

Rising to Britain's Net Zero Challenge

**Networks' fair and faster
connections plan**

ena
energy networks
association

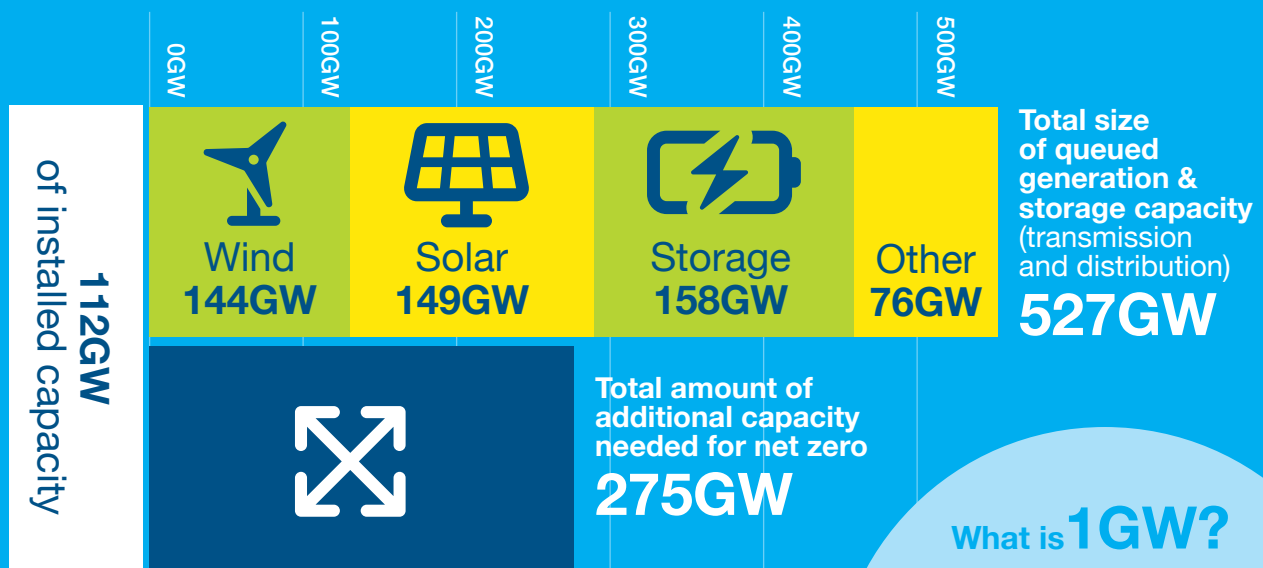
Rising to the challenge

Britain has led the industrialised world in the march towards net zero emissions and, with it, greater energy security. Since the UK's first commercial wind farm began exporting renewable power to the network in 1992, the networks have connected nearly 83GW of low-carbon electricity generation at transmission level and around c. 32GW at distribution level, enabling our rapid progress towards a decarbonised power grid by 2035.

But the recent unprecedented surge in applications for network connection, which have tripled between 2019 and 2023, has created a challenge for customers and network operators. It has resulted in a step change in the volumes and capacity seeking access to both transmission and distribution networks, driven by large scale generation and storage projects, creating the so-called "queue". The rate of applications is not slowing down and in fact, continues to increase.

Simply connecting the whole queue is not what Britain needs. This is because the queue:

- Includes supply and storage capacity that significantly exceeds even our most ambitious net zero scenarios. There is 252GW more generation and supply capacity in the queue today than is required by 2050 according to the system operator's Future Energy Scenarios.
- Includes a material volume of speculative or non-viable projects that will never connect. As of September 2023, there were 7,480 customer projects, representing 547GW of capacity, including demand and generation, with a contract to connect to the network – 404GW at transmission level and 143GW at distribution level, but we know from our experience that a significant proportion of these projects will not go ahead.



What is 1GW?

- 20,000 Rapid EV Chargers
- 3 million solar panels
- 500,000 homes powered

Approximations, given for illustrative purposes only.

Capacity needed by 2050 is per National Grid ESO's FES scenario 'leading the way' for 2050. All data shown above excludes demand.

Reinforcement category for distribution queue as of September 2023

Network is ready to connect 27% (39GW)	Distribution reinforcement required 8% (12GW)	Transmission reinforcement under review 30% (43GW)	Transmission reinforcement required 35% (49GW)	Total distribution connections queue 143GW
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Network operators are committed to providing customers with the network connections they require, supporting the net zero transition and connecting those customer projects that are ready to be energised at pace.

So far this financial year, network operators have connected around 5.2GW of large, non-domestic projects to the network and are on track to connect more this year than ever before. At this pace, networks are connecting, on average, more than two Hinkley Point C's worth of zero-carbon generation and storage every year. At distribution level, approximately 35% (50GW) of contracted connections projects either do not require network reinforcements or only require distribution network reinforcements, which are typically completed before customers are ready to connect and thus are not 'queueing' at all.

However, network operators recognise that the existing framework and solutions require reform at pace. And networks are taking action. They are working together along with Ofgem and Government to address the challenge and improve connection outcomes for customers.

Networks welcome Ofgem's and Government's recently published Joint Action Plan, and are committed to supporting the implementation of those actions, in coordination with Ofgem and Government through the Connections

Delivery Board. This report provides data-driven insights into the connections challenge, an update on the solutions and reforms networks are already delivering (including the Strategic Connections Group Action Plan, the ESO 5 Point Plan, and ESO Connections Reform), and announces additional solution delivery commitments that will further benefit customers.

These actions, alongside several critical policy and regulatory reforms, outline our plan that will deliver fair and faster access for all our customers, and will follow through on networks' role within Ofgem's and Government's Joint Connections Action Plan. Fair and fast network access will mean that: applying to connect to the network is transparent and more predictable; that queue position does not affect the speed with which customers can connect; customers have flexible connection options to connect to the network ahead of reinforcement works; and that networks will continue to enable the transition to net zero. By delivering this plan, we estimate we will **release up to 139GW of network capacity and accelerate connection dates for up to 71GW of customer projects**. Nearly 50GW of these benefits are already being made available to customers in 2023. Uptake of these benefits, however, will depend on the ability of the market to progress those projects, driven by individual project business cases and timelines and how much of the queue is unique viable projects.

Our action plan **for fair and faster** **connections**

1

Strengthen and tighten the application process

Some customers submit speculative applications due to a lack of information and a perception that having a connection offer is in itself valuable. This has driven exponential growth in application volumes (nearly tripling since 2019) – though it is recognised that the majority of these will not go on to become viable projects. To address this, network operators will take steps to make the application process more discerning – providing more information to the market, requesting more data from applicants, and standardising pre-application engagement. These actions will contribute towards ensuring fewer but higher quality projects apply, addressing today’s rapid queue growth, and lowering attrition within the queue.

new action

2

Release up to 90GW of capacity by cleaning up the queue and actively managing a “first-ready, first-connected” process

To address the challenge that many projects with a connection offer will not ultimately be completed by the customer (up to 60% attrition rate at transmission level), and that customers are not ready to connect in the order that they apply, network operators are cleaning up the queue and transitioning to a first-ready, first-connected process. This will release up to 90GW of capacity through customer exits and accelerate remaining applications.

**commenced
early 2023**

3

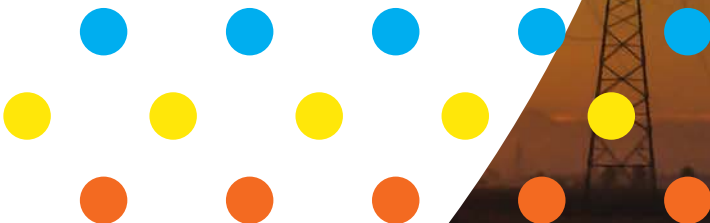
Accelerate up to 70GW of applications by allowing some applicants to connect faster, before network reinforcements are completed

Historically, customers could not be connected until network reinforcements had been completed, which led to later connection dates in some cases – 31% (167GW) have connection dates more than 10 years away. To accelerate connections of up to 70GW of applications, network operators are providing flexible contracts for generation and storage customers through solutions at distribution and transmission level. These will allow customers to receive earlier connection dates and connect ahead of enabling works, though they may be instructed to reduce their output/consumption when needed.

commenced
early 2023

139GW

the estimated
additional network
capacity which will
be released as a
result of our plan





71GW

the capacity of customer projects whose connections dates could be accelerated

4

Release nearly 3GW of capacity by treating storage differently

Applications for storage projects are increasing faster than any other technology (5,930% from 2019-2023) and are a significant contributor to network capacity constraints. This volume (158GW, 29% of the queue) is driven in part by the historical treatment of storage. Network operators are changing the modelling and assumptions for storage projects at both transmission and distribution level, to better align with actual usage patterns. This will directly release nearly 3GW of capacity, and will also contribute to the impact and benefits delivered through action 5, *make network planning more coordinated and realistic*.

**commenced
early 2023**

5

Release 46GW of capacity by making network planning processes more coordinated and realistic

Network operators are reforming connections and network planning processes to better coordinate capacity and reinforcement decisions with actual requirements. Improved construction planning assumptions, and the strategic reform of the transmission connections framework will allow for a more efficient process that is not hindered by high application volumes and customer attrition from the queue. We estimate this will release up to 46GW of capacity and accelerate future customer applications.

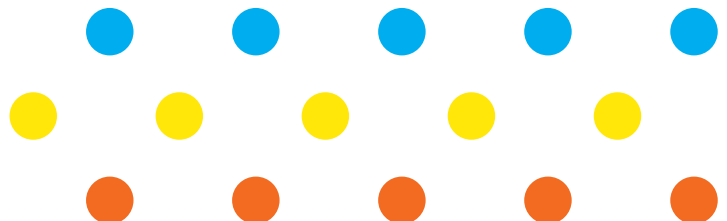
commenced
early 2023

6

Further improve coordination between transmission and distribution operators

Given the increasing interdependence between connections at distribution and transmission levels, network operators are developing a new solution to improve coordination between distribution network operators and transmission operators, including reviewing the threshold at which impacts on the transmission network are assessed, improving transmission – distribution data exchanges, and reforming how distribution customers are charged for triggering transmission network reinforcements. These actions will create a more streamlined and equitable customer experience for distribution customers whose projects impact transmission.

new action



Our action plan for policymakers

Through the six actions described above, network companies are doing all within their gift to improve the connections process. However, to truly address the grid connections challenge, wider reforms are needed from government and Ofgem too.



Reform planning, land rights and consenting

Reforms are needed to address severe delays to infrastructure upgrades caused by planning approvals and consenting process. We recommend the government implements our plan for land rights and consents (available at [energynetworks.org/improvingconnections](https://www.en-connections.org/improvingconnections)).



Policymakers need to prioritise the queue

Network operators are obliged to offer connections to any project looking to connect to the grid, regardless of technology type. This can lead to challenges, such as infrastructure being built on a project-by-project basis which is not efficient in the long term. This also leads to all types of technology joining the queue even if the need for that technology is oversubscribed. This can mean more of one type of technology is queuing than is necessary, restricting space and delaying other types of technology from connecting.

