

Report to National Grid the ESO

Transmission project pipeline: High-level planning assessment

An analysis of the UK transmission pipeline's spatial



planning status and development timeframes – results
report

September 2024 – Final draft. Internal report not for publication

About Regen

Regen is an independent centre of energy expertise with a mission to accelerate the transition to a zero-carbon energy system. We have nearly 20 years' experience in transforming the energy system for net zero and delivering expert advice and market insight on the systemic challenges of decarbonising power, heat, and transport.

Regen is also a membership organisation, managing the Regen members network and the Electricity Storage Network (ESN) – the voice of the UK storage industry. We have over 150 members who share our mission, including clean energy developers, businesses, local authorities, community energy groups, academic institutions, and research organisations across the energy sector.

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1 Executive summary

Background and approach

Regen was commissioned by the Electricity System Operator (the ESO) to assess the planning status of the UK electricity transmission project pipeline. This work is part of a wider process undertaken by the ESO to reform the management of the significant and growing queue of energy projects (predominantly generation and storage technologies) seeking to connect to electricity networks across Great Britain (GB). As part of the proposed reforms, project developers will be required to provide evidence of spatial planning status and land rights to demonstrate progress in the connection queue. Ahead of implementing the necessary code reforms and policy changes, the ESO has been undertaking an impact assessment to consider the material impact of implementing the new stage gate requirements on the connection queue. To support this, the ESO issued a Request for Information (RFI), closed on 28 June 2024, seeking to obtain up-to-date information on the land rights and levels of advancement in planning for projects in the connection queue.

Across July and August, Regen completed research and analysis on a snapshot of the UK transmission project pipeline to act as supporting information for assessing the current planning status and development timelines of pipeline projects. This assessment consisted of three work streams:

- 1. An analysis of the historic timescale for projects to progress from submitted in planning or planning approval to build out**
- 2. An assessment of the current planning status of a proportion of the current pipeline projects seeking to connect to the electricity transmission network**
- 3. A high-level review of the responses the ESO received to the RFI, summarising high-level response rates and any cross-referencing to the results of the planning site research found.**

The purpose of this report is to present the high-level approach and summary of the analysis results from each work stream. The first section summarises the findings from work package one on the analysis of historical project planning timescales, including:

- An analysis of all sites found in the Renewable Energy Planning Database (REPD) with local authority planning consent
- A separate analysis of projects was determined through the Nationally Significant Infrastructure Projects (NSIP) regime in England, Wales and Scotland, respectively.

The report also provides a summary of the key findings from the planning status assessment for the current transmission project pipeline and an overview of the RFI responses and how they compare to the planning research undertaken by Regen.

Regen's data processing and analysis results for the pipeline research and RFI analysis are detailed in an Excel workbook as a separate deliverable to this report.

Key findings

Planning development timeline

Based on an analysis of historic projects from national and devolved planning databases, the following findings can be summarised for the development timeframes of renewable energy projects:

Solar PV

- Required, on average, 16 months to go from planning being submitted to operational in local planning. The one nationally consented solar farm took 36 months to become operational.
- Required, on average, five months to receive a decision after applying to local planning authorities. National governments took, on average, between 14-16 months to issue a decision.
- It took 11 months, on average, for solar farms to go from planning granted to operational.
- Project capacity scale (MW) does not appear to have significantly impacted the time required for solar farms to progress through planning.

Onshore wind

- Required, on average, 53 months (c. 4.4 years) at the local authority level and 84 months (7 years) at the national level to go from planning submitted to operational.
- Required, on average, 15 months to receive a decision after applying to local planners. National governments took, on average, 35 months to issue a planning decision.
- It took 34 months on average for onshore wind farms to go from planning granted to operational.
- Regional variations in planning timeframes were present for both solar and onshore wind, with Yorkshire and the Humber having the longest lead times. Solar PV projects generally progress quicker in the North East, North West, East Midlands and South East regions, while onshore projects progressed fastest in the North West, East Midlands and East of England.

Other renewables

- Other renewable technologies vary significantly in planning timeframes, and site capacity tends to dictate how quickly some projects move through planning regimes. Smaller projects tend to have a wider range of possible development timeframes and produce more outliers.
- Energy-from-waste (EfW) (via incineration) was the only technology with a high statistical correlation ($r=0.53$) between technology capacity and the time to progress from planning submitted to operational.
- Across all technologies, a moderate correlation ($r=0.32$) was found between capacity size and the number of months from planning application submitted to operational.

Battery Storage

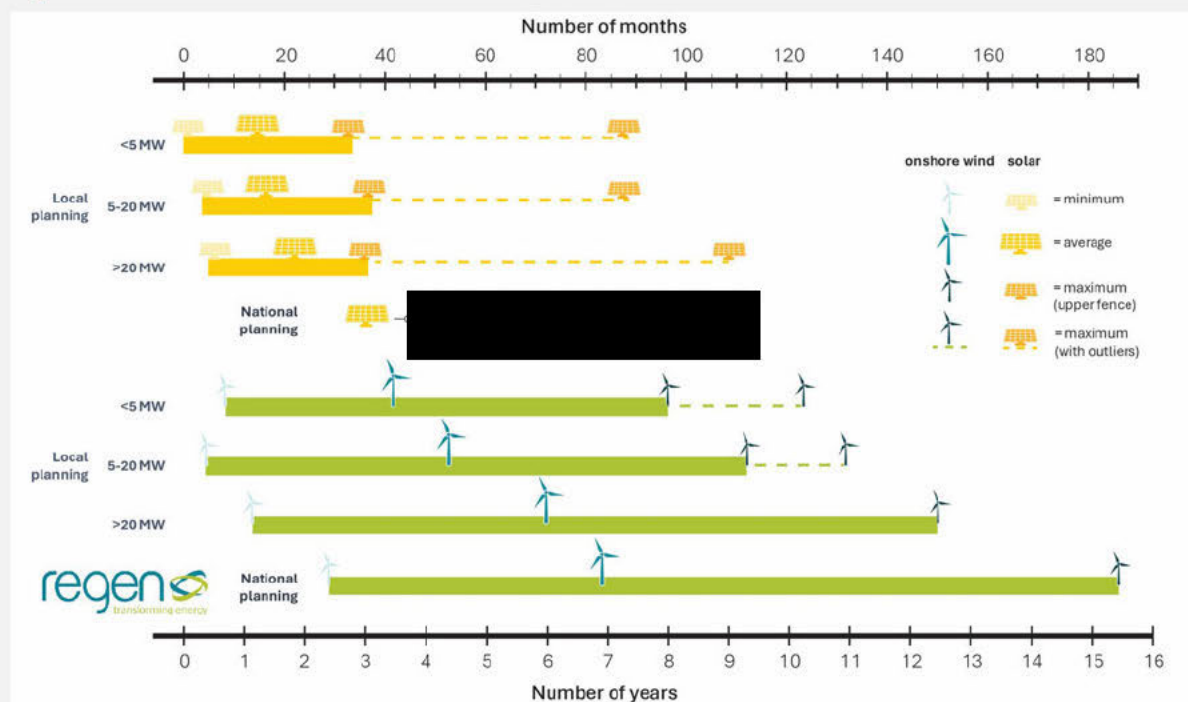
- On average, standalone battery storage sites took 42 months to go from planning submitted to operational, while co-located projects were slightly faster at 36 months.
- On average, standalone battery storage projects were found to be decided within five months from initial application, while co-located sites were decided on average in 8 months.

Offshore wind

- Offshore wind projects took, on average, 73 months (6 years, one month) to go from submitted to operational. The average time to issue a planning decision was faster in Scotland (15 months) than in England (21 months).

Figure 1

Minimum, average and maximum development timescales for solar PV and onshore wind projects in GB – planning submitted to operational



Transmission pipeline planning assessment

the ESO 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 521 GW 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.

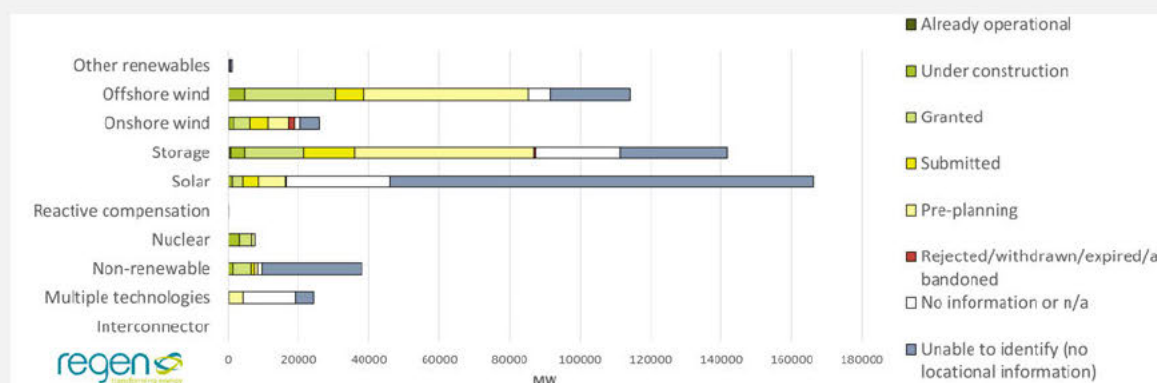
Approximately 5% of sites were positively identified as having been awarded a Contract for Difference (CfD), increasing their intentions to progress through buildout and operation.

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 submitted an application and 37% in the 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 ESO. Around 25% of sites that could be searched (211 projects, 77 GW) could not be found in planning.

Figure 2

Overview of planning status of transmission pipeline projects found in planning local and national planning databases – categorised by technology sector and planning status



The ESO project development RFI Analysis

Regen was issued an extract of the responses to the ESO's RFI that was issued to developers with contracted connection offers in May 2024. This RFI included questions asking developers about the land rights and planning status for projects in the connection queue. The questionnaire related to the new proposed 'Gate 2' criteria, which asked applicants to demonstrate their ability to meet land rights and planning status requirements.

The RFI received around 2,576 responses, comprising 23% of the distribution and 58% of the transmission pipelines. Of the sites that responded, 84% identified they were ready to meet Gate 2 criteria, equating to over 350 GW.

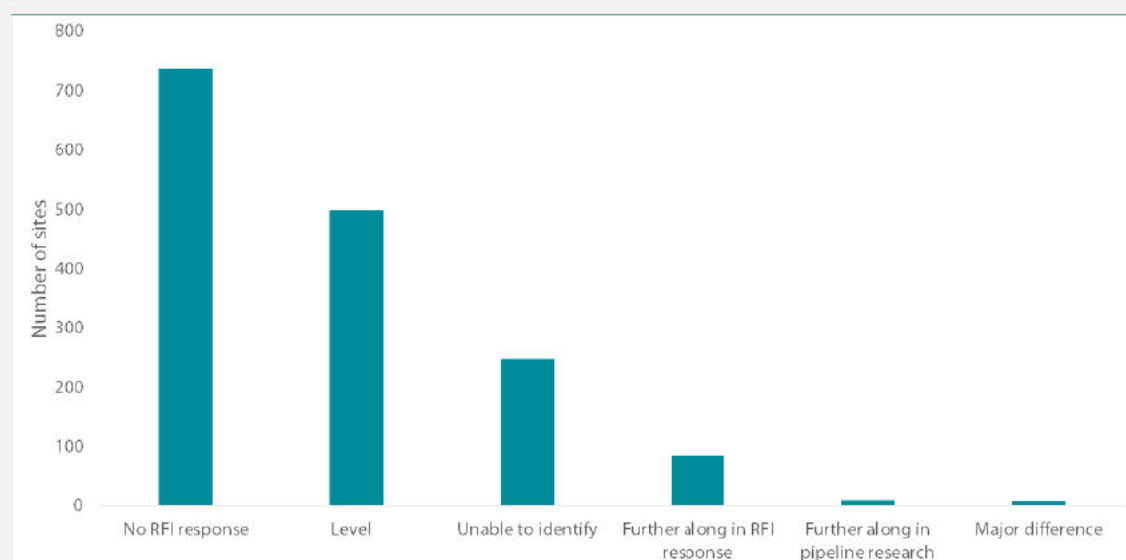
Regen also undertook a reconciliation process, matching sites in the ESO connections data to those in the RFI responses. A sample of matched sites was reconciled and the responses to the RFI were compared with the Regen-determined planning status by searching individual sites in national and local planning databases.

Overall, 850 sites could be matched between the RFI responses and the transmission planning desktop research completed as part of this pipeline analysis. Of these sites:

- 500 sites (131 GW) were found to be at the same planning stage in the individual site research and as detailed in individual RFI responses.
- Eight sites (2 GW) were found to be further progressed in the planning system from the pipeline research than detailed in equivalent RFI responses.
- 86 sites (27 GW) were detailed as being further progressed in planning in individual RFI responses than was found through searching public planning databases.

Figure 3

Differences in planning stages were only found in a small number of sites between the RFI responses and the pipeline research



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2 Introduction

Connection reform in GB

The queue of projects seeking to connect to the GB electricity system has significantly grown over the past 2-3 years. Thousands of projects have secured connection offers with transmission and distribution network operators across GB, with estimated connection years stretching to the 2030s and beyond. The UK government, Ofgem and the ESO have responded to this, with the ESO leading a process to implement reforms and updates to the connection process; a process designed to streamline the connection queue and enable projects to build out and connect sooner.

The ESO's proposed reforms are currently centred around a 'First Ready, First Connected' approach, also referred to as TMO4+. This is an expanded version of the ESO's Target Model Option 4 (TMO4) approach, previously recommended in late 2023.¹ The TMO4+ proposals outlined by the ESO across 2024 include introducing new stage gate criteria, whereby developers holding a contracted connection offer will be required to provide evidence of both spatial planning status and land rights.

In May 2024, a RFI was issued, asking project developers with contracted connections with the ESO to provide up-to-date information on the ability of individual projects to meet certain land rights criteria and spatial planning application status. This RFI closed to responses on 28 June 2024. At the end of July, the ESO published a set of proposed code modifications to enable the implementation of the new requirements and gate criteria into the connections process.^{2,3}

The ESO is combining this programme of work with industry consultation to assess the impact of implementing these reforms and code modifications. This work will ultimately result in a report to Ofgem outlining the potential material effects these proposed reforms and new criteria will have on the connection queue in GB.

