



Department for
Energy Security
& Net Zero

ofgem

Connections Action Plan

Speeding up connections to the electricity
network across Great Britain

The Department for Energy Security and Net Zero
Ofgem

November 2023



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Foreword from Secretary of State for Energy Security and Net Zero

The UK is a world leader in renewable energy. In the first quarter of this year, 48% of our electricity came from renewables, up from just 6% in the first quarter of 2010.¹ We have increased our country's renewable electricity capacity by more than fivefold in the last 13 years. Energy security means national security. We must replace imported fossil fuels with cheaper, cleaner, domestic sources of energy. By doing so, we will ensure the UK will never suffer the rising prices caused by the weaponisation of energy after Russia invaded Ukraine last year.



As we increase electrification and decarbonise heat, transport and industry in our transition to net zero, we expect a doubling in demand for electricity by 2050. To achieve this, we will require millions of new and upgraded electricity network connections, underlining just how important the grid will continue to be to our way of life.

Over the last five years the volume of connection applications to the transmission network has grown approximately tenfold. This has led to an average delay of over five years for projects applying to connect to the transmission network. This impacts our ability to decarbonise our energy system, roll out low carbon technologies and attract investment into the UK. While there is a fundamental need for new network infrastructure, which the Transmission Acceleration Action Plan seeks to address, the process for grid connections is not fit for purpose.

Our Connections Action Plan sets out ambitious plans for the UK Government, Ofgem and industry to significantly accelerate connections. The total connection queue across transmission and distribution is around 500GW, five times the amount that is currently connected. We know that too many projects in the connection queue will not connect and many are hoarding capacity, preventing viable projects from connecting.

We will move away from the 'first come, first served' approach, cutting the average delay that projects face to connect from 5 years to 6 months. This plan will release over 100GW of capacity from the current queue – equivalent to around a quarter of the electricity needed to power our economy in 2050.

Our Transmission Acceleration Action Plan will halve the time it takes to complete physical build of transmission assets. By reducing delays in network build and speeding up grid connections, the two Action Plans taken together could bring forward around £90 billion of investment over the next 10 years.² As well as boosting the deployment of renewable and low carbon generation, ensuring energy security and supporting the decarbonisation of industry, heat and transport, the actions will strengthen the UK's position as a leading destination for inward investment.

¹ Energy Trends 6.1, September 2023, https://assets.publishing.service.gov.uk/media/65130d373d3718000d6d0c1d/ET_6.1_SEP_23.xlsx

² This includes £15bn associated with the Transmission Acceleration Action Plan and £50-100bn (£75bn central estimate) associated with the Connections Action Plan.

We and Ofgem will establish a Connections Delivery Board to ensure timely and effective implementation by monitoring progress and impacts. The Board will also bring together all the actions to deliver connections reform , including those being led by network companies, providing strategic direction and mandating further actions as required. Through this work, the Government is committed to significantly reducing connection timescales as part of the transformation of Britain's electricity grid.

A handwritten signature in dark ink, appearing to read 'Claire Coutinho', with a long horizontal stroke extending to the right.

Rt Hon Claire Coutinho MP
Secretary of State for Energy Security and Net Zero

Ofgem Foreword from Jonathan Brearley



Over the last two years, our energy system has faced major risks, with customers struggling to afford the energy they need. This underlines the importance of doing everything we can as a sector to protect our customers through this winter and beyond. Equally, to protect customers from high and volatile energy prices in the long term, we need to speed up the transition towards cleaner, affordable, and more secure forms of energy.

For Ofgem, that task is underlined by the recent addition of a statutory net zero duty, and we are taking new steps to plan out our energy system much more strategically. However, these changes need to be matched by the system operator and the network companies to connect up new sources of low carbon energy to customers much more quickly.

Nearly half of transmission generation projects have a connection date at least five years from now, with some scheduled to wait ten years or more. This is simply too slow and remains the biggest risk to our ability to decarbonise our power system by 2035.

So today, in partnership with the Department for Energy Security and Net Zero, we are launching this Connections Action Plan, setting out what needs to be done to improve and speed up the connections process.

The Plan is a call for network companies, the system operator, and the sector as a whole to deliver a major step change in the pace of connections; strengthening incentives, obligations, and requirements to do so. It also asks connections customers to be realistic and flexible in their connection requirements, and to engage on our proposals as they develop. Finally, building on our recent actions, it sends a clear message to stalled ‘zombie’ projects that they need to use their place in the connections queue or lose it: a big step towards moving away from the first-come first-served system.

Taken together, the Plan is aimed at getting a significant majority of projects connected by their requested connection date, up from 14 per cent today, and to reduce the average delay a project faces in connecting to the transmission network from five years to six months.

This will be accompanied by a new Ofgem-chaired Connections Delivery Board, an industry and government wide taskforce to intervene and challenge the sector as required. Additionally, today the Government is launching its Transmission Acceleration Action Plan, which I warmly welcome, setting out steps to halve the amount of time it takes to build network infrastructure; a key part of ensuring viable projects can connect more quickly.

I recognise that these are ambitious and challenging goals, and if we do not see the progress we need it will be Ofgem's responsibility to consider a wider range of reforms in how grid capacity is allocated. However, working together, government, industry, electricity system operator, and regulator, I am optimistic that we can deliver the cleaner, affordable, and more secure energy system that our customers need.

A handwritten signature in black ink, appearing to read 'JBearley', enclosed within a thin black rectangular border.

Jonathan Brearley

Ofgem Chief Executive Officer

Executive summary

Customers seeking network connections are experiencing significant delays with some customers being offered connection dates in the late 2030s. As announced in the *Powering Up Britain Energy Security Plan*³ and subsequently highlighted in the Prime Minister's speech on net zero,⁴ the Connections Action Plan sets out ambitious actions for government, Ofgem, the ESO and network companies to significantly reduce connection timescales.

Ensuring customers can connect to the electricity network where and when they need to is crucial to achieving net zero, as well as to delivering affordability for consumers and maintaining security of supply.

Decarbonising energy

The energy sector is a significant contributor to greenhouse gas emissions and has a key role to play in achieving government's net zero targets and mitigating climate change. We need to decarbonise our activities through electrification and ensure that the electricity we use is low carbon. This is causing an ever-increasing need for new and upgraded connections to the distribution and transmission networks, supporting the decarbonisation of transport, heat, homes, businesses and industry and enabling the deployment of large-scale renewable and low carbon generation.

The UK is a world leader in energy system decarbonisation, having connected the second highest amount of renewable energy in Europe since 2010.⁵ The *Powering Up Britain Energy Security Plan* promised to deliver the new nuclear, offshore wind and solar generation essential to achieve our decarbonisation goals.

In order to physically deliver low carbon electricity into our homes and businesses we need (i) a transformation of the electricity network at a scale and pace not seen in decades and (ii) fundamental reform to the connection process. On the former, the Transmission Acceleration Action Plan, published alongside this document⁶, sets out steps to halve the amount of time it takes to build new transmission infrastructure. We know that network capacity is a significant factor in delayed connections and expect that a combination of the Transmission Acceleration Action Plan, plus the agile funding mechanisms in place for distribution networks and Ofgem's work to evolve RIIO-3⁷, will all be key to alleviating that. On the latter, the Connections Action Plan sets out actions to reform the connections process, so that viable projects are able to connect in a timely and cost-effective manner.

Connections process issues

Projects crucial to achieving net zero, currently seeking grid connections, are facing serious connection delays. Many are facing delays which cause them real difficulty; equally many projects with connection agreements will never connect. It is clear that the current connection process is not fit for purpose and requires fundamental reform. There is currently around 500GW of capacity across transmission and distribution holding connection agreements and

³https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1148252/powering-up-britain-energy-security-plan.pdf (page 50)

⁴<https://www.gov.uk/government/speeches/pm-speech-on-net-zero-20-september-2023>

⁵<https://www.irena.org/Data/View-data-by-topic/Capacity-and-Generation/Country-Rankings>

⁶<https://www.gov.uk/government/publications/electricity-networks-transmission-acceleration-action-plan>

⁷<https://www.ofgem.gov.uk/sites/default/files/2023-10/FSNR%20Overview%20Document%20Final.pdf>

this is increasing rapidly as an unprecedented number of renewable/low carbon generation and storage projects accept connection offers. The current pipeline of generation and storage projects seeking connection goes substantially beyond what is required to meet our decarbonisation targets, but is blocked by surmountable regulatory, technical, procedural and commercial barriers.

Relatively low entry requirements for transmission projects; the inability of the Electricity System Operator (ESO) to terminate transmission connection agreements for projects that are not progressing; how network capacity is modelled and allocated; and the availability and use of data, have all contributed to lengthy connection timescales.

Without action to remove these barriers, the connection queue will continue to increase with consequences on (1) our ability to decarbonise our energy supply and meet net zero targets; (2) our energy security; (3) consumer bills; and (4) missed opportunities for attracting investment with its associated jobs and economic growth.

It is crucial that viable projects, many of which are vital to our net zero ambitions, can connect faster and that investors have certainty in the connection dates that are offered.

Vision

An efficient and effective connections regime will act as an enabler for a net zero power system while supporting economic growth and contributing to the UK's attractiveness for investment. We want to see a connections process that works equally for demand and generation customers, as well as the energy system as a whole, supported by exemplary customer service whether connecting to the distribution or transmission networks.

Our ambition is for **transmission** connection dates offered to be on average **no more than 6 months** beyond the date requested by the customer, for viable, net zero aligned projects taking account of the requirement on the ESO and network companies to develop an economic, efficient and coordinated network. Currently this stands at **5 years**. We would also expect to see **a significant majority of projects receive the connection date they requested**, up from only 14% of projects currently. Substantial progress on these actions is needed as soon as possible, and at latest by 2025. We will monitor performance against this objective carefully, to ensure that it remains a useful indicator of progress towards our stated goals, of seeing shorter average connection dates which better meet customers' needs and enable a timely transition to net zero.

We will continue to work with the ESO and network companies to gain insights and monitor performance and will confirm our forward expectations for **distribution** network connections, as part of the ongoing monitoring, evaluation and review of incentives and obligations.

Ultimately, we do not want viable projects to be delayed by the connections process, provided they make a connection application with reasonable notice. We will monitor progress and consider any further actions needed to achieve this.

Solutions

We support the ESO and network company-led initiatives to reduce connection timescales already underway, but they do not go far enough. Government and Ofgem are jointly publishing this Action Plan to hold the ESO and network companies to account to ensure delivery of their initiatives; and to go further and set strategic direction to deliver substantial further improvements.

The Plan contains agreed actions to be taken now and over the next few months in addition to actions that will take longer to be designed and implemented. It also sets out longer-term actions to be developed and ready to deliver, dependent on viability and the effectiveness of actions already taken. The Action Plan sets a framework for ongoing review, timely and effective implementation, and continual improvement, aligned with, and supporting, wider energy market and network planning reforms.

The **Connections Action Plan** sets out six key areas of action for government, Ofgem, the ESO, and the network companies to drive further action and significantly reduce connection timescales:

1. Raise entry requirements to increase the quality of projects applying for transmission connections and deter speculative connection applications. Subject to Ofgem's approval, the ESO will start requiring a landowner Letter of Authority to evidence permission from a landowner for a transmission network connection application⁸ to be accepted.
2. Remove stalled projects to release capacity for more viable projects. We will require milestones in transmission connection contracts⁹ which a connection customer must meet or face termination of their connection contract – termination would see the affected customer lose their position in the queue. We will review and improve enforcement of existing connection milestones at distribution level.
3. Better utilise existing network capacity to reduce connection timelines. We will change how the impact of connections is assessed by the ESO and network companies, beyond existing actions, and enhance use of flexibility, including non-firm/flexible connections.¹⁰
4. Better allocate available network capacity¹¹ moving away from the first come, first served approach to one that connects projects that are readier to progress and are able to quickly make use of capacity. The Department for Energy Security and Net Zero in collaboration with the Office for Investment will manage a triage process to ensure the most strategically important projects receive the strongest possible support to explore timely connection solutions, working together with Ofgem, the ESO and network companies.
5. Improve data and processes and sharpen obligations and incentives on the ESO and network companies to: • Give connection customers a better understanding of the condition of networks, to improve the quality of their connection applications and reduce speculative applications. • Ensure network companies deliver timely connections and high-quality customer service, as well as acting consistently. This will ensure that all customers receive the same high-quality service from the ESO and network companies wherever they are located, improve the interaction and consistency between transmission and distribution, and that network companies deliver timely connections. As part of this, Ofgem will undertake an end-to-end review of connections incentives, obligations and requirements on the ESO and networks companies.

⁸ A Letter of Authority is already required at distribution level.

⁹ Connection milestones are already inserted into distribution connection contracts.

¹⁰ Connection customers agree that under certain network conditions they will be unable to export/import in return for a faster, and potentially cheaper, connection.

¹¹ For example from revised network company modelling of the impact of connections on their networks.

6. Develop longer term connections process models aligned with strategic planning and market reform to ensure they are integrated to deliver strategic outcomes for a timely and efficient transition to a net zero energy system.

Impacts and implementation

The actions presented in this Plan, in combination with ESO and network company initiatives underway and longer-term ESO connection reforms, will have both an immediate and enduring impact. The scale of the potential benefits is considerable, government estimates that these actions could bring forward £50-100bn of capital expenditure over the next 10 years.¹²

In the immediate term, current initiatives being led by the ESO¹³ should free up around **100GW of transmission capacity**, more than **is currently connected**¹⁴ and of a similar magnitude to the 90-100GW of generation capacity that will need to be connected by 2030 to align with the Government's net zero pathways.¹⁵ It is therefore crucial this capacity is allocated in the best way to maximise the impacts for viable, net zero-aligned projects. At the distribution level, similar short-term actions being led by the Energy Networks Association (ENA)¹⁶ will enable around 30GW of generation connections to be accelerated, improving connection dates for some existing customers by up to 10 years. Improved connection offers are beginning to be provided and there is the opportunity for a further c.20GW to be accelerated in 2024 as the actions are rolled out across the country.

Realising these improvements will require all parties – the ESO, network companies and connection customers, Ofgem and government – to play their parts, including a willingness to do things differently.

These actions will be implemented by a new Ofgem-chaired Connections Delivery Board, comprising UK, Scottish and Welsh Governments, the ESO, the ENA, network companies and connection customer representatives. The Board will provide strategic direction and accountability, track progress against targets, and mandate further actions as required.

Benefits to connection customers

The actions in this Plan will positively impact all types of connection customers from large-scale renewable generation, industrial decarbonisation projects and freeports, to a company installing EV chargepoints and an individual installing a heat pump in their home. The Action Plan also describes in Chapter 4 how customers can best secure the right connection and provides a summary of our expectations of network companies to ensure the best customer experience. There are also case studies illustrating steps different types of customers can take immediately to support their connections process.

¹² 2023 prices, 10-year period taken as 2024/25-2033/34. Further details in Annex D

¹³ <https://www.nationalgrideso.com/industry-information/connections/what-are-we-doing-now-our-five-point-plan>

¹⁴ [Digest of UK Energy Statistics 2023 Chapter 5: Electricity](#); DESNZ, 2023

¹⁵ [Energy and emissions projections: 2021 to 2040](#); DESNZ, 2023. Annex O: Total cumulative new electricity generating capacity.

¹⁶ <https://www.energynetworks.org/newsroom/energy-networks-launch-action-plan-to-accelerate-grid-connections>

Chapter 1: Context

1.1 Introduction

The increasing importance of electricity networks

Electricity networks are key to realising the benefits of a net zero power system by 2035 – by ensuring that low carbon energy reaches our homes and businesses. In recent years, Great Britain's electricity networks have undergone fundamental changes, from transporting electricity generated from a small number of fossil fuel or nuclear-powered generators to a diverse generation mix, with a rapidly increasing proportion of renewable and low carbon technologies.

As recent world events have emphasised, a shift away from fossil fuels to domestically produced, including low carbon energy, is essential for energy security and limiting our vulnerability to sudden changes in global energy markets.

The UK is a world leader in power system decarbonisation. In 2022, 56% of electricity in Great Britain came from low carbon sources, including nuclear.¹⁷ By 2035, the electricity system will have decarbonised entirely, comprising renewable generators including wind and solar farms, nuclear power stations and abated fossil fuel power generators, alongside energy storage and interconnection. Peak demand for electricity is also expected to increase from 47GW in 2022 to between 90-120GW in 2035¹⁸ as transport, heating and industry electrify. This will require 260-310GW of generation connected to the electricity network by 2035¹⁹ compared to 100GW connected today.²⁰

The opportunities and challenges

These changes come with vast opportunities. From the manufacturing of electric vehicles (EVs) and batteries to the supply chains required to deliver energy infrastructure, the net zero economy is expected to grow substantially. McKinsey estimates a global market opportunity of £1 trillion for British businesses in the period to 2030²¹.

Alongside those opportunities are significant challenges. The surge in low carbon generation and storage projects seeking connections has largely outstripped the available network infrastructure to connect to. Transmission and distribution connection customers are receiving longer connection timescales, increasingly into the late 2030s. Ensuring customers can connect in a timely manner will be crucial in achieving net zero, as well as in managing consumer bills and maintaining security of supply. It will also support economic growth, housebuilding, school rebuilding programme, etc.

The role of government

Government sets the legislative and policy framework including legally binding decarbonisation targets and targets for renewable deployment. Government cannot, and does not, require network companies to change connection dates for individual projects. The role of government

¹⁷ [Digest of UK Energy Statistics \(DUKES\) 2023](#): Table 5.6; DESNZ, 2023

¹⁸ [Electricity Networks Strategic Framework; BEIS 2022](#)

¹⁹ [Energy and emissions projections: 2021 to 2040](#); DESNZ, 2023. Annex O: Total electricity generating capacity.

²⁰ [Digest of UK Energy Statistics \(DUKES\) 2023](#): Table 5.12; DESNZ, 2023

²¹ McKinsey, <https://www.mckinsey.com/capabilities/sustainability/our-insights/opportunities-for-uk-businesses-in-the-net-zero-transition>

is to work with the ESO, network companies and Ofgem to develop and help implement solutions to improve the connections process and ensure it supports our energy, economic growth and other objectives.

The role of Ofgem

Ofgem's core objective is to protect the interests of current and future energy consumers, with a new legal duty under the Energy Act 2023 to strengthen its role in the transition to net zero by 2050. Ofgem takes a central role in driving progress on the reform of connections by monitoring ESO and network company progress and pushing for further action, with a range of regulatory levers available. In addition, as part of the Smarter Regulation programme, following a consultation over the summer the Government has confirmed it will extend the Growth Duty to Ofgem (alongside Ofwat and Ofcom) provided for in the Deregulation Act 2015.

Ofgem regulates the companies who design, construct, maintain and operate the electricity networks – the ESO, Transmission Owners (TOs), Distribution Network Operators (DNOs) and Independent Distribution Network Operators (IDNOs). Ofgem is responsible for the network price control mechanisms which set the framework for investment in, and delivery and maintenance of, network infrastructure. Ofgem sets incentives and obligations and has the authority to administer penalties if regulated companies do not meet requirements. Ofgem also oversees the regulatory regime for connections, including for example deciding on industry code modifications²² and resolving disputes between connection customers and network companies.

For the avoidance of doubt, 'we' in this document refers to Ofgem and government together.

Scope of the Connections Action Plan

Delivering the improvements needed for connection times relies on a combination of factors – strategic investment bringing forward the network capacity needed in a timely manner; efficient and flexible management of network capacity; and an efficient connections process.

The Connections Action Plan focuses on the last of these factors: the processes and systems in place to provide a connection offer, managing the pipeline of projects waiting to connect at both transmission and distribution, and the faster delivery of connections.

Some connections will remain dependent on the delivery of wider network infrastructure, which will continue to determine their connection dates. This is why, in July 2022, the Government commissioned the Electricity Networks Commissioner Nick Winser CBE, to provide recommendations as to how the delivery of transmission network infrastructure could be halved from current rates of 12-14 years. Government has worked closely with Ofgem, the ESO, network companies and other key stakeholders and its response to the recommendations is presented in the Transmission Acceleration Action Plan.

This builds on measures already in place to ensure timely upgrades to transmission network infrastructure, for example: the c.£20bn Accelerated Strategic Transmission Investment (ASTI) framework and the Holistic Network Design (HND). Timely upgrades to transmission infrastructure can also enable faster connection of distribution network connections where these are dependent on transmission capacity.

²² <https://www.ofgem.gov.uk/energy-policy-and-regulation/industry-codes-and-standards>

Measures already in place to ensure timely upgrades to distribution network infrastructure include: £22.2bn in investment allowed in the current electricity distribution price control (RIIO-ED2), with double the baseline allowances for network upgrades, compared with the previous price control (RIIO-ED1) levels and agile funding arrangements that will allow investment to dial up in response to changes in demand, particularly the uptake of EVs and heat pumps at the local level.

Connection reform is part of a wider and evolving landscape of governance and network planning reform, with the establishment of the Future System Operator (FSO) and development of a Strategic Spatial Energy Plan (SSEP) and the Centralised Strategic Network Plan²³ (CSNP). It is anticipated that a more centrally planned strategic network will help enable the strategic placement of infrastructure to support quicker connections. Furthermore, reforms to electricity markets under the Review of Electricity Market Arrangements (REMA) are being developed. It is vital that reforms to the connection process take account of these changes to ensure the systems work in an integrated way to deliver strategic outcomes for a timely and efficient transition to a net zero system and are ‘future-proofed’ as far as possible. Interactions and interdependencies with these wider reforms are discussed in more detail in Chapter 3.6.

The Connections Action Plan encompasses GB. Northern Ireland operates in a separate electricity market with Ireland (the Single Electricity Market) and is regulated by the Utility Regulator, which works with Ofgem to protect electricity interests across the jurisdictions. Any regulatory and ESO/network company actions set out here will only apply to GB.

1.2 Problem statement

Connecting to the electricity network

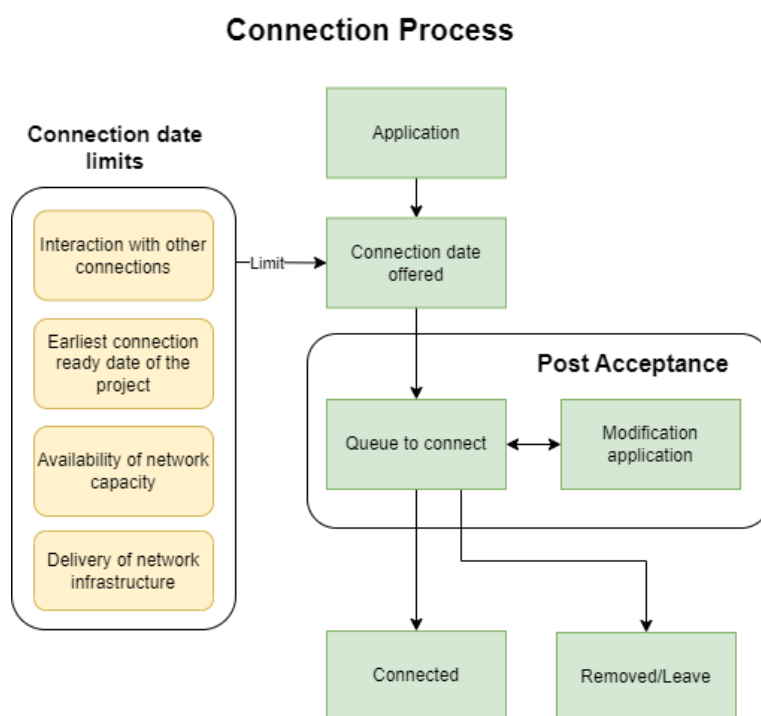
Transmission networks carry high-voltage electricity across the country with lower-voltage distribution networks delivering the power to homes and businesses. Customers can connect to either the transmission or distribution network. The ESO and DNOs are required to provide a connection offer upon request provided the applicant provides sufficient information and pays any applicable fee.

The ESO is, amongst other things, responsible for the contractual relationship with transmission network connection customers.²⁴ Distribution network connections are the responsibility of DNOs. Where distribution connections may have an impact on the transmission network the DNO engages with the ESO on its customers’ behalf and incorporates any transmission requirements into the connection offer.

²³ [Centralised Strategic Network Plan: Consultation on framework for identifying and assessing transmission investment options | Ofgem.](#)

²⁴ In some cases the ESO will have a direct contractual relationship with distribution connection customers.

Figure 1: Overview of the connection process and the key limitations on connection dates.



Connection applications are currently managed by the ESO and network companies on a first-come-first-served (FCFS) basis, with each new connection request being considered (and offered network capacity – either existing or future) in light of those whose application was accepted earlier. This is an established process, but is not a regulatory requirement. Where more than one project is dependent on the same network reinforcement this creates a ‘connection queue’. Typically, the ESO and network companies do not allow one customer in a queue to overtake another, unless the network reinforcement they are both dependent on is completed, or on a non-firm basis at the connection customer’s risk.²⁵

The ESO and network companies have licence conditions set by Ofgem which prohibit undue discrimination between connection customers²⁶ to enable fair and transparent access to their networks. The UK also follows the EU Trade and Cooperation Agreement provision to not discriminate against renewable energy producers.²⁷ The non-discrimination licence conditions have been long been applied by operating a FCFS system, however this is not prescribed by the licences and is not explicitly mandated in industry codes. While FCFS is generally considered non-discriminatory, it has become increasingly clear that it has significant limitations in an oversubscribed system.

Causes of connection delays

The main drivers of connection delays are:

- the volume of projects holding connection agreements due to:

²⁵ Should the project(s) ahead of the customer who connects on a non-firm basis subsequently connect this would impact on the availability of access to the network for that project.

²⁶ Transmission standard licence conditions C7 and D5. Distribution standard licence condition 19

²⁷ Article 306: ‘Each Party shall ensure that transmission system operators treat producers of renewable energy on reasonable and non-discriminatory terms regarding connection to, and use of, the electricity network.’

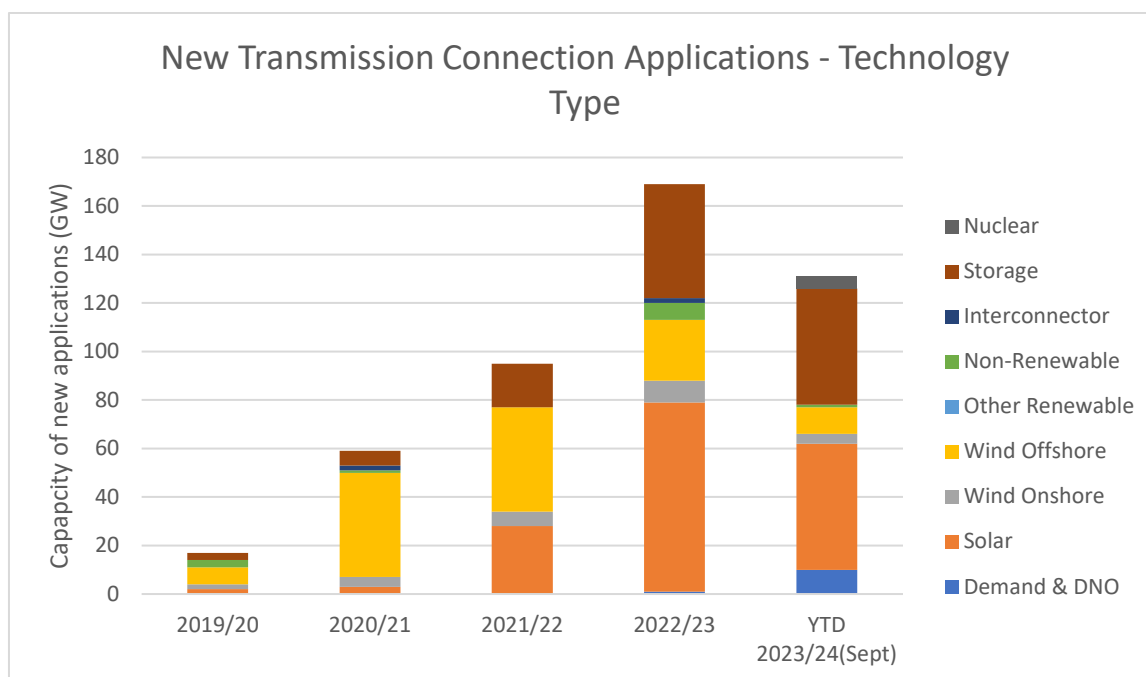
- The relative ease for projects to gain a connection agreement, even for highly speculative applications.
- Slow-moving or stalled projects' ability to retain their connection agreements while relatively easily pushing back their connection dates, affecting those projects behind them in a connection queue.
- The FCFS approach to connections giving no consideration of their viability, status or merit to the wider energy system;
- how the impacts of existing, offered and proposed connections are assessed by the ESO and network companies; and
- following this assessment the consequential 'need' for network reinforcement to be in place before the network can accommodate the connections.

