix with unintended consequences. As a result, our initial recommendation is that PQM is not included within the reformed connections process. We include RQM and RQM+ within our TMOs, but we have a preference at this stage for RQM+ as we consider it performs better against the overall design objectives by providing greater potential for project advancement, without detriment to other projects or consumers.

Whilst we are not recommending PQM at this stage, we welcome views on whether there are any ways to robustly mitigate the significant drawbacks/risks identified under PQM, which might make PQM a more viable option now or in future.

24. For example, because of a project's connection contract being terminated, or because its capacity has reduced.
25. We use 'theoretically' as due to the queue complexity under first come, first served arrangements further detailed work would be required to determine how capacity would be allocated in practice.

Key Target Model Add-ons

Consultation Questions – Please explain your rationale

7 Do you agree with our initial recommendation with regard to TMA D (requirements to apply)?

8 Do you agree with our initial recommendation with regard to TMA E (determination of enabling works), including that it is right to wait until the impact of the 5-Point Plan is known before forming a view on whether further changes to TMA E are required?

9 Do you agree with our initial recommendation with regard to TMA F (criteria for accelerating 'priority' projects)?

10 Do you agree with our initial recommendation with regard to TMA G (queue management)?

6. Target Model Options

ESO

Target Model Options

We have pulled together Target Model Options (TMOs) based on combinations of the foundational design options and key variations, as per Chapter 3, and key Target Model Add-ons (TMAs), as per Chapter 5. Whilst we discussed other different combinations with stakeholders, these were ruled out at an earlier stage in the process and therefore do not appear as TMOs.

For example, we have not presented a TMO which has an entry gate or window with a high barrier, such as planning consent, based on stakeholder feedback within the design workstreams.

We consider the four shortlisted TMOs to be the most coherent and credible overall models to put forward for consultation. They attempt to balance the need for more efficient capacity allocation, coordinated network design and transmission investment with providing clarity on connection date and location to developers as early as possible in order to support their investment case.

Each TMO does this to a different extent and in a different way, but we have tried to make trade-offs so that these TMOs are balanced options. As they deviate away from the status quo the TMOs start to become more radical and increasingly seek to address more of the issues with the current connections process. This is demonstrated in their assessment against the design criteria, as found within Chapter 7 and Appendix 2. The general trend as we move through the TMOs is increasingly material changes from the status quo. This includes a move towards greater batching and co-ordinated network design; a move towards greater developer involvement in the network design process; a greater ability to change how queue position is allocated and managed; and a greater ability to treat readier to connect and priority projects in a differentiated manner without detrimental impacts to other projects and/or consumers.

We have not presented a ‘do nothing’ option as whilst this is in theory possible, based on the Case for Change we do not believe this would be appropriate.

Even with our 5-Point Plan making a positive impact, more must be done to reform the connections process. Therefore, whilst TMO1 is presented as the ‘Status Quo Plus’ option, there are several TMAs which make TMO1 a more viable (albeit in our view, still ultimately unattractive) option than the status quo.[26]

This chapter sets out the journey we have been on to consider and discount options, which has led us to the four TMOs presented, as illustrated initially within Figure 6.1.

26. Whilst in many cases the TMAs are agnostic of the TMO, in this case we do not foresee TMO1 being viable without those TMAs, as in effect that would bring us back towards the status quo arrangements.

Target Model Options

Sprint 3a	Sprint 3b	Sprint 4	Consultation
Foundational Option 1 Status Quo Plus	Status Quo Plus but Application Upon Consent - Discounted		N/A
	Status Quo Plus		TM01
Foundational Option 2 Gated	Additional Gate (Initial Version)	Additional Gate (Further Version)	TM02
	Additional Gate and Late Window (Initial Version)	Additional Gate and Late Window (Discounted)	N/A
	N/A	Additional Gate and Mid Window (Initial Version)	TM03
	Additional Gate and Early Window (Initial Version)	Additional Gate and Early Window (Initial Version)	TMO4
Variation 4 Application Windows	Standalone Option Discounted Considered within some TMOs as part of Foundational Option 2		N/A
Foundational Option 3 Central Planning	Option Parked Technology Type Elements considered within TMO Add-ons in other TMOs		N/A

Figure 6.1: TMO Development Journey

For each of the four TMOs we provide a description, along with a simple visual of the process, and initially assess some of the relative strengths and weaknesses. This assessment is supplemental to the full design criteria assessment for each of the TMOs in Chapter 7 and Appendix 2. We conclude with a comparison table showing the key components of each of the TMOs and where there are similarities and differences. Whilst we describe the TMOs in relation to new connection applications, the process described in the TMOs would apply in some circumstances to modification applications. Other forms of contractual activity (e.g. contract novations and administrative changes) are further explored within Chapter 9 in respect of TMA O.

The key TMAs referenced throughout this chapter were described in Chapter 5. Further TMAs which are not featured in this chapter can be found within Chapter 9. It is worth noting that our initial recommendation is that all four TMOs include the TMAs associated with the Pre-Application Stage, as per Chapter 4. We do not further discuss this in this chapter for each of the TMOs.

Until just prior to this consultation being published, under TMO2 and TMO4 we had Gate 2 as ‘shovel ready’ rather than being related to the submission of planning consents. We also had a ‘Gate 3’ under TMO3 (which we have since removed) related to being ‘shovel ready’. We made these changes as following feedback at the Steering Group, we felt that only knowing if there is potential for advancement at the ‘shovel ready’ stage in a project’s development cycle could be too late for the project to mobilise accordingly and could be too late from an investment confidence perspective. As such we moved the gates to an earlier stage in the process (i.e. submission of planning consents).

However, the drawback of this change is that accelerated connections dates would be provided to projects which are less certain (as a project which has submitted planning consents is less certain than a project which is ‘shovel ready’). At the end of this chapter, we invite views on this point specifically as well as more generally on the four TMOs.

Target Model Options

TMO1 - ‘Status Quo Plus’

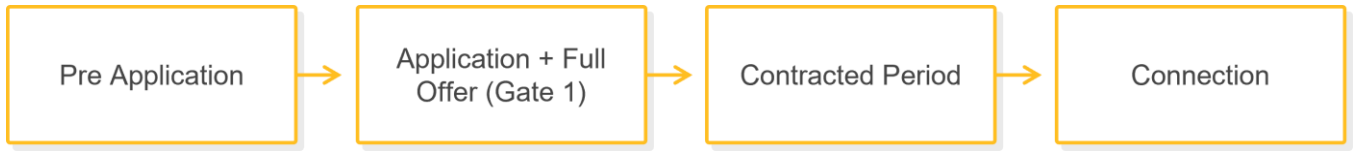


Figure 6.2: TMO1 High-Level Process Diagram

In TMO1 there would be a single stage gate with application entry requirements, as illustrated in Figure 6.2 and as per the current process[27].

Developers would continue to apply when they want and be provided with an offer on the same first come, first served basis as today i.e. with a queue position being allocated at this point in time based upon connection contract counter-signature date. In addition to the current entry requirements there would be the requirement of a Letter of Authority to enter into the application process and a check against that Letter of Authority to remove duplicates (TMAs D1 and D4).

Contracts would be simplified and standardised (TMA D5) and (except for any non-standard or project specific elements) accepted electronically upon application (TMA D6). In limited circumstances, the ESO could choose to not progress a competent application e.g. from an offshore wind farm where there is no apparent route to a seabed lease (TMA I2). Attrition Construction Planning Assumptions (CPAs) (TMA E2) could continue to be utilised as per our 5-Point Plan tactical changes, but there may be attrition assumption challenges in terms of how efficiently this could be done, as taking an informed view on project attrition is more challenging when applications continue to be received on an incremental ad-hoc basis.

Developers would be provided with a firm offer, or if requested, the opportunity for a design variation and/or interim restrictions on availability[28] (TMA E3).

Reactive Queue Management (RQM) (as per CMP376) would facilitate the potential for advancement of projects where a suitable gap is created through a project termination (TMAs G1 and G5). However, due to the absence of a second gate, projects would (in theory) be advanced in queue order when gaps were created by the termination of other projects. Therefore, there would be no way to provide for advancement of ‘priority projects’ (TMA F).[29]

27. An overview of the current process can be found as follows. Your Connections journey | ESO (nationalgrideso.com)
28. As a reminder, firm access is where all enabling works have been completed and there are no contracted restrictions on availability, a design variation is where there are permanently contracted restrictions on availability due to a non-compliant customer choice connection and interim restrictions on availability relate to a connection ahead of some of the enabling works. Restrictions on availability and interim restrictions on availability are both colloquially known as ‘non-firm’ access.
29. There would be potential for advancement of ‘priority projects’ if Proactive Queue Management were used instead of RQM.

Target Model Options

TMO1 Strengths and Weaknesses

Table 6.1 below summarises some of the apparent strengths and weaknesses of TMO1, relative to the other options.

Topic	Strengths	Weaknesses
Co-ordinated Design	-	Limited opportunity for coordinated design - as each connection offer is designed in isolation potential for inefficient cost and environmental/community impact of the network design remains.
Implementation	Can be implemented relatively easily as built on the existing process.	Once implemented, unlikely to fully address the underlying issues and causes interface issues/inefficiencies with offshore wind connections. Requires code changes.
Interactivity[30]	-	Interactivity remains in the process and results in contract rework and extended offer timescales for those impacted.
Investment Certainty	Due to this being a known approach investors may feel comfortable in what this delivers, and the TMO provides quickest time to offer a firm connection contract.	Level of improvement to connection dates and queue is highly dependent on how many projects are terminated through RQM (and how quickly) and the impact of changes progressed via the 5-Point Plan.
Queue Management	-	RQM+ would not be possible so gaps created by the termination of contracts would (in theory) be filled based on existing first come first served queue positions.
Resource	-	Would need significant uprate in resources (e.g. for Pre-Application Stage) until technology solutions can deliver efficiencies and less effective use of skilled resources than some of the other TMOs.

Table 6.1: TMO1 Strengths and Weaknesses

30. Interactivity is where a connection offer is dependent upon one or more other connection offers not being accepted and this process can result in connection offers being withdrawn and needing to be reissued at a later date. This extends the time between original connection offer and having an offer which is capable of acceptance by developers.

Target Model Options

TMO2 – Gated process without application windows

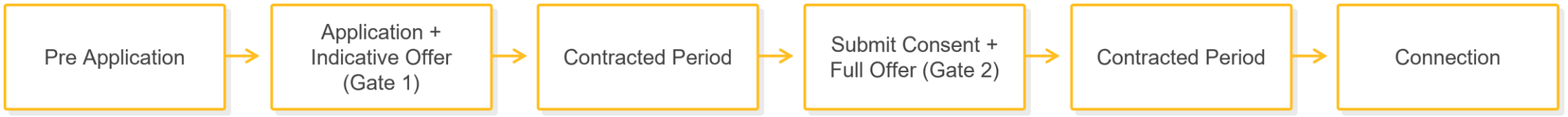


Figure 6.3: TMO2 High-Level Process Diagram

A second gate would be introduced to the current process and the current process would be amended in respect of the first gate as illustrated in Figure 6.3.

Developers would continue to apply when they want and be provided with an offer on the same first come, first served basis as today i.e. with a queue position being allocated at this point in time at Gate 1, based upon connection contract counter-signature date.[31] However, this would be an indicative offer, where the capacity and connection site would be confirmed, but the connection date would remain provisional.

The reason the offer would be indicative at Gate 1 is because full network studies would not be undertaken to identify the full suite of connection works (and hence the connection date) until the project submits planning consents and is able to progress through Gate 2.[32]

This means that the ESO and Transmission Owners (TOs) could focus their resources on projects which are readier to connect leading up to Gate 2, rather than on all projects at the earlier stages of their development leading up to Gate 1.

31. We considered queue position being allocated only at Gate 2, but we felt that this would not be acceptable to developers as in effect it would (in theory) result in the indicative offer being entirely amendable due to other projects progressing through Gate 2.
32. As a result of this there would likely be consequential impacts to explore on User Commitment arrangements. This also applies to both TMO3 and TMO4, but it is not repeated under those TMO descriptions.

Target Model Options

At application stage (i.e. leading up to Gate 1), in addition to the current entry requirements, there would be the requirement of a Letter of Authority to enter into the application process and a check against that Letter of Authority to remove duplicates (TMAs D1 and D4).

Contracts would be simplified and standardised (TMA D5) and (except for any non-standard or project specific elements) accepted electronically upon application (TMA D6). In limited circumstances, the ESO could choose to not progress a competent application, e.g. from an offshore wind farm where there is no apparent route to a seabed lease (TMA I2).

At Gate 2 and following full network studies the connection date and all associated connection works would be confirmed within a firm offer, but only for projects which have submitted planning consents and other 'priority projects' (TMA F).