Co-ordination and prioritisation are key. Working together with industry, government and Ofgem should examine the current set up and seek to make improvements to how the queue is accessed and prioritised. We don't believe it's the role of individual network operators to do this. However it is done, it must be done in a fair way which supports confidence in the market. This should also include focus on the ability for networks to invest against scenarios, for example through the detailed design of the Regional System Energy Planner supporting net zero enabling investment, and though investment in transmission infrastructure based on future network need.

[Networks welcome the support and collaborative working to date with Ofgem and Government, as well as the recent joint Connections Action Plan. We will work closely with Ofgem through the Connections Delivery Board to support these actions and the overall industry response to this challenge.](#)

Next steps

Together, these actions form a holistic approach to addressing the connections challenge and will allow networks to deliver fair and faster connections for their customers. Each of the actions described above will have a direct or indirect impact on the connections queue, either by releasing capacity, accelerating connection dates, or reducing the volume of applications with low potential to connect.

The scope of these actions and this report, including all figures, is focused on large and non-domestic customers. These are the customers that are primarily driving, and impacted by, the growth in the connections queue.

Network companies are taking action at pace and delivering 50GW of released capacity and accelerated applications in 2023. The full suite of solutions will be fully implemented by the end of 2024, further benefitting customers.

Finally, networks will continue to review the impact and scope of this plan to ensure any further opportunities are identified and delivered.

Reporting

To monitor and demonstrate this progress, network operators will publicly report on the progress and outcomes on a quarterly basis at energynetworks.org/improvingconnections.

As the solutions take effect, the results will be visible in these metrics:

- The size of the connections queue
- The pace of connections being delivered
- Performance indicators for the connection service we are providing (e.g., actual time to connect)
- The benefits being delivered by our reforms (e.g. GW of capacity released, GW of applications accelerated)

What you can expect from us

We will:

1. Host at least four briefings across the country over the next year. In doing so, we will report on progress regionally and nationally.
2. Provide you with a route to contact us with comments, suggestions and questions on our plans and progress by emailing improvingconnections@energynetworks.org
3. Actively engage with those who have an interest in connections to manage issues in advance and help design the future environment that will deliver faster and efficient connections.
4. Provide quarterly data on the scale of the challenge as we work to manage an unprecedented level of connection requests.
5. Keep our plans under review, and be prepared to adapt and change them based on feedback from our customers, stakeholders, Ofgem and the government.



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Context

Britain has led the industrialised world in the march towards net zero emissions and, with it, greater energy security – particularly through connecting more and more renewable energy projects to the network.

However, an unprecedented increase in the number of network connection requests has created a new set of challenges for customers accessing network capacity.

As Britain continues to lead the world in the net zero transition, we are now seeing an unprecedented increase in the number of network connection requests, especially for energy generation and storage projects. The current rate of connections puts the country on track to achieve net zero, and indeed, exceeds the forecast generation capacity requirements for a net zero energy system across most technologies. Nonetheless, the rush to connect creates a challenging landscape for customers. Networks are taking action to improve connection availability and outcomes for customers. ENA's Strategic Connections Group was established to make rapid changes to improve how customers connect to the network at distribution level.

It brings together senior representatives of electricity transmission and distribution network companies, the ESO, the Department for Energy Security & Net Zero, and Ofgem. In April 2023, the Strategic Connections Group announced an Action Plan with three key actions to address the connections challenge. Meanwhile, in February 2023 the ESO announced a Five Point Plan (5PP) of tactical initiatives to improve the time it takes to connect to the electricity transmission system in the short-term while it undertakes a broader Connections Reform process that will fundamentally reshape connections in the long-term.

This report, prepared collaboratively by all network companies, provides:

- Quantification and data-driven insight into the connections challenge in Britain
- An update on the solutions and reforms that networks are already delivering (including the Strategic Connections Group Action Plan, the ESO 5 Point Plan, and ESO Connections Reform)
- Additional solution delivery commitments that will further benefit customers

The scope of this report, including all figures, is focused on large, non-domestic connections only (except where specified otherwise). We focus on challenges and solutions for large, non-domestic connections because these projects are primarily driving – and impacted by – the growth in the connections queue. Networks are also separately working to deliver efficient and effective connections for small and domestic customers; however, the challenges and solutions are distinct.

The queue

Data being collected by network operators shows an unprecedented and continuing increase in network connection requests at both transmission and distribution, which is primarily being driven by applications for renewables and storage connection (representing 84% of the contracted capacity). Applications are far outstripping the rate at which customers can complete their projects, and the contracted queue significantly exceeds even our most ambitious net zero scenarios.

The decentralisation of generation and uptake of energy storage is driving an unprecedented increase in the number of network connection requests. The total queue of projects with a contract to connect across both transmission and distribution has risen from 12GW in FY2019/20 to a staggering 547GW in September 2023. The cumulative impact of additional projects at distribution level is now causing the need for more capacity on the transmission network.

Assessment of the contracted capacity against Britain’s forecasted energy needs

When we analyse the connections queue relative to the system operator’s Future Energy Scenario (FES)¹, which presents forecast scenarios of the generation mix required to achieve the government’s net zero emissions goals, we see that the queue for generation capacity of all technology types exceeds FES requirements for the next decade or more – often by a wide margin. When we account for expected attrition rates, the capacity in the contracted queue is within or above the FES range for all technologies except offshore and onshore wind. This means that the existing queue already has sufficient solar, storage and other renewable capacity to meet our 2050 goal, even with expected attrition. For offshore and onshore wind, the capacity we expect to connect is in-line with FES requirements until the mid-2030s, after which additional projects would need to enter the queue to provide enough capacity to reach net zero by 2050.

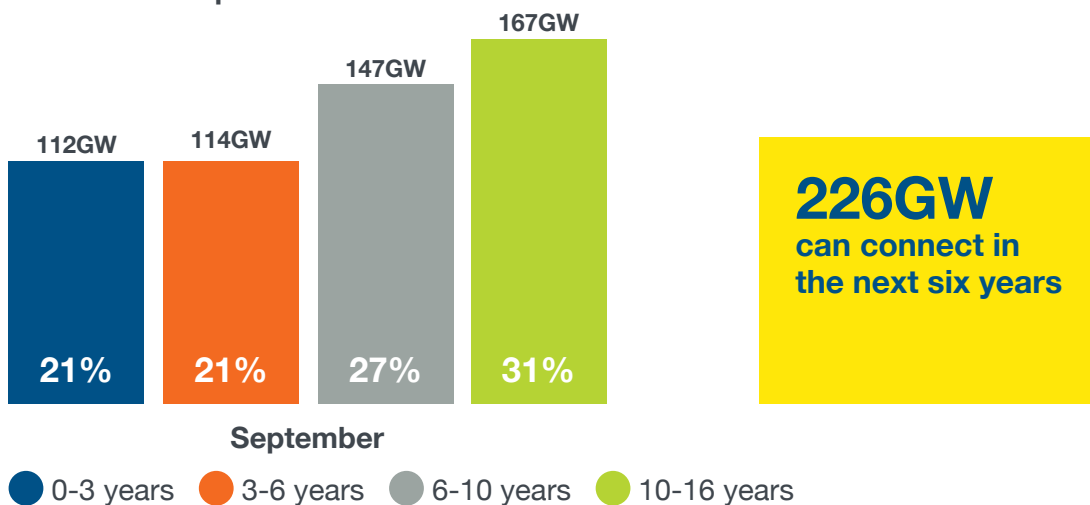
Connection timelines

The connection date that networks offer to customers is based on both the customer project completion timeline, as well as the time needed for network operators to supply a connection at the location specified. Forty-two percent (226GW) of customer projects are scheduled to connect in six years or less.

Half of distribution customers in the queue today will be able to connect as soon as their project is ready – because their connection either does not depend on new network reinforcements, or it only requires distribution network works, which are typically delivered in line with customer project timelines. Meanwhile, in 2022, 217GW of offers sent at transmission level had connection dates in line with customer project timelines.

A significant portion of the queue faces longer lead times to connect – 31% have connection dates more than ten years away. Altogether, 373GW of projects are scheduled to connect in the next ten years.

Figure 1: Transmission and Distribution Connection Timescale of Accepted Offers as of September 2023²



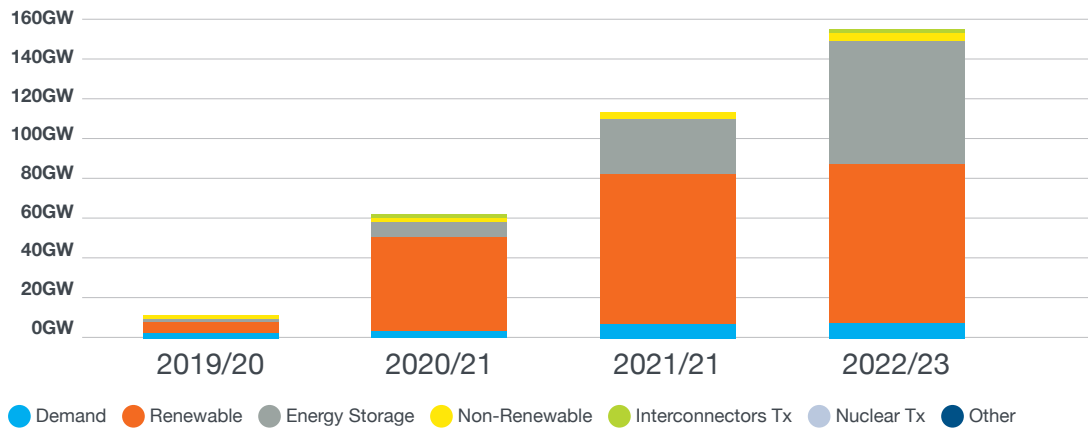
¹ National Grid ESO – Future Energy Scenarios 2023 Report

² For the purposes of this report, customers in the queue refers specifically to those customers who have accepted a connection offer and are waiting to connect.

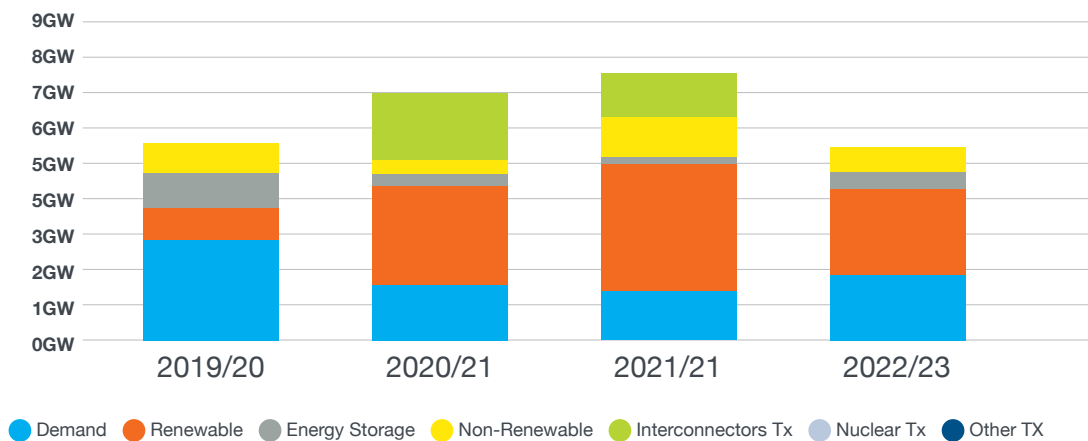
The queue continues to grow at a significant rate. In the three months from July to September this year alone, the queue³ grew by 40GW (equivalent to a 7.9% quarterly increase). Considering the time required for customers and networks to develop and connect new projects (Figure 1), it is clear that new contracts far outstrip new connections, and thus the queue will continue to grow.