Volume of projects

The volume of connection applications received by the ESO has increased approximately tenfold over the last five years. The transmission generation and storage connection queue has been growing by rates of up to 30GW a month.

As of September 2023, 549GW of projects held connection agreements across the system (143GW distribution; 406GW transmission). This includes 518GW generation and storage, almost double the amount required to be on the system in 2035.²⁸

Figure 2: New connection applications to the transmission network by technology and capacity.



At transmission level, the relative ease for developers to apply for a connection agreement has allowed speculative and non-viable projects to receive connection offers and be allocated network capacity, even if they do not progress the projects. There are many developers who hold connection agreements but, ultimately, do not connect (approximately 60-70% at Transmission level, depending on the technology type).

²⁸ [Energy and Emissions Projections: 2021-2040](#) DESNZ, 2023. Annex O: Total electricity generating capacity. Not all projects with connection agreements will connect, and technology make-up required will differ.

The ability to ‘sell on’ network capacity once secured also increases the attractiveness for speculative projects to submit applications and accept offers. The result is a large number of non-viable, slow projects clogging up the transmission queue and delaying more viable, advanced and valuable developments from connecting. At distribution level this is less pronounced with stricter application requirements and enforceable milestones in connection agreements. However, long connection timescales for those distribution connections dependent on transmission works makes meeting distribution connection milestones more challenging, as delays are beyond the customer’s control.

Assessing connection impacts and network reinforcement

The assessment of the impacts of connections on the network can be too ‘cautious’, for example resulting in unrealistic assumptions about the proportion of projects that will connect and how projects will act once connected. This leads to a requirement for network infrastructure that takes time to deliver but much of which will not ultimately be required to accommodate the projects that do connect. This is then reflected in connection dates offered to customers.

Some transmission connected assets will always trigger network reinforcements. Therefore, the delivery of wider network infrastructure will continue to determine some customers’ connection dates. This is why the Transmission Acceleration Action Plan to accelerate electricity transmission network delivery is so crucial.

Distribution network connections can also be impacted by constraints on the transmission network, even if there is spare capacity locally. Distributed generation projects over 1MW (or lower in some areas) require assessment of impacts at the transmission level which can significantly delay a project and impose additional costs where the need for transmission reinforcement is identified. Similar limits (1MVA) apply to demand projects in certain parts of the country.

Real-world impacts

Lengthy connection dates lead to a slower transition from fossil fuels to low carbon generation and technologies. If business is deterred from expanding or investing in new projects requiring electricity network connections, this negatively impacts on economic growth and job creation. Lengthy connection dates also hinder the decarbonisation of demand as projects take longer to connect, or are dissuaded from electrifying, in addition to the electricity that is consumed being more carbon intensive. They also impact on construction and expansion of housing, schools, hospitals and other amenities.

Government analysis suggests the pipeline of generation and storage projects within the transmission and distribution queues to 2030 have an associated capital expenditure of £140-200bn.²⁹ Barriers to timely connection of viable projects delays investment, limiting economic growth. Government estimates the impact of the actions presented in this plan, in combination with the ESO’s 5-Point Plan and the ENA’s 3-Step Plan, could bring forward £50-100bn of capital expenditure³⁰ over the next 10 years.

²⁹ Not all the projects within the pipeline will connect. Excludes nuclear generation. 2023 prices, 10-year period taken as 2024/25-2033/34.

³⁰ Details of the analysis are in Annex D. 2023 prices, 10-year period taken as 2024/25-2033/34.

1.3 Vision for the future

Our Vision

An efficient and effective connections regime will act as an enabler for a net zero power system while supporting economic growth and contributing to the UK's attractiveness for investment. We want to see a connections process that works for customers as well as the energy system as a whole.

The connections process should facilitate viable projects to connect in line with their required timeframes and the required pathways to net zero. Connection customers should be informed and supported to enable them to make effective and realistic connection decisions, and they should receive high-quality and consistent customer service wherever they seek to connect.

The process should be completely aligned with future strategic network build and spatial energy planning. There needs to be continual improvement informed by effective monitoring, and timely and coordinated delivery of implementation of reforms.

Our Objective

As set out in Ofgem's Open Letter on future reform to the electricity connections process,³¹ the objective is to see electricity connection offers, at both transmission and distribution, with shorter average connection dates which better meet customers' needs and enable a timely transition to net zero, underpinned by supporting principles. This remains the broad ambition for change and the guiding principles set out remain relevant.

Going further, we want to see:

- **Connection dates that better meet customers' reasonable needs** with the difference between requested and offered dates falling significantly - in particular:
 - For transmission connection dates offered to be on average **no more than 6 months** beyond the date requested by the customer, for viable, net zero aligned projects. Currently this stands at **5 years**.
 - For **a significant majority of projects to receive the connection date they requested**, up from only 14% of projects currently.
- **A pipeline of expected projects and connection dates that is consistent with net zero targets**³² and all parts working together (network planning, build and connections) so net zero aligned projects can connect when ready.

Substantial progress in these areas is needed as soon as possible, and at latest by 2025, with longer-term reforms developed in parallel. In the immediate term,

- Current initiatives³³ being led by the ESO in its 5-Point Plan should free up around **100GW capacity, more than is currently connected to the transmission network**, improving connection dates for some existing customers **by between 2-10 years** with updated offers being provided from Q4 2023.

³¹ [Open letter on future reform to the electricity connections process | Ofgem](#)

³² Incorporating the need to operate a safe and secure electricity system.

³³ <https://www.nationalgrideso.com/industry-information/connections/what-are-we-doing-now-our-five-point-plan>

- At the distribution level, similar actions currently being led by the ENA's 3-Step Plan³⁴ will advance 39GW of capacity.

It is crucial this released capacity is allocated in the best way to maximise the impacts for viable, net zero-aligned projects. Further details on these plans are provided in Chapter 2.

Pathway to connections reform

Urgent and substantial progress is needed with continual improvements to customers' connection dates and experience. Actions are being taken now by the ESO and network companies to deliver reduced connection timescales. However, we recognise that these do not go far enough and the Connections Action Plan sets out further steps being taken and considered by ESO and network companies (Chapter 2) and where we think more is needed (Chapter 3). Within this we consider longer-term connection reform to better align with strategic planning of the network, and are ready to take forward further actions in the future as required.

There are three key elements of the connections reform programme:

- 1) Clear objectives for reform, underpinned by measurable targets and progress indicators;
- 2) A robust and coordinated whole system reform programme, with strong programme management, which embeds ongoing review; and
- 3) A willingness from all parties to do things differently, including the ESO and network companies making best use of all available information to act intelligently and decisively, and customers recognising where being flexible in their connection requirements can help unblock delays, optimising outcomes overall.

We will continue to work with the ESO, network companies and wider stakeholders to ensure delivery of near-term reforms, driving further and faster improvement, and take decisions where a strategic view is needed. We will also continue to work closely to develop and scrutinise longer-term proposals for reform.

Implementation and monitoring of connections reform

The delivery structure we are establishing will ensure timely and effective implementation of actions by providing strategic direction and monitoring progress. A new, dedicated Connections Delivery Board (CDB) and associated sub-groups will rapidly assess and propose additional steps, as needed, across the connections process and other energy system arrangements. Ofgem and government are determined to work together with the ESO and network companies to implement the changes set out in this action plan. We provide further details in Chapter 5.

³⁴ <https://www.energynetworks.org/newsroom/energy-networks-launch-action-plan-to-accelerate-grid-connections>

Chapter 2: ESO and network company actions

2.1 ESO and network company actions underway

To reduce connection timescales, the ESO and network companies are taking action to release network capacity and improve the connection process. The ESO is implementing a 5-point plan to accelerate transmission connections and the Energy Networks Association (ENA) is implementing a 3-Step Plan to reduce distribution connection timescales.

ESO's 5-Point Plan – Transmission Level

1. **Transmission Entry Capacity (TEC) Amnesty:**³⁵ c.4GW of customer projects will be allowed to terminate or reduce the capacity of their connection agreements, without incurring penalties.
2. **Construction Planning Assumptions (CPAs):** More accurate modelling by the ESO and TOs of the impacts of all connections to the transmission network, for example by applying attrition rates to projects with connection agreements. This will result in a more realistic view of the transmission network reinforcements required to accommodate contracted connections, creating the opportunity for some projects to be given accelerated connection dates.
3. **More realistic modelling of the network impacts of battery energy storage systems (BESS):** The key new assumptions are that BESS projects would not export at times of peak generation and import at times of peak demand; that not all BESS projects in an area will operate in exactly the same way and at the same time; and recognising that BESS operates for relatively short periods. This will allow many BESS projects to connect faster while increasing network capacity for other projects.
4. Introduce **progression milestones** in connection agreements to ensure projects progress to set milestones or face termination. This should free up capacity for progressing projects to be accelerated.
5. Offer **non-firm connection options to BESS** projects so that they can connect sooner, on the understanding that they may not be able to import or export under certain network conditions.

ENA's 3-Step Plan – Distribution connections.

1. **Reform distribution connection queue management** by inserting milestones into pre-2017 generation connection contracts,³⁶ progressing connection customer cancellations (including by enforcing existing milestones) and extending the insertion of milestones into demand connection contracts. The capacity this releases can then be offered to other projects.
2. **Improve the interaction between the transmission and distribution networks**, to allow DNOs to manage connections within technical limits set by the ESO allowing more distributed generation to connect sooner.

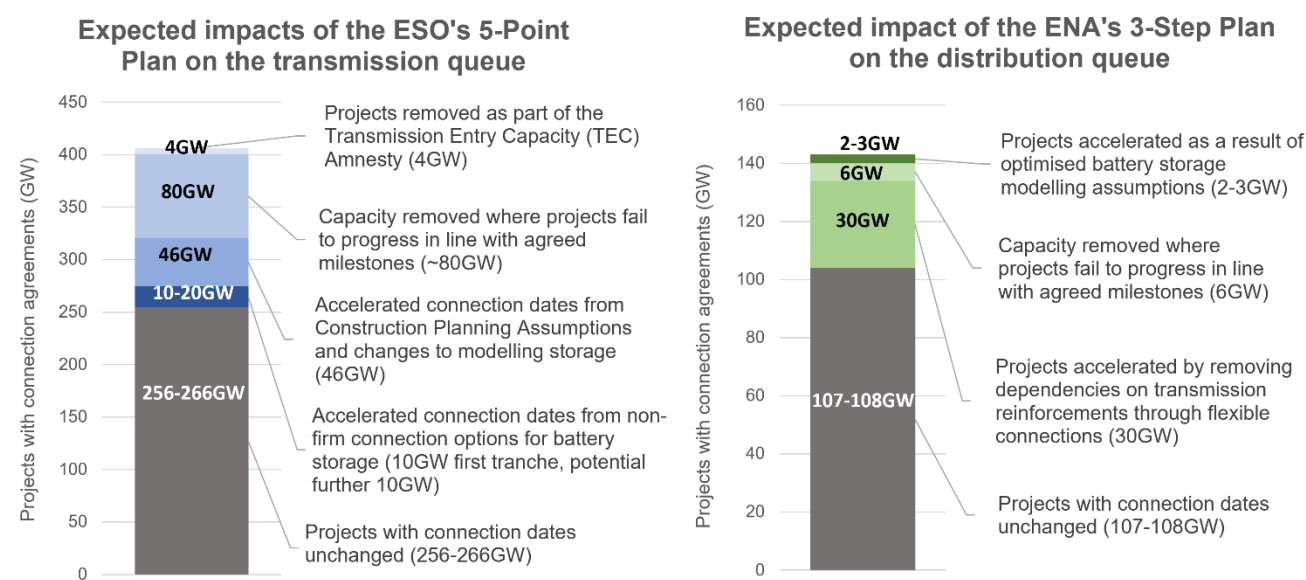
³⁵ <https://www.nationalgrideso.com/industry-information/connections/tec-amnesty-now-closed>

³⁶ ENA agreed milestones were inserted into new distribution generation connection contracts from 2017, but existing connection contracts and demand connection contracts were generally not affected.

3. **Standardise firm access provisions for BESS customers** and re-assess the impact of BESS projects on the network, facilitating faster connections and increasing capacity for other projects.

These figures detail the indicative impacts and timings of the ESO and network company actions:

Figure 3: Impact of the ESO's 5-Point Plan and ENA's 3-Step Plan on the transmission and distribution connection queues respectively as of November 2023.



Government and Ofgem view of ESO and network company actions

Government and Ofgem support the actions underway and have been involved in their development and implementation, including through participation in the ENA's Strategic Connections Group³⁷ (SCG) and providing support for a range of measures across the ESO's 5-Point Plan and ENA's 3-Step Plan. Examples include the publication of letters of support by Ofgem for the SCG's approach to distribution queue management and BESS connections followed by ongoing monitoring, for example, to ensure that all distribution generation connection agreements contain milestones. Ofgem also provided its agreement to the ESO and National Grid Electricity Transmission's (NGET's) request for a temporary (12 month) 2-step offer process whilst new background modelling is being undertaken. A further letter of support has been provided by Ofgem to the ESO to facilitate the processing of the TEC Amnesty. We continue to emphasise the need for these measures to go as far and fast as possible to maximise opportunities to deliver benefits, in line with our strategic outcomes.

It is crucial that, in implementing these initiatives every opportunity is considered to maximise their benefits in a coherent way across the system, and with a clear line of sight to longer-term direction of travel. The Connections Action Plan includes actions to help ensure the timely and effective delivery of actions already underway.

We recognise the challenges that have been faced by the ESO and network companies and welcome their work to ensure consistent and effective implementation of the various actions.

³⁷ ENA group comprising senior representatives of ESO, TOs, DNOs, IDNO, the Department for Energy Security and Net Zero and Ofgem to oversee implementation of the ENA 3-Step Plan, help ensure coherence with the ESO 5-Point Plan, and agree further actions to accelerate distribution connections.

We also recognise that for many connections more network infrastructure needs to be built to accommodate them. Some of the issues behind connection delays have been apparent for years, though, for example exporting Grid Supply Points (GSPs) impacting on transmission and inefficiencies in the connection process at the transmission/distribution interface, and progress to resolve them has been slow. The rapid and widespread increase in connection applications and accepted connection offers has exacerbated the impacts on connection timescales, which are now being felt across generation and demand and by much smaller projects than previously.

We believe a more effective and responsive approach, with stronger forward planning focused on anticipating actions required to manage the future pipeline of connections – across connections processes and network planning and design – will minimise the lengthy delays to offered dates, and pressures on networks. Both improved stewardship of connections arrangements and further network infrastructure build will be vital going forward.

We are pleased that improved connection offers are beginning to be issued and emphasise the importance of ongoing engagement between the ESO and network companies and connection customers on implementation of near-term changes, and further measures. Continuous review and improvement, identifying and rapidly progressing additional actions as needed, is crucial to the success of connection reform. We will hold the ESO and network companies to account for delivering impactful improvements at pace, including through our delivery structures (see Chapter 5) and Ofgem's regulatory levers, as appropriate.

2.2 ESO and network company further actions

The scale of the connections challenge means further actions need to be taken by the ESO and network companies ahead of longer-term connection reforms being developed by the ESO.

We are encouraged that the ESO and network companies are engaging constructively in reviewing and amending their approaches and connections processes, building on learning as they do so. We support efforts by the ESO and ENA to develop and implement additional measures in the near-term to reduce connection timescales further. The ESO, in collaboration with network companies, is considering more substantial measures to extend the benefits of the initiatives underway, with further actions, including to reduce the existing queue. The ESO will soon publish options for further action as part of its final recommendations and implementation plan for connections reform. In addition, the ENA is considering further actions beyond its 3-Step Plan.

We welcome this further work, which must be as ambitious as possible and drive rapidly to deliver benefits. We will continue to work closely with the ESO and ENA to identify, and support as appropriate) priority steps for further progress.

2.3 ESO longer-term connections reform

The ESO launched its connections reform project in October 2022, with the aim of designing and delivering a reformed process to facilitate faster transmission network connections in a more coordinated and efficient manner.³⁸ It proposes to apply this process to new generation, storage, interconnectors and large demand applications from the date the reform goes live.

³⁸ ESO Connections Reform Consultation <https://www.nationalgrideso.com/industry-information/connections/connections-reform#Key-documents>

The ESO also envisages a reformed process for assessing projects that connect at the distribution level, but require transmission level upgrades. These connections reforms would only apply to new connection applications.

The ESO published a consultation on options for transmission connection reform in June 2023. The ESO's preferred model³⁹ would establish various mechanisms to improve the connections process the most notable being the introduction of 'gates and windows':

- '**Gates**' enable a project which can demonstrate a certain level of progress or status to receive the benefit of a more certain, and likely accelerated, connection date.
- '**Windows**' would limit the period during which applications can be submitted. This would allow the ESO to work with network companies to review applications on a batched basis, to better enable design of the network in a more strategic and coordinated way. This contrasts with the current process where much of the network is designed and delivered in response to individual applications and should align with the move to strategic planning of the transmission network underway with the CSNP.⁴⁰

Figure 4: The ESO's preferred connection model



In the ESO's preferred model, a second gate would determine queue positions for projects within the window. This second gate may also have the potential to accelerate projects which have submitted planning consents, or other priority projects. The ESO's proposals envisage that the application window would occur annually, applying to all technology types nationally, although it recognises the potential for these aspects to evolve. The ESO continues to consider the frequency and duration of windows. The ESO is expected to publish final recommendations by the end of the year taking account of stakeholder feedback. Details of all potential connection models can be found in the ESO's connections reform consultation.

Government and Ofgem view of the preferred reformed connection model

We welcome, and are engaging closely with, the ESO and stakeholders on its proposals. We support longer-term connection reform and see the merits in the ESO's preferred model and support the aim of moving towards a system which enables the interaction between connections and network planning to be undertaken in a more holistic, strategic and coordinated way. The models should allow adaptability to future strategic system planning, in which the FSO, when it is established, will have a leading role. We expect the ESO to continue to consider how these two processes can best be integrated to achieve strategic outcomes.

Success of the ESO's connection reform proposals for managing new connection applications will be influenced by actions to address issues with the current connection queue. Therefore we will continue to work with the ESO and network companies to develop process improvements to address the existing connection queue and ensure any longer-term model can start from as solid a foundation as possible. We intend to hold the ESO to account for

³⁹ ESO preferred target model TM04 as described in the ESO's summer 2023 consultation <https://www.nationalgrideso.com/industry-information/connections/connections-reform#Key-documents>

⁴⁰ Further details of the CSNP and the interactions with connections can be found in Chapter 3.6.

delivering the expected benefits from this longer-term reform project, alongside its delivery of near-term, impactful improvements to the process overall.

We recognise such a model should allow projects that are able to connect faster to do so unhindered by slower moving projects in any given window, in line with wider strategic outcomes and plans, while noting it is imperative that projects with naturally longer development times have equal opportunity to connect in their required timeframes.

There are some challenges to address within the ESO's preferred model, to ensure it best supports strategic outcomes and meets the reasonable needs of connections customers, which we encourage the ESO to consider further in developing its proposals. These include:

- **Frequency of windows:** While we understand the rationale for proposing a window to allow the ESO to review applications on a batched basis, streamlining the process and improving management of interactivity; a single annual national window applying to all technology types may not be sufficient, potentially delaying projects where the window does not align with their timelines. For example, we have heard from demand customers the challenges that an annual connection window could cause for investment decisions. It will be important to consider its suitability for different customers and interactions with planning and investment processes (eg Capacity Market and Contracts for Difference timeframes, and strategic planning cycles). We note the ESO is considering the benefits and feasibility of more frequent and shorter duration windows, and further clarity is required on how the system, including interactions between different windows, could be adapted to meet such concerns. The ESO should consider how the scope and design of any windows may evolve, depending on the wider market and planning context, for example potential benefits of more locational, or technology-specific, windows.
- **Whole system interactions:** A further challenge will be how the ESO's preferred model would interact with distribution network connections that require transmission capacity. While we are encouraged by recent developments to explore these options jointly with the ENA, further clarity is needed on how arrangements in this area will work in practice, to ensure arrangements work for customers across the system.
- **Definition and criteria for gates:** The initial recommendation of the ESO's preferred model suggests that at gate 1 customers will have an indicative connection offer with a backstop date. Gate 2 would be used to determine queue position and projects would be potentially accelerated if they have submitted planning consent or are prioritised. It is important to define clear terms and conditions to reach each gate, including the nature of connection offer customers receive at a particular gate. At gate 2, additional criteria could include approaches that improve capacity allocation and are better aligned with strategic network planning.
- **Interactions with strategic plans:** There is a need to consider the respective roles of the connections process and wider strategic planning, to ensure they are integrated and support strategic outcomes – notably how strategic planning for groups of connection customers will be accommodated, and how centralised plans will be informed by connection applications in the windows. The ESO has proposed how these interactions could be managed. Further consideration should be given to interactions with Regional Energy Strategic Planners⁴¹ (RESP) recently introduced. RESPs will be delivered by FSO, and their outputs will also interact and be coherent with the CSNP and SSEP.

⁴¹ [Decision on future of local energy institutions and governance | Ofgem](#)

Chapter 3: Actions

We welcome, and are supportive of, the measures underway and being developed by the ESO and network companies to accelerate connections. But we need to go further. This chapter presents key actions to release more network capacity and improve the connections process to accelerate connections. These look across transmission and distribution, including the interface between the two; build on work underway; and cover new and existing connections to maximise impact, laying the groundwork for longer-term reform.

The ‘guiding principles’ set out in Ofgem’s Open Letter on connections reform remain relevant in developing and taking forward actions, namely that reforms:

- benefit current and future consumers;
- accelerate progress to net zero;
- begin to deliver as soon as possible with impacts seen by 2025;
- support improved coordination across the onshore and offshore networks and the transmission and distribution grids; and
- are resilient to wider reforms.

In developing actions, we have considered, as appropriate, the practicality, proportionality, responsibility, and deliverability⁴² of actions. Any actions set out in the Action Plan for the ESO will continue under the FSO, once it is established.

We have grouped actions into the following areas:

1. Raise entry requirements:

It is currently relatively easy to apply for a transmission connection and there is perceived value in holding connection capacity, for example to sell at a later date. This has resulted in developers submitting speculative and multiple connection applications, and at times without the knowledge of landowners on whose land any projects would need to be constructed. Chapter 3.1 includes actions to raise the connection application requirements and reduce the attractiveness of holding network capacity. This should reduce speculative applications that are contributing to lengthy connection timescales for more viable projects.

2. Remove stalled projects:

Slow progressing and stalled projects in the transmission connection queue, which (often repeatedly) fail to meet their connection dates, are contributing to lengthy connection timescales. Chapter 3.2 presents actions to allow the ESO to remove such projects and ensure that this is undertaken in a consistent and effective manner, which should allow more viable projects to connect faster.

3. Better utilise existing network capacity:

Efficient utilisation of existing networks can defer or negate the need for expensive new infrastructure, which takes time to deliver. It can also allow connections before the enduring solution of new infrastructure is delivered. In Chapter 3.3 we task the ESO and network

⁴² In this Plan we provide our views on key areas of reform and necessary actions, including developing, assessing and bringing forward proposals for change through the code modification process on appropriate timeframes given the time-critical nature of the connections challenge. We note, however, that nothing in this document fetters Ofgem’s discretion when assessing modification proposals or recommendations for urgency, which it will consider on their merits in line with the applicable code objectives and urgency criteria.

companies to take further action on the utilisation of connection and reinforcement assets, to allow projects to connect faster.

4. Better allocate available network capacity:

We need to ensure that existing and future capacity is allocated efficiently to allow timely connection offers, aligned with net zero objectives. We recognise that the current FCFS approach is not fit for purpose and want to make sure those ready first, can connect first. In Chapter 3.4, we set out an action to review and implement alternative approaches with the ESO and network companies both in the near term, including allocating capacity freed-up from actions already underway, and in the longer-term.

5. Improve data and processes and sharpen obligations and incentives:

Given the scale of connection applications it is more challenging, it is more important than ever, that the connection process is efficient and user-friendly. More can be done to improve how the ESO and network companies engage with each other and their customers, to increase the transparency and accessibility of data and to ensure a consistent approach across the networks. We have set out actions, in Chapter 3.5, to improve the speed and efficiency of the connection process, including an Ofgem-led review of the regulatory framework of obligations and incentives covering timely delivery of connections and customer service.

6. Develop longer term connections process models aligned with strategic planning and market reform:

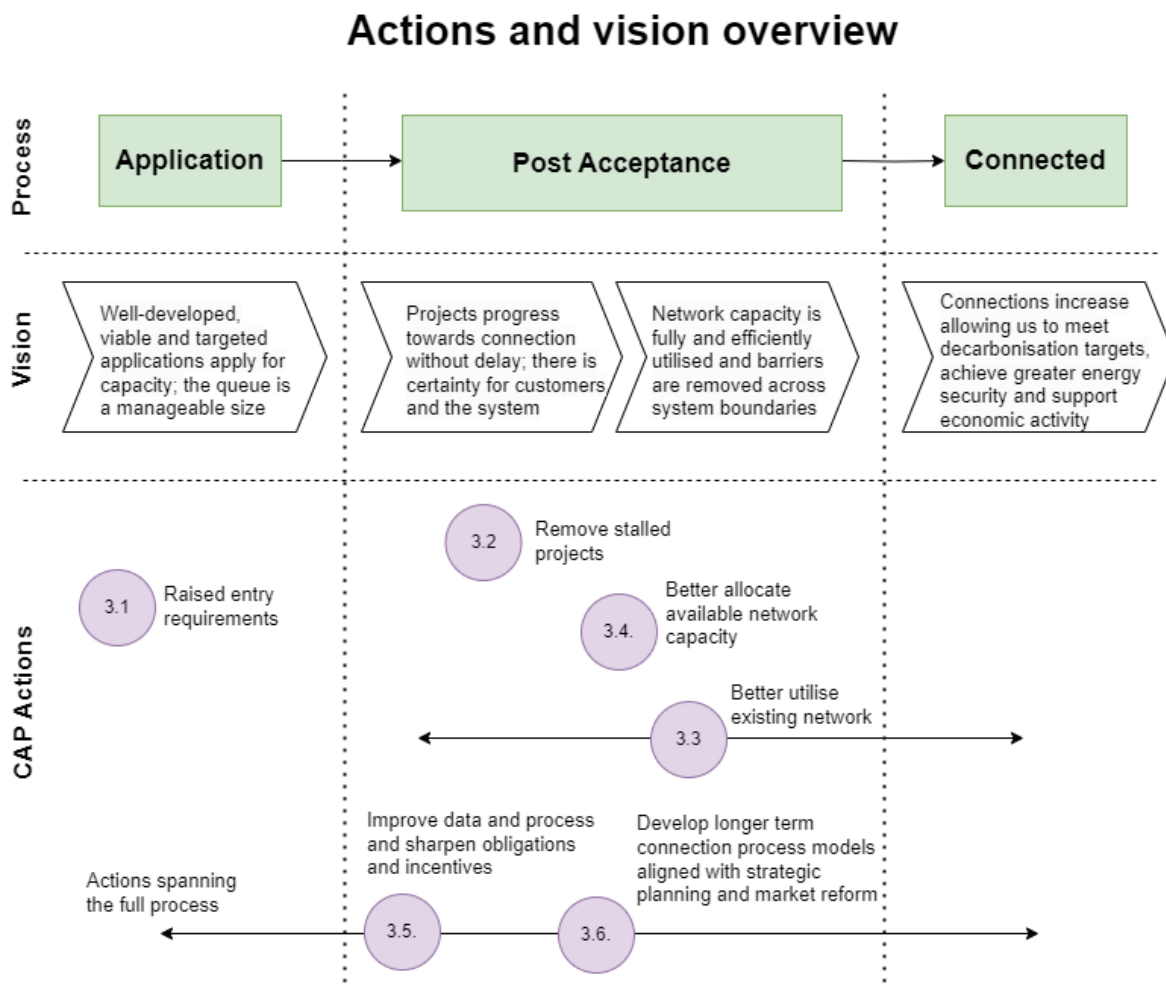
The Action Plan focuses on actions and reforms specific to the connection process. However, there are other factors that affect connections, or will do in the future, which are outside the scope of this document, including action to accelerate network build, more strategic network planning, and potential reforms to markets and signals under REMA. We need to ensure that reform of the connections process is aligned with centralised network planning and future-proofed for accelerating network build, REMA and other initiatives as far as possible. We explain the links and action to ensure alignment and future-proofing in Chapter 3.6.