Attrition CPAs (TMA E2) could continue to be utilised as per our 5-Point Plan as part of the network studies associated with Gate 1 and Gate 2, but there may be attrition assumption challenges as taking an informed view on project attrition is more challenging when applications continue to be received on an incremental ad-hoc basis. However, these challenges would be reduced compared to TMO1, as the CPAs used at Gate 2 would be closer to the likely connections we anticipate that most projects that reach Gate 2 would likely progress to completion.

The connection date within the firm offer received at Gate 2 could in theory be a later or earlier connection date than the provisional date provided at Gate 1, depending on how the Gate 1 offer was developed by the ESO and TOs.[33]

If requested by the developer, a design variation could be provided at Gate 1 and/or the opportunity for interim restrictions on availability (TMA E3) could be provided at Gate 2.

Projects which had submitted planning consents and other 'priority projects' (TMA F) could all bypass Gate 1 and move straight to Gate 2. However, under that scenario they would not receive their connection offer until Gate 2 and would therefore be at a later place in the queue than would have otherwise been the case.

Any gaps created through termination of contracts or reductions in contracted capacity could be allocated, via RQM+, to projects which have submitted planning consents or other 'priority projects' (TMA F) at Gate 2.

33. To explain, if the provisional connection date were an estimate of all required enabling works, this estimate could turn out to be optimistic or pessimistic at Gate 2 once more is known about the enabling works after full studies. However, if the provisional connection date were only related to the physical works required for connection, then it is likely that the provisional date would remain as it was at Gate 1 or move backwards once the full set of enabling works were identified at Gate 2. This is because the more detailed assessment at Gate 2 would not review the physical works required for connection. The opportunity for interim restrictions on availability (i.e. temporary non-firm access) would also be provided to developers at Gate 2. It is also worth noting a risk that critical path enabling works might not be identified until Gate 2 and this could impact on connections timescales.

Target Model Options

TMO2 Strengths and Weaknesses

Table 6.2 below summarises some of the apparent strengths and weaknesses of TMO2, relative to the other options.

Topic	Strengths	Weaknesses
Co-ordinated Design	-	Limited opportunity for coordinated design - as each connection offer is designed in isolation potential for inefficient cost and environmental/community impact of the network design remains.
Implementation	Can be implemented quicker than windowed options with less dependency on the timing of implementation (i.e. no need to wait for window to be in place before implementation).	Likely to need licence change and code change to facilitate implementation by clarifying and formalising the approach/scope, likely increasing implementation timescales. Once implemented, unlikely to fully address the underlying issues and causes interface issues/inefficiencies with offshore wind connections.
Interactivity	Potentially less interactivity depending on approach to determining indicative connection offer at Gate 1.	Interactivity remains in the process and results in contract rework and extended offer timescales for those impacted.
Investment Certainty	Whilst time to get full offer is longer overall compared to TMO1, time to get indicative offer is potentially quicker.	Provisional connection date offer at Gate 1 does not provide as much investor certainty when compared to TMO1. Level of improvement to connection dates and queue is highly dependent on how many projects are terminated through RQM (and how quickly) and the impact of changes progressed via the 5-Point Plan.
Queue Management	At Gate 2 there is greater potential for advancement of some projects due to RQM+.	-
Resource	Some resource saving due to not having full offers for all applications.	-

Table 6.2: TMO2 Strengths and Weaknesses

Target Model Options

TMO3 – Gated process with a ‘mid’ window

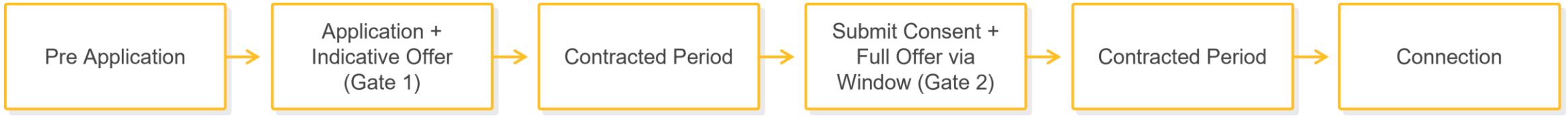


Figure 6.4: TMO3 Gated process with a ‘mid’ window

TMO3 is a gated process with an application window leading up to a second gate for providing firm connection offers but only for projects which have submitted planning consents and other ‘priority projects’ (TMA F) and as illustrated in Figure 6.4. The current process would also be amended in respect of the first gate.

Developers would continue to apply when they want and be provided with a connection offer on the same first come, first served basis as today i.e. with a queue position being allocated at this point in time at Gate 1 (for the same reasons as for TMO 2) based upon connection contract counter-signature date. However, this would be an indicative offer, where the capacity and connection site would be confirmed, but the connection date would remain provisional. As for TMO2, this is because full network studies would not be undertaken to identify the full suite of connection works (and hence the connection date) until the project submits planning consents and enters into the application window leading up to Gate 2. At application stage (i.e. leading up to Gate 1), in addition to the current entry requirements, there would be the requirement of a Letter of Authority to enter into the application process and a check against that Letter of Authority to remove duplicates (TMAs D1 and D4).

Contracts would be simplified and standardised (TMA D5) and (except for any non-standard or project specific elements) accepted electronically upon application (TMA D6). In limited circumstances, the ESO could choose to not progress a competent application, e.g. from an offshore wind farm where there is no apparent route to a seabed lease (TMA I2).

At Gate 2 the connection date and all associated connection works would be confirmed within a firm offer, following full network studies.

Attrition CPAs (TMA E2) could continue to be utilised as per our 5-Point Plan as part of the network studies associated with Gate 1 and Gate 2, but there may be attrition assumption challenges. This is because taking an informed view on project attrition is more challenging when applications continue to be received on an incremental ad-hoc basis. However, these challenges would be reduced compared to TMO1 (and, to an extent, due to the application window, TMO2), as the CPAs used at Gate 2 would be closer to the likely connections as we anticipate that most projects that reach Gate 2 would likely progress to completion.

Target Model Options

As described for TMO2 the connection date within the firm offer received at Gate 2 could in theory be a later or earlier connection date than the provisional date provided at Gate 1, depending on how the Gate 1 offer was developed by the ESO and TOs.

If requested by the developer, a design variation could be provided at Gate 1 and/or the opportunity for interim restrictions on availability (TMA E3) could be provided at Gate 2.

All the Gate 2 activity would be undertaken on a batched basis for all projects that had submitted planning consents, and notified the ESO of this, within the timescales of an application window. This would allow a co-ordinated network design process, which could include greater developer collaboration within the design process, although this could be limited by the time available and the fact some of the design aspects were confirmed in the indicative offer at Gate 1. It would also be possible, to a certain extent, to efficiently consider a broader range of network design criteria within a co-ordinated process, such as environmental and community impact.

There could be the potential for minimal-to-moderate levels of anticipatory investment to be considered and designed efficiently within these co-ordinated network design processes. It would not be possible to consider high levels of anticipatory investment in any efficient way as doing so would change the nature and duration of the design exercise within the window leading up to Gate 2.

It is worth noting a risk of the design window being at this stage that critical path enabling works might not be identified until Gate 2. There may be material benefits to consumers of building those enabling works (e.g. in terms of material constraint cost savings, or materially lower environmental or community impact) but only identifying those works at Gate 2 could push back connections dates for any affected projects compared to the provisional dates provided at Gate 1.

Projects which had submitted planning consents and other ‘priority projects’ (TMA F) could all bypass Gate 1 and move straight to Gate 2. However, under that scenario they would not receive their connection offer until Gate 2 and would therefore be at a later place in the queue than would have otherwise been the case.

Any gaps created due to contract termination (or capacity reductions) could be allocated via RQM+, to projects being considered within the window i.e. which have submitted planning consents or other ‘priority projects’ (TMA F) at Gate 2.

We currently foresee the windows to be national and to apply for all technology types, with each window running in sequence to allow for the output of one window to inform the inputs into the subsequent window. Whilst only an early estimate, we foresee windows running on a six-monthly basis.

Target Model Options

TMO3 Strengths and Weaknesses

Table 6.3 below summarises some of the apparent strengths and weaknesses of TMO3, relative to the other options

Topic	Strengths	Weaknesses
Co-ordinated Design	The coordinated design process has some flexibility and should achieve more efficient network costs and some mitigation of wider environmental and community impact of the network design through some co-ordinated design optionality. Risk of changes to or inefficiencies in the coordinated design reduced due to later timing of window. There is also potential for some (albeit limited) anticipatory investment.	Risk that critical path enabling works might not be identified until Gate 2, which could push back connections dates for any affected projects compared to the provisional dates provided at Gate 1.
Implementation	-	Would need licence change and code changes, which would increase implementation timescales. More complex to implement than TMO1 and TMO2. Once implemented, unlikely to fully address the underlying issues and causes interface issues/inefficiencies with offshore wind connections.

Table 6.3: TMO3 Strengths and Weaknesses

Target Model Options

Topic	Strengths	Weaknesses
Interactivity	Potentially less interactivity depending on approach to indicative connection offer at Gate 1.	Interactivity remains in the process and results in contract rework and extended offer timescales for those impacted.
Investment Certainty	Whilst time to get full offer is longer overall compared to TMO 1, time to get indicative offer is potentially quicker.	Provisional connection date offer at Gate 1 does not provide as much investor certainty when compared to TMO1. Level of improvement to connection dates and queue is highly dependent on how many projects are terminated through RQM (and how quickly) and the impact of changes progressed via the 5-Point Plan.
Queue Management	At Gate 2 there is greater potential for advancement of some projects due to RQM+.	-
Resource	Some resource saving due to not having full offers for all applications.	

Table 6.3: TMO3 Strengths and Weaknesses (continued)

Target Model Options

TMO4 – Gated process with an early window

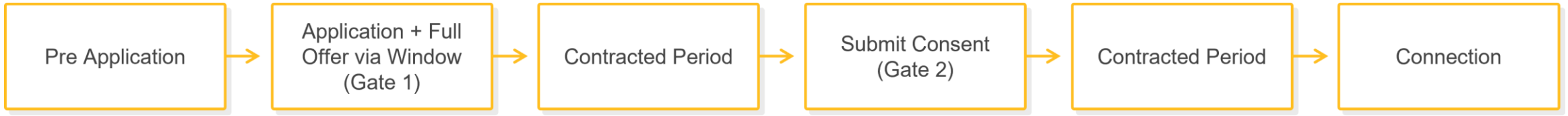


Figure 6.5: TMO4 High-Level Process Diagram[34]

TMO4 is a gated process with an early application window leading up to Gate 1, with Gate 2 being used to determine queue position for projects within the window and to potentially accelerate projects which have submitted planning consents, or other 'priority projects' (TMA F). This is illustrated within Figure 6.5.

Developers would no longer be able to apply when they wanted and would have to apply via an application window, except in limited circumstances e.g. for administrative contract changes (TMA O). In order to enter into an application window, in addition to the current entry requirements, there would be the requirement of a Letter of Authority and a check against that Letter of Authority to remove duplicates (TMAs D1 and D4).

Contracts would be simplified and standardised (TMA D5) and (except for any non-standard or project specific elements) accepted electronically upon application (TMA D6). In limited circumstances, the ESO could choose to not progress a competent application e.g. from an offshore wind farm if there is no route to a seabed lease (TMA I2).

Application windows would run sequentially and are currently estimated as occurring annually. As per TMO3 we currently foresee application windows to be national and to apply for all technology types, with each window running in sequence to allow for the output of one window to inform the inputs into the subsequent window.

Attrition CPAs (TMA E2) could continue to be utilised as per our 5-Point Plan as part of the full network studies that would occur during the window. Given that those studies would be undertaken on all connection applications submitted/accepted within the window, there would be significant opportunity to introduce a much more co-ordinated network design and anticipatory investment[35] could be considered to the greatest extent possible in any of the TMOs. It would also be possible to efficiently consider a broader range of network design criteria within a co-ordinated process, such as environmental and community impact. There would also be the opportunity to include greater developer collaboration within the design process e.g. as there could be more time available to engage on potential and potentially preferred options within the process, etc.

34. Whilst not depicted in Figure 6.1 earlier in this chapter, it is worth noting that based on stakeholder feedback within the sprints we had briefly considered a version of TMO4 without Gate 2 but as this started to look like key variation 4 as a standalone option, which is considered in Figure 6.1 and was discounted, including due to it having challenges with both queue position allocation and the potential for advancement. Therefore, we did not further develop this as a standalone option after it was initially suggested within those discussions.
35. It is worth noting that the potential impact of anticipatory investment within a co-ordinated network design process, and the interaction of this anticipatory investment with backstop connection dates, requires further consideration to ensure that there are no unintended interactions between the two within application windows i.e. it may not be desirable for the presence of anticipatory investment in a network design to result in delays to the backstop connection dates for applicants within that window related to that network design..

Target Model Options

The output of a window would be connection offers to all applicants in a window. Those offers would include confirmed capacity and connection site and a backstop connection date[36]. The use of Attrition CPAs would be expected to make the backstop connection date a more reasonable connection date than the connections dates seen under the status quo.