Figure 2: Transmission and Distribution Connection Offers Accepted and Connected from 2019 – 2023

Transmission and Distribution Accepted (GW) 2019 to 2023



Transmission and Distribution Connection Offers Connected (GW) 2019 to 2023



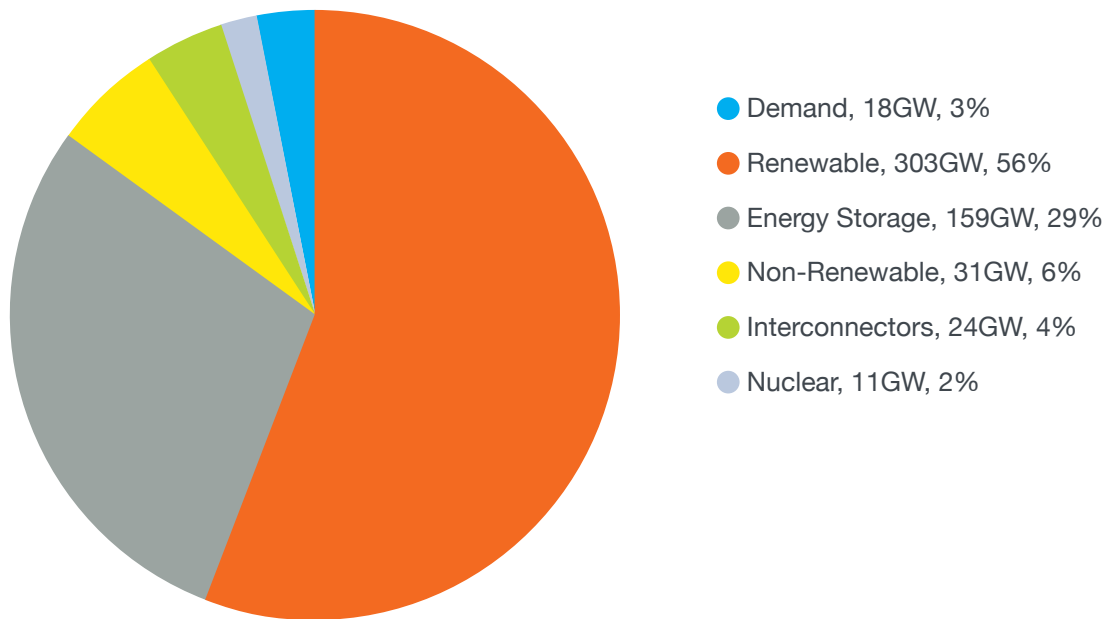
³ For the purposes of this report, customers in the queue refers specifically to those customers who have accepted a connection offer and are waiting to connect.

Queue composition:

Growth in the contracted queue is primarily being driven by applications for renewables (56% of contracted capacity) and storage projects (29%).

Resulting challenges – Network operators are being asked to plan for and connect much more capacity than even the most aggressive FES scenarios would suggest is needed. This poses a multifaceted challenge with several potential consequences. While many queued projects won't ultimately be built if the economics do not make sense for them to do so, the level of oversubscription is impacting customer access in the short term and could lead to an inefficient transition to net zero through resource wastage, unnecessary supply chain constraints and increased costs for consumers. We need a suitably efficient process to allow the projects that are commercially viable and ready to connect to do so, and to align the energy mix of connections to future requirements.

Figure 3: Transmission and Distribution Queue – Technology Breakdown of Contracted Offers as of September 2023

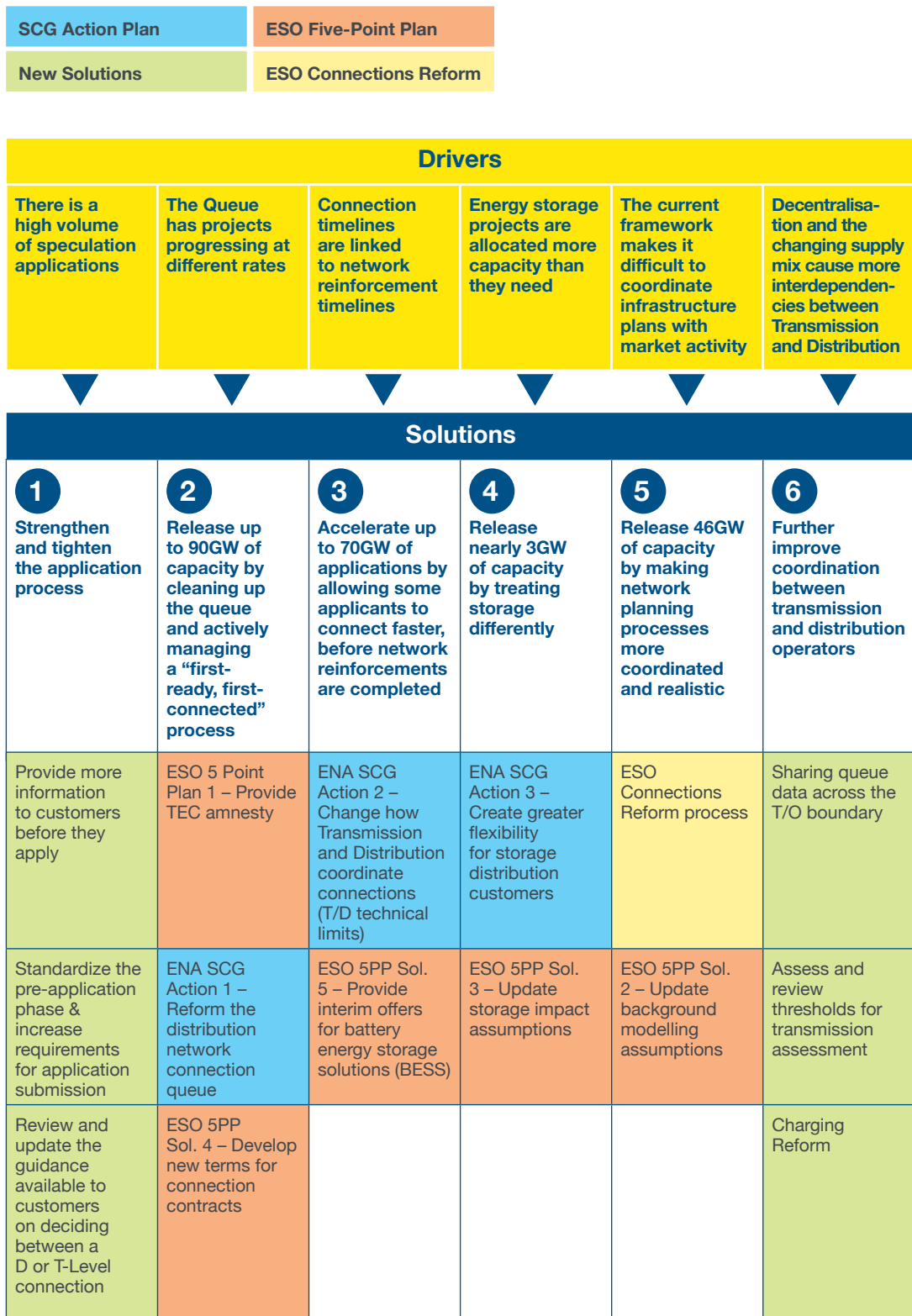


Drivers of the connections challenge and solutions being delivered

What is driving the growth in the queue, and how are network operators addressing these problems?

Considering these data and the challenges facing networks' businesses and customers, there are six primary drivers contributing to the growth of the queue. Network operators are working collaboratively to address the respective drivers by enacting six solutions, through the ESO five-point plan, the Strategic Connections Group Action Plan, ESO Connections Reform, and new actions that we are now mobilising to enact. Together, these solutions form a holistic approach to improving connection outcomes for customers.

Figure 4: Driver-Solution Map



The actions operate on distribution level, transmission level, or across the Transmission/Distribution boundary, and they impact distribution and transmission-connecting customers differently. For a breakdown of how these solutions impact different customers, refer to Figure 10 and Appendix 1.

1

Strengthen and tighten the application process

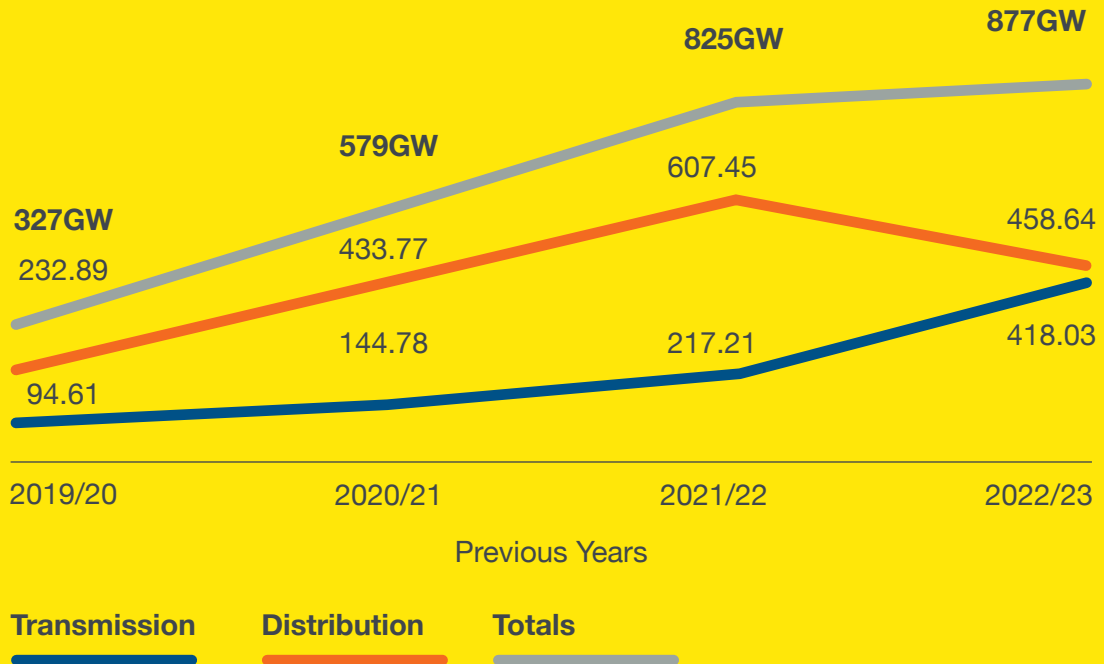
Driver

There is a high volume of speculative applications

Customers submit speculative applications due to a lack of information and the value placed on having a position in the queue. This has driven exponential growth in application volume (168% increase since 2019) – where a majority of applications are now unlikely to connect.

