Public

Draft – NESO Connections Reform Data Impact Assessment v0.02

November 2024

05.11.2024: Please note this version includes updated CP30 pathway values for transmission and distribution storage in figures 28, 29, 37, 38, 39, 40.

NESO
National Energy System Operator

Contents

Figures

Tables

Purpose of this document

This document sets out the potential impact on the connections queue (for connection to or use of the electricity transmission system) of our connections reform proposals.

Detail on our connections reform proposals are set out in separate documents and are not covered here. Please see our accompanying suite of documents.[1]

This document is split into two parts:

The potential impact of applying the 'readiness' element of the proposed Gate 2 criteria to the connections queue; and

The potential impact of applying the 'strategic alignment' element of the proposed Gate 2 criteria to the connections queue.

This is a draft impact assessment as we will refresh the analysis within this document once Government publishes its CP30 Plan.

[11] https://www.neso.energy/industry-information/connections/connections-reform

PART 1: The potential impact of the 'readiness' element of the proposed Gate 2 criteria to the connections queue

Overview

As set out in our accompanying documentation, we propose that the reformed connections queue is only formed of projects which meet the 'readiness' element of the newly proposed Gate 2 criteria.

This part of the report therefore considers the potential impact on the queue of applying the 'readiness' element of the newly proposed Gate 2 criteria, addressing the following points:

- **[1] Current Transmission Queue and potential growth without connections reform**
  - Current queue and potential continued growth of connections queue and resulting technology mix connecting over time without connections reform, compared with potential future needs of the energy system, including our Future Energy Scenarios (FES)
- **[2] Transmission Pipeline Analysis (Industry Data)**
  - Verification of NESO data and projections using industry data; analysis of transmission queue (supported by Regen) to verify status of connections projects and to validate Land Rights RFI findings
- **[3] Transmission Queue & 'readiness' element of Connections Reform**
  - Day 1 and later impact on GW capacity/ technology mix of GB transmission connections queue if the 'readiness' element of connections reform are implemented as proposed

Baseline Data

Based on the TMO4+ scope, a project list has been created.

In-Scope	Out-of-scope
• Directly Connected Generation • Directly Connected Interconnectors & OHAs • Directly Connected Demand • Large Embedded Generation • Relevant Small and Medium Embedded Generation (i.e., that impacts the transmission system)	• Embedded Demand • Small and Medium Embedded Generation that does not impact the transmission system • New Transmission Assets

Table 1 Project Scope for CMP435 Implementation

For transmission projects, data is taken from September 2024 NESO connection information. For distribution projects, data is taken from the June 2024 ENA (Energy Networks Association) DNO data workbook.

Register	Project Count	Capacity (MW)
Distribution	1862	159,509
Transmission	1607	557,395
Transmission (Direct Demand)	92	19,632
Grand Total	**3561**	**736,536**

Table 2 Breakdown of projects in scope for analysis by count and MW capacity

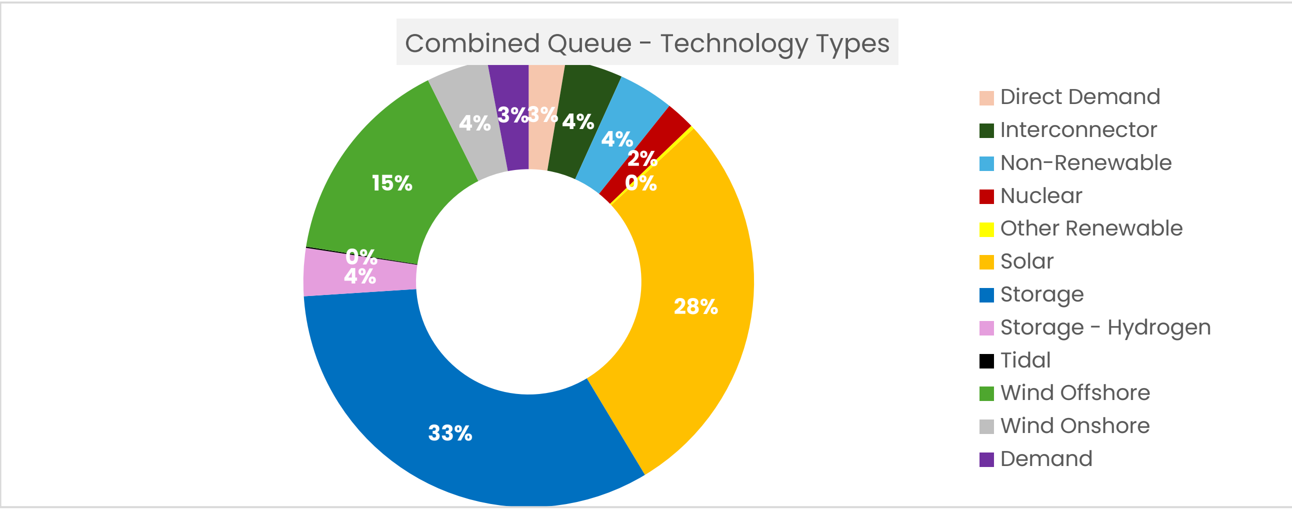


Figure 1. Aggregated technology types for transmission and distribution connected projects

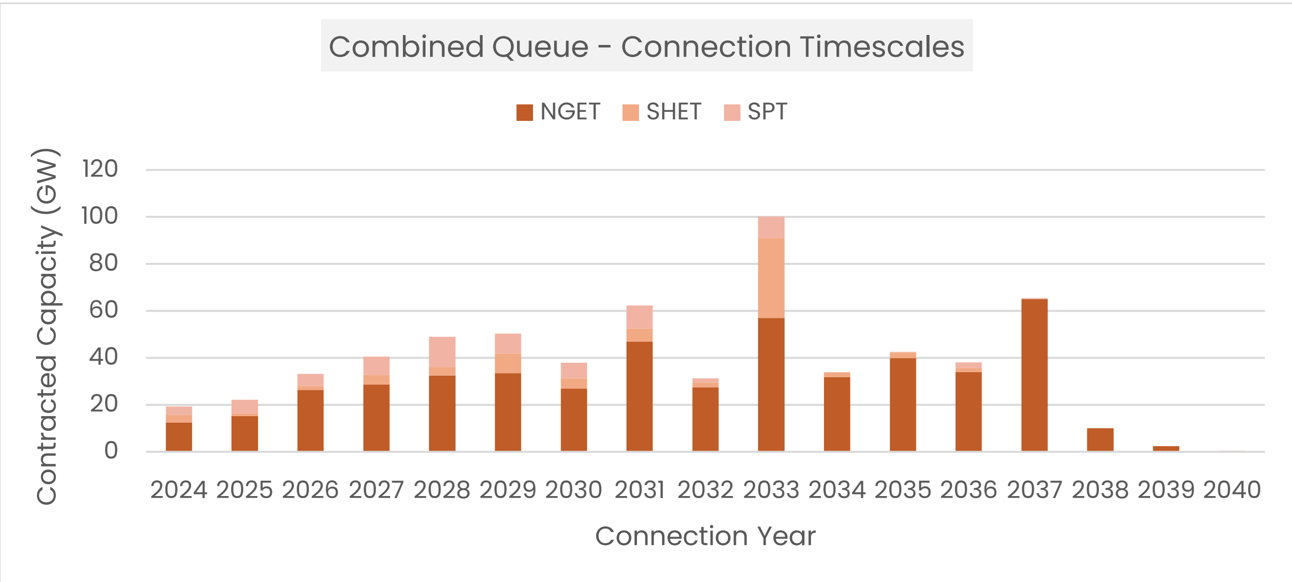


Figure 2. Combined connections queue - capacities connecting between 2024 and 2040

Assumptions/ Notes

- Where Combined Queue is mentioned, this refers to the Transmission Queue (as of September 2024) in addition to the Distribution Queue (as of June 2024)

1. Current Transmission Queue and TMO4+ Counterfactual Growth

Since NESO (then ESO) started its Connections Reform programme in October 2022, the transmission connections queue has grown by more than 300GW.

NESO has observed an average growth of 12GW a month, for the last 30 months. This is despite the tactical actions that have been introduced as part of the NESO's 5 Point Plan and the ENA's 3 Point Plan.[2]

The Rising Volume of Applications

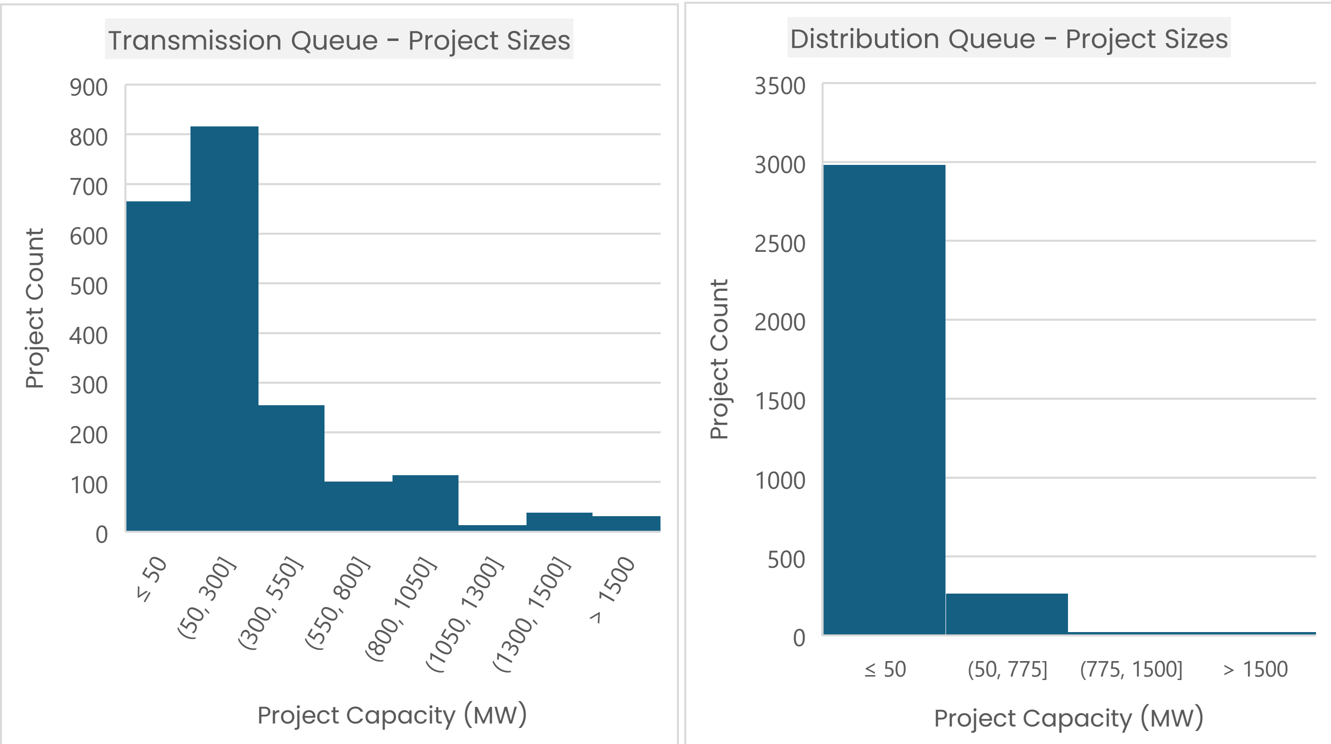


Figure 3. Combined connections queue - project sizes

All transmission connection projects originate from applications submitted to the NESO.

[2] NESO Workgroup Consultation Paper: CMP435: Application of Gate 2 Criteria to existing contracted background– What is the Issue? [Updated]

While not all applications will clock start and lead to a connection offer, it's important to note the steep increase in applications processed by the NESO and assessed by the TOs.

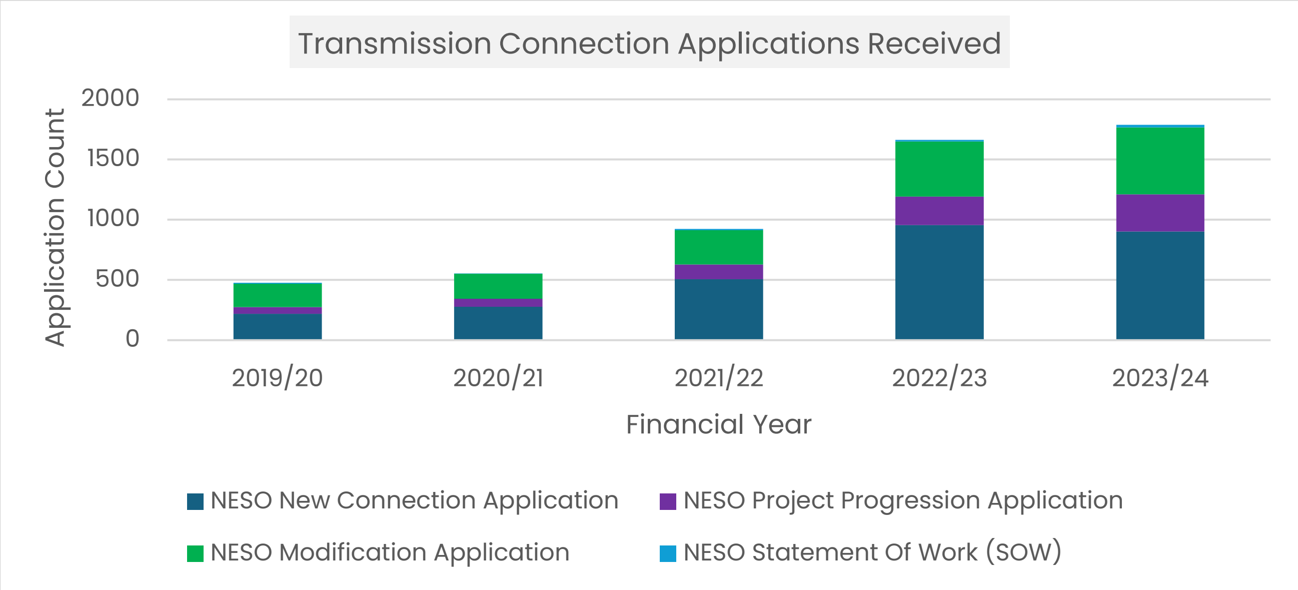


Figure 4. Licensed applications received by the NESO for transmission-level connections

Assumptions/ Notes

- This information illustrates Transmission Connections
- Across the period shown, total applications received by financial year rose by 275%
- There is little-to-no correlation between applications received and connections energised, meaning connections aren't being energised at a fast enough rate to offset application growth.

The Growing Gap between Requested and Offered Connection Dates

Upon submitting their connection application, transmission customers provide a date by which they would like to connect. Following the Transmission Owners' (TOs) technical assessment, a connection date is offered to the customer; this date factors in the works required for the connection.

The difference between these dates is growing. Developers are waiting longer to connect, in part, because the rate of queue growth exceeds the rate of project energisation. As long as the queue system is 'first come, first served', it will remain a challenge to offer connection dates in line with customer requests.

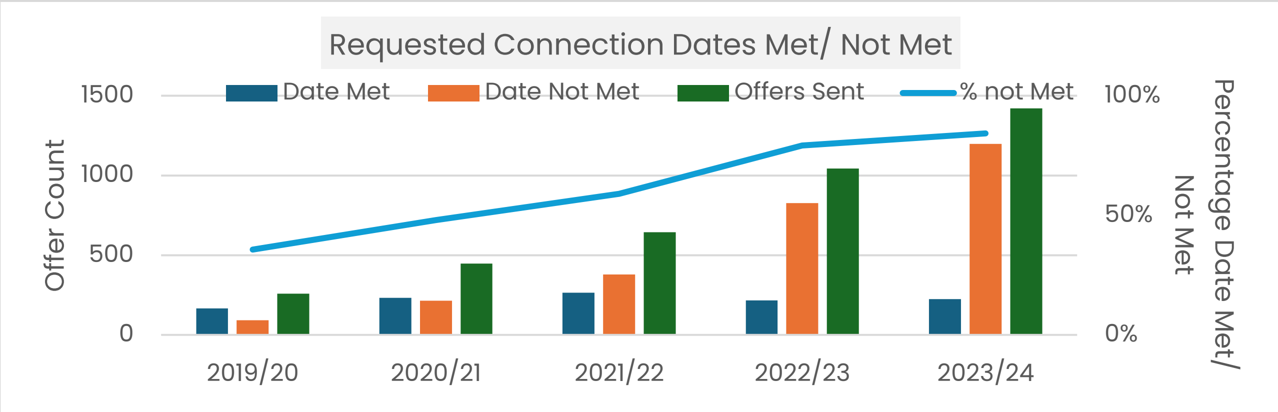


Figure 5. Proportion of offered connections dates met (Transmission Only)

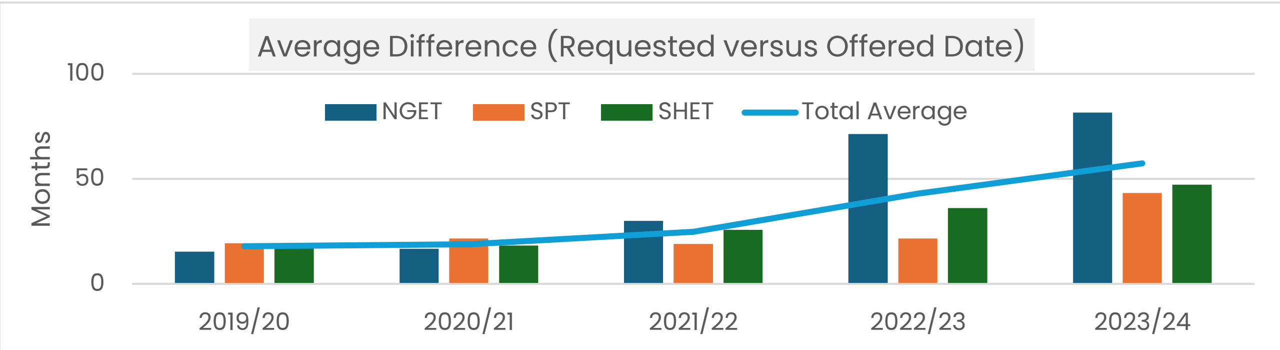


Figure 6. Offers with connection dates later than requested (Transmission Only)

Assumptions/ Notes

- These figures represent the transmission queue only
- The number of requested dates not met (See top chart "No") is rising by more than 10% each year
- The difference between requested and offered dates (where requested date is not met) is increasing by an average of 10 months each year

- Following the introduction of Two-Step and transitional offers in mid-2024, (provisional) offered dates are expected to venture into the 2040s

The Growth Rate of the Transmission Connection Queue

Rising application and offer figures have a direct impact on the size of the queue. Connections Reform comes at a critical time as the queue is growing at a far greater rate than connections are energised (or that attrition removes projects from the queue).