First come, first served would not apply within the window as whilst capacity would be reserved/allocated at the end of the window (i.e. at Gate 1) a queue position for the projects covered by the window would only be provided at Gate 2 when a project submits planning consents, or the point at which a project is designated as a 'priority project' (TMA F). This would represent a move to 'First Ready, First Served' at Gate 2.

At Gate 2 there would be potential for connection date[37] advancement relative to other projects in the window due to the approach to batched assessment at the prior process stage leading up to Gate 1. So, at a minimum, projects would maintain their backstop connection date at Gate 2 and would have the potential to secure an advanced connection date if they reached Gate 2 more quickly than other projects in that window.

If requested by the developer, a design variation could be provided at Gate 1 and/or the opportunity for interim restrictions on availability (TMA E3) could be provided at Gate 2.

For any projects that entered the application window having already submitted planning consents, or were 'priority projects' (TMA F), those projects would then simultaneously pass both Gate 1 and Gate 2. As a result they would therefore receive a queue position and an advanced connection date at that point in time.

Any gaps created through termination of contracts or reductions in contracted capacity could be allocated, via RQM+, to projects which reach Gate 2.

Case Study 1 in Appendix 5 sets out how TMO4 could work in future for an onshore project which is directly connected to the transmission system.

36. Note that this backstop date would be based on the estimated timescale for delivery of the enabling works i.e. the actual connection date would still be subject to the enabling works being delivered efficiently, as is the case today, and it would not be a guaranteed connection date i.e. one which cannot change in any circumstances.
37. An indication of the potential for advancement could be provided at Gate 1 but as this would be relative to the progression of other projects within a window this would need to be indicative.

Target Model Options

TMO4 Strengths and Weaknesses

Table 6.4 below summarises some of the apparent strengths and weaknesses of TMO4, relative to the other options.

Topic	Strengths	Weaknesses
Co-ordinated Design	Significant opportunity to introduce a co-ordinated network design and anticipatory investment could be considered to the greatest extent possible in any of the TMOs. Opportunity for much better alignment to Centralised Strategic Network Plans, potentially allowing earlier build of enabling works.	Risk that many of the projects used as the basis for the coordinated design do not ultimately proceed, introducing a risk of over-investment, which is mitigated to some extent by using Attrition CPAs. It may also be mitigated further by the improved ability to use network competition and/or give more considered thought to non-build solutions.
Implementation	-	Would need licence change and code changes, which would increase implementation timescales. More complex to implement than TMO1 and TMO2.
Interactivity	Interactivity mostly removed as a concept and as a result reduces for potential contract rework and customer dissatisfaction.	-

Table 6.4: TMO4 Strengths and Weaknesses

Target Model Options

Topic	Strengths	Weaknesses
Investment Certainty	Provides a backstop date at Gate 1 and best chance for advancement for projects that proceed quickly to Gate 2.	A more radical departure from the current arrangements, which could be viewed to introduce risk. The window adds to time in process to when a connection offer is provided compared to other TMOs and restricts when developers can submit connection applications.
Queue Management	Queue (for projects within a window) only forms at Gate 2 so allows move to 'First Ready, First Served' and there is more opportunity for projects that are progressing to secure better overall connection dates.	-
Resource	Gate 2 provides further opportunity for advancement under RQM+. Resources can be deployed more effectively across the process stages than other TMOs e.g. annual opportunity for a focussed and more efficient Pre-Application Stage. Resource savings in relation to reduction in need to manage interactivity within process.	Continues to provide full offers to all applicants and potentially increases the per-applicant effort to do so.

Table 6.4: TMO4 Strengths and Weaknesses (continued)

Target Model Options

We set out below in Table 6.5 a comparison of the indicative core components of each of the four TMOs.

Core Components	TMO1	TMO2	TMO3	TMO4
Number of Formal Gates	1	2	2	2
Gate 1 Trigger Point	Application	Application	Application	Application
Gate 2 Trigger Point	N/A	Planning Consent Submission	Planning Consent Submission	Planning Consent Submission
Gate 1 Process Time	3 Months	<3 Months	<3 Months	TBC *Initial estimate of 12 months*[38]
Gate 2 Process Time	N/A	3 Months	TBC *Initial estimate of 6 months*[39]	3 Months
Queue Position Allocation e.g. First Come First Served (FCFS)	Gate 1: FCFS	Gate 1: FCFS	Gate 1: FCFS	Gate 1: No queue position within window, but later windows sit behind earlier windows e.g. window 2 projects behind window 1 projects Gate 2: First Ready, First Served
Provisional Connection Date Allocation	N/A	Gate 1	Gate 1	N/A

Table 6.5: Comparison of the core components of the four TMOs

38. Please note that the connection offer would be expected to be available up to three months prior to the end of this period of time.
39. Please note that the connection offer would be expected to be available up to three months prior to the end of this period of time.

Target Model Options

Core Components	TMO1	TMO2	TMO3	TMO4
Firm Connection Site Allocation	Gate 1*	Gate 1**	Gate 1**	Gate 1
Firm Connection Date Allocation	Gate 1*	Gate 2	Gate 2	Gate 1 (Backstop Date)
If available, Earlier Non-Firm Access Date Allocation	Gate 1	Gate 2	Gate 2	Gate 2
If available, Advanced Connection Date Allocation (Excluding RQM+)	N/A	N/A	N/A	Gate 2
Queue Management	RQM	RQM+ (Gate 2)	RQM+ (Gate 2)	RQM+ (Gate 2)
Interactivity	Gate 1	Gate 1***	Gate 1***	Gate 2 (Limited)
Holistic / Batched Connections Design + Greater Developer Collaboration	No	No	Yes, albeit limited (Gate 2)	Yes (Gate 1)

*Except for offshore wind, interconnector and Multi-Purpose Interconnector (MPI) applications which would still require a Holistic Network Design (HND) type process in place of the Connections and Infrastructure Options Note (CION) process, or continued use of the CION process, to confirm the connection / interface site.
**Except for offshore wind, interconnector and MPI applications which would still require the Gate 1 connection / interface site to remain indicative until an HND-type (or CION) process.
***Potential for this to also occur at Gate 2 but this requires further consideration.

Table 6.5: Comparison of the core components of the four TMOs

Target Model Options

Consultation Questions – Please explain your rationale

11 Do you agree these four TMOs present a reasonable range of options to consider for a reformed connections process?

12 Do you think any of the four TMOs could be materially improved e.g. by adding, removing or changing a specific aspect of the TMO? If so, what and why?

13 Are there any important TMOs we have missed?

14 Do you think ‘Submit Consent’ is too early for Gate 2 in TMO2 to TMO4? If so, what milestone should be used instead and why?

7. Preferred Target Model Option

Preferred TMO

Having considered the Target Model Options (TMOs) in Chapter 6, and the Target Model Add-ons (TMAs) in Chapter 5, this chapter sets out our initially preferred TMO.

Table 7.1 sets out our overall assessment of each of the TMOs against the design objectives and design criteria. These scores are based on our assessment of how each TMO would perform if applied to new connection applications and other material contract changes via modification applications. We have not scored the TMOs against how they might apply to projects with current connection contracts that are waiting to connect. This is because any such scoring would depend on what happens to those contracted projects in the transition period between now and 'go live' of the new reformed connections process, which is still to be determined (see Chapter 10).

Appendix 2 provides further information on how we undertook this assessment and provides more detail to support the score against each criterion. We are interested in your views on how we have scored the TMOs.

Preferred TMO

Design Objectives	Design Criteria	Reference	TMO1	TMO2	TMO3	TMO4
Creates a more coordinated and efficient transmission system and network design	Better informs when and where to connect	1	+1	+1	+1	+2
	Enables economic, efficient, coordinated network design	2	-1	-1	+1	+2
	Delivers more efficient use of network capacity	3	0	+1	+2	+2
	Maintains or improves operability of network	4	+1	+1	+1	+1
Options collaboratively developed throughout the connections lifecycle	Reduces risk of wasted effort	5	0	+1	+2	+1
	Parties able to engage to identify best option(s)	6	0	0	+1	+2
Quicker connections for projects progressed on their merits	Better recognises nature and status of connections	7	+1	+1	+2	+2
	Enables “shovel ready" projects to progress more quickly	8	+1	+1	+2	+2
	Accelerates timing of connections	9	+1	+1	+1	+2
A simple transparent and coordinated approach to connections	Improve Transmission and Distribution coordination	10	0	0	+1	+1
	Improve the connections process experience of connectees	11	+1	+1	+1	+1
	Efficiently manages policy complexity/interdependencies	12	-1	0	+1	+2
Easy access to self-service tools, consistent data and quality insight	Gives better access to and visibility of data and info for parties	13	+1	+1	+1	+2
	Enables parties to plan and act more efficiently	14	+1	+1	+1	+2
	Reduces reliance and/or workload on others	15	+1	+1	+1	+2
Consistent, skilled and well-resourced engagement	Provides coherent customer experience across networks	16	+1	+1	+1	+2
	Skills and capabilities matched to responsibilities and customer needs	17	0	0	0	+1
Future proof process	Adaptability to changes in the market landscape	18	0	+1	+2	+1
	Supports greater investment certainty across the industry	19	+1	+1	+1	+2
	Flexibility to evolve process to deliver future needs	20	-1	0	+1	+2
Better cost outcomes for the end consumer	Reduces overall costs to end consumers	21	0	0	+1	+2
	Can be implemented in a timely and efficient manner	22	0	-1	-2	-2
	Environmental and community impacts are avoided, minimised or mitigated by the network design	23	0	0	+1	+2

Table 7.1: Our overall assessment of each of the TMOs against the design objectives and design criteria

Preferred TMO

In our view TMO4 is the TMO which (by a material margin) best meets the design criteria, and we think is most likely to deliver the widest range of benefits. Having considered a range of different alternatives, we consider that TMO4 has clear additional benefits over other options.

TMO4 would represent a significant change from the current connections process and would require some time and effort to implement. However, the extent of the issues with the current connections process requires significant and bold action. We consider that once implemented TMO4 would best facilitate quicker connection to and use of the electricity transmission system, in a more coordinated and efficient way, in order to help meet Net Zero ambitions and targets.

Through this consultation we are however keen to understand from stakeholders whether there are any other viable models that would deliver similar benefits.

We set out further information on our view of expected benefits of TMO4 in the rest of this chapter. We also provide a view on key challenges and how to best address them. We provide a summary of all of our initial recommendations across this consultation (in relation to the TMOs and TMAs) in Appendix 4.

Overview of benefits of TMO4

It is challenging to accurately forecast the expected benefits of the TMOs and of our initial recommendations due to moving baselines (due to the recent introduction of our 5-Point Plan), the early stage of development of our proposals, and uncertainty over the timing and scope of transitional arrangements (see Chapter 10). However, we have formed a high-level view on some of the key aspects of TMO4 and our initial recommendations where we think it is reasonable to expect the potential for material benefit. We set out some of these expected benefits as follows.

Creating a more coordinated and efficient transmission system and network design

One of our key objectives of the reformed connections process is to create a more coordinated and efficient electricity transmission system and network design. More efficient network design (together with additional measures to allocate capacity more efficiently to projects that are ready to proceed) will deliver better value. This will not just be better value for consumers, but will also ultimately connect projects more quickly, through a more efficient process. But an important pre-requisite of producing efficient and robust coordinated connection designs is to be able to study connections applications in batches and within a reasonable timescale. We believe that TMO4 unlocks these benefits significantly more efficiently than other options considered, for the reasons set out below.

The Holistic Network Design (HND) process is expected to lead to overall net consumer savings of approximately £5.5 billion when compared to an optimised radial design i.e. the introduction of a co-ordinated process for a discreet set of offshore wind developers resulted in the expectation of a considerable saving for consumers. The HND also considered environmental, community and deliverability network design objectives, as well as economic and efficient network design objectives. The output of the HND also contributed to expedited regulatory processes (e.g. through Ofgem's Accelerated Strategic Transmission Investment (ASTI) framework[40]) and has the potential to provide consenting process benefits.

It is reasonable to assume that there could be similar benefits across onshore connection applicants as a result of our preferred TMO and initial recommendations. The scale of savings from co-ordinated network design may be lower for onshore projects than for offshore projects due to less locational optionality in respect of the connection of onshore projects when compared to the connection of offshore projects.

40. Decision on accelerating onshore electricity transmission investment | Ofgem

Preferred TMO

However, this is counterbalanced by a significantly higher capacity volume of onshore connections (i.e. nearly twice as much capacity) compared to offshore connections, which triggers much more extensive network investment, both due to the greater volume of capacity but also due to the greater volume of projects[41].

Our Centralised Strategic Network Plan (CSNP) (as set out in Chapter 1) will ensure that we strategically plan and deliver the wider transmission network (onshore and offshore), including through targeted anticipatory investment. We think that TMO4 would best enable the development of a coordinated design for local and enabling works, including at the boundary between transmission and distribution networks. Ensuring process and methodology alignment between CSNP and the new connections process would therefore deliver efficiencies in network design and delivery at a whole network design level.