Applications to connect to the electricity network have been growing since 2012, but that growth has accelerated recently. Transmission and Distribution applications nearly tripled from 2019 to 2023, from 327GW to 877GW of interest. This high volume of applications is the first step in the chain that leads to growth in the queue.

Figure 5: Transmission and Distribution Applications Received in Previous Years in GW



Whereas customers previously applied for connections only at sites where they intended to build a project, now the application process is more speculative. Customer feedback sessions reveal that customers do not have access to information that supports informed portfolio management. Customers may apply to Grid Supply Points that are already oversubscribed because they lack information about congestion levels and local energy demand profiles. Some project developers submit applications for many sites, with the expectation that only a fraction of them will ultimately connect. They view each site as an “option” that could be developed, where connection wait time is one factor they consider alongside financing, planning permissions and land rights. As a result of customer efforts to hedge and manage risk, the pool of applications is now more speculative and duplicative.

The speculative nature of applications creates challenges for networks. Network operators often receive multiple applications for the same connection point from different customers. Operators must assess each application individually, leading to duplication of effort. All accepted offers are treated as though they will connect – meaning that they reserve capacity that cannot be allocated to other customers, and they trigger network reinforcements. This results in inefficient processes and over-build of the network when projects do not go on to connect.

As a result of these factors, the current application process is inefficient for both applicants who lack sufficient information to target applications to those locations that are most commercially viable, and for network operators who must process each application as though it will ultimately connect.

Solution

Strengthen and tighten the application process.

Network operators are developing a new solution to make the application process more orderly. This solution addresses the first stages of the connection process; namely pre-application and application. It is designed to ensure that the applications entering the queue to begin with are more likely to connect. We expect that these actions will result in customers submitting fewer applications which are of higher quality, generating a smaller queue growth rate, and lower attrition within the queue.

Key:

New Solutions

Solution	Transmission-Connected			Distribution-Connected		
	Generation	Demand	Storage	Generation	Demand	Storage
1.1 Provide more information to customers before they apply				✓	✓	✓
1.2 Standardize the pre-application phase & increase requirements for application submission				✓	✓	✓
1.3 Review and update the guidance available to customers on deciding between a Distribution or Transmission Level connection	✓	✓	✓	✓	✓	✓

The three proposed solutions are:

1. Provide more information to customers before they apply

Distribution network operators will provide more user-friendly information about each grid supply point (GSP), including the profile of the connections queue, to support customers with opportunity identification and portfolio management. This should result in more commercially attractive schemes receiving earlier focus and drive to progress, and less attractive schemes being closed down earlier – ultimately improving connection success rates. We aim to complete this by March 2024.

2. Standardise the pre-application phase and increase requirements for application submission

Relatedly, networks will create a more robust pre-application process through a single, well-publicised cross-DNO standard. This could include greater information online, standardised processes and stage gates for progression prior to application submission, and structured engagement with DNOs. This will provide clarity for investors on the level of maturity that projects should have at each stage, and will result in higher-quality applications being submitted.

In addition, distribution network operators will work with the regulator and industry to increase the requirements for data and/or evidence of right to progress for customers connecting at distribution in order to apply. This will build upon the requirement introduced at distribution in 2015 for customers to provide evidence of their right to progress the project by including a letter of authority for land use with their application. Similarly, action planned at transmission level will also introduce the requirement for letters of authority at application stage. These changes will be designed to prevent projects which have little or no chance of progressing from entering the queue.

We welcome Ofgem and DESNZ's support of this solution area in their joint Connections Action Plan, and will work with them through the Connections Delivery Board to identify and agree further changes to best address the volume and speculative nature of applications. We aim to complete this by mid-2024.

3. Review and update the guidance available to customers on deciding between a Distribution or Transmission Level connection

We will review and reform the guidance for customers taking the decision of whether to connect to the DNO or TO network in their preferred location. We believe additional guidance from Transmission and Distribution networks could accelerate the processing of applications by improving the efficiency of how customers interact with DNOs or TOs, and could mitigate against congestion at distribution level by right-sizing projects for network design. We aim to provide this guidance by June 2024. If, on further review and evidence, it were deemed beneficial to codify those thresholds as requirements we would bring to Ofgem for support and approval. We aim to complete this by June 2024.

This solution is currently under development in the SCG. Delivery groups will be mobilised, with the aim to complete implementation by mid-2024.

2

Release up to 90wGW of capacity by cleaning up the queue and actively managing a “first-ready, first-connected” process

Driver

The queue has projects progressing at different rates

To address the facts that many contracted projects will not ultimately be completed (40-60% at transmission level), and that customers are not ready to connect in the order that they apply, network operators are cleaning up the queue and transitioning to a ‘first-ready’, ‘first-connected’ process. This will release up to 90GW of capacity through customer exits and accelerate remaining applications.



At transmission level, we estimate that at present, around only 40-60% of projects with connection offers progress to be completed and connected.

As with connection applications, customers queued to connect are at varying levels of project maturity, and they progress at different rates. Due to the speculative nature of applications, many project developers do not intend to or are not sufficiently capitalised to complete every project they are responsible for, and often sell projects which have received planning permission and a network connection offer to other developers. Some projects stall indefinitely. For example, at transmission level, we estimate that at present, around only 40-60% of projects with connection offers progress to be completed and connected.

Even after reaching final investment decision, projects can face unforeseen delays, including securing planning permissions, construction delays, and numerous others. Customers who apply later may in fact be ready to connect before others ahead of them in the queue, but network operators do not have real-time visibility of how projects in the queue are progressing. These factors make it difficult to connect projects in an orderly fashion, especially under the traditional “first to apply, first to connect” framework.

Solution

Clean up the queue and actively manage a ‘first-ready, first-connected’ process

Network operators are implementing changes to the connection process to ensure that projects can connect as quickly as possible once they are ready to do so. To do this, network operators are moving away from a ‘first come, first served’ model for queue management to a ‘first-ready’, ‘first-connected’ model. In this model, projects that progress against their milestones more quickly can be promoted to connect to the network sooner, where they can do so without impacting others in the queue.

These changes are being enacted through ENA’s Strategic Connections Group’s Action 1: Reform the Distribution Network Connection Queue for the distribution customers, the ESO Five Point Plan Solution 1 Provide TEC Amnesty, and ESO’s Five Point Plan solution to Develop new terms for connection contracts ESO solution 4, which affect customers at both transmission and distribution levels.

These solutions have three main functions:

- 1. Impose milestones within contract terms to ensure that customers in the queue are progressing towards project completion and connections**
- 2. Remove non-progressing projects from the queue, thereby freeing up capacity and accelerating connections of those remaining, through DNO milestone enforcement actions and ESO TEC Amnesty**
- 3. Reallocate the capacity that has been released through these exercises to other customers, thereby accelerating connection dates for progressing customers**

Key:

SCG Action Plan

ESO Five-Point Plan

Solution	Transmission-Connected			Distribution-Connected		
	Generation	Demand	Storage	Generation	Demand	Storage
2.1 ESO 5PP Sol. 1 – Provide TEC amnesty	✓		✓			
2.2 ENA SCG Action 1 – Reform the distribution network connection queue				✓ (Phase 1)	✓ (Phase 2)	
2.3 ESO 5PP Sol. 4 – Develop new terms for connections contracts	✓	✓	✓			

Expected benefits:

- As of October 2023, SCG Action 1 has released 3.3GW of distribution capacity across GB and accelerated 1GW of applications. Capacity released is anticipated to grow to 6GW.
- The ESO has released 4GW of capacity through the TEC amnesty programme.
- The recently approved transmission queue management solution is expected to release up to 80GW of capacity at transmission.
- In total, these initiatives will release up to 90GW of capacity and accelerate 1GW of customer applications.

Note that the reallocation of capacity from removed projects will accelerate connections for many customers, though it is difficult to estimate and predict this acceleration ahead of time.

Next steps:

- So far, the distribution-level solution has been applied only to generation customers. Commencing October 2023, contract milestones are being applied to demand schemes of 1 Mega Volt-Amp (MVA) and above with little or no progress since acceptance in 2017 or before.
- It is likely that in future, contract milestones will be applied retroactively to more recent demand scheme offers as well.
- The methodology for reallocation of capacity is under development, and is being designed to ensure fair promotions within the queue, prioritising customers that are ready to connect.
- Implement queue management at transmission for existing and future connections customers, following Ofgem's recent approval of the Transmission Queue Management code modification CMP376. Networks will also continue to explore more stringent measures to improve the certainty and progression of customers holding capacity, in line with the Ofgem and DESNZ Joint Action Plan. Any such move would need to be carefully considered and to take into account the variety of circumstances surrounding queued projects. We will work with Ofgem through the Connections Delivery Board on any such changes.

3

Accelerate up to 70GW of applications by allowing some applicants to connect faster, before network reinforcements are completed

Driver

Connection timelines are linked to network reinforcement timelines

Enabling works

This is work which is needed to prepare for a connection.

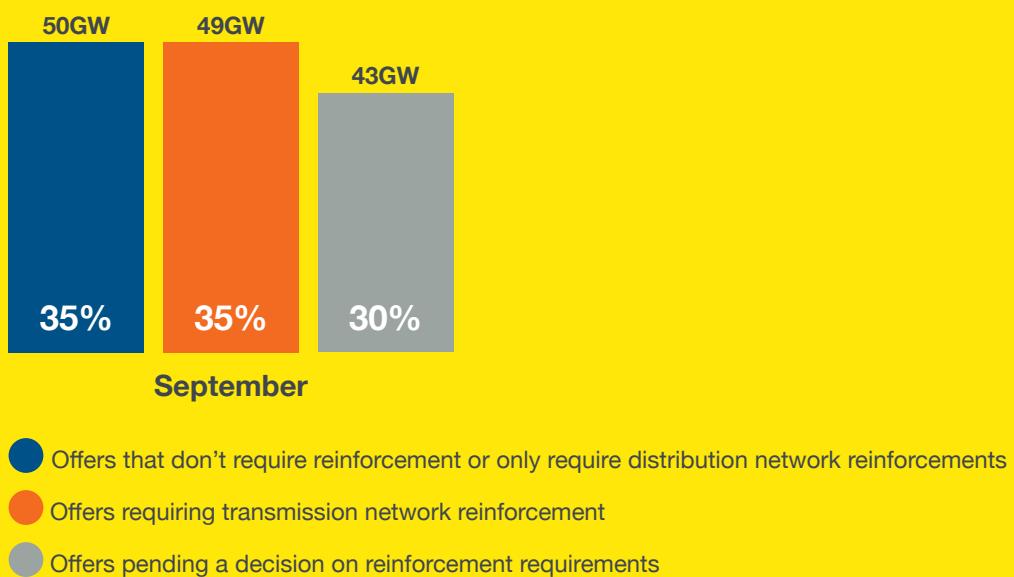
Historically, customers could not be connected until enabling works had been completed – which led to later connection dates in some cases – 31% (167GW) have connection dates more than 10 years away. To accelerate connections of up to 70GW of applications, network operators are providing flexible contracts for generation and storage customers, whereby customers can connect ahead of enabling works. Customers receive earlier connection dates but may be instructed to reduce their output or consumption when needed.