The actions in this chapter relate to all stages of the connection process from pre-application through the application process to how projects subsequently progress to connection. The actions are for the ESO, network companies, Ofgem and government, and connection customers, reflecting the need to work collectively to ensure that the connections process works for customers and the energy system as a whole. This includes requirements on customers to provide more information and certainty on their projects; for the ESO and network companies to improve efficiency, transparency and consistency in the connection process; and for Ofgem and government to ensure the regulatory and legislative framework supports the actions needed.

For all actions we have provided clarity on specific expectations, assigned lead organisations, set progress indicators, which will be monitored and reviewed through our proposed delivery structure, and indicated timescales and review dates. Actions range from those which have been agreed and are underway to those which will take more time to define the detail and design and/or to implement, to those in the longer-term aligning with broader network planning and market reform. We recognise that many actions have short delivery timescales and that there will be a need for prioritisation and an assessment of how some actions interact with each other. The CDB will consider this and provide direction (see Chapter 5.3). We also recognise that many changes will likely require changes to industry codes which will, in turn,

require decisions by Ofgem. Where this is the case, government and Ofgem are committed to supporting timely and effective implementation, but without prejudicing any decisions Ofgem make on any code modifications brought to it for decision, which will be decided using the usual criteria and procedure.

Figure 5: Connections Action Plan and the high-level connection stages for all connection customers .



A summary of actions is presented in the following table, setting out each action, lead organisation(s) and the relevant timescales, with timescales defined as follows;

Date of Introduction: this is the date when the action described is complete

Impact Date: this is the earliest date when the action, or reform taken forward, is expected to deliver impacts for new and/or existing customers. Impact dates are typically not included where we have requested proposals/recommendations to be brought forward, as impact dates would depend on nature of proposals/recommendations and implementation. This will be determined by the CDB, however our expectation would be for impacts to be felt before Q1 2025.

Review Date: this is the point when the action is reviewed, particularly focused on impacts delivered. Review dates are typically not included where we have requested proposals/recommendations to be brought forward as such dates would depend on nature of proposals/recommendations and implementation. This will be determined by the CDB.

Action area	Action	Lead	Date of introduction	Progress indicator	Impact date / review date
ESO and network company led short-term initiatives	ESO's 5-point plan: Deliver existing measures Assess and recommend further measures	ESO	Ongoing with recommendations for further change by Q1 2024	Positive impacts from the ongoing short-term actions Recommendations of further measures	Immediate/ Monthly
	ENA's 3-Step Plan: Deliver existing measures Assess and recommend further measures	DNOs TOs ESO	Ongoing with recommendations for further change by Q1 2024	Positive impacts from the ongoing short-term actions Recommendations of further measures	Immediate/ Monthly
Raise entry requirements (Chapter 3.1)	Introduce letter of authority at transmission (LoA)	ESO	Q4 2023 (voluntary for new and existing applications) By Q1 2024 (code modification proposal) Q2 2024 (consider further LoA actions)	Increased applications being rejected due to not having LoA Connection applications accepted only from those who have LoA Reduced rate of connection applications being submitted	Immediate (voluntary LoA)/Monthly from Q2 2024 Q2 2024 (code mod)/Monthly Further LoA actions dependent on their nature
	Identify, assess and bring forward proposals to strengthen entry requirements	ESO DNOs TOs	Q1 2024 for recommendations to CDB	Reduction in uncertain / speculative projects applying to connect Reduction in number of projects being rejected at application and offer stage	Dependent on recommendations brought forward

Action area	Action	Lead	Date of introduction	Progress indicator	Impact date / review date
Remove stalled projects (Chapter 3.2)	CMP376 implementation	ESO	Q4 2023	Proportion of contracts with milestones Reduction in projects seeking to change connection date (after initial implementation) Projects terminated Capacity released	Q2 2024/ Monthly
	Monitor application of queue management at distribution	DNOs Ofgem	Q1 2024	Proportion of contracts with milestones Termination of contracts	Immediate impact/ Monthly
	Bring forward recommendations to improve certainty and progression of customers holding capacity	ESOs DNOs TOs	Bring forward recommendations to CDB Q1 2024	Removal of projects Reduction in projects seeking to change connection date Capacity released	Dependent on recommendations brought forward
Better utilise existing network (Chapter 3.3)	Bring forward recommendations to optimise existing network capacity	ESO TOs DNOs	Bring forward recommendations to CDB Q1 2024	Projects connecting sooner Capacity released	Dependent on recommendations brought forward
	Review scope for improvements in CPAs for optimised planning	ESO TOs with Ofgem input	Bring forward recommendations to CDB Q1 2024	Projects connecting sooner Reduction in works expected to be required	Dependent on recommendations brought forward
	Review the scope of enabling works	ESO TOs with Ofgem input	Bring forward recommendations to CDB Q1 2024	Reinforcement works removed from contracts Earlier connection dates	Dependent on recommendations brought forward
Better allocate available network	Effectively allocate network capacity	ESO DNOs	Q1 2024 to bring forward recommendations	Connection dates for projects advanced	Q2 2024 (allocating capacity)/ongoing

Action area	Action	Lead	Date of introduction	Progress indicator	Impact date / review date
capacity (Chapter 3.4)	released in short-term	TOs Ofgem		Percentage of contracted background reviewed Alignment of queue with net zero pathways	
	Decide longer-term approach to allocate capacity complementing strategic network planning	ESO DNOs TOs Ofgem	Recommendations by Q2 2024	Scope and delivery plan agreed. Ofgem open letter or consultation, if required, published.	By Q1 2025/ ongoing review
Improve data and processes and sharpen obligations and incentives (Chapter 3.5)	A single digital view of network data for connection customers	ESO TOs DNOs	Feb 2024 (implementation plan) and Q1 2024 signposting)	Improved quality of connection applications Fewer duplicate applications and connection offers more aligned with requested dates; leading to higher quality of projects entering the queue	Q1 2024/ monthly
	Develop a transparent/ faster process to assess and convey transmission impacts of distribution connections	ESO TOs DNOs	From Q4 2023 onwards	Improved communications and customer experience Transmission work impact for distribution is transparent	Q1 2024/ Q1 2024
	Flexible connections and management of distribution connections within agreed 'technical limits' across all GSPs	DNOs TOs ESO	From Q4 2023 onwards	Capacity accelerated as a result of flexible connections Number and capacity of distribution connections, dependent on transmission reinforcement, offered earlier connections	Q1 2024/ monthly

Action area	Action	Lead	Date of introduction	Progress indicator	Impact date / review date
	Identify and resolve inconsistencies	DNOs TOs ESO IDNOs Ofgem	Q4 2023	Improved customer satisfaction Reduction in connection delays	Q1 2024 / ongoing
	Undertake review of connection incentives, obligations and requirements	Ofgem	Q2 2024 (recommendations)	Improved quality of service and timely connection outcomes	Dependent on recommendations
Develop longer-term connection process models aligned with strategic planning and market reform (Chapter 3.6)	Ensure connection process is integrated with strategic planning	Ofgem DESNZ ESO	From Q4 2023	Effective engagement between connections reform and strategic planning to ensure policy coordination	N/A / Q2 2024 - as FSO develops CSNP methodology
	Ensure collaborative approach between the Transmission Acceleration and Connections Action Plans	DESNZ	Q4 2023	Effective engagement on and alignment of the Action Plans	N/A / Monthly
	Ensure coordination with future market reforms under REMA	DESNZ Ofgem	From Q4 2023	Effective engagement between connections reform and REMA to ensure policy coordination	N/A / ongoing as REMA develops
Delivering the benefits (Chapter 5)	Establish CDB to oversee implementation.	Ofgem DESNZ	Q4 2023	Changes required to implement reforms delivered faster than under standard processes.	from Q1 2024/ongoing review by CDB
	Formally require more detailed and frequent reporting of connections data.	Ofgem DNOs ESO	Q4 2023	Timely, detailed and high-quality connection data provided by network companies.	Q2 2024 / Monthly

Below is a timeline of each action, split by responsible owner, to be used as a guide for understanding when actions will be implemented and then when each action will begin to deliver impacts.

Figure 6: Timeline of actions within the action plan, when they begin and will be delivered by.

Q4 2023		Q1 2024		Q2 2024		Q3 2024	
Voluntary Letter of Authority at transmission for new connection applications and existing connection agreements, code modification, and consider further action							
Identify, assess and bring forward proposals to raise entry requirements							
CMP376 implementation, introduction of milestones in Transmission connection contracts (ongoing)							
Monitor application of queue management (ongoing)							
Bring forward proposals to improve certainty and progression of holding capacity							
Review and bring forward proposals to optimise utilisation of existing assets							
		Review scope for improvements in CPAs					
		Review scope of enabling works					
Effectively allocate network capacity released in short-term							
				Assess longer-term approach to allocate capacity			
Clear and transparent process to assess Transmission/Distribution impacts							
GSP Technical Limits (Phases 1 and 2)							
		Single digital view of network data for connections					
		End-to-end review of connection incentives, obligations and requirements on ESO and network companies					
		Identify and resolve inconsistencies between network companies					
Ensure Connection reform aligns with/supports wider network planning and energy market reforms (ongoing)							
Align Connection and Transmission Acceleration Action Plans (ongoing)							
Establish Connections Delivery Board							
Formalise more detailed and frequent reporting of connections data by ESO and network companies							
ESO and ENA to deliver existing measures and present further actions							
Key							
ESO							
ESO/TOs/DNOs							
Ofgem/ESO/DNOs							
DESNZ							
ESO/TOs							
Ofgem/DESNZ/ESO							
DESNZ/Ofgem							
Ofgem							

3.1 Raise entry requirements

Desired outcome: Reduction in speculative and duplicate connection contracts

Actions	<i>ESO to rapidly bring forward a Landowner Letter of Authority (LoA) requirement for transmission connection applications by:</i> <i>I) Requesting LoAs on a voluntary basis from new and existing applicants</i> <i>II) Rapidly bringing forward proposals to codify the requirement to submit and maintain an LoA for new and amended connection applications</i> <i>III) Keep under review and consider where proposals could be brought forward to CDB to strengthen LoA connection application requirements</i>
Action lead	ESO
Action introduction date / impact date	ESO: I) Q4 2023 / immediate impact (voluntary submission for new connection applications) II) Q1 2024 / Q2 2024 (code modification proposal) or sooner if applicable III) Q2 2024/dependent on any proposals
Progress indicator	Reduced number of applications rejected or withdrawn for not being able to provide an LoA / reduction in number of applications 'clock-started' No projects receiving a connection offer without the knowledge or consent of the landowner of the site Reduced rate of connection applications being submitted
Action review date	Impact reviewed monthly. Assess success of actions from Q2 2024

Currently, the criteria for a transmission connection application to be considered effective and accepted by the ESO comprises the accurate completion and submission of the following: (i) an application form, (ii) the Data Registration Code template and (iii) payment of an application fee. This relatively low bar, compared to distribution connection applications (which already have LoA requirements) has contributed to the volume of speculative and duplicate projects holding transmission connection agreements. We are aware of cases where landowners are unaware that connection offers have been accepted for projects that would have to be located on their land. Projects retain their connection agreement even where they have subsequently not been able to secure such land rights, preventing other projects from accessing that capacity under the FCFS approach and lack of progression milestones in connection contracts.

From the ESO's engagement with stakeholders in pre-consultation workshops and responses received to the ESO's connection reform consultation, there was strong support for the introduction of a requirement for a landowner LoA. The ESO has proposed that transmission

network connection applicants should be required to provide an LoA alongside their transmission network connection application.⁴³

The LoA would provide confirmation that the project developer has formally engaged in discussions with the landowner(s) in respect of the rights needed to enable the construction of the project on their land, although it would not require evidence that the rights have been granted. This should not only prevent speculative applications without landowner authority from entering the queue, but also improve the credentials of an application and the likelihood of the project progressing. It could also identify, or prevent, duplicate projects in the queue, depending on the design. These are aims which Ofgem and government support.

We therefore encourage the ESO to immediately begin requesting LoAs on a voluntary basis from new applicants and those already holding connection contracts, as well as those who submit modification applications, which will help to identify duplicate projects in the queue and better inform network planning and assessment of the impact of connections.

As the current transmission connection application requirements are set out in the Connection and Use of System Code (CUSC), CUSC amendments would be required to introduce binding LoA requirements for applicants. We therefore encourage the ESO to rapidly bring forward proposals, in Q1 2024 or sooner, through the CUSC process which would establish a robust and effective LoA requirement. We encourage the ESO to consider and bring forward proposals for those LoA elements that will be most effective, and deliver the most benefit, but that can still be brought forward in a timely manner, for submission of a Final Modification Report (FMR) by March 2024. This should draw on experience from similar provisions at distribution. If approved, this would introduce appropriate entry criteria to reduce speculative applications as soon as possible.

Ofgem would assess all modification proposals brought forward on their merits and against the applicable code objectives, but we consider a solution of this nature could help to make the improvements we think are necessary to prevent speculative applications. We expect the ESO to engage with the connections governance structures, outlined in Chapter 5.3, as it develops its proposals.

The ESO should closely monitor the impact of LoA measures and any code modification made, reviewing its effectiveness regularly, and considering where further measures, including a follow-up code modification, if appropriate, would strengthen the LoA requirement. This should include considering the feasibility and suitability of applying the LoA to modification applications and a process for duplication checks based on red line boundaries⁴⁴, with any associated flexibility needed.

Progress would be identified and measured through: i) the numbers of applications rejected or withdrawn as a result of being unable to provide an LoA, and so fewer applications being 'clock-started'; and ii) projects not receiving connection offers without the consent of the landowner, and iii) the reduced rate of connection applications being submitted. We recognise that these metrics will not capture the full impact of the introduction of an LoA requirement, for example developers who do not submit an application as they are unable to obtain an LoA.

⁴³ If a developer owns the land then they would be expected to submit a copy of evidence such as title deeds or a letter from a solicitor.

⁴⁴ Information presenting the location of the proposed project.

The requirement for an LoA for new transmission connection applications should have an immediate impact on the number of speculative projects submitted, which should be reflected in the numbers of applications joining the queue each month.

Desired outcome: To reduce the number of unviable projects entering the connection queue

Action	Identify, assess and bring forward recommendations to strengthen entry requirements further
Action lead	ESO / TOs / DNOs with input from Ofgem and DESNZ
Action introduction date / impact date	Q1 2024 to bring forward recommendations to CDB for implementation / impact date dependent on recommendations
Progress indicator	Reduction in uncertain / speculative projects applying to connect Reduction in number of projects being rejected at application and offer stage
Action review date	Dependent on recommendations

Whilst it is expected that an LoA requirement will help reduce speculative and duplicate projects entering the connection queue, more restrictive measures may need to be taken if the queue continues to grow considerably with unviable projects. We expect the ESO and network companies to develop and assess the potential impact of further measures to prevent speculative and/or duplicate projects entering the queue. They should bring forward these recommendations / proposals to the CDB.

In considering these they should adopt learnings from other similar or alternative measures applied across the system, for example at distribution level, or in other contexts and consider how they would work and the impacts.

Any proposed changes that required a code modification would be assessed by Ofgem on their merits and in compliance with code objectives, considering urgency criteria where applicable.

Such potential actions could include:

- 1) Increasing financial requirements for attaining a connection or holding connection capacity.
- 2) Placing restrictions on the buying or selling of TEC.
- 3) Introducing a temporary moratorium on connection applications.

More detail on potential solutions is at Annex A.

Our initial view is that increasing financial requirements, particularly, merits strong and rapid consideration to ensure financial incentives to secure and hold capacity are appropriately set. We are not clear at this time that a simple moratorium on connection applications would have sufficient benefits, particularly given the potential uncertainty for customers and the investment environment in GB this could bring. However, we recognise that a clearly targeted pause could have a role in the run up to introduction of longer-term ESO connections reform. Ofgem's queue management decision (CMP376) should reduce the scope and incentives for

speculative trading of capacity, but it will be important to monitor the impacts to assess if they are going far enough and consider whether further measures are appropriate. TEC trading limits should be considered further to potentially reduce the incentive to apply with the intention of selling on the position, which may take the place of a more developed project.

3.2 Remove stalled projects

Desired outcome: Projects that are unable to progress do not unduly delay viable projects

Action	<i>Introduction of queue management milestones into transmission connection contracts (CMP376)</i>
Action lead	ESO
Action introduction date / impact date	Q4 2023 / immediate impact (for placing milestones into contracts) Q2 2024 for removal of projects
Progress indicator	Introduction of milestones Reduction in projects seeking to change connection date (after initial implementation) Projects terminated Capacity released to allow other customers to advance
Action review date	Impact reviewed monthly. Assess success of the action from Q2 2024

Previously, the process for connecting to the transmission network placed limited obligations on connection customers to progress in a timely manner and granted the ESO limited contractual rights to terminate contracts where projects were not progressing. In addition, customers could delay their completion date, and related termination provisions, from taking effect through agreeing to a contract variation with the ESO (known as a 'modification application' or 'mod app').

Together, this enabled non-viable, stalled and slow to progress projects to retain capacity which could have been more efficiently allocated elsewhere, and hindered the faster progression of viable projects. This also complicated decisions on capacity allocation and network build, resulting in lengthy connection offer dates.

Ofgem's recent approval of code modification CMP376⁴⁵ amends the terms on which connection customers can connect to the transmission system through the introduction of a Queue Management Process for all new and some existing connection customers. Specifically, it inserts Milestones into connection contracts. Milestones are dates by which connection customers are required to evidence certain indicators of progress towards completion. If a customer fails to demonstrate that a Milestone has been met by the specified date, the ESO has a contractual right to terminate the connection contract. Once introduced into connection contracts, Milestone dates will be fixed in respect of each connection and the ESO does not

⁴⁵ [CMP376: Inclusion of Queue Management process within the CUSC | Ofgem](#)

intend to agree contract variations to change those dates, save in certain exceptional circumstances (even where a delay to the connection date is agreed).

The timelines for reaching each Milestone are calculated backwards from the customer's connection date and are designed to be achievable, while ensuring progression in a timely way. As a result, projects with long lead times, such as offshore wind projects, will be afforded more time proportionately according to how far away their contracted connection date is. Crucially, however, there are additional measures in place to ensure that connection customers with viable and on track projects are not unduly adversely affected by Queue Management. This includes a defined Exceptions process, which allows customers more time to meet Milestones in prescribed exceptional circumstances, and the ESO's commitment to engage with projects before exercising its right to terminate where certain Milestones are not met, in order to establish the likelihood that the project will be able to progress to completion.

The Queue Management process will allow for the removal of slow, stalled and non-viable projects from the connections queue and go towards facilitating the reallocation of capacity to projects able to progress faster. It will also provide more certainty for the ESO and TOs when planning what capacity will be required to accommodate connections. We expect the introduction of the Queue Management process to also reduce speculative connection applications.

This process should also lead to improvements at distribution level where distribution customers are delayed by transmission elements of their connection agreements, and by improving alignment across the transmission-distribution boundary.

The ESO projects that the approval of CMP376 could release around 80 GW of transmission capacity, based on projects currently not expected by the ESO to meet their contracted completion date, over a number of years.⁴⁶

This measure will come into effect from 27 November 2023.

Desired outcome: Effective application of queue management systems in terminating connection contracts for slow-moving and stalled projects

Action	Monitor application of queue management via progression milestones across the system
Action lead	ESO / DNOs with reporting to Ofgem
Action introduction date / impact date	Q1 2024/immediate impact
Progress indicator	Proportion of projects that have milestones in their connection contracts Increased termination of connection contracts. Capacity released to allow other customers to advance

⁴⁶ Ofgem considered that the realisation of the benefits of CMP376 would be secured most efficiently by applying the Queue Management Process to existing customers as well as new ones. This is supported by ESO estimates that the approved solution could release between 8.5% and 18% more capacity by 2030, than a version which applied to new customers only.

Action review date	Monthly
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Milestones have been inserted into new distribution generation connection contracts since 2017 under an agreed ENA approach. Under the ENA's 3-Step Plan, milestones are being inserted into pre-2017 generation connection contracts, which is expected to release 6GW of capacity. There are also plans to insert milestones into demand connection contracts at distribution level.

DNOs are already providing data on connection contract terminations, and we will work with the ENA to review consistent and effective enforcement of milestones in contracts. Further actions could involve changes to milestones themselves, or incentives and obligations on DNOs to properly enforce them.

We recognise it will take time for milestones to be inserted into transmission connection contracts and then to be enforced. We will initially require data on how many (and what proportion) of transmission connection contracts have milestones inserted and then establish similar data requirements from the ESO as are applied to DNOs on the termination of connection contracts, and consider whether any further action is required.

Desired outcome: Release unutilised network capacity

Action	<i>Rapidly explore more stringent measures to improve the certainty and progression of customers holding capacity, bringing forward recommendations to CDB.</i>
Action lead	ESO, TOs, DNOs
Action introduction date / impact date	Q1 2024 to bring forward recommendations to CDB for implementation / Impact dependent on recommendations
Progress indicator	Removal of projects Reduction in projects seeking to change connection date Capacity released to allow other customers to advance
Action review date	Review dependent on recommendations

Whilst we expect queue management measures to play a significant role in reducing connection timescales for viable projects, further steps may need to be taken if the ESO and network companies have insufficient certainty about customers' status to enable them to accommodate other customers onto the network in an efficient way. We expect the ESO and network companies to closely monitor the impacts of queue management changes and develop and assess further actions which might be taken to optimise the benefits for customers, to ensure they are ready to implement if required. In doing so these they should learn from similar, or alternative, measures applied across transmission and distribution. Such actions could include:

- 1) ***Disincentivising, or more explicitly limiting the scope, of modification applications***
- 2) ***Strengthening opportunities or requirements to return unused capacity***
- 3) ***Strengthening financial disincentives for holding capacity – pre- and post-connection***
- 4) ***Establishing a one-off, facilitated trading window***

It should also be noted that any of these options could be applied at distribution, if required.

More detail on potential solutions is at Annex B.

Our initial view is that queue management proposals should significantly reduce requests from customers to move back their connection dates, but further steps may be needed if sufficient impacts are not realised. We expect the ESO and network companies to thoroughly assess all options, including those in Annex B, and in doing so, take into account learnings from similar or alternative measures across the electricity system. They should consider how they would work for all customers, including both distribution and transmission. We would expect the ESO and network companies to begin assessment as soon as possible, bringing forward recommendations and evidenced proposals to the CDB to reach agreement on a way forward.

We also expect the ESO and network companies to develop and assess the potential impact of further measures to improve the certainty of progress of customers holding capacity. They should bring forward these recommendations and proposals to the CDB to reach agreement on a way forward.

Any proposed changes that required code modification(s) would be assessed by Ofgem on their merits and compliance with code objectives, considering urgency criteria where applicable.

3.3 Better utilise existing network capacity

Desired outcome: available network assets are utilised in the most efficient manner, accelerating connections

Action	ESO and network companies to review and assess approaches to optimise use of the existing network and bring forward recommendations, including exploring more technically innovative designs and approaches
Action lead	ESO / TOs / DNOs with Ofgem and government input
Action introduction date / impact date	Q1 2024 to bring forward recommendations to CDB for implementation / impact dependent on recommendations
Progress indicator	Projects progressing through the queue, and connecting, sooner Capacity released to allow other customers to advance
Action review date	Review dependent on recommendations

There are two further ways to increase network capacity. First, increasing network build, which is not the focus of this action plan, but is an absolute priority for government and Ofgem - as described in the Transmission Acceleration Action Plan and in regulatory reforms by Ofgem, such as ASTI. The second, more immediate and typically lower cost method, is to maximise the use of the currently available and planned network capacity. This could include changes to the standards, processes, and assumptions that the ESO and network companies use in determining how much capacity is available. We support the existing work in this area, such as CPA reviews and the associated transmission reinforcement works (TRW) review.

We expect the ESO, jointly with network companies, to undertake a further review of standards and processes to identify and assess additional solutions which could help maximise capacity as soon as possible. Any proposed changes that required code modification(s) would be assessed by Ofgem on their merits and compliance with code objectives, considering urgency criteria where applicable.

The ESO and network companies should also review technical standards for connection assets and design, and approaches to connections planning. This will ensure that they are future-proof, enabling faster and more efficient connection of greater volumes, and accommodating a more flexible approach to capacity allocation, as we move to an approach more based on projects' readiness. We consider there could be benefit in reviewing a range of areas, bringing forward proposals for further review to the CDB by Q1 2024, including:

Enhance standardisation and substitutability of connection design:

- Enhance standardisation of connection design where appropriate to better facilitate flexibility and contestability in optimising use of capacity. This may include providing less specificity to customers about particular works at an early stage.

Ensure connections approaches align with strategic and whole system planning approaches, including:

- Ensure connections approaches support a future-proofed, strategic approach to network planning for connections and connection design, which appropriately considers and prepares for the potential need for future expansion, considering roles and responsibilities in undertaking these assessments and interactions with ESO assessments, such as Network Options Assessment.
- Enhance assessment of solution optionality across system boundaries, including transmission-distribution, to identify the optimal design to meet customers' needs quickly and efficiently, supporting improvements in capacity allocation.
- Consider issuing guidance or standards for suitability of customer sizes / requirements to connect at either transmission or distribution, assessing the need for such an approach in the context of the review of incentives at the transmission/distribution (see Chapter 3.5).

Flexibility and innovation:

Explore use of other more innovative solutions to maximising capacity including:

- Enhanced use of flexibility for example through innovative engineering solutions to avoid network reinforcement dependencies and provide faster and cheaper connections.

- Alternative commercial requirements for customers, such as agreeing capacity phasing profiles, as foreseen under DCP407⁴⁷, and exploring the potential for commercial agreements to facilitate sharing of grid capacity - where this could avoid the need for new infrastructure.
- Better support alternative non-firm, phased or other forms of connection options by providing appropriate levels of information, for example likely curtailment.