The early batched assessment of connection applications under TMO4 would also allow efficient inclusion of anticipatory investment in network design. This anticipatory investment need not be limited to traditional network build solutions – efficient anticipatory investment could also include more innovative, technological or other non-build solutions to address network constraints.

As well as reducing overall system costs, additional benefits of coordinated network design under TMO4 would be a better ability to take holistic account of the environmental and community impact of transmission network (as we have done through the HND process). It should also help introduce innovation into network designs by facilitating competition in the design and delivery of infrastructure related to connections - as planning in advance should provide clear scope and time for competitive tenders.

Finally, an additional benefit of a batched coordinated connections design process under TMO4 would be the ability for project developers to have a more active role in the process (e.g. to be involved to some extent in the design of their connections, or at least kept more informed on the design process), as has happened under the HND process(es). This may help improve the customer experience as well as potentially delivering better outcomes.

In practice, we think that we could apply a range of learnings from the HND process(es) for connection of new offshore generation in order to design the methodology to be used to develop the coordinated connections design under TMO4. This would for example allow us to improve the way we and the Transmission Owners (TOs) use the Construction Planning Assumptions (CPAs) to design all connections.

41. ESO Data Portal: Transmission Entry Capacity (TEC) Register - Dataset| National Grid Electricity System Operator (nationalgrideso.com)

Preferred TMO

Cumulative Impacts

Over time each project that is offered and signs a connection agreement within a window will 'resolve' with either connection or termination. As a result, the capacity allocated within each window under TMO4 will either be allocated to a connecting project or removed from a project and reallocated. We propose that it is first allocated to projects in the same window (as they reach Gate 2), but if there is still spare capacity, then it could be allocated to projects in later windows that also reach Gate 2.[42]

An example of this using illustrative numbers can be found below in Figure 7.1. Please note that we have deliberately used a conservative attrition rate of 50% for projects. In reality, that rate may be up to 70%, which would further reduce the number of projects progressing and therefore further speed up connection dates.

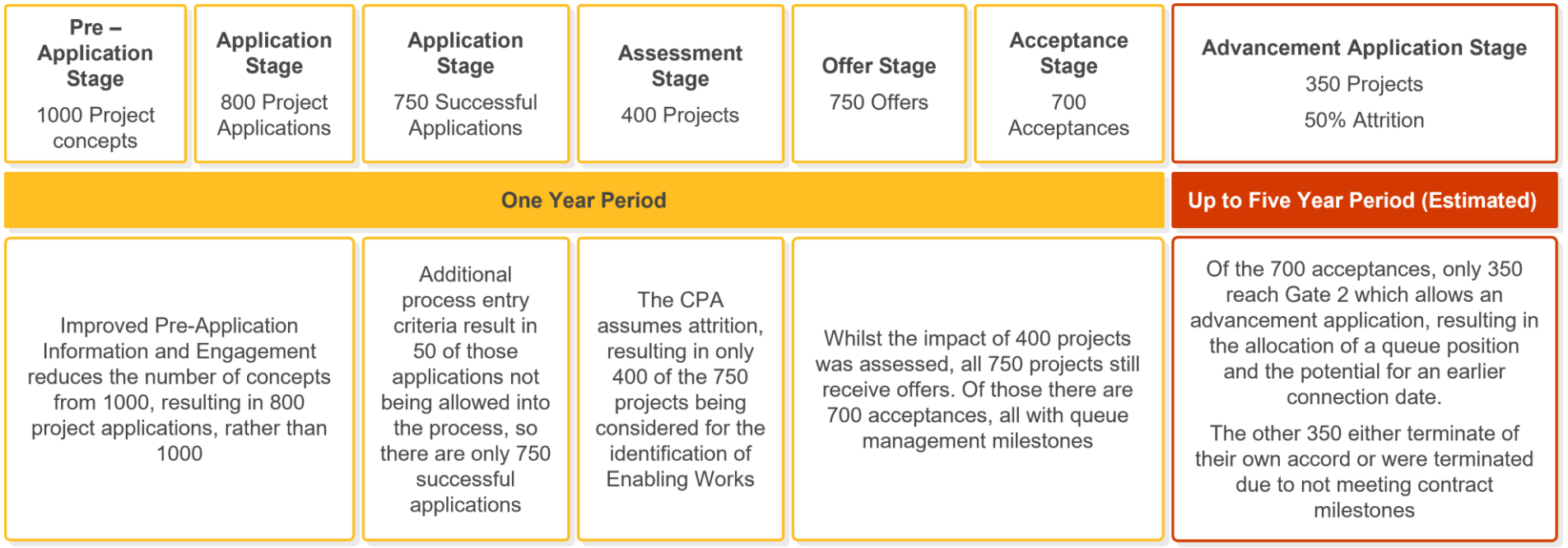


Figure 7.1: Illustration of how the attrition rate of projects leaving the connections queue may develop throughout the connections journey

42. There is also the potential for capacity to instead be returned to consumers in the event that the Attrition CPAs related to a particular window over-forecasted the level of expected attrition related to projects within that window.

Preferred TMO

As the illustrative example above relates to a single application window, as multiple sequential application windows are run, their outputs will progress in the same manner and as a result there will be a continual downwards pressure on the volume of projects in the cumulative contracted background. Therefore, projects from earlier windows in the contract background will gradually reduce as later windows are being undertaken, as those from earlier windows will either be progressing towards connection or progressing towards contract termination.

Acceleration of connection dates

The 5-Point Plan is taking several steps to facilitate advanced connections dates. Our proposals include many of the features found within the 5-Point Plan, but on an enduring basis, such as Attrition CPAs. Our proposals also include measures included within the 5-Point Plan, but that have not been implemented yet (such as queue management). In many cases however our initial recommendations under TMO4 go significantly further, for example:

- a 'First Ready, First Served' approach where queue position and capacity allocation is provided to those projects more advanced than others and potentially other 'priority projects'[43];
- an enhanced form of 'reactive queue management' that allows projects that are ready (i.e. that pass Gate 2) to secure capacity created by the termination of contracts where projects do not meet their contracted delivery milestones, as detailed in Chapter 5;
- the potential for a more defined and efficient earlier non-firm access product (as detailed in Chapter 9); and
- Use it or lose it arrangements for connected projects, freeing up additional capacity (as detailed in Chapter 9).

For these reasons we think it is reasonable to assume that projects will on average be able to connect significantly earlier under TMO4 than under the 5-Point Plan arrangements.

Other Expected Benefits

We believe that TMO4 is the most adaptive to future priorities and challenges. For example, if Government, now or in the future, wanted to expedite connections for large demand customers or certain renewables to meet targets, then the model could flex to enable that outcome. Ultimately this could potentially extend to enabling a future centrally planned approach for deployment of generation and large demand. TMO4 would facilitate this because windows and gates could be tailored to enable[44] the efficient connection of certain projects and/or technologies if and where centralised deployment is determined to be the right approach. In practice this could be achieved by for example adjusting entry requirements with an application window, or running windows limited to certain technology types and/or capacities.

For the reasons set out earlier, TMO4 is best future-proofed to any future approaches to accelerating priority projects that meet wider criteria as set out in TMA F.

TMO4 is also best aligned with future connection of offshore projects in order to maximise the benefits of future coordinated network designs for offshore projects (see Chapter 8 for further details).

TMO4 could also be used to harmonise connection process entry and queue allocation between directly connected and large embedded generation projects and relevant small and medium embedded generation projects, removing a considerable issue for Distribution Network Operators (DNOs) and embedded generators (see Chapter 8 for further details).

43. Subject to implementation of our initial recommendations for TMA F.
44. By 'enable' in this context we mean that the project/technology would be planned and delivered in a co-optimised way with the development of the network, and this would be both the wider network designed through CSNP and the more local connections network design process. Connection capacity would be 'reserved' at relevant connection/interface locations, but once they are in the connections queue/process any such projects would be subject to the same rules as other projects and only progress through the queue as and when they reach key delivery milestones e.g. planning consent submission.

Preferred TMO

The early window within TMO4 allows more efficient implementation of pre-application stage improvements (e.g. easier access to self-service tools, consistent data and quality insight) and it allows more efficient resource allocation so that customers can receive consistent, skilled and timely engagement.

Finally, although not strictly related to the connections process, we have considered potential interactions between the reformed connections process and delivery models and network investment. The delivery of the coordinated network design and associated transmission reinforcement works (or non-build solutions) recommended as a result of an application window could progress via multiple routes, albeit all potentially subject to Ofgem direction/decision. For example, if not on a critical path for connection, investment could be progressed by the TOs under normal regulatory arrangements or be signposted as potentially being suitable for network competition. However, if on the critical path for connection, investment could potentially be progressed by the TOs under expedited regulatory arrangements akin to the ASTI process.

This is ultimately a matter for Ofgem and the TOs, or other delivery bodies where relevant. However, in order to fully unlock these delivery benefits, we consider that it is important that clarification is provided by Ofgem on the process for and treatment of the delivery of recommended network designs which would result from application windows, including in relation to needs cases, regulatory arrangements and delivery models.[45] As such it will be important to provide a clear path and framework to delivery (through whichever delivery model is utilised) as part of implementation of the reformed connections process.

Overview of key challenges of TMO4 and how we would propose to address them

We consider that the main challenges of TMO4 relate to the time required to carry out detailed design and then implementation, as well as potential concerns from project developers about the introduction of a new process that will take longer to provide them with a connection offer than under the current arrangements. This could especially be the case for small and medium embedded generation project developers unless (as we propose) mitigatory actions are taken.

Detailed design and implementation

We set out our views on detailed design and implementation in Chapter 10, including where there may be potential quick wins which could be delivered prior to ‘go live’ (i.e. implementation) of our overall preferred TMO and initial recommendations. We also set out initial views on potential transitional arrangements before ‘go live’.

While we think ‘go live’ for the reformed process might not be before mid to late 2025, we will explore with delivery partners (e.g. the Department for Energy Security and Net Zero and Ofgem) whether earlier implementation is possible under variations to the standard industry governance processes for code changes. We note that all the TMOs and associated higher impact improvements to the connections process (via the TMAs) would also require industry code (and potentially licence) changes and therefore be subject to similar implementation timescales.

45. These are important as they can strongly interact with connection dates i.e. a connection date may be dependent upon their being a confirmed needs case, regulatory arrangements being in place and clarity in relation to the delivery model being utilised for the infrastructure.

Preferred TMO

Potential concerns about the introduction of a new process that will take longer to provide a connection offer

We are aware that there may be concerns from project developers about the introduction of a new process that will take longer to provide them with a connection offer than under the current arrangements. Our current estimate is that windows would run annually and a connection offer would be provided within 6 to 9 months of closure of the window. We commit to working closely with TOs to keep this period as short as possible, whilst allowing sufficient time for the batched assessment of connection applications that will deliver material benefits through more coordinated and efficient network design.

We set out in Chapter 8 how we propose to address any specific concerns in this regard from DNOs and embedded generation which impacts on or uses the transmission system. We commit to working closely with the DNOs to develop clear and robust processes for embedded generation and large demand requirements.

Ultimately, we think the additional time up front will deliver better value for consumers, as well as connect customers more quickly, so the overall benefits case is strong.

Overall impact on efficient delivery of Net Zero

Whilst an important facilitator, we feel that it is important to be realistic about the impact connections reform can have, of and by itself, on the efficient overall delivery of Net Zero. As set out in other parts of this document there are a number of other major initiatives taking place across the energy sector that will impact on the number, mix, location and size of generation and large demand projects that come forward seeking connection.

The Review of Electricity Market Arrangements (REMA) is considering locational signals for siting and dispatch of generation and demand and Government is considering the potential future framework for offshore projects under the Offshore Transmission Network Review. Some of the options under consideration in REMA would constitute a greater role for central planning, potentially alongside locational signals, in determining the future siting of assets. We have therefore also referred to future proofing the connections process to facilitate efficient connection of certain projects/technologies if and where more centralised deployment is determined to be the right approach in future.

There are clearly key decisions ahead in these areas about how to most efficiently incentivise the efficient siting of the range of different technologies we will need to deliver Net Zero. While the reformed connections process should enable and facilitate those decisions, we do not think it should favour particular approaches before those decisions are made. We look forward to working with national and local governments, Ofgem and other key stakeholders over the coming months and years, as we transition into the Future System Operator, to help inform these decisions.

Preferred TMO

Consultation Questions – Please explain your rationale

15 Do you agree that TMO4 should be the preferred TMO?

16 Do you agree with our design criteria assessment of the four TMOs? If not, what would you change any why?

17 What are your views on the stated benefits and key challenges in relation to TMO4?

18 Do you think that there is a better TMO than TMO4? Whether that be TMO1 to TMO3, as presented, a materially different option, or a refined version of one of the four TMOs we have presented?