Due to the unprecedented scale of demand and generation connecting to the network, and the multi-year processes for reinforcing, upgrading and supplementing transmission and distribution networks, the current network is significantly capacity constrained. Across GB, over 70% of grid supply points (GSPs) connecting distribution networks to transmission face contractual constraints due to transmission limitations. As a result, distribution connections are now being impacted by transmission constraints.

With connection arrangements that historically use the contracted queue to inform required network investment, a ‘just in time’ approach to reinforcing the network to facilitate connections is standard. This worked well when the volume of connection applications and build time for those developments aligned with network reinforcement plans. However, with the significant increase of connection applications, the balance has shifted and is driving a substantial volume of network reinforcements to be completed, to relieve the capacity constraints that have developed. It is important to note that these network reinforcements are triggered in part by the need to connect over 500GW of contracted generation and demand capacity: a volume that is unlikely to be required.

Long connection wait times described above are driven in part by the need to wait for network reinforcements to be executed before the customer can safely connect. 73% of the queue is dependent on reinforcements or pending a decision on reinforcement dependency. 35% of projects are queued behind transmission reinforcements.

Figure 6: Transmission and Distribution Offers Requiring Network Reinforcements – % of All Accepted Offers as of September 2023



The current process, in which offered connection dates are tied to specific reinforcements, slows down the connections process. DNOs need individual permission for each generator above a certain size to connect, resulting in a first-come, first-served queue with connection times extending to the 2030s and 2040s. At present, 30% of the queue has offers pending a decision on reinforcement requirements.

Solution

Allowing applicants to connect faster before network reinforcements are completed

Non-firm contracts

Non-Firm contracts contain restrictions that limit a user being able to export their full capacity under certain conditions. The non-firm period can either be temporary (staged contract) or permanent.

To help release capacity that might otherwise be under-used, network companies are offering more flexible connection agreements, under which customers agree to generate or use electricity in certain ways that better match electricity generation with demand. Previously, the outcomes of transmission impact assessments were largely binary: either a customer was offered a firm connection, or they were queued behind reinforcements. The ESO and ENA’s members are now offering customers the opportunity to connect to the network on a non-firm basis through ENA SCG Action 2 – Change how Transmission and Distribution coordinate connections (T/D technical limits) at distribution level and ESO 5 Point Plan (5PP) Sol. 5 – *Provide interim offers for battery energy storage solutions (BESS)* at transmission level. These actions have three primary functions:

1. Identify an aggregate power flow limit for each grid supply point (GSP), and allow DNOs to connect queued customers up to that limit, with a provision to manage local electricity supply to stay within the agreed limit
2. Accelerate generation customer connections by offering non-firm (curtailable) contracts to connect to the distribution network ahead of network reinforcements
3. Accelerate transmission-level storage customer connections by updating contractual terms for flexible ‘non-firm’ contracts, whereby customers may be instructed to reduce their output.

Key:

SCG Action Plan

ESO Five-Point Plan

Solution	Transmission-Connected			Distribution-Connected		
	Generation	Demand	Storage	Generation	Demand	Storage
3.1 ENA SCG Action 2 – Change how T&D coordinate connections (T/D technical limits)				✓	✓	✓
3.2 ESO 5PP Sol. 5 – Provide interim offers for battery energy storage solutions			✓			

These actions are in addition to the networks' existing activities in using and expanding local, smart energy flexibility markets. Flexibility markets allow them to contract with customers and projects to vary their electricity generation and consumption, balancing supply and demand more accurately and freeing up additional network capacity from existing infrastructure. DNOs are also implementing a Phased Capacity Policy, whereby larger projects connect to distribution networks in a phased way in-line with the capacity that is available and required by the customer, rather than having to wait until the total amount is free.

Expected benefits:

- ESO 5PP Solution 5 will speed up connections for up to 20GW of transmission-connected energy storage projects in the queue.
- SCG Action 2 is expected to accelerate up to 50GW of customer applications at distribution level. The first phase was implemented on simple GSP connections, and enabled the acceleration of up to 30GW of projects across more than 800 customers and 76 GSPs.

Next steps:

Both of these actions are being rolled out in tranches. Over the next several months, the next batches of customers will receive offers to accelerate their connection dates. **This process will be completed by September 2024.**

4

Release nearly 50GW of capacity by treating storage differently

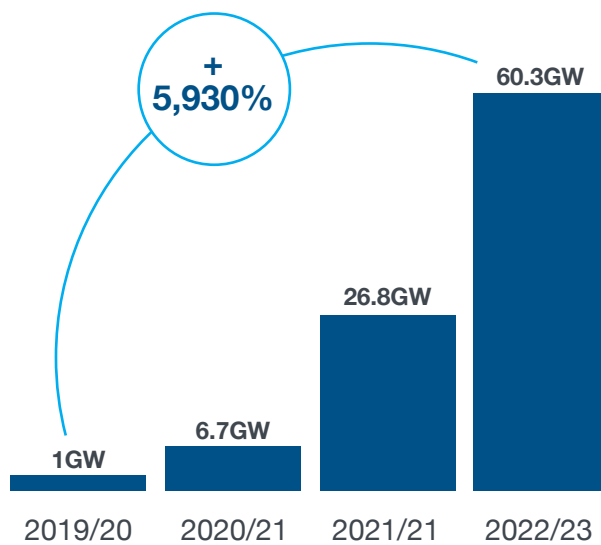
Driver

Energy storage projects are allocated more capacity than they need

Applications for storage projects are increasing faster than any other technology (5,930% from 2019-2023) – and are a significant contributor to network capacity constraints. This volume (150GW, 28% of the queue) is driven in part by the historically cautious treatment of storage.

Demand for connection of battery storage is a primary driver of GB-wide capacity constraints. In September 2023, Storage accounted for 29% (159GW across distribution and transmission) of queued capacity. The rate of storage contracts is accelerating each year (Figure 7). For distribution electricity storage alone, by June 2023 the capacity of all connected and contracted projects had grown to over 50GW, with over half of this signed in the last year. To provide context to this volume, this is close to the total GB electricity peak demand (~60GW), and over seven times the highest forecast for distribution electricity storage in 2030 in the latest ESO Future Energy Scenarios (FES). Some customers are seeking connections for close to the entirety of the remaining capacity headroom at grid supply points. As of September 2023, 79GW of storage projects are queued for connection at a transmission level.

Figure 7: Energy Storage Transmission and Distribution Connections Offers in the Queue from FY2020 to FY2023



● **Energy Storage**

These volumes provide an opportunity for decarbonisation but also present some significant network challenges. A key outcome is that, in many areas, there is little spare network capacity for smaller-scale demand and generation growth, including for the domestic decarbonisation that is essential to achieving legislated net zero targets – this is adversely impacting customers.

Network operators took a conservative approach to assessing the impact of storage projects to maintain the safety and stability of the network. Different network companies also assessed larger-scale customer applications in different ways, so this is more pronounced in some service areas than others. With time, we have been able to monitor the capacity usage patterns of connected batteries, and note that their capacity usage is far below the levels of pure generation technologies. This presents an opportunity to update and standardise how batteries are treated on the network in order to release under-utilised capacity for other customers.

Solution

Treat storage differently to free up capacity

To address the capacity constraints on the network that are being driven by storage projects, network operators have developed solutions at transmission and distribution level to change the way that energy storage project applications are assessed – and the way that capacity is allocated to them. These actions are being delivered through the ESO 5PP Solution 3 – Update storage impact assumptions at transmission level, and ENA SCG Action 3 – Connection arrangements for distribution electricity storage customers – at distribution level. They have two primary functions:

- 1. Update the calculations for the way that energy storage technologies impact the network to reflect actual usage more closely, and release unused capacity for other uses. This is being done for queued connections at transmission level, and new applications at distribution level.**
- 2. Standardise the network access rights provided to storage projects applying to connect at distribution level. This will create consistent treatment of storage projects across DNOs.**

Key:

SCG Action Plan

ESO Five-Point Plan

Solution	Transmission-Connected			Distribution-Connected		
	Generation	Demand	Storage	Generation	Demand	Storage
4.1 ENA SCG Action 3 – Create greater flexibility for storage distribution customers						✓
4.2 ESO 5PP Sol. 3 – Update storage impact assumptions			✓			

Expected benefits:

- Combined, these solutions reduce the risk of electricity storage triggering distribution network reinforcements that are likely to be very lightly utilised, enable better use of existing network capacity, and enable quicker connections.
- The SCG Solution 2 changes have released an initial 3GW of capacity at distribution level, and will create an extra 2-3GW of available distribution capacity per annum.
- At transmission level, ESO Solution 2 and ESO Solution 3 will together release 46GW of capacity.

Next steps:

Calculations for storage impacts on the transmission networks have been updated as part of the ESO 5PP Solution 3 in 2023, and will be utilised in updated offers to customers as part of the ESO 5PP Solutions 2 and 5 by September 2024. Distribution network operators are considering whether further medium-term solutions are required. This includes investigating how to treat the existing 50GW of connected and contracted distribution electricity storage. Any such changes would only be done following in-depth analysis and Ofgem support and, where required, industry consultation.

5

Release 46GW of capacity by making network planning processes more coordinated and realistic

Driver

The current framework makes it difficult to coordinate infrastructure plans with market activity

Network operators are reforming connections and planning processes to decouple reinforcement decisions from individual applications – allowing for a more efficient process that is not hindered by high application volumes and customer attrition from the queue. These actions will release 46GW of capacity and accelerate future customer applications.

The sheer volume of applications, and the high level of uncertainty as to whether contracted projects will ultimately connect, is not suited to the existing connections process. The connections process used to-date has been necessarily reactive and technology-agnostic, in line with network operators' licence obligations to provide connections in an efficient and affordable way, whilst maintaining the engineering needs of the network. The connections process has been largely successful in meeting these obligations, but the changing nature of applications means it must now be fixed.

Each application to connect to the network triggers a series of analyses to determine the impacts on the network, what reinforcements are required to connect the customer safely, and how much of that cost should be borne by the customer. Queue attrition leads to re-work to calculate the impact on downstream customers and drives delays in both processing applications and providing connections.