Regen has undertaken work to look specifically at the spatial planning aspect of the proposed stage gate criteria. The work has involved assessing the historic development timeline for projects in the planning system and a view of the current planning status for the transmission connection queue.

This work, culminating in this report and an accompanying data workbook detailing the results of the site-by-site planning status research, was commissioned by the ESO to act as an additional source of evidence and data collection to inform their impact assessment.

¹ *Connections Reform - Final Recommendations Report*, the ESO, December 2023: <https://www.nationalgridtheESO.com/document/298496/download>

² See Connection and Use of System Code (CUSC) modifications CMP434 and CMP435: <https://www.nationalgridtheESO.com/industry-information/codes/connection-and-use-system-code-cusc/cusc-modifications>

³ See System Operator Transmission Owner Code (STC) modifications CM095 and CM096: <https://www.nationalgridtheESO.com/industry-information/codes/system-operator-transmission-owner-code-stc/stc-modifications>

Planning regimes in GB

Local Planning

To obtain planning permission for a renewable energy project in the UK, developers must submit a detailed application to the local planning authority (LPA). The application includes a range of supporting information, such as environmental impact assessments and community consultation evidence. The LPA reviews each application, taking into consideration local and national planning policies, environmental factors and public feedback before deciding.

National Planning

Depending on the power capacity of the energy project, energy generation projects may fall under national planning regimes rather than LPAs. In England (and to some extent in Wales) this is through the Nationally Significant Infrastructure Project (NSIP) regime.

Different capacity thresholds apply to devolved national planning regimes overseen by the Scottish government and the Welsh government for projects located in Scotland and Wales.

At the time of analysis, English NSIP data was published through a new Beta reporting service, while Welsh projects remained on a previous NSIP register website. In Scotland, data for national planning applications are held under the Scottish government's Energy Consents Unit.

A breakdown of the relevant planning regimes and applicable thresholds at the time of writing is detailed in Table 1.

Table 1

Consenting regime by devolved government and technology

Country	Relevant policy for onshore wind
England	All onshore wind applications are decided by the relevant LPA. However, this is subject to change following updates to the National Planning Policy Framework (NPPF) proposed by the Labour government in July 2024. ⁴
Wales	Under the Infrastructure Wales Act 2024, which became law on 03 June 2024, the minimum threshold for significant infrastructure projects was changed to 50 MW. Projects over 50 MW need planning consent from Welsh ministers. Previously, onshore wind farms of under 10 MW (now 50 MW as of June 2024) were determined by the relevant LPA unless material considerations indicated otherwise.
Scotland	Onshore wind farms with a capacity below 50 MW are made to and determined by the relevant LPA. Onshore wind farms with a generating capacity above 50 MW require energy consent from Scottish ministers under section 36 of the Electricity Act 1989. They are also classed as 'national developments' (as defined in the Scottish government's National Planning Framework 4 (NPF4)).
Country	Relevant policy for solar PV
England	The relevant LPA decides on solar projects with a capacity of up to 50 MW. Projects with a generating capacity above 50 MW are considered NSIPs and require consent from the Secretary of State for Energy Security and Net Zero.
Wales	Unless material considerations indicate otherwise, the LPA determines solar projects of under 10 MW. Solar projects between 10 MW and 350 MW are covered by the Planning (Wales) Act 2015 and are considered Developments of National Significance (DNS). They must seek planning permission from Welsh Ministers. Solar projects with a generating capacity of above 350 MW are classified as NSIPs and require consent from the Secretary of State under Section 15 of the Planning Act 2008.
Scotland	The relevant LPA decides on solar projects up to 50 MW. Solar projects above 50 MW must seek consent from Scottish Ministers through the Scottish government's Energy Consent Unit.

⁴ Proposed reforms to the National Planning Policy Framework and other changes to the planning system, July 2024: <https://www.gov.uk/government/consultations/proposed-reforms-to-the-national-planning-policy-framework-and-other-changes-to-the-planning-system#full-publication-update-history>



Country	Relevant policy for hydropower
England	<p>The relevant LPA decides on hydropower projects with a capacity of up to 50 MW.</p> <p>The Secretary of State consents to more than 50 MW hydropower projects under the NSIP process.</p>
Wales	<p>Under the Infrastructure Wales Act 2024, which became law on 03 June 2024, the minimum threshold for significant infrastructure projects was changed to 50 MW. Previously, the relevant LPA decided on hydropower projects with a capacity of up to 10 MW.</p> <p>Hydropower projects which have an installed generation capacity between 50 MW and 350 MW are made directly to the Welsh Ministers under the DNS regime and are determined in accordance with the development plan, unless material considerations indicate otherwise.</p> <p>Hydropower projects over 350 MW are consented to by the Secretary of State under the NSIP process.</p>
Scotland	<p>The relevant LPA grants applications up to 50 MW.</p> <p>Sites above 50 MW must seek consent from Scottish Ministers through the Scottish government's Energy Consent Unit.</p>
Country	Relevant policy for offshore wind
England	<p>The Secretary of State consents to more than 100 MW offshore wind projects under the NSIP process.</p>
Wales	<p>Offshore wind projects of between 50 MW and 350 MW are consented by Welsh Ministers, which remains unchanged by the Infrastructure Wales Act 2024.</p>
Scotland	<p>Consent from Scottish Ministers under Section 36 of the Electricity Act (1989) is required for generating stations above 1 MW in Scottish inshore regions and above 50 MW in Scottish offshore regions.</p>

Country	Tidal and wave
England	The Planning Act 2008 states offshore generating stations are nationally significant if they are over 100 MW. In practice, previous tidal projects of below 100 MW in England have applied through the Crown Estate, Department of Energy and Climate Change (DECC), and Isle of Wight Council, indicating no clear capacity cutoff for local versus governmental consenting. Marine Licenses are required for all the marine elements of a proposed offshore development. Any Development Consent Order (DCO) granted by the Secretary of State may include provisions deeming the grant of a Marine Licence for operations carried out wholly in England and English waters.
Wales	<p>In the Welsh inshore area (out to 12 nautical miles, NM), Welsh Ministers consent to renewable energy generation projects between 1 MW and 350 MW under section 36 of the Electricity Act 1989.</p> <p>In the Welsh offshore area (beyond 12 NM out to 200 NM), the Welsh Ministers consent to all types of energy-generating projects between 50 MW and 350 MW under section 36 of the Electricity Act 1989.</p> <p>Offshore energy projects of over 350MW are consented to by the Secretary of State under the NSIP process.</p>
Scotland	Consent from Scottish Ministers under Section 36 of the Electricity Act (1989) is required for generating stations above 1 MW in Scottish inshore regions and above 50 MW in Scottish offshore regions.
Country	Energy-from-waste
England	The relevant LPA decides on EfW projects up to 50 MW. EfW projects above 50 MW are considered NSIPs and require consent from the Secretary of State.
Wales	<p>Unless material considerations indicate otherwise, the relevant LPA determines EfW projects under 10 MW.</p> <p>EfW projects between 10 MW and 350 MW are made directly to the Welsh Ministers under the DNS regime and are determined in accordance with the development plan unless material considerations indicate otherwise.</p> <p>The Secretary of State consents to EfW projects over 350 MW under the NSIP process.</p>
Scotland	EfW projects must obtain planning permission from the relevant LPA and a permit under the Pollution Prevention and Control (Scotland) Regulations 2000. Note that the Scottish National Planning Framework 4 states that Development proposals for EfW facilities will not be supported except under limited circumstances.

Country	Battery Storage
England	Relevant LPAs decide on planning applications for all battery storage projects in England and Wales.
Wales	
Scotland	The relevant LPA decides on battery storage projects with a capacity of up to 50 MW. Battery storage projects greater than 50 MW must seek consent from Scottish Ministers under Section 36 of the Electricity Act (1989) through the Scottish government's Energy Consent Unit.

Future effects of planning policy changes

Changes to consenting thresholds and local authority the resourcing

At the time of writing, the UK government is consulting on changes to the National Planning Policy Framework (NPPF).⁵ For energy projects in England, the following changes to the consenting regime have been proposed:

- Changing the threshold at which onshore wind projects are deemed to be nationally significant from 50 MW to 100MW, therefore consented to under the NSIP regime
- Changing the threshold at which solar PV projects are deemed nationally significant from 50MW to 150MW, therefore, consented to under the NSIP regime.

If these proposed changes come into effect, then there would be an expected increase in the number of planning applications being submitted to local planning authorities, adding to the workload placed on already stretched local planning authorities and likely leading to increased consenting times.

The government have committed to hiring 300 new Local Authority Planners.⁶ However, this is unlikely to make much of an impact in terms of the scale of the resourcing challenges faced by local planning authorities across the devolved nations. These additional planners will be working across multiple projects, not specifically on renewable energy, and the government has not addressed the underlying issues of high staff turnover and poor working conditions for local authority planners.⁷

⁵ Consultation: Proposed reforms to the National Planning Policy Framework, MHCLG, July 2024: <https://www.gov.uk/government/consultations/proposed-reforms-to-the-national-planning-policy-framework-and-other-changes-to-the-planning-system/proposed-reforms-to-the-national-planning-policy-framework-and-other-changes-to-the-planning-system>

⁶ Chancellor unveils a new era for economic growth, HM Treasury, July 2024: <https://www.gov.uk/government/news/chancellor-unveils-a-new-era-for-economic-growth>

⁷ Local Planning for Renewables, Regen, May 2024: <https://www.regen.co.uk/wp-content/uploads/Local-Planning-for-Renewables-report-Regen.pdf>

Additionally, earlier this year, the previous government launched a consultation on an accelerated planning system for major commercial development applications being decided by local authorities.⁸ The proposed accelerated planning system did not apply to renewables. If the current government takes forward this proposal, there could be unintended consequences on the speed of decision-making for renewables applications due to a focus on prioritising other applications.

Regen's development timeframe analysis, undertaken as part of this assessment, is based on a statistical analysis of actual projects categorised by scale, technology, and planning regime. However, with the reforms being proposed and an increasing demand on local authority planners, it is noted that the timeframe to process, review, and determine planning applications for renewable energy generation and energy storage projects could be variable.

Greater prioritisation for renewables within the National Planning Policy Framework

The NPPF consultation includes amendments to give more significant weight to the benefits associated with renewable and low-carbon energy generation, as well as proposals' contribution to meeting a net zero future. In doing so, the NPPF guidance aims to increase the likelihood of local planning authorities granting permission to renewable energy schemes. The consultation also contains wording that seeks to establish a stronger expectation that authorities proactively identify renewable and low-carbon development sites when producing plans. If implemented, these proposed changes could positively impact the success rate for projects being decided at a local authority level in England.

The outcomes of the NPPF consultation and the impact this may have on projects entering the planning system may be an important consideration when implementing connection policy reforms. The requirement to demonstrate evidence of progress in the planning system (and land rights) could be impacted by the implementation of the proposals (either as is or modified after the consultation closes and responses are assessed).

⁸ *Consultation: An accelerated planning system*, Regen response, April 2024: <https://www.regen.co.uk/wp-content/uploads/Regen-response-Consultation-on-an-accelerated-planning-system.pdf>

Transmission pipeline planning assessment approach

Regen was commissioned to undertake a planning assessment for GB electricity transmission projects across July and August 2024 to support the evidence base for the ESO's impact assessment.

This work culminated in site-specific research and analysis on a snapshot of the UK transmission project baseline and pipeline to act as supporting information for assessing the current planning status and development timelines for energy generation and storage projects.

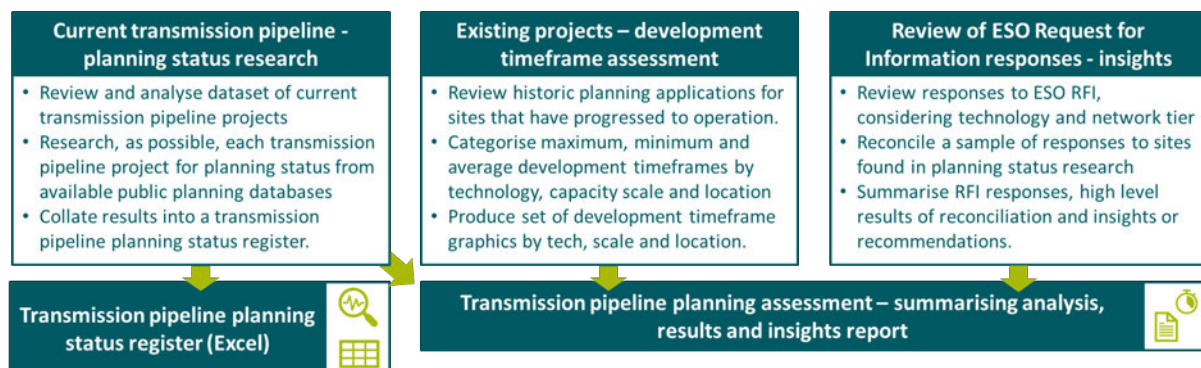
This assessment consisted of three work packages:

1. An analysis of the historic timescale for projects to progress from submitted in planning or planning approval to buildout
2. An assessment of the current planning status of a proportion of the current pipeline projects seeking to connect to the electricity transmission network
3. A high-level review of the responses the ESO received to the RFI summarising high-level response rates and any cross-referencing to the results of the planning site research found.

See the summary of Regen's approach in Figure 4.

Figure 4

Transmission pipeline planning assessment - overview of Regen approach



Data sources used

The analysis within the three workstreams was based wholly on published data to ensure this assessment was entirely evidence-based. The datasets, online registers and search platforms were all accessed between July and August 2024.

Details of the data sources and which workstreams they were used in are outlined in Table 2.