Contestability:

Ofgem and the ESO will also consider the scope and role of contestable works, and the extent to which competition, or developer-led build of local assets, can bring forward connections more quickly and efficiently, seeking inputs from network companies as needed. This may include:

- The ESO considering changes to the boundaries between connections vs shared asset and the point at which developers can take forward works. The ESO should assess if this can support faster connection of projects ready to progress, by better enabling ‘plug and play’.
- Ofgem will consider the role of Independent Network Operators, as well as the customer, and wider developments on the scope of contestability, as considered under code modification proposal CMP374⁴⁸.

Desired outcome: CPAs fully optimised, to allow networks to be modelled more accurately and projects to potentially connect sooner.

Action	ESO and network companies to further review the scope for beneficial revisions to CPAs, to support more optimised planning
Action lead	ESO and TOs with Ofgem input
Action introduction date / impact date	Q1 2024 to bring forward recommendations to CDB for implementation / Impact dependent on recommendations
Progress indicator	Projects connecting sooner Reduction in works expected to be required
Action review date	Review dependent on recommendations

Building on the benefits to be delivered by the work undertaken in the ESO’s 5-Point Plan, the ESO and TOs should review and assess whether further revisions to CPAs should be made to release further capacity and allow projects to potentially connect sooner, eg if assumptions were revised to include a higher or more granular attrition rate. Any such revision may imply changes in risk or uncertainty and may be linked to different operational approaches or increased cost risk for consumers or connecting parties, which would need to be carefully

⁴⁷ <https://www.ofgem.gov.uk/publications/decision-dcp-407-access-scr-speculative-developments>

⁴⁸ <https://www.nationalgrideso.com/industry-information/codes/cusc/modifications/cmp330cmp374-allowing-new-transmission-connected>

considered. A review of further revisions to CPAs should not impair the current work on revising CPAs.

There may also be benefit in reviewing other aspects of approaches and assumptions around diversity in network planning, including ensuring the most up to date information on customers status and capacity utilisation can be applied in network planning decisions.

Desired outcome: To allow projects to connect earlier by removing certain reinforcement works from the scope of enabling works.

Action	ESO and Network companies to review the scope of enabling works, with a view to assessing the costs and benefits of removing aspects of reinforcement works as a dependency from connection offers
Action lead	ESO and TOs with Ofgem input
Action introduction date / impact date	Q1 2024 to bring forward recommendations to CDB for implementation/Impact date dependent on recommendations
Progress indicator	Reinforcement works removed from contracts Earlier connection dates
Action review date	Review dependent on recommendations

Enabling works are the minimum transmission reinforcement works which need to be completed before a connection customer can be connected to, and be given firm access to, the transmission network (ie between the customer and the nearest suitable point on the network). ‘Wider works’ are the other transmission reinforcement works associated with reinforcing the network to accommodate the new connection and ensure compliance with the NETS SQSS.⁴⁹

We are increasingly seeing enabling works with greater levels of complexity impacting on connection dates, as they typically dictate the timescale of connection. Wider works, in contrast, are managed operationally through the balancing mechanism, so do not delay connections.

The ESO, jointly with TOs, should review the scope of enabling works, and undertake an assessment of the drivers, costs, risks and benefits of a potential change to enabling works, to improve connections dates. This analysis should consider what capacity can be allocated and bring forward cost-effective options for connections design and operational approaches that do not impact negatively on future planning or system operability. In doing so, they should consider alignment with CSNP and SSEP.

The review of these technical standards would aim to remove the dependency of connections on some significant reinforcement works, therefore enabling earlier connections. However,

⁴⁹ The Security and Quality of Supply Standard (SQSS) sets out the criteria and methodology for planning and operating the National Electricity Transmission System (NETS). See: [Security and Quality of Supply Standard \(SQSS\) | ESO \(nationalgrideso.com\)](https://www.nationalgrideso.com/sqss/)

there are risks associated with this option, notably in regard to constraint costs, which would need to be considered, including in the context of REMA.

3.4 Better allocate available network capacity

Desired outcome: Capacity allocation approaches maximise the benefits of available capacity such that projects that are more ready and able to connect can do so ahead of those which are stalled, while maintaining appropriate opportunities for technologies with varying lead times, in line with net zero pathways.

Action	Confirm the approach to allocating capacity released through near term actions (5-Point Plan and 3-Step Plan and any additional short-term actions) and explore further measures to maximise the benefits for producing timely connection dates within offers, aligned with net zero pathways
Action lead	ESO, TOs, DNOs and Ofgem
Action introduction date / impact date	Q1 2024 network companies to bring forward recommendations / Q2 2024 (for allocating capacity)
Progress indicator	Connection dates for projects advanced Percentage of contracted background reviewed Alignment of queue with net zero pathways (FES for example)
Action review date	Ongoing (for allocating capacity)

The range of ESO and network company initiatives underway, and further measures being considered, are expected to release substantial amounts of capacity on the system to the benefit of connection customers. We must ensure the benefits of this capacity released can be maximised, to accelerate connections.

Characteristics of capacity

Capacity can be allocated at different stages throughout the connections process – most commonly on initial application, where the current FCFS approach is typically applied. Customers also frequently seek to change their transmission connection date through modification applications. Currently, when additional capacity becomes available, it has been relatively rare that the ESO has offered accelerated dates (or reduced reinforcement works) to customers, but should become more prevalent as the 5-Point Plan and other near-term actions are implemented.

Available capacity is a function of the existing physical network or works planned, the capacity allocated to parties in contracts and any capacity released. Capacity allocation approaches may touch on each aspect.

Network capacity has some particular features which inform how it can be allocated:

- Locational and technological specificity- capacity is not interchangeable across locations and availability may be impacted by technological characteristics
- Continuity through time of network capacity - projects will need continuous access to capacity, otherwise they would be subject to periods of non-firm access, interrupting access for businesses or increasing costs for consumers
- Network level – where it may be easier to reallocate capacity associated with reinforcement works which serve multiple customers than works specific to an individual connection.

Action overview - accelerating connections under near term initiatives:

The approach to allocating capacity released in the near term-needs to be determined. A connection agreement with a confirmed connection date would not typically be reviewed unless a specific reason or request arose. There is currently no clear established process to determine how additional capacity released may be made available.

With actions to release network capacity underway, opportunities will now arise to allocate capacity and advance customers' connection dates. We encourage the ESO and TOs to bring forward proposals by Q1 2024, to improve allocation of capacity as it is freed up. We stand ready to work with the ESO and network companies to consider any regulatory clarification or changes which may be needed to support this. We expect the ESO to also consider how it can best provide clarity for customers around the approach it intends to take. It will be important that any approach adopted is transparent and, as far as possible, based on clear processes and criteria.

As a starting point, we expect consistency across system and organisational boundaries (ESO, TOs and DNOs), except where differences can be justified. It will also be important to be aligned with the longer-term direction to the extent possible, without delaying the need for immediate progress.

Desired outcome: Move towards an approach to capacity allocation where parties that are readier to progress are not unduly delayed by those which are stalled

Action	Develop clear recommendations and definitions for an improved approach to allocating capacity, both initially and upon reallocation, to allow projects to connect faster, considering longer-term alignment with strategic and spatial planning approaches, alongside wider reforms to markets and signals
Action lead	ESO, TOs, DNOs and Ofgem
Action introduction date / impact date	Recommendations on approach by Q2 2024; implementation of new model from Q1 2025, with some aspects introduced ahead where possible
Progress indicator	Scope and delivery plan agreed. Open letter or consultation, if required, published.
Action review date	Q1 2025

More broadly, we are concerned that the FCFS approach is not fit-for-purpose as we transition to a net zero energy system. Moving towards an approach where those who are in a position to progress can connect more readily is an important step to accelerate connections and maximise benefits for consumers, in line with strategic outcomes.

Improving allocation of capacity - First-come, first-served (FCFS)

The concept where a 'queue position' is determined based on the party who has an application accepted first, was developed by the ESO and network companies at a time when fewer, larger connections needed to be accommodated, with more available capacity – and where the 'Connect and Manage' approach at transmission removed the dependency on wider network reinforcement.

However, neither FCFS nor the 'connections queue' were ever explicitly defined and documented. Licences place an obligation on the ESO and network companies (TOs, DNOs, IDNOs) not to unduly discriminate throughout the connections process. To support this, standard processes and contract terms have been developed and codified for those seeking a connection to (or use of) the network. However, these do not explicitly dictate how capacity should be distributed between parties using and applying to use the network, as long as this is carried out in a non-discriminatory manner.

Despite its simplicity and certainty for the order in which projects' requirements will be addressed, the current FCFS approach enables stalled projects to cause delays for others. We are clear that non-discrimination requirements are not synonymous with FCFS, and that FCFS is not the only viable way to allocate capacity – there are models which take more account of projects' readiness which would be compatible with the current regulatory framework. CMP376 is a step forward in considering readiness under the current queue system, but there is a need for further improvement, moving to an approach which better allows well-developed projects to progress, in line with their need and those of a net zero electricity system.

Enhanced entry conditions and queue management approaches will help improve the degree of certainty of project development and, hence, network planning. However, they will take time to take full effect, and it is imperative that available capacity is best allocated in the meantime.

Alternative approaches to allocating capacity:

Many approaches are possible to determine who receives the capacity created or released.

First Ready First Connected (FRFC): Options should be explored that better account for project 'readiness'. This option is based on prioritising connections that meet specified criteria, if compatible with their required timeframes. This could be designed in different ways, depending on the conditions required to advance, and the extent to which changes may impact other customers.

Different options exist for the degree of 'readiness' that projects may be required to demonstrate.⁵⁰ Selection criteria would likely need to balance a project's ability to demonstrate viability and to advance faster. Using planning consent may have advantages, at least in the near term. However, there are also risks with a 'readiness-based' approach. Just as FCFS entails risks of delaying projects that are more ready to connect, it may be necessary to

⁵⁰For example, these could include milestones such as submitting or achieving planning consent, or potentially reaching final investment decision (FID) or beginning construction, or a combination of milestones.

consider how to facilitate projects with longer lead times through the design of FRFC approaches. Hybrid approaches, such as involving primary and secondary criteria are also possible where the capacity available is insufficient to meet all requested dates for advancement.

In the longer-term, a more fundamentally different approach to allocating capacity may be needed, to support strategic network and spatial energy planning, and market reforms.

Wider approaches: More complex approaches, such as those reliant on strategic network / spatial energy plans or involving price-based mechanisms, may merit consideration, particularly in the longer-term. Such approaches may more closely reflect strategic outcomes of reducing average connection wait times and enabling a connections pipeline in line with net zero pathways, while taking account of applicable non-discrimination requirements.

But change is needed in the short-term, as outlined above, where simpler, rules-based approaches are likely to be more feasible. It will be important for the ESO and network companies to consider how to optimise the sequencing and allocation of reinforcement works, to maximise the benefits of available capacity in specific locations. This could potentially change the way risks and costs are shared amongst network companies and connection customers, which would need to be reviewed and carefully considered.

Such approaches may also be relevant to consider under the 'stacking' concept the ESO is considering, aiming to manage oversubscription of capacity, notably in congested areas, by providing projects with different degrees of offer specificity, based on how congested or 'oversubscribed' an area is, compared to Future Energy Scenarios. Those applying to connect in such areas could be 'stacked'. The practicalities for the stacked projects would need to be determined for the option to be fully assessed, such as how projects are assigned to and leave the 'stack', and how detailed connection agreements would be for 'stacked' projects and for those progressing from the 'stack'.

We have considered more radical options to address the current queue, such as more fundamental reallocation of queue positions. We do not propose to pursue them at this time, but, as we have indicated, we stand ready to take bold action if the improvement we need to see is not forthcoming.

Allocating capacity in the longer-term

Network capacity will continue to be freed up, for example through connection queue management. Therefore, building on the capacity allocation approach for the near-term actions, further work on assessing longer-term capacity allocation approaches for existing connection agreements is required by the ESO, network companies, Ofgem and government, to develop and implement suitable proposals for longer term arrangements.

ESO's connection reform for new connections

For new connections, the ESO and network companies should bring forward proposals to support projects that are readier to connect before the ESO's longer-term connections reform is implemented, ideally by Q2 2024, but ready to be implemented alongside it. Areas to consider include:

- The ESO's consultation on connections reform proposed a move to a model of gates and windows by Q1 2025. Allocating capacity at this point, would need to consider

several key factors that could have value in a future process for allocating capacity where it is insufficient to meet all requested connection dates.

- A built-in process to reflect projects' readiness to connect, with the potential to allow projects to have their connections progressed efficiently and quickly based on different criteria. This could be based on level of progress, alignment with system needs (in the context of a net zero system), or other projects of strategic value.
- Greater coordination between the ESO and network companies and connection customers with the integration of strategic network and/or spatial energy plan(s).

Alignment with strategic planning

Further consideration is needed on the roles and interactions between the connections process and strategic network and spatial energy plans. As we move to longer term strategic planning infrastructure, any future policy and regulatory instruments for capacity allocation should be aligned with the delivery of the spatial energy plan, ensuring compatibility with applicable non-discrimination requirements. There could also be scope for broader approaches to capacity allocation in the longer-term, such as price-based mechanisms, if found to be beneficial. This will need clarity on the extent to which the connections process facilitates strategic plans and strikes a balance with market-led demand for capacity, which comes forward through the connections process, acknowledging that strategic network planning will have longer-term drivers than the connections process. Any decision on approach will need to clearly show the risks and benefits to ensure proportionality, and compliance with applicable non-discrimination requirements in the solution.

3.5 Improve data and processes and sharpen obligations and incentives

The changing characteristics and increased volume of connection applications, and the reduced availability of network capacity, in recent years has increased the complexity and interactivity of connections. Work is needed to improve and standardise processes and solutions provided to customers, as well as to clarify, update and strengthen responsibilities and expectations on the ESO and network companies. The latter will ensure that they allocate resources and engage and communicate with each other, and customers, more effectively. These challenges can broadly be characterised as:

- Providing more transparent and accessible pre-application data;
- Reducing friction at the interface across system boundaries (including between the transmission and distribution networks);
- Ensuring consistency including the allocation of costs; and
- Improving quality of customer service and timely connections

Where solutions are identified in these and other areas, new or modified regulatory levers may be required, to ensure that outcomes are clear, measurable, and enforceable. Ofgem will review these in parallel with the wider actions described in the Action Plan and make any necessary amendments, working with government if legislative change is required, to obligations, standards and incentives that support improved connection outcomes.

3.5a Providing more transparent and accessible pre-application data

Desired outcome: Transparent, accessible and standardised data across transmission and distribution supports improved quality and targeting of connection applications.

Action	The ESO and network companies to work together to create a single digital view of connections, the associated enabling and reinforcement works and available capacity across transmission and distribution.
Action lead	ESO /TOs/ DNOs
Action introduction date / impact date	Implementation Plan Feb 2024; Signposting end of Q1 2024
Progress indicator	Improved quality of connection applications Fewer duplicate applications and connection offers more aligned with requested dates; leading to higher quality of projects entering the queue.
Action review date	Effectiveness reviewed monthly

Transparent and detailed data on the status of connections to different parts of the network, the scope and timescales of associated enabling works and network reinforcements, and the capacity that these create, are vital for connection customers to make informed decisions.

Data on current and planned network capacity, reinforcement works, and contracted connections is currently published by the ESO and network companies on their websites, including through the TEC Register, the Transmission Works Register, the DNOs' Network Capacity Heat Maps, Long Term Development Statements (LTDS), and Embedded Capacity Registers (ECRs). However, it is not currently possible to see the interactivity or dependencies between projects, the specific locational impacts that these might have, and the relationship between these projects and the associated enabling and wider reinforcement works and the capacity that these works create, where and by when.

The ESO and network companies are all working to embed the values of 'presumed open', as required under Data Best Practice⁵¹ principle 11, that is, making data publicly shareable as much as possible, while protecting commercially or personally sensitive data. The ESO considered ways to improve the transparency of transmission connections data as part of its Connections Reform consultation, however, we believe a more complete picture is required, for connection customers across the system. The ESO and network companies should go further; a more holistic solution is required particularly given the increasing interactivity between distribution and transmission.

The ESO, TOs and DNOs should work together, to develop a whole electricity system view of connections and associated works, across GB, providing, as a minimum, a geographic/ locational visualisation, underpinned by the following data.

- Current and future import and export capacity at GSPs, Bulk Supply Points and primary sub-stations, considering applied for, offered and contracted demand and generation capacity. As strategic planning requirements become clearer in the future, such outputs

⁵¹ <https://www.ofgem.gov.uk/sites/default/files/2023-08/Track%20Changes%20Data%20Best%20Practice%20Guidance%20v2.0.pdf>

would need to evolve to ensure connections data best supports an integrated view of system requirements and whole system solutions.

- Details of enabling works (meaning those works required to enable a compliant connection) and wider reinforcement works, clearly showing the dependencies between these works and specific connections, including where such works are interactive with other projects (at both transmission and distribution), the ordering of these works and the completion dates when additional capacity will be available.
- All details relating to individual connections, contained in the publicly available TEC Register and ECRs should be accessible via this new visualisation, alongside an equivalent level of detail for demand connections >50kW.
- GSP data should clearly show the interactivity between distribution and transmission connections and the associated enabling works, and should provide full transparency of Bilateral Connection Agreement (BCA) Appendix G information and Technical Limits (see Chapter 3.5b) once agreed between the DNOs and ESO. The earliest possible connection date for new demand and generation connection applications should be provided at each GSP.

Any such whole system view of connections and associated works will require collaboration and the sharing of data between the ESO, distribution and transmission network companies. The ESO should therefore work with the TOs and DNOs, to bring forward an implementation plan, by the end of February 2024, setting out how it will increase the transparency and usefulness of network and connections data for customers and the costs and benefits of different approaches to doing so.

A staged implementation approach may be appropriate, ensuring early benefits for customers; prioritising the coordination, signposting, and access to, the existing data by the end of Q1 2024 at the latest, followed by a fully functioning whole electricity system connections visualisation tool, using the Common Information Model (CIM), in line with an agreed implementation plan. We would expect the tool to evolve in the future to incorporate new data sources that may become available, and which may be of value to connection customers.

In summary, we believe the ESO should go further, faster; to develop and enhance its Connections Portal⁵², working in close collaboration with the DNOs and TOs, to enable a seamless and consistent view of connections for the market, including connections queue data, associated enabling and reinforcement works, and available capacity, across transmission and distribution networks, to better inform customers of where and when they can connect.

Separately, at distribution, Ofgem is currently considering changes to the form of LTDS⁵³ and Capacity Heatmaps for DNOs, with new requirements proposed including the publication of full grid model data in CIM format, enabling more detailed pre-application analysis to be undertaken by potential applicants. Similar efforts are required at transmission level. Ofgem has confirmed that CIM will become a requirement for all relevant licensed network data exchanges in the future, driving commonality, standardisation and interoperability across network planning data and setting the course for wider adoption across the energy system.

⁵² <https://www.nationalgrideso.com/industry-information/connections/connections-portal>

⁵³ <https://www.ofgem.gov.uk/publications/long-term-development-statement-ltlds-guidance-update-informal-consultation>

Grid Code Modification GC0139⁵⁴ further supports this approach, with a proposal to use CIM for the sharing of data at the interface between the transmission and distribution networks. The TOs should engage with transmission connection customers to determine whether connection data requirements are being met and take immediate steps to improve transparency and access where necessary, whilst at the same time accelerating the provision of network data in CIM format for the benefit of connection customers.

These initiatives will improve access to relevant data for connection customers and result in fewer speculative or duplicate applications, helping to ensure that connection applications are of higher quality, potentially made in areas where there is more capacity and where enabling works have shorter timescales.

3.5b Reducing friction at the Transmission/Distribution Interface

Distribution network connections can have an impact on the transmission system. This interactivity is increasing, with over 80% of GSPs across GB, now being subject to transmission constraints. This results in increasing numbers of distribution connections triggering the Project Progression process, adding time and cost to their connections.

Conversely, transmission connections sometimes have an impact on distribution networks, particularly where transmission connections are made close to distribution. In these cases, the 'Third Party Works' (TPW) process is triggered. This similarly increases the interactions between different network companies, which can lead to unforeseen costs and delays. Code modifications (CMP328 and DCP392)⁵⁵ have been raised relating to the TPW process and cost apportionment of works arising. DCP392 is with Ofgem for decision, while Ofgem has issued a send-back for CMP328.⁵⁶

Where a connection impacts on both the distribution and transmission network the need for efficient and accurate information flows between the parties is critical. Furthermore, the ESO and network companies are required to proactively consider optionality of solutions across the boundary of their respective networks, in line with their Whole System licence obligations.

The process of interaction between DNOs and the ESO/TOs, in situations where there is, or could be, impacts on the other party's network is defined in the CUSC for transmission impacts and Distribution Connection and Use of System Agreement (DCUSA) for distribution impacts.

The DNOs and ESO have made some progress in terms of information sharing, through the introduction of a new Transmission Impact Assessment (TIA) process, and inclusion of Appendix G to the DNO/ESO BCAs at GSPs in England and Wales. Whilst the principles of Appendix G have been widely adopted, there is no common approach. Further work is needed to ensure greater alignment and standardisation and to ensure the complete roll out of the Appendix G process to all areas. Irrespective of the outcome of CMP298 (which intends to fully implement Appendix G), we want the ESO and network companies to go further by sharing all connection data at each GSP, with interested parties, as Open Data.

⁵⁴ <https://www.nationalgrideso.com/industry-information/codes/gc/modifications/gc0139-enhanced-planning-data-exchange-facilitate-whole>

⁵⁵ <https://www.nationalgrideso.com/industry-information/codes/cusc/modifications/cmp328-connections-triggering-distribution-impact-assessment> and <https://www.dcusa.co.uk/group/dcp-392-working-group/>

⁵⁶ <https://www.ofgem.gov.uk/publications/authority-decision-send-back-cusc-modification-proposal-cmp328>

Even with these improvements, the current arrangements are not adequate. Many customers are experiencing unacceptably long delays (up to two years in some cases) between receiving a DNO connection offer (where this is conditional on a TIA) and receiving a final connection offer including the transmission aspects, including any cost and timing impacts. Distribution connections are increasingly dependent on transmission reinforcements, resulting in the conditional connection dates (which only cover distribution network aspects) being revised, sometimes by as much as 10 years, frequently making such projects unviable. In some cases, communication is poor, with little or no information on the likely outcome of the TIA for distribution customers, meaning connection dates can be moved very materially, sometimes with little warning. This uncertainty creates risk for project developers and investors.

There are two fundamental problems that need to be addressed;

1. the process by which DNOs request, and are allocated, transmission capacity from the ESO is not fit for purpose. It typically takes too long, and distribution connection customers are not being provided with adequate information about likely transmission impacts at an early enough stage.
2. around 64%⁵⁷ of generation and storage projects are unable to connect to the distribution network without transmission reinforcement works.

Actions to resolve these two problems are described below.

Desired Outcome: A clear, consistent, streamlined and transparent process to provide faster connection offers to distribution connected projects that have transmission system impacts on appropriate timeframes.

Action	ESO and DNOs to work closely to improve existing processes at the transmission/distribution interface and to ensure that any proposed future connection process enables DNOs to secure and allocate GSP capacity efficiently, providing certainty for distribution connection customers.
Action lead	ESO/DNOs
Action introduction date / impact date	Q4 2023 / Q1 2024
Progress indicator	Improved communication and customer experience Transmission works impacts for distribution customers are flagged and understood more quickly
Action review date	Q1 2024

In the short-term we expect to see a marked improvement in the performance of DNOs and the ESO. We expect to see the average period between a DNO identifying the potential need for a TIA and the customer receiving a full connection offer, including any transmission works, substantially reduced. We recognise that there are no comprehensive regulatory timelines

⁵⁷ Proportion of distribution capacity confirmed as dependent on, or under assessment for dependency on, transmission reinforcements. Data provided by DNOs.

applying to this process and Ofgem will consider this as part of its wider review of connections incentives and obligations (see Chapter 3.5d). In the meantime, we would like to see the ESO and DNOs working together to introduce and clearly communicate a consistent approach by the end of January 2024, resulting in regular and predictable Project Progression submission timescales, underpinned by voluntary targets and monitoring/reporting of timelines.

We would also like to see the ESO and DNOs assess and review the thresholds for TIAs; to accelerate connection timescales for distribution customers.

We also expect communication between the DNOs and their customers to improve significantly, in respect of potential transmission impacts. DNOs should ensure that customers are aware that their connections dates and costs may change, depending on transmission network impacts. Ofgem will monitor this activity carefully, consider appropriate policy levers and consult on solutions to ensure that the ESO and DNOs are held to account in terms of the transparency and timeliness of interactions at the Transmission/Distribution interface, as part of the review of connections incentives and obligations (see Chapter 3.5d).

In the medium-term, further revisions to the process at the Transmission/Distribution interface are expected, as part of the ESO's longer-term connections reform, which would also impact on distribution connections that may have an impact on the transmission network.

Under the ESO's preferred model each DNO would apply for Reserved Developer Capacity (RDC) at each GSP during the annual application window alongside transmission connection applications. By aggregating all connections that may have an impact on transmission in a single application window, the ESO and TOs would be able to consider the system impacts and design solutions on a more holistic, whole system basis. Under this approach the ESO has reasoned that DNOs would be able to allocate capacity to their customers throughout the year, without recourse to the ESO on individual connections.

While the principles of an RDC application process have been described at high-level by the ESO, more detail is needed to understand whether this approach would provide the desired outcome of a clear, consistent and transparent process to provide connection offers to distribution connection customers.

There are certainly challenges with the RDC approach that need further consideration. Further consultation is needed with the DNOs and their customers, and the ESO is working with the ENA to explore the RDC solution further. It is important that momentum is maintained, that the ESO, TOs and DNOs continue to engage actively and constructively, and that concerns are adequately addressed, prior to the ESO making recommendations.

Desired Outcome: Accelerated connection of distribution projects, which are currently dependent on transmission reinforcement, where the impacts on transmission are proportionate

Action	DNOs to offer flexible connections and manage distributed generation and demand within ‘technical limits’ across all GSPs.
Action lead	ESO/DNOs/TOs
Action introduction date / impact date	Q4 2023 / Q1 2024
Progress indicator	Increased number and capacity of distribution connections, dependent on transmission reinforcement, which are offered earlier connection dates. Capacity accelerated (MW and years), as a result of flexible connections.
Action review date	Monthly

As part of the ENA’s 3-step plan, the ESO and DNOs are decoupling generation connecting at distribution from transmission reinforcement works. Currently, nearly a third of distribution connections are dependent on transmission network upgrades, which is increasingly pushing distribution connection dates into the late 2030s, whilst at the same time adding significant costs to projects. There is a clear need for smaller projects, thresholds are as low as 50kW in some areas, to be decoupled from these reinforcements to the greatest practical and proportionate degree, while considering whole system outcomes.

Ofgem and government welcome the action taken by the ESO and DNOs to allow DNOs to manage connections to their networks within technical limits⁵⁸ without the need for recourse to the ESO. Phase 1 of this solution is being applied at 72 GSPs (20% of the total 355 GSPs) which could potentially release up to 30GW of capacity to be made available to connection customers by the end of the year. The first 45 GSPs being considered are the most straightforward, involving just one DNO. DNOs are currently reaching out to their customers to discuss how their connections might be accelerated and improved connection offers are being made. Phase 2, beginning in Q1 2024, will cover more complex GSPs which involve multiple DNOs, with the potential to release a further 20GW of capacity.

We will continue to support and monitor the impacts of this initiative, including ensuring that the solution is being delivered alongside the necessary network build required for enduring firm access. We would also want to see the solution rolled out across all GSPs including those with import constraints where technical limits could be applied to demand connections.

