Public

tRESP

Pathways Methodology and Detailed Design

NESO
National Energy System Operator

Contents

Scope and Structure

The tRESP Pathways are structured in a similar way as the building block outputs from National Energy System Operator (NESO) Future Energy Scenarios (FES) 2025: Pathways to Net Zero[1]. Each building block represents an individual component of demand or generation, which in combination provide a view of the changing energy landscape out to 2050.

We are aligning to these FES building blocks as they provide a strong established foundation to build from. In particular:

- They were developed collaboratively between distribution networks and NESO through the Energy Networks Association (ENA) Open Networks project[2] and have been used for many years in FES i.e. 2025 and previously.
- They were developed with a consideration for whole energy systems, not just electricity, which gives us a good starting point for the full RESP.
- A key purpose of the building blocks was to set a consistent language between national and regional modelling, whilst providing improved clarity and transparency to stakeholders.

While the structure of tRESP Pathways aligns to these building block outputs, the scope is not the same as FES 2025 Pathways. For tRESP, we have prioritised certain demand and generation building blocks, due to their relevance and importance for the ED3 price control period. The following sections provide the rationale for this prioritisation. Due to the prioritisation, Distribution Network Operators (DNOs) need to define additional components, particularly of demand, to provide the full view of the changing energy landscape at the distribution network level.

Demand pathways

Demand for electricity and the corresponding investment in networks will be primarily influenced by technologies projected to grow significantly in the coming years, such as electric vehicles (EVs), heat pumps (HPs), and district heating. Based on analysis of FES 2025 Pathways, EVs, HPs and district heating are expected to account for 93% of the peak demand increase by 2035 and over 80% by 2050 (Figure 1).

The scope of the building blocks for demand pathways includes:

1. Domestic and Industrial & commercial (I&C) HPs
2. EVs
3. Domestic and I&C air conditioning (AC)
4. Domestic district heating

[1] Future Energy Scenarios (FES) | National Energy System Operator
[2] ON22-WS1B-P2 FES and DFES Building Blocks (16 Jun 2022) – ENA

How do we know this is robust?

According to FES 2025 Holistic Transition (Figure 1), 80% of the total increase in peak demand by 2050 is due to EVs (15%), HPs (52%) and district heating (13%). Over 50% of the increase by 2050 relates to EVs and domestic HPs. The I&C component in Figure 1 includes demand from electric heat other than heat pumps, rail electrification, and industrial decarbonisation, all of which are expected to increase by 2050. Rail electrification and industrial decarbonisation projects are excluded from the tRESP Pathways as these are highly location specific projects. They would either come through as connections requests for each DNO, for projects that have already progressed and are likely to connect, or through the Strategic Investment Need (SI Need), for more uncertain, less developed projects.

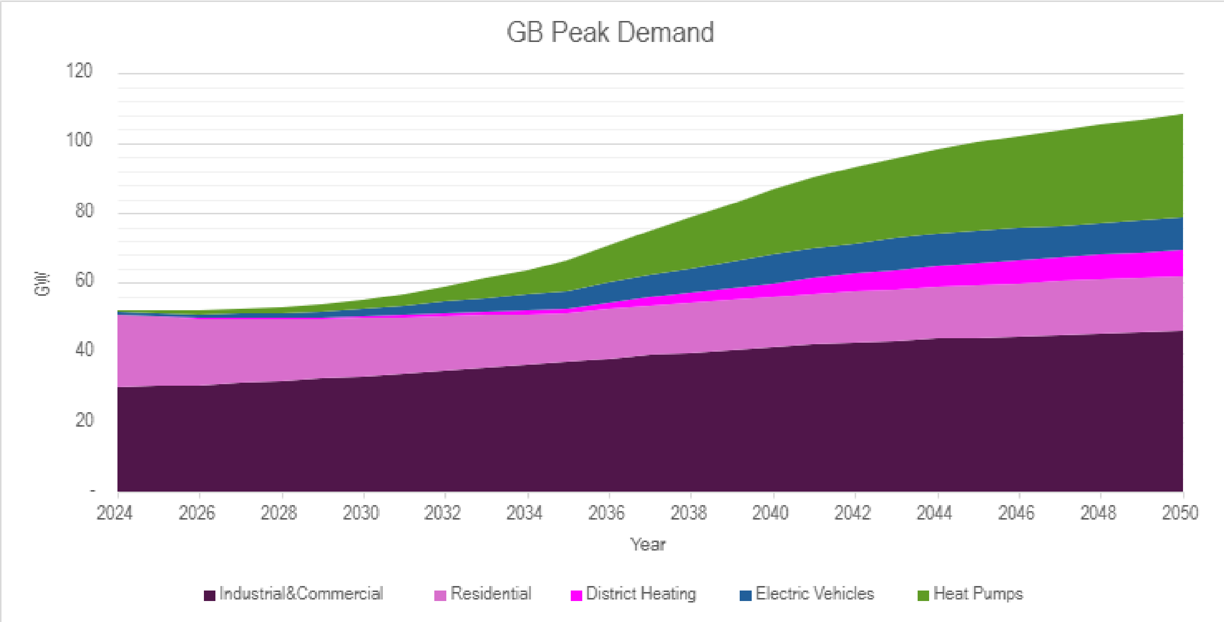

Figure 1: FES 2025 Holistic Transition peak demand breakdown excluding losses 2024-2050, sourced from FES 2025 Pathways to Net Zero, Table ED1

We validated with DNOs, Gas Distribution Networks (GDNs), Independent Distribution Network Operators (IDNOs)[3] and Ofgem through our Technical Working Group, that the electric vehicle charging infrastructure and the use of heat pumps are the primary contributors to growth in peak electricity demand and overall energy consumption. Electricity distribution networks in their analysis also confirm EVs and HPs contributing to a 99.5% increase in residential demand to peak demand by 2050 (example in Figure 2).

[3] IDNOs were represented by the Independent Network Association (INA)

Contributions to Peak Demand MW			Contributions to Energy Consumption MWh		
	Additional at 2035 - % of underlying	Additional at 2050 - % of underlying		Additional at 2035 - % of underlying	Additional at 2050 - % of underlying
Heat pumps - domestic	6.6%	53.6%	Heat pumps - domestic	5.1%	41.5%
Heat pumps - I & C	2.2%	17.9%	Heat pumps - I & C	1.5%	11.7%
EV - cars & vans	16.3%	21.2%	EV - cars & vans	22.2%	28.8%
Electric HGVs	4.2%	6.8%	Electric HGVs	10.1%	16.5%
Electric Buses	0.2%	0.4%	Electric Buses	1.4%	2.1%
Electrolysers	8.5%	21.4%	Electrolysers	14.2%	36.0%
Large industry Fuel Switching	4.7%	10.0%	Large industry Fuel Switching	7.9%	16.9%

Figure 2: Increases to peak demand and energy in 2035 and 2050 of future demand components as a percentage of underlying residential and commercial demand (Northern Powergrid 2023 DFES – Best View scenario). HGV = heavy goods vehicle. Source: Energy Networks Association[4].

Generation pathways

The scope of the generation pathways aligns closely with the generation building blocks from NESO's FES 2025, developed collaboratively through the ENA working group. For tRESP, we've focused on building blocks relative to distribution networks, and have therefore excluded offshore wind, marine and nuclear, which connect primarily to transmission networks.

The building blocks for generation and storage pathways (including micro-generation) are as follows:

1. Solar PV (small and large)
2. Wind (onshore, small and large)
3. Storage (battery, small and large)
4. Power plants (incl. combined heat and power (CHP))

[4] Energy Networks Association, Open Networks: *Summary of DNO DFES Electrical Load Forecasting Assumptions, February 2025.*

5. Hydro
6. Geothermal
7. Hydrogen/fuel cells

How do we know this is robust?

Solar photovoltaic (PV) systems, wind energy, and energy storage are identified as the major contributors to the capacity installed at the distribution level. According to FES 2025, compared to the total amount of distributed generation (Figure 3) solar PV, onshore wind and storage account for 83% of the distribution generation capacity in the Holistic Transition pathway in 2030 and 91% in 2050.

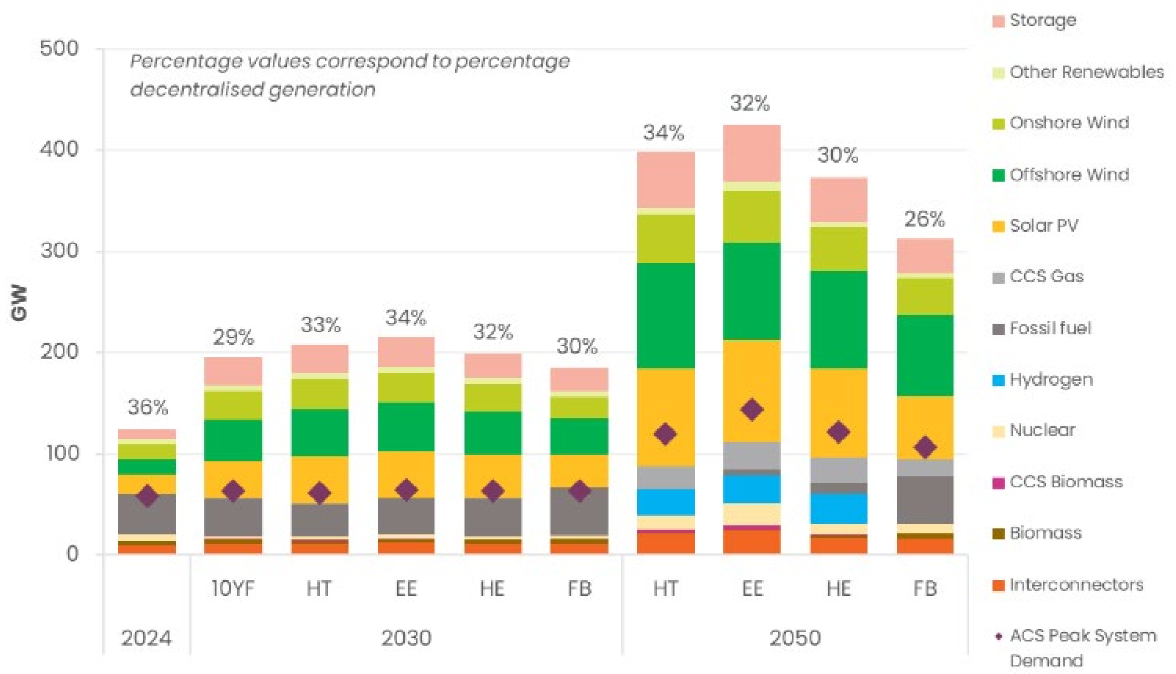

Figure 3: Installed generation capacity, peak demand and percentage of decentralised generation capacity (Source: Figure F12 from FES 2025 Pathways).