Table 2

Data sources used to inform planning assessment analysis

Data used	Source
Renewable Energy Planning Database (Apr 2024 quarterly extract)	Department of Energy Security and Net Zero
Nationally Significant Infrastructure Projects Register (England and Wales)	National Planning Inspectorates: - England - Wales
Scottish Energy Consents Unit Register	Scottish Government
Marine Scotland Data Portal	Scottish Government Marine Directorate
UK Offshore Wind Project Listings (including rights granted by Crown Estate Scotland) (September 2023)	The Crown Estate
Local authority planning data	SearchLand web application
the ESO Request for Information on Land Rights and Planning Status – response data	Issued directly to Regen by National Grid, the ESO

Limitations of this assessment

This report outlines the high-level approach for each phase of the assessment, the input data used/ accessed, and the analysis findings and results collated for each of the three workstreams.

These sections will detail data sources used to inform the results presented and outline where evidence could not be found for individual sites or technologies.

It is noted that the approach taken in this assessment has several limitations relating to site-specific data and available published datasets. Some of these limitations are outlined in Table 3.

Table 3

Limitations of the transmission pipeline assessment by workstream

Workstream	Limitations
Existing projects – development timeframe assessment	The analysis to determine a range of development lead times is based wholly on historic planning application data for existing operational projects sourced from the REPD. This may not necessarily reflect the determination/development timelines for more recent or future projects due to the volume of planning applications currently being processed by local planners and the ongoing evolution of planning policy relating to energy projects.
	The ranges of development timeframes for each technology, capacity scale and location are presented as a maximum, minimum and average value. This is a product of all projects that fall within these categories, directly representing the conversion timeframes detailed in the REPD. Some edge cases/more extreme examples of project development timelines may result in atypical maximum or minimum values and potentially skew the average. This has been accounted for by removing outliers.
	Determining statistical significance typically requires a sample size of at least 100 data points. For this analysis, smaller samples were used to provide a general idea of the time it takes for individual technologies to progress to commissioning. However, due to the limited data points available for some technologies, it could be considered that results relating to technologies with larger value counts (e.g. solar PV and onshore wind) will likely be better predictors of future project buildout than technologies with fewer value counts.
	Within some of the categorisations assessed, the sample size for some categories was too small to include. We have indicated where we have omitted instances of specific categories (e.g. offshore wind national planning regime decision timeframes in Wales). The statistical analysis for more recently developed technology sectors, such as battery storage, has been mainly focused on pre-operational development timeframes. This is due to the low number of operational battery sites compared to the pipeline of sites in the planning system seeking to connect.



Transmission pipeline planning status research	<p>The planning status research was wholly based on transmission pipeline project data provided by the ESO. Several sites in this dataset included locational identifiers and/or distinct project names that enabled Regen to successfully search for and, in some cases, identify relevant planning applications.</p> <p>However, many sites did not have locational identifiers or unique and easy-to-match site names. These sites could not be searched in planning and have been outlined as such in the results register provided to the ESO. This means that the assessment completed by Regen is not an exhaustive assessment of the planning status of the current GB transmission connection queue. Therefore, the ESO should consider the results presented as a proportional sample of the planning status of the current transmission connection queue.</p> <hr/> <p>The databases and registers used to inform the planning status research were the most recent and comprehensive datasets publicly available at the time of access. As such, some projects may have progressed further than the status captured in public databases.</p> <p>Therefore, the results presented should be considered a snapshot of planning status at a site-by-site level. The ESO should be aware that some sites may have progressed further than public planning databases show.</p>
Review and reconciliation of RFI responses	<p>The responses to the RFI do not represent the full GB transmission (or distribution) connection queue. Only a proportion of the queue submitted a response. Regen was able to reconcile a selection of the transmission sites from the RFI responses to equivalent sites identified from the ESO connections data used to inform planning research assessment.</p> <p>This should be considered an illustrative sample. Once the ESO has obtained a firm planning status/evidence for most sites in the pipeline, it could consider a fuller, more in-depth reconciliation process.</p>

3 Planning development timeframe analysis

Overview of requirement

The ESO required an analysis of the timeframe for energy projects to progress from:

1. Planning application submitted to project build out and commissioning.
2. Planning application submitted to planning decision determined.

This work contributes to a wider assessment of the impact of implementing the proposed TMO4+ Gate 2 criteria. If several sites in the pipeline meet the planning and land rights criteria, it's crucial to have a clearer understanding of the potential timeframe for these projects to progress to connection in order to better assess their impact.

Approach

Regen undertook an analysis to determine the number of months it took for projects to pass through key stage gates in the planning process. The key planning periods of interest were:

- Overall planning timeframe – from planning application submitted to operational
- Planning submitted to decision determination
- Planning granted to under construction
- Under construction to operational
- End to end timeframe of planning submitted to operational.

The development timeframe analysis at key stage gates was based on a statistical analysis of the REPD, which includes individual operational and determined projects alongside relevant dates that planning stages were met and when projects came online. Where gaps in the data were present, information on individual sites, such as planning decision dates, was sourced from the online planning data platform Searchland⁹ or through relevant local authority planning portals.

Data and development timeframes were assessed and summarised separately for projects under local, devolved national and GB-wide planning regimes. All sites in Northern Ireland were removed from the analysis due to the scope focusing on GB projects. Planning authorities from national parks were also included in the local authority planning timeframe analysis.

⁹ Searchland web application: <https://app.searchland.co.uk/>

All projects in the REPD with an appropriate planning date have been analysed for the development timeframe analysis, regardless of planning status. Some atypical cases could skew average (or possibly maximum/minimum) development timeframes. Examples of these cases include projects that were delayed due to an appealed refusal or projects that became abandoned, even after obtaining planning permission. These cases were rare and did not materially impact the statistical analysis. For instance, if a project was granted planning permission but later abandoned, it will still be considered in the statistical analysis of projects from the "submission to decision made" stage.

Several categories were developed to segment the timeframe analysis, including spatial planning regime/tier, technology sector, capacity scale and geographic region. The categorisation of the timeframe analysis is outlined in Table 4.

Table 4

Summary of the categorisation of development timeframe analysis

Categorisation	Categories used to segment timeframe analysis
Technology sector	Onshore wind, offshore wind, solar PV, hydropower, battery storage, pumped hydropower, tidal/marine and EfW.
Planning regime	National planning, local planning
Geographic region	National: England, Scotland, Wales Local: East Midlands, Eastern, London, North East, North West, Scotland, South East, South West, Wales, West Midlands, Yorkshire & Humber
Capacity buckets	National: <5 MW, 5-20 MW, >20MW Local: All sizes

Project data for existing/operational sites and historic planning applications were extracted from the REPD and relevant NSIP registers. For each category considered in Table 4, the **maximum**, **minimum** and **average** timeframes were determined by collating the projects relevant to each analysis category. Two versions of the maximum value were determined: one that removed edge case/outliers (where sample sizes were applicable) and one that included all projects, including outliers (except for those considered to be erroneous).

Analysis methodology

The methodology used to develop the historical pipeline buildout analysis was based on statistical methods. The number of projects within each category was limited, so the statistical methods were simplified to allow for more data points. For example:

- For categories with a higher number of projects overall – e.g. those obtained from local authority planning applications data from the REPD – more advanced statistical techniques were applied, such as determining the interquartile range and eliminating outliers.
- Only 30 developments of national significance in Wales could be identified, and only solar and battery projects had enough data to be analysed statistically within this category.



For most statistical samples, a minimum of 20 projects were taken to determine statistical results per category variable. In some cases, a smaller sample size was taken where the variance between the results was found to be low. This was the case in the solar PV and onshore wind regional analysis, as well as Welsh government consented batteries.

As a result, the analysis of local authority planning data with larger sample sizes is likely to be more reflective than categories with fewer relevant projects, such as devolved government national infrastructure projects. Outliers were identified by determining a maximum threshold based on interquartile ranges using the $1.5 \times IQR$ rule. The formula for this is as follows:

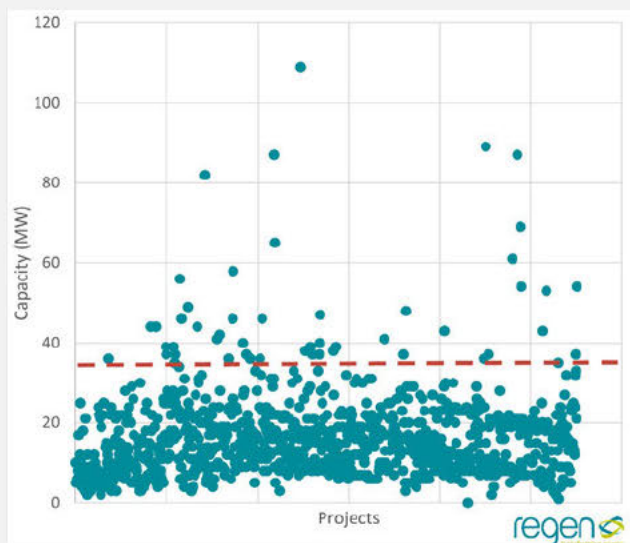
$$Q3 + (1.5 \times IQR)$$

Statistical outliers were signalled but not entirely removed from the analysis using this method.

Outliers suspected to be erroneous were researched individually, and where planning dates were incorrect, they were revised and corrected. The scatter plot shown in Figure 5 demonstrates the application of a threshold of 36½ months. In this example, 43 sites (4% of the sample size) fell above the upper fence threshold.

Figure 5

Months for solar sites to progress from submitted to operational



- = maximum statistical threshold after which projects are removed from the analysis
- = individual projects. Note that projects are spread across the x-axis in no particular order for better visibility

Results and commentary

Applying the method described above to an extract of the REPD, the following sections summarise the development timeframe analysis results by several different categorisations. The first two sections summarise high-level results for all technologies under local planning and national consenting regimes. The following sections then go into further detail on each technology sector. Where sufficient data was available, each technology was examined based on capacity bucket sizes and regional uptake.

Local Authority Planning

LPAs manage planning applications for most energy projects below relevant NSIP thresholds. As a result, detailed statistical analysis across various technologies was possible, analysing projects that apply/obtain planning permission through LPAs. Table 5, Table 6 and Table 7 summarise the number of months for projects to progress in planning through several stage gates. Projects are categorised by the technology sector as a set of minimum, maximum and average statistical ranges.

Table 5

Total time in months for projects to progress from planning submitted to decision determined by technology sector - local planning regimes

Technology	Number of projects	Development timeframe metric (in months)			
		Minimum (lower fence)	Average	Maximum (upper fence)	Maximum (outliers retained)
Solar PV	2,536	<1	5	8	60
Onshore wind	1,414	<1	16	40	123
Biomass	197	<1	7	19	86
Small hydropower	82	<1	11	33	71
Anaerobic digestion	244	<1	7	18	88
Energy-from-waste	135	1	11	34	55
Advanced Conversion Technologies (ACTs)	106	<1	9	21	112
Battery storage (standalone grid services)	402	<1	5	15	34
Battery storage (co-located)	230	<1	8	23	35

Note: Offshore wind and tidal technologies are more often consented to through the national planning channels as NSIPs and are thus not present in this table.

A smaller number of projects were analysed to assess the time taken to go from planning permission submitted to projects becoming operational. In some cases, such as battery storage, only a small sample size of sites with operational dates was available. These have been included in Table 6Error! Not a valid bookmark self-reference. but may not fully represent how quickly future battery projects may achieve energisation, especially with wider connection and spatial planning reform currently underway.

Table 6

Total time in months for projects to progress from planning submitted to operational by technology sector - local planning regimes

Technology	Number of projects	Development timeframe metric (in months)			
		Minimum (lower fence)	Average	Maximum (upper fence)	Maximum (outliers retained)
Solar PV	1, 101	<1	16	36	109
Onshore wind	596	4	53	115	150
Biomass	57	3	43	108	108
Small hydropower	45	14	44	65	92
Anaerobic digestion	126	2	34	76	109
Energy-from-waste	47	7	69	132	132
Advanced Conversion Technologies (ACTs)	18	11	65	136	136
Battery storage (standalone grid services)	11	10	42	82	82
Battery storage (co-located)	6	10	36	89	89

Note: Offshore wind and tidal technologies are more often consented to through the national planning channels as NSIPs and are thus not present in this table.

Table 7

Total time in months for projects to progress from granted to operational by technology sector - local planning regimes

Technology	Number of projects	Development timeframe metric (in months)			
		Minimum (lower fence)	Average	Maximum (upper fence)	Maximum (outliers retained)
Solar PV	1,098	<1	11	29	91
Onshore wind	567	<1	34	81	131
Biomass	55	4	37	99	99
Small hydropower	45	11	33	55	70
Anaerobic digestion	407	<1	30	87	154
Energy-from-waste	46	4	58	125	125
Advanced Conversion Technologies (ACTs)	18	9	58	130	130

Note: Less than ten sites were available for batteries due to incorrect or missing granted dates in the REPD, and thus, results for both co-located and standalone have been excluded. Offshore wind and tidal technologies are more often consented to through the national planning channels as NSIPs and are thus not present in this table.

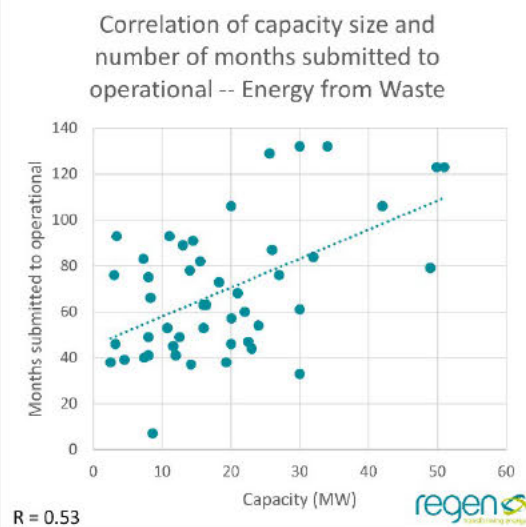
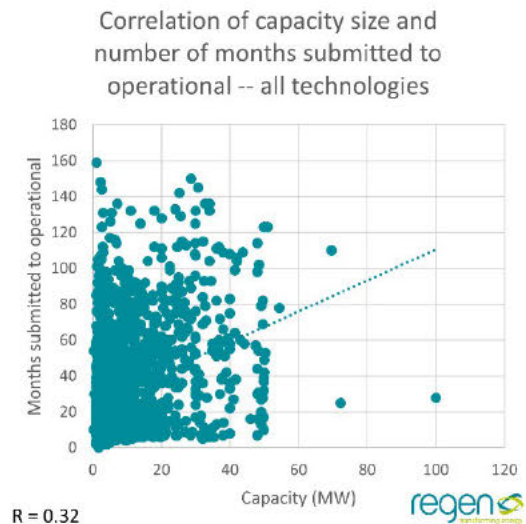


Overview of the degree of correlation between project capacity size and development time from planning submitted to operational

It was important to determine the degree to which capacity was a factor to progress from planning submitted to operational status. To understand this, a correlation analysis was performed by technology type, as well as looking at all technologies together. The results of this analysis are detailed in Table 8, showing the plots of the sample sets.