8. Key Customer and Technology Type Adjustments

Key Customer and Technology Type Adjustments

Introduction

We generally considered the Target Model Options (TMOs) and Target Model Add-ons (TMAs) in a customer and technology type agnostic manner as we developed them throughout our stakeholder engagement and design workstream sprints. However, as expected, several customer and technology type specific elements arose in our engagement, which potentially require separate consideration. The four main areas which arose were:

- the Transmission / Distribution (T/D) Interface;
- Directly Connected Demand;
- Offshore Connections; and
- Network Competition i.e. Network Options Assessment (NOA) Pathfinders, Competitively Appointed Transmission Owners (CATOs) and Offshore Transmission Owners (OFTOs).

T/D Interface[46]

One of the areas where we had significant discussion with the Steering Group and with Distribution Network Operators (DNOs) was in relation to the appropriateness of our preferred option (TMO4) for projects that connect at the distribution network, but that may have an impact on, or use, the transmission system. We think there are two key factors to consider:

1. The level of interactivity between T/D networks i.e. the criteria and thresholds for determining whether and how distribution connected projects impact the transmission system, and if so, how that impact is managed; and
2. The process by which any such projects are allocated a connection date in respect of the transmission impact/works and the extent to which that process differs from the one for projects that connect directly to the transmission system.

We are currently working closely with DNOs, via the Energy Networks Association's (ENA) Strategic Connections Group (SCG), to consider the first factor above, irrespective of whichever TMO is ultimately taken forward under connections reform. This includes the extent to which distribution connected projects impact the transmission system, and how that impact is managed. That work is ongoing and we do not want to prejudge the outcome at this stage; however, there is a shared ambition to align and standardise processes, provide more transparency to project developers and ultimately to support better and more coordinated medium and long-term planning and operation of T/D networks.

We have also not considered whether the TMO should include a Distribution Impact Assessment or improved Third Party Works process, as this is currently being considered by CMP328[47]. Ultimately, we think that the future reformed connections process can accommodate whichever process is determined to be most efficient, without the need for material change to the overall TMO.

Whatever arrangements are ultimately agreed through the above work, our view is that some distribution connected projects will still continue to have an impact on, or use, the electricity transmission system. Additionally, the general direction of travel in the industry is towards sharing more and better data, and it is important that any future approach ensures highly efficient data exchange between T/D networks.

46. Note that the T/D Interface proposals are expected to apply to Independent Distribution Network Operators (IDNOs) to the extent that they are required for both relevant demand and relevant generation. However, further consideration may be required in relation to IDNOs and the T/D Interface, and potentially also Directly Connected Demand in future.
47. CMP328: Connections triggering distribution impact assessment: https://www.nationalgrideso.com/industry-information/codes/cusc/modifications/cmp328-connections-triggering-distribution-impact

Key Customer and Technology Type Adjustments

We have therefore focussed in the connections reform project and in this consultation on how best to address the second key factor above. That led us to consider the following key areas relating to the design of the TMO.

1. Whether the TMO would apply to Demand as well as Embedded Generation (EG);
2. The process under which DNOs would apply to the ESO for a connection date in relation to transmission impact/works on behalf of relevant small and medium EG projects;[48] and
3. The gate/stage at which relevant EG projects would be provided with the opportunity for interim restrictions on availability i.e. temporary non-firm access.

DNO Demand

We initially believe (subject to the points below) that the TMO should apply to new demand requirements i.e. where a new demand requirement is identified, such as a new Grid Supply Point (GSP[49]), or where there is an additional demand requirement at an existing GSP. Where that then triggers new infrastructure considerations, the process within the TMO should be followed. This does not necessarily mean that the TMO would replace the Week 24 and BO7 processes,[50] but that the assessment of new and additional demand should be undertaken in alignment with the principles/process of the TMO. The benefits and challenges of including demand in the reformed connections process on the same (or a similar) basis to generation are broadly the same as for generation and are therefore set out in Chapter 7.

Within TMO1 the existing demand related processes could continue unchanged, as TMO1 remains first come, first served with incremental and ad-hoc applications.

However, there may still be some additional application entry requirements to consider, such as in relation to the requirement for a Letter of Authority for any land requirement associated with the application. This is also the case with TMO2 and TMO3, but with additional, new gates being required as the projects move through the respective TMO processes. In respect of TMO3, the full design of the connection would only be undertaken within a design window once planning consents had been submitted by the applicant i.e. the DNO in respect of their new or additional demand requirements. As TMO2 and TMO3 introduce the concepts of additional gates, these gates would also apply to the DNO in respect of their new/additional demand requirements, where those requirements have triggered the new network need, but only where necessary for it to be considered by the connections process.

However, in respect of TMO4, the early application window would mean that new or additional demand requirements would need to be considered within the co-ordinated network design process, alongside other projects within that application window. From a process timing and interaction perspective, there could be impacts and interactions which would need to be further considered in detailed design. For example, whether an application window would need to align with current or proposed[51] Week 24 and BO7 process timescales, whether those timescales would need to change to align with the application window, or whether the processes could work independently i.e. whether those processes could continue to run as they are and dovetail with a TMO4 process.

48. Noting that (notwithstanding some stakeholders raising potential fairness concerns with this approach due to large EG being classified as different MW sizes geographically) we foresee large EG projects going through the same process as directly connected projects. It is also worth noting GC0117 here, which is a live code modification which is considering amending (amongst other things) what MWs is considered to be a large power station.
49. The substation including the boundary between the T/D networks.
50. These Grid Code related processes generally allow the DNOs to forecast their future demand requirements and as a result to identify where additional network reinforcement is required as a result to maintain network compliance.
51. Grid Code Proposal GC0139 is reviewing the scope and detail of data exchanged between DNOs and ESO for system planning.

Key Customer and Technology Type Adjustments

For the avoidance of doubt, the above is not proposing a change to what triggers the need to submit an application in respect of new or additional demand i.e. if the requirement were incorporated into the existing Week 24 data process, without triggering the need to design additional network reinforcement to permit that additional requirement, then there would be no need for that additional requirement to go through the TMO process. Under that scenario it would be considered as a 'secondary process' in accordance with TMA O (see Chapter 9).

Finally, it is worth noting the potential interaction with TMA K4 (Chapter 9) for the better definition of Transmission Import Capacity as there could be a link between contracted Transmission Import Capacity and the need to submit an application for modified demand requirements in future. As we further develop the T/D Interface proposals in respect of TMO4 we will include considerations in relation to TMA K4.

The process under which DNOs apply to the ESO on behalf of relevant small and medium EG projects which impact on or use the transmission system

At present, DNOs apply to the ESO to assess the impact on the transmission system on behalf of relevant small and medium EGs. A connection date (i.e. when the DNO can energise the project from a transmission perspective) is provided to the DNO in respect of the 'Developer Capacity' for those developers. We anticipate that this would remain the case under any of the TMOs. However, there are DNO and EG specific considerations which differ across each of the TMOs.

Within TMO1 to TMO3, DNOs would continue to apply at their discretion on a first come, first served basis via the prevailing application process (e.g. Confirmation of Project Progression and/or 'Appendix G', as is in the process of being formally introduced via CMP298[52]) and be provided with either a full or an indicative connection offer depending on the TMO. Within TMO2 and TMO3, when EG projects reach Gate 2, the DNO would trigger Gate 2 on their behalf. In TMO3, the DNO (on behalf of EG) would need to await the window alongside other projects which are to be considered within that window. This approach within TMO1 to TMO3 would however not address concerns we heard from DNOs and EG about queue position misalignment between EG and directly connected projects due to 'first come, first served' capacity allocation. Therefore, we do not believe TMO1 to TMO3 adequately resolve those DNO and EG process issues highlighted within our Case for Change.

In TMO4 our initial view is that DNOs would need to apply within the application window period (on behalf of relevant small and medium EG) for the transmission impacts, in relation to Developer Capacity. This would harmonise process entry and queue allocation between transmission connected and large EG projects and relevant small and medium EG projects, thus removing a considerable issue for DNOs and EG. However, it would result in greater wait time for such EG to receive a connection offer/date when compared against the status quo arrangements and TMO1 to TMO3.

We are therefore initially of the view that TMO4 should include the potential for and provision of Reserved Developer Capacity (RDC[53]) in respect of relevant small and medium EG projects.

52. CMP298: Updating the Statement of Works process to facilitate aggregated assessment of relevant and collectively relevant embedded generation | ESO (nationalgrideso.com)
53. By RDC we mean Developer Capacity for EG which can be reserved by a DNO for EG prior to that EG becoming relevant and triggering the transmission connections process. For example, the extent to which a DNO could reserve capacity via the connections process for any EG expected to apply to connect to their network in future, in addition to the known EG which has actually triggered the connections process. To illustrate this example, 'Known 5MW Storage Provider A' has triggered the transmission connections process and the DNO progressed an application to the ESO on their behalf for their 5MW of Developer Capacity. RDC would be where the DNO also requested another 5MW of Developer Capacity for 'Unknown Storage Provider B' at the same time so that when 'Unknown 5MW Storage Provider B' becomes 'Known 5MW Storage Provider B' by applying to connect to the DNO, the DNO already has that 5MW Developer Capacity to allocate to 'Known 5MW Storage Provider B' without a further application for Developer Capacity. For the avoidance of doubt, we imagine that RDC would need to be technology type specific and attributable to known projects up to the maximum of the allocated RDC on a technology-by-technology basis i.e. it could not be allocated to other technology types nor used to over-allocate above the maximum RDC. However, this remains to be discussed and agreed in detailed design, having further engaged with the SCG and, for the avoidance of doubt, we think RDC as a concept would work equally well without such technology type elements.

Key Customer and Technology Type Adjustments

Under such an approach DNOs would request RDC within an application window so that they can continue to make offers to small and medium EG (up to the level of the RDC) in the period between windows. If RDC were robustly forecast (by taking account of strategic medium to longer-term requirements, such as future deployment rates for EG and demand via Distribution Future Energy Scenarios processes) and allocated this would mitigate the risk of greater wait time. Any RDC allocated for use in the period between windows would effectively be treated as though it were allocated in the prior application window at the point at which it is allocated to a specific EG project.

Our working assumption is that the front-end distribution connections process run by DNOs would continue as is under TMO4, subject only to any improvements made via the SCG over the coming months. Changes would however be required at the T/D interface in respect of the most efficient processes and mechanisms to manage application windows and RDC. For example, if taken forward, there would be a need to replace the existing 'Statement of Works' and 'Project Progression' processes. However, the existing process by which the DNOs inform the ESO of relevant developer data changes via 'Appendix G', as is being formally implemented by CMP298, would likely need to continue in future.

There are a few considerations with the RDC approach:

- We would need to consider whether the different approach to transmission connected generators and large EG is justified as large EG would be unable to benefit from such inter-window arrangements;
- There would need to be some thought as to the financial and/or regulatory mechanism (e.g. User Commitment) to incentivise accurate forecasting of requirements by DNOs and avoid more RDC than is necessary being requested, at the risk of inefficient network reinforcement;
- Any RDC may need to be made available on a rolling use-it-or-lose it basis i.e. if RDC was unused from the prior window at the start of the relevant subsequent window it would be returned for use within that subsequent window; and
- We would need to consider how to ensure that RDC is fairly allocated once made available e.g. to avoid a situation where small and medium EG applies for additional capacity (and therefore unnecessarily uses up all the RDC) out of concern that RDC will not be available later in the inter-window period.

We have also considered how TMO4 could work for EG if RDC was not introduced i.e. DNOs could only provide transmission access to specific small/medium EG projects that applied within the window period. Feedback from stakeholders was that this would raise significant concerns for those EG developers unless the window period was similar to the end-to-end time for issuing offers under the current process. Our experience with the Holistic Network Design (HND) process for offshore developers is that it would not be possible to run windows so regularly, due to the complexity (and therefore time required) to develop a coordinated network design. Therefore, whilst TMO4 could function without RDC it could be a significantly less responsive process for EG and DNOs compared to TMO4 with RDC.

Key Customer and Technology Type Adjustments

Finally, we have not yet considered in any detail the methodology under which RDC should be calculated, defined and managed. As some similar concepts are being considered by the SCG, it would seem appropriate for RDC to be considered further in that context, albeit we think it would be important for the ESO to approve any such methodology to ensure it is robust and consistent in respect of the reform programme.

The gate/stage at which relevant EG projects would be provided with the opportunity for temporary non-firm access

As a general principle we think that relevant EG projects should be provided with the opportunity for temporary non-firm access at the same time as transmission connected and large EG projects. As such, in TMO1, it would be possible for relevant EG to request (via the DNO) temporary non-firm access at Gate 1. In TMO2, TMO3 and TMO4 it would only be possible for EG to request (via the DNO) temporary non-firm access at Gate 2.[54]

The above relates to when temporary non-firm access would be allocated and how non-firm access is assessed and allocated is currently being explored within the SCG, including with the ESO. Once there is an agreed outcome on how non-firm access is allocated we can assess that in respect of our preferred TMO. However, at this stage we anticipate that the eventual outcome on how any non-firm access is assessed and allocated should be compatible with our preferred TMO.