Finalised building blocks for tRESP Pathways

Table 1 overleaf summarises the list of demand and generation building blocks covered in the tRESP Pathways and is also available in spreadsheet format.

Table 1: List of building blocks covered in the tRESP Pathways.

	Technology	FES BB ID number	Technology detail	Units
Demand	Electric Vehicles	Lct_BB001	Pure Electric (vans, cars and motorbikes)	Number
Demand	Electric Vehicles	Lct_BB002	Plug-in-hybrid (vans, cars and motorbikes)	Number
Demand	Electric Vehicles	Lct_BB003	Pure Electric (buses, coaches and HGVs)	Number
Demand	Electric Vehicles	Lct_BB004	Plug-in-hybrid (buses, coaches and HGVs)	Number
Demand	Heat Pumps	Lct_BB005	Domestic - Non-hybrid	Number
Demand	Heat Pumps	Lct_BB006	Domestic – Hybrid	Number
Demand	Heat Pumps	Dem_BB05	I&C HP (incl. hybrid)	Annual demand (GWh)
Demand	District Heating	Lct_BB009		Number
Demand	Airconditioning units	Lct_BB014	AC Domestic units	Number
Demand	Airconditioning units	Lct_BB015	AC I&C units	Annual demand (GWh)
Storage	Storage	Srg_BB001	Batteries	Capacity installed (MW)
Storage	Storage	Srg_BB002	Domestic Batteries (G98)	Capacity installed (MW)
Storage	Storage	Srg_BB003	Pumped Hydro	Capacity installed (MW)
Storage	Storage	Srg_BB004	Other	Capacity installed (MW)
Storage	Storage	Srg_BB005	V2G	Capacity installed (MW)
Generation	Non-renewable CHP plants	Gen_BB001	>=1MW	Capacity installed (MW)
Generation	Non-renewable CHP plants	Gen_BB002	<1MW	Capacity installed (MW)
Generation	Micro CHP plants	Gen_BB003	Domestic (G98/G83) including gas	Capacity installed (MW)
Generation	Renewable Engines (Landfill Gas, Sewage Gas, Biogas)	Gen_BB004		Capacity installed (MW)
Generation	Non-renewable Engines (Diesel) (non-CHP plants)	Gen_BB005		Capacity installed (MW)
Generation	Non-renewable Engines (Gas) (non-CHP plants)	Gen_BB006		Capacity installed (MW)
Generation	Fuel Cells	Gen_BB007		Capacity installed (MW)
Generation	OCGTs (non-CHP plants)	Gen_BB008		Capacity installed (MW)
Generation	CCGTs (non-CHP plants)	Gen_BB009		Capacity installed (MW)
Generation	Biomass & Energy Crops (including CHP plants)	Gen_BB010	Includes Biomass Conversions	Capacity installed (MW)
Generation	Waste Incineration (including CHP plants)	Gen_BB011		Capacity installed (MW)
Generation	Solar Generation	Gen_BB012	Large (G99)	Capacity installed (MW)
Generation	Solar Generation	Gen_BB013	Small (G98/G83)	Capacity installed (MW)
Generation	Wind	Gen_BB015	Onshore Wind >=1MW	Capacity installed (MW)
Generation	Wind	Gen_BB016	Onshore Wind <1MW	Capacity installed (MW)
Generation	Hydro	Gen_BB018	Not pumped hydro	Capacity installed (MW)
Generation	Geothermal	Gen_BB019		Capacity installed (MW)
Generation	Hydrogen	Gen_BB023	Hydrogen	Capacity installed (MW)

For the final January 2026 tRESP pathway publication outputs, additional building blocks will be published which are a subset of specific storage, PV and onshore wind building blocks (Srg_BB001, Gen_BB012, Gen_BB015, and Gen_BB016) but covering only generation at or above the 200 kW, 1 MW and 5 MW Transmission Impact Assessment (TIA) thresholds. The values above the TIA threshold will be reviewed based on the outcome of the Gate 2 connections reform process[5] implementing UK Government's Clean Power 2030 Action Plan.

Spatial resolution

The outputs of the pathways are produced for the catchment area of each Grid Supply Point (GSP) in Great Britain (GB). There are 348 GSPs in GB which are at the interface between the transmission and distribution network and therefore providing outputs at this level is a reasonable starting point for the first outputs NESO delivers as part of the Regional Energy Strategic Plan (RESP) role. The full RESP will build on the tRESP and develop more geospatially granular outputs.

GSP definition

Different stakeholders utilise varying definitions, both for the names of the GSPs and the catchment areas that they serve. These definitions can evolve over time due to the introduction of new assets and the dynamic nature of the network. For the sake of consistency, the tRESP Pathways use the GSP definition and feeding areas published by NESO’s FES team on 9 January 2025[6].

GSPs in Scotland are connected to transmission at a lower voltage than in England and Wales, so are smaller and more numerous. To account for this difference and help with comparison with GSPs in England and Wales, the tRESP Pathways will also be provided in a version which aggregates Scottish GSPs to form GSP groups at 132 kV with the support of DNOs.

The GSP outputs will also be aggregated to:

- DNO licence area
- RESP nations and regions

Interaction with other tRESP components

There are four tRESP components: Nations and Regions Contexts, Pathways, Consistent Planning Assumptions (CPAs), and SI Need. Whilst all have distinct use cases, there is also a broader co-ordination piece that exists across them.

Quantitative interactions are detailed in this section, but there are several qualitative interactions from pathways to the other tRESP components. Qualitative interactions include how all these pieces fit together to form an overall narrative for tRESP. When discussing pathways for instance, we will be able to refer to the Nations and Regions Contexts, i.e. in RESP

[5] Clean Power 2030 Action Plan: connections reform annex (updated April 2025)
[6] Available at: https://www.neso.energy/data-portal/gis-boundaries-gb-grid-supply-points.

Region X, a key priority is Y, you can see how this is reflected in our pathways. As described later, the tRESP Pathways include local input as part of using the DNOs' Distribution Future Energy Scenarios (DFES) output.

Strategic Investment

The tRESP Pathways are a projection based upon both our own bottom-up data sources and projections from DNOs as part of their DFES process. As such, there is a potential interaction between the tRESP Pathways and what is included in SI Need. For example, there could be situations where a need is identified that already exists in the pathway.

We have mitigated this risk through the request for information (RFI) process that has been run for SI Need, notably asking for clarity from DNOs whether the projects they have set out are already included in their emerging baseline plans for the ED3 price control period. Where any duplication is identified, for example, through examining growth outliers within the pathway alignment review framework, we will ensure that this is not in both pathways and SI Need. We are not proposing incorporating any new SI Need directly into the tRESP Pathways, based on SI Need submissions which are identified as either in or out of scope for SI Need.

Nations and Regions Contexts

The Nations and Regions Contexts and Pathways Teams are working together to ensure there is data consistency across both outputs. Nations and Regions Context reports will be published for each RESP nation and region, covering a range of topics with comparisons to GB averages (where possible) to highlight any differences where relevant. The final tRESP publication in January 2026 will cover the topics shown in Figure 4, with a focus on mapping the present national and regional picture, as well as covering the pipeline for low-carbon technology uptake on both the supply and demand sides for some of the areas detailed next. These will be provided at either GSP or Lower layer Super Output Area (LSOA) level.

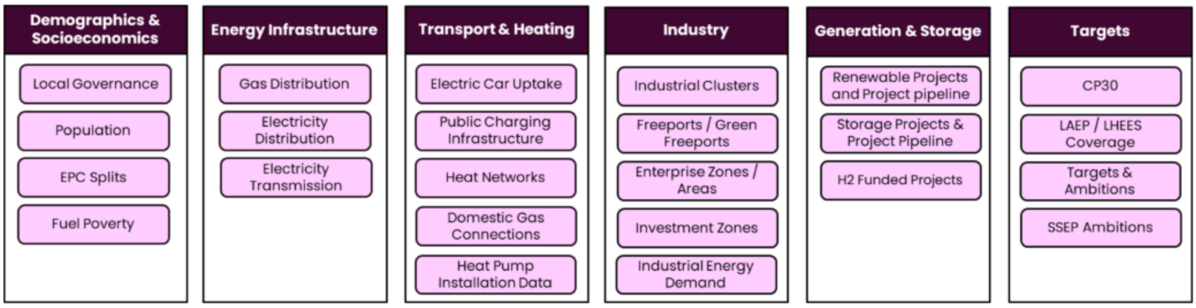

Figure 4: Content for tRESP Nations and Regions Contexts reports.

We have ensured that we are coherent with the data inputs used between Nations and Regions Contexts and pathways for both the baseline and the short-term pathway. Nations and Regions Contexts is not covering technologies post-2035, so coherence with the long-term pathways is not needed.