Table 8
Correlation of project capacity and timeframe from planning submitted to operational

Technology	R value	Degree of correlation
Solar PV	0.15	Low
Wind onshore	0.39	Moderate
Battery storage	-0.13	Low
Biomass (dedicated)	0.47	Moderate
EfW incineration	0.53	Strong
Anaerobic digestion	0.08	Low
Advanced Conversion Technologies	0.10	Low
Small hydro	0.16	Low
All technologies	0.32	Moderate



This shows that the correlation between capacity and development timeframes for sites falling within local planning regimes varies significantly by technology sector. For technologies that account for a significant proportion of the current GB pipeline, such as solar PV and battery storage, correlation is low and should not be considered a significant factor in development lead times. For onshore wind projects, capacity could be a more material consideration but this may be impacted by the proposed changes to onshore wind thresholds in the NPPF

Nationally Significant Infrastructure Projects

Compared to the higher number of small-scale projects assessed by local planning authorities, NSIPs are notably fewer. Therefore, statistical analysis of development timeframes is based on small sample sets, especially when categorising by technology and capacity scales.

A higher number of projects were found to have planning decisions determined; however, notably, fewer projects for each technology have progressed to operational status. Table 9 details the number of months it takes for projects under national planning regimes to progress from planning submitted to planning granted, categorised by the technology sector.

Table 9

Total time in months for projects to progress from planning submitted to granted by technology and country - national consenting regimes

Government	Technology	Count	Development timeframe (in months)		
			Min	Average	Max
Scotland	Small hydropower	7	8	15	42
	Tidal	8	2	11	24
	Onshore wind	120	6	35	121
	Solar PV	7	7	14	23
	Pumped hydropower	1	10	19	30
	Battery storage	38	<1	19	56
England	Solar PV	15	15	16	18
	Natural gas	14	14	16	20
	Energy-from-waste	10	13	17	27
Wales	Solar PV	10	8	14	19
	Battery storage	1	7	14.4	22

Note: Where there were less than five sites with planning decisions, these have been excluded from the analysis. Due to the low sample size of completed Welsh government projects, only enough data was found for solar and battery projects.

Significantly fewer nationally consented projects could be identified with operational dates. Only one solar farm was identified in the data and, thus, was discounted from the analysis. Enough offshore and onshore wind sites were identified for statistical analysis, as shown in Table 10.



Table 10

Total time in months for wind projects to progress from planning submitted to operational - all national consenting regimes

Technology	Count	Minimum (lower fence)	Average	Maximum (upper fence)	Maximum (outliers retained)
Offshore wind	16	17	73	115	115
Onshore wind	56	24	84	186	186

Note: Due to a small sample size, all devolved government consenting regimes have been analysed as one statistical sample. Only results for onshore and offshore wind were statistically significant.

Total time in months for wind projects to progress from planning granted to operational - all national consenting regimes

Technology	Count	Minimum (lower fence)	Average	Maximum (upper fence)	Maximum (outliers retained)
Offshore wind	10	13	60	96	96
Onshore wind	56	3	46	123	123

Note: Due to a small sample size, all devolved government consenting regimes have been analysed as one statistical sample. Only results for onshore and offshore wind were statistically significant.

Solar PV and onshore wind

The development of onshore wind farms and solar PV arrays is well established in GB. Despite the long-term embargo on new onshore wind projects in England between 2015 and 2024 (that has been reversed by newly implemented labour government policy), several projects continue to be developed in Scotland and Wales, with a significant number of English projects brought online during the peak of the feed-in tariff. Consequently, there are numerous wind and solar projects to assess and determine planning timeframe ranges.

Due to the modular nature of deployment, along with less significant statutory consultees and planning impact assessments that are more confined to the development site, solar PV projects in GB progress from planning to operation more quickly than onshore wind. This is the case for sites that local authority planners have assessed. There are limited examples of national-scale infrastructure solar projects across the UK, with one site found to have an operational planning date. The minimum, maximum and average number of months to achieve operational status did not vary significantly according to project capacity, with an overall average of 16 months to go from applying to project buildout. Of the solar PV projects obtained planning from local planning authorities, 86% were granted permission.

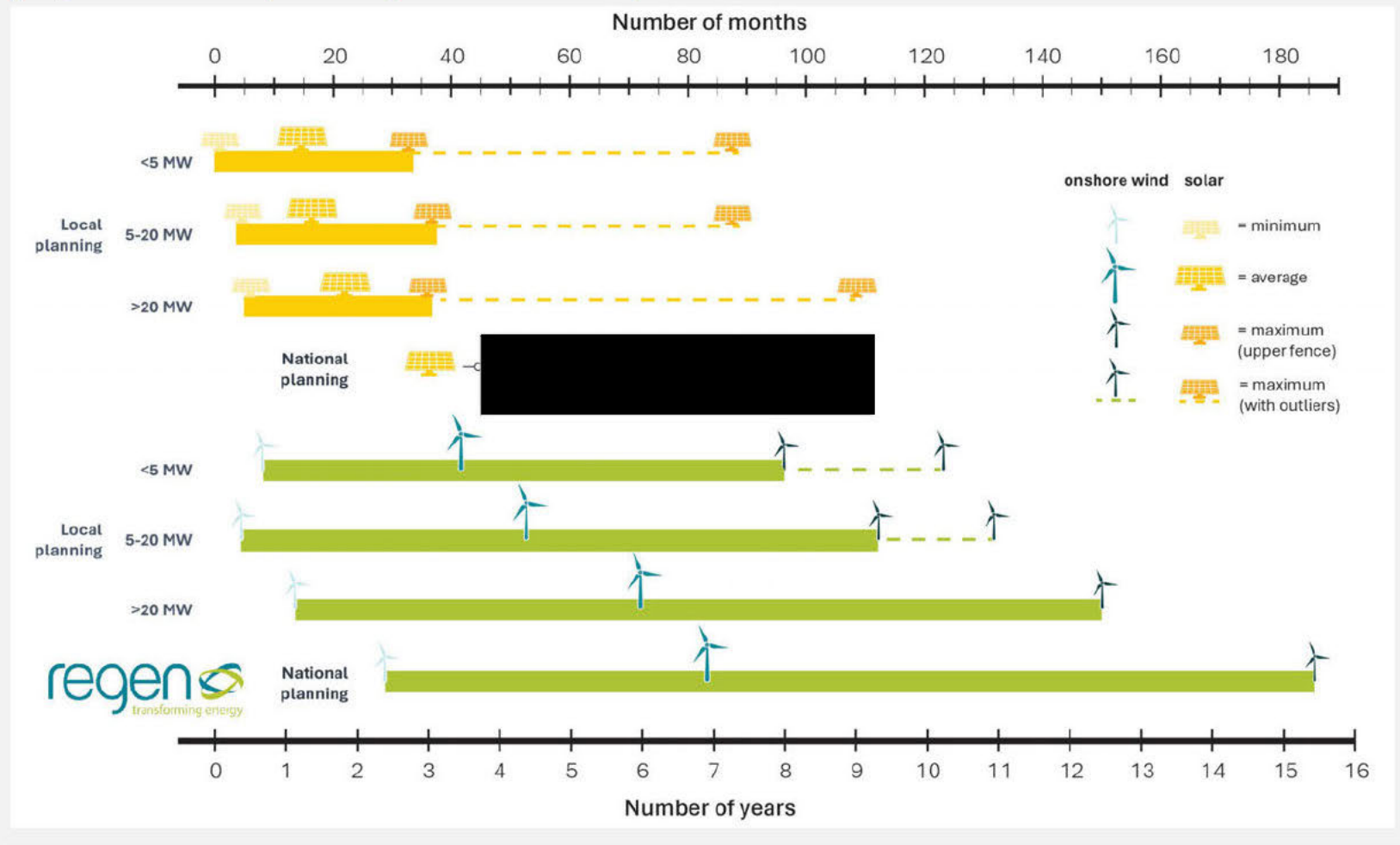
Onshore wind has a longer development timeframe than solar PV in each capacity bucket category. Each increase in capacity scale corresponds to an average increase in the time it takes to progress to operation. On average, it takes 53 months for an onshore wind project to connect in GB, but smaller wind farms may connect more quickly, averaging 42 months.



Unlike solar PV projects, the range of possible development timeframes was larger, ranging from as low as four months to as high as 150 months, under local planning regimes. In addition, higher capacity onshore wind farms may have a slightly higher range of buildout timeframes, but they can also build out at the same rate or more quickly than a smaller wind farm, and often do. Thus, we could say that onshore wind has a moderate relationship between capacity size and time it takes to reach the operational stage. The results of the development timeframe range analysis for solar PV and onshore wind are shown in Figure 6.

Figure 6

Minimum, average and maximum development timescales for solar PV and onshore wind projects in GB – planning submitted to operational



Regional variation

The time it takes to go from a submitted planning application to operational can also be categorised by GB region. The results for each region for solar PV and onshore wind are summarised in Figure 7.

The analysis shows that:

- Solar PV projects generally progress quicker in the North East, North West, East Midlands and South East regions
- Solar PV projects take longer on average to progress in the Yorkshire and Humber, Scotland and Wales regions.
- The South West region reflects the national average of 15.9 months for solar projects.
- Onshore wind sees faster progress through planning in the North West, East Midlands and East of England.
- The three regions with the longest average timeframes for onshore wind are Yorkshire and Humber, the South East and Scotland.
- Wales represents the national average of 52.9 months for onshore wind projects.

Figure 7

Regional variation of the average number of months to progress from planning applications submitted to operational – solar PV and wind

Regions	Solar Photovoltaics	Onshore Wind	Solar (count)	wind (count)
East Midlands	14.3	48.9	141	42
Eastern	16.2	49.8	135	51
London	<i>removed*</i>	<i>removed*</i>	*3	*3
North East	12.9	50.3	10	40
North West	14.6	46.6	36	45
Scotland	17.8	55.2	16	269
South East	14.7	54.8	179	8
South West	15.9	52.2	379	30
Wales	18.6	52.9	111	63
West Midlands	16.8	<i>removed*</i>	63	*3
Yorkshire and Humber	18.8	58.0	28	42
All Regions	15.9	52.9	1,101	596

Note: regions with less than 5 projects were removed from the statistical analysis.



Other renewable energy technologies

When looking at other technologies represented in the REPD data (biomass, waste incineration, anaerobic digestion, and small hydropower), some variation can be seen based on installed capacity, particularly for biomass and waste incineration. These technologies take, on average, longer to go from submitted planning applications to operational, compared to solar PV. Contrarily, the maximum buildout times are not as long as onshore wind farms.

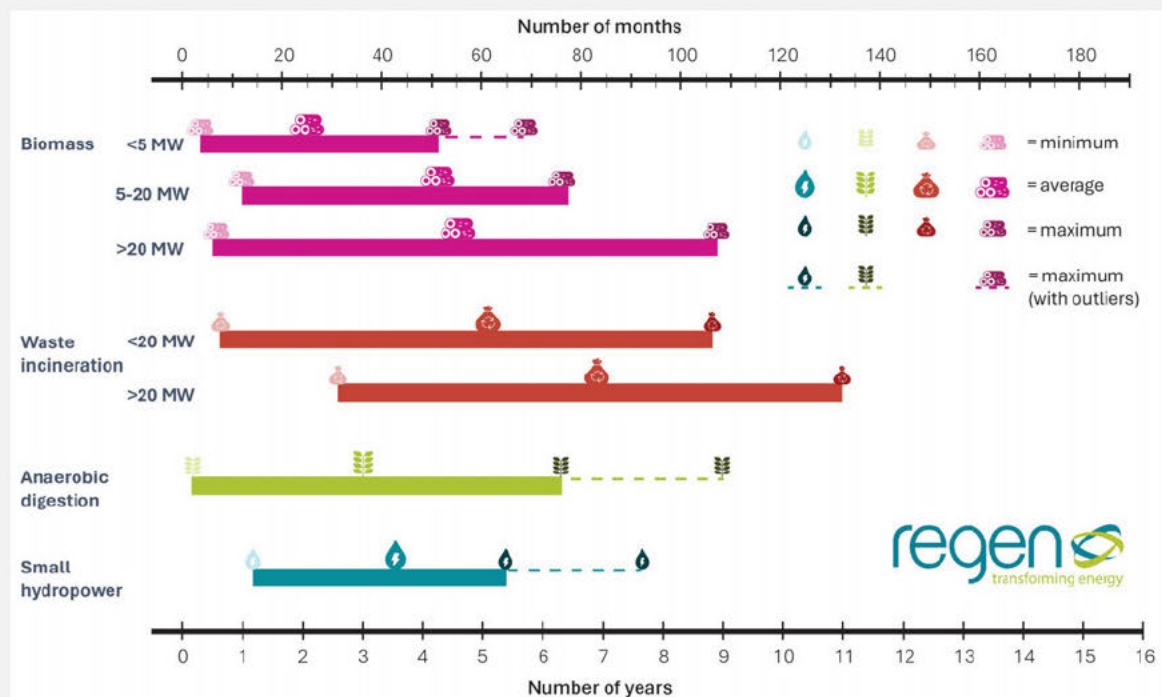
Anaerobic digestion and small hydropower projects tend to move through the planning system more quickly, averaging close to three years from submission of a planning application to operational.

Outliers tend to be more present where projects are smaller for other renewable technologies. This is particularly true for small biomass plants, anaerobic digestion and small hydropower sites. This could indicate more challenging planning conditions, licencing requirements, locational nuances and resultant consenting timelines for smaller generators.