Case Study 2 in Appendix 5 sets out our initial view of how TMO4 could work for small EG (and their DNO), including with regards RDC and the timing of the opportunity for temporary non-firm access.

Alternative processes

In the above sections we have assumed as a general principle that the process by which DNOs apply to the ESO for access to the transmission system on behalf of relevant small and medium EG projects would be via the same core underlying process as for transmission connected projects (and large EG), subject only to the introduction of RDC under TMO4. However, we have also considered whether there could or should be separate distinct processes.

54. It is worth noting that relevant EG projects would also have the same opportunities for connection date advancement at Gate 2 as transmission connected and large EG projects, as described in Chapter 7. This includes the potential for connection advancement as a priority project or via Reactive Queue Management+ arrangements. It also includes the opportunity for projects that had already submitted planning consents (or that had met the 'priority projects' criteria in TMA F) to simultaneously pass Gate 1 and Gate 2 and thereby apply for temporary non-firm access at Gate 1.

Key Customer and Technology Type Adjustments

We do not feel that entirely separate and distinct processes would be justified, as it would result in a less efficient and co-ordinated network design, thereby reducing many of the overall benefits, especially in relation to TMO4. An entirely separate and distinct process would also introduce greater network operability risk, process complexity and inefficiency (for example, in terms of queue allocation and queue management), whilst resulting in a reduction in transparency for customers. We also do not think that entirely separate and distinct processes would align with the potential future direction of travel for Regional System Planning, as per Ofgem's recent consultation, or with regards to efficient data exchange and visibility of data.

Finally, we have also considered and initially discounted another potential deviation in relation to the T/D Interface i.e. we could apply a different approach to TMA E (determination of enabling works) in respect of the T/D Interface. For example, this might be done by limiting the depth of the enabling works to the GSP so that more distribution connected projects can connect without triggering the need for transmission system reinforcement. Whilst this could be further explored in future, we think that such an approach would need to be considered as part of our wider recommendation related to TMA E i.e. the impact of the 5-Point Plan should first be assessed prior to further changes being made, so that any decision takes proper account of any potential for significantly increased cost and operational risk.

Assessment against the design objectives and design criteria

Our proposed approach is high level at this stage, and further development is needed to determine how many relevant EG projects would ultimately impact on the transmission system and how the process would work in practice. Subject to the outcomes of this consultation we intend to work further with key stakeholders, including with the ENA SCG, to further develop the detailed design. We also welcome views on alternative arrangements that would deliver better or comparable overall outcomes against the design criteria. Therefore, as we further develop our proposals for the T/D Interface we will revisit our assessment of the TMOs against the design objectives and design criteria. Please note that the T/D Interface is primarily scored against design criterion 10 in Appendix 2.

Directly Connected Demand

Further electrification will lead to significantly increased energy need and more demand customers connecting, including the potential for more directly (i.e. transmission) connected demand. Our connections process must be agile to respond to these growing requirements.

We considered whether directly connected demand should follows the same TMO or whether a process deviation is required. As directly connected demand applications require assessment, impact upon the transmission system and result in connection dates being offered we feel it is appropriate for the TMO to be applicable. **Therefore, our initial view is that directly connected demand would go through the same process as directly connected generation.**

Key Customer and Technology Type Adjustments

The benefits and challenges of including such directly connected demand projects within the reformed connections process on the same (or a similar) basis to generation are broadly the same as for generation and as such they are set out in Chapter 7. It is worth noting that there are also some customer type specific considerations akin to those considered above in relation to DNO Demand i.e. in relation to the Week 24 process; these will be further considered within detailed design and implementation.

Offshore Connections

We have considered whether and to what extent the TMOs and TMAs would be fit for purpose when considering offshore wind, other offshore generation and interconnection, including Multi-Purpose Interconnectors (MPIs).

In the current connections process, there is no differentiation between onshore wind (or any other type of onshore generation) and offshore wind, other than the latter previously requiring a Connection and Infrastructure Options Note (CION) process, which has recently been replaced by the HND and HND Follow-up Exercise (HNDFUE) processes. However, there are several key differences that need consideration in the reformed connections process, including some not directly related to connections, especially in the context of developments under the Offshore Transmission Network Review (OTNR).

For offshore wind, there is already a more centrally planned approach relative to other forms of technology. Both The Crown Estate and Crown Estate Scotland award seabed rights for offshore wind development and create leasing rounds. Seabed leasing undertaken by Crown Estate Scotland follows the Scottish Government's marine spatial planning process, which identifies areas of seabed suitable for offshore wind development. In historic leasing rounds the connections and seabed leasing processes were relatively separate. However, work is now underway to better align these for future seabed leasing rounds, although (whilst ideally kept to a minimum) differences may remain in how connections and seabed leasing could work across The Crown Estate and Crown Estate Scotland.

Key Customer and Technology Type Adjustments

Our current view is that only TMO4 aligns with the direction of travel under the OTNR.

TMO4 is the process most aligned with the OTNR as the process is an evolved version of the HND/HNDFUE. Under HND/HNDFUE a more coordinated network design solution was developed for a group of projects, rather than for individual projects (as was the case with the preceding CION process). TMO4 could therefore work for all projects and could improve the overall offshore connections process. For example, we anticipate that, subject to the outcome of ongoing collaboration with The Crown Estate and Crown Estate Scotland, offshore connection application windows could be better aligned with upcoming / announced leasing rounds. This would allow early sight of what seabed is to be leased in future, to provide early insight into the capacity requirements associated with those future seabed leases, thus enabling a more efficient and holistic system design. It might also be possible for bulk capacity to be reserved within the application window on the basis of the capacity associated with future planned leasing rounds.

If any other TMO were to be preferred there would need to be a parallel or mutually exclusive primary process for the connection of offshore wind, as well as interconnectors and MPIs. This is because TMO1 and TMO2 include no tools within their process design to support the co-ordinated design element activities necessary for future HND-type designs. Whilst TMO3 starts introducing the concept of a co-ordinated design, it does so in a manner which would not work for offshore projects, as developing co-ordinated designs after consents submission is likely incompatible with the current policy direction for the design of future offshore connections. However, creating any such separate processes, where these processes would need to be run concurrently, would likely cause significant issues. For example, constituting reasonable Construction Planning Assumptions (CPA) for network planning purposes would be extremely challenging as it would be very difficult to make assumptions about likely attrition rates and what constitutes an overall baseline when running concurrent but separate processes.

Queue allocation and queue management would also be very difficult to coordinate across both sets of processes. Therefore, at this stage we do not think that it would be prudent to work out in further detail how any separate offshore process may work until the overall preferred TMO is confirmed.

We think that the TMAs discussed within and across the various TMOs would likely be applicable to offshore projects even if the TMO itself were not. For example, TMAs such as acceleration of projects and queue management principles, should be equally applicable to offshore projects. However, some of the TMAs may need adjusting e.g. requiring a Letter of Authority as an entry requirement would not be relevant or appropriate for offshore projects, but something similar could be required for offshore applicants wanting to progress with an application. The exact detail of what that would look like remains to be agreed but some sort of evidence could be required from an offshore developer that they were applying for a live or announced / upcoming leasing round e.g. by way of a formal letter or some other form of communication from The Crown Estate and/or Crown Estate Scotland, or a document that details the relevant upcoming seabed leasing round.

Additionally, for other types of offshore projects which are not subject to The Crown Estate or Crown Estate Scotland seabed leasing rounds (e.g. interconnectors), or where leasing rounds might follow a different structure (e.g. wave and tidal), similar principles could apply but in slightly different ways. For example, these projects would not be subject to leasing round capacity considerations within the reformed connections process and due to this they would not need proof of participation in an upcoming / announced leasing round in order to progress with their application. However, we could require a similar document to acknowledge that The Crown Estate and/or Crown Estate Scotland had granted, or are in the process of granting, seabed leasing rights to them. This would help align different types of offshore projects as far as is reasonably practicable in respect of connection process entry requirements.

Case Study 3 in Appendix 5 sets out how TMO4 could work in future for an offshore wind leasing round.

Key Customer and Technology Type Adjustments

Network Competition

Any reformed connections process will need to consider that in future there is the potential for interaction between the connections process and competitive processes and competitively appointed parties e.g. through NOA Pathfinders, CATOs and OFTOs. In Chapter 3 we set out that there are interactions with contestability, where there could be a greater right for developers to undertake detailed design and construction of assets related to connections.

For NOA Pathfinders, there may be a need for the ESO, in relation to future NOA Pathfinder exercises, to reserve bays and/or capacity in anticipation of the outcome. This is considered as part of TMA F2 in Chapter 5.

For CATOs and OFTOs, there may be connection applications within their networks, or network design options, as a result of connection applications in other areas, that impact their current or future networks. Effectively, this means that any connections design process, whether incremental and ad-hoc in TMO1, or fully co-ordinated at an early stage via an application window in TMO4, will need to be workable and efficient to incorporate the above considerations. If the reformed connections process does not do this efficiently then there is potential efficiency loss for network design optionality and design recommendations. **Our current view is that TMO4 is the option which is most aligned with this requirement as it is the option which includes the most design time at an early stage in the end-to-end process**. As a result, there is more time to identify and consider impacts and options in respect of network which has been (or could be) competed via network competition processes.

It is also worth noting that due to underlying differences in incentives and obligations via the regulatory or commercial arrangements for each different party, there could be actor specific considerations in the design process which need to be taken into account. For example, whether future connection and new investment obligations and timescales will be harmonised across TOs, OFTOs and CATOs, or whether there will be regulatory considerations, such as existing licence limits on additional investment in radial OFTO's licences.

We will further consider each of these aspects in detailed design in Phase 3 once we have made final recommendations by November 2023.

Key Customer and Technology Type Adjustments

Consultation Questions – Please explain your rationale

T/D Interface

19 Do you agree with our views on DNO Demand in respect of the TMOs?

20 Do you have any views on the appropriate mechanism to incentivise accurate forecasting of requirements and avoid more RDC than is necessary being requested by DNOs?

21 Do you agree with our views on the process under which DNOs apply to the ESO on behalf of relevant small and medium EG which impacts on or uses the transmission system, including that (under TMO4):

i. DNOs should be able to request RDC via application windows to allow them to continue to make offers to EG inter-window; and
ii. resulting offers should be for firm access until relevant EG has reached Gate 2 (at which point they can request advancement and an earlier non-firm connection date)?

Directly Connected Demand

22 Do you agree that directly connected demand should be included within TMO4 and that the benefits and challenges are broadly similar as for directly connected generation?

Key Customer and Technology Type Adjustments

Consultation Questions – Please explain your rationale

Offshore

23 Do you agree that TMO1 to TMO3 would require a separate offshore process, and that this would result in material disbenefits?

24 Do you agree that TMO4 is the most aligned to the direction of travel for offshore projects? If not, why?

25 Other than the Letter of Authority differences are there any other TMAs which have specific offshore considerations?

Network Competition

26 Do you agree with our views on network competition in the context of connections reform, including that TMO4 is the option which is most aligned with network competition as it includes the most design time at an early stage in the end-to-end process? .

9. Supplementary Target Model Add-ons

Supplementary Target Model Add-ons

In addition to the Target Model Add-ons (TMAs) and Target Model Options (TMOs) in Chapter 5 and Chapter 6 respectively, we considered a range of additional TMAs that are fully supplementary to the TMOs and so do not affect the fundamental design of any TMO. This chapter provides an overview of these supplementary TMAs, with further information provided in Appendix 6, including details on each of the TMAs referenced below.

TMA H – Structure and Value of Fees

This TMA relates to the options suggested for when application fees are applied at different stages of the connections process, how they are calculated and what the payment terms of these application fees should be. We heard a lot of views about applications fees, but these were in the context of the existing connections process. Changes to application fees would need to be considered in the context of a significantly reformed connections process to ensure these fees are cost-reflective and account for the different cost profiles incurred by Transmission Owners (TOs) and the ESO in producing connection offers in the reformed connections process.

Currently, application fees are due to be paid by applicants when they submit their initial application and when they apply to modify an existing contract. The value of these application fees is dependent upon numerous factors (including location, size and type of application) and payment is due before any work is started by the ESO i.e. the application fees are pre-paid by applicants.

We propose to keep the current scope of what fees applicants are liable for (e.g. new applications or changes to existing connection contracts), but to review the methodology behind how the value of these application fees are calculated and the timing of these application fees i.e. we are initially recommending TMAs H1 to H5.

As discussed in Chapter 4, TMA H1 would effectively be a nominal advance of the application fee, rather than being a separate fee for the Pre-Application Stage.[55]

The review of the application fee methodology would solely be to ensure alignment and proportionality of application fees in relation to a reformed connections process. It would not set out to change the application fee as a mechanism for materially raising or lowering application process entry requirements.