Baseline:

1. Transport: total EV chargers are covered in the Nations and Regions Contexts via using national government statistics. These are not covered in tRESP Pathways but in tRESP CPAs. Current number of EVs produced by pathways will be used as the same input source for Nations and Regions Contexts to ensure coherence across the two components.

2. Heat: Nations and Regions Contexts will cover heat networks in the nations/regions from the Heat Network Planning Database, as well as heat zoning trials. Current heat pump installations will be used directly from pathways.

3. Supply side generation and electricity storage: installed energy generation and storage capacity will be checked against the input data sources that Nations and Regions Contexts and pathways use, i.e. Renewable Energy Planning Database (REPD) and Embedded Capacity Registers (ECRs), respectively. These data sources are complementary to each other, i.e. larger transmission projects for hydro & biomass generation as well as large electricity storage projects (standalone or hybrid) covered via the REPD in Nations and Regions Contexts are not in scope for pathways. For distributed-connected onshore wind, solar and battery storage, it will be ensured that there is coherence across nations and regions for the current installed capacity between Nations and Regions Contexts and pathways.

Short-term pathway:

1. Future supply side generation and electricity storage pipelines: similarly to Step 3 in the baseline section, the REPD and ECR datasets are complementary to each other for Nations and Regions Contexts and for pathways. A comparison will be performed for the relevant technologies covered in both (onshore wind, solar and batteries) at the distribution level. Differences will be expected between the tRESP Pathways (particularly after the November 2025 update reflecting the outcome of the Gate 2 connections reform process) and the pipeline used in the Nations and Regions Contexts (based on the Renewable Energy Planning Database and covering generation and battery storage at both transmission and distribution levels).

2. Local Area Energy Plans (LAEPs) will be mentioned in the Nations and Regions Contexts Report covering future local ambitions/targets qualitatively, with possible enablers to achieve these. In pathways, these ambitions may appear via the DNO submission to NESO in November 2025, and we have asked DNOs to confirm LAEPs included. However, for any LAEP published after autumn 2025, DNOs will not have had an opportunity to incorporate this in their update to NESO, so it is not expected that this addition will be reflected in the tRESP Pathways.

Delivery timeline

As illustrated by Figure 5, the tRESP Pathways are delivered following an iterative approach with a first version delivered in July 2025 which is improved through feedback and internal checks for October 2025. This October version includes initial application as a dry-run of the alignment review framework described in the “Alignment Review Framework" section.

Thereafter, an update of the tRESP Pathways will be done in November/December 2025 following the incorporation of data from the Gate 2 Connection Reform Process and updated building blocks projections from DNOs informed by FES 2025. The final version of the tRESP Pathways goes through an alignment review framework that reviews the outputs and their alignment with the UK Government's Clean Power 2030 Action Plan, the 6th Carbon Budget and advice on the 7th UK Carbon Budget[14].

The following sections describe in more detail the different steps introduced here, from the creation of the first version to the final version of the tRESP Pathways.

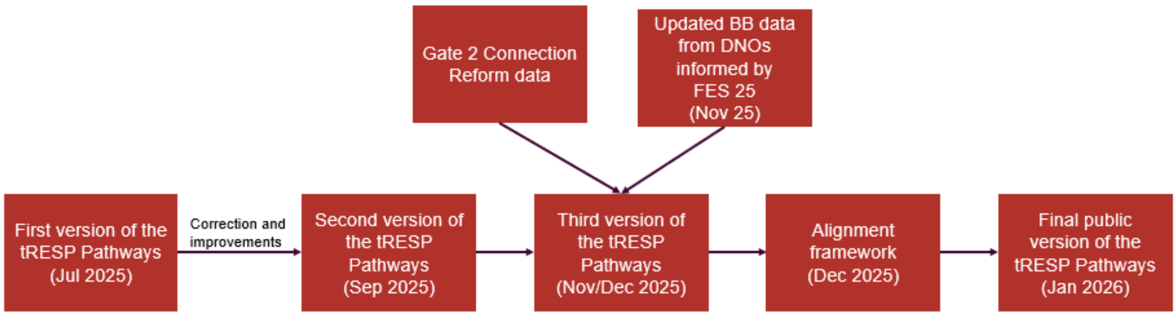

Figure 5: Delivery timeline of the tRESP Pathways from versions to DNOs in July, October and December 2025, to the final public version in January 2026.

Methodology for Baseline (Year 0)

Objectives

The first step in creating the tRESP Pathways is to establish the baseline year (2024) values for each building block. Through engagements with DNOs, we have identified that the DNOs' previous detailed methodology to derive volumes in the baseline year within their DFES data varied from one DNO to another. This variation includes the approach itself, as well as the snapshot date of the input data used. To bring consistency, we have developed a bottom-up methodology that can be applied to each building block and all GSPs.

The following sections describe the baseline methodology for each building block.

Our decision

Four options were considered to create the baseline year data:

1. Use the FES 2025 disaggregation done as part of the FES regionalisation exercise to GSP.
2. Use the DFES data from a specific year to disaggregate FES 2025 at GSP.
3. Establish our own baseline for all GSPs e.g. do our own independent disaggregation of FES to GSP using primary datasets (such as energy performance certificates (EPC), Census, Microgeneration Certification Scheme (MCS), ECR where suitable, using local data directly).
4. Purchase models from a consulting company working on LAEP or DFES and do a run for the whole of GB.

Option 3 was selected as this provides an independent view of the baseline, using granular primary datasets, while still providing the option of aligning with the baseline of the national forecasts produced by the FES Pathways. Local data includes datasets from sources such as the Office for National Statistics (ONS), EPC and MCS. The data processing models were set up using FES 2024 data and subsequently updated using FES 2025 data. The tRESP baseline year was initially set as 2024 to align with the baseline of FES 2025. For the final tRESP outputs, the baseline is being updated to 31 March 2025 across all building blocks.

Why this approach is robust

- The methodology for disaggregation is based on reliable sources which provide data at local level. This includes data from the ONS, EPC, Department for Transport (DfT), Department for Energy Security and Net Zero (DESNZ).
- The methodology uses data comparable to what DNOs use in DFES which has been developed and improved in the past 10 years.
- The aggregated numbers align with FES 2025 or are based on an updated version of the input data used by the FES which provides trusted and robust pathways.

Methodology for each building block including input data mapping

This section describes the methodology used to calculate the baseline year data for each building block. Key assumptions are included in a tab of the tRESP Pathways building block list[7] shared separately.

Electric vehicles (EVs) - FES BB ID Number: Lct_BB001, Lct_BB002, Lct_BB003, Lct_BB004

This methodology is leveraging the VEH0142 and VEH0145 data from DfT which is available at local authority level. The data is converted to GSP level to estimate the distribution of the EVs to support the disaggregation of the FES 2025 data.

For each building block:

1. Collect data for accommodation (incl. all housing types) at LSOA/DZ (Lower layer super output area in England and Wales, Data Zone in Scotland) using census data.
2. Calculate an accommodation weighted factor based on accommodation type at LSOA/DZ level (see key assumptions tab for details).
3. Calculate distribution of vehicles at LSOA/DZ level for each local authority based on the accommodation weighted factors.
4. Collect all EV data at local authority level from EV statistics sheet for 2024 Q4 column from DfT EV Statistics.

[7] tRESP Pathways Building Blocks List.

5. Disaggregate the EV data from LA to LSOA/DZ level using results from Step 3.
6. To deal with areas with higher than usual registrations of commercial EVs, the Ofgem methodology:[8] for DNOs' annual regulatory reporting was used:
    a. Using the VEH0145 dataset from the DfT providing information for fuel type and keepership of vehicles at LSOA level, the commercially kept battery electric and plug-in vehicles were extracted.
    b. Number of vehicles per LSOA was capped at 100. Any unallocated vehicles were distributed across GB proportionally to the existing number of vehicles.
    c. The split between battery electric cars and light vans and plugin-in electric cars and light vans was done using GB level data from VEH0142. This data was used to replace these categories of vehicles in Step 5 at LSOA level.
7. Aggregate EV data (Step 6) to GSP level using NESO GSP map data.
8. Distribute FES 2025 data based on number of vehicles in each GSP from Step 7.

Domestic heat pumps (HPs) - FES BB ID Number: Lct_BB005, Lct_BB006

The output of the FES heat model (used to produce the FES 2025 data) at local authority level was used to provide the basis of this methodology. This data was converted to GSP level with the following methodology:

1. Collect number of domestic heat pumps (hybrid & non-hybrid) at local authority level from the FES 2025 heating model data in 2025.
2. Take sum of detached houses, semi-detached houses and flats at LSOA level from the Census Data for England, Wales, and Scotland.
3. Calculate the distribution of dwellings at LSOA/DZ level for each LA to calculate the number of hybrid and non-hybrid residential HP at LSOA/DZ level.
4. Aggregate the data from LSOA/DZ level to GSP level.

Industrial and commercial (I&C) heat pumps - FES BB ID Number: Dem_BB005

Non-domestic EPCs were used to estimate the distribution of electricity heated property, which was used as a proxy for the distribution of the demand from I&C heat pumps.

1. Collect the non-domestic EPC certificates, remove duplicates and assign a LSOA/DZ to each record.

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[8] p107 of RIIO-ED2_Annex_B_Costs_Volumes_and_Revenue_v1.1 at Modifications to electricity distribution Regulatory Instructions and Guidance and Regulatory Reporting Packs for RIIO-2 Year 2 | Ofgem

2. Collect surface area in square metres by heating fuel and property type at the LSOA level from the non-domestic EPC data. In each non-domestic EPC file, column E is for the postcode to match the LSOA, column I is for property type, column S is for heating fuel, and column W is for the floor area.
3. Calculate the percentage of floor area for electricity heated property – the floor area which is electricity heated at LSOA level / total floor area electricity heated in GB.
4. Distribute the FES 2025 value for this building block based on percentage of floor area for electricity heated property (step 3).
5. Aggregate the data from LSOA/DZ level to GSP level.