The range of development timeframes to progress from planning applications submitted to operational for other renewable energy technologies is summarised by capacity bucket (where available) in Figure 8.

Figure 8

Minimum, maximum and average development timescales for other renewable technologies in GB – planning submitted to operational



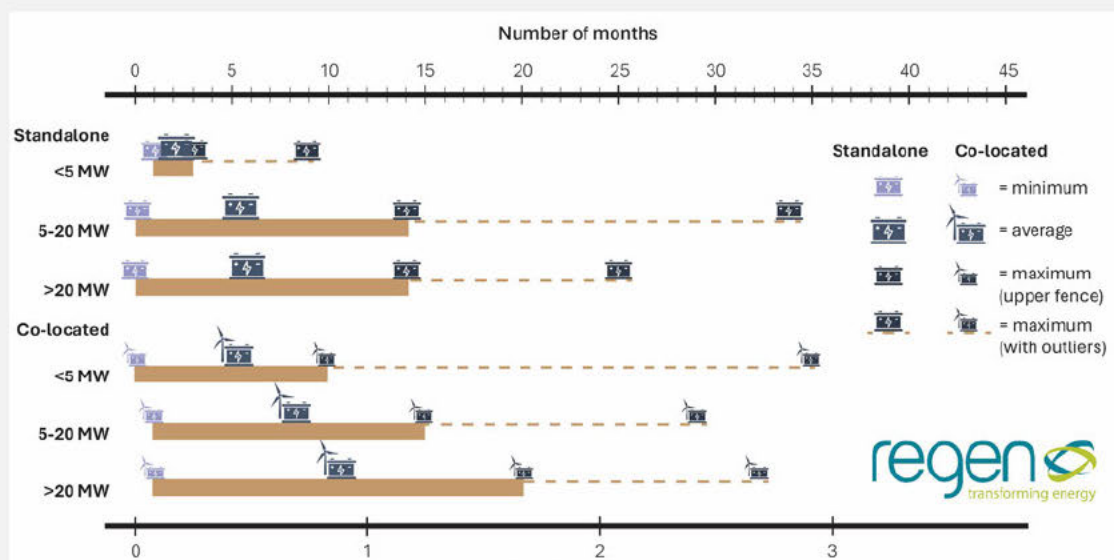
Battery storage

Compared to renewable energy generation sectors, the development of battery storage projects through to buildout is still relatively limited in GB. While an extremely large pipeline of new sites is seeking to connect to the electricity network, relatively few have become operational.¹⁰ Therefore, the development timeframe statistical analysis for battery storage has focused on assessing the time taken to progress from the application submitted to planning decision determination. The results of this analysis, categorised by capacity bucket, are shown in Figure 9.

A summary of the wider timeframe for battery storage projects to progress from planning application submitted to operational (where data was available) is shown in Table 6, but may not be fully representative of how quickly future battery projects may achieve energisation, especially with wider connection reform and spatial planning reform currently underway.

Figure 9

Minimum, maximum and average timescales for battery projects to progress from planning application submitted to determination



¹⁰ See Regen's GB electricity storage pipeline ArcGIS map:
<https://regengis.maps.arcgis.com/apps/dashboards/9c29e3a1dc42497db27308ee87e099ba>

Offshore wind and tidal generation

Unlike demonstrator and small-scale floating wind, offshore wind projects are typically larger in capacity. Most offshore wind sites fall under national consenting regimes, either needing a Development Consent Order or requirements under Section 36 of the Electricity Act 1989. Furthermore, the consenting process requires sites to obtain a Marine Licence, which introduces further time to the development timeline to commission projects. The same applies to tidal projects, which often require national consent and marine licences. See Table 11.

Table 11

Required consents for offshore wind projects in Great Britain

Consent	Scotland	Wales	England
Development Consent Order	N/A	>350MW	>100MW
S36 consent	>1MW (to 12 nm) >50MW (beyond 12 nm)	1MW – 350MW	1MW – 100MW
Marine licence	Always required	Always required	Always required (can be deemed in DCO)
Planning permission (onshore grid)	Always required (can be deemed in S36 consent)	Always required	N/A (included automatically within DCO)

Source: Offshore Renewable Energy Catapult 2021, [Floating Offshore wind Development and Consenting Process – Risks and Opportunities](#)

The statistical analysis results for offshore projects progressing from planning applications to decision determinations are outlined in Table 12 and Figure 10. This shows some regional variation and a notable range overall, with a minimum example in Scotland of 7 months and a maximum of 43 months (3½ years) in England. Timeframes across all planning stages are detailed in Figure 11.

Table 12

Total time in months for offshore energy projects to progress from planning application submitted to decision determination by technology and country – national consenting regimes

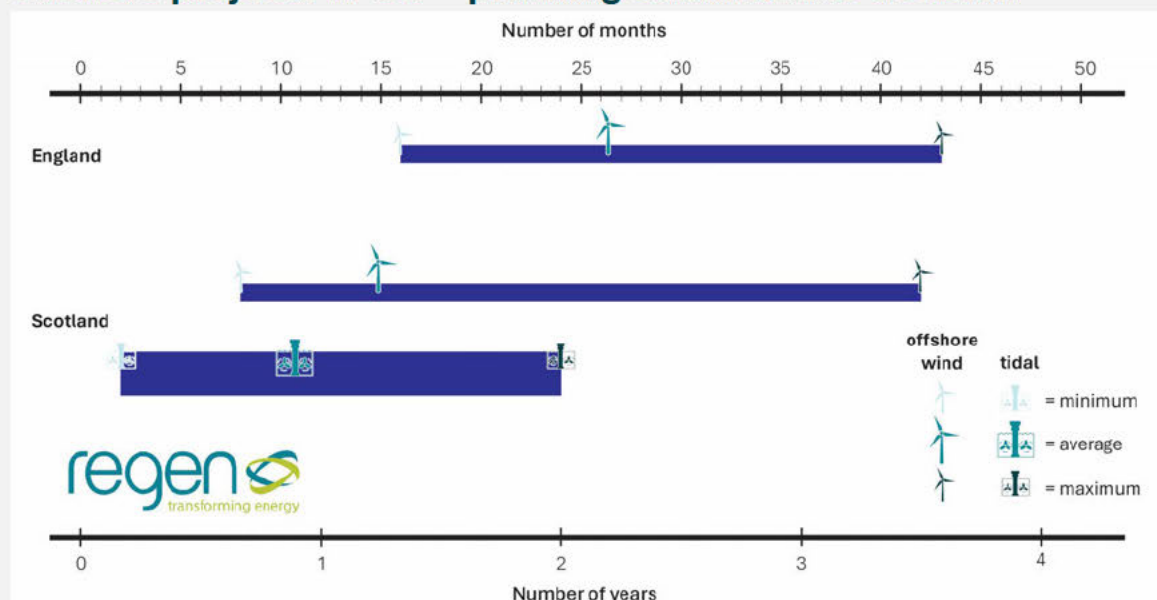
Government	Technology	Count	Min	Average	Max
Scotland	Offshore wind	7	8	15	42
	Tidal	8	2	11	24
England	Offshore wind	27	16	21	43

Note: Only one offshore wind and one tidal energy project were identified in Wales after reviewing Welsh NSIP planning data in the REPD and the online Welsh government planning portal. Hence, Welsh analysis has been omitted for offshore projects due to a lack of significant historical evidence.



Figure 10

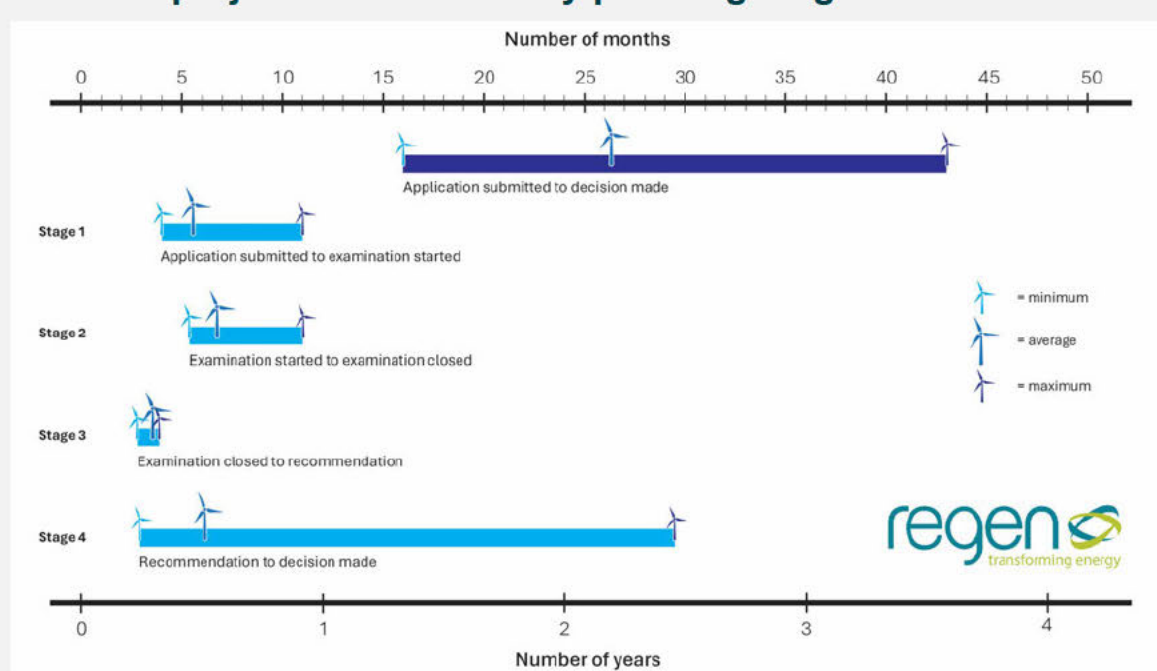
Minimum, average and maximum development timescales for offshore projects in GB – planning submitted to decision



Note: Only planning for offshore elements have been considered. Consents for onshore infrastructure components go through local authority planning processes.

Figure 11

Minimum, average and maximum development timescales for offshore projects in GB – all key planning stages



Note: Only planning for offshore elements have been considered. Consents for onshore infrastructure components go through local authority planning processes.

4 Transmission pipeline planning assessment

Overview of requirement

One of the two evidence points for the proposed TMO4+ Gate 2 criteria centres around evidence of projects entering the planning system. This is outlined in the ESO's Connection and Use of System Code (CUSC) modifications:

"We propose the criteria to meet Gate 2 (in respect of the milestone achievement aspects) to be:

- The requirement to submit the application for planning consent at the earliest of: i) the Queue Management Milestone M1 calculated back from the connection date (as per current CMP376 methodology); or ii) M1 calculated forwards (based on an agreed standard time period for each planning type) to move from Queue Management Milestone M3 to M1."

CUSC Modification Proposal – CMP434: Implementing Connections Reform

The ESO sought to obtain information from project developers with contracted connection offers in GB through the aforementioned RFI, issued between May and July 2024. Alongside this, the ESO commissioned Regen to use the experience and methodology developed through delivering Distribution Future Energy Scenarios (DFES) assessments for GB Distribution Network Operators (DNO) licence areas to undertake a planning status review of the GB transmission pipeline. This would act as an additional source of evidence, developed independently by Regen, to contribute to an impact assessment of the implementation of TMO4+ currently undertaken by the ESO.

Approach

Regen was issued a dataset of all generation and storage pipeline projects seeking to connect to the GB transmission system. This register of 1,586 sites included multiple technologies, locations, capacity scales and a range of timeframes (i.e. how long they had contracted with the ESO). Regen's approach was to individually search each pipeline site, as possible, in publicly available spatial planning databases associated with each site's relevant planning regime (see Table 2).

The results of this site research have been captured in an accompanying *Transmission Project Planning Status Register* Excel workbook. This section of the report provides a high-level summary of the results of this assessment. As discussed in Table 3, many of the projects in the transmission pipeline dataset provided by the ESO did not include locational fields or sufficiently detailed site

name information to enable Regen to search for the site in planning. As a result, the planning status was only determined for a moderate proportion of the transmission pipeline.

Results and commentary

Due to the aforementioned partial locational data, 67% (1,039 sites) could be researched in relevant spatial planning and Contracts for Difference (CfD) databases. The results of this research have been split into what was found in spatial planning databases and CfD registers.

Local and national planning status

Of the 1,061 sites that were searched in planning, the following results were found:

Table 13

Summary Pipeline assessment results (excluding sites unable to be searched)

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	212 (24.5%)	77.5 (19.9%)

The pipeline was categorised by key technology sectors. Instances where multiple generating technologies were present were categorised as "multiple technologies". Where storage technologies were co-located with a single generating technology, that site was categorised according to the primary generating technology.

The results of the site-specific research from local and national planning databases are detailed in the accompanying *Transmission Project Planning Status Register*. This deliverable summarises the planning status that could be found at the time based on the site information provided. In some cases, this involved matching site project names (rather than locational information), cross-referencing with other sources of information (e.g. project planning consultation websites) or a proximity matching exercise using the grid supply point (GSP) substations shown in the ESO connections dataset.