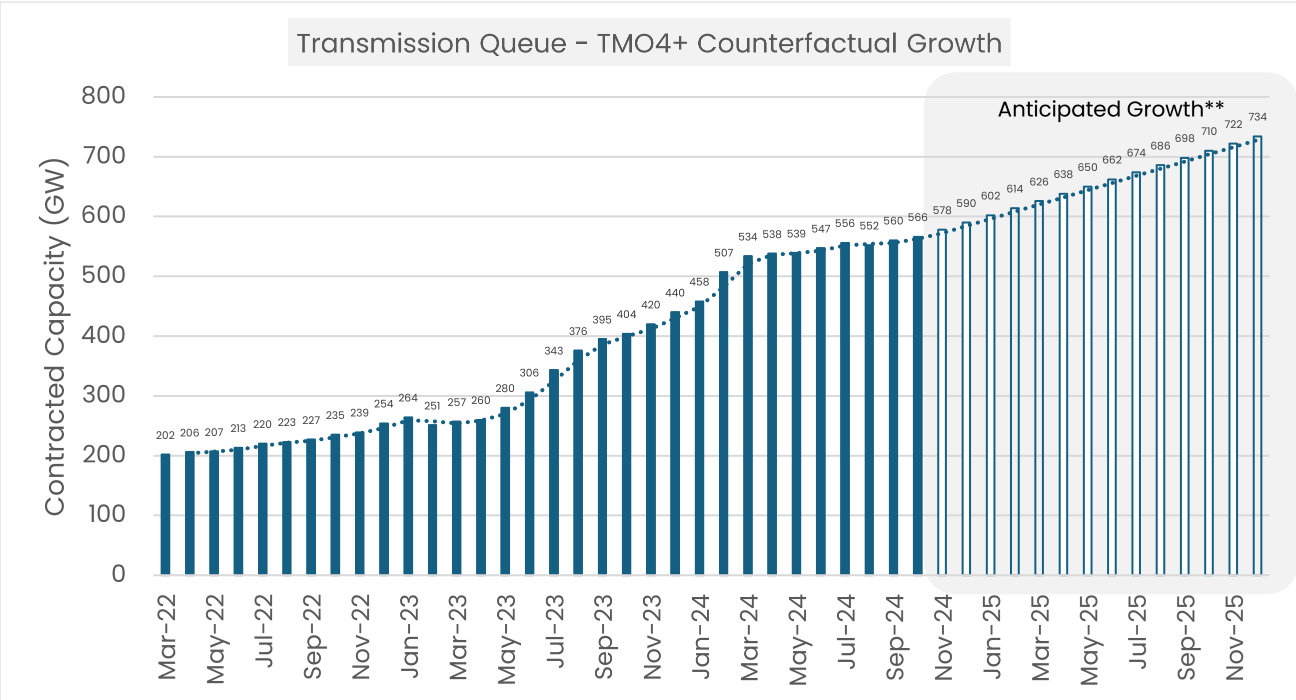


Figure 7. Transmission Queue – TMO4+ Counterfactual Queue Growth

Assumptions/ Notes

- This chart anticipates queue growth for transmission connections (this does not include directly connected demand, nor distribution)
- An increase of 12GW per month has been applied beyond August 2024, representing the average increase from March 2022 to August 2024
- While this forecast is based on historical trends, it cannot predict the actual queue growth (based on customer/ market influences) and is intended to demonstrate the possible rate of growth.
- NESO understands that this growth rate cannot be sustained indefinitely
- There is insufficient information available to forecast the impact of additional 'barriers to entry' that fall short of the 'readiness' element of the Gate 2 criteria (for example the current Letter of Authority entry requirement) on the growing queue figure.

Transmission Queue Compared to Energy Pathways

This section compares the current and (potential) future connections queue with the Future Energy Scenarios 2024. The analysis demonstrates that, across most technologies, the capacity in the current queue exceeds the upper limit of capacity under the FES 2024 scenarios. In some cases, it significantly exceeds even 2050 figures.

Future Energy Scenarios 2024

FES Range: The lower FES value represents the *counterfactual* [3], and the upper FES value represents the *holistic transition*[4] pathway.

Connection Project Data

This is a static view of the queue and doesn't represent projects that could join the queue and/or become 'ready' over time (both in terms of projects in the existing queue and new applicants).

Transmission Queue: This is NESO transmission connections data up to September 2024

Combined Queue: Where applicable, this includes September 2024 Transmission and June 2024 Distribution data

Reformed Transmission Queue: This reflects currently contracted capacity in the transmission queue that could meet the 'readiness' element of the Gate 2 criteria today (based on responses to our Request for Information to industry, supplemented by projects we know to have submitted consents as a minimum (including those with consents achieved; under construction/ commissioning). The green line increases over times as we have plotted the projects that are 'ready' against the current connection dates of those projects in the current queue. However, as stated above we have not plotted projects that could become 'ready' over time.

Further details and data on our RFI and supplementary analysis are provided in PART 2.

[3] FES 2024: Counterfactual - The Counterfactual sees the least renewable capacity and has heavy reliance on natural gas, which leads to net zero missed. Because of the lower needs for flexibility, lower electricity storage, interconnectors and low carbon dispatchable power are present.

[4] FES 2024: Holistic Transition - Highest renewable capacity pathway with unabated gas dropping sharply to zero after 2036. Moderate levels of nuclear capacity and lowest levels of hydrogen dispatchable power present. Supply side flexibility is high, delivered through electricity storage and interconnectors

Interconnectors

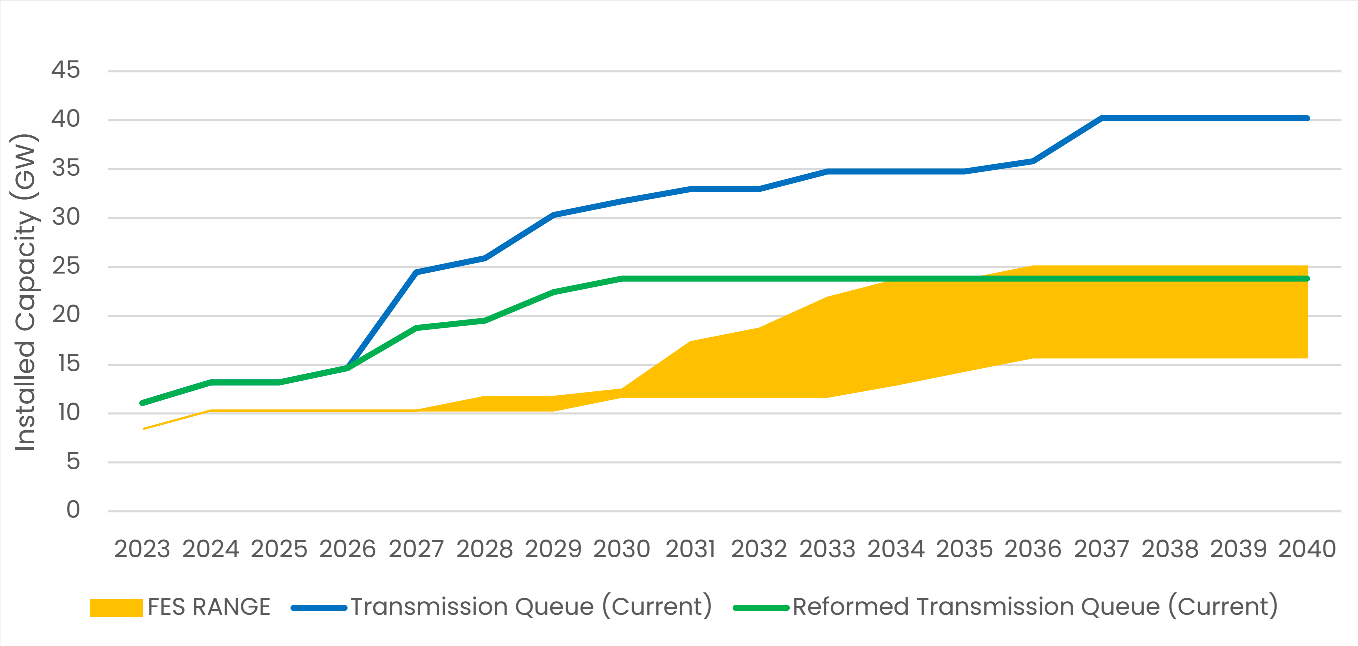


Figure 8. Current Interconnector queue and potential future reformed transmission queue (static 2024 view) versus FES 2024 Scenarios

Offshore Wind

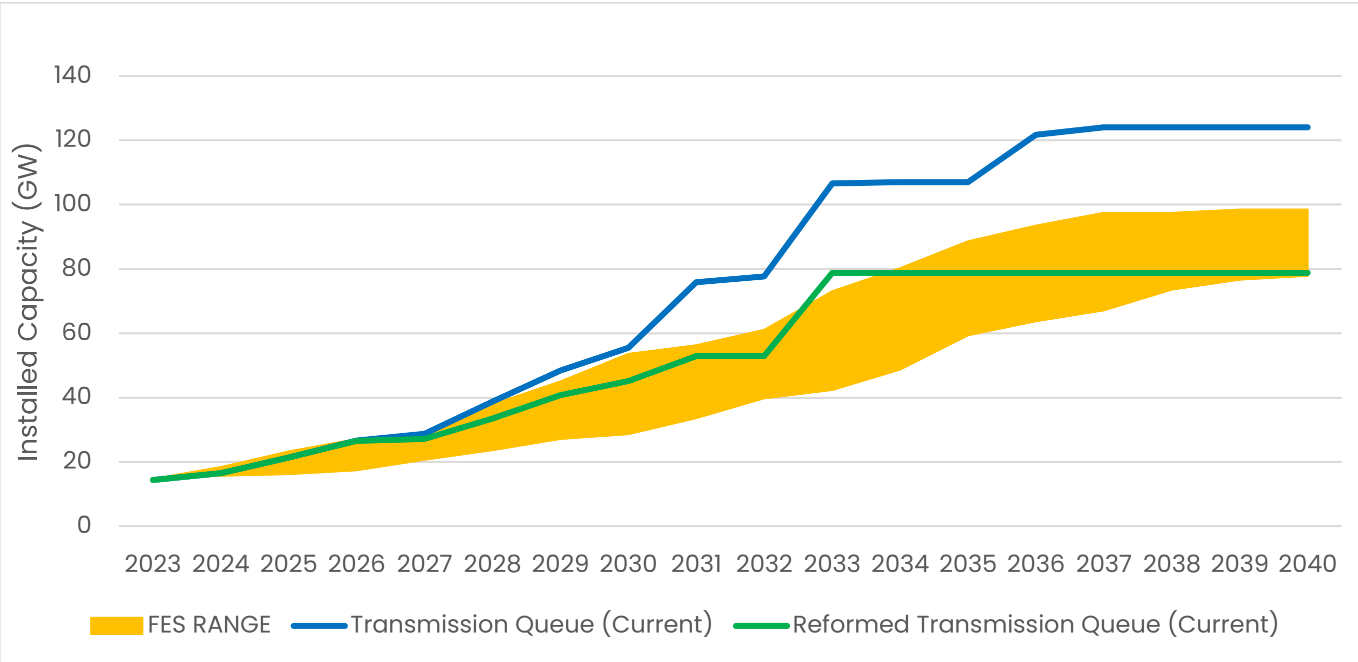


Figure 9. Current Offshore Wind queue and potential future reformed transmission queue (static 2024 view) versus FES 2024 Scenarios

Onshore Wind

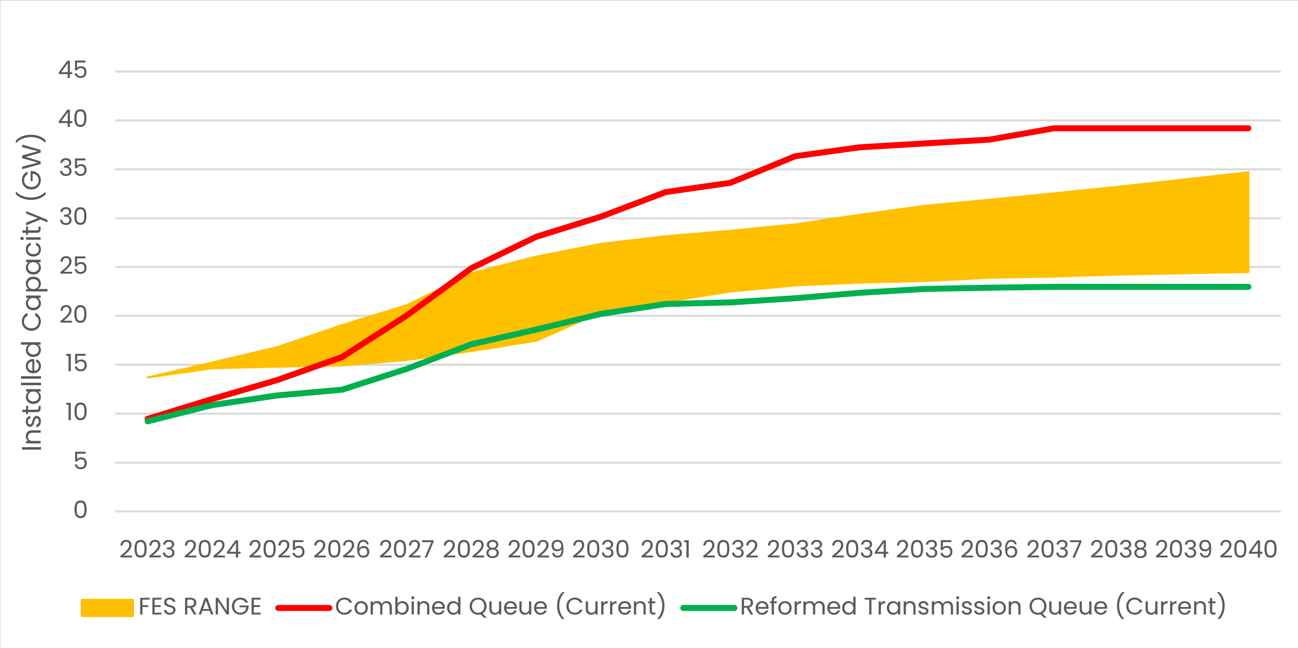


Figure 10. Current Onshore Wind queue and potential future reformed transmission queue (static 2024 view) versus FES 2024 Scenarios

Solar

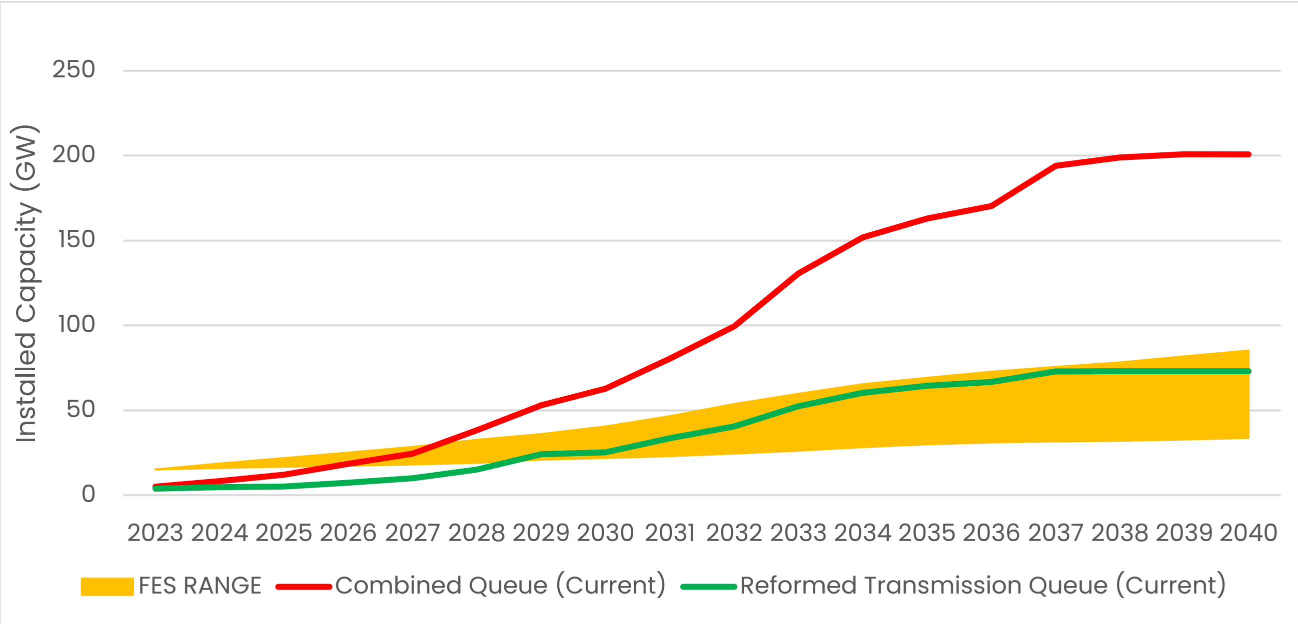


Figure 11. Current Solar queue and potential future reformed transmission queue (static 2024 view) versus FES 2024 Scenarios