District heating - FES BB ID Number: Lct_BB009 and V2G - FES BB ID Number: Srg_BB005

For district heating and Vehicle-to-Grid (V2G), the FES 2025 data was used directly.

1. Align with the GSP-resolution baseline from FES BB tables (Future Energy Scenarios 2025 Data Workbook) for Lct_BB009 and Srg_BB005.

Domestic air conditioning (AC) units - FES BB ID Number: Lct_BB014

The number of domestic AC is not available in FES 2025. It was estimated based on the percentage of households in England with AC from the English Housing Survey applied to GB.

1. Calculate the total number of detached, semi-detached, terraced and flats at LSOA/DZ level using the Census data for England, Wales and Scotland.
2. Based on the assumption that 3% of dwellings have AC units in GB (English Housing Survey headline report), the number of detached, semi-detached, terraced and flats have AC proportionally.
3. Aggregate the numbers of AC units to GSP level.

I&C air conditioning (AC) units - FES BB ID Number: Lct_BB015

The I&C AC electricity demand was estimated using non-domestic EPC data and findings from a Building Research Establishment (BRE) study looking at air conditioning in non-domestic buildings.

1. Calculate the floor area for non-domestic AC units from EPC Data.
2. Map postcodes to LSOA level using lookup table for each record from Step 1 and aggregate results to GSP level.
3. Use the standard kWh/m2 of demand (40 kWh/m2) for cooling from the BRE study (bregroup.com/reports/new-insights-into-air-conditioning-in-the-uk) to estimate the demand.

Distributed generation and storage - FES BB ID Number: Srg_BB001, Srg_BB003, Srg_BB005, Gen_BB001-23

For distributed generation, the methodology is based on the use of the Embedded Capacity Registers (ECR) published by the DNOs. This part of the methodology will be updated to reflect the Gate 2 connection reform update due to be incorporated in November 2025.

For each building block:

1. Collect the ECRs (current ECR data used was downloaded in April 2025) for above and below 1 MW for all six DNO groups.
2. Consolidate the data from all DNOs into a single dataset where:
    a. Each asset is categorised into building blocks.
    b. The GSP name to which each asset is connected is normalised and mapped to the NESO GSP definition. Option 1 is to use the GSP column name in the ECR; if not available, coordinates are used.
    c. Hybrid systems are split into multiple components (i.e., a battery photovoltaic system is broken down into two assets: a single battery and a single photovoltaic system sharing the same connection)
3. After applying the filters, take the sum of the already connected registered capacity (MW) column for each building block as of 31 December 2024.
4. Calculate percentage distribution by GSP based on total capacity installed at GSP level.
5. Distribute the GB value of the building block from the FES 2025 data.

Domestic battery storage - FES BB ID Number: Srg_BB002

The installed capacity of batteries in dwellings was estimated from the MCS data. FES 2025 data was not used for this building block.

1. Collect battery installations data from MCS data at local authority level.
2. Collect accommodation type at LSOA/DZ level data for England, Wales, and Scotland from the Census data.
3. Distribute local authority data from Step 1 to LSOA/DZ based on number of detached and semi-detached dwellings.
4. Aggregate results to GSP level.

Storage other - FES BB ID Number: Srg_BB004

Due to challenges with filtering the ECR data to find records falling to the "Storage Other" category, the REPD published by the UK Government was used to distribute the FES 2025 data.

1. Apply filter on the technology type column from the REPD dataset to include: Pumped Storage Hydroelectricity, Liquid Air Energy Storage, Compressed Air Energy Storage from.
2. Map each record to GSP level using their coordinates.
3. Calculate percentage distribution by GSP based on total capacity installed at GSP level.
4. Distribute the GB value of building block Srg_BB004 from the FES 2025 data.

Fuel cell - FES BB ID Number: Gen_BB007

The same methodology as for "Storage other" was used for fuel cells, with the difference that Step 4 was not performed, as FES 2025 data report 0 MW for this technology in 2024.

Micro CHP - FES BB ID Number: Gen_BB003

Micro CHP plant information was collected from the MCS data available at local authority level and used to estimate the capacity at GSP level.

1. Collect number of micro CHP installations by local authority using MCS data.
2. Convert the micro CHP data at local authority level to GSP level using spatial percentages (the percentage area of GSPs under each local authority).

The FES 2025 data was not used as the installed capacity for this technology was reported to be 0 MW.

Methodology for Short-term and Long-term Pathways

Objectives

The starting point for projections was based on the following set of requirements:

- Align with the latest UK Carbon Budget (practically with the 6th and 7th Carbon Budgets as represented in FES 2025).
- Align with FES 2025 data for the baseline demand – this represents end of 2024.
- Align with DNO ECR data in spring 2025 and other primary datasets (EPC, Census, MCS, REPD) for the baseline generation and storage.
- Single pathways from 2024-2035 and three pathways from 2035-2050.
- 33 building blocks that capture generation and low carbon technologies.

- GSP spatial resolution (348 GSPs) – later extended to also show by RESP nation and region, and by DNO licence area.

Our decision

The methodology used for short-term and long-term pathways is based on leveraging DFES outputs for all the building blocks that are covered by DFES, and using FES otherwise. This approach was informed by the need to reflect local characteristics which is currently done by DNOs in DFES through their modelling and stakeholder engagement. The Details section covers the pros and cons of the options considered to deliver the tRESP Pathways.

FES and DFES consider three net zero pathways: Electric Engagement, Holistic Transition and Hydrogen Evolution – this is the general approach since 2024. For tRESP Pathways, we have aligned our short-term pathways with Holistic Transition to provide a more balanced and low regret view. The long-term pathways are aligned to all three.

In summary, as shown in Figure 6, the projections are:

- DFES-based: Projections will be based on DFES which captures local input data.
- Include a short-term pathway: Projections will focus on a Holistic Transition approach, considering immediate and integrated changes within the system.
- Show three long-term pathways: Projections will align with long-term DFES trends for Holistic Transition, Electric Engagement and Hydrogen Evolution by 2050, ensuring consistency with the FES 2025 Pathways for future planning and development.

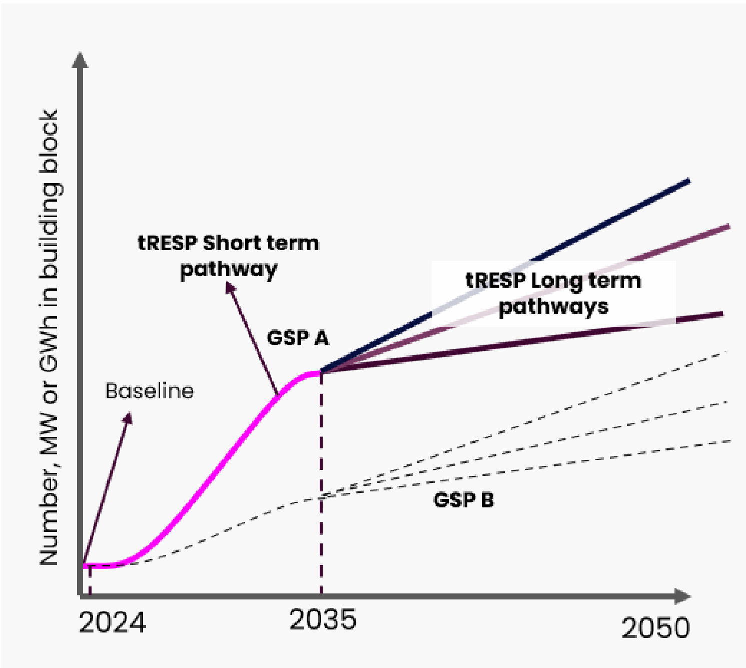

Figure 6: tRESP Short-term and Long-term Pathways.

Details

Several options were considered for short-term and long-term pathways. Table 2 describes the three options that were considered to develop the tRESP short-term Pathways including pros and cons. Based on the requirements of the pathways, we have decided to develop our short-term pathways using Option 2. This was mainly driven by the need to reflect local characteristics into our pathways which is done by DFES but not by FES. Following on, Table 3 describes the options considered for long-term pathways. In a similar way to the short-term pathways, it was decided to use Option 3 (using numbers from DFES 2024 data). Option 2 was considered but disregarded as it could result in uncapped numbers (for example, having larger number of heat-pumps compared to dwellings in a GSP area).

Table 2: Options considered to create tRESP short-term Pathways (2024-2035).

	Option 1 – Regionalised FES projections	**Option 2 – DFES projections (numbers) aligned to baseline**	**Option 3 – tRESP integrated models**
Approach	FES projections used for every building block.	DFES 2024 (latest) projections used for every building block for every GSP, assessing their credibility/deliverability through a framework. Option 1 is used as a default option if DFES is not available.	Develop bottom-up models (like DFES) to create pathways for each building block based on national and local input data and assumptions.
Benefits	• Approach is aligned with FES until 2050. • Standard approach for all GB. • Simple. • Aligned with UK Carbon Budget.	• Realigned to tRESP baseline, with most significant impact in earlier years. • Leverage local data by using DFES (DNOs already feed information from LAEP/Local Heat and Energy Efficiency Strategy (LHEES) into their process). • Leverage DNOs view on their connection pipeline, and DFES modelling capabilities which is more granular and bottom-up than FES. • Considered credible by DNOs. • Includes a framework to review all projections and assess their credibility (such as exploring projections above a given percentile and gather narratives to validate them, facilitating additional investigation rather than just considering outliers).	• Standard approach for all GB. • Ingest national and local input data. • Can be built to align with constraints (alignment with Carbon Budget).