There may be instances where the real-world status of some projects may not be fully represented in the planning databases used to inform this assessment. Also, there may be instances where the site

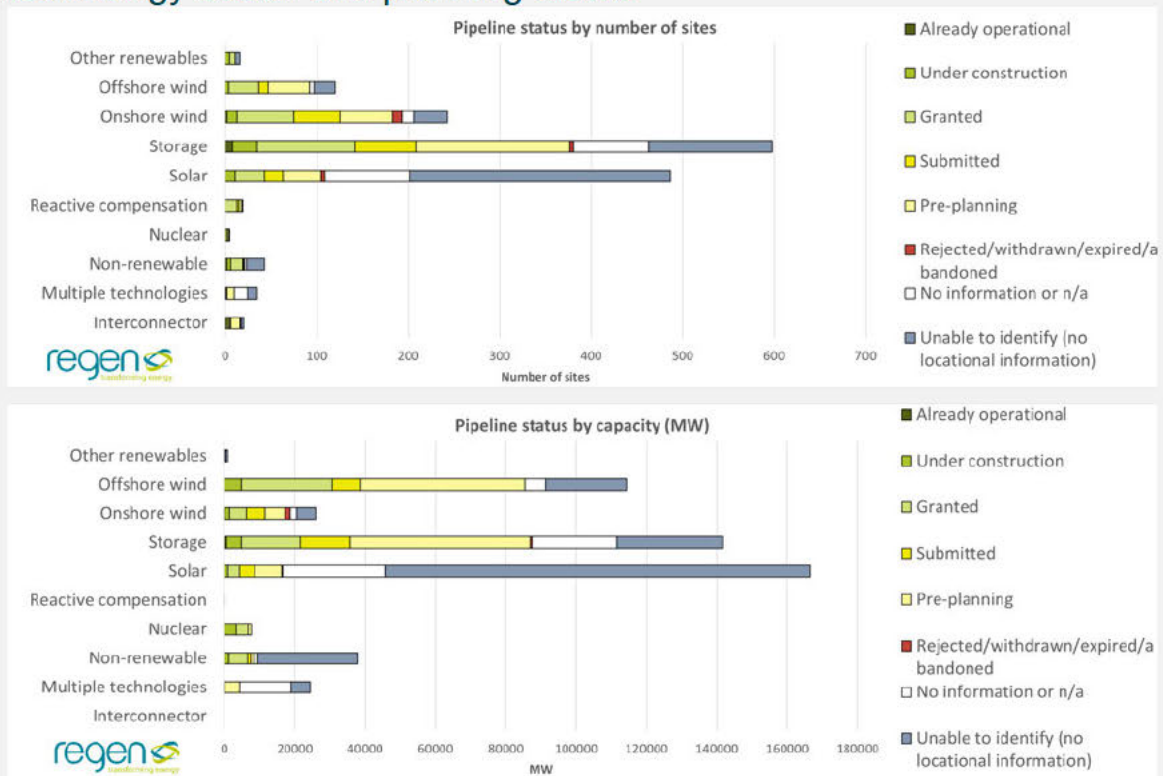


name matching or proximity matching to GSP could have been mismatched to a planning application despite a firm indication that the entries are likely to be the same project.

Due to the volume of sites, technologies and national/local planning databases used to undertake this planning status assessment, the accompanying Excel workbook includes a dashboard for the ESO to filter the results found. Figure 12 provides a high-level summary of the results, detailing the number of projects found to be at each planning stage and grouped by technology.

Figure 12

Overview of planning status of transmission pipeline projects found in local and national planning databases – categorised by technology sector and planning status

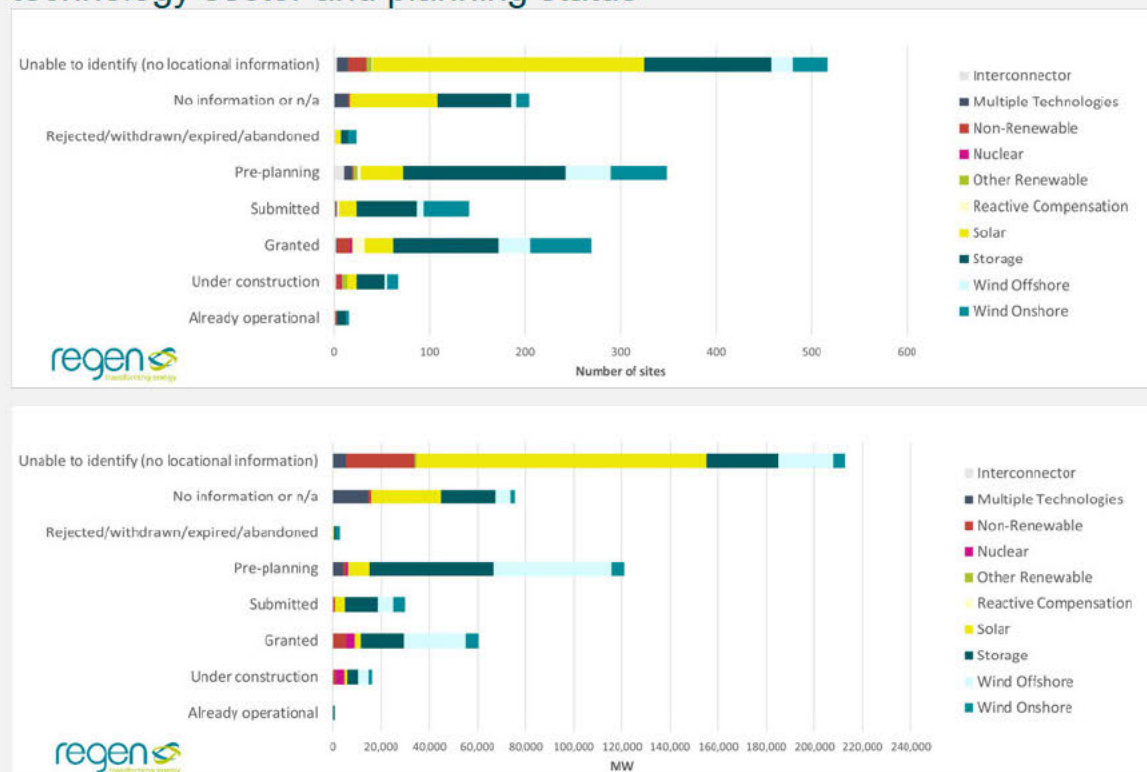


Note: A higher number of solar projects were unable to be searched for in planning than storage, due to a lack of locational information. This was due to the ability to identify individual standalone battery storage sites through substation location, while solar sites are less identifiable by substation.



Figure 13

Overview of planning status of transmission pipeline projects found in local and national planning databases – categorised by technology sector and planning status



Note: A higher number of solar projects were unable to be searched for in planning than storage, due to a lack of locational information. This was due to the ability to identify individual standalone battery storage sites through substation location, while solar sites are less identifiable by substation.



Sites not found in planning

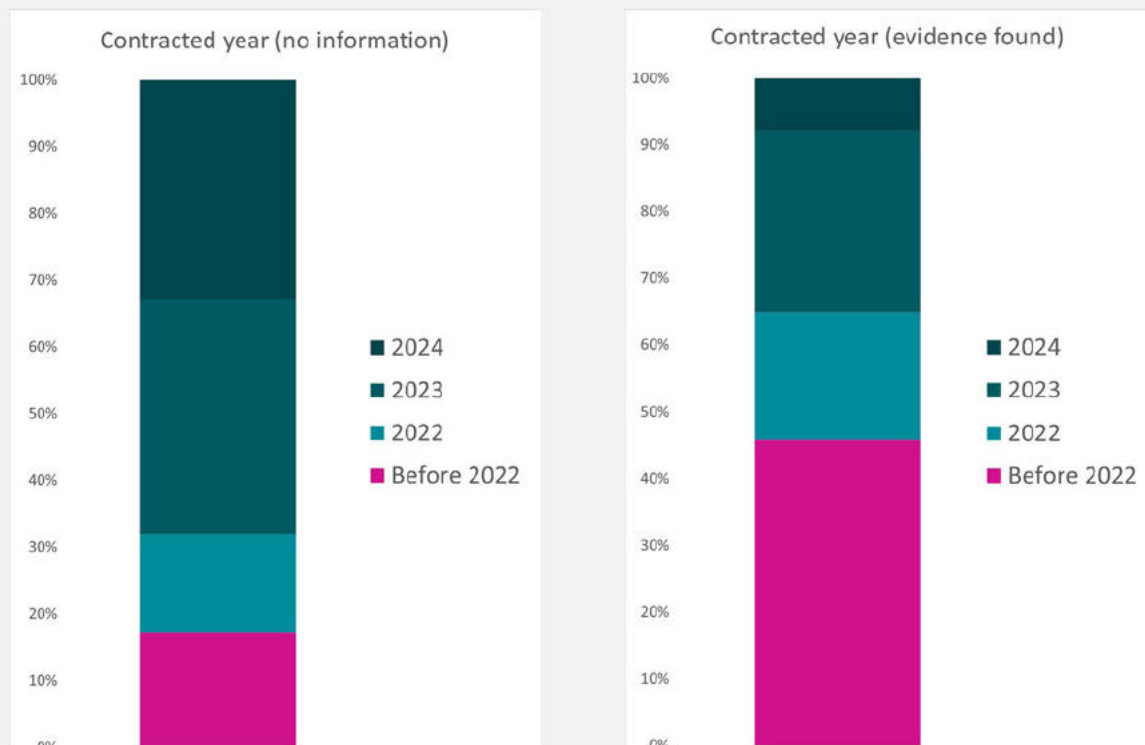
Many sites could not be found in planning. Therefore, they were not attributed a planning status. Excluding those that could not be properly searched due to a lack of locational data or insufficient identification details, such as a distinct site name, 211 sites (24.5%) were categorised as "not found 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 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. Still, direct engagement with project developers would provide further clarity on this. Sites with grid connections may also be difficult to identify in planning records due to the age of the planning application or project details that cannot be easily matched in local or national planning registers.

Regen has analysed the amount of time the projects that could not be found in planning have held grid connection offers with the ESO. Figure 14 shows that most sites not found in planning held connection offers from 2022 to 2024. Contrarily, a higher proportion of sites where planning information was found had connection years from 2021 or earlier.

Figure 14

Analysis shows that pipeline sites not found in planning secured connection offers more recently than those sites found in planning.



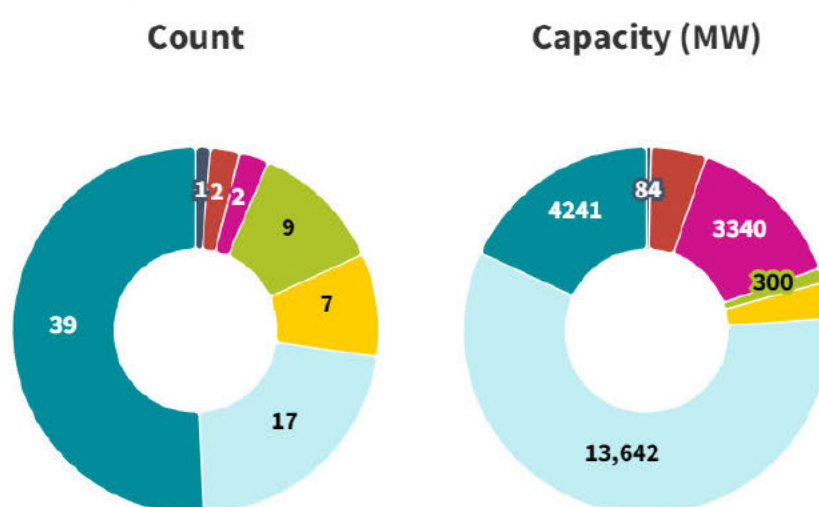
Contracts for Difference

In addition to spatial planning applications, applying for and securing a CfD is another indicator of development evidence for a project. Given the financial stability this brings, if a CfD has been obtained, the likelihood of that project being built out is higher. Alongside the review of planning status, Regen reviewed CfD auction results registers, matching transmission pipeline projects where possible. In total, 77 sites (5% of the transmission pipeline) had been awarded CfD. Figure 13 shows this breakdown by technology as the number of sites and installed capacity.

Figure 15

Contracts for Difference - breakdown by technology type

■ Multiple technologies ■ Non-renewable ■ Nuclear ■ Other renewables ■ Solar PV
■ Offshore wind ■ Onshore wind



Marine licences

Certain technologies are required to apply for a marine licence, including offshore wind projects, tidal projects and interconnectors. Of the 150 sites in the transmission pipeline that may require a marine licence based on their technology type, the following was found:

Table 14

Breakdown of marine licences

Planning status	Number of sites	Capacity (GW)
Granted a marine licence	37 (28.2%)	23.2 (19.7%)
Submitted a marine licence application	14 (10.7%)	10.3 (8.7%)
Pre-application	52 (39.7%)	56.7 (48.0%)
No information	28 (21.4%)	27.9 (23.6%)

Note: Capacity figures exclude interconnectors



Future connection dates

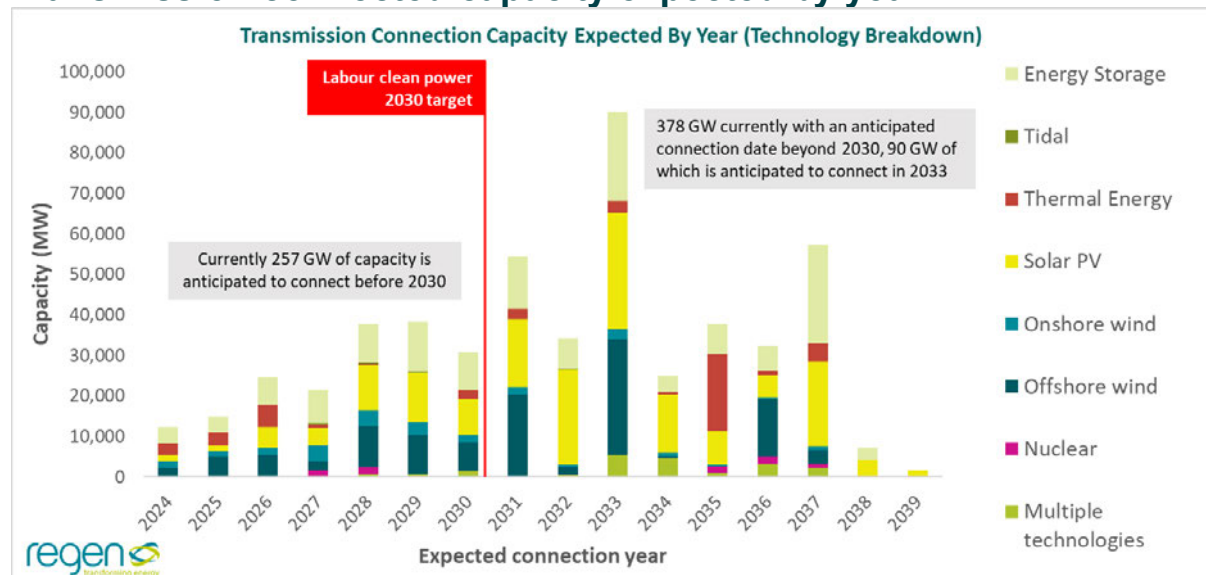
As proposed connection reforms are progressed and enacted, the sites holding a contracted offer to connect to the transmission network have an anticipated connection date when the connection capacity could move through to connection and energisation. This is an indicative 'capacity effective date' that ESO holds and publishes for each pipeline project within the Transmission Entry Capacity (TEC) register.