⁵⁸ Use of temporary non-firm connection agreements to allow generation at distribution level, currently dependent on transmission reinforcement works, to connect sooner, under the condition that their ability to export electricity may be limited under certain network conditions.

3.5c Ensuring consistency including the allocation of costs.

Desired Outcome: Consistency and standardisation between DNOs, between DNOs and TOs and between DNOs and IDNOs

Action	ESO and network companies to continue to identify, and take actions to resolve, areas where a lack of consistency or standardisation is leading to poor outcomes for customers and/or the wider electricity system
Action lead	ESO/DNOs/TOs/IDNOs/Ofgem ENA to coordinate via Strategic Connections Group
Action introduction date / impact date	Q4 2023 / Q1 2024
Progress indicator	Improved customer satisfaction Reduction in connection delays
Action review date	Ongoing

We are aware of network companies taking different approaches to connections under the same regulatory framework. Examples include approaches to defining and allocating access rights, technical assumptions relating to the impact that different technologies have on the system and the way that some costs are allocated between network companies and connecting customers. Whilst this can be beneficial in some instances, for instance to encourage innovation, it can be frustrating for customers who can justifiably feel their connection date or costs are part of a 'postcode lottery', or can lead to misunderstandings and confusion. This can contribute to poorly developed connection applications and inefficiencies, which delay connection dates and increase administrative workload for network companies. For individuals, households and businesses looking to decarbonise, longer than needed connection times can act as a disincentive to install EV chargepoints and heat pumps.

We have identified several examples where a greater degree of standardisation between network companies especially, but not exclusively, between different DNOs, could result in earlier connection dates. In some cases, the ESO and network companies are already addressing the issues (see i-iii below). We support the work that is underway and encourage the ESO and network companies to make rapid progress in these areas. In other examples, further work is required. There are other areas of inconsistency and we recognise that prioritisation will be required to ensure that resources are best deployed to address those that have the biggest impact on timescales and/or affect the most customers. We will work closely with the ESO and network companies on this.

i) **Ensuring appropriate and consistent approach to access rights offered to BESS.**

BESS projects act as both generation and demand and providing firm access rights can be more likely to require significant reinforcement. Without definitions for firm and non-firm access rights for storage, DNOs have interpreted access rights differently, with some providing the same rights as they would for generation, and others aligning more closely with demand.

Unsuitable access rights have led to less efficient connection solutions and identified network investment, ultimately delaying BESS (and other technologies) unnecessarily. We support the DNOs agreement on a common definition for firm access for BESS,⁵⁹ aligned with the access rights of generation (given that the function of BESS is more closely aligned with generation than final demand). Guidance for DNOs has been published on the ENA website,⁶⁰ effective for new BESS connections from 30 September 2023. We will work with DNOs to monitor the impact of this change.

ii) Ensure alignment in Distribution BESS Diversity Assumptions.

There also needs to be equal treatment in the assessment of import on the distribution network from BESS assets for system planning and connection design. DNOs currently use an industry code⁶¹ to determine the capacity and security of supply of the network when considering import power. This does not apply as much diversity as might reasonably or safely be possible for BESS, which could result in unnecessary reinforcement of the network leading to inefficiencies and underutilisation of network assets. The code allows 'diversity' to be applied to demand connections, including BESS, but DNOs are not universally doing so.

Diversity assumptions, reflecting BESS' unique operating characteristics, could be applied uniformly when assessing import impacts of these connections which would typically reduce the impact. Ofgem issued a letter of support to the ENA on 15 August 2023, in respect of Electricity Storage Solutions.⁶² Guidance for DNOs has subsequently been published on the ENA website⁶³ and is effective for new connections from 30 September 2023.

We also believe consistency is important across distribution and transmission, and therefore unless good reasons exist for differences, the DNOs, ESO and TOs, should ensure that, as far as possible, there is alignment in the approach to BESS modelling, planning assumptions and flexible connections.

Points i) and ii) are being progressed through the SCG.

iii) Define a proportionate and risk-based approach to the consideration of 'behind the meter' connections on demand sites (net export or in some cases zero export).⁶⁴

DNOs do not apply consistent methodologies to the assessment of generation behind customer meters. This is leading to different consumer outcomes in different regions. While in some cases there may be impacts on the network beyond the site, in this configuration, the DNOs' assessment of the impact and risks appear to be inconsistent and, in some cases, can lead to reinforcement works, sometimes at transmission level.

Some DNOs model this less conservatively on the network than others, leading to much earlier connection offers in some areas than others. Work should be accelerated to resolve this inconsistency, overseen by the SCG, to ensure that all DNOs follow a proportionate, common methodology when assessing network impacts for such arrangements.

⁵⁹ [ENA SCG Battery Storage Solutions - Ofgem letter of support | Ofgem](#)

⁶⁰ <https://www.energynetworks.org/publications/battery-storage-connections-tactical-solutions-guidance-notes>

⁶¹ ENA EREC P2 Issue 8 (dcode.org.uk)

⁶² <https://www.ofgem.gov.uk/publications/ena-scg-battery-storage-solutions-ofgem-letter-support>

⁶³ <https://www.energynetworks.org/publications/battery-storage-connections-tactical-solutions-guidance-notes>

⁶⁴ 'Behind the meter' generation refers to on-site generation for a demand connection. An example would be rooftop solar, as the electricity is generated and consumed behind the electricity meter.

iv) Define a consistent approach to the passing through of transmission reinforcement costs and securities, where relevant, to distribution connection customers.

Securities relating to transmission network reinforcement costs are often passed through to the distribution connection customer. These costs can be considerable and act as a barrier. However, the extent to which such securities are passed on and the methodology used vary, depending on the DNO, with some DNOs passing through the costs as a one-off charge, some gradually and others not at all. Much greater alignment is needed between how these costs are apportioned.

We are also aware that there are variations in the requirement for developers to fund new SGTs which are triggered by distribution connections. These costs are currently either socialised through transmission charges, or charged directly to one or more distribution connection customer, depending on the categorisation of the impacted GSP.⁶⁵

This can lead to inconsistency across DNO regions, and volatility for connection customers, with projects potentially becoming unfinanceable. This was identified as an issue during Ofgem's Access and Forward-Looking Significant Code Review.⁶⁶ Although no action was taken, Ofgem committed to keeping it under review to decide whether such reinforcement should be fully socialised through transmission or distribution use of system charges, or whether there was another more appropriate solution.

Work should be progressed by the SCG, to identify discrepancies and inconsistencies relating to charges and securities, across the Transmission/Distribution interface, and propose solutions, within 3 months, that address these issues. This work should also include a review of the guidance available to customers on deciding between a distribution or transmission level connection.

Ofgem will further consider SGT cost apportionment and provide an update by March 2024.

v) Differences in security arrangements for demand and generation

Security and liability arrangements mean customers connecting to the transmission network must underwrite costs for work on the network which they trigger. This covers the risk of consumers having to fund stranded assets. It represents a financial commitment which is replaced with Use of System charges once a customer is connected to the transmission system. In the event a customer terminates a connection agreement prior to connection, or reduces their capacity, they have a liability for costs incurred to the ESO.

To date, there have been differences in the security arrangements for generation and demand customers wanting to connect to the transmission system. This means demand customers are sometimes required to pay significantly higher (relative to their capacity) upfront securities as a guarantee that they will cover the full cost of their connection project if they decide to cancel an accepted connection offer, or reduce its capacity after work has begun. As such, securities are a barrier to entry for demand customers and have rendered some projects unviable.

⁶⁵ At Connection Asset sites, SGT reinforcement costs are passed through to the connecting customers, whereas at Infrastructure sites, SGT reinforcement costs are socialised via TNUOS.

⁶⁶ <https://www.ofgem.gov.uk/publications/access-and-forward-looking-charges-significant-code-review-decision-and-direction>

The ESO is developing a proposed CUSC modification (CMP417⁶⁷). We encourage the working group to bring to Ofgem a well-developed proposal with a clear benefits case and appropriate analysis conducted. In the meantime, the ESO has been considering an interim measure around the way that demand customers are charged securities, looking to rationalise the extent of transmission works that are solely driven by the demand customer. Ofgem is engaging with the ESO on this.

vi) **Standard definition and application of flexible capacity offers**

Key to the reduction in connection timescales for many actions in the Action Plan is the uptake of flexible (non-firm) connection offers. Such offers would typically be considered a transitional or temporary measure to allow for network reinforcements to be constructed, after which time 'firm' access would be provided, as set out in Ofgem's Access SCR Decision. We are aware of inconsistencies in how flexible connection offers are provided. We therefore support standard definitions and processes for allocating flexible capacity to be agreed and implemented by the ESO and network companies to support clarity and certainty for connection customers. The need for a clearer definition of non-firm transmission access (to support a common understanding and provide clarity to customers) was highlighted in the ESO's connection reform consultation and was reported to have strong stakeholder support. The ESO should work with network companies to ensure definitions are agreed and implemented as soon as reasonably possible. We also encourage the ESO and network companies to be proactive in providing alternative solutions, such as flexible connections, to customers whose requirements cannot be delivered within a viable timescale for them.

In summary, while a number of initiatives are underway to address inconsistency in approaches to connection customers and interpretation of the regulatory framework (between network companies, between demand and generation, and between different types of asset), much remains to be done.

Current actions (i, ii and vi) should continue to be delivered as part of the existing ENA and ESO work programmes. Actions iii, iv, v and vii should be progressed as new work programmes led by network companies, via the ENA. Ofgem will separately provide guidance on SGT cost apportionment.

3.5d Standards, Obligations and Incentives

Desired Outcome: A framework of incentives, obligations and requirements pertaining to network companies and the ESO that ensure improved quality of service and timely connection outcomes

Action	Ofgem will undertake an end-to-end review of the incentives, obligations and requirements, relating to transmission and distribution connections
Action lead	Ofgem
Action introduction date / impact date	Commence: Q4 2023 Report on recommendations: Q2 2024 Impact dependent on recommendations

⁶⁷ <https://www.nationalgrideso.com/industry-information/codes/cusc/modifications/cmp417-extending-principles-cusc-section-15-all-users>

Progress indicator	Improved quality of service and timely connection outcomes
Action review date	Dependent on recommendations

Customers impacted by long connection dates or connection offer delays, poor-quality connection offers, or a lack of communication, are rightly frustrated and while there is evidence of good practice, it is also clear that the performance of the DNOs, TOs and ESO does not always meet expectations. Some examples of issues that have been highlighted to us are summarised below. The list is not exhaustive, but provides an indication of some of the problems that customers are facing.

Timescales for connection offers

- Inconsistent obligations for different types, and aspects, of connection offer (across initial offers to different forms of modification) to be provided to customers, with a lack of clear and appropriate timescales for all relevant parties to provide necessary input.
- Inconsistent application of the Statement of Works/Project Progression process, with significant delays being experienced by some customers, particularly where DNOs are aggregating connections, delaying the submission of Project Progressions unnecessarily. Poor communication and a lack of engagement during this period can result in further frustration.
- The quality of connection offers is sometimes poor, with offers generally being produced within the regulatory period, but not always with the necessary diligence or scrutiny; resulting in offers that contain errors, and a lack of detail. Steps have been taken, for example through the introduction of new regularly reported evidence by the ESO for 'right first time' connection offers, but issues remain across the system.
- Fast track connection processes are in place for some smaller connections within the scope of EREC G98⁶⁸ and EREC G99.⁶⁹ However, smaller connection projects can still be subject to disproportionately onerous procedures.

Timeliness of connection dates

- Many customers are receiving connection dates that are well beyond their requested dates making it difficult for them to commit time and resources to further developing these projects, impacting investor confidence.
- A lack of visibility of where a project sits in the queue of connections pending enabling works and potentially the status of other projects which may be dependent on similar works, means that it is difficult for connection customers to assess the likelihood of their connection date being accelerated.

Data transparency and quality

- ECRs are sometimes not up to date or complete, meaning that valuable information about the status or nature of certain connections cannot be relied upon.

⁶⁸ <https://www.energynetworks.org/publications/erec-g98-requirements-for-connection-of-fully-type-tested-micro-generators>

⁶⁹ [EREC G99 Requirements for Connection of Generation Equipment – Energy Networks Association \(ENA\)](#)

- Curtailment forecasts for non-firm connections are often not representative of the actual likely operational curtailment that would be implemented, creating significant problems for developers or investors trying to quantify operational risks.
- Differing support from network companies in helping customers to identify the right solution for a connection, for example by suggesting short-term flexible export/import limitation, slightly lower capacity, ramping, etc.

Communication and engagement

- In some cases, we hear that DNOs are difficult to contact and there are limited opportunities for early quality, pre-application conversations.
- Some DNOs do not provide a single point of contact for connections, meaning there is a lack of continuity and detailed understanding of specific connection requests/offers, including lack of clarity where applications require transmission impact assessments and what the implications might be for customers' connection offers.
- Some DNOs do not provide adequate regular updates to their connection customers. The ESO's monthly knowledge sharing workshops ('Agoras') have been cited as a good example here; there is more to be done by some DNOs and TOs, in this area.
- Lack of (or slow) communication and engagement with connection customers on their projects at an early stage.

Design and construction

- Poor performance from network companies in relation to project development, design and delivery.
- Lack of construction planning and delivery standards following signature of a connection offer can mean that the performance of network companies at this critical stage sometimes falls below expectations.
- Limited evidence that network companies are optioneering across system boundaries to identify more efficient, quicker or cheaper alternative solutions to better meet customers required connection dates.

Domestic connections

- Regulatory standards, such as the Guaranteed Standards of Performance (GSoPs), do not apply to all connection activity. For example, there are none to cover unlooping of services or timescales for domestic load checks. We have evidence of DNOs providing lengthy timelines for unlooping of domestic properties to install heat pumps, as part of a government-funded scheme, which has led to installations being abandoned, as well as reports of delays in receiving load checks when installing EV chargepoints. We believe that a lack of incentive/penalty for DNOs could be contributing to these outcomes.
- Poor visibility of low voltage network assets delaying or blocking heat pump deployment.

Requirements in the form of obligations, standards and incentives on licensed network companies and the ESO, to deliver timely connections, and to provide certain levels of customer service are found in a range of regulatory documents, including licence conditions, guidance and codes as well as in legislation. We recognise that they are not comprehensive and do not cover the entirety of the connection customer journey. For example, while a customer will likely receive a connection offer within the required standards of service timescale it might take months to set up a pre-application discussion with a network company, where no standards of service timelines apply.

We will immediately commence a review of the adequacy of existing levers and the extent to which they may need to be clarified or strengthened. Where there are gaps, new mechanisms could be introduced. Implementation of any recommendations would follow the relevant processes under company licences and could cover both the current and/or future price control periods. In the short-term, however, we would strongly encourage the DNOs, TOs and ESO to consider where there may be opportunities to put in place voluntary Service Level Agreements, responding to concerns raised by customers, areas where there are known inconsistencies between companies or where performance could be improved more generally.

We will approach this review from a customer perspective, considering the end-to-end ‘customer journey’ for different connection customer groups at different voltages, interfacing with different licensed entities, including DNOs, TOs and ESO and to ensure that obligations and incentives support overall efficient whole system outcomes and optimal use and allocation of capacity to maximise the benefits. This may be through amendments to existing obligations and incentives, or new, where appropriate. As referenced in the Plan for Drivers⁷⁰, government will also be conducting a separate review of the EV connections process.

We have already strengthened the reporting of connection data by the ESO and network companies, enabling us to better understand some of the problems being experienced by connection customers and to create a baseline for future impact analysis. This has seen the ESO and network companies reporting detailed data that has not previously been shared with Ofgem and DESNZ, and reporting certain existing metrics, more frequently. This is enabling Ofgem to track the performance of the ESO and network companies more carefully and to inform this detailed review of regulatory levers. As described in Chapter 5.1, we will publish more data on network performance.

As described in Chapter 5.1 we are also monitoring the impact of the near-term actions being delivered by the ESO and network companies, including the introduction and enforcement of queue management milestones in connection agreements. The DNOs can already terminate connection agreements relating to slow moving projects that do not meet their contracted milestones and it is important that these milestones are enforced in a timely and equitable way.

We will continue to monitor progress and take further steps if required, including considering the need for the reporting of more detailed information about domestic connections.

There may also be a need for obligations and incentives to evolve to support implementation of further future reforms, including near term initiatives, building on the ESO’s 5-Point Plan and ENA’s 3-Step Plan, and to support longer-term connections reform, as is being considered through the ESO’s connections reform project.

3.6 Develop longer term connections process models aligned with strategic planning and market reform

This Action Plan focuses on actions and reforms specific to the connection process. However, there are a range of other factors that can influence a connection date outside the scope of these reforms. Furthermore, connection reform is operating in the context of an evolving energy system which will be transformed alongside the delivery of a new connections process.

⁷⁰ <https://www.gov.uk/government/publications/plan-for-drivers/the-plan-for-drivers>

There are already workstreams underway by government and Ofgem to drive these wider improvements, most notably the Transmission Acceleration Action Plan, strategic planning of the network, and the review of future markets under REMA. It will be crucial that the connections process aligns with, and supports, these wider initiatives to achieve overarching strategic outcomes of a timely and efficient transition to a net zero system.

Responses to the question in the ESO's consultation on longer-term connections reform on *"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?"* highlighted several key areas that respondents wanted to see a focus on:

- clear and joined up thinking across major reform programmes and communicating their interactions, for instance with REMA and FSO.
- ensuring timely network investment, including anticipatory investment.
- reforming the planning/consenting system and how long consents are applicable once granted.

Desired Outcome: Ensure that connections reform is aligned with wider network reform

Action	<i>Ensure that the connections process is well integrated with wider arrangements for strategic planning, to deliver timely and cost-effective change. Roles and responsibilities of network companies and the FSO need to be clear.</i>
Action lead	Ofgem, DESNZ, and ESO
Action introduction date / impact date	Q4 2023 / impact n/a
Progress indicator	Effective engagement between connections reform and strategic planning to ensure policy coordination
Action review date	Q2 2024 as FSO develops its CSNP methodology

Connections reform will accelerate connections, but achieving the required progress will also depend on aligning the connections process with strategic network and system planning being developed under the CSNP and RESP which will be delivered by the FSO. To achieve this there needs to be clearly defined and coordinated roles and interactions between the connections process and strategic planning.

The HND already coordinates offshore windfarm connections alongside onshore network planning, creating a single holistic network. The HND will be followed by the ESO's CSNP which is expected to be published early next year. When the FSO is established, it will be important that it manages the interaction between its connection responsibilities and the CSNP to ensure the overall network remains optimally planned. This should be considered further by the ESO/FSO as it develops its CSNP methodology in time for the 2026 publication of the first full CSNP. Further coordination will also be introduced by RESPs, which will be tasked with developing a strategic plan in each region, facilitating effective local engagement. The output of the RESPs should also be coherent and interact with CSNP and SSEP.

The ESO is currently considering models for longer-term connections reform and it will be important to ensure the adopted model facilitates a coordinated network design in line with strategic plans. The ESO's preferred model at consultation involves a system of 'gates' and 'windows' for connection applications, to help management interactivity and plan the network better, with more certainty on which connection projects are progressing. This approach could support strategic plans, although it will be important to understand how the accumulation of connections in a given area would be assessed, and how this model would align and integrate with CSNP products and processes, including annual updates.

Wider aspects of electricity connections reform should also support more effective network planning, such as:

- standardisation and improvement of processes and obligations;
- termination of stalled connections; and
- improved modelling of the impact of connections on the network.

We also anticipate a need to consider how the approach to capacity allocation under the connections process may need to evolve to reflect the strategic drivers of the CSNP. This may also need to explore the extent to which factors/criteria considered within CSNP are reflected in connection arrangements.

The roles and responsibilities of the ESO/FSO, TOs and other parties may need to evolve to best deliver these new approaches, including consideration of the potential for a role for the FSO in:

- ensuring the design of connection solutions in an area feeds into the CSNP;
- scrutinising TO connection designs in a given area, to ensure they are compatible with network development plans, and appropriately flexible and future-proof; and
- providing clear definitions of enabling works and wider works to balance the desire for accelerated connections alongside costs to consumers.

Desired Outcome: Ensure that connections reform is aligned with wider network reform

Action	<i>Ensure a joined up and collaborative approach between the Transmission Acceleration Action Plan, and other network reforms, and the Connections Action Plan</i>
Action lead	DESNZ, Ofgem
Action introduction date / impact date	Q4 2023 / N/A
Progress indicator	Effective engagement between connections reform and Transmission Acceleration Action Plan to ensure alignment
Action review date	Reviewed monthly

Transmission Acceleration Action Plan

The Transmission Acceleration Action Plan highlights the need to better standardise infrastructure and equipment design. Under the plan, the ESO will convene a taskforce with TOs, UK, Scottish and Welsh Governments, Ofgem and the ENA to progress a set of Electricity Transmission Design Principles. This workstream relates to consideration of the standardisation of connection design (Chapter 3.3) where we have tasked the ESO and network companies to review and assess approaches to optimise use of the existing network and bring forward beneficial changes. We expect them to ensure that these considerations are aligned with the work of the ESO taskforce on standardising infrastructure and equipment design.

Accelerated Strategic Transmission Investment

The Energy Act 2023 introduces competition into onshore electricity networks which will drive down costs for consumers. It will also incentivise innovative solutions to network constraints and drive inward investment to increase network capacity. Expansion in capacity is a key enabler for earlier connection dates, alongside reforms to the connections process.

We do however acknowledge that the uncertainty around whether a TO will deliver a specific project or not has the potential to cause project delays. As part of the ASTI mechanism to support delivery of government's 2030 offshore wind targets response, Ofgem has exempted nearly £20bn of strategic network investment from consideration for delivery via competition.

Ofgem will consider the needs case for projects identified in the transitional CSNP and will build on the successful approach taken under ASTI. The needs case will include whether to exempt those projects from competition which will be done within six months of the transitional CSNP publication. Enabling network companies to contract with their supply chains.

A Strategic Spatial Energy Plan

In September, the Prime Minister announced that the Government will produce a SSEP in line with the Electricity Networks Commissioner's recommendation. The SSEP will help determine the most efficient locations and types of energy infrastructure needed to support decarbonising the power system by 2035 and achieving net zero in a pragmatic manner. It will also support the forming of pathways from which more granular plans like the CSNP and sectoral energy plans will flow. A more strategic approach to spatial planning will enable a coordinated, whole systems approach to the planning of generation and network infrastructure, creating a more efficient system and reducing waiting times for generation projects to connect to the grid. More detail on the SSEP is set out in the Transmission Acceleration Action Plan.

Supply chain

Global supply chain shortages are hindering the delivery of energy infrastructure. This issue is being felt internationally and across many sectors. Furthermore, inflation in commodities has increased the costs faced by developers to deploy low carbon energy and other projects.

Timely connections are dependent on the delivery of connection-specific and, often, wider network infrastructure. Government sees the importance of domestic supply chains in reducing the reliance on international supply chains, which can often be turbulent. UK supply chain capabilities also provide significant economic opportunities. Further information on how

government can secure UK supply chain capabilities is addressed in the Transmission Acceleration Action Plan.

Planning

Government recognises that reform of the planning system for electricity networks is required to achieve timely network delivery and connections. The Government consulted earlier this year on five updated National Policy Statements⁷¹, which set out national energy policy and form the framework for decision-making on applications for nationally significant infrastructure projects. Further information on how government is reforming and streamlining the planning system for electricity networks is covered in the Transmission Acceleration Action Plan.

Land rights

Land rights can be a barrier to the delivery of network infrastructure and, hence, to timely connections. In 2022 the Government published a Call for Evidence on land rights and consenting for electricity network infrastructure.⁷² This sought views on whether current land rights and consenting processes for electricity network infrastructure are fit to accommodate the rapid, transformative change to the electricity network that will be required in the coming decades. Government will publish a response to the call for evidence by spring 2024 including proposed policy measures government will be considering, to address planning and consenting barriers to connections.

Review of Electricity Market Arrangements

Action	<i>Ensure coordination with future market reforms being considered under REMA, including the review of electricity network charging arrangements, connection access rights and other options for sending locational signals.</i>
Action lead	DESNZ (in conjunction with Ofgem)
Action introduction date / impact date	Autumn 2023 (second consultation)/ N/A
Progress indicator	Effective engagement between connections reform and REMA to ensure policy coordination
Action review date	Ongoing

To some extent planning and market signals may provide alternative options, but in all cases government will need to ensure they are complementary. We will do this through close alignment with the ongoing REMA programme.

REMA is a major review of Britain's electricity market design that will enhance energy security and help deliver our world leading climate targets whilst ensuring a fair deal for consumers. REMA considers options for reform to all electricity (non-retail) markets and policies that can

⁷¹ <https://www.gov.uk/government/consultations/planning-for-new-energy-infrastructure-revisions-to-national-policy-statements>

⁷² <https://www.gov.uk/government/calls-for-evidence/land-rights-and-consents-for-electricity-network-infrastructure-call-for-evidence>

provide signals for investment in, and operation of, assets that generate, store, and use electricity.

One of the challenges REMA will address is how to cost effectively operate and optimise a renewables-based system. As part of this, REMA is considering options to send locational signals to incentivise assets to locate and operate in ways which are most beneficial to the network and help lower overall system costs. Some of these options could have implications for future connections reform:

- The role and design of **transmission network charges** in the future. Transmission Network Use of System (TNUoS) charges are the annual charges used to recover the costs of the transmission network from both demand and generation. TNUoS differs by location in GB, and these differences are expected to increase in the coming years. However, charges are perceived to be volatile and hard to predict. Ofgem is considering whether network charging can be improved to more effectively influence where generators choose to site their assets in the future as part of their wider work on strategic transmission charging reform. Network charging reform would need to be considered alongside connections costs and impacts on connections policy.
- The future role of **transmission access rights**. Currently, GB transmission-connected market participants generally have financially firm access rights to the transmission network. This form of financially firm access rights has contributed to increased constraint management costs, which are expected to increase as large volumes of renewables connect to constrained networks even with significant network expansion. Ofgem will consider whether changes to access rights could help incentivise investment in specific areas and reduce the cost of balancing and operating the system.
- The introduction of **locational pricing** in the GB electricity wholesale market. Currently, the wholesale electricity price is based on a single national price. Locational pricing would embed the locational value of energy into the wholesale price. Under this, we would expect locations in GB with excess renewables supply to have lower prices and vice versa. In theory, this could incentivise generation and demand to locate in more suitable parts of the network and operate more efficiently to lower system costs. If introduced, this would be a transformative change with wide-reaching implications, requiring changes to both access rights and charging arrangements.

These options will be set out in further detail and considered as part of the REMA 2nd consultation. There are other REMA options, outside of those listed above, which could also have implications for connections reform. It will be important that the connections process is well integrated with any reforms and changes in the near-term are sufficiently aligned with, or take account of any divergence from, the longer-term direction of travel.

Chapter 4: Connection customers and investors

4.1 Introduction

The reforms and actions in Chapter 3 will deliver quick and meaningful reductions in connection timescales for viable projects. This will benefit all types of connection customers and we are committed to ensuring a smooth transition for all. The significant expected increase in volume and variety of decarbonised projects will bring a wealth of new investment opportunities across the country, and we are keen to ensure that grid connection reform will help secure these, reach net zero, and meet our carbon budgets.

This chapter provides an overview of how the Connections Action Plan will positively impact on a variety of connection customers, and how customers can best engage with the connections process. This includes case studies of the connection experience for different customer types, suggestions to empower customers to make sure their connection is as efficient as possible, and a summary of what customers can expect from the ESO and network companies to ensure the best customer experience.