Drawbacks	• Not reflecting regional characteristics as it does not use local data. • Growth rates will have the same shape everywhere. • Credibility of growth rates could be challenged. • Some building blocks are not produced by FES (such as AC units and EV charging) so another methodology will be needed for those. • May not be aligned with the published regionalised FES 2025 causing credibility issues.	• Approach is not standardised as DFES approaches vary between DNOs. • Additional checks required to test alignment with Carbon Budget. • Unlikely to align with FES after baseline year. • Electricity focused pathways. • Additional checks required to test alignment with the outcome of the Gate 2 connections reform process implementing UK Government's Clean Power 2030 Action Plan. • Requires an approach to reflect connection reform and impact on connection pipeline and DFES projections. • Some building blocks are not produced by all DFES (such as AC units and heat networks) so another methodology will be needed for those.	• High complexity and requires resources, and very high risk of not reaching sufficient level of quality by summer 2025. • Unlikely to align with FES after baseline year. • This can create confusion for stakeholders as we are producing pathways which are different from FES, DFES and Strategic Spatial Energy Plan (SSEP).

Table 3: Options considered to create tRESP long-term Pathways (2035-2050).

	Option 1 - FES based	**Option 2 - DFES based (growth rates)**	**Option 3 - DFES based (numbers)**	**Option 4 - tRESP models**
Approach	Use growth rates between 2035 and 2050 from FES 2025.	Use growth rates between 2035 and 2050 from DFES 2024 (informed by FES 2024).	Use 2050 numbers from DFES 2024 (subsequently updated to DFES 2025 with the November 2025 update informed by FES 2025).	Develop our own models for long-term pathways.
Benefits	Standard approach for all of GB.	• Region specific (with the caveat that very few local/regional inputs may be used in DFES in the period 2035-2050).	• Region specific (with the caveat that very few local/regional inputs may be used in DFES in the period 2035-2050). • Lower risk of uncapped values (such as number of heat pumps being higher than number of dwellings) compared to using growth rates.	• Standard approach for all of GB. • Ingest national and local input data. • Can be built to align with constraints (alignment with UK Carbon Budget).
Drawbacks	• Uniform change rates applied across all GSPs. • Certain building blocks (such as AC units, EV charging) are not produced by FES 2025, necessitating an alternative methodology. • Potential misalignment with the regionalised FES 2025 published by NESO's FES Team.	• Lack of standardisation, as each DNO employs different methodologies in their DFES. • Development of a framework like that used for projections from 2025-2035 may be necessary to validate projection credibility. • Influenced by FES 2025, but unlikely to align with FES. • Electricity-centric pathways.	• Approach is not standardised as every DNO uses different approaches for their DFES. • Each DNO uses different building block definition so there may be some assumptions to be done. • Unlikely to align with FES 2025 after in the period 2035-2050.	• High complexity, resource demands, and significant risk of not achieving adequate quality by summer 2025. • Unlikely to align with FES 2025 post-baseline year. • Potential for stakeholder confusion due to the production of pathways that differ from FES and DFES.

	• Projecting a 2050 value based on relative growth from a 2035 value that does not correspond with the tRESP 2035 value.	• Unlimited units available; consider using ratios instead of percentage changes (such as proportion of heat pumps relative to total stock). • Variability in interpretation of building block definitions across different DNOs. • Projecting a 2050 value based on relative growth from a 2035 value that does not align with the tRESP 2035 value.		

How to produce short and long-term pathways

This section illustrates the process used to create short and long-term pathways for all building blocks and GSPs. The same process cannot be applied to all building blocks and GSPs because of variances between DFES, including:

- different list of building blocks
- some building blocks may be aggregated in some DFES
- some building blocks are not modelled by DFES.

Hence, for each GSP and building block we have developed a decision tree and detailed methodologies to cover all cases:

1. DFES values exist for the building block at GSP level.

   → Solution: "Use the main approach"

2. DFES values exist, but only for aggregated building blocks. Example: only 'residential EVs' exists and no split between Lct_BB001 and Lct_BB002.

   → Solution: "Use FES data to split" (FES 2025 data)

3. DFES values do not exist, but FES (GSP-resolution) values exist. Note: only applies to the case where DFES data does not exist for any GSP within a DNO licence area. If individual GSPs are missing within a DNO licence area, but other GSPs have values, assume 0 for the missing GSP.

   → Solution: "Use FES data" (FES 2025 data)

4. Neither DFES nor GSP-resolution FES values exist.

   → Solution: "Bespoke solution needed"

The decision tree is shown in Figure 7 and the detailed methodology applied in each case to produce short-term and long-term pathways are described in the rest of this section.

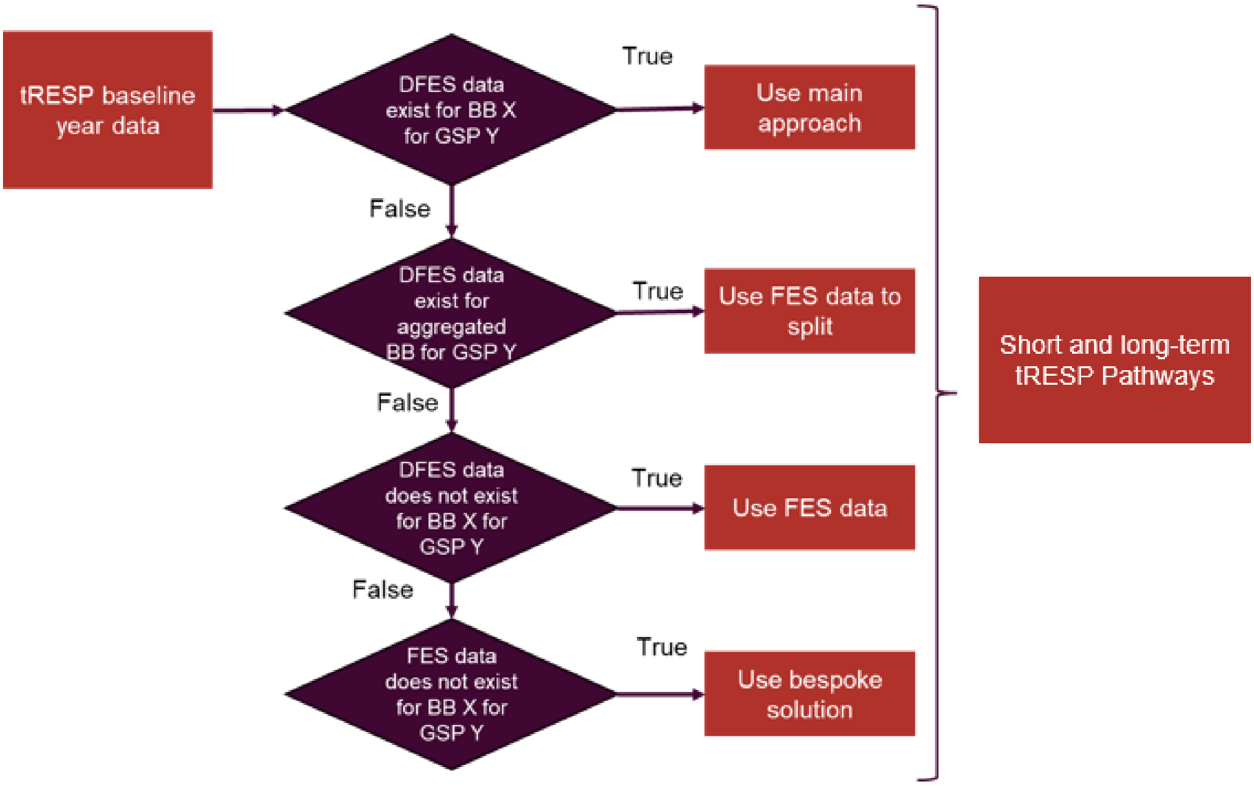

Figure 7: Overview of process to develop short and long-term pathways for each building block and GSP.

Main approach

1. Collect tRESP baseline year data.
2. Collect projections for building block X.
3. Create the tRESP short-term pathway for each GSP and each BB based on a transposed and scaled DNO projection. This should start at the tRESP baseline point while maintaining the original 2035 value, using the following:

$$tRESP_{gsp1,\,bbX,\,year_x} = DNO_{gsp1,bbX,year_x} \times Scaling\ \ factor + offset$$

With:

$$Scaling\ \ factor = \frac{DNO_{gsp1,\,bbX,2035} - tRESP_{gsp1,\,bbX,\,2024}}{DNO_{gsp1,\,bbX,2035} - DNO_{gsp1,bbX,2024}}$$

$$Offset = tRESP_{gsp1,\,bbX,\,2024} - \left(DNO_{gsp1,bbX,2024} \times Scaling\ factor\right)$$

4. Create the tRESP long-term pathways based on a transposed and scaled DNO projection for each GSP and each BB. This should start at the tRESP 2035 point while maintaining the original

DFES 2050 value, using the following equation, which provides an example of how the Hydrogen Evolution (HE) pathway is created:

$$tRESP_{gsp1,\,ev,\,year_x,\,HE} = DNO_{gsp1,ev,year_x,\,HE} \times Scaling\ \ factor + offset$$

With:

$$Scaling\ \ factor = \frac{DNO_{gsp1,\,ev,2050,\,HE} - tRESP_{gsp1,\,ev,\,2035,\,HT}}{DNO_{gsp1,\,ev,2050,\,HE} - DNO_{gsp1,ev,2035,\,HE}}$$

$$Offset = tRESP_{gsp1,\,ev,\,2035,\,HT} - \left(DNO_{gsp1,ev,2035,\,HE} \times Scaling\ factor\right)$$

5. In the case Steps 3 or 4 are producing negative values for BBs other than Srg_BB005 (V2G), which is defined as negative capacity in FES, a linear interpolation of the number between the start year and end year will be applied. For short-term pathways, this means that a linear interpolation will be done between the baseline year value and the 2035 value. For long-term pathways, the linear interpolation will be done between the 2035 value and the 2050 value.