Not only are applications difficult to assess and plan for on an individual basis, but the market-driven approach does not necessarily align generation and network infrastructure with the associated requirements for electricity demand. The large queue of projects indicate that power generation capacity may outstrip power demand on the network. This problem is true GB-wide, but especially true in certain localities, where customers seeking to connect generation may find that there is limited demand for that power in the local area. To connect this generation to load, additional reinforcements are triggered. The drive to connect all generation, wherever it may be located, and the requirement to plan the network as though every project in the queue will connect, will lead to an unnecessary build-out of capacity which is costly for consumers.

Solution

Make the network planning processes more coordinated and realistic

The ESO is collaborating with the TOs and DNOs to make the planning processes more efficient and realistic. Short-term impacts will be realised through ESO 5PP Solution 2 – Update background modelling assumptions. Reforming the connections process will result in more holistic changes but will take longer to deliver. These actions will help ensure that network investment can in some cases be delivered ahead of customer connection needs, e.g. by having the potential to decouple network reinforcements from individual customer applications. This will accelerate connection timelines for customers and result in a network that is more fit-for-purpose. These actions complement the existing Distribution System Operator capabilities at distribution level.

These actions have two primary functions:

1. Update Construction Planning Assumptions (as part of the Transmission Works Review) to model network reinforcements at a regional level, rather than project-by-project. This can translate into potentially accelerated dates for customers.
2. Reform the connections process to move away from the first come, first served approach, which is currently utilised as part of an incremental and ad-hoc approach to network design for connections. This will allow the ESO to process connections applications in batches and plan network reinforcements in a more coordinated way.

Key:

ESO Five-Point Plan
ESO Connections Reform

Solution	Transmission-Connected			Distribution-Connected		
	Generation	Demand	Storage	Generation	Demand	Storage
5.1 ESO Connections Reform process	✓	✓	✓	✓	✓	✓
5.2 ESO 5PP Sol. 2 – Update background modelling assumptions	✓	✓	✓	✓	✓	✓

Expected benefits:

- Once implemented, Connections Reform will result in network planning improvements, including in relation to connections anticipatory investment, and it is expected to lead to improvements to capacity allocation and reallocation, as well as to earlier connection dates.
- Changes to modelling assumptions via ESO 5PP Solution 2 are expected to release 46GW of capacity at transmission level, in conjunction with ESO 5PP Sol. 3 – *Update storage impact assumptions* described above.

Next steps:

- Once the Construction Planning Assumptions studies are completed by the TOs, connection dates will be brought forward in as many agreements as possible. Works will also be reduced in these agreements.
- The ESO recently released its final recommendations for the reformed connections process. Next will be the detailed process design and implementation phase of the connections reform programme. The current expectation for 'go live' of the reformed connections process is January 2025, once relevant licence, code and process changes have been made. Further information can be found at this link. www.nationalgrideso.com/industry-information/connections/connections-reform

6

Further improve coordination between transmission and distribution operators

Driver

Decentralisation and the changing supply mix cause more interdependencies between distribution and transmission

Given the increasing interdependence between connections at distribution and transmission levels, network operators are developing new actions to improve coordination between DNOs and TOs, which will create a more streamlined and equitable customer experience for distribution customers whose projects impact transmission.

The changing nature of generation projects – decentralisation, increased intermittency, and smaller project sizes – means that there is more generation connected at the distribution level than previously. As a result, there are now more interdependencies between the transmission and distribution networks that must be managed by network operators. This has introduced complexity into the prevailing process for customers to apply for and pay for a connection. Three specific challenges emerge.

First, the widespread, mass connection of low-carbon technologies at a distribution network level will require network companies to collect and share far more data about how electricity is being consumed and generated, to best utilise existing network capacity for connections customers.

Second, when a customer applies for a connection at distribution level, their application is handled by the DNO. However, if the customer's requested capacity will trigger the need for transmission assessments or network reinforcements at distribution or transmission level, that introduces delays to application processing. This is increasingly the case due to the high level of capacity constraint across the network and the growth in distribution-connecting generation. If network reinforcements are required, this can result in significantly later connection dates and higher costs for the customer, who must contribute to or securitise against the cost of the reinforcement.

Third, network reinforcement costs at transmission and distribution level are paid for by customers applying for connection in accordance with current charging methodology under Access SCR. This methodology can result in distribution customers inequitably being charged for reinforcements in order to connect. This challenge was described in Roadnight Taylor's open letter to Ofgem. Specifically, large reinforcements such as Super Grid Transformers (SGTs) are regularly required and charged up front by the DNO to small and medium sized customers who do not have the financial flexibility to shoulder these costs. In comparison, an equivalent transmission customer would have the option of paying for the asset over its life, typically 40 years. The majority of DNOs have received requests for enduring non-firm transmission access rather than paying for firm access.

These interdependencies require more coordinated action between network operators to assess customer applications, plan reinforcements, and ensure equitable treatment as the connections process shifts to a 'first-ready, 'first connected' model.

Solution

Further improve coordination between transmission and distribution operators

Network operators will address these challenges by improving coordination between distribution and transmission network operators, and the ESO. The SCG is developing a new solution aimed at updating procedures that impact customers across the transmission/distribution boundary.

This solution has three primary functions:

1. Greater data sharing across the T/D boundary

The Strategic Connections Group are developing a proposal to increase the level of data exchange across the T/D boundary to better manage queues and inform efficient network development. The aim of this proposal is to enable optimal use of existing network capacity, thereby providing greater access to capacity for new distribution connections, and informing targeted network development across the T/D boundary. This proposal relies on getting enhanced information from customers on how they intend to operate and utilise capacity over future years. While it will not directly impact individual customer applications, it is expected to help maximise the use of network capacity, reducing the need for reinforcements and potentially indirectly accelerating connection dates that can be offered to customers. We aim to complete this by December 2024.

Key:

New Solutions

Solution	Transmission-Connected			Distribution-Connected		
	Generation	Demand	Storage	Generation	Demand	Storage
6.1 Assess and review thresholds for transmission assessment	✓	✓	✓	✓	✓	✓
6.2 Sharing queue data across the T/D boundary				✓	✓	✓
6.3 Charging Reform				✓	✓	✓

2. Assess and Review Thresholds for Transmission Assessments

To address DNO customer connection timescales being impacted by transmission reinforcement validation, the SCG are developing a solution to:

- Assess and articulate, across England, Wales and Scotland, where import/export threshold policies are in place and at what MW/MVA level. Deliver an output which enables customers to access this information in a clear way in order to support project decision-making.
- Review the threshold policies to understand if they will continue to be necessary, and where changes to thresholds beyond those set out through technical limits (SCG Action 2) are deemed to be beneficial, set out implementation plans to enact these changes. We aim to complete this by June 2024.

3. Charging Reform

Third, to address impactful charging of distribution customers for reinforcement works, the SCG is developing a solution to socialise the charging of transmission connection assets similar to the Access SCR approach. By introducing shallow charging rules in line with Access SCR, we would remove blockers to connection for smaller customers. This would also provide DNOs the ability (coupled with other proposals in this paper) to take more strategic decisions around which investments to make and when, in collaboration with the ESO and TOs. Proposals for charging reform will be developed and shared for any required regulatory or code modification approvals by June 2024. These may include DCUS and/or CUSC legal text changes, and in which case would be subject to Ofgem approval.

This solution will create a more streamlined and equitable application experience for distribution connecting customers who have impacts on transmission. This solution is currently under development in the SCG: delivery groups will be mobilised, with the aim to complete implementation by the end of 2024.



Expected impacts of these solutions

Together, the six solutions described above will help to address the connections backlog and improve connection outcomes for customers. We estimate that the combined effect of these actions will result in up to 71GW of accelerated applications and up to 139GW of capacity released.

The solutions will enable network operators to:

- Accelerate the connections process
- Utilise network capacity better and more flexibly
- Plan and build network capacity more efficiently

As a result of these solutions being implemented, customers will find that:

- Applying to connect to the network is transparent and more predictable
- Position in the “queue” does not affect speed with which customers can connect
- Customers have flexible connection options to connect to the network ahead of reinforcement works
- The network continues to enable the transition to net zero

Figure 8: ENA SCG actions & ESO 5PP Solutions Impacts in Numbers

SCG Action Plan		ESO Five-Point Plan	
Solution	Program	Capacity Released (GW)	Applications Accelerated (GW)
Clean up the queue and actively manage to 'first-ready', 'first-connected' process	ESO 5PP Sol. 1 – Provide TEC amnesty	4	-
	ENA SCG Action 1 – Reform the distribution network connection queue	5	1
	ESO 5PP Sol. 4 – Develop new terms for connections contracts	Up to 80	-
	Total	Up to 90	1
Allowing applicants to connect faster before network reinforcements are completed	ENA SCG Action 2 – Change how Transmission and Distribution coordinate connections (T&D technical limits)	-	Initial up to 30 Up to 50 total
	ESO 5PP Sol. 5 – Provide interim offers for the battery energy storage solutions	-	Up to 20 In Tranches 1&2
	Total	-	Up to 70
Treat storage differently to free up capacity	ENA SCG Action 3 – Create greater flexibility for storage distribution customers	Initial 3GW 2-3GW per annum	-
	ESO 5PP Sol. 3 – Provide interim offers for the battery energy storage solutions	<i>Included in ESO 5PP Sol. 2</i>	-
	Total	3+	-
Make network planning processes more coordinated & realistic	ESO 5PP Sol. 2 – Update background modelling assumptions	46*	-
	Total	46*	-
Total solution impact estimates		Up to 139	Up to 71

Policy and regulatory reforms needed to address the connections challenge

There are two fundamental problems that are not within the gift of network operators to address: the severe delays to infrastructure upgrades caused by the consenting process, and the conflicting goals of providing a connection for every project while achieving an efficient transition to net zero. Policy action is needed to address these.

Through the six solutions described above, network companies are doing all within their gift to improve the connections process. However, to truly address the grid connections challenge, wider reforms are needed from government and Ofgem too.



Planning, land rights and consenting reforms to accelerate connection

Problem: Network infrastructure upgrades can be severely delayed by planning, land rights and consenting processes.

Action required: Network companies urge the government to implement planning, land rights and consenting reforms, which will accelerate connections for many customers.

We seek support of ENA's plan¹ on planning, in which we propose reforms that:

1. Reduce statutory notice periods for network companies to modify existing network assets.
2. Consolidate access rights, creating a single provision for access rights to repair, maintain and replace network infrastructure and to conduct ancillary works on third party land, including the extension of these rights to include transmission licence holders.
3. Amend the Electricity Act 1989 to provide network companies with a general right to install cables within private streets, aligning with the Gas Act 1986.
4. Introduce a statutory process that provides cost and time certainty for consumers and operators for the installation of new, and retention of existing, assets.

In order to support the implementation of these reforms, we recommend that industry stakeholders develop a Code of Practice in relation to land rights and compensation, and that national and devolved governments coordinate plans for energy network infrastructure.

¹ National Grid ESO – Future Energy Scenarios 2023 Report

We support implementation of the recommendations set out by the Electricity Networks Commissioner to halve the total development time for transmission infrastructure.