4.2 Key measures to support different types of connection customers

4.2a Generation and BESS connection customers

Onshore wind, nuclear and other generation projects as well as energy storage will be vital in delivering a decarbonised electricity system, while also strengthening the UK's energy security, fostering growth in the country's green industries, and reducing exposure to volatile global gas prices. Connection reform will send powerful signals, increasing developer confidence and enhancing the UK's reputation as among the most attractive places to invest and grow the green economy.

Transmission connected generation

The vast majority of the c.400GW of projects with transmission connection agreements are generation and storage projects. In addition to action underway by the ESO and network companies to improve connection timescales, there are a number of proposals summarised in Chapter 3 that will particularly benefit transmission generation customers with viable projects. Examples include raising entry requirements and terminating connection contracts that fail to meet connection milestones (see Chapters 3.1 and 3.2).

In parallel, transmission connected generation projects will be able to benefit from reforms in the Transmission Acceleration Action Plan for example around strategic planning, improving supply chain capacity and streamlining design standards.

Distribution connected generation

Customers that connect to the distribution network largely comprise solar farms and BESS projects, and nearly a third of distribution connections are dependent on transmission network upgrades. As outlined in Chapter 3.5, we want to ensure that friction across the Transmission

/Distribution interface is reduced and that the network is optimally designed across system boundaries to ensure transmission reinforcement assessments and reinforcement can be carried out as smoothly and quickly as possible. In addition, under the ENA's 3-Step Plan, new technical limits are being rolled out across GSPs and milestones will be inserted into pre-2017 generation contracts allowing more stalled projects to be removed from the distribution queue and releasing capacity to other customers (see Chapter 3.2). As described in Chapter 3.5, DNO incentives and expectations will also be sharpened to improve the quality of customer service and the provision of timely connections.

Microgeneration

Microgeneration customers comprise homeowners and small businesses and other organisations who install small generation technologies, such as solar PV, at their property(s) or site(s). Connection delays are being experienced even at this level.

Key proposals from the Connections Action Plan that will accelerate the microgenerator's connection journey include a review and strengthening of the regulatory frameworks pertaining to DNO performance and the action to improve consistency and standardisation between DNOs. This will help ensure that DNOs are consistently delivering timely connections and excellent customer service.

BESS

Electricity storage technologies will play an increasingly important role in transitioning to a net zero energy system by helping to maximise the contribution from (often) renewable generation and supporting a smart, flexible electricity system. There are currently over 35GW of BESS projects that have either submitted a planning application, have had a planning application accepted or are under construction.⁷³ As presented in Chapter 2, several ESO and network company actions will accelerate BESS connections, for example:

- As part of the ESO's 5 Point-Plan, the ESO are changing how it calculates network impacts of BESS to help them connect faster. Assumptions will be updated to recognise that BESS (1) does not typically export at times of peak generation and import at times of peak demand; (2) does not act uniformly at all times; (3) operates for relatively short periods; and (4) modelling should be aligned across transmission and distribution.
- The ESO has also recently removed the requirement, for transmission and distribution BESS connection customers to have non-critical transmission enabling works completed before connecting (on a non-firm basis). This offers the opportunity for faster connections before non-critical enabling and wider works are completed.
- The ENA is progressing actions to standardise processes for BESS, for example in offering access rights and diversity assumptions.

4.2b Demand customers

In the lead up to net zero, electricity demand in GB is likely to double, with an expected increase to between 450-500 TWh by 2035 and between 570-770 TWh by 2050 depending on how net zero is met.⁷⁴ As significantly more demand customers connect, or upgrade their connections, including at transmission level, it is essential that they do so in a timely and

⁷³ [Renewable Energy Planning Database July 2023](#); DESNZ, 2023

⁷⁴ [Electricity Networks Strategic Framework; BEIS 2022](#)

efficient manner. Electrification across all sectors of the economy will have an essential role to play in achieving net zero. Government is committed to a fully decarbonised electricity system by 2035, which will open up the path to the full decarbonisation of other sectors, including transport, industry and heat.

The ability for businesses to fully electrify and obtain their power from 100% decarbonised sources in a timely and cost-effective fashion will see that the UK remains a world-leader in decarbonisation and continues to attract green investment, both domestically and from overseas. The Department for Business and Trade's (DBT's) Smarter Regulation: Strengthening the economic regulation of the energy, water and telecoms sectors' consultation explores opportunities to improve the regulatory environment to support investment and ensure energy networks receive the necessary levels of funding. Similarly, DBT's reform of the regulators' Growth Duty will ensure that Ofgem considers wider economic growth when delivering its functions.

We want to ensure that network connections support the electrification of demand. One key proposal through our Action Plan that will benefit all customers is having transparent and publicly available data on factors such as status of connections, enabling works, and the new capacity this creates across GB. This will benefit demand customers in particular, as it includes establishing a TEC register for demand projects. This will significantly support understanding of connection projects' interactions and dependencies.

We are also recommending that the ESO, TOs and DNOs should collaborate to develop a single, publicly available, digital view of connections and associated works across GB, including locational visualisation (Chapter 3.5). We have requested an implementation plan, by the end of February 2024, setting out how the ESO and network companies will increase the transparency and usefulness of network and connections data for customers and the costs and benefits of different approaches to doing so.

Outlined below are examples of key demand sectors and further examples of how this Action Plan help will help to accelerate their connections.

Transport and Electric Vehicles

Each year, transport contributes a large proportion of the UK's greenhouse gas emissions. Therefore, the decarbonisation of key transport sectors, such as ports, heavy duty vehicles, and rail, is a key priority for government. The Transport Decarbonisation Plan⁷⁵ sets out the Government's commitments and actions needed to decarbonise the entire transport system in the UK, including road, rail, maritime and seaports, and aviation. Timely network connections will play a crucial role in achieving this.

Additionally, The Future of Freight (FOF) plan⁷⁶ sets out the Government's approach to achieve its long-term vision of a freight and logistics sector that is robust, efficient, and environmentally sustainable. To achieve a net zero freight and logistics sector by 2050, the FoF plan identifies a priority action to facilitate the energy infrastructure required by the sector including a connections process that enables timely, cost-effective, and streamlined installation.

⁷⁵ <https://www.gov.uk/government/publications/transport-decarbonisation-plan>

⁷⁶ <https://www.gov.uk/government/publications/future-of-freight-plan>

- As set out in Chapter 3.5, we are encouraging the ESO and network companies to undertake an assessment of optimisation options for current processes, and to explore the benefits of using more technologically innovative methods to connect projects faster.
- The remodelling of transmission network impacts under ESO's 5-Point Plan will help release network capacity which could be allocated to demand projects such as electrifying transport projects. These actions, among others outlined in this Action Plan, will help to enable more timely connections across the whole transport sector.
- The Electric Vehicle Infrastructure Strategy⁷⁷ sets out government's vision and plan for the rollout of EV charging infrastructure in the UK. To meet the milestones set out in this strategy, the connections process must be reformed to ensure that businesses and homeowners can readily secure upgrades and new connections to the distribution network to install EV chargepoints in sufficient numbers.
- As outlined in Chapter 3.5, this would include, for example, providing more transparent and accessible pre-application data so that EV chargepoint installers can gauge where capacity is available on the network and establish where their place in the connection queue would be prior to submitting an application. Furthermore, the implementation of stringent queue management processes and transition towards a FRFC system will help to remove stalled projects, allowing EV projects that are ready to go to connect faster. Additionally, strengthening the connections regulatory framework relating to network company performance, as well as standardising processes, will promote more timely distribution network connections and improve customer service to support EV chargepoint installations. The Government is also undertaking a review of DNO processes in relation to EV connections, as set out in the Plan for Drivers.

These actions build on a strong foundation of robust regulatory frameworks that already provide substantial support for EV connections. For example, the current price control (RIIO ED2) allocates £3.1 billion for strategic network upgrades and incentivises DNOs to proactively reinforce the network in anticipation of increasing demand from low carbon technologies such as EVs and heat pumps. Furthermore, the reforms to connection charging in the Access Significant Code Review⁷⁸ removed the cost of distribution network reinforcement for demand connection customers applying after 1 April 2023.

The Electrification of Heat in Buildings

Meeting our target of a 78% reduction in carbon emissions by 2035, and to reach net zero emissions by 2050, means decarbonising the majority of heat in buildings and most industrial processes. This will be achieved mainly via the rollout of heat pumps, however, other technologies such as hydrogen will also play a role.

Connections reform will accelerate the connection of heat pumps in homes and businesses to help ensure that heat electrification will be delivered in a timely and cost-effective way. Examples include strengthening the connections regulatory framework relating to network company performance which will promote more timely distribution network connections and improve customer service to support heat pump uptake (see Chapter 3.5).

⁷⁷ <https://www.gov.uk/government/publications/uk-electric-vehicle-infrastructure-strategy>

⁷⁸ <https://www.ofgem.gov.uk/publications/access-and-forward-looking-charges-significant-code-review-decision-and-direction>

Industrial Decarbonisation

The UK's Industrial Decarbonisation Strategy⁷⁹ is the first strategy published by a major economy which sets out how industry can decarbonise in line with net zero, while remaining competitive and without pushing emissions abroad. Ensuring timely network connections for a range of industrial sectors, such as construction and manufacturing, which require increased electricity demand to decarbonise is a key priority for government.

- To support this, the Government recently launched a call for evidence⁸⁰ on enabling industrial electrification. This consultation included specific questions on grid connections to pinpoint the issues that sites are facing to electrify. Government is also working closely with sectors outside the scope of the Industrial Decarbonisation Strategy, such as Oil and Gas, to identify barriers to network connections and opportunities to resolve them.
- The majority of actions and proposals considered in Chapter 3 will support accelerated connection timescales for industrial electrification projects. For example, streamlining processes and modelling at the Transmission/Distribution interface will ensure that DNOs return connection offers faster with earlier connection dates for large, industrial projects that require transmission reinforcement works.
- Furthermore, making sure there is a consistent, defined, proportionate and risk-based approach to DNOs consideration of 'behind the meter' solutions, will lead to earlier connection dates due to the need for less reinforcement works to accommodate them.

Large Strategic Demand Customers

We expect an increase in large industrial demand customers with significant net zero, economic and wider societal value to the UK – such as battery gigafactories or energy intensive sectors looking to electrify. Some of these are likely to be large enough to need connections at transmission rather than distribution level.

- Large industrial demand customers are likely to see their connections accelerated via an accumulation of the actions in this Action Plan. For example, having improved and new publicly available, transparent data on the connection landscape across the whole of GB including demand connections will assist with identifying network locations that best suit large demand projects needed when making important investment decisions.
- The implementation of stringent queue management processes and removal of stalled connection projects, allowing large demand projects that are able to, to connect faster.
- As described in Chapter 3.5, the proposed code modification CMP417 is looking at reducing upfront security costs for demand customers, and we encourage industry to bring forward a comprehensive proposal, which Ofgem will assess based on its merits and against the relevant code objectives. In the meantime, the ESO is looking further at how to establish interim measures to reduce security costs for demand customers.

Beyond the Action Plan, we are keen to support the grid connection requirements of key customers to help secure their economic, social and environmental benefits. DESNZ will work with the Office for Investment to manage a triage process to ensure that the most strategically important projects receive the strongest possible government support to facilitate timely connection times, without detriment to other viable customers in the connections queue. For

⁷⁹ <https://www.gov.uk/government/publications/industrial-decarbonisation-strategy>

⁸⁰ <https://www.gov.uk/government/calls-for-evidence/enabling-industrial-electrification-a-call-for-evidence>

each project, a bespoke, cross-departmental team led by the Office for Investment and DESNZ will work closely and at pace with the investor, relevant network companies, Ofgem, and the ESO to identify specific barriers and then explore innovative solutions to remove them.

4.3 Customer service

We expect DNOs, TOs and the ESO to deliver high quality services that meet the needs of connection customers. This will be delivered by continuing to improve the level of service and timeliness of offers that customers receive when they require a new or modified connection or have a general enquiry – and to ensure that complaints are dealt with quickly and effectively.

Outputs and incentives are a key feature of Ofgem’s price control framework (under RIIO-ED2 and RIIO-ET2) and the ESO’s incentives. They are designed to drive network companies to focus on delivering the objectives that matter to existing and future customers. TOs and DNOs are required through their existing price control incentives to provide certain levels of service and collaborate in order to provide good service and connection outcomes for customers.

Ofgem consulted on changes to the ESO Roles Guidance document as part of its assessment of the ESO’s second business plan cycle and has set out the finalised ESO Roles Guidance which sees a step change in expectations in the Connections area.⁸¹

The various incentives and expectations on the ESO and network companies are set out below:

Party	Incentive	Responsibilities
ESO	Timelines of Connections Offers (3X) Introduced for assessment period 1 April 2023 – 31 March 2025	- Report quarterly on the number of connection offers made within 3 months, and the number of connection offers made that took longer than 3 months. - Report on the scale of the connection queue in terms of GW and average time from offer acceptance to connection date, including the delta from when this data was last reported. - Include breakdown of assets in the connection queue by size and technology type.
	Percentage of ‘Right First Time’ Connection Offers (3Y) Introduced for assessment period 1 April 2023 – 31 March 2025	The ESO will report the percentage of connection offers made over the period which were right first time, in addition to a breakdown of connection offers which needed reissuing by reason.
TOs	Timely Connections (output delivery incentive (ODI)-F) Retained in RIIO-ET2	The Timely Connections Incentive is a financial penalty incentive which aims to encourage the efficient timely delivery of connection offers to applicants (via the ESO) for new connections to the Transmission Network.

⁸¹ [Decision on Amendments to BP2 ESO Roles Guidance | Ofgem](#)

Party	Incentive	Responsibilities
	Quality of Connections Survey (ODI-F)	Described in customer feedback (Chapter 5.4).
DNOs	Time to connect (ODI-F) Retained in RIIO-ED2	Designed to incentivise DNOs to reduce the average connection time for customers seeking a minor connection to the distribution network, the incentive is comprised of two parts: i) 'Time to Quote' (TTQ) – time from the DNO receiving the initial application to issuing a quotation. ii) 'Time to Connect' (TTC) - time from the customer accepting the quotation to the connection being completed. The target is set based upon the most recent 4-year average. The incentive is symmetrical and both penalties and rewards are available for performance which is worse or better than the target respectively.
	Major connections (ODI-F and ODI-R) New incentive introduced for RIIO-ED2	This incentive has both a financial element and reputational element, aiming to ensure DNOs deliver quality service to customers seeking major connections in RIIO-ED2. The ODI-F element of the target is calculated from the Major Connections Customer Satisfaction Survey (MCCSS). The incentive is penalty only, therefore if DNOs do not reach an average score across their MCCSS for a given year, up to -0.35% RoRE can be charged as a penalty. Only market segments where competition is not effective are within scope. The reputational element of the Major Connections Incentive (ODI-R) aims to ensure companies are held accountable for delivering their Major Connection Strategies within-period. This will be achieved by requiring the DNOs to report on not only their MCCSS, but also (similar to the time to connect incentive above) on their Major Connections TTQ and Major Connections TTC metrics.
	BMCS connections survey (ODI-F)	Described in customer feedback (Chapter 5.4)
	GSOPs	Guaranteed Standards of Performance (GSOPs) are set out in statute under The Electricity (Connection Standards of Performance) Regulations 2015 and The Electricity (Standards of Performance) Amendment Regulations 2023⁴⁸. These set out provisions regarding the timeliness of demand connection quotations and work completed. Equivalent provisions exist for generation customers through 'The Distributed Generation Standards Direction'⁴⁹. The GSOPs lay out the payments that a customer is eligible to receive should the DNO not meet the prescribed period.

In addition, in 2021, the Whole Electricity System Licence Condition⁸² was introduced into the Electricity Transmission and Distribution Licences, which sets out the expectation that network companies and the ESO co-ordinate and co-operate to ensure efficient outcomes across the whole system. Ofgem has previously stated the outcomes that it expects to come from this licence condition. In relation to connections, Ofgem emphasises the outcome of improving and maintaining services for connection customers. Ofgem expects the ESO and network companies to collaborate on connection solutions, including for example to deliver ramped up connection profiles, and improve expected connection dates for customers. Ofgem views these outcomes and behaviours as part of this obligation and it expects to see, and hear from connections customers, that the ESO and network companies have been complying with this.

4.4 Streamlining the connections process

There are many things that connection customers can do to ensure that their connection application is processed as quickly as is reasonably possible, the right connection solution is identified, and best available connection dates offered:

Clear and Early Communication

Customers can find their local DNO or TO via the ENA's website.⁸³ We encourage all connection customers to engage with their network company at the earliest possible moment, including well in advance of any potential investment decisions. With support from the network company, customers can consider their energy requirements ahead of time and submit their connection application(s) promptly, resulting in a faster connection offer.

Each network company has its own website which provides details on how to get in contact and begin the connection application process. Customers will need to provide details of their electricity requirements to have their application accepted, which is then followed by a connection offer from the network company that will give a breakdown of any associated costs and timescales.

It is important for customers to communicate the specifics of their electricity requirements clearly with the network company(s) from the outset and provide as much detail as possible regarding any development proposals. For example, for small-scale projects wishing to connect a single site, such as a home or commercial property, this would include providing details of the size of the building, the type of connection needed (single phase or three phase for example), whether plans include installing low carbon technologies such as heat pumps, EV chargepoints, or micro generation, and any other details that will help the network company process an application efficiently. For large-scale projects, such as a housing developer, this could include details of how many flats, houses (with number of heat pumps, EV chargepoints, solar PV on rooftops, etc.), or for an industrial site wanting to electrify, the type, quantity, and size of the machinery required.

In particular, it is advisable to have a comprehensive understanding of the technical requirements of a project. This could include the amount of existing or new capacity required in kW/MW at each site, what type of connection is needed (firm/standard or non-firm/flexible),

⁸² For more information on network companies' obligations surrounding this licence condition, please see Ofgem's guidance document: [Link](#)

⁸³ <https://www.energynetworks.org/customers/find-my-network-operator>

and the level of security of supply required (such as a single or dual circuit). It could also include if the project requires a diversion of a network company's electrical assets, detailed maps of the site location and layout, and any extra details that will enable an application to be processed in the first instance.

Resourcing

For large or intricate projects, we recognise that understanding and submitting the technical requirements of a connection project can be complex, especially for those who are new to the electricity network connection process. In these instances, we recommend customers dedicate as much resource as possible to their connection journeys. For example, this could be having a dedicated specialist or team member to manage the connection process, such as appointing a Principal Contractor or consultancy to liaise directly with the network company.

We strongly encourage customers to reach out to their network company if there are any aspects of the connection process that need clarifying. There is also a multitude of tools available online, provided by the network companies, to assist customers with their connection journey. Please see Annex C: 'Online Resources and Tools for Connection Customers' for further details.

Flexible Connections

Flexible connection arrangements have been available at distribution for some time where the customer does not need access to all of their contracted capacity at all times, or where there may be a specific network need for curtailment to manage local network constraints. They can also be options for transmission connections (known as non-firm connections).

One type of flexible connection sometimes offered is a curtailable connection, as set out in DCUSA Schedule 2D, which may enable a customer to connect quicker, before reinforcement to the network is carried out, by agreeing that the use of some or all of that connection capacity may be restricted by the DNO at certain times, such as when demand exceeds generation in the area. The DNO will provide these curtailment limits in the connection offer. The DNO will also have to ensure that these arrangements have an end date, after which the connection will need to be made firm or non-curtailable. Exceptions can apply where the customer has not requested a firm connection. It is worth customers noting that curtailment of a non-firm connection is not compensated. In practice, this means that a project could connect quicker, with a certain amount of guaranteed capacity, as well as agreement between themselves and the DNO on a certain amount of time during the year when the connection may not have access to the capacity or is effectively offline. This can be a good solution for customers who may not need 100% of their capacity all of the time. The arrangements for these types of practices have been standardised in the Access SCR and are now quite common practice.

Customers can request a non-firm connection when applying for their connection by indicating this on their application form, but they will first need to ensure that they meet the criteria. These criteria will be set out on the DNOs website, many DNOs now have dedicated pages on their websites around alternative connection solutions.

DNOs may use ANM (Active Network Management) to manage associated network constraints and when they take place - this is a type of software that monitors limits on the network. It typically allocates capacity available to connection customers based on when they requested their connection. This is the Last In, First Out (LIFO) hierarchy, which prioritises the earliest connections when allocating capacity at any given time.

Non-firm connections can also be made available at transmission. As part of its 5-Point Plan, the ESO committed to accelerating BESS connections. One of the ways ESO is doing this is by removing the requirement for BESS connections to have non-critical enabling works complete before connecting under a non-firm basis.⁸⁴ This means that the only transmission works BESS customers will need to wait for are those that are essential to enable a physical connection to the network, those needed to mitigate fault level issues or those needed to meet safety-based requirements. This will allow most BESS projects to connect quicker.

Phased Connections

Where the connection capacity is expected to increase over several years, a phased⁸⁵ or ramped connection solution may be possible for the customer at distribution and transmission. The connection will have an initial capacity, which will increase according to an agreed schedule over time, until it reaches the maximum capacity. This means that the customer has a commitment from the network company that they will secure their necessary capacity at an agreed date, but may connect sooner and potentially pay lower charges, by only using the capacity they need during the initial years of the connection. At the application stage, the customer can indicate that they are interested in this, and the DNO/ESO will work with them to create an appropriate capacity schedule and plan.

Identifying whether lower connection capacity could be acceptable initially would be valuable in saving customers time when discussing connection applications with network companies. Creating clear phased connection plans and estimated capacity with dates will help to progress to an offer more quickly. Additionally, it is sometimes possible for customers to ramp-up from a smaller distribution connection to a larger transmission connection in phases, which would require engagement and collaboration between the customer, the ESO and relevant network companies.

If customers apply for a non-phased, full connection, and are unhappy with their connection timescale, we encourage network companies to proactively provide phased connection, and other solutions, where appropriate and possible. We also encourage customers to re-engage with the network company to establish whether a phased connection solution is possible.

Independent Connection Providers

At the distribution level, some of the work for new connections or upgrading existing connections can be delivered by independent connection providers. This element will be described as ‘contestable works’ on the DNO’s connection offer. Details of independent connection providers are provided on each of the DNO’s website. This can often provide a cheaper and quicker connection.

Behind the Meter Solutions

For smaller-scale generation and demand projects, as an alternative to upgrading the connection from single-phase to three-phase, customers might be able to install an export or import limitation device, or other behind-the-meter solutions, such as off-grid BESS systems. Although this would mean the customer may not be able to use all their electrical devices simultaneously, it could negate the need for an upgrade and any associated costs and timescales. DNOs will be able to advise customers on such alternatives. However, it is also

⁸⁴ [ESO Word Template - Full Width \(nationalgrideso.com\)](#)

⁸⁵ <https://www.energynetworks-org.webpkgcache.com/doc/-/s/www.energynetworks.org/assets/images/ENA%20Phased%20Capacity%20Guidance%20FINAL.pdf>

worth bearing in mind that a three-phase upgrade would provide customers with the capacity to install more, or more powerful, low carbon technologies and electrical appliances in the future.

Customer Feedback

As set out in Chapter 3.6, the ESO and network companies have obligations that they must meet, and that Ofgem can penalise or reward them in accordance with their performance. The experience of connection customers and their feedback is crucial to many of these obligations and Ofgem's decision on how network companies and the ESO have performed against them. We therefore encourage connection customers to feedback through these mechanisms.

Owner	Incentive	Description
TOs	Quality of Connections Survey (ODI-F)	This survey measures the satisfaction levels of connections customers across all TOs, aims to incentivise them to improve their service levels.
DNOs	BMCS connections survey (ODI-F)	The Broad Measure of Customer Satisfaction survey aims to encourage DNOs to continue to improve the quality of their customer service. The BMCS takes a broader view of customer satisfaction with their DNO when undergoing a connection.

4.5 Case studies

Described below are a variety of hypothetical case studies of different types of connection customers that illustrate how some of the recommendations to customers in this chapter can be practically used to accelerate connections:

Domestic Low Carbon Technologies (LCT)s

A homeowner living in a rural area wants to decarbonise their home. They already have an EV chargepoint installed and plan to install a heat pump. They employ a heat-pump installer to assess whether their property has enough electrical capacity to support this. Upon inspection, the installer identifies that the fuse size of the property is 60A, which is not large enough to support both an EV chargepoint and a heat pump. Therefore, the homeowner needs to upgrade the fuse to their property to safely install a heat pump.

All DNOs will upgrade a domestic fuse up to standard size (80A or 100A, depending on the DNO) free of charge to accommodate LCT connections. Generally, upgrading to a standard fuse size will enable multiple LCTs to be connected to a single property. However, homeowners have an alternative option to upgrade their connection from a single-phase to a three-phase power supply. A three-phase supply consists of three service cables and provides more power than a single-phase supply. Three-phase upgrades are not free of charge, but they can allow for more powerful, or multiple, heat pumps and EV chargepoints to be installed.

In this case, the homeowner chose to purchase a three-phase upgrade. They applied for a connection upgrade with their local DNO who responded with a connection offer outlining the associated costs and timescales.

Later that year, the homeowner decided they wanted to install solar panels so they could sell electricity back to the grid. They contacted a solar PV installer who applied to the DNO for a solar connection on their behalf and provided the technical information on how much export

capacity was required. The DNO responded with a connection offer. However, in order for the desired export capacity to be met, a local substation needed upgrading. The DNO advised that the solar panels could be installed in the meantime if an export limitation device was installed alongside the solar PV. Once the substation was upgraded the export limitation device would be removed. As a 'final demand site' the homeowner would not be required to contribute to the cost of upgrading the substation.

An export limitation device restricts generation/energy storage output or increases the customer demand in order to prevent the Agreed Export Capacity (as stated by the DNO) from being exceeded. This reduces the amount of electricity that a property is allowed to sell back to the grid but enables an earlier connection. The homeowner decided to pursue this option to remove the timescales associated with waiting for the network reinforcement to accommodate the full capacity of the solar PV project.

EV Depot

A courier service plans to electrify its fleet to reduce costs and decarbonise. Given the nature of the service it provides, with high daily mileage, they require 10 EV chargepoints for their first electric-only depot to be viable. The company commissioned its engineering team to apply for an upgraded, firm connection via the local DNO, and sent over as much information on the technical requirements and project site as possible. The DNO responded with a connection date of 2027 as upgrades on the network are required to facilitate the increased electricity demand. There would be no costs associated with upgrading the network as demand customers are not liable to pay for network reinforcement costs at the distribution level. However, connecting in 2027 did not fit with the company's plans.

In response, the DNO also offered an alternative, flexible connection solution to accelerate the installation of the chargepoints. To assist with this process, the company used the Optimise Prime Site Planning Tool⁸⁶ which helps depot-based businesses to assess how to make the switch to EVs at the lowest connection cost. It includes software that implements a smart charging algorithm so customers can model how they might charge their EVs when electricity is cheaper (when demand for electricity is lower, for example at night, or when there are high amounts of renewable energy on the grid), to reduce the cost of running their fleet.