Implications of the main approach for projection alignment to the tRESP baseline

It is noted that the approach to produce projections for the short-term pathway, as detailed in steps 3 and 4 above, matches the DNO's DFES projections for Holistic Transition in 2035 and 2050, as shown in Figure 8 for the period to 2035.

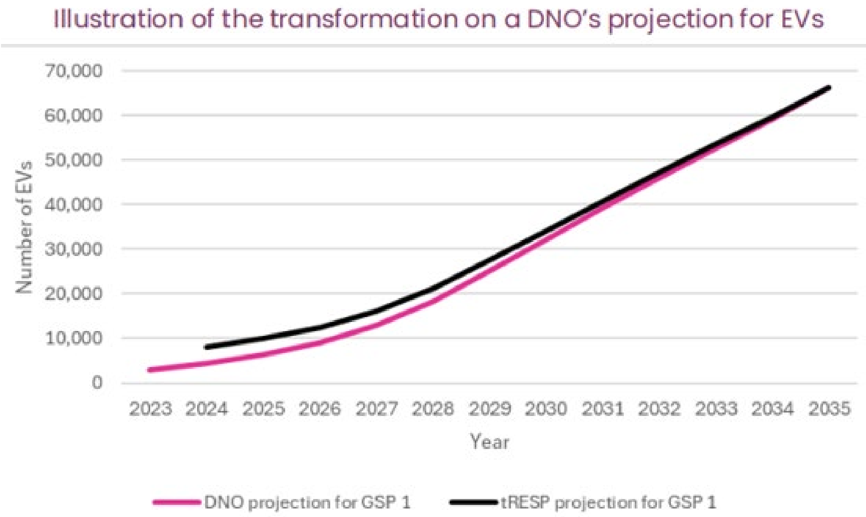

Figure 8: Transformation from a DNO projection to a re-baselined tRESP projection.

The projections for the short-term pathway for each GSP and BB may be further amended by the application of the alignment review framework and any consequential adjustments.

However, for the initial tRESP projections before the alignment review, consideration was given to matching volumes or growth rates provided in the DNO DFES data (this option was described in Table 3, Option 2). There are risks around incorrectly representing DFES projections by scaling a tRESP baseline with growth rates. For example, the DFES projections might be based on targets, such as the number of heat pumps by 2028 or the proportion of EV stock that is electrified. If a growth trend is derived from DFES and applied to a baseline that is different to the DFES baseline, then tRESP is not representing the DFES data in the way that it was modelled. Potential consequences are having more heat pumps than households or not aligning to the targets that drive the DFES modelling and therefore the overall projections become less credible.

The chosen approach in Option 3 of matching volumes in 2035 reflects that the DNOs possess detailed local information that FES does not have, and that this modelling and inputs are often based on volumes and projects. Consequently, the chosen approach is that the tRESP baseline does not have an impact beyond 2035. This tRESP baselining and projection approach is ideal to reflect the impact of connections project progress within 2024 up to the baseline date and realigning the projection for this, where the fundamentals of the analysis to 2035 are reasonable. Taking a percentage growth rate from DFES instead, particularly for technologies with initially small deployment volumes, leads to a material risk that 2024-2035 growth rates are distorted by the status of what projects were actually deployed by early 2025.

However, it is acknowledged that a difference between tRESP baseline and DFES baseline may not be just due to connections progress up to the baseline date. Other reasons for a baseline difference could be due to:

- a different and more consistent understanding of baseline uptake across GB applied to each GSP. This may particularly be the case for technologies such as EV and HP, i.e. a different understanding of the customers and stakeholders in the area served by a GSP.
- a different understanding of the feeding area served by the GSP, which may particularly be the case where there have been or will be changes in network running arrangements, or GSPs shared between DNO licence areas. Such area differences are being assessed as part of the creation and review of the v2 draft pathways, including creating a metric to compare the NESO's and DNO's assumptions for area served by the GSP, and may highlight here the GSP feeding area definition needs to be updated.

In those cases, there may be a rationale for updating the Option 3 projection method set out in step 3 of the main approach detailed above, for specific technologies. This could scale the DFES projection up or down based on the inverse of the scaling factor described in step 3, ensuring that an offset remains in 2035 and in 2050. This will be reviewed as part of the application of the alignment framework with each DNO and will be discussed as part of the validation of trends per GSP, informed by a common understanding of difference in the baseline.

Use FES data to split DNO DFES data

For building blocks, where DFES trends only exist for an aggregate (sum) of multiple BBs:

1. Determine which BBs are covered by the DFES trend, e.g. 'residential EVs' represents Lct_BB001+Lct_BB002.

2. Using FES 2025 Building Block data at a GB level (sum of all GSPs), determine the annual proportional split between the affected BBs in Holistic Transition [2024-2050], Electric Engagement [2035-2050] and Hydrogen Evolution [2035-2050].
3. Apply these proportions to DFES data to split up and create 'updated DFES data' for Holistic Transition [2024-2050], Electric Engagement [2035-2050] and Hydrogen Evolution [2035-2050].
4. Feed the updated Holistic Transition [2024-2035] data into the short-term pathway methodology.
5. Store the updated Holistic Transition [2035-2050] Electric Engagement [2035-2050] and Hydrogen Evolution [2035-2050] for feeding into the long-term pathway methodology.
6. Apply the main approach to the data produced in Step 4 and 5.

Use FES data in absence of DNO DFES data

For building blocks where DFES trends don't exist, but FES data exists:

1. From FES 2025 BB data, gather data for each missing GSP from Holistic Transition [2024-2050], Electric Engagement [2035-2050] and Hydrogen Evolution [2035-2050] and use as 'updated DFES data'.
2. Feed the updated Holistic Transition [2024-2035] data into the short-term pathway methodology.
3. Store the updated Holistic Transition [2035-2050] Electric Engagement [2035-2050] and Hydrogen Evolution [2035-2050] for feeding into the long-term pathway methodology.
4. Apply the main approach to the data produced in Step 3

Bespoke solution when neither DFES nor FES data exists

For building blocks where neither DFES trends nor FES data exist by GSP, a bespoke solution is required. The only building blocks where this is the case are residential and I&C air conditioning.

For residential air conditioning:

1. Use data from FES 2025 table ED1 table on Residential Air Conditioning Demand (GWh) - assuming a constant demand per dwelling between 2024-2050.
2. Use the growth rate in demand and apply to the baseline year data from each GSP to project the increase in number of dwellings with AC installed.

For I&C air conditioning:

1. For GSPs which are covered by the DFES from UK Power Networks (UKPN) and SP Electricity North West (ENW) use the main approach.
2. For other GSPs:

a) Calculate the values for each GSP for 2035 and 2050 based on baseline year using Table 4, which summarises the trends indicated by UKPN and SP ENW.

b) Interpolate linearly the data between 2024 and 2035 to create the short-term pathways.

c) Interpolate linearly the data between 2035 and 2050 to create the three long-term pathways.

Table 4: Increase in I&C air conditioning consumption in 2035 and 2050 for the three pathways. The values in this table are average values between the DFES 2024 projections from UKPN and SP ENW.

I&C AC GWh scenarios	Growth rate for 2035	Growth rate for 2050
Holistic Transition	10%	16%
Electric Engagement	NA	48%
Hydrogen Evolution	NA	48%

Update of pathways at the end of 2025 to produce final tRESP Pathways

The description of the methodology so far describes the approach to generate the first version of the tRESP Pathways produced in July 2025 with no planned change in input data or methodology between July and October 2025, but an opportunity to address feedback points and data corrections for the October update. This section describes how the pathways will be further updated at the end of 2025 with new projection inputs requested from DNOs for the tRESP building blocks, and with the outcome of NESO's Gate 2 connections reform process implementing the UK Government's Clean Power 2030 Action Plan. This will generate the final update of the tRESP Pathways, which will then be subject to the alignment review and adjustments described in the next section on the alignment review framework.

The data update at the end of 2025 has no planned impact on the pathways baseline but would impact the building block projections (the short-term and long-term pathways, primarily the short-term pathway).

Earlier in this document, DFES refers to DNO's last DFES based on 2024 inputs, which were published by DNOs at the end of 2024 or early 2025. This DFES would be a DNO's local interpretation of scenarios for its networks, informed by inputs such as FES 2024, local connections data and baseline from early 2024, and local plan inputs in 2024.

Since then, there have been material changes in the policy environment. This is particularly true for generation with:

a) the implementation of the UK Government's Clean Power 2030 Action Plan (last update in April 2025 with data by transmission and distribution network region, with GSP-level data from the outcome of the Gate 2 process to be available by the end of the year)

b) the change in the threshold for TIA from 1 MW to 5 MW in England and Wales announced in May 2025

c) the government's announcement in June 2025 that the Future Homes Standard to be published in the autumn via building regulations will practically require almost all new homes to include rooftop solar

In addition, it is noted that FES 2025 pathways aligned with carbon budgets suggests higher EV uptake and lower HP sales. Consequently, where DNOs could review their projections informed by FES 2025, changes in the volumes of these two building blocks would be expected. However, more generally it is recognised that in the absence of tRESP, DNOs would have used 2025 inputs to inform their ED3 business planning in 2026, particularly reflecting updates in connections data and local plans. Therefore, this will enable DNOs to provide updated projections (where they have more recent relevant local data) to inform the tRESP and ED3, in advance of their next DFES publication which we expect will use the tRESP components.