Electricity network companies are seeking to invest £31bn in building new transmission and distribution network capacity over the course of the current RII02 price control. However, the on-time delivery of these investments, especially the buildout of high-voltage transmission network infrastructure, is heavily dependent on planning consents. Land rights and consenting reform could drastically reduce the connection wait time for many customers.



Policyholders need to prioritise the queue

Problem: the mandate to provide a connection for every project – regardless of factors such as location, proximity to demand, and existing network constraints – is at odds with achieving an efficient transition to net zero.

Action required: Policymakers should review how to better align connections decisions with energy policy.

In our market-driven energy system, network operators don't and shouldn't choose which projects connect to the network. However, this framework allows all types of technology to join the queue – even if that technology is oversubscribed – and obligates networks to provide connection. This often conflicts with economic operation of the system for all customers and may not allocate capacity to those projects that enable an efficient net zero transition. 'First-ready, 'first-connected' will not in itself address this conflict and the oversubscription of the queue today compared to Britain's requirements demonstrates that this isn't an academic problem. We believe policymakers should examine ways to do this which enable an efficient transition to net zero at lowest cost for all network customers. It is imperative that this includes addressing the existing queue that has accumulated, in addition to those seeking to apply to connect in future. This needs to be done while supporting confidence in the market and fair connections outcomes for customers.

A connections process which is aligned with energy policy could allow distribution networks to objectively prioritise projects and technologies already in the connections queue, and introduce or change entry requirements as a means of enacting national policies that best optimise the net zero transition for all. We welcome the Department of Energy Security and Net Zero and Ofgem to work with distribution networks to develop such a reformed process, and to develop the associated policies, policy statements and, where necessary, enabling legislative and code reforms at the pace required to respond to the connections challenge. This should also include focus on the ability for networks to invest against scenarios, for example through the detailed design of the Regional System Energy Planner supporting net zero enabling investment, and through investment in transmission infrastructure based on future network need. This would allow us to better match sources of electricity generation and demand at specific locations on the networks, offer faster connections for projects and maximize the use of network capacity.

Forward plan and reporting transparency

Key:

SCG Action Plan
ESO Five-Point Plan
New Solutions
ESO Connections Reform

Figure 9: Solutions Timeline and Governance

	Solution	Timeline						Impacts		
		Jul – Sep 2023	Oct – Dec 2023	Jan – Mar 2024	Apr – Jun 2024	Jul – Sep 2024	Oct – Dec 2024	Capacity Released	Applications Accelerated	Pipeline Quality Improved
1	Strengthen and tighten the application process		Provide more information to customers before they apply Standardize the pre-application phase and increase requirements for application submission Review and update the guidance available to customers on deciding between a D or T-level connection						✓	
2	Clean up the queue and actively manage a 'first-ready, first-connected' process	ESO 5PP Sol. 1 – Provide TEC amnesty								
		ENA SCG Action 1 – Reform the distribution network connection queue						✓	✓	
3	Accelerate up to 70GW of applications by allowing some applicants to connect faster, before network reinforcements are completed	ENA SCG Action 2 – Change how T&D coordinate connections (T/D technical limits)							✓	
		ESO 5PP Sol. 5 – Provide interim offers for battery energy storage solutions								
4	Treat storage differently to free up capacity	ENA SCG Action 3 – Connection arrangements for distribution of electricity storage customers								
		ESO 5PP Sol. 3 – Update storage impact assumptions						✓		
5	Make the network planning processes more coordinated and realistic	ESO Connections Reform process >> Go live in 2025						✓	✓	✓
		ESO 5PP Sol. 2 – Update background modelling assumptions								
6	Further improve coordination between transmission and distribution operators	Asses and review thresholds for transmission assessment								
		Sharing queue data across the T/D boundary							✓	✓
		Charging Reform								

Key:

SCG Action Plan
ESO Five-Point Plan
New Solutions
ESO Connections Reform

Solution Relevance by Customer figure 10.

Solution	Transmission-Connected			Distribution-Connected		
	Generation	Demand	Storage	Generation	Demand	Storage
1.1 Provide more information to customers before they apply				✓	✓	✓
1.2 Standardize the pre-application phase & increase requirements for application submission				✓	✓	✓
1.3 Review and update the guidance available to customers on deciding between a Distribution or Transmission Level connection	✓	✓	✓	✓	✓	✓
2.1 ESO 5PP Sol. 1 – Provide TEC amnesty	✓		✓			
2.2 ENA SCG Action 1 – Reform the distribution network connection queue				✓ (Phase 1)	✓ (Phase 2)	
2.3 ESO 5PP Sol. 4 – Develop new terms for connections contracts	✓	✓	✓			
3.1 ENA SCG Action 2 – Change how T&D coordinate connections (T/D technical limits)				✓	✓	✓
3.2 ESO 5PP Sol. 5 – Provide interim offers for battery energy storage solutions			✓			
4.1 ENA SCG Action 3 – Create greater flexibility for storage distribution customers						✓
4.2 ESO 5PP Sol. 3 – Update storage impact assumptions			✓			
5.1 ESO Connections Reform process	✓	✓	✓	✓	✓	✓
5.2 ESO 5PP Sol. 2 – Update background modelling assumptions	✓	✓	✓	✓	✓	✓
6.1 Assess and review thresholds for transmission assessment	✓	✓	✓	✓	✓	✓
6.2 Sharing queue data across the T/D boundary				✓	✓	✓
6.3 Charging Reform				✓	✓	✓

Conclusion

ENA's Strategic Connections Group is committed to taking these actions in the near-term.

With these solutions, networks are doing all within their gift to deliver substantive progress as quickly as possible. Most of these solutions will be delivered by the end of 2024, without dependence on supporting legislation or changes to license conditions. We seek regulatory support for those initiatives (charging reform, application form updates and size thresholds) which do require license changes, and we call on the government to implement the planning, consenting and land rights reforms required to support faster delivery of network upgrades. We will work collaboratively with Ofgem on these actions through the Connections Delivery Board.

Rising to the connections challenge will be a substantial and ongoing task. Our solutions will naturally evolve, recognising a wide range of interdependencies and interactions across our energy system, our economy, and our society. These initiatives have been identified and will be delivered in the context of today's current regulatory framework environment. They will be interactive with wider policy reforms under Ofgem's Future of Networks and System Regulation programme and the government's Review of Electricity Market Arrangements and the government's own proposals to accelerate the connections process.

Appendices

Key:

SCG Action Plan
ESO Five-Point Plan
New Solutions
ESO Connections Reform

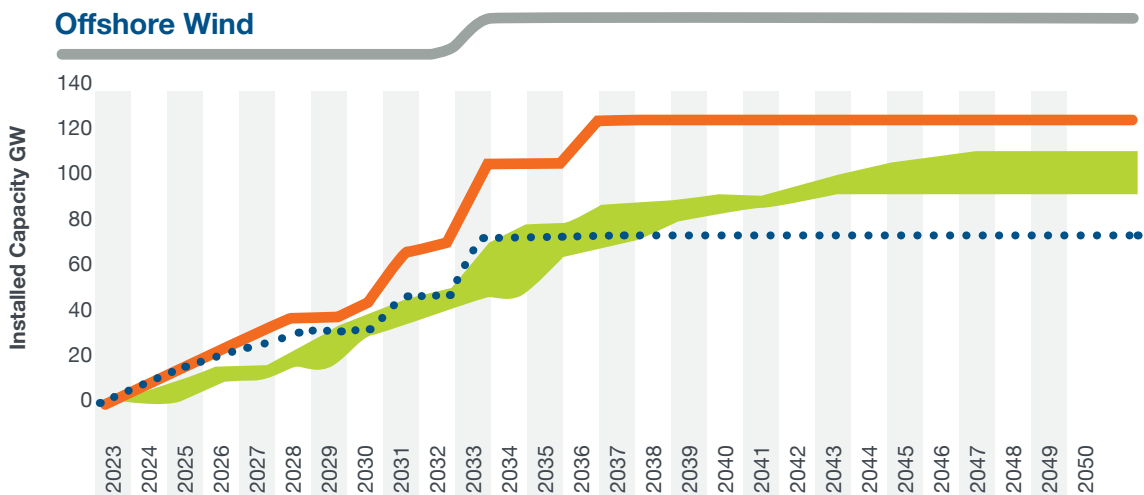
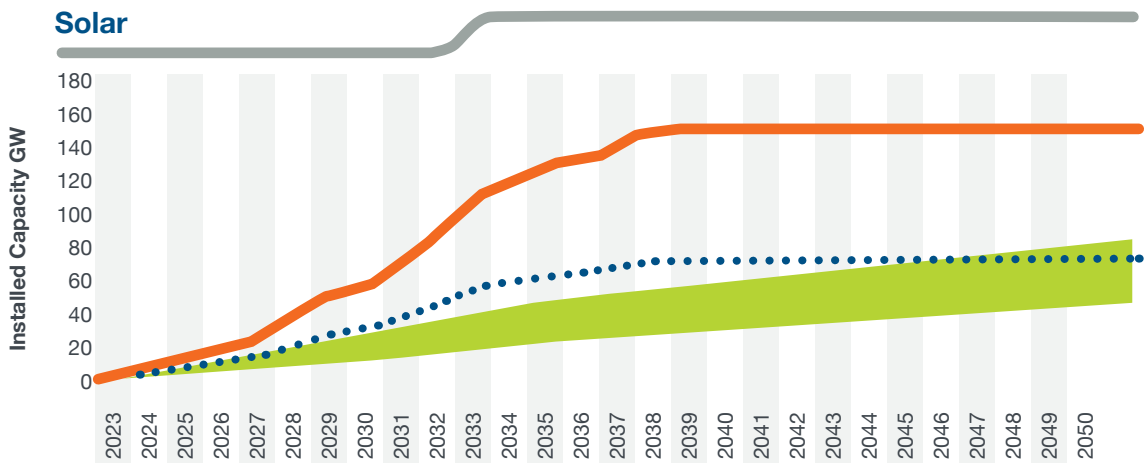
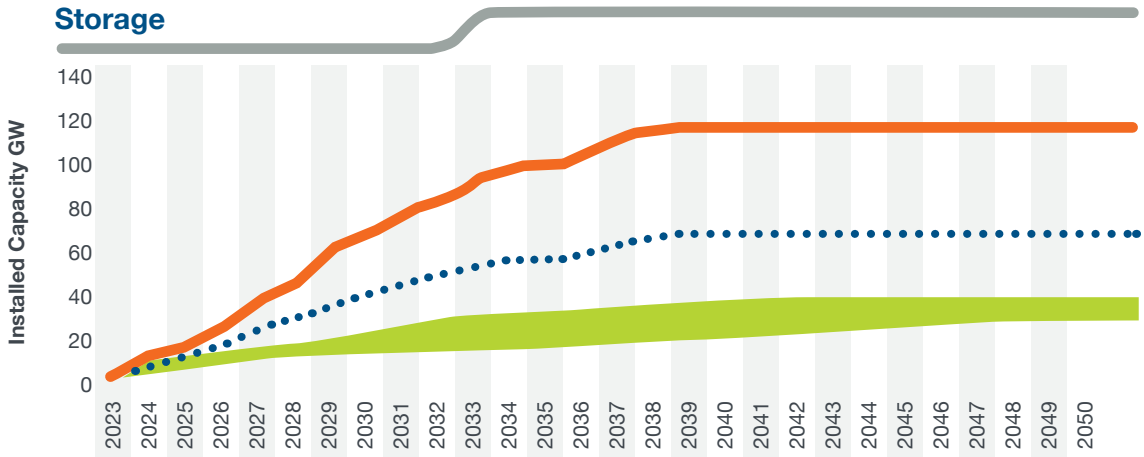
Appendix 1: ENA SCG Plan & ESO 5 Point Plan Transmission and Distribution Impact Mapping