Tidal

Public

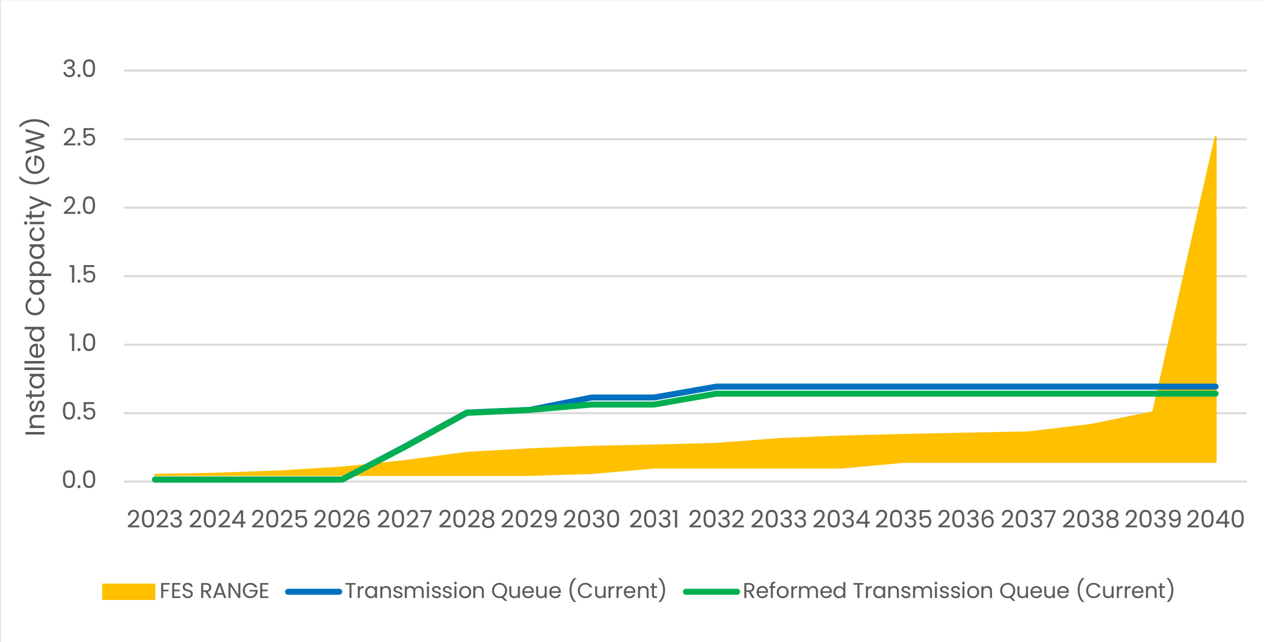


Figure 12. Current Tidal queue and potential future reformed transmission queue (static 2024 view) versus FES 2024 Scenarios

Storage

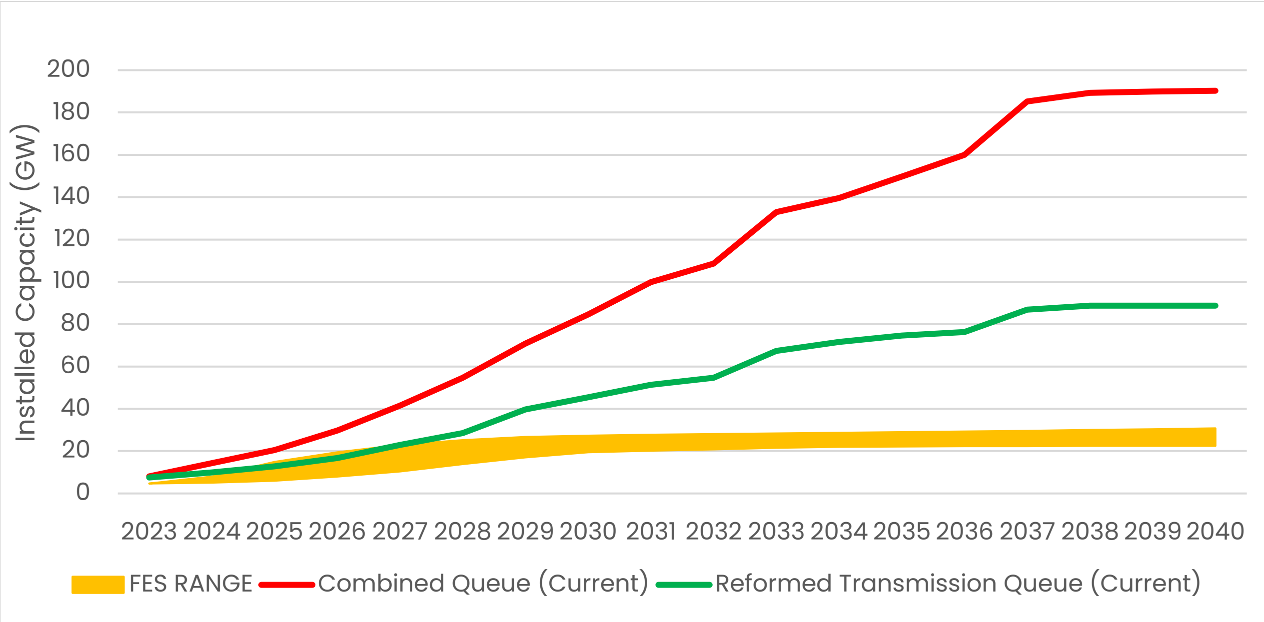


Figure 13. Current Energy Storage queue and potential future reformed transmission queue (static 2024 view) versus FES 2024 Scenarios

Nuclear

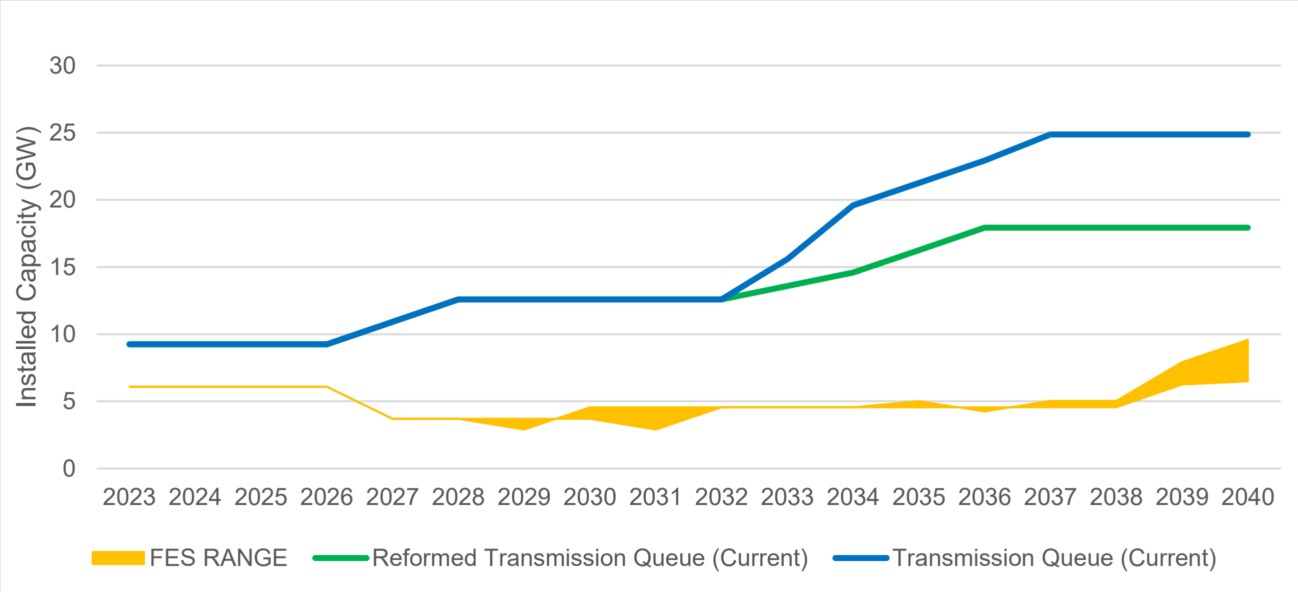


Figure 14. Current Nuclear queue and potential future reformed transmission queue (static 2024 view) versus FES 2024 Scenarios

Non-Renewable

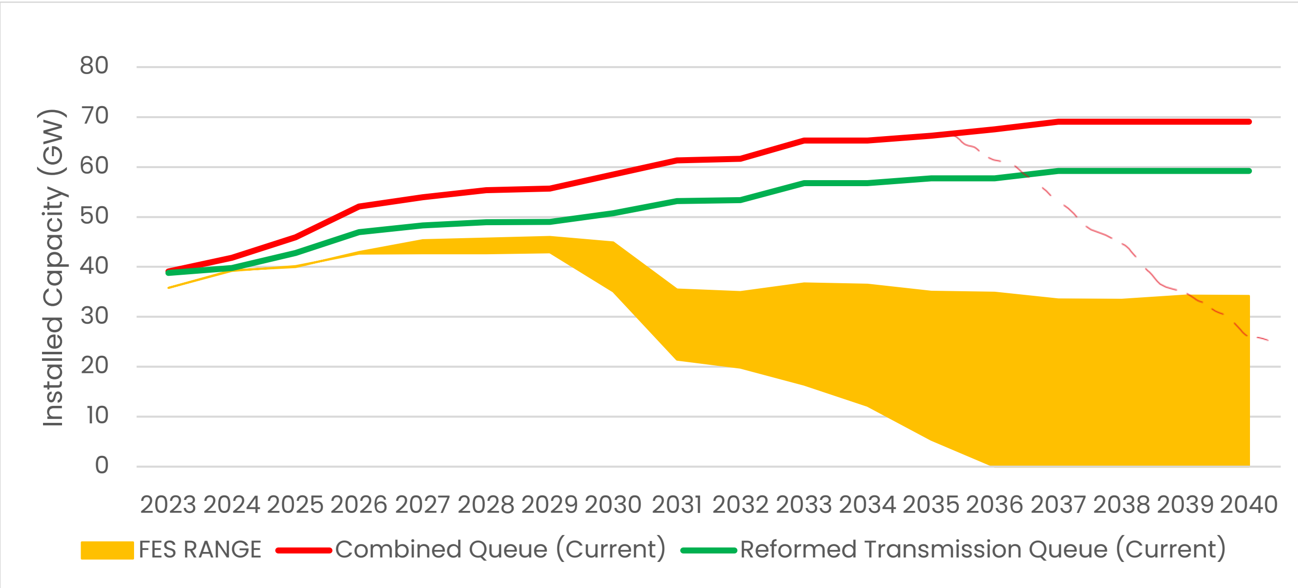


Figure 15. Current Non-Renewable queue and potential future reformed transmission queue (static 2024 view) versus FES 2024 Scenarios

Assumptions/ Notes

- FES figures are based on FES 2024

- The FES 2024 range includes generation connecting at transmission and distribution level
- For multi-technology (hybrid) projects, the technology type is aggregated to the plant with the highest typical export capacity
- Storage
    - Refers to Energy Storage System-only projects (with no other technology types represented in this category)
    - Around 500 transmission generation projects include a storage element; these projects are categorised by the generation technology (i.e., the storage element of those projects is not included in the above data / charts)
- Non-Renewable
    - Non-Renewable includes projects referenced as Fossil Fuel in the FES publication
    - The FES range (decline) anticipates the retirement of the existing gas fleet, as well as any connections of new non-renewable capacity
    - Under certain FES pathways, we see the retirement of unabated gas [5]by end of 2035; this therefore is included in the FES range and counters the introduction of Power CCS and H2 generation.[6]
    - A provisional line has been added to illustrate a potential decline in non-renewable generation based on the retirement of these technologies (this isn't currently supported by any data)

[5] CCGT (Combined Cycle Gas Turbine); CHP (Combined Heat and Power); Coal; Gas Reciprocating; OCGT (Open Cycle Gas Turbine); Oil & AGT (Advanced Gas Turbine)
[6] Energy Analyst - System Operator Strategy & Regulation

Conclusion - Current Transmission Queue and TMO4+ Counterfactual Growth

- Connection figures are growing at an unprecedented rate; this is reflected in application, offer and contracted project volumes
- Although the cumulative growth of the queue has slowed slightly towards mid/late 2024, there remains a queue of over 1500 transmission projects and over 1800 distribution projects (representing over 700GW of capacity) waiting to connect to the electricity network
- (Transmission) An average of 5GW of projects is energised (Final Operational Notification) each year; this rate needs to be increased significantly to help meet net zero targets.
- Data on stalled projects (and reasons) is limited; however, it is likely that a significant proportion of contracted projects are stuck behind projects with a higher queue position but a lower readiness to connect. This is observed through modifications to connection agreements (customer driven) where connection dates are pushed further out[7]

[7] CMP376 – Queue Management will provide a means of tracking projects readiness, ensuring developers can demonstrate they are progressing towards their connection, while terminating developers who fail to meet their milestones. This initiative aims to eliminate stalled projects, but it will take months, possibly years, for this initiative to impact (reduce) the queue size materially.

2. Transmission Pipeline Analysis (Industry Data)

Customer Data - Land Rights Request for Information

RFI Overview

As part of the process to understand the readiness of developers holding connection offers, NESO (then ESO) issued an RFI to all contracted connection holders in May 2024.

The RFI closed on 28 June 2024. NESO (then ESO) commissioned Regen to undertake a high-level review of the survey results to assist in their review of the responses. Regen was also commissioned to assess the planning status of the UK electricity transmission project pipeline.[8]

The RFI was not exhaustive, with only a proportion of the transmission queue and an even smaller proportion of the distribution queue responding but it provided a means of verifying NESO projections with more accurate data, via consultation with industry.

The RFI questionnaire asked project developers to identify which of the following four criteria around demonstrating land rights that they would be able to meet, either now or by 01 January 2025[9]:

1. The project developer owns or is a tenant on the land on which the site will be situated
2. The project developer has agreed to lease the land from the owner of the land on which the site will be situated
3. The project developer has an option to purchase or lease the land on which the project will be situated
4. For offshore projects, the developer has agreed to use the seabed on which the site will be situated.

RFI Response

Just over half of the RFI responses represented projects seeking to connect to the distribution network. This also included distributed generators holding a Bilateral Embedded Generator Agreement (BEGA) or a Bilateral Embedded Licence Exemptible Large Generator Agreement (BELLA) in Scotland.[10]

The vast majority of respondents to the RFI stated that they would be able to demonstrate some form of access to land by 01 January 2025, with over 2,200 sites able to meet one of the four criteria highlighted.

---

[8] ESO Transmission Pipeline Report published by Regen – September 2024
[9] At the time the RFI was issued, January 2025 was the provisional start date for Connections Reform
[10] Adapted from ESO Transmission Pipeline Report published by Regen – September 2024

Of those able to meet one of these criteria, the most common response was an option to purchase or lease land, for which c.1,600 sites stated they would be able to demonstrate by 01 January 2025.

By technology, RFI responses were dominated by solar PV and battery storage projects and a notable number of wind projects (both offshore and onshore wind).

When considering the number of projects, this is a fair reflection of the wider connection queue. However, by capacity, the RFI responses represented only a small proportion of the total transmission storage and wind pipeline capacity, with over 232 GW of capacity not reflected in the responses received across these technologies.

Network	Capacity (MW)	Queue Size	Response Rate
Distribution	88,762	159,509	75%
Distribution with BEGA or BELLA	30,511		
Transmission	316,146	577,027	55%
Grand Total	435,419	736,536	59%

Table 3 Proportion of responses by MW (Tx Queue as of September 2024, Dx Queue as of June 2024)

Regen RFI Analysis Artefacts

As part of the RFI analysis, Regen generated a series of charts and visuals that are included below.

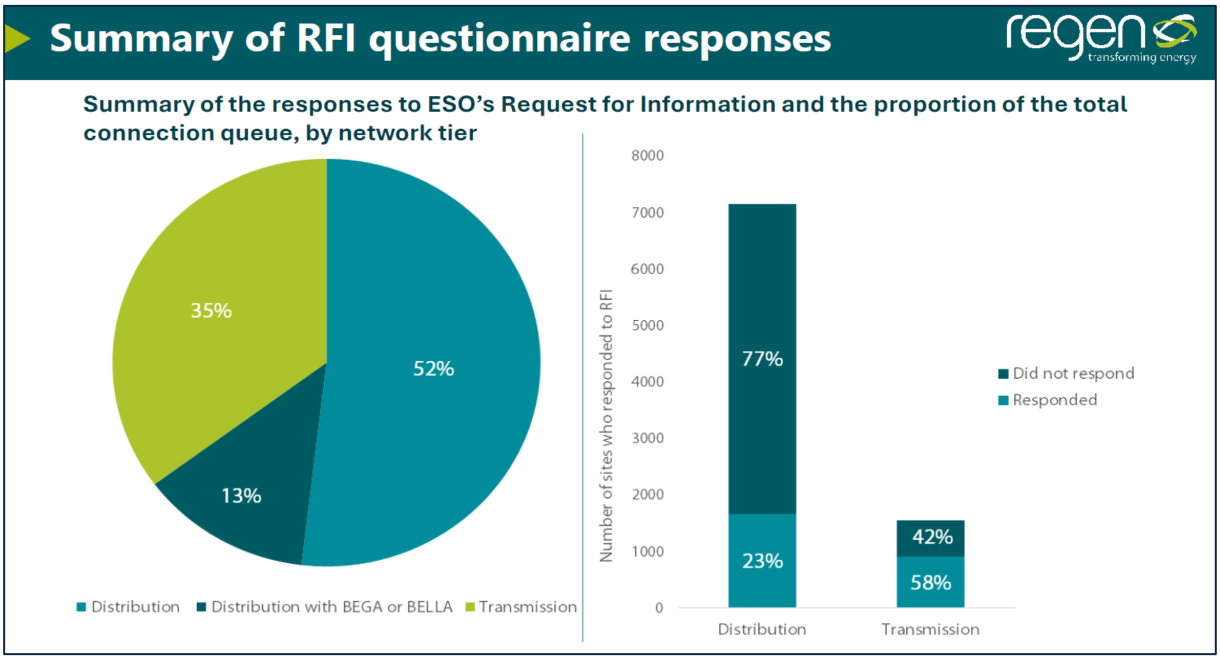


Figure 16. Regen visual summary of RFI – Proportion of respondents (project count)