The updated data from DNOs will not necessarily be a full DFES output; the equations set out earlier in this section about how to generate the building block projections will be used with this updated DNO dataset. However, there will be a change in approach for four generation building blocks listed in Table 5, where data is requested from DNOs subdivided by projects above or equal to 5 MW and below 5 MW i.e. the transmission impact assessment (TIA) threshold. For Scottish DNOs, this split should therefore be at 200 kW not 5 MW. This applies for the following BB for batteries, solar and onshore wind.

Table 5: Building blocks split by TIA threshold.

Technology	FES BB ID number	Technology detail
Storage	Srg_BB001	Batteries
Solar Generation	Gen_BB012	Large (G99)
Wind	Gen_BB015	Onshore Wind >=1MW
Wind	Gen_BB016	Onshore Wind <1MW

In these cases, the projection approach is applied separately below and above the TIA threshold, and the total result for the BB is the sum of those two components. Above the TIA threshold, data will be sourced from the outcome of NESO's Gate 2 connection reform process. If DNOs do not provide this data by GSP, NESO will directly use the Gate 2 outcome and then extend to 2050 based on other sources such as FES 2025. If DNOs provide this data, then this will be cross checked. In the January 2026 tRESP Pathways, additional building blocks will be provided for the portion of these BBs above the TIA threshold.

Alignment Review Framework

This section contains the approach for the alignment review framework used to review the tRESP Pathways per GSP, including:

- Trend validation: The approach for reviewing trends per GSP for EV and low carbon heating projections, the principles for assessing what constitutes a valid trend and the method for making any adjustments to ensure validation.
- Alignment against targets in the UK Government's Clean Power 2030 Action Plan: as they are implemented in the outcome of the Gate 2 connections reform process
- Carbon Budget alignment: how we ensure that the pathways are aligned with the National Carbon Budgets.

Nations and Regions Contexts coherence will also confirm that the tRESP baseline and short-term pathways are consistent with the Nations and Regions Contexts.

The overall alignment review framework is summarised in Figure 9. The alignment review framework is applied to both the short- and long-term pathways.

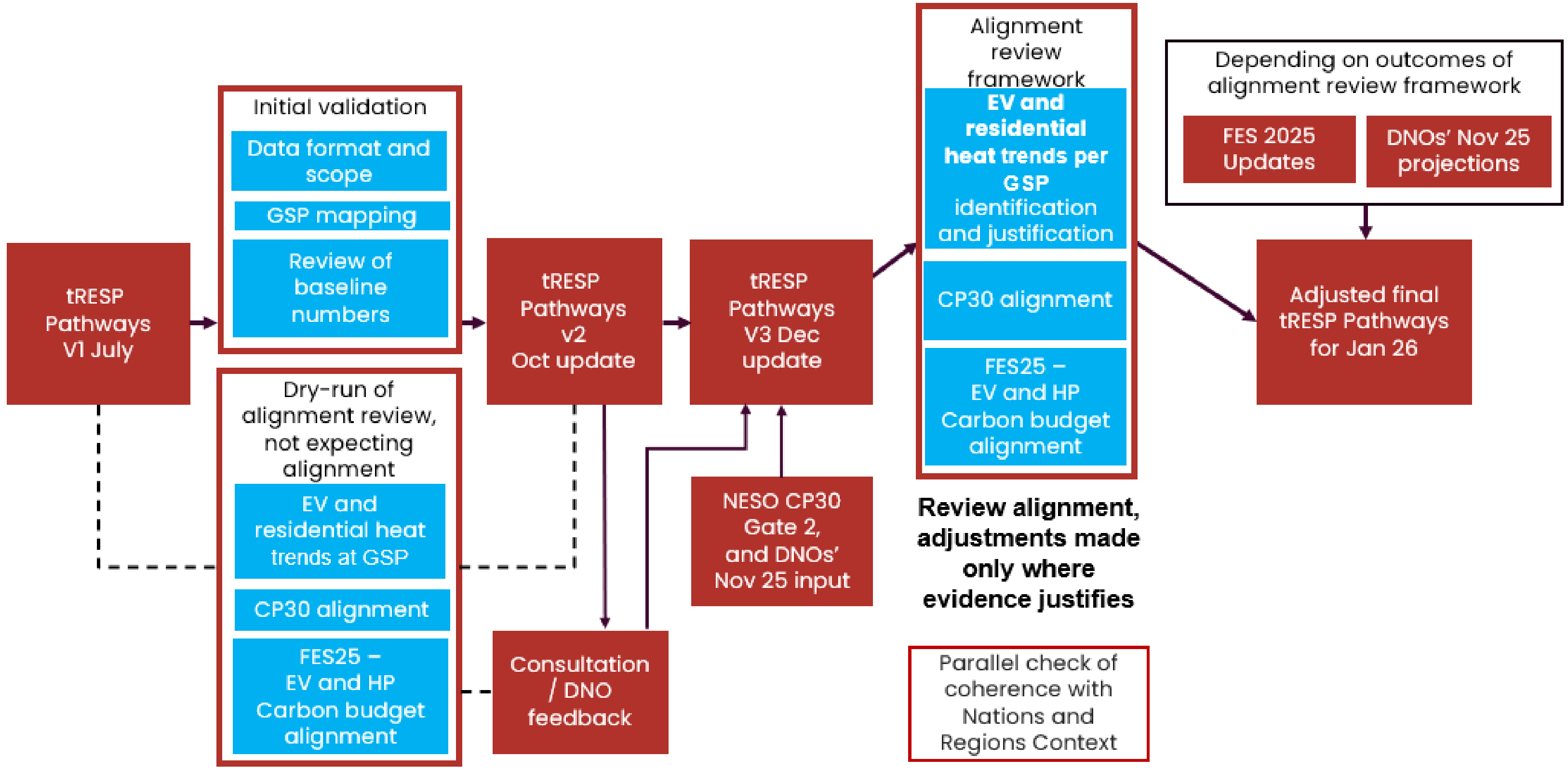

Figure 9: Alignment review framework applied to short- and long-term pathways with relevant timelines.

Initial validation checks will be conducted on the draft tRESP Pathways produced in July with a focus on data format, correct application of the projection method, GSP mapping and baseline validation. A dry run of the alignment review framework will also be conducted, focused on the scope of the initial validation checks, to derisk the application in November. The focus of the dry-run is an internal operation, but the results will be shared with DNOs. However, as data will be updated later in the year and there is no initial expectation of alignment of the July 2025 draft pathways with early Clean Power 2030 data and FES 2025, there would be no adjustments made at this stage and minimal expectation of feedback on this from DNOs. The full alignment framework would then be applied in November/December. This will provide the information to inform any adjustments and finalise the pathways for the end of January 2026.

The focus of the alignment review is validation of the short-term pathway to 2035 but there are also aspects affecting the long-term pathways to 2050 – both the starting point of the long-term pathways in 2035 and the trend and carbon budget checks applied to the long-term pathways. Further details on the alignment review are shown in Figure 10 indicating how results will be shared and reviewed with DNOs before final decisions made on the pathways. Alignment will be reviewed, with adjustments only made to align where evidence justifies this. It is anticipated that there will be changes between the October 2025 and January 2026 pathways, due to the alignment review and resolving site-specific issues, and due to the data update for implementation of Clean Power 2030 in Gate 2 connections reform and additional DNO inputs in November 2025.

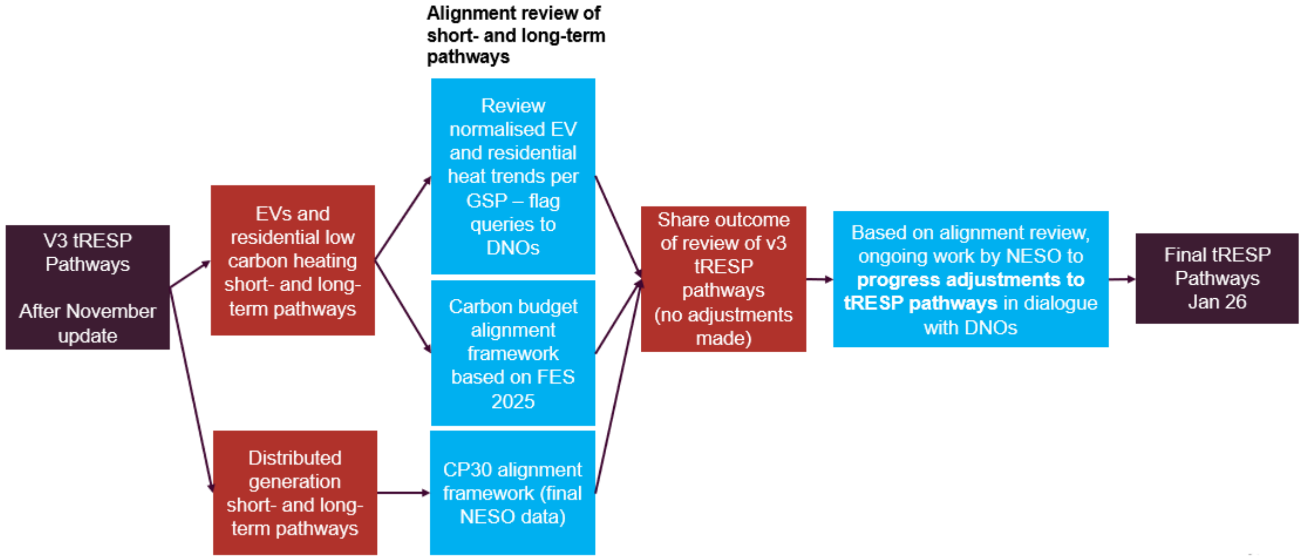

Figure 10: Detail of alignment review on the v3 short- and long-term pathways

Trend validation: EV and residential low carbon heating projections

One part of the planned validation of the tRESP Pathways is a per-GSP review of the magnitude and shape (changes in uptake per year) of the short- and long-term pathways. This will review similarities and differences between GSPs, to facilitate an informed discussion of the underlying reasons and whether any corrective adjustments to the DNO or NESO inputs or their application should be applied. There will be no automatic adjustment made to any pathway based on this alignment review check.