TMA I – Criteria for ESO to reject an application

TMA D (Chapter 5) relates to what information must be provided by an applicant for the application to be complete. In TMA I we considered under what circumstances (if any) the ESO can reject an application even if it is full, accurate and complete.

There are no existing provisions for the ESO to reject such an application (i.e. the status quo would be not to implement TMA I), so this would create new provisions.[56]

We believe that there would be merit in defining clear and transparent criteria whereby the ESO is able to reject connections applications based on (for example) location or technology type in future e.g. where those applications did not align with a central plan (TMA I2). There were concerns raised about this approach, but as set out in Chapter 3 we think a reformed connections process should be future proof to allow for potential central planning in relation to specific technology types.

The most immediate possibility relates to offshore wind where there would be the potential under TMA I to no longer accept applications from offshore wind projects where the project does not relate to a known future leasing round and/or if and where The Crown Estate and/or Crown Estate Scotland instead reserve capacity within the application process (as set out within Chapter 8).

55. As also discussed in Chapter 4, we expect that a customer who applies within a reasonable time period of their Pre-Application Stage engagement would then have this Pre-Application Stage fee discounted from their application fee.
56. These new provisions are not to be confused with an existing right for the ESO to not provide an offer in specific circumstances after receiving and progressing the application. For example, where providing the offer would result in a breach of the ESO's licence obligations.

Supplementary Target Model Add-ons

TMA J – Optionality provided in an offer

Stakeholder feedback during Phase 2 was that stakeholders would like to be more involved in the design selection processes undertaken by networks companies when creating their connection offers. TMA J considered possibilities to formalise this so that connection offers provided by the ESO would be required to contain different options for applicants to choose between.

Depending on the TMO progressed, some of the options within the TMA group may not be practically possible. However, including in relation to TMO4, we believe that maintaining the status quo (i.e. providing a single offer) with the ability to advance connections dates later in the project's development cycle would be most appropriate (TMA J2). This should not detract from the intention to collaboratively work with stakeholders to understand and agree the most suitable connection solution e.g. where minor changes to the project could avoid triggering additional reinforcement, etc.

TMA K – Capacity products in an offer

To provide connections to and use of the transmission system, we have a range of products which provide capacity. The main product being Transmission Entry Capacity (TEC), with less frequently used products to exchange or temporarily increase TEC. Other access rights to use the transmission system such as demand capacity or 'non-firm' capacity are currently not defined. TMA K considered better defining or clarifying these access rights, which the connections contracts would then provide for in future.

Our initial recommendations are:

- A better definition of Transmission Import Capacity (TMA K4). This supports data transparency and contract management, as it would likely facilitate the introduction of a Transmission Import Capacity Register and contracted import access values in the same way as exists for export values.
- A better, clearer definition of 'non-firm' access (TMA K3). This supports a common understanding and use of the term 'non-firm' at Transmission and would avoid confusion with the use of the same term in respect of Distribution. It would also provide clarity to applicants on what they are able to request and at what point in time in the process. This involves better defining 'non-firm' at Transmission as it exists today and is not proposing further changes e.g. introducing compensation.
- Simplification of the existing temporary capacity products i.e. Short Term TEC, Limited Duration TEC, Temporary TEC Exchange and TEC Trade (TMA K2 and K6 respectively). This will support process and code simplification. We are not proposing to broaden these concepts e.g. to apply to capacity prior to connection, or to provide for exchange without reference to the ESO, or other related suggestions which we discussed as part of our stakeholder engagement on capacity products. However, it may be worth exploring whether the simplified products could be made more dynamic than they are at the moment e.g. more frequently requestable and/or available for shorter time periods. Once implemented, there may also be scope to further consider this in conjunction with TMA K3, to explore if and how it could be possible for a project with non-firm access to temporarily increase their 'firmness' under such arrangements.[57]

57. Non-firm projects are connected so it may be possible for them to exchange or trade capacity with other connected projects.

Supplementary Target Model Add-ons

TMA L – Requirements to accept an offer

To accept an offer, there are existing requirements that the applicant must complete in order for their acceptance to remain valid. We believe these should largely remain unchanged from today, albeit some minor changes to the user commitment arrangements may be required to allow compatibility with specific TMOs to ensure that there are no unintended consequences.

Currently, once developers accept their connection contract they will become liable for user commitment in accordance with the prevailing methodology until their connection date. In TMO4, the Gate 1 contracted position would be related to a backstop connection date derived from backstop reinforcement works. As such there is the potential for unintended consequences in relation to the user commitment arrangements and this would need to be reviewed. In addition, TMO2 and TMO3 would provide an indicative offer where the full scope of works (and so the scope of works subject to the User Commitment methodology) would not be known in the indicative offer and so there is potential for unintended consequences with these TMOs.

As part of detailed design and implementation we propose that there should be a review of user commitment arrangements, solely in relation to ensuring that the prevailing methodology and TMOs are in alignment, rather than to change any of the underlying principles.

Other options in this category may also have a potential benefit but require further development before they are considered and so are not recommended at this stage (details of these can be found in Appendix 6).

TMA M – Timeframe for updating contracts

Due to the lead-time between a connection contract first being signed and that project connecting, it is likely that the contract will need to be updated to reflect project or network related changes. TMA M considered how these contract updates would be managed. Our initial recommendation is that the status quo should be maintained and that contracts should updated as required (TMA M1).

TMA N – Criteria for ESO to reject a modification

Whereas TMA I determines in what instances the ESO can reject a new application, TMA N considered if and when the ESO could reject a modification application.

There is existing (under review) guidance that is used to determine the maximum scope of a modification and when a new application must be submitted and we propose to continue to use this guidance, albeit the guidance would need to be reviewed to ensure it aligns with the reformed connections process (TMA N3).

TMA O – Secondary processes

The TMOs are designed to accommodate full, complex applications, or material changes to existing applications.

Some changes requested by contracted parties do not however need to progress via the full process as they are smaller and simpler in scope. TMA O considered which simpler changes could progress via a secondary process.

Supplementary Target Model Add-ons

The range of changes to be processed via secondary processes needs to be clarified but we believe it should include the following:

- Charging only changes (TMA O1);
- Corrections and administrative changes (TMA O2);
- Contract novations (TMA O3); and
- No transmission system impact applications (TMA O4).

Our initial recommendation is therefore for a review of secondary processes prior to implementation of a reformed connections process. This will ensure that secondary processes are clear and aligned with the primary process. For example, under TMO3 and TMO4 this should provide clarity on what applications would need to be submitted via an application window and those which could proceed outside of those windows. The review should also explore the appropriate timescales related to secondary processes with the aim that these be undertaken quicker than the primary process.

TMA P – Dual Track Process

TMA P considered whether ‘priority projects’ (under TMA F) should be accelerated through Gate 1 within the TMOs i.e. should the contract offer at Gate 1 be provided quicker to such projects. We believe that any such projects should be progressed through Gate 1 in the same timescales as other projects to ensure robust consideration of their applications. As such we are not proposing a dual-track process up to Gate 1 (TMA P1).

TMA Q – Financial compensation

Between contract signature and connection, there may instances where the ESO or TO need to enact a contract change that is detrimental to the applicant e.g. unforeseen extra costs or delays. TMA Q considered whether there are options to mitigate the impact of these contract changes to provide more certainty and/or more closely aligned connection contracts with commercial contracts.

The options in TMA Q would dramatically affect the balance of risk between applicants, networks and contracted parties and so we believe it is prudent to maintain the status quo (TMA Q1) unless Ofgem deem this balance should be adjusted in future. For example, through price control arrangements.

Supplementary Target Model Add-ons

TMA R – Management of underused capacity

Other than the payment of Transmission Network Use of System (TNUoS) charges, there is no long-term incentive for parties to ensure the capacity they have contracted is efficiently used and, due to the locational nature of TNUoS charges, this long-term incentive is geographically inconsistent. User Commitment plays a similar role before energisation, but it is only indirectly linked to capacity.

TMA R considered whether there needs to be something new which aims to ensure that contracted capacity is utilised and not 'hoarded'.

We believe there should be a new mechanism to monitor how much capacity is actually used by projects once they have connected and reclaim any capacity that is not used i.e. use it or lose it arrangements (TMA R1).

This will ensure more efficient capacity reallocation where projects are no longer using their contracted TEC but are yet to relinquish it. It is important that such arrangements carefully consider the potential for unintended consequences as part of the design and prior to implementation e.g. projects which intermittently use their full contracted capacity, but do use it periodically, or may have a requirement to mostly/only use it for non-wholesale market reasons.

There may also be benefit that can be derived from a new capacity holding charge, or capacity holding security requirement. However, stakeholder feedback on this concept was unfavourable (due to concerns about disproportionate impact on smaller projects / smaller project developers and interaction with or differentiation from existing financial security arrangements such as User Commitment) so we have not recommended any changes in this area at this stage pending further development of our thinking on potential proposals.

TMA S – Fast-track dispute process

Under TMO2 to TMO4 there would need to be a fast-track dispute process in place related to key process stages e.g. where the ESO has determined that a project has not met the requirements for progressing through a gate and the applicant wishes to challenge that decision. This would ensure that disputes/appeals do not hold up or adversely interact with the subsequent process stages. This disputes process would also need to be clear to customers in advance.

Subject to our final recommendations, we propose to work with Ofgem to create a fast-track dispute process to allow the efficient running of the reformed connections process and to provide a fair and transparent process for customers (TMA S1).

Consultation Questions – Please explain your rationale

27 Do you agree with our initial recommendation related to each of the TMAs within this chapter? If so, why? If not, what would you change and why?

10. Detailed Design, Implementation and Transitional Arrangements

Detailed Design, Implementation and Transitional Arrangements

This chapter considers, at a high-level, the detailed design and implementation approach for our preferred Target Model Option (TMO) and initial recommendations for a reformed connections process. It also sets out initial high-level thoughts on potential transitional arrangements i.e. what might happen between now and 'go live' of a new reformed connections process.

In summary, we think that the level of benefits to be derived from implementing TMO4 (or any similarly beneficial new connections process) means that we need to be ambitious and creative as an industry about how we can best work together to design and implement reform as quickly as possible. We do not think this should mean ignoring or minimising stakeholder input and challenge, or cutting corners in terms of the robustness of new processes. But we believe that the case for reform is so strong and immediate that we need to push the industry governance processes as hard as possible to enact reform as quickly as possible that will deliver material benefits for customers and for consumers as a whole.

We do not want to prejudge the outcome of this consultation and our final recommendations, currently expected by November 2023. However, we think it is important at this stage to provide some visibility on the key actions that would need to be taken to support timely and efficient implementation of TMO4, if it is ultimately taken forward. This helps clarify the plan of action and provide some confidence in delivery. It is important to note that TMO4 is a distinct option i.e. it is not a direct evolution of any of the other TMOs, and as such we do not foresee any of the other TMOs being implemented first as a step towards TMO4.

Additionally, even if such a stepped approach was possible, we do not believe it would be advisable as the implementation timescales of TMO4 are likely not much greater than for either TMO2 or TMO3, as those TMOs would also require industry code and licence changes. As a result there would be material overlap between implementation programmes, resulting in greater risk, wasted effort and potential for delays.

Detailed Design, Implementation and Transitional Arrangements

Detailed Design and Implementation Approach

Figure 10.1 provides a high-level overview of the outline implementation programme for TMO4.

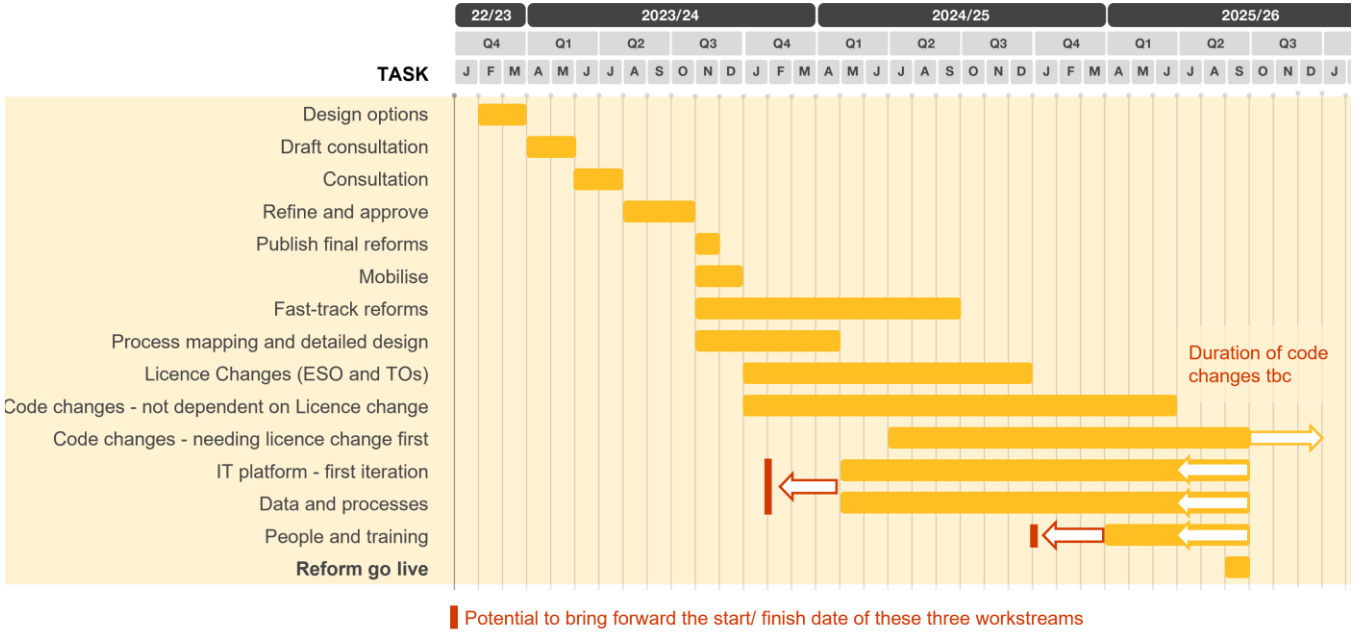


Figure 10.1: High level Implementation Plan

We intend to explore a more detailed delivery programme over the coming months, including where there may be trade-offs and/or quick wins. For example, we may be able to implement some of our final recommendations prior to a Minimum Viable Product (MVP) for the reformed process going live.