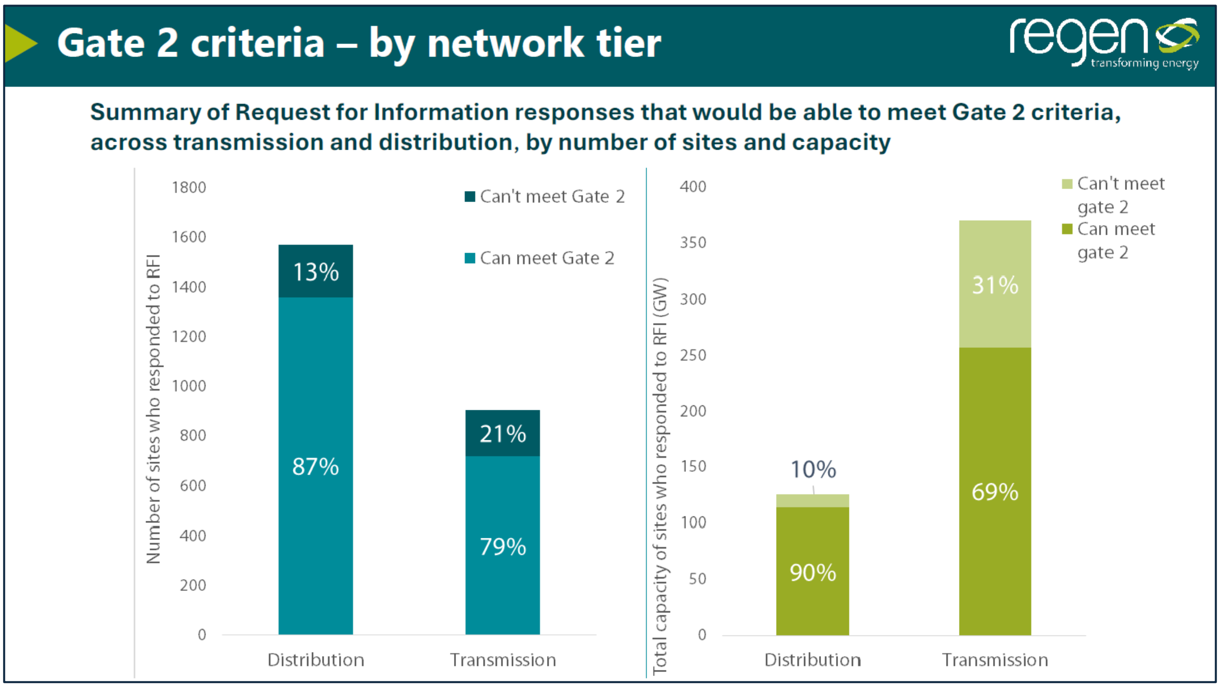


Figure 17. Regen visual summary of RFI – Projects ability to meet Gate 2 at time of RFI completion (by Count and GW Capacity)

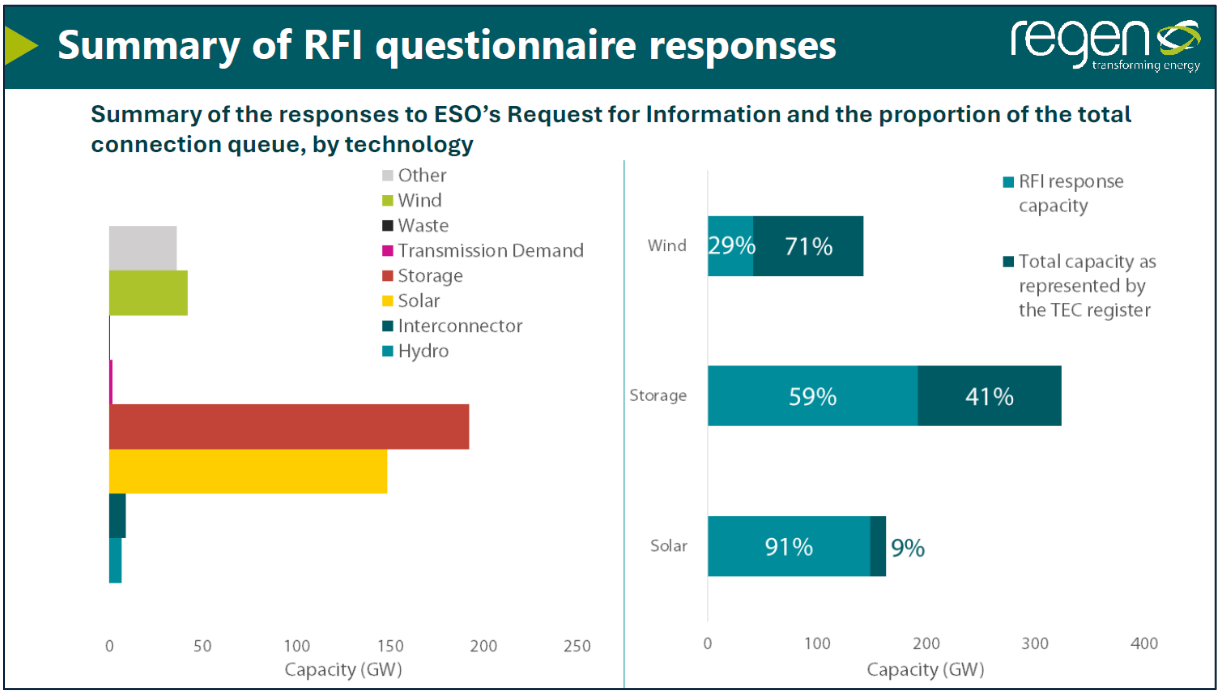


Figure 18. Regen visual summary of RFI – Projects ability to meet Gate 2 (Technology spread)

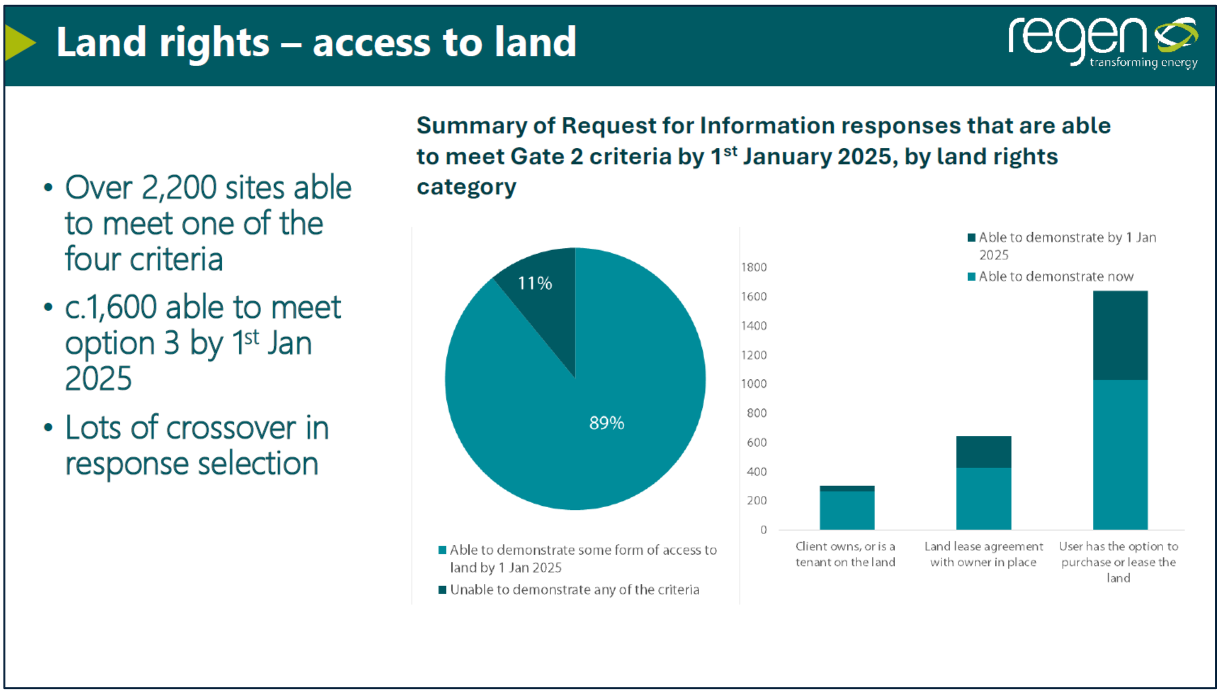


Figure 19. Regen visual summary of RFI – Timeframe for meeting Gate 2

NESO Project Data – Transmission Pipeline / Project Statuses

Assessment Findings

NESO provided Regen with an extract of the current GB transmission connection queue to assess each project's current planning status. This dataset detailed 1,586 pipeline projects, totalling 521GW across nine technology sectors.

Due to locational data being unavailable for a proportion of the pipeline, only 67% (1,061 sites) could be searched.

Project data for operational sites and historic planning applications was extracted from the REPD and Searchland, supplemented with data from the English Nationally Significant Infrastructure Project (NSIP) register.

Welsh and Scottish projects were sourced from the REPD and supplemented with data from online project databases.

Planning status	Number of sites	Capacity (GW)
Already operational	13 (0.2%)	0.7 (1.2%)
Under construction	67 (5.5%)	16.7 (6.3%)
Granted in planning	259 (18.3%)	55.7 (24.5%)
Submitted in planning	153 (11.5%)	35.1 (14.4%)
Pre-planning	338 (38.6%)	118.1 (31.9%)
Rejected, expired, abandoned or withdrawn	19 (0.7%)	2.1 (1.8%)
Not found in planning	211 (24.5%)	77.5 (19.9%)

Table 4 Regen transmission pipelines findings

Approximately 5% of sites were positively identified as having been awarded a Contract for Difference (CfD), increasing their intentions to progress through buildout and operation.

Of the projects required to apply for a marine licence (offshore wind, tidal, and interconnectors), approximately 28% were found to have already been granted a marine licence, with 10% having applied and 37% in pre-planning stages.

Overall, a significant proportion of the searchable pipeline (c.75% of projects) was found to be in the planning system (across all regimes), with 18% holding a granted planning approval alongside their connection agreement with the NESO. Around 25% of sites that could be searched (211 projects, 77 GW) could not be found in planning.[11]

From a site-matching analysis, 850 matches were identified across the RFI responses and the pipeline connections datasets. This is a strong representative sample of the transmission pipeline, allowing a comparison of planning statuses identified through desktop research and as indicated in the RFI response.

Of those sites that were matched:

- For 500 sites (59% of matched sites), the planning status found in the pipeline analysis was the same as the planning status identified in the matching RFI response
- For 101 sites (12% of matched sites), there was some level of variance in the planning statuses found/indicated. Of these, 87 (10%) were stated to be a stage further along in planning in their RFI response data than they were found to be in the pipeline research, and 8 (1%) were found to be a stage further along in the pipeline research than they were in their RFI response.
- Only 6 (>1%) sites were found to have a major difference between the planning stage in the pipeline research and that stated in the corresponding RFI response.

Of those sites where a difference between the planning stages was found:

- No information was found for 59 sites (19.4 GW) stated to be further along in their RFI response than in the pipeline research. These sites were at the "Scoping", "Pre-application", or "Feasibility/Ecological studies" stage, where information about the project isn't often publicly available or inputted into planning databases.
- 14 sites (6.1 GW) were at the "Under construction" stage in their RFI response but were only found to have consent "Granted" in the pipeline research. Again, this is understandable as information on the commencement of construction work isn't always public.[12]

Pipeline Assessment: Sites not found in planning

Many sites could not be found in planning. Therefore, they were not attributed a planning status. Excluding those that could not be properly searched due to a lack of locational data or insufficient identification details, such as a distinct site name, 211 sites (24.5%) were categorised as "not found in planning".

The most likely reason is that these sites have not yet begun planning despite applying for a grid connection. These sites are likely to have applied for a grid connection within the past year or

[11] ESO Transmission Pipeline Report published by Regen – September 2024

[12] ESO Transmission Pipeline Report published by Regen – September 2024

two. Where sites without planning information have held a grid connection offer for over two years, it becomes more likely that these sites may no longer be progressing. [13]

Conclusion - Transmission Pipeline Analysis (Industry Data)

Based on the above, NESO is comfortable that the RFI results so far are a 'best-endeavours' reflection of the transmission queue (based on responses).[14]

Follow-Up RFI

In September 2024, NESO issued a follow-up RFI, targeted towards the non-respondents. This closed in mid-October; therefore, NESO have not had sufficient time to factor those responses into the analysis in this draft Impact Assessment. NESO will factor the responses to the follow-up RFI into the final Impact Assessment we submit to Ofgem by the end of 2024.

[13] ESO Transmission Pipeline Report published by Regen – September 2024

[14] In the absence of responses, an assumption has been applied that the unmatched projects and non-responses have not met Gate 2

3. Transmission Queue & Connections Reform

With a view of the connections queue, and the supplementary RFI findings, we can explore how the 'readiness' element of the Gate 2 criteria within the TMO4+ proposal could reduce the size of the transmission connections [15]queue at:

- Day 0 (this refers to the queue as of today, if connections reform were implemented today)
- Reform Day 1 (this refers to when we intend to start implementing connections reform, May 2025, rather than when we intend to issue connections offers as a result of the Gate 2 to the whole queue process by end 2025); and
- over time beyond that.

Connections Queue Composition – Day 0

Additional to the RFI figures, there are 425 (96GW) contracted transmission projects (Awaiting Consents, Consents Approved or Under Construction/ Commissioning), which have been added to the 'ready' Gate 2 capacity. This give the total Day 0 figures below:

Category	Capacity (GW)	%
Gate 1	302	52%
'Ready' Gate 2	281	48%
Current Queue	583	100%

Table 5 Potential transmission connections queue breakdown (Gate 1 and Gate 2) based on current queue

If we were to apply the 'readiness' element of the Gate 2 criteria to the current transmission-connected queue today, the potential results are shown below.

[15] NESO does not have sufficient project-level distribution data to reconcile with the RFI results, therefore section 3, only includes the transmission-connected queue

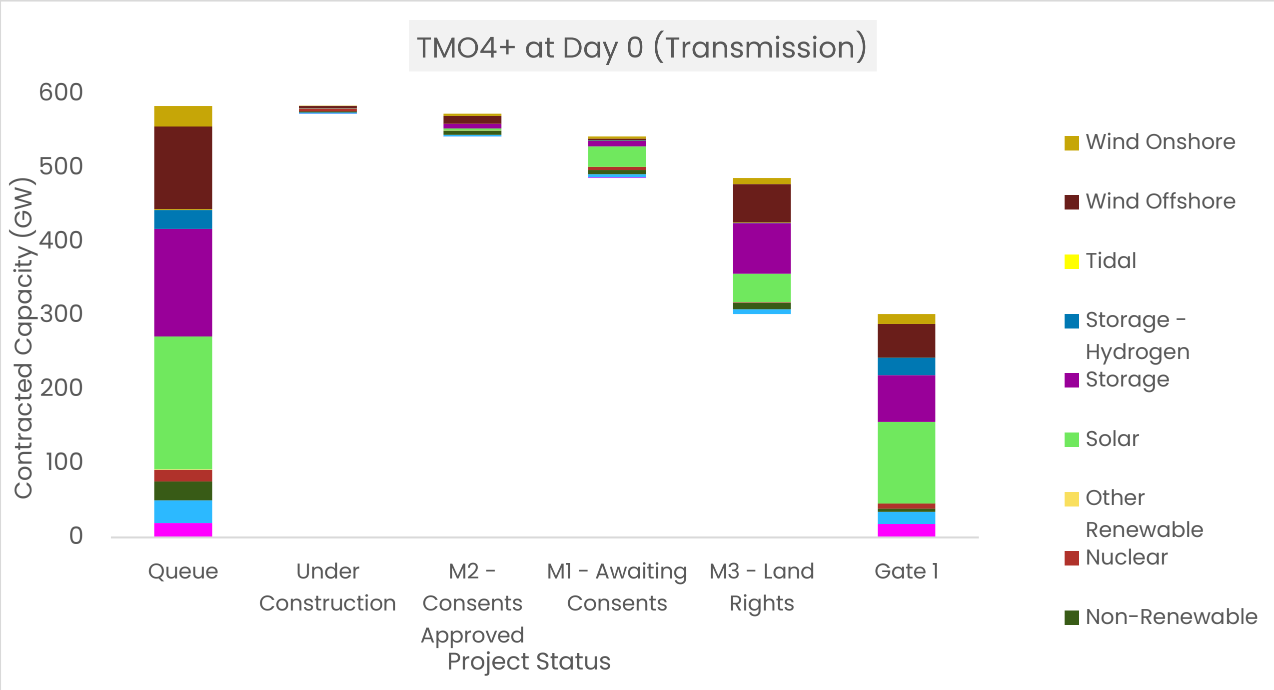


Figure 20. Potential transmission connection queue breakdown into Gate 1 and Gate 2 by technology type

Assumptions/ Notes

- Represents the current transmission queue (September 2024)
- Gate 2 is comprised of projects that are under construction (10GW), have submitted consents (56GW), have achieved consents (31GW) and projects that have confirmed in the Land Rights RFI that they can meet the Gate 2 criteria (183GW)
- Gate 1 projects are those with a project status of Scoping, where we have been unable to confirm Gate 2 readiness; this includes 8GW of RFI respondents who believe they can subsequently meet Gate 2 by January 2025
- The M3 – Land Rights category also includes around 50GW of 'Offshore Additions' (Offshore Wind and Interconnector projects that have been assumed to be Gate 2 ready based on some knowledge of the specific projects)

Connections Queue Composition – Day 1

Looking ahead to Reform Day 1 implementation, if we applied the 'readiness' element of the Gate 2 criteria to the transmission-connected queue on 1st May 2025, the results are shown in the figure below.

As we forecast outwards, we lose some granularity of individual project technology and but it's still possible to anticipate the size of each project status area.