Regen undertook additional analysis on these expected future connection dates to gauge how much of the transmission pipeline is likely to connect prior to any changes to the queue. See Figure 16.

- 257 GW across all technologies is anticipated to connect before 2030.
- 378 GW is anticipated to connect between 2031 and 2039, including a significant mix of additional solar, storage, offshore wind, new fossil fuel, and nuclear generation.

Figure 16

Transmission connected capacity expected by year



These capacity figures notably outstrip technology targets set out in the Clean Power 2030 Plan by the Labour government. This target for renewable energy generation capacity includes¹¹:

- 55 GW of offshore wind
- 5 GW of floating offshore wind
- 50 GW of solar power
- 35 GW of onshore wind

The transmission pipeline includes a proportion of speculative projects and dormant projects that may fall away once connection reform policy requirements are implemented.

¹¹ Labour Party 2024, *Make Britain a Clean Energy Superpower*: <https://labour.org.uk/wp-content/uploads/2024/03/Make-Britain-a-Clean-Energy-Superpower.pdf>

5 RFI analysis

Overview of requirement

As part of the process to understand the readiness of developers holding connection offers, the ESO issued a RFI to all contracted connection holders in May 2024. The RFI closed on 28 June 2024. The ESO commissioned Regen to undertake a high-level review of the survey results to assist in their review of the responses. This included:

1. A summary of the RFI response data collated by the ESO, with technology-specific views
2. A sample comparison between the planning status stated for some projects detailed in the RFI responses and the planning status that was able to be identified for the same project (where possible to match) from Regen's transmission pipeline assessment.

The data summarised indicates the proportion of projects in the connection queue that could meet the proposed TMO4+ gate 2 criteria, their level of access to land and the degree to which each site can demonstrate that it can meet these criteria.

As detailed in the results, the response to the RFI was not exhaustive, with only a proportion of the transmission queue and an even smaller proportion of the distribution queue responding.

Approach

Review and summary of RFI questionnaire responses

The raw RFI questionnaire response data that was issued to Regen had already been analysed by the ESO, including summary views of:

- The rate of responses at both a transmission and distribution level, compared to the total number of projects in the Total Embedded Capacity (TEC) Register
- The percentage of respondents that stated they could meet Gate 2 criteria and the capacity of these projects
- A view of technology-specific responses received.

The review of the RFI included some data cleaning, e.g., removing text-based responses for capacity figures, which prevented these capacities from being included in the overall sum. Further columns were added to the dataset so that information on land rights could be separated in more detail.

In addition to cleaning and producing a summary of the RFI responses received, Regen also compared the pipeline to the latest TEC/ESO connection data to capture how much of the pipeline was represented in the RFI responses.



Overview of responses to land rights

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:

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.

The RFI asked whether the respondents could prove any of these criteria either now or by 01 January 2025. To capture a summary of responses around land rights, responses were separated, outlining the status of when each site would be able to demonstrate the options they selected and the degree of certainty they would be able to demonstrate this status.

As the RFI responses didn't delineate between onshore and offshore wind, the projects that responded to the RFI questionnaire were cross-checked with the offshore wind project pipeline data. This enabled offshore wind projects with access seabed to be separately accounted for.

Comparison with pipeline status

As part of the overall analysis of the RFI responses received, Regen also compared the planning status provided by project developers in the RFI with the planning status that Regen could find for a selection of cross-matched projects from the transmission pipeline planning assessment. This analysis was an illustrative cross-check of the RFI responses, providing a sense of quality assurance to the planning status captured whilst also acknowledging that there may be valid reasons that some planning statuses were mismatched between the datasets.

This comparison was completed by conducting a multi-step site-matching process:

1. Identifying exact matches based on clear/evident project names, where possible
2. Identifying exact matches based on PRO reference numbers held in the ESO data and RFI data
3. "Fuzzy" matching sites using a Python programming-based method, based on the project name, developer name, and technology type.
4. Manual verification of fuzzy-matched results and removal of any sites not closely matched.

Matches were found for 850 of the 2,576 sites that responded to the RFI. Contrastingly, 54% of the transmission pipeline could also be matched with an equivalent RFI response.

The planning status from the transmission pipeline research and the planning status provided in the RFI response were combined and compared for each matched site. Any variances were then identified and highlighted.

Results and commentary

Summary of RFI questionnaire responses

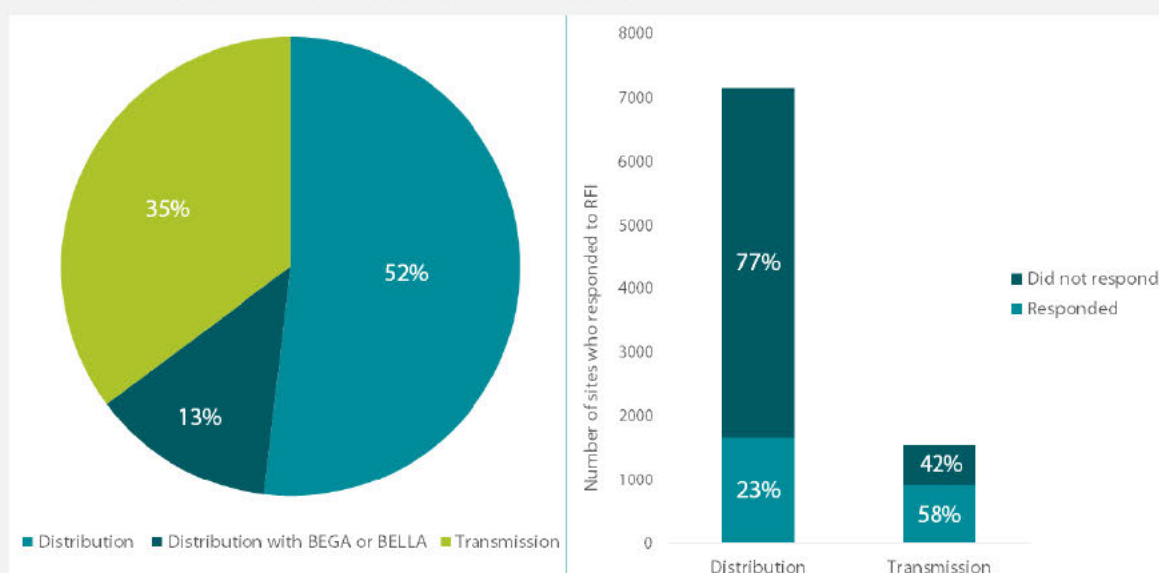
Overall response

Overall, 2,576 sites responded to the RFI. This accounts for 23% of the distribution and 58% of the transmission pipelines, see Figure 17.

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.

Figure 17

Summary of the responses to the ESO's RFI and the proportion of total connection queue by network tier.



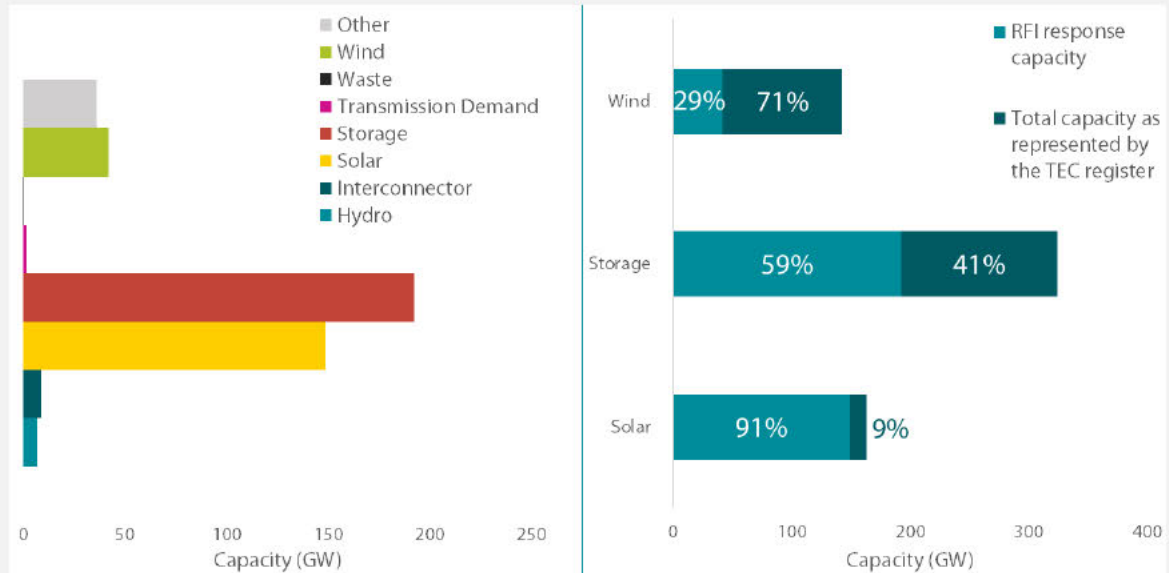
Breakdown by technology

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. See Figure 18.

Figure 18

Summary of the responses to the ESO's RFI and the proportion of total connection queue by technology



Ability to meet Gate 2 criteria

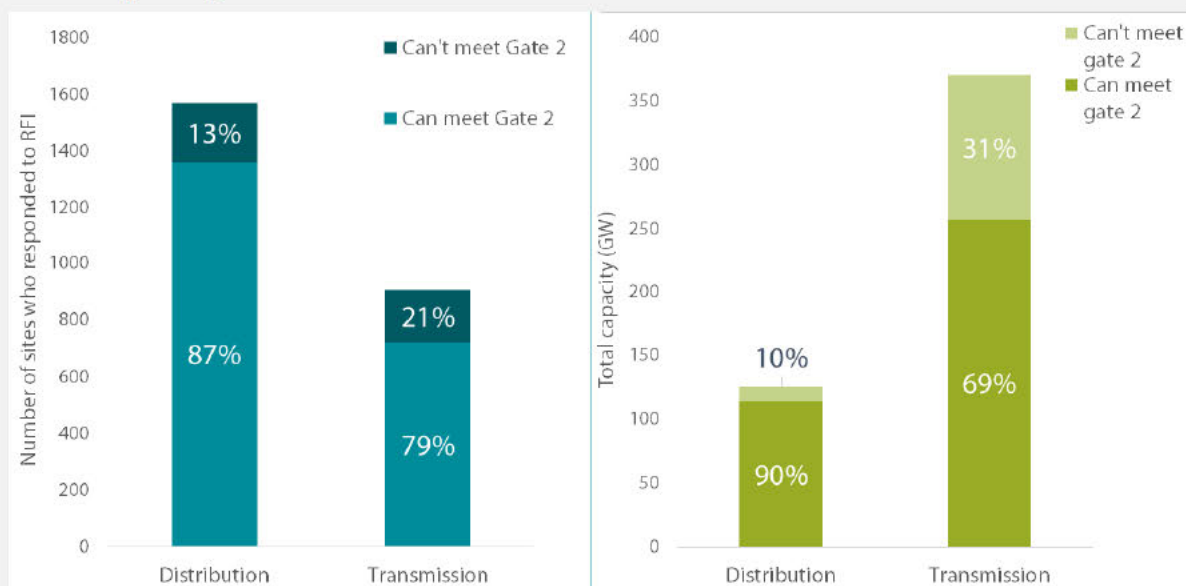
As summarised in Figure 19, of those sites that did respond:

- Approximately 87% of distribution sites and 90% of distribution network sites stated that they would be able to meet the planned Gate 2 criteria.
- Approximately 79% of transmission sites and 69% of distribution network capacity (370.3 GW) stated that they would be able to meet the planned Gate 2 criteria.

Whilst this is a significant number of pipeline sites and capacity, there is a risk that the proportion of sites able to meet Gate 2, as shown by the RFI responses, may not represent the rest of the pipeline. Some developers may have responded to the RFI due to being further progressed. Contrarily, some less progressed developers may have opted not to respond to the RFI. Regen's pipeline planning assessment has also shown several projects in the connection queue that aren't yet in the planning system or may be speculative.

Figure 19

Summary of RFI responses that would be able to meet Gate 2 criteria, across transmission and distribution, by number of sites and capacity



Summary of land rights

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. 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.

There was difficulty in distinguishing between the different land rights for some projects. The format of the RFI questionnaire allowed respondents to select multiple answers/categories for land rights. As these categories are not mutually exclusive, this resulted in potentially conflicting responses for some projects. As a result, Figure 20 represents only the number of sites that have selected a land rights category, not capacity, to avoid duplication.

Several respondents may also have misinterpreted some of the questions by stating that they could demonstrate one of the criteria now while also responding to follow-up questions intended for sites that cannot demonstrate land rights.

This means that the responses and corresponding summated results to these questions are potentially conflicted for some developers and may not accurately represent the certainty level for some projects to demonstrate land rights.

Despite these discrepancies, most sites that responded to the RFI indicated they could demonstrate land rights now or in 6 months. See Figure 21.