Solutions at distribution level that benefit distribution customers	Solutions involving both transmission and distribution networks to benefit distribution customers	Solutions at transmission level that benefit transmission customers directly and distribution customers indirectly
<i>Implemented by DNOs</i>	<i>Implemented by DNOs, TOs & ESO</i>	<i>Implemented by TOs & ESO</i>
ENA SCG Action 1 – Reform the distribution network connection queue	ENA SCG Action 2 – Change how T&D coordinate connections (T/D technical limits)	ESO 5PP Sol. 1 – Provide TEC amnesty
ENA SCG Action 3 – Create greater flexibility for storage distribution customers	Assess and review thresholds for transmission assessment	ESO 5PP Sol. 2 – Update background modelling assumptions
Provide more information to customers before they apply	Review and update the guidance available to customers on deciding between a Distribution or Transmission Level connection	ESO 5PP Sol. 3 – Update storage impact assumptions
Standardize the pre-application phase & increase requirements for application submission	Sharing queue data across the T/D boundary	ESO 5PP Sol. 4 – Develop new terms for connections contracts
	Charging Reform	ESO 5PP Sol. 5 – Provide interim offers for battery energy storage solutions
		ESO Connections Reform process

Appendix 2: FES Scenarios vs Transmission and Distribution Contracted Connections

FES Range Contracted Contracted w/ Attrition

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Appendix 3: Existing Solution Action Details

ENA SCG Action Plan for Improving Connections

ENA SCG Action 1: Reform the Distribution Network Connection Queue

(Part of Solution 2: Clean up the queue and actively manage to 'first-ready, first-connected' process)

Under SCG Action 1, DNOs are harmonising the way network operators manage connection queues by consistently applying ENA's 2021 Queue Management Guidance to older contracts. DNOs are now:

- Applying progression milestones older generation connection contracts. Now, generation customers must meet the milestones within their contracts or demonstrate progress if they miss a milestone.
 - Note: Customers who applied for a connection prior to 2017 received connection offers without standardised milestones.
- Removing projects that do not demonstrate progress against agreed milestones from the queue.
- Promoting projects that progress against their milestones more quickly to connect to the network sooner, where they can do so without impacting others in the queue.
- Developing a suitable approach to reallocate the distribution network capacity that has been released through this exercise, which will allow distribution-connecting customers to be promoted out of the transmission-constrained queue.
- Next, DNOs will apply contract milestones to non-progressing demand schemes. DNOs have agreed to tackle 1MVA (and above) demand schemes with little or no progress since acceptance in 2017 or before.
- It is likely that in future, contract milestones will be applied retroactively to more recent demand scheme offers.
- DNOs are considering the application of milestones to all demand connection offers above a certain size going forward. This has already been adopted by some DNOs since 2021, but not others.

ENA SCG Action 2: Change how Transmission and Distribution coordinate connections (T/D technical limits)

(Part of Solution 3: Allowing applicants to connect faster before network reinforcements are completed)

Under SCG Action 2, Network operators are developing a solution to accelerate the distribution-connected generation of customers on a non-firm basis. The SCG is working to:

- Set technical limits for each GSP – an aggregate limit for the total power flow for each GSP at any given moment. This will give distribution networks greater autonomy to connect and manage distribution customers and projects up to that limit. The solution will accelerate customer connections at a reduced cost.
- Once a limit has been set for each GSP, DNOs review the contracts of queued customers to identify those which can be accelerated, subject to curtailment. Curtailment is forecast by the DNO based on available data and allocated on a Last-In-First-Out (LIFO) basis. Different technology types may experience different levels of curtailment based on the timing of their generation applications. Already connected customers and demand customers will not be impacted.
- The first phase was implemented on simple GSP connections, and it allowed up to 30GW of customer projects to be accelerated through non-firm offers. This accelerates 750 customers across 72 GSPs.
- Next, the solution will be applied to complex sites. That final phase is expected to be completed by September 2024.

ENA SCG Action 3: Connection arrangements for distribution electricity storage customers

(Part of Solution 4: Treat storage differently to free up capacity)

Under SCG Action 3, Distribution network operators are implementing three solutions for battery storage customers applying to connect at distribution level:

- First, DNOs shall adopt a common interpretation of the network access rights that new electricity storage customers will receive under their Minimum Scheme. Electricity storage customers will still be able to choose a connection with lower network access rights, such as a Curtailable Connection, as introduced by Access SCR.
- Second, DNOs shall adopt a common approach to treating electricity storage when undertaking EREC P2/8 compliance assessments. This includes use of diversity factors and the demand side response (DSR) provision.
- Third, when assessing demand, generation, and electricity storage connection applications, in addition to existing and contracted demand and generation, DNOs shall incorporate up to ten years of projected low carbon technologies (LCT) demand and generation growth. This helps ensure there is sufficient capacity for domestic customers to charge their cars and heat their homes.

Combined, these solutions reduce the risk of electricity storage triggering distribution network reinforcements that are likely to be very lightly utilised, enable better use of existing network capacity, and enable quicker connections. Following Ofgem's August 2023 letter of support for these solutions, phased implementation began on 30 September 2023. **ESO Five Point Plan**

ESO 5PP Solution 1 – Provide TEC Amnesty

(Part of Solution 2: Clean up the queue and actively manage to 'first-ready, first-connected' process)

The ESO is running a programme of Transmission Entry Capacity amnesties to remove queued projects that are not progressing, and projects which are speculative, from the connections queue, whereby electricity generators queueing for a connection confirm whether they would be willing to terminate their agreement at minimal or no cost or reduce the amount of power they plan to export to the grid. The ESO offered customers the opportunity to leave their queue without incurring penalties for doing so. This process is expected to release 4GW of capacity and to be complete by September 2024.

ESO 5PP Sol 2. – Update background modelling assumptions

(Part of 5: Make network planning processes more coordinated & realistic)

The second point in the ESO's Five Point Plan is updating modelling assumptions for connection assessments to ensure they are as accurate as possible for all projects. The ESO are working to review and update existing contracts with these new Construction Planning Assumptions. It is estimated that this will free up 46GW of capacity. The process will be completed by September 2024.

Through this solution, the ESO provides CPA modelling assumptions to TOs, and TOs model reinforcements at a regional level, which can translate into potentially accelerated dates for customers. This is an example of the principle of decoupling individual customer applications from the network planning process. This project benefits both Transmission Connected and DNO-connected parties. The ESO is working closely with ENA on this.

ESO 5PP Solution 3 – Update storage impact assumptions

(Part of Solution 4: Treat storage differently to free up capacity)

The ESO Solution 3 updates the calculations for the way that energy storage technologies impact the grid, to reflect actual usage more closely. This change in assumptions will allow the ESO to safely release capacity currently reserved for storage projects for other uses.

ESO 5PP Solution 4 – Develop new terms for connection contracts

(Part of Solution 2: Clean up the queue and actively manage to ‘first-ready, first-connected’ process)

The ESO is looking to introduce into CUSC (and Construction Agreements) following Ofgem’s recent approval of CMP376 Queue Management to help manage contracted connections at Transmission level.

The key components of the new Queue Management arrangements include:

- A set of eight prescribed Queue Management Milestones to be added into customer agreements.
- Associated timescales for each of the eight Queue Management Milestones by which they must be complied with by connecting customers.
- The acceptable forms of evidence that can be used to confirm User compliance with the eight Milestones.
- Outcomes for resolving non-compliance, including an exceptions process or powers for ESO to terminate agreements.

This code change introduces a right for the Electricity System Operator (ESO) to terminate contracted projects which are not progressing against agreed Milestones and to ensure contracted capacity is fully utilised, and that projects have the best chance to connect. Decision is sought 10 November from Ofgem. ESO will be looking to publish a working guidance document which enables CUSC parties to understand in practical terms how the Queue Management policy will work operationally, particularly where customers need to demonstrate progress against agreed Queue Management Milestones or where flexible resource could delay or offset the need for network reinforcement.

ESO 5PP Sol. 5 – Provide interim offers for battery energy storage solutions (BESS)

(Part of Solution 3: Allowing applicants to connect faster before network reinforcements are completed)

The ESO Solution 5, Interim Offers for Battery Energy Storage Solutions (BESS) will enable transmission-connected energy storage projects to connect to the grid more quickly. The ESO, together with TOs, has developed new contractual terms for flexible ‘non-firm’ transmission connection contracts for energy storage projects to enable them to connect on a non-firm basis once enabling works are complete. This will speed up connections for energy storage projects in the pipeline. However, to ensure system security, they may be instructed to reduce their output. The ESO began offering updated contract terms to an initial tranche of 20 transmission customers (~10GW) in England and Wales in December 2023. This accelerates these customers by on average 4 years. Further tranches will follow.

ESO Connections Reform

ESO Connections Reform process

(Part of Solution 5: Make network planning processes more coordinated & realistic)

In June 2023 the ESO set out and consulted on their initial recommendations for a reformed connections process. This was followed up in December 2023 by their final recommendations. The recommended option for all projects connecting to, impacting on or using the electricity transmission system, including relevant embedded generation, is 'Target Model Option 4' (TMO4). This is comprised of an early application window with two subsequent formal stage gates, which allow a move away from a First Come, First Served approach to capacity and connection date allocation, and the concept of Reserved Developer Capacity / Distribution Forecasted Transmission Capacity (RDC / DFTC) for relevant embedded generation (distribution-connecting) projects. Further information on TMO4 and RDC / DFTC can be found within the ESO final recommendations www.nationalgrideso.com/industry-information/connections/connections-reform

Within the ESO's final recommendations for a reformed connections process, the concept of RDC / DFTC in relation to the TMO4 model will provide DNOs the ability to reserve firm developer capacity within each application window. This will require that DNOs forecast future transmission capacity requirements and apply for RDC / DFTC (for projects between certain MW thresholds) within application windows. This will allow DNOs to offer and allocate developer capacity to embedded generation applicants in the inter-window period in line with agreed high-level arrangements. Where RDC / DFTC is available, DNOs will then be able to provide firm connection dates to such projects from a transmission perspective in parallel to providing these projects with their distribution connection offers and without the need to await the outcome of an application window, or go through a subsequent 'confirmation of project progression' process.