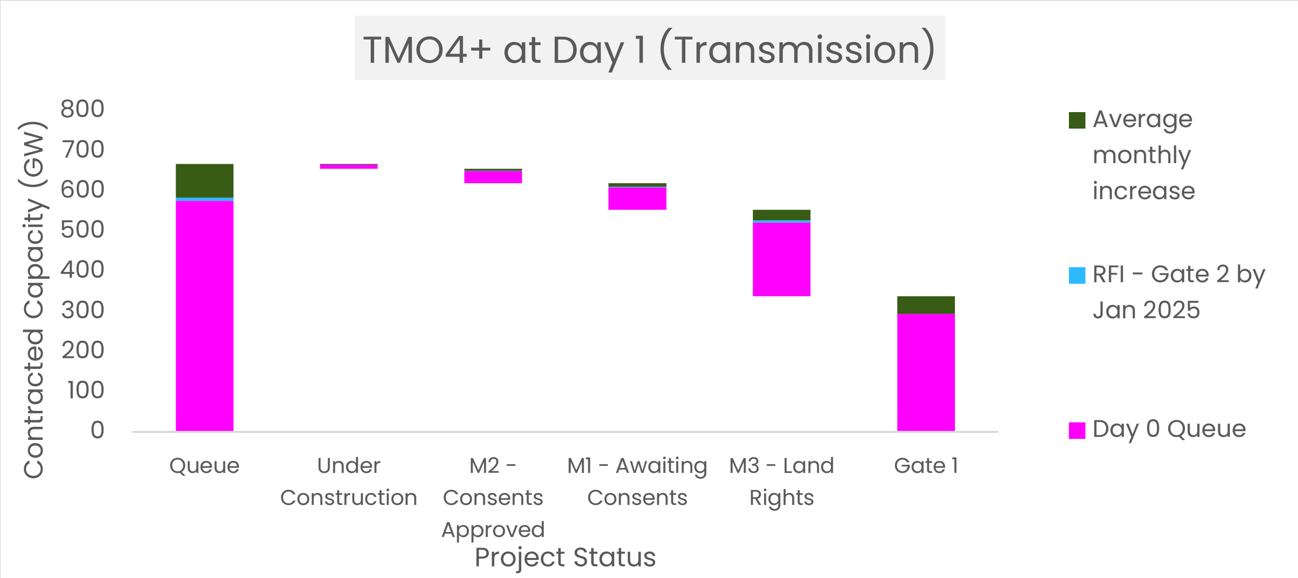


Figure 21. Potential transmission connection queue breakdown into Gate 1 and Gate

Category	Queue	Under Construction	M2 - Consents Approved	M1 - Awaiting Consents	M3 - Land Rights	Gate 1
Day 0 Queue	575	10	31	56	184	294
RFI - Gate 2 by Jan 2025	8	0	1	2	5	0
Average monthly increase	84	2	4	8	26	44
Surplus	0	655	619	553	338	0
Total	668	12	36	66	216	338

Table 6 Underlying data for potential transmission connection queue at Day 1

Assumptions/ Notes

- Represents the new reformed transmission queue as of 1 May 2025 (based on instant implementation on 1 May)
- While the RFI form requested a portal reference from respondents, this wasn't always interpreted as project number, therefore, we cannot provide an exact match for every RFI response and transmission connection register entry
- The Day 0 queue figures have been used as a baseline
- The 8GW of RFI respondents who believe they can meet Gate 2 by January 2025 have been moved from Gate 1 to Gate 2 (between the Day 0 and Day 1 visuals)
- An average monthly increase of 12GW has been applied to the queue between October 2024 and April 2025 (84GW)
- The potential 84GW increase has been spread across the project statuses in equal proportion (48% added to Gate 2, 52% added to Gate 1)

Connections Queue Composition – Beyond Day 1

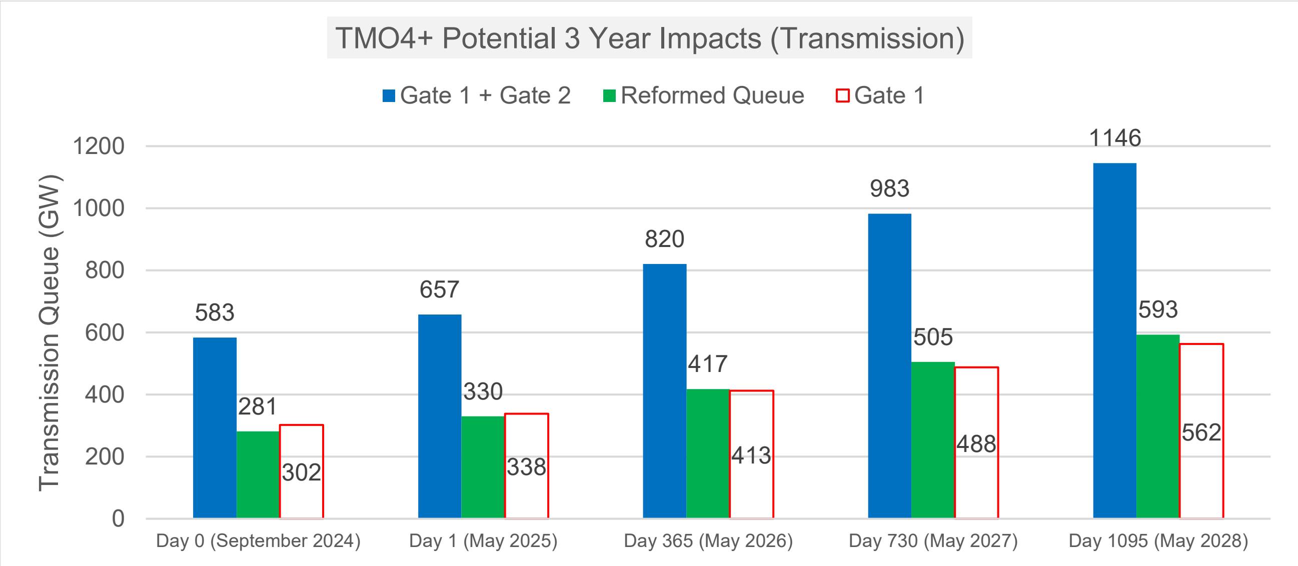


Figure 22. Potential Reformed Queue (GW) over time if TMO4+ readiness element applied

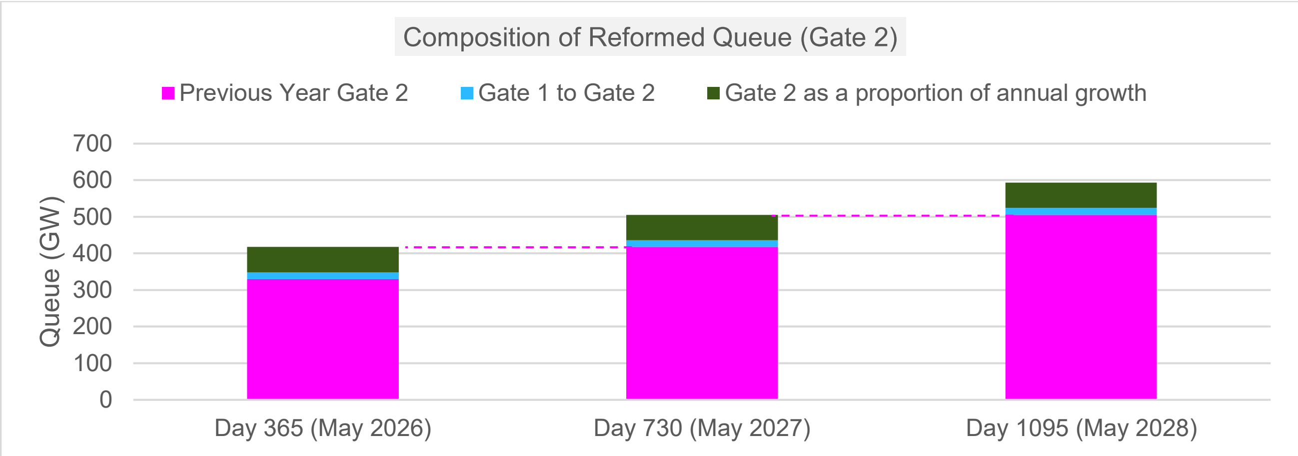


Figure 23. Potential composition of Reformed Queue (Gate 2) over time

Assumptions/ Notes

- The average monthly queue increase is 12GW (March 2022 – August 2024)
- 50% of projects that join the Gate 1 group as a result of the Gate 2 to the whole queue exercise will remain in Gate 1 indefinitely
- Of the remaining 50% that do leave Gate 1 we assume that 25% (i.e., 25% of the 50%) meet Gate 2 every year
- On top of the above, we assume that we get 144GW (12 x monthly average) of new applicants every year, of which 48% meet Gate 2 every year
- An assumed connection rate of 10GW per year has been applied (this is lower than the contracted amount but is closer to the actual amount of capacity connected each year (4-6GW) – this has been netted off the above figures
- We have not made any assumptions about projects terminating and therefore leaving the reformed queue as this is hard to estimate at this stage given the limited data set due to recent introduction of queue management milestones

Conclusion - Transmission Queue & Connections Reform

- On Day 1 of the new Connections queue (1st May 2025), if the Gate 2 readiness criterion was applied, the reformed connections queue could contain c330GW of capacity (with c 340GW of projects having a Gate 1 contract). This would result in significant amounts of capacity being released from the queue which could be allocated to projects remaining in the reformed queue, to accelerate their connection dates, although any acceleration is dependent on the current queue position of projects that exit the queue (e.g. if most of these are towards the back of the queue this would not lead to much acceleration).

- NESO is unable to predict the impact of that released capacity on connection dates as this is dependent on numerous factors, ego (a) network availability (b) dependencies between reinforcement works (c) developer's ability to demonstrated Gate 2 readiness in time for the application windows; (d) regional variations; (e) the current queue position of projects that leave the connections queue; etc.
- While NESO cannot currently quantify project acceleration, it can be concluded that as the new Gate 2 queue would have a higher proportion of projects with a greater readiness to connect, on average those projects should receive more favourable connection timescales and be able to connect sooner than under the current arrangements.

Conclusion of Part 1

The transmission connections queue is growing at an unprecedented rate and the current connections process cannot sustain the influx of projects. The consequence is a 580GW+ (transmission connected capacity only), slow-moving queue of contracted projects. In this queue, many of those ready-to-connect may be unable to do so as quickly as they would wish (on account of being stuck behind stalled projects).

NESO estimates that, on Reform Day 1[16], the queue size could be cut from c660GW[17] to 330GW. This shorter queue should provide readier projects a more favourable connection date on average.

However, a significant number of projects would still remain in the queue, and that queue would likely grow over time (e.g., up to potentially c500GW by mid-2027). The capacity of projects remaining in the reformed queue would still significantly exceed capacities in all our FES scenarios, with a particularly material oversupply in some technologies (e.g., short-duration storage, and to a lesser extent, solar)

The next step for ESO Connections is to consider the impacts of Government's Clean Power 2030 Action Plan ("CP30 plan") and to understand how the output scenarios could shape the reformed connections queue.

[16] ESO Connections Reform Day 1 – 1st May 2025
[17] Transmission queue; including Directly Connected Generation & Demand and Embedded Generation

PART 2: The potential impact of applying the 'strategic alignment' element of the proposed Gate 2 criteria to the connections queue

As set out in our accompanying documentation, we propose that the reformed connections queue is aligned to strategic energy plans. More specifically, we propose that the reformed connections queue is aligned to the pathways (to 2030 and to 2035) within Government's Clean Power 2030 Action Plan (CP30 plan).

Government's CP30 plan hasn't been published yet (we currently expect it to be published by the end of 2024). However, we have recently provided advice to Government on the pathways we consider could deliver Clean Power by 2030, along with an additional pathway from 2031 to 2035, which can be used as the basis for issuing connections offers for projects in that period. The data used below is therefore derived from our recent advice to Government and where we refer to 'CP30 pathways' we therefore refer to the data from our recent advice to Government.

We will update this data once Government publishes its CP30 plan.

Part 2 focusses on the technology lens for connections reform in relation to the CP30 plan. The models below show the estimated "ready" connections queue (with a high case and low case) to compare potential differences between our queue and the 2030 pathways. The analysis includes the entire generation queue (Transmission & Distribution) and compares to the latest CP30 pathways.

The differences in modelling between Part 1 and Part 2 are:

- Includes both transmission and distribution
- Generation only (demand not included)
- Comparison is to CP30 pathways (rather than FES)
- For national analysis current built capacity is based on CP30 modelling figure for 2023 plus known built projects since start of 2024.
- The data sources in Part 2 have a lower total connections queue than those in Part 1 (c.650GW vs c.700GW of generation projects in queue.) This is because of different data sources for information i.e. differences between Tec register and our other data base.

Clean Power 2030

This section compares the current queue with the Clean Power 2030 pathways to 2030 and to 2035 we provided to Government in our recent CP30 report. The figures show that in most technologies there is oversupply at a GB level (i.e. not taking account at this stage of location – locational analysis follows later in this document), but that there is potential undersupply in a couple of instances, depending on the pathway selected.

The following graphs show the estimated “ready” queue with connection dates to 2030, 2035, and the full queue compared to the pathways in our CP30 report. It includes a high case (full queue) and low case (RFI respondents with land now) ‘readiness’ estimate of the revised connections queue.

4. Full connections queue compared to 2030 and 2035 pathways

Queue to 2030 compared to CP30 pathways to 2030

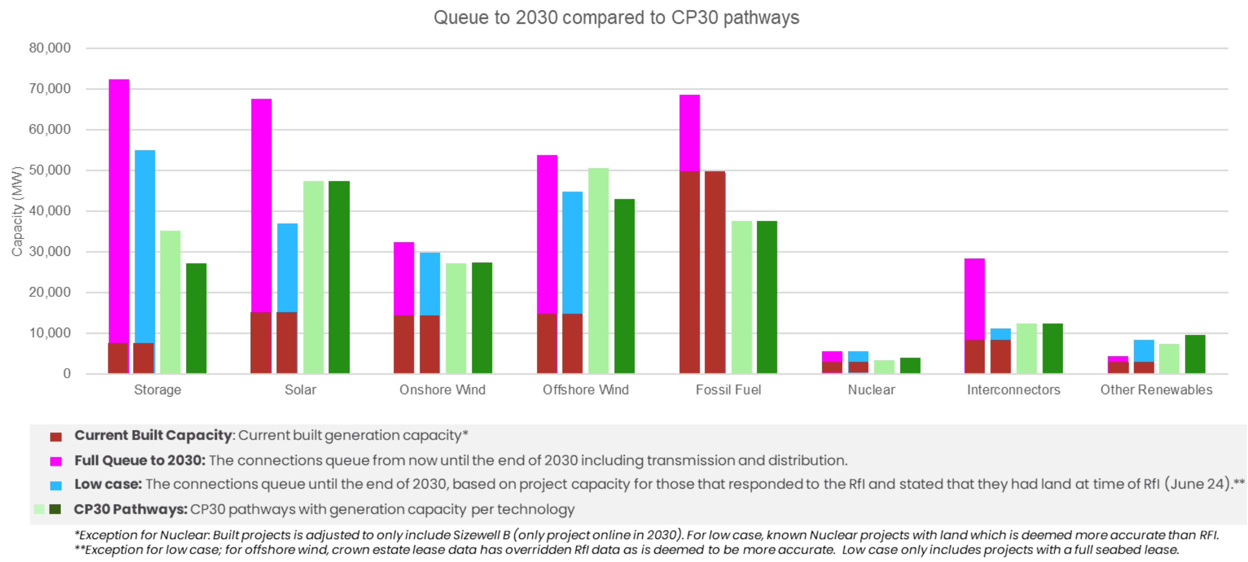


Figure 24. Queue to 2030 compared to CP30 pathways

There is an estimated oversupply (no less than c20GW) of ‘ready’ storage in the current queue to 2030 compared to the 2030 pathways, as shown in Figure 24. For other technologies, such as interconnectors, nuclear, and onshore wind, the low readiness case often closely matches the 2030 pathways. However, the low readiness case for offshore wind and solar are below the 2030 pathways which means there could be an undersupply of ‘ready’ projects for these technologies (if the low readiness scenario were to eventuate). It also doesn’t take account of ‘ready’ projects with current connection dates beyond 2030 taking advantage of freed up capacity and being accelerated to 2030 or before.

Clearly the low readiness case may also be a material underestimation of the ‘ready’ projects, as it doesn’t include projects that have told us they would be ‘ready’ by 1 Jan 2025 (or beyond) and assumes all non-respondents to the RFI would not be ready. It also does not take into consideration any new applications meeting the Gate 2 ‘readiness’ criteria over time. So any potential undersupply against the low readiness case should be treated with some caution given the factors above.

Queue to 2030, with 20% of capacity accelerated projects from the 2030-2035 queue, compared to CP30 pathways

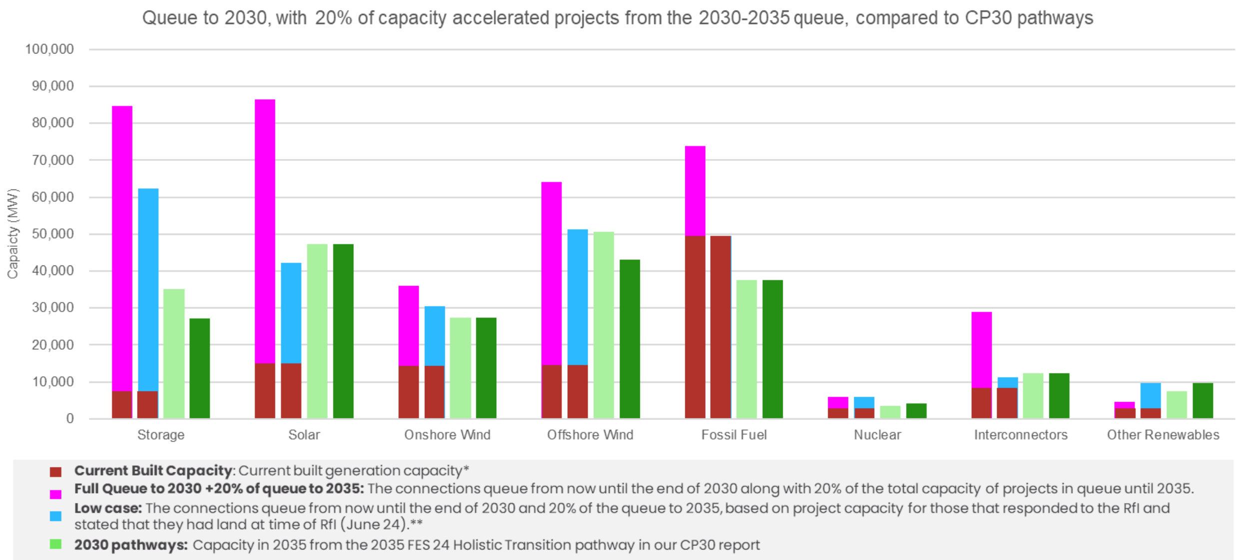


Figure 25. Queue to 2030, with 20% of capacity accelerated projects from the 2030-2035 queue, compared to CP30 pathways

To address potential undersupply, connections reform could enable required 'ready' projects later in the queue to accelerate and meet that undersupply (as capacity would have been freed up ahead of them in the queue from 'non-ready' projects receiving Gate 1 contracts and exiting the queue). Figure 25 shows the potential revised under- or oversupply where we could accelerate 20% of the current 2031-35 queue to meet undersupply in the period to 2030. This would reduce potential undersupply compared to the 2030 pathways, although if the low readiness scenario were to eventuate there may be undersupply in the solar category (although noting the potential for the low readiness scenario to be overly-pessimistic as set out above).