Figure 20

Summary of RFI responses that are able to meet Gate 2 criteria by 01 January 2025, by land rights category

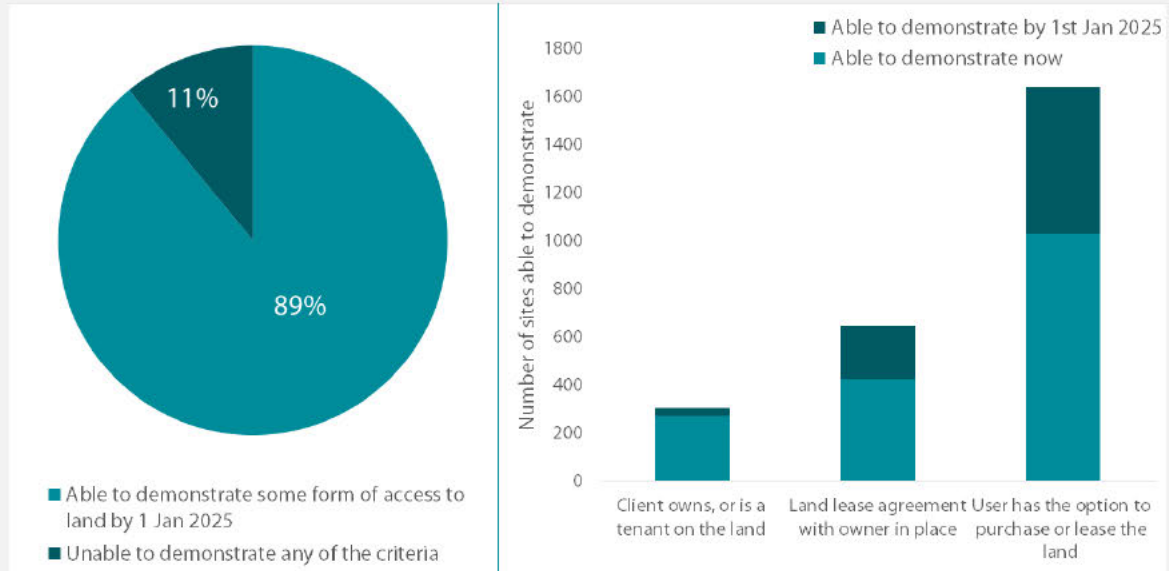
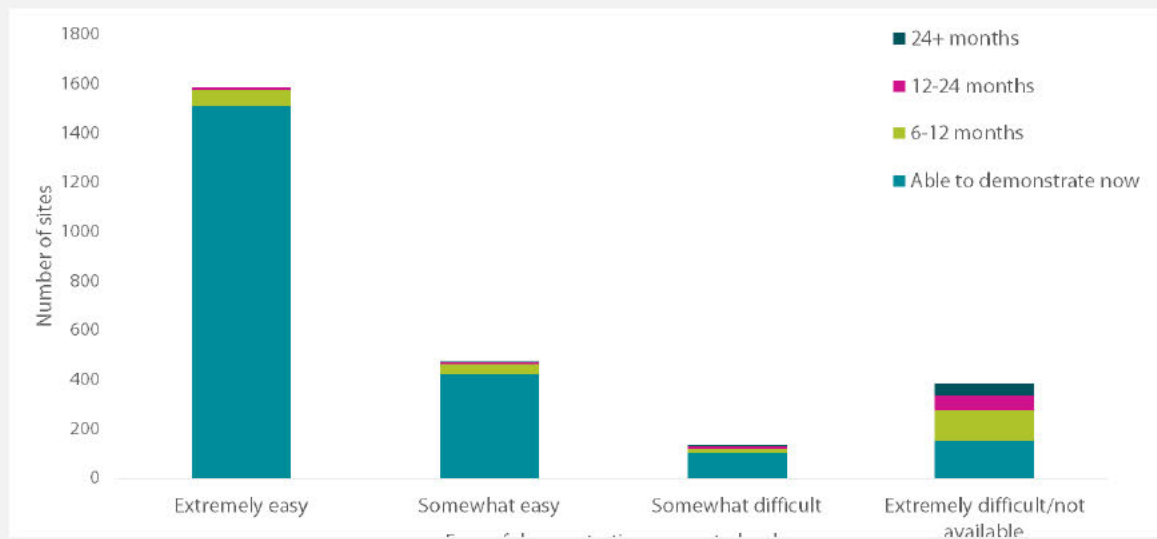


Figure 21

Summary of the timeframe and level of certainty to demonstrate land access, based on Request for Information responses received



Comparison with pipeline status

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.

See Figure 22 for a visual breakdown of these results and Table 15 for a numerical breakdown.

Figure 22

Differences in planning stage were only found in a small number of sites between the RFI responses and the pipeline research

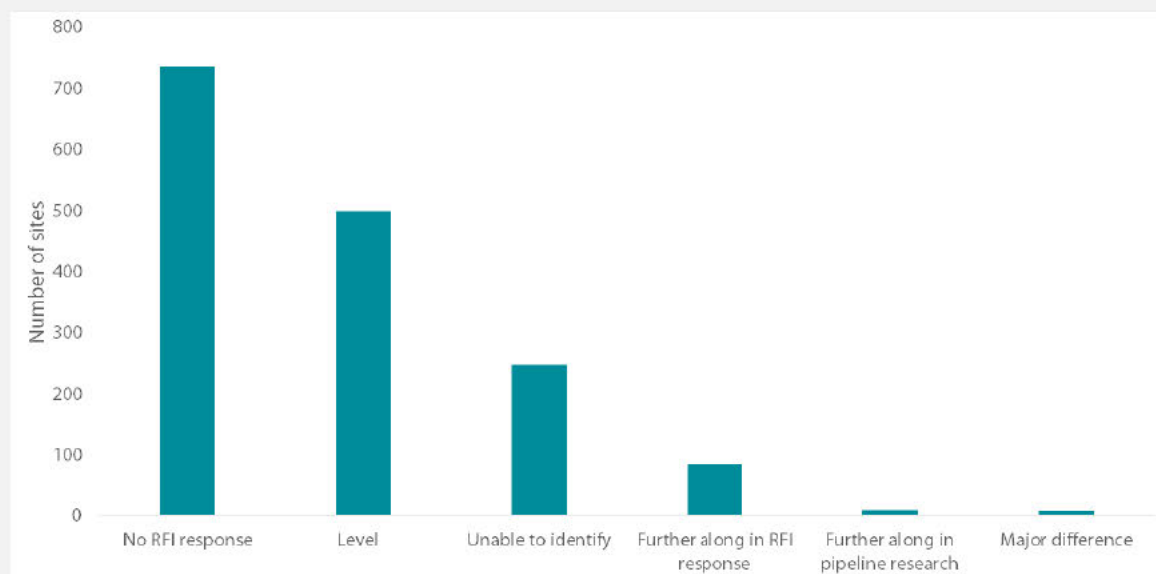


Table 15

Summary RFI comparison with pipeline research results

Planning stage comparison	Number of sites	Capacity (GW)
No RFI response	736	278.9
Level	500	131.0
Unable to identify	249	124.1
Further along in the RFI response	87	27.2
Further along in pipeline research	8	2.0
Major difference	6	2.6

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.

Secondary checks were performed for the sites where a lack of public information couldn't be explained. Of those sites that were checked and where a difference was still found:

- Eight sites (2 GW) were found to be further along in the pipeline research than their RFI responses by only one planning stage difference, which could be explained by the gap in time between the RFI responses being received and the RFI comparison analysis being carried out
- 14 sites (1.7 GW) were stated to be further along in their RFI responses (six in "Application submitted vs Pre-planning", [REDACTED] in "Consents approved vs Submitted", [REDACTED] "Pre-application vs Rejected/withdrawn/etc.", [REDACTED] "Scoping vs Rejected/withdrawn/etc" and [REDACTED] "Application submitted vs No info or n/a"), are but sufficient evidence wasn't found to suggest the status in the RFI responses was more accurate than that found in the pipeline research

Six sites (2.6 GW) had significant differences between the planning stages (Table 18).



Table 16

Summary of projects stated to be further along in their RFI responses than found in the pipeline research

RFI response planning stage	Pipeline research planning stage				
	No info or n/a	Granted	Pre-planning	Rejected/withdrawn/etc.	Submitted
Feasibility/ecological studies commenced	19	0	0	0	0
Application submitted	■	0	6	0	0
Consents approved	0	0	0	0	■
Pre-application	14	0	0	■	0
Scoping	26	0	0	■	0
Under construction	0	14	0	0	0

Table 17

Summary of projects found to be further along in the pipeline research than stated in their RFI responses

RFI response planning stage	Pipeline research planning stage				
	Granted	Pre-planning	Rejected/withdrawn/etc.	Submitted	Under construction
Application submitted	■	0	0	0	0
Consents approved	0	0	0	0	■
Not started	0	■	0	0	0
Pre-application	0	0	■	■	0



Table 18

Projects where a major difference was found between the planning stage found in the pipeline research and that stated in the RFI response

RFI response planning stage	Pipeline research planning stage	
	Granted	Already operational
Feasibility/Ecological studies commenced	■	0
Not started	■	0
Pre-application	■	0
Scoping	0	■

Major differences existed for the six sites in Table 18 between what was stated in the RFI responses and what was found in the pipeline research. It should be noted each of these major differences was a case of the planning status found in the pipeline research being much further on. Of these six sites, four sites had no evidence to suggest the pipeline planning status was incorrect; one site was because of a lack of clarity in the distinction between which phase of the project was input for planning, and the last site was a case of planning permission potentially being expired. The full list of the sites found to have major differences is shown in Table 19.

Table 19

Summary and explanation of projects found to have a major discrepancy between their RFI response and the pipeline research

Site name	Project ID	Capacity (MW)	RFI planning status	Pipeline planning status	Comments

6 Conclusion

This report has summarised the approach and results of three work packages that Regen has delivered to provide National Grid ESO with additional evidence around:

- The planning status of the current transmission connection queue
- The timeframe of historic planning applications and connections
- The results received from the RFI process conducted by ESO

The key outcomes from these workstreams are summarised below, alongside some views around additional analysis that could be undertaken to build on the analysis that has been completed.

Planning development timeframe analysis

The deployment timeframes of energy generation and storage projects were determined as a 'minimum, maximum and average' value using historic planning data, where sufficient data was available. The data was categorised by the technology sector, planning regime, capacity scale and location to assess the relationships between these variables.

Some key findings from this analysis included:

- **There were some variances in development timeframes for projects that go through local and national planning regimes.** For example, national planning regimes result in longer average development timeframes for onshore wind than through local planning authorities.
- **Capacity scale isn't a firm indicator of development timeframes.** Some technologies, such as onshore wind, had a moderately positive relationship between capacity and time from submitted in planning to operational. Others, like solar PV, showed no clear relationship. An exception to this was energy from waste generation, which saw longer development times for larger projects.
- **Evidence showed that solar PV projects are quicker to progress through planning and move to deployment than onshore wind at all stages.** This is a widely understood consideration due to the physical components of each technology and the consultation process for wind projects potentially being more involved than for solar farms.
- **A limited number of operational battery sites meant that analysis was inconclusive.** This suggests that buildout timeframes would be better to be re-assessed when more projects have moved through to connection and more data is available.
- **On average, offshore wind going through devolved government consents is much quicker to receive consenting in Scotland than in England.** Data for Wales was too low to consider.

Transmission pipeline planning assessment

Regen searched each site with a transmission connection offer in publicly available spatial planning databases to determine the current planning status of each site, where possible.

Some key findings from this analysis included:

- **Due to limitations in the site data held by ESO, only a proportion of the transmission pipeline could be searched.** After filtering sites with no locational information, 67% of sites (59% of total capacity) could be searched in planning.
- **A notable proportion of the transmission pipeline has entered the planning system.** Of the sites that were able to be searched:
 - 75% of sites (80% of capacity) were found to be in the planning system, including pre-planning stages.
 - 25% of sites (20% of capacity) could not be identified.
- **Some sites may not be in the planning system yet, due to only recently accepting a connection offer with ESO.** Of the 25% of sites that were searched but could not be found in planning, the majority (over 80%) have accepted connection offers within the last three years (2022 to 2024).
- **5% of the sites (5% of capacity) were also found to have secured a Contract for Difference.** This is a further indication of market and development activity and revenue certainty.

RFI analysis

Regen reviewed the responses that ESO received to their RFI to transmission and distribution connection holders, aiming to highlight any observations or insights from the responses and a cross-reference to the pipeline spatial planning research Regen undertook.

Some key findings from this analysis included:

- **A higher proportion of the transmission pipeline responded than the distribution network pipeline.** Only 23% of the distribution pipeline responded, compared to 58% of all transmission pipeline sites.
- **Overall, the majority of those sites that responded to the RFI demonstrated that they could meet the stage gate 2 criteria.** 87% of distribution network sites (90% of distributed capacity) and 79% of transmission network sites (69% of transmission capacity) stated they could meet gate 2 criteria.
- **The proportion of the pipeline that could meet this criterion increases further when expanding the date to demonstrate the evidence to January.** 89% of sites (.c1,600 projects) stated they could demonstrate land rights/access by 01 January 2025.
- **850 RFI sites were matched with corresponding transmission pipeline sites researched by Regen in spatial planning databases.** Of these matched sites, only 101 showed a variance in planning status. Most of the variances related to potential different classifications of pre-planning/scoping assessments etc. Only eight sites (2 GW) had a major deviation, variety of reasons for these variances, including more up to date information or project naming.

Opportunity for further analysis

The analysis summarised in this report encapsulates a specific snapshot view and evidence of the spatial planning position of historic and pipeline energy generation and storage projects. Further work could be taken forwards to build on this analysis and construct a more complete picture of active projects and expected buildout timeframes. Future work could include:

- Further engagement directly with technology developers to validate planning timeframes, considering likely future buildout based on new grid connection and planning policy reform proposed by ESO and UK Government.
- Expanding the planning status analysis to consider sites with missing locational information, e.g. using substation locations to identify further matches in the planning system.
- Researching transmission pipeline for activity in the UK Capacity Market auctions, by searching T-1, T-4 and T-3 capacity auction registers. Alongside spatial planning and contracts for difference, this would be an additional point of development evidence for those projects entering, pre-qualifying or securing capacity agreements. For those sites that have won/secured capacity agreements in T-4 auctions, this would also link to specific future delivery years and could be a secondary indicator/factor to consider around project development timeframes.
- Additional analysis could be conducted to determine whether planning submission occurs before or after grid contracted dates for specific technologies or project capacity scales.
- A regional reconciliation of planning activity could be conducted between the transmission pipeline analysis completed in this project and the equivalent analysis undertaken at the distribution network level. For example, Regen conducts a site-by-site analysis of the planning status of all contracted (and some quote issued) pipeline projects in both National Grid Electricity Distribution and Scottish and Southern Electricity Networks' licence areas every year through the delivery of Distribution Future Energy Scenarios (DFES) assessments).



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September 2024 – Final draft. Internal report not for publication