Additionally, other elements of our recommendations could potentially be given less focus in the implementation period to enhance the focus on delivering the MVP, at least until the MVP is on track for successful and timely implementation.

This distinction is explored further in our initial recommendation summary table within Appendix 4. We will continue to give this further thought and engage with key implementation stakeholders as we progress towards making final recommendations by November 2023.

Below we set out further information on each main workstream.

Process Mapping and Detailed Design

This is likely to be a considerable undertaking, as prior to the implementation of a reformed connections process it will be important that the end-to-end process, and policies in relation to that process are clear and documented, and that stakeholders involved within (or taking part in) the process understand those processes and policies.

The precise methodology and timing related to the reformed connections process would need to be agreed with the Transmission Owners (TOs), Ofgem and other key stakeholders as part of Phase 3.[58] For example, we would need to work very closely with the TOs and Distribution Network Operators (DNOs) (in respect of the Transmission and Distribution Interface) to develop the end-to-end process and underpinning policies for TMO4.

58. It is also worth noting that this co-ordinated design process will, as also considered in Chapter 8, need to adequately involve other parties who own and/or are developing transmission network, such as Competitively Appointed Transmission Owners. Therefore, within the design window, options related to and/or impacting such parties will need to be identified and sufficiently considered, with any underlying regulatory restrictions being taken into account in the options assessment stage to ensure the preferred options are deliverable.

Detailed Design, Implementation and Transitional Arrangements

This will need to be done in much greater detail e.g. in relation to the frequency and duration of windows and gates, the process touchpoints, the design methodology[59], including connections related anticipatory investment etc.

In addition, some of this process mapping and detailed design work is likely to be necessary to inform potential licence and code changes.

Potential Licence Changes

We would need to work with Ofgem to explore and action the necessary Transmission Licence changes to facilitate TMO4.

We estimate that the licence change process could take 12 months; however, this is a matter for Ofgem, so the timescale and process would require their confirmation. Ideally, licence changes would be undertaken prior to code changes as the former can influence and interact with the latter, so it might be prudent to have more clarity on the former prior to commencing with the latter to minimise rework risks. However, given the need for pace, we have proposed that some code changes could be taken forward in parallel to licence changes. This will need testing with Ofgem once we have given further consideration to the detailed implementation plan.

The licence changes we foresee potentially being required are:

- A change to licenced offer process and timescale i.e. to reflect the move away from an ad-hoc trigger three-month period to an application window-based approach with an additional gate, and potentially changes to reflect the move away from a first come, first served approach to connections. At present the three-month period to make an offer from receipt of an application is incorporated into licence conditions.
- A potential change to acknowledge that in certain circumstances, certain projects may: i) have their applications rejected, and ii) be accelerated in line with the criteria under TMA F.

Code Changes

Changes would be required to the Connection and Use of System Code (CUSC) and System Operator Transmission Owner Code as a minimum in order to implement TMO4. There is also potential to make changes to other industry codes to improve cross-code coordination, but these are not key to implementation. We estimate that this could take 18 months but may take considerably longer depending on governance, prioritisation and industry support for our proposals.

This timeline assumes open governance for code changes, which may be the only route open for connections related code changes. However, we plan to explore other options in parallel to this consultation e.g. whether there is potential for a Significant Code Review; whether there is potential to utilise Energy Code Reform; or whether to potentially seek Secretary of State powers to direct changes to the codes. Each of these potential alternative options require discussion with Ofgem and Government to consider their feasibility as alternatives to open governance.

59. For example, we would need to work closely with TOs to determine how the Construction Planning Assumptions (CPAs) will be adapted to best determine the coordinated network design within the window. We will also need to consider how to best integrate the CPAs with the Centralised Strategic Network Plan (CSNP) outputs in order to robustly identify anticipatory investment. For example, it may be relatively straightforward to adapt the current CPA methodology to determine the most appropriate design of a shared overhead line triggered by an assessment of all the connections applications received within the window. However, more material changes to the current CPA methodology would likely be needed in order to robustly determine the appropriate design of substations and connection bays for individual project developers. ~~Our initial view~~ is that the latter may require some integration of the CPA and CSNP modelling tools.

Detailed Design, Implementation and Transitional Arrangements

Although this may not materially reduce the overall timeline for ‘go live’, we also plan to explore whether it might be prudent to focus efforts on some aspects of our final recommendations ahead of others e.g. to expedite the delivery of a MVP. For example, we could potentially only raise MVP related code changes in the first instance, with others to be raised at a later date.

The code changes we foresee potentially being required for our initial recommendations (including the MVP) are:

- As a result of the change to licenced offer process and timescales, the CUSC would also need to change to align with the corresponding licence changes. At present the three-month period to make an offer from receipt of an application is incorporated into (for example) CUSC Section 2 and CUSC Section 6. This would also involve targeted amendments to the codified process(es) in relation to relevant small and medium embedded generators. It would potentially also involve targeted amendments to the codified process(es) in relation to applications (where required) for additional demand at connection sites.
- As a result of the extension to Pre-Application Stage information provision a CUSC change would likely be required to allow publication of information about applications at an earlier stage than at present i.e. making public submitted applications as well as accepted offers, whether that be via the Transmission Entry Capacity (TEC) Register or another route. Whether other aspects of the Pre-Application Stage could/should be codified requires further consideration.
- Discreet code changes would likely be required to: i) better define Transmission Import Capacity, ii) better define ‘non-firm’ access iii) simplify existing temporary capacity products and make them more dynamic, iv) introduce use-it-or-lose-it arrangements for connected projects, and v) align both User Commitment and Final Sums with TMO4.
- Other discreet code changes could potentially be required in relation to i) a review of secondary processes, ii) contract simplification and standardisation, and iii) what constitutes submission of planning consent - this might be straightforward but it still needs to be clear to both the ESO and to developers.
- Additional code changes may also be required depending on the amount of detail that is codified versus that provided via other means (e.g. guidance notes).

Data and Technology

There would be considerable connections related data and technology updates and creation required in respect of TMO4, especially in relation to the Pre-Application Stage. We will need to more fully scope this once our data and technology requirements become clearer prior to being able to define a data and technology implementation programme. Depending on the outcome of this scoping, it may be prudent to plan staged delivery of data and technology solutions, with a first, basic iteration, available at ‘go live’.

People and training

There would be considerable process and guidance updates and creation required in respect of TMO4, especially for the ESO and TOs, and potentially also for DNOs depending on the approach taken to managing the transmission / distribution interface. This is likely largely dependent in areas upon licence and code changes. Once developed, time would be required to train/inform stakeholders and network company staff on the new processes. As such, irrespective of the timing and complexity of code and licence changes, there would be a significant package of work to develop and document detailed cross-industry processes and guidance prior to 'go live'.

Detailed Design, Implementation and Transitional Arrangements

Potential Legislative Considerations

As detailed in Chapter 5, discussion would be required with Government (and Ofgem) to consider whether there could potentially be legislative (and/or regulatory) considerations in relation to any aspect of TMA F1 and TMA F2. In addition, as mentioned above in respect of code changes, there could potentially be legislative considerations in relation to directing code changes.

Overall Implementation Timescales

If we were to follow standard practices for changing industry codes and licences, the 'go live' for these reforms would be mid to late 2025. However, we will continue to work with industry, Ofgem and the Department for Energy Security and Net Zero to explore how this timeline can be accelerated.

There are some, albeit fairly limited, elements of our initial recommendations which could potentially be implemented sooner, if the programme allows, as they are separable from the implementation of TMO4. For example, as per Appendix 4 (where we list potential quick wins) it may be possible and desirable to introduce the requirement for a Letter of Authority (with duplication check) in advance of the implementation of the reformed connections process. However, these potential quick wins are likely limited due to many of the initial recommendations requiring a significant level of licence, code, process and/or guidance change prior to being implementable. In addition, it might be possible for staged implementation of some of our initial recommendations on the route to full implementation (such as in relation to the Pre-Application stage improvements) but this will require further consideration in the detailed design stage and as part of our final recommendations by November 2023.

Transition

Given the fairly lengthy implementation period for developing and implementing the reformed connections process, we think it is important to be ambitious about the actions we take during the transition from the current process to the new process 'going live'. In particular we think we need to take bold action during the transition to address the size of the current queue for connection, otherwise no matter how efficient the reformed process is, it will take significant time for its benefits to be felt for projects waiting for connection as well as those newly applying. For example, we currently estimate that it may take 5 years or more to insert queue management milestones and clauses under CMP376 (if approved and implemented) into all existing connections contracts, if those clauses are only added to new contracts or to contracts that apply for modification. We will continue to communicate our plans in this area, especially in the weeks that follow Ofgem's decision on CMP376.

In the intervening period before 'go live', we need to continue to improve the outcomes of the connections process as much as possible. As such we will continue to introduce the changes we are able to under the current frameworks, via our 5-Point Plan. We will also work with TOs and DNOs to pilot the alignment of connections platforms. Depending on the level of impact driven by the 5-Point Plan, we will consider whether there are further actions we could take in order to further improve connections timescales before 'go live'. For example, as set out in Chapter 5, we could potentially make further adjustments to how we determine enabling works. However, in doing so, we would need to take a view on the associated impact on the balance of risk between developers and consumers, particularly for constraint costs and network operability.

Finally, once the implementation plan and timescales for 'go live' of the reformed process are confirmed, we will need to consider whether there should be a pause in receiving and providing new connections offers to projects in order to facilitate efficient introduction of the new process.

Detailed Design, Implementation and Transitional Arrangements

Further Government or Ofgem interventions

Both Government and Ofgem have committed to actions with and alongside industry to facilitate connection reform. In March 2023, the Department for Energy Security and Net Zero stated in their 'Powering up Britain' policy papers that they are 'working with industry and Ofgem to reform the grid connections process, at both transmission and distribution levels, which is delaying both generation and demand projects in parts of the country'. Ofgem has also recently published an open letter on connections, setting out their own views and requesting feedback on certain points. As demonstrated in this chapter, both will be instrumental in the implementation of actions set out in this consultation.

Considering the scale of the challenge, Government and Ofgem are also open to considering more fundamental reform options, including those beyond the remit of the ESO which might require Government and/or Ofgem to take further action. This could be in relation to managing existing projects in the connection queue, the implementation of connections reform, ensuring an efficient and effective transition to any new arrangements, or other relevant measures. Government and Ofgem are considering such options and will articulate these further in an Action Plan to be published this summer. As part of this process, Government and Ofgem are interested in hearing from stakeholders.

Consultation Questions – Please explain your rationale

28 Do you agree with our current views in respect of the implementation period?

29 Do you agree with our current views in respect of transitional arrangements? What are your views on how and when we should transition to TMO4?

30 What further action could Government and/or Ofgem take to support connections reform and reduce connection timescales, including in areas outside of connections process reform?

11. Next steps and how to get involved

Next steps and how to get involved

We would like to hear your views and have included consultation questions.

We have included consultation questions throughout this consultation, and these are collated in Appendix 7. This consultation will remain open until Friday 28th July. We are holding two in-person events, with the first in Glasgow (Thursday 15 June), followed by London (Tuesday 20 June), as well as a webinar on Thursday 22 June. These events will provide an overview of the consultation and a walkthrough of key aspects. To share your views on the consultation, or to request a call to discuss your views, please get in touch at:

box.connectionsreform@nationalgrideso.com

After the consultation closes, we will review responses, refine our proposals and confirm our final recommendations. We will develop a detailed design and implementation plan, including consideration of transitional arrangements from the live connections process to the reformed process. We expect to publish our final recommendations and an implementation plan by November 2023.