Queue to 2035 compared to 2035 pathway

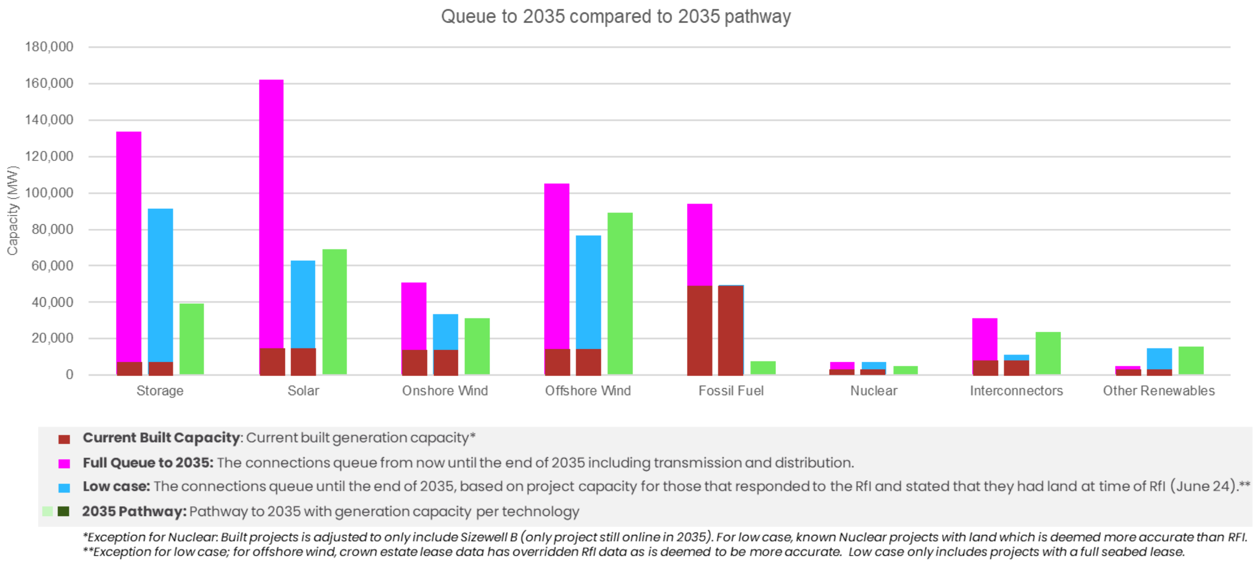


Figure 26. Queue to 2035 compared to 2035 pathway

Figure 26 shows the connections queue to 2035 compared to the CP30 pathway to 2035. This shows that there is an estimated oversupply (no less than c50GW) of 'ready' storage in the current queue to 2035 compared to the 2035 pathway. For other technologies the low readiness case fairly closely matches the 2035 pathways. However, the low readiness case for offshore wind, interconnectors and solar is below the 2035 pathway which means there could be an undersupply of 'ready' projects for these technologies (if the low readiness scenario were to eventuate and noting the potential for the low readiness scenario to be overly-pessimistic as set out above).

Full queue, including beyond 2035, compared to 2035 pathways

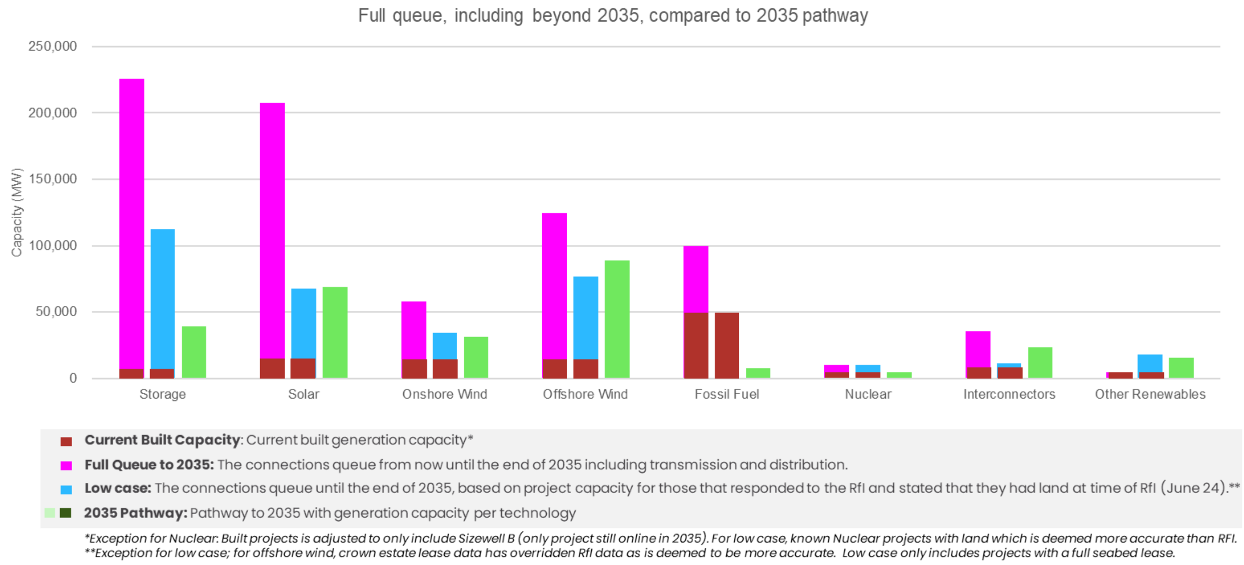


Figure 27. Full queue, including beyond 2035, compared to 2035 pathways

Figure 27 shows the full current queue (i.e. all currently contracted projects in the queue) compared to the CP30 pathway to 2035. The full current queue has up to 485GW more supply than what is required for 2035, which is largely driven by the oversupply of short duration storage. The only two technologies to change materially in this figure compared to Figure 25 are storage and solar, where the full queue and the low case readiness queues have both increased. A total capacity of c380GW of projects fall under the low case readiness category across all technologies (compared to c350GW under the low case readiness category in Figure 26).

The large additional capacities in the current queue illustrates the large pool of projects that could potentially become ready, either by Day 1 of connections reform, or before SSEP is introduced and used to set a new pathway for the connections queue (currently estimated as late 2026). As set out in Figure 23, we estimate that the capacity of 'ready' transmission-connected projects (if the Gate 2 criteria just reflected the 'readiness' element) could increase materially over time, to c330GW by May 2025, then c415GW by May 2026 and to c500GW by May 2027. Including 'ready' relevant distribution-connected projects increases this capacity of 'ready' projects in the queue further (e.g. to over 400GW by May 2025).

This compares to a total capacity required by 2035 under the 2035 pathway of c285GW) – also noting that: a) the 2035 pathway includes distribution-connected projects as well as transmission-connected projects; and b) the 2035 pathway figures include built capacity, of which there is currently more than 100GW, which means that the 2035 pathway only requires a queue of an additional c185GW.

This clearly represents both an opportunity and a risk.

- The opportunity is that any undersupply relating to the 2035 pathway may be addressed through a combination of 'ready' projects from the current queue and / or new 'ready' projects moving from Gate 1 to Gate 2 or new Gate 2 ready projects joining the connections queue in future Gate 2 windows

- The risk is that, without intervention (i.e. without using overall design 2 as per our accompanying 'Overview' document), the total capacity of 'ready' projects may substantially exceed the total capacity for the 2035 pathway, potentially by as much as 130-220GW by the time SSEP is introduced and used to set new pathway(s) for the connections queue. This is the risk we refer to in the accompanying Overview document with regards to overall design 3. Under overall design 3 this additional 130-220GW of capacity would be at the back of the new queue (beyond 2035) and there is a risk that much of it may not align with the SSEP pathway(s), in terms of capacity/technology/location mix, which would represent a significant risk to either consumers or project developers (or both). To further illustrate this point, the total capacities of the technologies of some 'ready' projects in the queue (particularly short duration storage, but potentially also solar) may be substantially beyond even what we need by 2040 or 2050 (if the FES are used as a proxy for what we may need beyond 2035, see Figures 8 to 15).
    - If implemented overall design 3 would mean either: a further retrospective change to customer contracts when an SSEP is available and projects which are not aligned with that plan are removed from the queue; or, building additional generation, storage and network which the new SSEP says are not needed. Ultimately both options would increase the cost to the consumer relative to design option 2. One would increase uncertainty to developers and the other would result in the delivery of an inefficient and uncoordinated future energy system.

Assumptions/ Notes

- Full queue represents our high case of readiness for projects. This represents that all projects are 'ready' and meet the Gate 2 requirements.
- Low case represents the scenario that only respondents to the RFI with land at time of RFI (June 2024) would be ready.
    - Exception for nuclear, where known Nuclear projects with land was used which is deemed more accurate than RFI.
    - Exception for offshore wind, where the Crown Estate Land Registry was used to find projects with seabed lease, which is deemed more accurate than RFI.
- Current built capacity is taken from FES24 generation for 2023 and is updated with projects that have been built since 2023. Note this provides a high level of built capacity (117GW) compared to those shown as built in connections registers (76GW).
    - Exception for nuclear, where current built projects was adjusted to only include Sizewell B, as this is the only currently built project online in 2030.

- The model does not account for projects that will disconnect before 2030/2035. Note:
  - Projects may not disconnect even when assets reach end of life, new projects could be developed at the same site.
  - Any implementation of connections reform will need to take into account where projects disconnect from the system.
- Contracted Capacity
  - Assumed that contracted connection capacity will be the generation capacity of projects, as our dataset does not include generation capacity behind the meter. This is because contracted connection capacity represents maximum instantaneous import/export from network and limited information on any more/less capacity behind the meter.
  - In the future, decisions regarding individual projects will be based on the specifics of those projects i.e. the information the developer provides regarding their project. We will use this information to consider how the project aligns with the criteria for entry into the reformed queue.
- The queue and CP30 technology type has been normalised to the TEC & Dx Register to only 9 categories due to the limitations of distribution data, which already categorises projects into these categories.
- Multi-technology projects
  - For multi-technology (hybrid) projects, the technology type is aggregated to the plant with the highest typical export capacity. Given there are 241GW of projects listed with more than one technology type (hybrid projects), this categorisation approach potentially overestimates generation and may misestimate storage.
  - In the future, decisions regarding individual projects will be based on the specifics of those projects i.e. the information the developer provides regarding their project. We will use this information to consider how the project aligns with the criteria for entry into the reformed queue.
- Storage
  - Refers to Energy Storage System-only projects (with no other technology types represented in this category)
  - Around 500 transmission generation projects include a storage element; these projects are categorised by the generation technology (i.e., the storage element of those projects is not included in the above data / charts). From import capacity, there could be c.180GW of increased storage capacity in the queue from these projects.

- Queue Visibility:
  - The TEC Register, Interconnector Register, Clean Power 2030 Data Workbook, distribution data, and internal datasets reflect the connection queue. We assume that the technology type, contracted capacity, and connection dates listed are reflective of the project's characteristics.
  - Due to time constraints, we were not able to incorporate DRC data or project specific DNO data, instead using aggregated data sources.
  - Note there is a limitation in our distribution data, which is taken from aggregated distribution workbook, where 67GW (45%) of projects do not have connection dates. For data quality purposes these have been added to our full queue analysis but have not been added in pre-2030 or pre-2035 models.
  - In reality, the data sources shown will not reflect the entire connection queue but are the most up-to-date and complete data available at the time of the modelling for this report. These sources provide a high-level view of the queue for comparison to CP30. The data will continue to be updated as Connections Reform is implemented.
- Assumed CP2030 will drive the need for 2035. These models do not account for if SSEP is driving from 2030 to 2035.
- G98 projects which do not need to make a connection application are not included in our queue data:
  - Our modelling of the 2030 pathways in all graphs includes solar projects connected to domestic and small commercial and industrial properties, which we described as micro solar.
  - Some micro generation projects which are within the scope of the Energy Network Associations (ENA) Engineering Recommendation G98[18] do not need to apply for a connection with the DNO and therefore are not included in our figures for the current queue.
  - For the purposes of connections reform and the Gate 2 criteria or Connections Network Design Methodology, we do not intend to include generation that will not have an impact on the transmission system within the scope of connections reform.
- In some graphs 'other renewables' shows as higher in the 'low case' than in the full queue. This is driven because the RFI data has some responses that do not provide detail, and state "Other" as their categorisation. These have been grouped with "Other Renewables", however these responses in the RFI are larger than that in the full queue.

[18] https://www.energynetworks.org/publications/erec-g98-requirements-for-connection-of-fully-type-tested-micro-generators

The RFI follow up, as mentioned in PART 1, has been sent to improve the data quality in future analysis.

Conclusions - Full Queue Analysis

- The connections queue to 2030 has between c.20GW to c.100GW more ‘ready’ capacity than the total from 2030 pathways, however with a technology type consideration applied technology such as offshore wind and other technologies (Hydrogen, CCS, etc.) could be undersupplied. Storage also stands out as having a large oversupply of ‘ready’ projects of at least c.20GW.
- Connections reform could enable ‘ready’ projects which align with the Government’s Clean Power Plan which are later in the queue to accelerate and meet undersupply (as capacity would have been freed up ahead of them in the queue from ‘non-ready’ and/or non-aligned projects receiving Gate 1 contracts and exiting the queue). If 20% of required projects from 2030-2035 were accelerated, the low case of ‘ready projects’ would move significantly to close the gap of undersupply.
- The connections queue has a greater oversupply of projects in the high case ‘ready’ full queue than in the queue to 2030. The low ‘readiness’ case of offshore wind, solar, and other renewables was below the 2035 pathway.
- The full current queue has up to c480GW more supply than what is required for 2035, which is largely driven by the oversupply of short duration storage.
    - This provides an opportunity to address any undersupply in the Clean Power 2030 pathways through a combination of ‘ready’ projects from the current queue and / or new ‘ready’ projects moving from Gate 1 to Gate 2 or new Gate 2 ready projects joining the connections queue in future Gate 2 windows
    - The risk is that, without intervention (i.e. without using overall design 2 as per our accompanying ‘Overview’ document), the total capacity of 'ready' projects may substantially exceed the total capacity for the 2035 pathway, potentially by as much as 130-220GW by the time SSEP is introduced and used to set a new/additional pathway for the connections queue. This excess capacity may not align with the SSEP pathway, in terms of capacity/technology/location mix, which would represent a significant risk to either consumers or project developers.

5. Transmission and distribution analysis

Distribution analysis

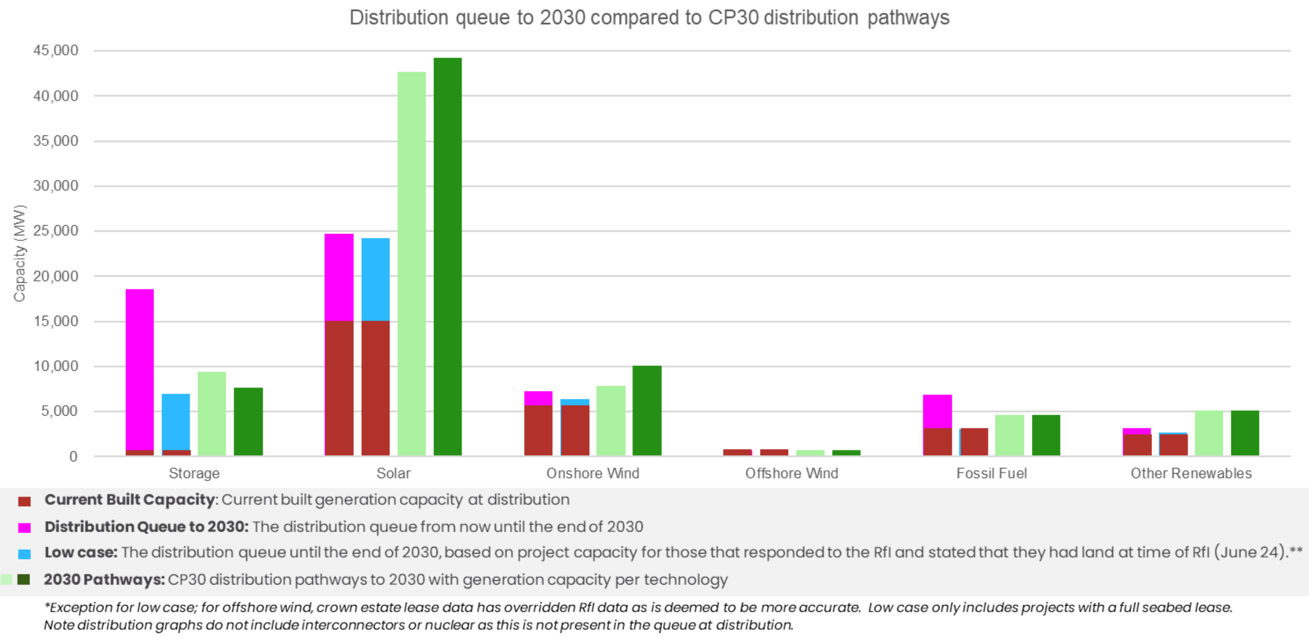


Figure 28. Distribution queue to 2030 compared to CP30 distribution pathways

Figures 26-28 above shows the distribution-connected queue to 2030 compared to the distribution element of the CP30 pathways to 2030. The distribution-connected queue only corresponds to those distribution-connected projects that would be in scope of TMO4+ therefore it doesn't include all distribution-connected projects. The graph excludes nuclear or interconnectors as these don't connect to the distribution network. Of the remaining technologies, the trends are similar to the combined transmission and distribution connections graphs to 2030 (Figure 23); however, a key difference is solar, which appears significantly undersupplied compared to the 2030 pathways.