Having used the Optimise Prime Site Planning Tool, the company concluded that they could charge their EV fleet overnight, between 9pm to 6am. The DNO revised the connection offer and confirmed that the flexible connection could be delivered in 2025 with no network reinforcement required. The DNO was not able to deliver until 2025 as the project was situated a long distance from the distribution network, meaning the 'sole-use' asset (the wire that connects a specific project to the network) required significant work to install. However, the customer was keen to explore whether they could accelerate the connection date and examined the 'contestable works' in their connection offer to establish whether an Independent Connection Provider (ICP) could install this element faster. They discussed this with their DNO who advised which ICPs could deliver the connection, and the company was able to have the connection delivered in 2024 by a local ICP. To reduce connection and installation costs of chargepoint infrastructure, the company also made use of the Government's Electric Vehicle Chargepoint and Infrastructure Grant⁸⁷ and Workplace Charging Scheme.⁸⁸

⁸⁶ <https://www.optimise-prime.com/site-planning-tool-intro>

⁸⁷ <https://www.gov.uk/guidance/electric-vehicle-chargepoint-and-infrastructure-grant-guidance-for-installers>

⁸⁸ <https://www.gov.uk/guidance/workplace-charging-scheme-guidance-for-applicants>

Electrification of an Industrial Site

A large ceramics manufacturer wants to decarbonise its operations by fully electrifying their production processes. They established that an 100MW connection directly to the transmission network was required. Their engineering team finalised the technical requirements and applied to connect through the ESO. The ESO engaged with the TO who modelled its network against the requirements and established that a new transformer would need to be installed at a nearby substation to facilitate the full connection. Due to the queue of customers wanting a connection in the area, and the volume of enabling works required, they would not be able to deliver the connection until 2031. In this case, applying for a non-firm or flexible connection was not an option because the company needed to be operational 24 hours a day.

The company was under strong pressure from its shareholders to decarbonise quickly and remain a competitive global manufacturer. As a result, their engineering team began looking into potential acceleration options, and in particular, assessing whether a 'ramped-up' connection profile could be viable. To investigate this option, the company applied for a smaller connection of 50MW (half their total required capacity) through their local DNO – if the company were able to partially electrify at an earlier date it would demonstrate their net zero commitment and keep their shareholders content.

Large distribution connections can often trigger reinforcement works on the transmission network. In these circumstances, the DNO is required to process the application through the ESO who engages with the relevant TO to assess whether (and if so, what) transmission upgrades are needed. The company's engineering team organised a series of bilateral calls with the network companies to ensure all of the technical requirements were accurate and comprehensively understood by the DNO. After the assessment was complete, the DNO returned a connection offer to the project stating that a 50MW connection could be delivered in 2026. Using a ramped-up connection profile, this would enable the company to hit the ground running and electrify half their operations by 2027 with a distribution connection, and the other half in 2031 with a transmission connection. The company accepted the distribution connection offer.

Rooftop Solar PV

A large warehouse facility wants to reduce its energy expenditure. It devises plans to generate its own renewable electricity to power some of its operations and sell energy back to the grid. They appoint an energy consultant to advise on the best course of action, who determines that installing approximately 50 solar panels on the roofs of their warehouses would accomplish their goals. Their consultant applies to their local DNO for a firm connection and, after processing, the DNO returns an offer with a connection date of 2029. The delay is caused by the need for a new overhead line on the transmission network to facilitate the level of electricity export of 50 solar panels. However, this timescale was not a viable option for the business.

The DNO explains to the warehouse facility that an alternative solution would be to connect on a temporary, 'non-firm' basis, and that this connection could be delivered in 2028. This is under the condition that their ability to export may be limited at certain times. The company is pleased that some progress has been made to accelerate their connection date, however, 2028 was still not a viable timescale for them.

Therefore, their energy consultant liaises with the DNO to discuss if there are any other options to expedite the connection date. The DNO explains that a phased connection solution would enable the company to connect to the grid in increments with their connection profile being

ramped-up over time. For example, the company would be able to connect 10 solar panels to the distribution network each year, starting from 2024, and leading up to 2028. This would allow the warehouse facility to begin producing and exporting a small amount of its own renewable electricity starting in 2024 and increasing their capacity connected by 20% each year, until all of the 50 solar panels were operational. The company were happy with this proposal as it meant they could begin to reduce their energy costs and begin their green transition almost immediately. The company also installed an off-grid battery at their site so they could store excess electricity that they were unable to export to the grid.

Chapter 5: Delivering the benefits

5.1 Connections data

Ofgem has strengthened the reporting of connection data provided by the ESO and network companies, enabling us to track performance more accurately, to analyse the impact of mitigating measures and to highlight problems being experienced by customers.

The network companies have moved quickly to support these new requirements, but further work is now needed to formalise this reporting through regulatory reporting packs (RRPs), ensuring that the level of assurance and accuracy of this data is equivalent to wider regulatory reporting, and enabling the transparent and coherent publication of the connections landscape, where appropriate. Ofgem has already started to make these changes for transmission connection reporting, via recent changes to the ESO role guidance that are now in place (and which will carry over to the FSO once established). We are also exploring the potential to embed connections pipeline data into wider analysis, such as the FES, to enable more meaningful insights to be drawn and to help identify implications for the connections process and wider policy areas, including network planning and market signals.

At distribution, this will be achieved through amendments to the Regulatory Instructions and Guidance (RIGs). Ofgem plans to put these formal reporting measures in place by the end of Q1 2024 and will publish more data on performance in this area, on an ongoing basis from Q2 2024 onwards, once we have codified the requirements.

We are monitoring the impact of actions being delivered by the ESO and network companies under the ESO's 5-Point Plan and ENA's 3-Step Plan and beyond, including the introduction and enforcement of queue management milestones in connection agreements, the introduction of non-firm offers to more customers, solutions to decouple distribution connections from transmission reinforcements and revised CPAs.

It will be crucial that the delivery of reforms to the connections process are founded on a solid understanding of the connections picture and enablers, with continuous monitoring and review of progress to identify where further actions may be needed. The delivery model set out in this chapter will involve network companies taking ownership of this data and reporting and reviewing progress against it to inform and recommend where further action is needed. This may involve further changes to the requirements that we are putting in place, to better support analysis, and we will continue to work closely with the ESO and network companies to develop any further requirements.

We will continue to monitor ESO and network company progress carefully and take further steps to strengthen the granularity of reporting and bring forward further policy actions where necessary.

5.2 Expected benefits, indicators, and monitoring

The Connections Action Plan aims to result in connection offers with shorter average connection dates which better meet customers' needs and those of the electricity system, to enable a timely transition to net zero.

We think clear objectives underpinned by measurable targets and progress indicators are crucial to understanding whether the necessary progress is being made rapidly enough,

enabling us, the ESO and network companies to identify and take further actions as needed. We are committed to ensuring that the best solutions are identified and delivered in a process of continual improvement, informed by high quality data. We have signalled that substantial progress on these areas is needed as soon as possible, and at latest by 2025, with longer term reforms developed in parallel.

Our ambition is for **transmission** connection dates offered to be on average **no more than 6 months** beyond the date requested by the customer, for viable, net zero aligned projects taking account of the requirement to develop an economic, efficient and coordinated network. Currently this stands at **5 years**. We also expect that **a significant majority of projects receive the connection date they requested**, up from only 14% of projects currently.

We will monitor performance against this objective carefully, to ensure that it remains a useful indicator of progress towards our stated goals, of seeing shorter average connection dates which better meet customers' needs and enable a timely transition to net zero.

At **distribution**, our ambition is to reduce the dependency on transmission reinforcement works, reduce the overall time to connect and improve customer satisfaction. We will continue to work with the DNOs to gain insights and monitor performance and will confirm our forward expectations, as part of the ongoing monitoring, evaluation and review of incentives and obligations.

The impacts of some of the initiatives described in the Action Plan should be felt quickly. The impact of more fundamental reforms may be fully realised over the medium to longer term. However, we understand ESO is targeting implementation of its longer-term connections reforms by early 2025, which aligns with wider dependencies such as CSNP, and so rapid progress is needed to deliver the necessary change across these areas.

In practice, this is likely to mean a staged programme of reform, based on continuous review and improvement. Our proposed approach to implementation is set out further in Chapter 5.3.

We recognise inherent challenges in setting blanket quantitative targets for connection times due to variations in technology types, how realistic connection customers are in their requested dates, as well as other factors outside the scope of connection reform. For instance, connection times at transmission for an offshore windfarm will differ to an onshore BESS project due to construction times, times to attain planning consents, supply chain requirements etc. However, we think the outcomes that we describe below provide a good indication of the progress that we expect to see across the system, reflecting improvements overall across the spectrum of connection customers.

Current Initiatives - Expected Benefits

Current initiatives being led by the ESO should free up around 100GW capacity, more than is currently connected to the transmission network. It is crucial that this capacity is utilised in an optimal way, to maximise the impacts for viable, net zero aligned projects. At distribution, short-term actions being led by the ENA will enable around 30GW generation to be accelerated, improving connection dates for some existing customers by up to 10 years with updated, flexible offers being provided from Q4 2023 onwards. A further phase, beginning in Q1 2024, will focus on more complex GSPs, including multiple DNOs, with the potential to accelerate a further 20GW capacity, currently dependent on transmission reinforcement works, on a flexible basis.

BESS, and BESS combined with generation as hybrid projects, represent over 50% of contracted connections across Transmission and Distribution. The ESO's non-firm access BESS trial will accelerate connection dates by up to 11 years for some projects. Changes in modelling assumptions used by the ESO and new guidance published by the ENA relating to the assessment of distribution connected BESS, should result in fewer reinforcement works and potentially earlier connection dates for these projects.

For larger, particularly transmission connected, projects the design and construction of new network infrastructure is often more of a barrier to the acceleration of connection dates than the connection process. However, for around 50GW of smaller, distributed generation projects, currently waiting for connections to the distribution networks, but dependent on upgrades to the transmission network, there is an immediate opportunity to decouple themselves from these transmission reinforcement works and accelerate connection dates by up to 10 years. These customers should be offered existing network capacity by the DNOs, under flexible connection arrangements, using ANM, ahead of planned transmission reinforcement works. An initial cohort of 30GW of distribution connections should be offered flexible connections by the end of 2023, with potentially a further 20GW in 2024.

The proposed introduction of an LoA for new transmission connection applications would have an impact on the number of speculative projects submitted, which should be reflected in the numbers of applications joining the queue each month. Whilst there are other variables that determine quantities of applications, the current rate should be reduced. We are keen to see a greater number of viable and deliverable projects holding connection agreements and moving forward in line with their progression milestones and wider development programmes. The measures outlined in this Action Plan should result in a reduction in the number of projects with connection agreements that are unable to progress to financial close or reach energisation (approximately 60-70% at transmission depending on technology type). We will use attrition rates, alongside other measures, as an indicator that the reforms being implemented are delivering against our objectives.

We also plan to use the annual FES process to support a wider review of the adequacy of generation projects holding connection agreements at distribution and transmission (scale, location and technology) to meet net zero pathways, taking into consideration likely attrition rates for different technology types. Whilst for some technologies, with shorter development cycles, foresight may be limited, this analysis will provide a good indication of the likelihood of meeting short- and medium-term net zero targets and support wider policy development activities.

5.3 Implementation approach and transition

Desired Outcome: Connections reforms delivered with a high degree of confidence in quality, pace, ambition and coordination of reform delivery, ensuring greater and faster impact of connection reform in reducing connection times as well as lower system and/or connection costs.

In selecting the most appropriate implementation approach for the Connections Action Plan, we were guided by a range of factors and principles. We want an implementation approach that ensures sufficient industry engagement and efficient and coordinated delivery of changes, taking into account the interests of all stakeholders, as well as wider strategic objectives

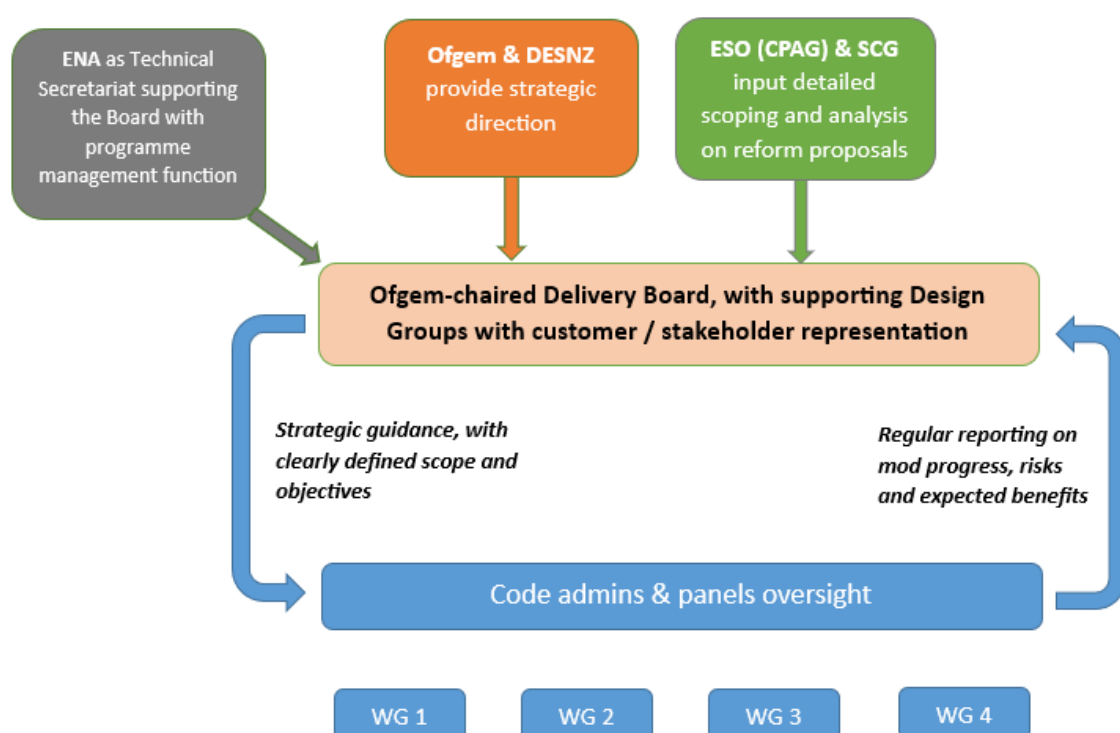
related to achieving net zero goals and enabling reforms to be substantially delivered by 2025 to ensure energy security and investability across the network.

Implementation approach

The selected implementation approach is an industry-led process with strengthened governance, oversight and strategic guidance from Ofgem and government to support and expedite the effective and coordinated delivery of code and non-code improvements to the connections process at both transmission and distribution levels.

The delivery structure will include monitoring and review functions, with accountability for tracking delivery and progress, initiating new areas of analysis or reform measures as needed.

Figure 7: Simplified connections action plan delivery structure diagram.



Actions in the Connections Action Plan will be delivered under the existing code governance framework and none of the structures outlined in the implementation model are intended to bypass or alter the standard processes that operate for code modifications. Whilst selected changes may be considered for eligibility under the 'Urgent' code change process, the agreed modification processes set out in each industry code will continue to operate and the Authority, in its role in approving or rejecting modification proposals submitted to it for decision, will consider each proposal on its merits when received.

A Connections Delivery Board (CDB) will be established to oversee the reform implementation process. High-level arrangements surrounding the scope of responsibilities and structure of the board are summarised in the table below. Broadly, the key assumptions are as follows:

- The CDB will comprise organisations and representatives responsible for, or affected by delivery of in-scope changes to regulatory, legal, industry and commercial frameworks for connections and will be chaired by Ofgem, working with government.

- Membership will be drawn from Ofgem, UK Government, Scottish and Welsh Governments, ESO, TOs, DNOs, ENA and connection customer representatives.
- The CDB will have a dual role: it will provide strategic guidance and oversee the programme management function.
- The ENA will take on the role of a Technical Secretariat. The organisation has been deemed best placed to coordinate the work of the board due to its past experiences creating a similar delivery framework.
- Data reporting and provision of the delivery dashboard to the CDB will be undertaken by the Technical Secretariat and network companies to ensure development of adequate metrics and visibility to monitor progress.
- A Connections Process Advisory Group (CPAG) reporting back to the board will be set up by the ESO and will be chaired by an independent party to identify areas of code for change and raise quality proposals to ensure a coordinated change across Transmission and Distribution.
- Ofgem and government are committed to working closely with the industry to provide strategic guidance, and ensuring written consultations are issued where required
- The CDB will **not** be responsible for making decisions on specific changes to industry code and licence frameworks.
- One of the CDB's main duties will be to review and scrutinise the overarching programme and intervene to prioritise workstreams that are key to achieving the targets set out by this action plan, as well as wider strategic objectives. Any urgent changes proposed will be subject to existing governance processes and Ofgem's approval

We recognise the significance of transparent and open engagement in our delivery structure with wider stakeholders across the industry. We will consider and announce shortly the how the CDB will engage externally and provide updates on progress.

	Connections Delivery Board (CDB)	Technical Secretariat	Connections Process Advisory Group (CPAG)
Purpose	The CDB will work collaboratively to ensure timely and efficient design and implementation of changes by: • setting overall strategic direction; • tracking progress against key milestones, deliverables and benefits, and monitoring overall delivery of workstreams, including standing up new work as needed; • providing a steer on key strategic matters of policy and process design, including where relevant endorsement of key matters and deliverables;	The Technical Secretariat shall support the Chair in ensuring the smooth functioning of the CDB and CPAG. Technical Secretariat will be responsible for coordinating, producing and circulating relevant materials including project plans and reports against milestones.	The CPAG will support timely and efficient design and implementation of changes and promote coordination across workstreams and other relevant industry groups. This will include the initial scoping of necessary industry code changes prior to proposals to amend the codes being submitted into the existing code governance processes for consideration.

	Connections Delivery Board (CDB)	Technical Secretariat	Connections Process Advisory Group (CPAG)
	• promoting coordination across workstreams: • monitoring benefits, identifying and providing advice, guidance and recommendations for managing key risks, issues and opportunities.		The group will support the ESO in undertaking more detailed design and implementation of changes to the connections process, as a result of the ESO's 5-Point Plan, ENA Strategic Connections Group Transmission/Distribution interface subgroup, Connections Reform project, and any further change measures introduced.
Chair	Ofgem	ENA (Secretary)	Independent (TBC)
Proposed membership	Ofgem, UK Government, Scottish and Welsh Governments, ESO, TOs, DNOs, ENA, chair of CPAG, chair of the ENA Strategic Connections Group Transmission/Distribution interface subgroup, Code Panel chairs, Customer representatives (director level representatives)	n/a	Steering group member organisations (working level representatives)
Launch	Q4 2023	Q4 2023	Q1 2024

Industry-led process

The key to achieving rapid and coordinated change is strong leadership within an industry-led process. This would entail strong programme management, coordination and proactive engagement (with written consultations as required) from stakeholders. The main benefit of this approach is that it will help ensure the submission of quality modification proposals and delivery of overarching, cross-code changes, which will facilitate delivery of the necessary improvements that are key to achieving net zero targets. An industry-led process will result in a high level of industry engagement which is crucial to driving the processes forward.

Industry engagement is indispensable for provision of technical expertise needed to inform code and process changes and to ensure ongoing effective stewardship of the resulting arrangements in an integrated way with system management and planning processes. Ofgem will be closely involved and provide strategic guidance and oversight to ensure changes are progressing at pace and are aligned with longer-term strategic objectives, with a strong

function for industry-led reporting and review and monitoring of progress against indicators and strategic outcomes.

Risks associated with this approach include the breadth and complexity of changes with requirements across the system and the potential for diverging views as to the necessary changes with impacts for different parts of the system and customer groups. Some decisions necessary to deliver the required outcomes may be contentious. This will require strong governance, quality assurance, and risk mitigation mechanisms to be developed at early stages of the implementation process. We believe that this can only be achieved with strong programme management and are encouraged that the ENA is committed to providing dedicated programme management resources to deliver this important function in its role as technical secretariat.

We expect a triage process considering proposals which are higher risk/impact, of greater complexity, requiring stronger whole system coordination, or are more likely to be contentious; will inform the extent to which proposals are more closely monitored and scrutinised by the board; versus those which may be progressed with lighter touch reporting under the respective ESO/ENA led reform programmes.

Industry will also have a key role in developing and reporting indicators of progress, including expected and realised benefits and an overarching benefits plan, and informing recommendations as to where reforms need to go further and faster to achieve desired outcomes. Chapter 5.2 outlines the data and indicators related to the size of the queue, the expected timeframes and the expected impact of the changes introduced. This shall serve as the basis for the CDB and the technical secretariat to set out an initial project plan and monitor progress, identifying and bringing forward further measures as needed.

Ofgem/government's role

Ofgem and government are working closely together on the establishment of the Ofgem-chaired CDB. We will provide strategic guidance, consulting as required, and ensure accountability for rapid delivery of progress supported by robust programme management, including assurance and risk analysis functions. Ofgem and government will continue to actively participate in the SCG and in the newly-formed CPAG. Ofgem will also participate in Code Working Group meetings, as appropriate.

It is key that the delivery governance structure works in parallel, and within, the existing code governance framework. The delivery structure will not replace the code working groups or circumvent any existing processes. The role of the CDB and associated subgroups will be to provide sufficient preliminary development, so that a clear, targeted and well-formed proposal set the scope and focus for the mod proposals associated with connections reform to be progressed further by code working groups, where needed, or reforms to industry processes directly. Whilst urgency should be recognised and proposed where appropriate to achieve targets, it will remain at Ofgem's discretion to determine whether the urgency criteria have been met in a particular case. We stand ready to act at the necessary pace to deliver beneficial change. Where code proposals meet the urgency criteria, Ofgem will consider and respond accordingly to ensure reform proceeds at the required pace, reflecting cross-cutting priorities.

The most significant risks relate to the pace and impact of change proposals, in view of the urgency, prospective contention and complexity of the change needed. There is a possibility of the change process not going as far as needed in terms of pace and cross-system coordination, and, as a result, changes not being delivered quickly enough. While our view

remains that the Connections Action Plan is best delivered by an industry-led process with strong governance, strategic oversight and programme management, all options remain open to us should other delivery routes need to be considered, including the potential for a Significant Code Review, should the necessary progress and coordination not be delivered. It remains at the discretion of The Authority to consider other reform delivery options if an intervention is required.

Similarly, government does not, at this stage, believe legislation is required to ensure timely and effective implementation, for example by granting powers to the Secretary of State/Ofgem to make changes to codes and agreements which are outlined in this action plan. However, government retains the option of legislative reform should sufficient progress not be made, and alternative mechanisms required.

The CDB will be established in Q4 2023. It will review, scrutinise and prioritise actions in the Connections Action Plan to establish the implementation programme. Core changes in the near-term will also be considered for eligibility under the 'Urgent' code change process. Each proposal will, however, need to follow the existing process both in terms of the Code process for request for urgency and Ofgem's process and criteria for urgency decisions. It is our intention to:

- Review the Terms of Reference for the Connections Delivery Board and the associated subgroup(s) ahead of publication;
- Continuously engage with industry during the reform implementation process; and
- Issue further communication over the coming weeks

The predicted impact of this implementation approach is allowing the necessary changes to progress at a quicker pace, and with higher quality and confidence. In addition, care will be taken to ensure that changes are coordinated and aligned at transmission and distribution. This will partially be achieved through Ofgem's involvement, as well as the work of programme managers and the CDB monitoring progress by setting out milestones for the industry to meet and regularly reviewing progress. The timeliness and quality of code modifications raised will allow us to measure the progress made in implementing connections reforms.

Role of customers / stakeholders

Connections customers' participation will be key to achieving successful delivery of this ambitious reform. We expect developers and investors to adequately engage and support the changes outlined in this Action Plan. This may involve doing things differently, and constructive participation in reform delivery and governance will be essential to maximise benefits. Customers will also form part of the delivery structure, with multiple customer representatives expected to be part of the CDB and actively participating in its work.

Interaction with Transmission Acceleration Action Plan implementation

A new Ministerially-chaired senior board will convene industry CEOs, Ofgem and the ESO, alongside representatives of the Scottish and Welsh Governments, to oversee delivery of the actions set out in the Transmission Acceleration Action Plan, and to monitor the impact on delivery of transmission. Government and Ofgem will ensure alignment between the CDB and the Transmission Acceleration Action Plan governance including through ensuring that connections issues are considered through the Ministerially-chaired board where appropriate.

ANNEX A – 3.1 Potential actions to further raise entry requirements

Desired outcome: Reduction in speculative and duplicate connection contracts

Action	<i>Identify, assess and bring forward proposals to raise entry requirements further</i>
Action lead	ESO/TOs/DNOs with input from Ofgem and DESNZ
Action introduction date / impact date	Q1 2024 to bring forward recommendations to CDB for implementation Delivery from Q2 2024 with immediate impact, or sooner if applicable
Progress indicator	Reduction in uncertain/speculative projects applying to connect Number of projects being rejected at application and offer stage
Action review date	Review after 6 months

1: Increase financial commitments to attaining a connection or holding capacity to deter speculative projects.

Increasing financial requirements as a condition to attain or hold a capacity agreement could disincentivise projects that wish to sell on their queue position or to those that submit multiple applications. It would create an added incentive for developers to submit highly credible projects that are likely to be advanced.

We note, however, that this action could disproportionately impact smaller developers, and any locational variations would need careful consideration. The ESO and network companies should, therefore, assess what the level of charge would be to ensure impact whilst also mitigating against risks of dissuading smaller applications.

2: Place restrictions on the buying and selling of TEC

Part of the motivation to submit speculative applications is the potential for developers to then sell on a project, based on its existing connection offer, often for a significant profit. Trading of speculatively reserved capacity is unlikely to support efficient and economic development and utilisation of network capacity.

The ESO could take further steps to contractually restrict the trading of TEC in a targeted way. For example, only being able to sell on a project once it has met certain progression dates could reduce the incentive to apply with the intention of selling on the position. Although we recognise having the flexibility to develop a project for onward sale can be a legitimate, and not necessarily negative, activity (as opposed to the commoditisation of the connection agreement and over-speculation), we see potential benefits with this policy. However, there are

considerations that would need to be addressed, such as whether the expected benefits would be sufficiently significant.

3: Introducing a temporary moratorium on new connection applications

At transmission, the ESO could introduce a temporary moratorium on new applications ahead of longer-term connection reforms coming into place as a one-off, transitional measure, potentially as the date for the first application window approaches, should this be established.

A temporary moratorium could support more effective management of the transition by ensuring applications assessed under the new arrangements are not potentially stuck behind existing projects. There could be further benefits, including allowing the ESO and network companies more time to train staff to assess new applications and engage with potential applicants on the new application requirements under the reformed connections process to help with a smooth transition.

Due to the likely impact on developer and investor confidence of a moratorium, we propose alternative options that should be considered in the first instance. An alternative option could be not to provide full offers in areas that surpass FES estimates, potentially for given technologies and locations or system-wide, discussed further under the 'stacking' model outlined in Chapter 3.4.

ANNEX B – 3.2 Remove stalled projects

Desired outcome: Release unutilised network capacity

Action	<i>Rapidly explore more stringent measures to improve the certainty and progression of customers holding capacity, bringing forward recommendations to CDB</i>
Action lead	ESO, TOs, DNOs
Action introduction date / impact date	Q1 2024 to bring forward recommendations to CDB for implementation
Progress indicator	Removal of projects Reduction in projects seeking to change connection date (through mod app for example) Capacity released to allow other customers to advance
Action review date	Review action by Q2 2024

1)Disincentivising and/or limiting the number of times a project can modify its application or more explicitly limiting the scope of what can be modified

2)Strengthening opportunities or requirements to return unused capacity

3) Strengthen financial disincentives for holding capacity – pre- and post-connection

4)Establish a one-off, facilitated trading window

1: Disincentivising project modification applications or more explicitly limiting the scope of what can be modified

Currently, projects can apply to modify their applications an unlimited number of times, which has led to unviable projects repeatedly pushing back their connection dates while retaining the capacity they have been allocated. Clarifying or strengthening disincentives/limitations on this process or reducing the scope of what a project is allowed to modify in its application would allow for the removal of unviable projects which regularly fail to meet their agreed connection date. It would also reduce speculative applications by incentivising customers to have more established project planning and development before agreeing to a connection offer.

2: Strengthening opportunities or requirements to return unused capacity

Under the current system, connected or contracted projects can hold onto excess connection capacity, which customers tend to do when they understand that getting that capacity back in the future, were they to return it, could take many years. The size of the capacity requested also has relatively little financial impact, potentially persuading projects to over-request their capacity. This may result in underutilised assets across the system, which could otherwise be allocated to projects seeking connection.