Figure 28 shows a potential significant undersupply of solar in the current queue compared to the CP30 pathways in 2030. To meet Government targets for solar requires significant roll out of this technology. In developing our advice to Government our modelling indicated that the most efficient point to connect significant volumes of new solar was to the distribution network. It should also be noted that within our modelling we included solar projects connected to domestic and small commercial and industrial properties, which we described as micro solar. Some micro generation projects which are within the scope of the Energy Network Associations (ENA) Engineering Recommendation G98[19] do not need to apply for a connection with the DNO. For the purposes of connections reform and the Gate 2 criteria or Connections Network Design

[19] https://www.energynetworks.org/publications/erec-g98-requirements-for-connection-of-fully-type-tested-micro-generators

Methodology, we do not intend to include micro solar in the capacities of the 2030 and 2035 pathways for solar at a distribution level. This will significantly reduce or remove the theoretical 'undersupply' shown in Figure 28.

Transmission analysis

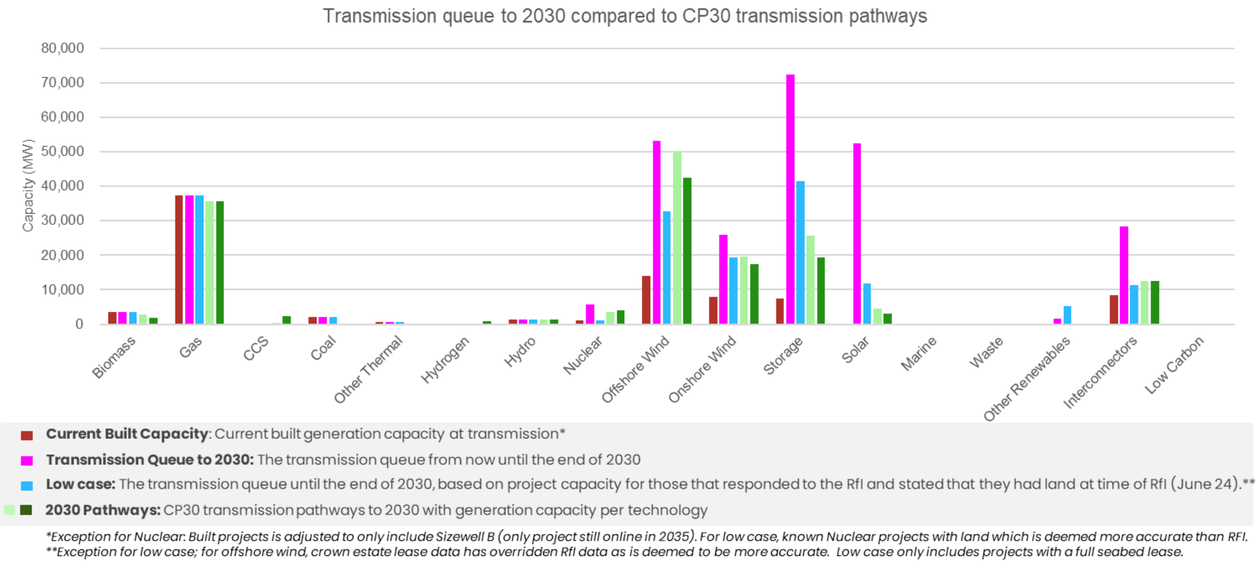


Figure 29. Transmission queue to 2030 compared to CP30 transmission pathways

Figure 29 above shows the transmission-connected queue to 2030 compared to the transmission element of the CP30 plan, to 2030. Due to the more granular view of technology Figure 29 is able to show one of the 2030 pathways includes hydrogen and CCS, which are currently not in the 2030 transmission queue. To meet this undersupply these projects could be able to accelerate through connections reform. The other trends are similar to the combined transmission and distribution connections graphs to 2030(Figure 23), so no further comment is made here.

Assumptions/ Notes

- At transmission level the project categorisation is not constrained by the distribution data. Therefore Figure 29 shows all technology types as listed in CP30 plan, to enable more detailed comparison.
- The remainder of assumptions are the same as those in section Full connections queue compared to 2030 and 2035 pathways.

Conclusion - Transmission and Distribution Analysis

- The CP30 pathway for transmission makes up over c.150GW and distribution makes up over 55GW.

- The distribution-connected queue shows potential undersupply, especially for solar projects, although as per the notes in section 2 above, this may be because we have not included micro solar (which does not need to apply for a connection) in our connections queue analysis - but also because there may be a gap between what is due to connect and Government policy aspirations. There are also other limitations to the distribution data, as listed above, that mitigate the potential scale of undersupply, so figures need to be treated with caution.
- The transmission-connected queue shows oversupply for the majority of technologies when comparing the full queue to the 2030 pathways and the trends are more similar to those of the full transmission-connected and distribution-connected queue.

6. Locational Analysis

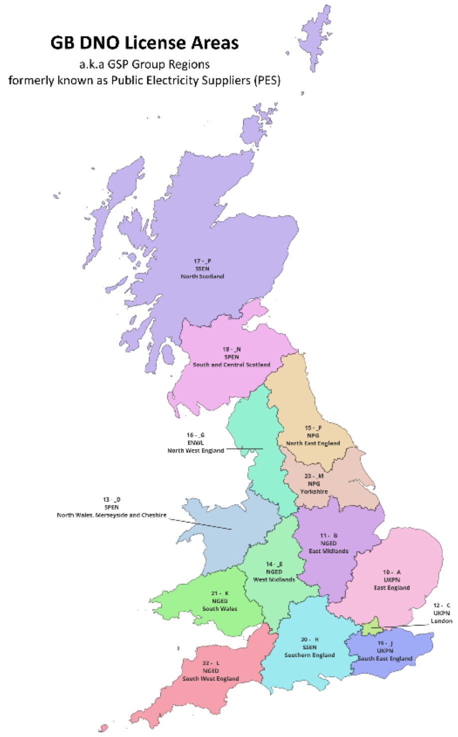
The following section shows the full queue and the estimated low case "ready" queue with connection dates to 2030, compared to the pathways in our CP30 report, split by location. For our analysis we have split the queue and CP30 pathways by 14 DNO license areas for the distribution connected queue and split by 17 GBR (Great Britain) zone regions for the transmission connected queue. This modelling can show where each technology may be undersupplied or oversupplied in each region, in comparison to the 2030 pathways.

When developing its Clean Power Plan, Government may want to consider amalgamating zones for certain technologies. We have provided some examples and reasons for this below.

- Offshore wind, where project capacity is allocated based on the location of the point of connection rather than the location of the generating station.
- Technologies such as interconnection, hydrogen, CCS etc where providing a narrow locational signal in the plan may limit the scope for commercial negotiation as there may only be one project in a specific zone.

Further, more granular location information is provided to government alongside our Clean Power 2030 report. The graphs below provide an early view based on the data currently available.

Mapping of locational analysis



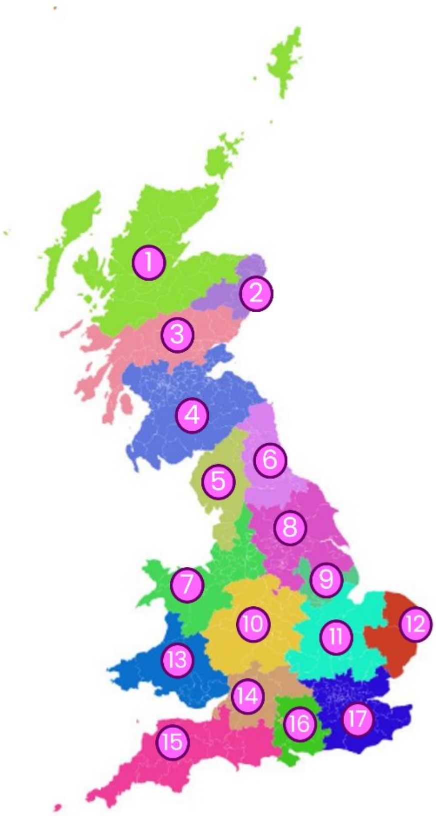


Figure 30. GB DNO License Areas (left)

Figure 31. GBR Zones (right)

The GBR_zones cover similar regions to the DNO license areas and align in in some regions as shown in Figure 30 and Figure 31, for example GBR zones 1-3 are the same as SSEN North Scotland. However, mainly the GBR zones have different boundaries, so cannot be compared exactly.

For transmission locational modelling we have mapped the sub-stations of each transmission connected project to the GBR_zone. Offshore wind and other projects are therefore assumed to be located at the point on transmission queue it connects, not the generating space.

For distribution locational modelling the CP30 pathways have been manually mapped to the DNO license areas for our distribution connections analysis, as the dataset is broken into the more granular Bid3 zones which is used for CP30 modelling, shown in Figure 30. Table 7 below shows the manual mapping between zones we have used for our analysis.

Public

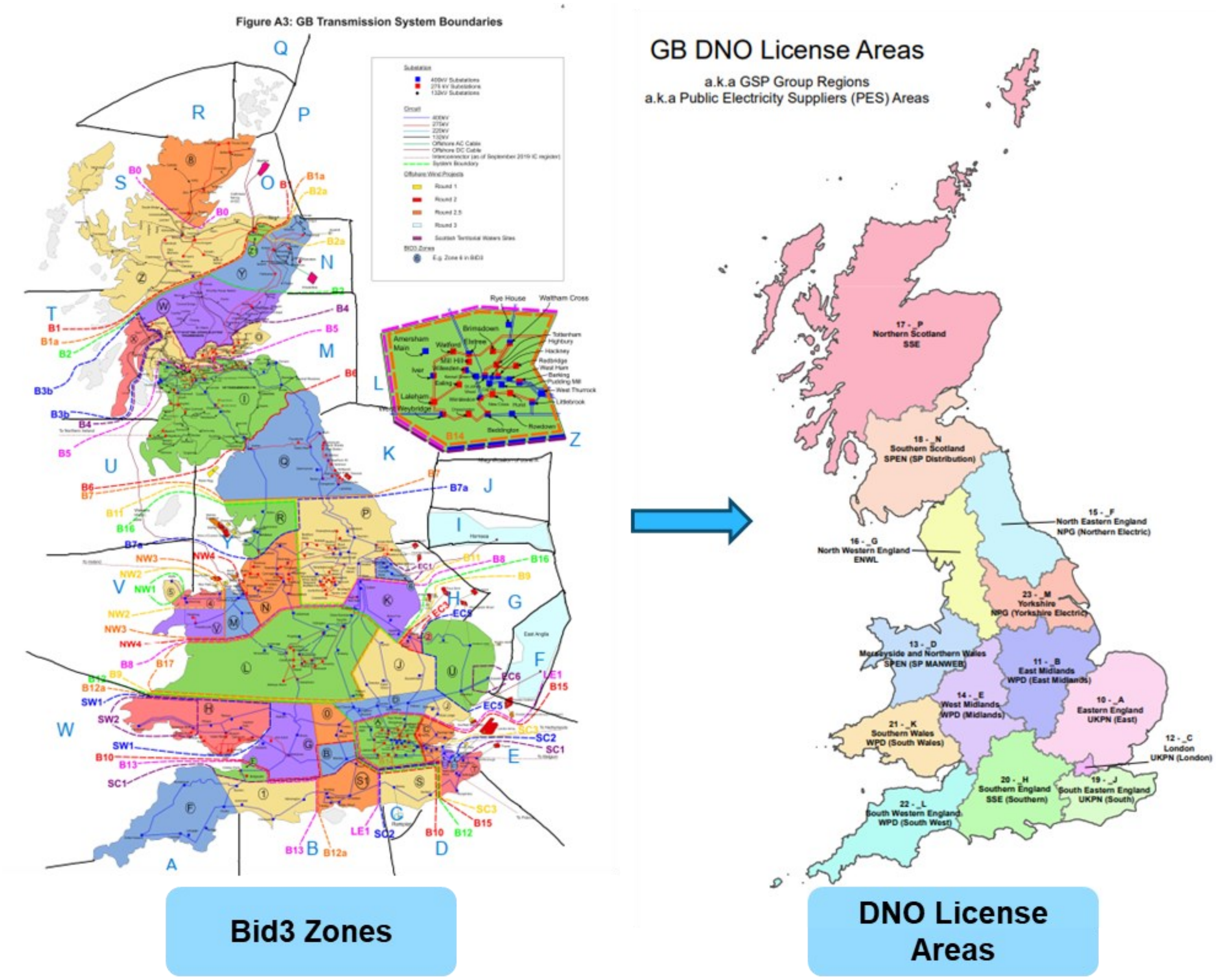


Figure 32. Bid3 Zones (left) & DNO License Areas (right)

The table for the mapping of Bid3 zone to DNO license areas:

Bid3 Zone	DNO License Area
0	SSE (Southern)
1	SSE (Southern)
2	UKPN (East)
4	SPEN (SP MANWEB)
5	SPEN (SP MANWEB)
6	NPG (Yorkshire Electric)
8	SSE
A	UKPN (London)
B	SSE (Southern)
C	UKPN (East)
C1	UKPN (South)
C3	UKPN (South)
D	UKPN (East)
E	WPD (South West)
F	WPD (South West)
G	SSE (Southern)
H	WPD (South Wales)
I	SPEN (SP Distribution)
J	UKPN (East)
K	WPD (East Midlands)
L	WPD (Midlands)
M	SPEN (SP MANWEB)
N	SPEN (SP MANWEB)
O	SSE

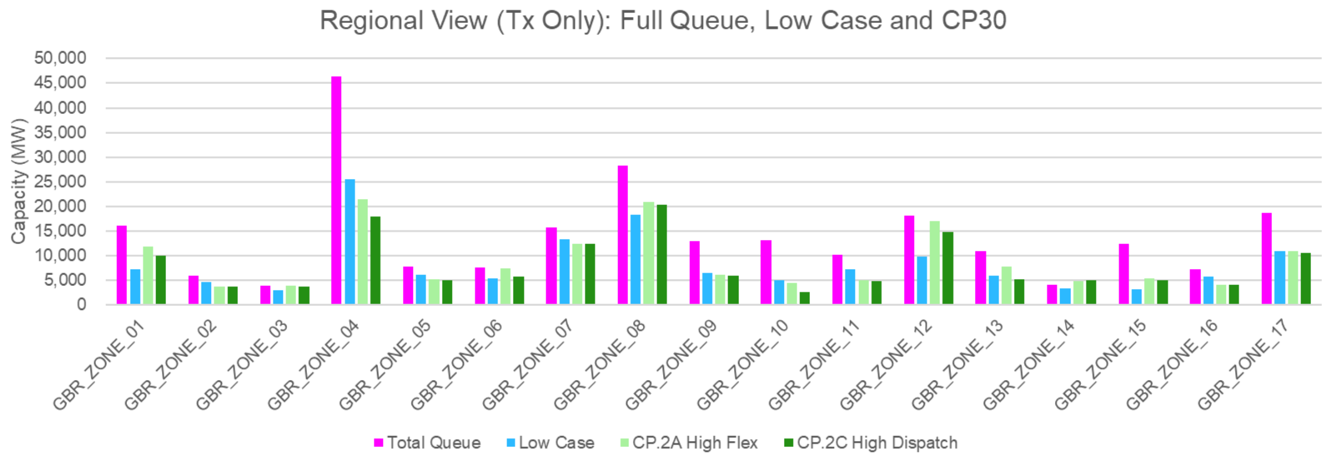
Bid3 Zone	DNO License Area
P	NPG (Yorkshire Electric)
Q	NPG (Northern Electric)
Qeast	NPG (Northern Electric)
Qwest	ENWL
R	ENWL
S	UKPN (South)
S1	SSE (Southern)
T	UKPN (South)
U	UKPN (East)
V	SPEN (SP MANWEB)
W	SSE
W5	SSE
W6	SSE
X	SSE
X1	SSE
X2	SSE
X3	SSE
X4	SSE
X5	SSE
X6	SSE
X8	UKPN (East)
Y	SSE
Z	SSE
Z1	SSE

Table 7 Bid3 zone to DNO license areas

The boundaries for DNO license areas do not align completely with the boundaries of the Bid3 zones therefore in our analysis we have mapped each Bid3 zone to the DNO license area with the largest overlap. Note that figures need to be treated with caution as they may differ to the actual CP30 pathways per DNO region. We will update and confirm these after Government publishes its CP30 plan.

Location Analysis by GBR Zone for transmission-connected queue

At transmission level we have compared the TEC register to the Clean Power 2030 pathways split by region. Interconnectors are not in the TEC register therefore are excluded from this analysis.



- **Transmission Queue to 2030:** The transmission queue from now until the end of 2030 including built capacity
- **Low case:** The transmission queue until the end of 2030, based on project capacity for those that responded to the RfI and stated that they had land at time of RfI (June 24) including built capacity.**
- **2030 Pathways:** CP30 transmission pathways to 2030 with generation capacity per technology

**Exception for Nuclear: Built projects is adjusted to only include Sizewell B (only project still online in 2035). For low case, known Nuclear projects with land which is deemed more accurate than RFI.*
***Exception for low case; for offshore wind, crown estate lease data has overridden RfI data as is deemed to be more accurate. Low case only includes projects with a full seabed lease.*

Figure 33. High-level regional view of the transmission-connected queue and low case by GBR zone

Figure 33 shows the total generation capacity, regardless of technology, by GBR zone compared to the 2030 pathways for each zone. There is an oversupply in the current full queue against all 17 zones, which will be mainly driven by storage projects similar to Figure 22.

However, when considering the low case 'ready' queue there is potentially undersupply in 7 zones (and oversupply in the remaining 10 zones), although as flagged earlier the low case readiness may be a significant underestimate. We also note that only one of the zones (zone 12) that are undersupplied reflects a material (e.g. more than a 2-3 GWs) level of undersupply.

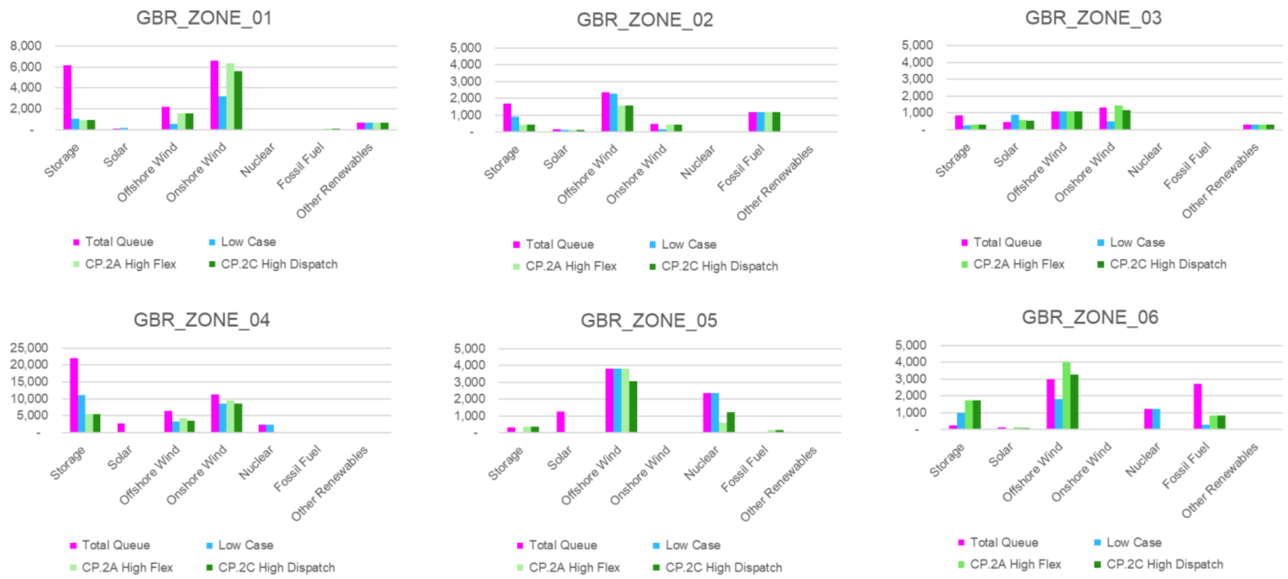


Figure 34. Transmission queue and low readiness case (MW) split by technology for each of the GBR zones (1/3)

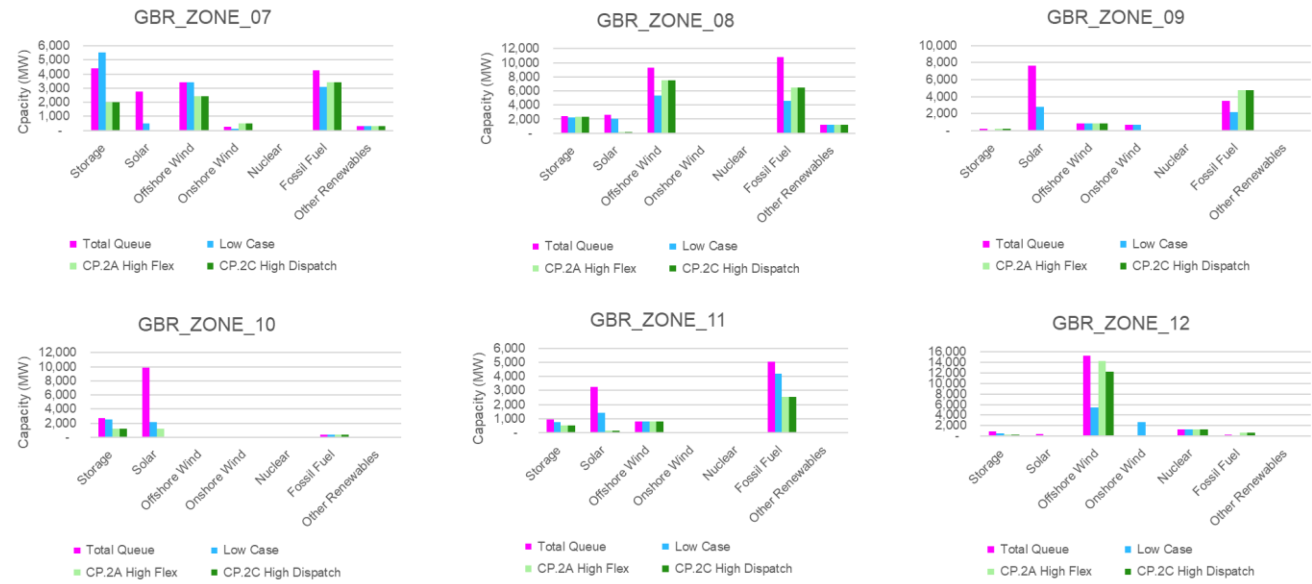


Figure 35. Transmission queue and low readiness case (MW) split by technology for each of the GBR zones (2/3)

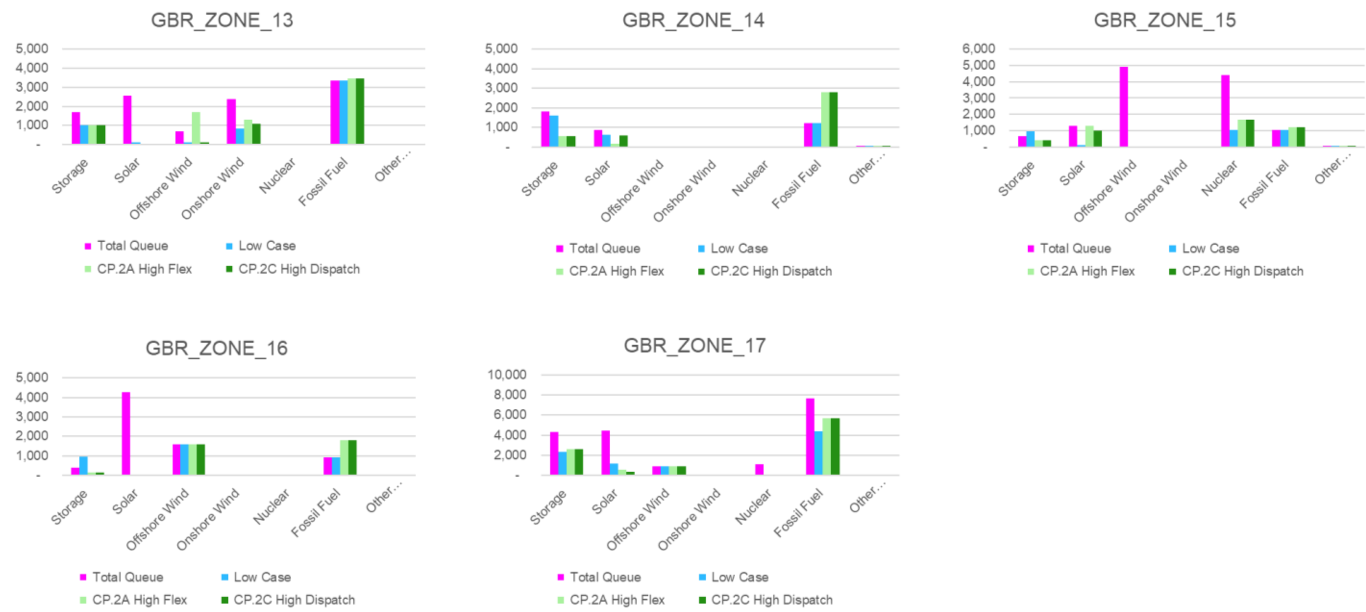


Figure 36. Transmission queue and low readiness case (MW) split by technology for each of the GBR zones (3/3)

Figures 34-36 above show the whole queue and the low case readiness queue mapped against each of the 17 zones for transmission-connected projects.

These graphs show some interesting variations by zone. As shown in Figures 34-36 the generation capacity in the CP30 pathways generally align to where there are already projects in the queue for that region, therefore the majority of what is required for clean power 2030 at transmission level can be met by the existing queue (if sufficient projects are 'ready'). The requirements per technology do vary with each zone.

The total undersupply from all regions and all technologies is c.10% of what is required for clean power 2030 when comparing to the total transmission queue. This undersupply is somewhat evenly distributed between zones, with the largest amount of undersupply for the total transmission queue in any region being less than 3GW, in zone 6.

There are some technologies that are undersupplied in some zones, despite oversupply at a national level. For example, in zones 9, 11 and 17 there is oversupply of fossil fuel in the full queue compared to the CP30 pathways, however in zone 16 there is undersupply.

Figures 34-36 also show that generation capacity is far higher in some regions, with large oversupply in GBR_Zone 4 which has c.45GW of supply, far more than a region such as GBR_Zone_14 which only has c.5GW of total capacity.

Public

Assumptions/ Notes

- Current built capacity differs to previous model as is created from projects listed as built or have connection dates in the past that are in the TEC Register. Note that this provides a lower estimate of built capacity than from our previous assumptions (using CP30 estimates).
- The current built capacity is included in the full queue and low case for all graphs.
- Projects have been mapped to each region based on their sub-station location. 99.8% of projects were matched to a location.
- The remainder of assumptions are the same as those in section: Full connections queue compared to 2030 and 2035 pathways.

Location Analysis by DNO Region (Distribution-connected Queue)

For Distribution connections analysis, our data source does have limitations. The data used provides high level connections per region and for a significant portion (45%) of the distribution queue does not provide the connection dates. These projects have been excluded from our analysis of the queue to 2030.

Therefore, it should be noted that the data in the following tables may be a significant underestimate of actual connections queue figures.

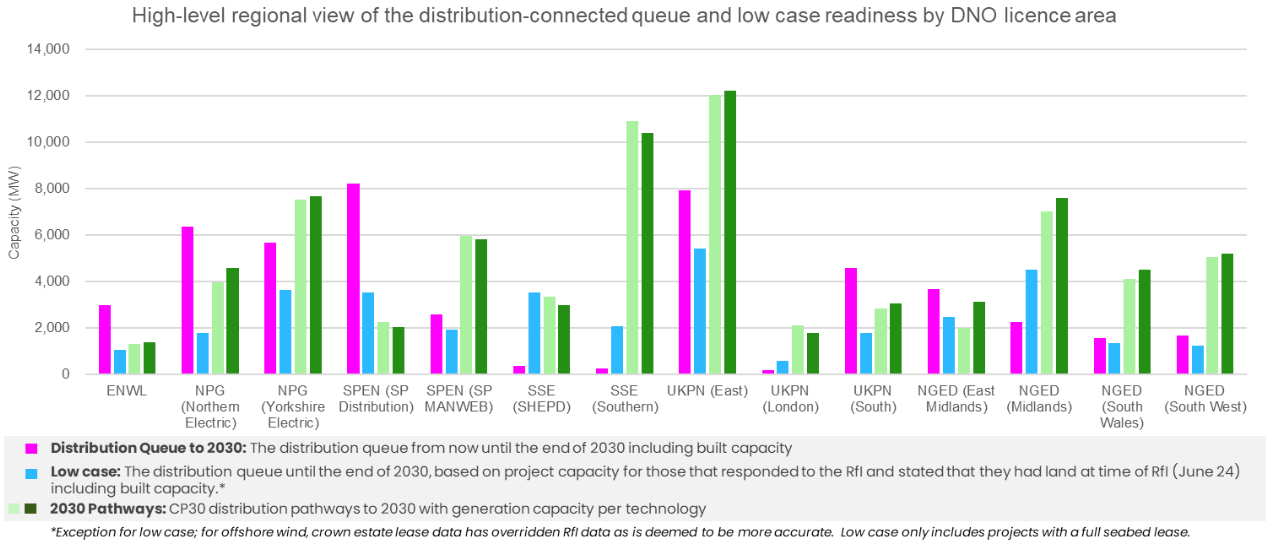


Figure 37. High-level regional view of the distribution-connected queue and low case readiness by DNO licence area

Figure 37 shows the 14 DNO regions, where comparing the full distribution queue to 2030 pathways potentially 5 regions have an oversupply and 9 regions have an undersupply. When comparing the low readiness case to 2030 pathways all regions show undersupply. However, due to the limitations of the data mentioned above, these figures should be treated with caution as the data may be significantly under-representative of the actual connections queue.

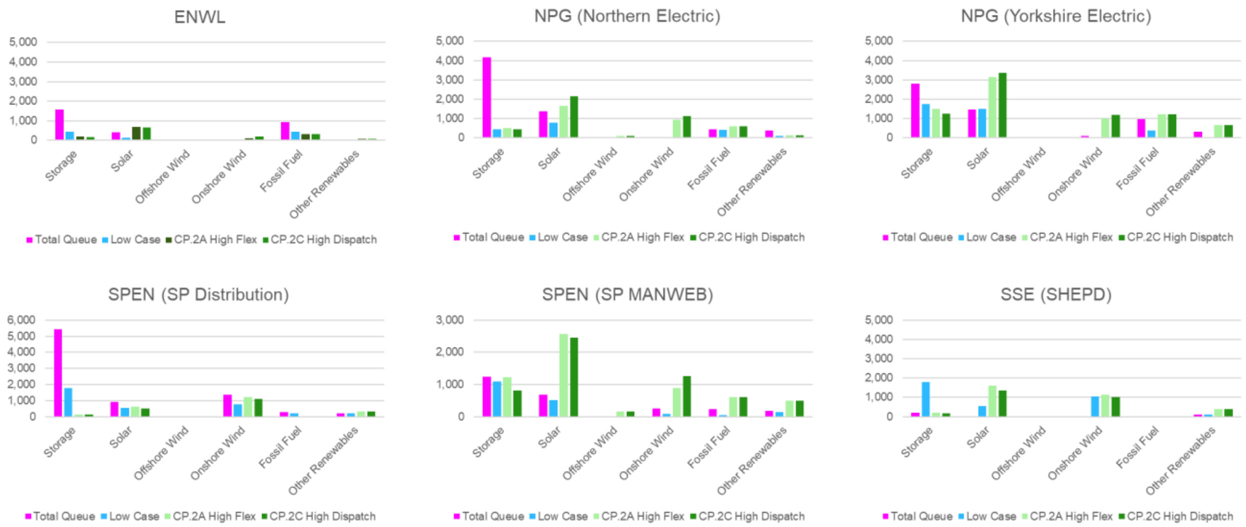


Figure 38. Split of the full queue and low readiness case (GW) split by technology for each of the DNO licence area (1/3)

Figure 39. Split of the full queue and low readiness case (GW) split by technology for each of the DNO licence area (2/3)

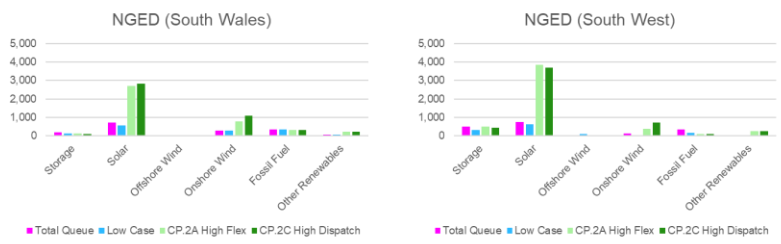


Figure 40. Split of the full queue and low readiness case (GW) split by technology for each of the DNO licence area (3/3)

Figures 38-40 above shows the full distribution queue and the low case readiness distribution queue mapped against each of the 14 DNO licence areas zones for relevant distribution-connected projects. These graphs show some interesting variations by zone; however, we are not inferring too much at this stage given the limitations to the current data referred to earlier and below.

Assumptions/ Notes

- As mentioned above, the data used provides high level connections per region and for a significant portion (45%) of the distribution queue does not provide the connection dates. These projects have been excluded from our analysis of the queue to 2030.
- The 2030 pathways have been mapped to DNO region based off the projects with the largest overlap with each region, however this mapping does not align for all regions.
- Current built capacity is based off projects listed as built or have connection dates in the past that are in the Distribution register. Note that this provides a lower estimate of built capacity than from our previous assumptions (using CP30 estimates).
- The current built capacity is included in the full queue and low case for all graphs.
- The remainder of assumptions are the same as those in section: Full connections queue compared to 2030 and 2035 pathways.

Conclusion - Locational Analysis

- The locational analysis provides an interesting view of the potential locational split of the current queue and the low case readiness queue against the locations in our CP30 report.
- However, the figures should be treated with caution as some of the locational accuracy of the queue figures (current and low case readiness) does not appear to be robust. Better locational data on the transmission and connections queues (particularly the distribution queues) is therefore required before making any judgements. As and when we apply the Gate 2 to the whole queue process from Q2

2025 we will be able to assess projects accurately against the locational aspects of the CP30 plan pathways, to 2030 and to 2035.

- In addition, the general points referred to earlier in the document should also be taken into account, i.e. potential underestimations of the low case readiness estimates and the potential to accelerate projects with current connection dates post 2030 once projects that do not meet the Gate 2 readiness criteria are removed from the queue.

Appendices

Information Sources

- NESO CMP434 Proposal Document
- NESO CMP435 Proposal Document
- NESO Future Energy Scenarios 2024 Publication (Data Workbook)
- NESO Transmission Connections Registers (September 2024)
- NESO CP30 Data Workbook
- NESO Request for Information (RFI) on Land Rights and Planning Status
- NESO Internal data sets
- Regen NESO Transmission Pipeline Report
- ENA Distribution Databook (June 2024)

End of Document