Introducing a requirement or creating opportunities to return unused capacity would help ensure more efficient utilisation of assets and allow projects to connect faster and at less cost. We recognise that some capacity might be utilised in the near future, for example a phased development project or a project that has faced unexpected delays. In such cases capacity could be retained for an agreed period.

We note that changes to the recovery of the residual element of Use of System charges, where these charges are now based on connection capacity rather than usage, should disincentivise retaining excess capacity.

3: Strengthen financial disincentives for holding capacity – pre and post connection

Should other measures not lead to a significant reduction in unused capacity, it may become necessary to introduce further financial disincentives for holding capacity, in the form of reforms to use of system charges, or a capacity holding charge, which could take the form of a 'deposit' against future charges when a customer actually connects. This may involve similar options to those outlined under Option 1 under Chapter 3.1 relating to financial incentives for applying for capacity.

Challenges exist around the implementation of stronger financial disincentives, and doing so was not supported in responses to the ESO's longer-term connections reform consultation. There is a risk of disincentivising investment, particularly from smaller scale projects and emerging technologies. The ESO would therefore have to carefully consider what the benefits and disadvantages of establishing these barriers would be, as well as a suggested implementation option, method and the relevant tolerances.

4: Establish a one-off, facilitated trading window

A further option for the ESO's consideration could be a one-off, facilitated trading window. This would allow customers to trade their capacity requirements.

However, we would expect that this would need to be an ESO-facilitated process, and may be very complex and time consuming to administer, with similar benefits to the 'stacking' model, described further in Chapter 3.4. We also acknowledge the risks of adding further value to network capacity. We, therefore, see this as a less promising option, subject to the ESO's assessment.

ANNEX C – Online resources for connection customers

5.4: Online Resources and Tools for Connection Customers

Transmission Customers:

National Grid Electricity Transmission (NGET) Online Resources & Tools	Links
Research Assistant: ensures customers have access to information they need before moving forward with their application. Customers can access specific regional and site information including key substation details and earliest potential connection dates	Link
Provides an overview of NGETs ways of working throughout the connections process, as well as useful context for customers to be aware of, such as the planning and utilisation of new and existing substations	Link
Key pages on the connections process for customers to easily access.	Link
Highlights some key recent connections NGET have delivered across their network	Link

Scottish Power Energy Networks (SPEN) Transmission Online Resources & Tools	Links
Provides an overview of SPEN and offers a high-level map on how each TO area is roughly split	Link
A guide on how a customer can apply to get a connection	Link
Page including all the resources for new transmission connection customers	Link
Statement of the basis of transmission owner charges	Link
The Transmission Owner Reinforcement Instruction (TORI) quarterly update report	Link
An online connection portal where customers can register for a pre-application call where they are prompted to provide their project details, any technical details and proposed site coordinates through an interactive map. Customers can view all their projects through the portal.	Link
This SPT Generation Heatmap will be launched on 30th November and shows where activity is on the network. The map will offer detail on the type of generation, name of the project, status of the project, total MW connected, and total MW contracted	Link

Scottish & Southern Electricity Networks (SSEN) Transmission Online Resources & Tools	Links
Main connections page including a transmission connections guide	Link
A form that customers can complete to request a pre-application call	Link
SSE is developing a new Customer Relationship Management system, which will also include an online portal for customers. This is in the early stages of development but will be available for customers in time.	N/A

Distribution Customers:

National Grid Electricity Distribution (NGED) Online Resources & Tools	Links
Small connections online application - Find out about connecting up to 4 domestic properties or a small commercial property up to 69kVA	Link
5 or more properties - You can apply online to connect 5 or more domestic properties using our Connections Online Application Form .	Link
Connections portal – online tracking system for the application process for small customers, from application to acceptance	Link
Budget estimate online self-serve tool – Helps customers get a rough idea of connection costs before submitting an application	Link
Interactive maps - explore NGED's network or find out more about your area.	Link
ICP (Independent Connections Provider) Portal	Link
Do NGED serve your area?	Link
Connection surgeries - Surgeries provide more detail to help you understand all the considerations of making a connection to the network	Link
Legal permissions and consents	Link
Competition in Connections information - Find out more about the role of independent companies in connections	Link
Domestic EV online self-serve - Customers can notify NGED of an electric vehicle charge point on the self-serve application and receive a real-time response	Link
Distributed Generation - Guides designed to help owners or developers of Distributed Generation to connect generation plants to the distribution network.	Link
Community Energy – Learn more about community energy projects and how to get involved	Link
Technical information on 12 key areas	Link
Guaranteed Standards - Ofgem has developed a set of Standards in conjunction with the electricity distribution network operators, industry representatives and customer groups	Link
Embedded capacity register - The ECR provides information to electricity network stakeholders on generation and storage resources (≥1MW) that are connected, or accepted to connect	Link
Distributed generation EHV constraint maps – provide an overview map of our EHV networks (33kV and above), highlighting those circuits which are operating at or near their limits for the connection of any further Distributed Generation	Link
Maps Hub – Page containing all map-based information, including interactive maps	Link

Scottish Power Energy Networks (SPEN) Distribution Online Resources & Tools	Links
A guide for customers to ensure they get the right content for their specific needs	Link
Within this webpage the customer can view detail on making changes to an existing connection	Link
Provides detail of how the process flows for customers and background on why they get offered specific generators	Link
interactive maps of SPEJ's SP Manweb and SP Distribution areas. This allows customers to get sight of how busy specific circuits or substations are prior to putting in an application	Link
Offers customers detail on Incentive on Connections Engagement and provides useful resources	Link

Northern Powergrid (NPg) Online Resources & Tools	Links
View indicative prices and timescales for connections to help inform project planning	Link
Access data and information about NPg's electricity distribution network across the North East, Yorkshire and northern Lincolnshire	Link
View NPg's network generation and demand heatmaps to understand the available capacity near your site to assess the timescales and cost of connecting in that area	Link
Assess opportunities available for development projects that require new or additional connections	Link
Assess information on connected resources and network services < 1MW	Link
Assess information on connected resources and network services ≥ 1MW	Link
Self-serve budget estimates for new connections up to 210kVA	Link
Assess information on potential future events built around the scenarios defined in the National Grid FES (Future Energy Scenarios).	Link
View where NPg is tendering for Flexibility Services and participate in the local flexibility market (Piclo Flex and Flexible Power)	Link
Distributed Secondary Substation Data : Assess capacity of NPg's Secondary Substation to understand the likelihood of being able to make demand connections in that area.	Link
Assess the impact of connecting additional Low Carbon Technology demand and generation	Link

Electricity North West (ENWL) Online Resources & Tools	Links
Customers can arrange a connections surgery meeting to speak to ENWL experts about their projects, complex schemes or a list of possible sites before submitting an application.	Link
Main connections page	Link
Network Asset Viewer : Search for assets on ENWL's distribution network. Customers can use this interactive map to identify the attributes of a specific asset and search an area of interest.	Link
Heat Map Tool that enables developers to assess the level of capacity that might be available for new connections to ENWL's network.	Link
An Open Data Portal that provides a wealth of information about the network which will aid developers planning their connection.	Link
Customers can discuss their requirements , get support on submitting an application, find out what the best solution is, resolving enquiries and FAQs by emailing PACE@enwl.co.uk or calling 0800 988 1730	Link

UK Power Networks (UKPN) Online Resources and Tools	Links
Open Data Portal : A catalogue of all the datasets available to customers. Information like network infrastructure and usage map helps inform customers where to connect.	Link
Standards library : G81 technical library containing all of UKPN's standards to help customers with the construction of their project.	Link
A series of simple guides to help commercial customers looking to connect EVs, solar, batteries and heat pumps .	Link
This Site Planning Tool helps fleet managers appropriately size electricity connections.	Link
A series of simple guides to help commercial customers looking to connect wind and solar farms and hydrogen facilities .	Link
A series of simple guides to help commercial customers connect housing and office projects .	Link
A service that enables customers to ask UKPN's experts for advice and book time at a connections surgery to discuss projects.	Link

Scottish & Southern Energy Networks (SSE) Distribution Online Resources & Tools	Links
SSEN Data Portal – allowing overlays of previously disconnected data sets as simple graphical interfaces. Designed with data experts, it is built on an open data protocol allowing users to access data through direct downloads and API	Link
Connections Capacity Mapping – at-a-glance maps showing generation and demand capacity in its networks areas with detailed information at a Bulk Supply Point (BSP) and primary substation level. This is particularly instructive to connectees at a scoping stage of a project.	Link
Demand Calculator – Can be used by applicants seeking demand connections to SSEN’s network for housing projects, large or small. Connectees can receive guidance on what level of demand capacity they will need.	Link
NERDA (Near-time real data access) tool – provides potential connected with information on power flows on the network. This is of particular interest to connectees of flexible assets such as batteries.	Link
EV Fleet Guide – Working with SPEN (Distribution), SSEN developed a specific guide for vehicle fleet operators considering an electrification programme with key steps and case studies. Access to a site identification tool, for mapping placement of charging assets, is also available.	Link
LENZA – Tool for Local Authorities to help develop their local area energy plans and associated connections using a whole system network database. Local Authorities are asked to express interest in the Local Energy Net Zero Acceleration (LENZA) tool which is provided free of charge.	Link

ANNEX D – Connections Action Plan

analytical note

This note underpins the investment line in the Connections Action Plan:

‘Government estimates that these actions⁸⁹ could bring forward £50-100bn of capital expenditure over the next 10 years.’

This estimate was developed based on a set of assumptions that are uncertain but have been tested with external stakeholders.⁹⁰ It forms part of a grid investment package, which combines the investment expected from the Connections Action Plan with the investment expected from the Transmission Acceleration Action Plan. The two can be combined without double counting as the Connections Action Plan investment relates to generation and storage waiting to be connected to the grid, whereas the Transmission Acceleration Action Plan investment concerns the onshore transmission network.

Investment in electricity generation is needed to support sustainable growth and net zero as electricity demand is expected to increase from 330TWh per annum to between 450-500TWh in 2035.⁹¹ Applications to connect to the electricity network have significantly increased. For the transmission network, the number of connection applications has grown tenfold over the last five years. Current connection agreements include over 500GW of generation and storage,⁹² over double the level required to be connected in 2035 under net zero scenarios.⁹³

The current connection processes and network availability limit the rate at which projects can be connected to the electricity network. Both the current high demand and limitations with the connection processes are contributing to large wait times for customers. Almost half of transmission connection projects have an offered connection date at least five years into the future and more than one in five will wait over ten years. Improving the connection processes will increase the number of projects connecting to the network and the business investment associated with these projects.

The Connections Action Plan, along with the ESO’s 5-Point Plan and the ENA’s 3-Step Plan, will reduce connection delays. In aggregate, these connection actions will alleviate the limits on connection dates offered to customers (shown in Figure 1) by removing stalled and slow-moving projects from the connection queues, making better use of existing network capacity and raising the entry requirements for projects to receive a transmission connection date.

Methodology

To assess the impact on business investment, we have compared a baseline scenario, the expected business investment in the absence of the actions, and a policy scenario, the

⁸⁹ Relating to the Connections Action Plan in combination with ESO and network company initiatives.

⁹⁰ This includes a review of the methodology by the Energy Systems Catapult, to be published on their website.

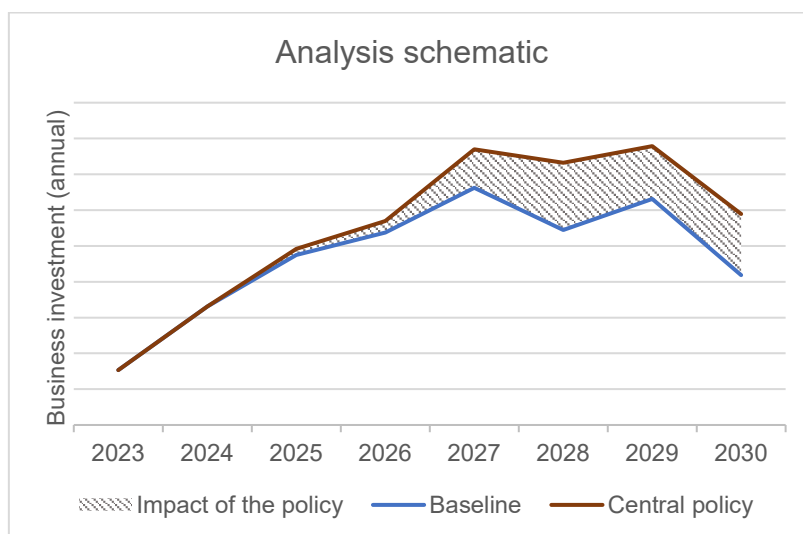
⁹¹ [Electricity Networks Strategic Framework](#), DESNZ, 2022

⁹² A proportion of these projects will be speculative and will never connect.

⁹³ [Energy and emissions projections: 2021 to 2040](#); DESNZ, 2023. Annex O: Total electricity generating capacity.

estimated business investment following the actions. This is shown in Figure 8. The expected impact of the policy is the shaded area between the policy and baseline scenario.

Figure 8: Schematic showing the impact of the policy - the area between the baseline and policy scenarios.



To calculate the business investment impact, we consider the impact on generation capacity connecting to the network. We do not include demand customers within the estimates as the vast majority of projects holding connection agreements are generation and storage projects, and we do not have a consistent way of estimating the capital expenditure of demand connections given their diversity. We convert the impact on generation and storage capacity connected to the network to business investment using cost data for each technology.^{94,95} We assume that capital expenditure corresponds to business investment.

Baseline scenario

The baseline scenario is created by considering how projects in the current distribution and transmission queues will connect to the electricity network in the absence of the connection actions. Not all projects entering the queue result in a connection. This is accounted for by applying attrition rates based on past trends and assuming projects that are expected to be removed via the connection actions do not connect. The baseline scenario takes into account the fact that we have more confidence in some projects connecting and these are assumed to come forward. This includes projects that have already secured planning consents or are part of the Holistic Network Design (HND).⁹⁶

Policy scenario

To estimate the impact of each action under the policy scenario, a yearly profile of the actions is created. This sets out the amount of new capacity released, either from projects being removed or from additional capacity being created, which projects can then be advanced into. Projects from within the respective queues are advanced into this space and, where appropriate, the space that advanced projects leave behind is backfilled with new projects joining the queue. We have made several assumptions to complete this analysis. These

⁹⁴ [Electricity generation costs 2023](#), DESNZ 2023

⁹⁵ [Storage cost and technical assumptions for electricity storage technologies](#), DESNZ 2020

⁹⁶ [Holistic Network Design](#), ESO

include the take up of the actions that lead to a connection, the profile of capacity made available, the technological make-up of projects advancing, the average number of years projects advance and the rates at which space is backfilled by new projects. In developing these assumptions, and the analytical approach, we have worked with the ESO and ENA. While the assumptions are uncertain, they believe them to be a reasonable assessment. We have also applied sensitivities to our assumptions where possible.

The full impact of the connection actions is considered additional to the baseline scenario. This is because although projects will be removed through the actions, we do not expect these projects to connect under the baseline scenario.

Before projects can connect to the electricity network, they need to complete pre-development steps (such as obtaining planning consent) and construct their plant. Timescales for these steps vary by technology. For projects advancing within the queue, we have assumed that they are at varying stages of pre-development, but have not started construction. To reflect this within the analysis, limits have been applied to the earliest date that it is possible to accelerate different technologies into, based on the pre-development and construction periods associated with those different technologies.⁹⁷ We have assumed new connection dates will be disseminated in 2024 and that projects for given technologies will be equally spread between their pre-development years.

Results

Under the baseline scenario we estimate that storage and generation projects⁹⁸ associated with £234bn⁹⁹ of capital expenditure connect to the electricity network in the ten-year period between 2024/25 and 2033/34. For the policy scenario we estimate this to be between £281-331bn with a central estimate of £308bn. From this, we estimate the connection actions will increase capital expenditure over the next ten years by between £47-96bn with a central estimate of £74bn. Figure 9 shows the cumulative capital expenditure of generation and storage capacity estimated to connect to the transmission and distribution networks between 2024 and 2034 under the baseline and policy scenarios. The figure also shows the range within the policy scenario from applying sensitivities to the key assumptions. In addition, we have not assessed how this investment is funded or whether it displaces other business investment in Great Britain. Finally, note that this is private investment.

⁹⁷ These figures come from [Electricity generation costs 2023](#), published by DESNZ and have been cross referenced against the [Renewable Energy Planning Database](#)

⁹⁸ Excluding nuclear and projects below 1MW in capacity

⁹⁹ All figures are in 2023 prices and are undiscounted

Figure 9: Impact on cumulative capital expenditure under the baseline and policy scenarios.

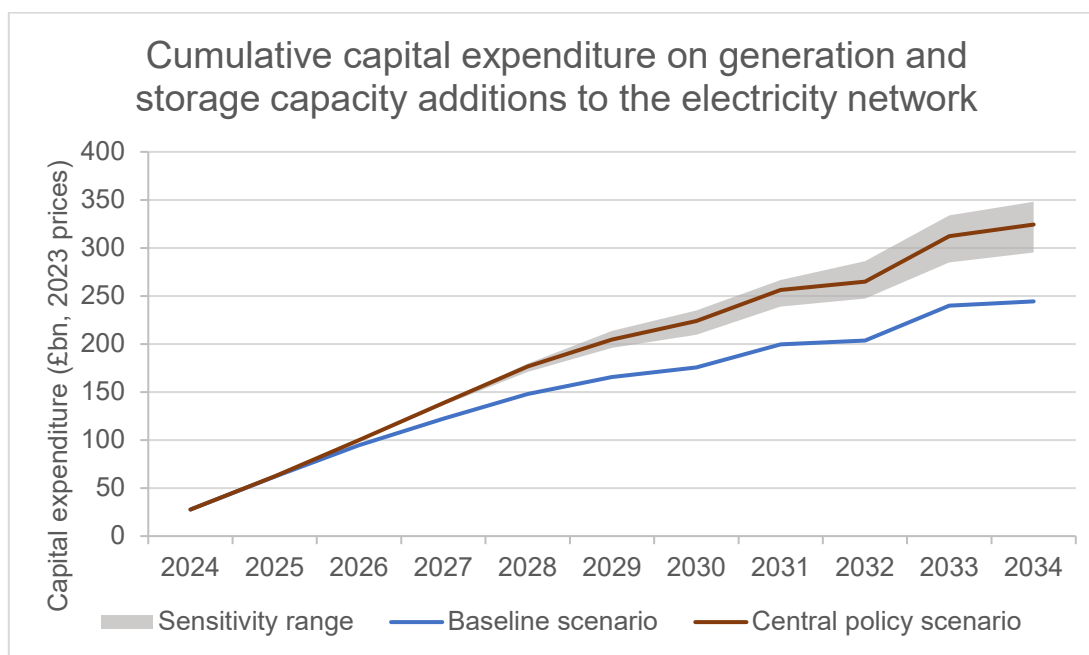


Figure 10: Annual increase in capital expenditure due to the Connections Action Plan and ESO and network company actions (£ billion, 2023 prices, undiscounted)

	2024/ 25	2025/ 26	2026/ 27	2027/ 28	2028/ 29	2029/ 30	2030/ 31	2031/ 32	2032/ 33	2033/ 34	Total
Low	0.0	1.0	5.4	9.9	8.6	6.4	3.9	5.2	3.6	2.5	47
Central	0.1	1.4	6.5	11.5	11.9	10.0	9.0	7.3	6.4	10.2	74
High	0.1	1.5	6.7	12.6	14.9	15.0	10.4	9.6	14.6	11.0	96

Glossary

A

A (Amps)

A measure of electrical current, for example, domestic single-phase connections are likely to have a fuse rating of 60A, 80A, or 100A.

Abated generation

Generation which incorporates carbon capture, utilisation, or storage technology (CCUS) to minimise associated carbon emissions.

Access SCR

Access and Forward-Looking Charges Significant Code Review, part of a package of reforms to how different parties access and pay charges for the electricity network.

ANM (Active Network Management)

Appendix G

An Appendix to the Bilateral Connection Agreement of a DNO that allows the DNO, TO and ESO to ascertain the capability of connection sites, the available GSP capacity and an improved view of distribution connections.

ASTI (Accelerated Strategic Transmission Investment).

B

BCA (Bilateral Connection Agreement)

An agreement that is required for any direct transmission network connections. Outlines requirements under codes and applicable to all connection types (generation, demand, DNO etc.)

BESS (Battery Energy Storage Systems)

BMCS (Broad Measure of Customer Satisfaction survey)

BSP (Bulk Supply Point)

Point where a distribution network steps down from 132kV to a lower voltage (typically to 33kV or 66kV).

C

CDB (Connections Delivery Board)

CPAG (Connections Process Advisory Group)

CfD (Contracts for Difference)

CIM (Common Information Model)

Clock Start

The date on which a transmission connection application is deemed technically competent and the fee paid. It signifies the start of the 3-month offer period.

CM (Capacity Market)

CMP

A CUSC code modification proposal

Code Mod (Code Modification Proposal)

Connect and Manage

A mechanism to improve access to the transmission system for generators by removing the need for 'wider works' to be completed before a connection is made.

Contestable Works

Connection works which may be provided by a DNO or alternative connection provider - as opposed to non-contestable works which must be carried out by a DNO.

Contracted background/connections

All projects with connection agreements, both already-connected and future projects.

CSNP (Centralised Strategic Network Plan)

The electricity transmission network planning output that will be delivered by the Future System Operator (FSO).

CUSC (Connection and Use of System Code)

The contractual framework for connecting to and using the transmission system

D

DCUSA (Distribution Connection and Use of System Agreement)

A multi-party contract between all licensed electricity distributors, suppliers and generators in GB on the use of the electricity distribution network.

DESNZ (Department for Energy Security and Net Zero)

Distributed Generation

Generation connected to the distribution network. Also known as 'embedded generation'

DNO (Distribution Network Operator)

DUoS (Distribution Use of System charges)

E

ECR (Embedded Capacity Register)

Enabling works

Any works a TO must carry out on the transmission system to facilitate a customer connection.

ENA (Energy Networks Association)

ESO (Electricity System Operator)

EV (Electric Vehicle)

F

FCFS (First-Come-First-Served)

FES (Future Energy Scenarios)

FID (Final Investment Decision)

Firm (offer/connection)

Connection offer/contract that enables user unrestricted access (with some exceptions such as outages) to the network up to their maximum contracted capacity.

Flexible connection

Connection contract that contains limitations on a user being able to export or import the full capacity of their project, usually under specified conditions. This can be either a temporary or permanent fixture of a contract. Typically refers to distribution network connections. Known as a 'non-firm connection' at transmission.

FRFC (First Ready, First Connected)

FSO (Future System Operator)

Government has taken powers, under the Energy Act 2023, to establish a new, publicly-owned Future System Operator. The FSO will be an expert, impartial body taking on responsibilities across electricity, gas and hydrogen, including all the existing functions of the ESO. The aim is for the FSO to be operational in 2024. Any actions set out in this Action Plan for the ESO will be taken on by the FSO once established.

G

Grid Code

The Grid Code details the technical requirements for connecting to and using the transmission system.

GSoPs (Guaranteed Standards of Performance)

GSP (Grid Supply Point)

Connection Point at which the Transmission System is connected to a Distribution System

GW (Gigawatt)

A measure of electrical power equivalent to 1000MW.

H

HND (Holistic Network Design)

Integrated approach for connecting 23GW of offshore wind to Great Britain.

I

ICP (Independent Connection Provider)

IDNO (Independent Distribution Network Operator)

Industry

Energy market participants including ESO, network companies, generators, demand customers, suppliers, retailers, etc.

Industry codes

A set of agreements that underpin the electricity and gas markets, including networks. Licensees are required to maintain, become party to, or comply with the industry codes in accordance with the conditions of their licence.

J

K

kV (kilovolt)

1kV = 1000 volts. One volt is the electric potential between two points of a conducting wire when an electric current of one ampere dissipates one watt of power between those points.

kW (kilowatt)

A measure of power. For example, a 7.5kW Electric Vehicle charger can provide 7.5kW of power. 1kW = 1000W.

kWh (kilowatt hours)

A measure of energy consumption or generation over time. For example, a 7.5kW EV charger will provide 15kWh of energy in 2 hours.

L

LoA (Letter of Authority)

LCT (Low Carbon Technology)

LIFO (Last In, First Out)

LTDS (Long Term Development Statements)

M

MCCSS (Major Connections Customer Satisfaction Survey)

Milestones

Stages within a connection agreement that must be met by the connection customer for the connection to proceed.

Modification Application, Mod App

A formal request to make changes to an existing customer connection agreement.

MW (Megawatt)

A measure of electrical power. 1MW = 1000kW.

N

NETS (National Electricity Transmission System)

NGET (National Grid Electricity Transmission)

NPS (National Policy Statement)

Non-firm (offer/connection)

Connection offers/contracts that contain limitations on a user being able to export or import the full capacity of their project, usually under specified conditions. This can be either a temporary or permanent fixture of a contract. Typically referred to as flexible connection at distribution level.

O

Office for Investment

A joint Department for Business and Trade and Number 10 unit which works across government to land top-tier investment into the UK.

P

Primary substation

Point where a distribution network steps down from 132kV to a lower voltage (typically to 33kV or 66kV).

Project Progression

An application submitted by the DNO to the ESO to alter their bilateral connection agreement (BCA) due to generation/storage/demand seeking connection to the DNO's network.

Q

R

RDC (Reserved Developer Capacity)

REMA (Review of Electricity Market Arrangements)

RIG (Regulatory Instructions Guidance)

A formal framework enabling Ofgem to collect data from network companies.

RIIO (Revenue = Incentives + Innovation + Outputs)

Price controls for the GB gas and electricity network companies, set by Ofgem. RIIO-T covers gas and electricity transmission and RIIO-ED covers electricity distribution.

RoRE (Return on Regulatory Equity)

RRP (Regulatory Reporting Pack)

RSP (Regional System Planner)

S

SCG (Strategic Connections Group)

SGT (Super Grid Transformer)

SHDF (Social Housing Decarbonisation Fund)

Sole Use Asset

Assets used to connect a customer to the electricity network that are exclusive to the customer/connection.

SSEP (Strategic Spatial Energy Plan)

The SSEP will help determine the most efficient locations and types of energy infrastructure needed to support decarbonising the power system by 2035 and achieving net zero in a pragmatic manner. It will also support the forming of pathways from which more granular plans like the CSNP and sectoral energy plans will flow.

SQSS (Security and Quality of Supply Standard)

Stacking

A mechanism being explored by the ESO for managing connections for projects that are beyond requirements for net zero and/or in congested areas of the network.

T

TEC (Transmission Entry Capacity)

Technical Limits

Power limitations at GSPs, agreed by the ESO and DNO, to allow distribution connections to proceed on a flexible basis, without the need for the completion of transmission reinforcement works that would otherwise be required.

TMA (Target Model Add-ons)

TNUoS (Transmission Network Use of System charges)

TO (Transmission Owner)

Licensed network company responsible for designing, building and maintaining the transmission network for its licence area.

TPW (Third Party Works)

Works required for a customer connection that has impacts on other users and where the work is carried out by a third-party.

Transmission Acceleration Action Plan

Action plan setting out steps to reduce the amount of time to build new transmission infrastructure by half.

TRW (Transmission Reinforcement Works)

TTC (Time to Connect)

TTQ (Time to Quote)

TW (Terawatt)

A measure of electrical power. 1TW = 1000GW.

TWh (Terawatt hours)

A measure of energy consumption or generation over time.

U

V

W

Wider works

Transmission reinforcement works beyond enabling works.

X

Y

Z

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