Differences in the pathways will be primarily driven by the DNO inputs (DFES with 2024 inputs and then updated through the bilateral data share of projections in November 2025), and how they reflect local characteristics and local plans such as LAEP in their scenarios, particularly Holistic Transition which will steer the short-term pathway. The validation will not review the detail of how and when local inputs have been reflected by DNOs in their scenarios, but inclusion of a local plan could be an explanation of a higher pathway.

Recognising the variation in the areas served by a GSP (both geographically and by population), this validation will be performed only for building blocks that can be made comparable by normalising based on the number of dwellings, using the domestic customer number projections provided by the DNO. Consequently, this check will be performed only for EVs and residential low carbon heating. Residential low carbon heating is defined as residential heat pumps (hybrid and non-hybrid) plus district heating; it is noted that the FES building blocks definition of district heat networks is restricted to HP and other low carbon technology i.e. FES excludes gas powered heat networks. We will confirm with DNOs that they are aligned to this interpretation. There will be no trend alignment review for any other categories.

The normalised aggregated building blocks by number of dwellings covered by this framework include:

- Aggregate pure electric vehicles: Sum of LCT_BB001 and LCT_BB003.
- Aggregate plug-in electric vehicles: Sum of LCT_BB002 and LCT_BB004.
- Aggregate residential low carbon heating: Sum of LCT_BB005 and LCT_BB006 for domestic heat pumps and LCT_BB009 for low carbon district heat.

Steps:

1. Send v3 of the short- and long-term pathways to DNOs.
2. A review to be performed initially as a dry-run with v1 pathways based on the DNOs' DFES inputs from 2024 data, recognising that some trends will change in the v2 and v3 pathways and that adjustments will not be made at this stage.
3. Alignment review to be performed fully on v3 after DNOs' updated projections from November 2025 are included.
4. Identify a list of GSPs to be reviewed - approximately 10 GSPs per DNO license area, including those with the highest and lowest normalised uptake, any with a discontinuity in

the trend, and others allocated at random. Additional GSPs identified through data analysis may also be added to the list.

5. Share a set of identified GSPs to DNOs ahead of bilateral, with a review template. This template will be used by DNOs to record potential explanations for behaviours of GSPs, for example, network changes such as a new GSP or bulk supply point, local inputs (LAEP or equivalent, connections data or other inputs), error identified by DNO or NESO, variance linked to difference in FES v DFES baseline.
6. Engage with each DNO individually (in a bilateral) to understand the underlying reasons for the shape and magnitude of the short-term (2024-2035) and long-term (2035-2050) pathways to 2050 of each selected GSP. This discussion will be supported by the filled template.
7. Assess the "validity" of the reasons. Outcomes will then be sent to DNOs to review. This step provides an opportunity for DNOs to provide updated profiles in case there is a disagreement.
8. If Step 5 is not conclusive and no data has been received from Step 7, the tRESP values for 2035 and 2050 will be replaced with the FES 2025 values. The values before and after 2035 will also be adjusted while keeping the shape of the tRESP profile if relevant and otherwise reverting to using the shape of the FES 2025 profile.

Carbon budget review framework

For tRESP, we are checking the alignment between the tRESP Pathways and the UK Carbon Budget by comparing the uptake of the tRESP building blocks related to transport and low carbon heating.

As FES 2025 is aligned with the 6th and 7th Carbon Budgets, we will use the FES 2025 data as a proxy to check alignment. We will check values for the short-term pathway specifically in relation to the middle of the 6th Carbon Budget (2033-2037) for the year 2035 and at the end of the 7th Carbon Budget (2038-2042) with regards to the alignment of the long-term pathways. Specifically, this is because FES 2025 is aligned with the 6th Carbon Budget and advice on the 7th UK Carbon Budget[14] and therefore its data will be used as a proxy for this alignment review check, reviewing 2035 and 2042 respectively.

The building blocks covered by this framework include EVs (LCT_BB001, LCT_BB002, LCT_BB003, LCT_BB004), HPs (LCT_BB005, LCT_BB006) and residential district heat (LCT_BB009).

Steps:

1. The analysis will use the v3 tRESP Pathways updated using 2025 DNO's inputs (as described in Figure 7). The dry-run will be done using the version of the tRESP Pathways before the update.
2. Comparison of the number of units of each building block at GB level between FES 2025 Holistic transition and tRESP Holistic transition for the year 2035.
3. Comparison of the number of units of each building block at GB level between FES 2025 Pathways and tRESP long-term pathways; these included Holistic Transition, Electric Engagement and Hydrogen Evolution for the year 2042.

4. If FES 2025 numbers are above the tRESP Pathways numbers for a building block, we compare values from FES 2025 and the tRESP Pathways at GSP level.
5. Highlight the GSPs where the value from FES 2025 is above the value from the tRESP Pathways for 2035 and 2042.
6. For highlighted GSPs, the tRESP value for 2035 and 2042 will be replaced with the FES 2025 values. The values before and after 2035 will also be adjusted while keeping the shape of the tRESP profile. Projections will not be adjusted for GSPs that are not highlighted.

Clean Power 2030 review framework

For tRESP, we are checking the alignment between the tRESP Pathways and the implementation of the UK Government's Clean Power 2030 Action Plan. This is reviewed for wind, solar and storage generation connected at the electricity distribution network level.

It is noted that DNOs' local interpretations of FES 2024 (in their late 2024 or early 2025 DFES publications) did not reflect the expected installed capacity for onshore wind, solar and battery storage from the UK Government's Clean Power 2030 Action Plan and the latest Connections Reform Assessment from April 2025, which is available per licensed DNO area. Additional details per site and per GSP will be available later in 2025 as an outcome of the Gate 2 Process.

As a result, we have requested updated views from DNOs of their building block projections in November 2025. We have had targeted bilateral engagement and technical working groups to test and gather feedback on the availability of this data within the requested timescales, which we have incorporated in the methodology.

It is understood that tRESP Pathways are directional pathways. Hence, it is possible that we see a significant difference between what is being anticipated to happen from the connection queue and what the outcome of the Gate 2 connections reform process implementing UK Government's Clean Power 2030 Action Plan is recommending (abbreviated to CP30 in the steps listed in this section). The gap between the queue and the connections reform process will need to be addressed through policies and incentives but the networks should be prepared to accommodate the capacity required by the UK Government's Clean Power 2030 Action Plan.

Steps:

1. Comparison of capacity installed for onshore wind, solar and battery storage in CP30 compared to licensed area. Initially using data from Table 4 from the Connections Reform Assessment from April 2025 per technology per DNO licence area, but detail per GSP will be available later in 2025 as an outcome of the Gate 2 process.
2. To ensure more detailed alignment with CP30, an adjustment process will be done at GSP level:
    a) As part of our checks, we will process the "Existing Agreement" (EA) register from the NESO Connections Team which reflects the outcome of the Gate 2 connections reform process. The EA register is expected to be received in November 2025. This will indicate our expectation for capacities (in MW) of

solar, onshore wind and battery storage above TIA thresholds per GSP and expected to connect by 2030 (Phase 1) and 2035 (Phase 2). These capacities will be expected to connect by 2030 and 2035 respectively; connection dates will not be given explicitly per year in the EA register.

b) We will then match our BB and GSP definitions to indicate the volumes we expect to see for these technologies for Phases 1 and 2 above the TIA threshold. We will share these results with DNOs.

c) The processed EA register and the DNOs' submission on 21 November 2025 will be compared for the relevant building blocks above the TIA threshold as part of the alignment review.

d) The value before and after 2030 and 2035 will also be adjusted while keeping the shape of the tRESP profile.

Appendix 1: Glossary of Terms and Acronyms

Term / Acronym	Definition / Full Form
AC	Air Conditioning
BB	Building Block
BRE	Building Research Establishment
CCGT	Combined Cycle Gas Turbine
CHP	Combined Heat and Power
CPA	Consistent Planning Assumption
DESNZ	Department for Energy Security and Net Zero
DFES	Distribution Future Energy Scenarios
DfT	Department for Transport
DNO	Distribution Network Operator - Any Electricity Distributor in whose electricity distribution licence the requirements of Section B of the standard conditions of that licence have effect (whether in whole or in part)
DZ	Data Zones (Scotland)
EA	Existing Agreement Register (outcome of NESO's generation connection reform
ECR	Embedded Capacity Register (DNO generation data)
ED3	Electricity Distribution period Three – the next electricity distribution price control, running from April 2028 to March 2033
Electric Engagement	a FES pathway to net zero
ENA	Energy Networks Association
EPC	Energy Performance Certificate
EV	Electric vehicle - vehicles wholly driven by an electric motor that is wholly powered through a battery and does not produce any tailpipe emissions
FES	Future Energy Scenarios

GB	Great Britain
GDN	Gas Distribution Network
GSP	Grid Supply Point - interface between transmission and distribution
GWh	Gigawatt-hours
HGV	Heavy Good Vehicles
Holistic Transition	One of the FES pathways to net zero
HP	Heat Pumps
Hydrogen Evolution	a FES pathway to net zero
I&C	Industrial and Commercial *e.g. electricity demand*
IDNO	Independent Distribution Network Operator
kWh	Kilowatt hour (unit of energy)
LAEP	Local Area Energy Plans
LCT	Low Carbon Technology: LCTs is the collective term for the following technologies: • Heat pumps at existing connections that do not lead to a new or modified connection • Electric vehicle (EV) chargers, both slow and fast charging, at existing connections that do not lead to a new or modified connection • Photovoltaics (PV) connected under Engineering Recommendation G98 • Other renewable Distributed Generation (DG), excluding PV, connected under Engineering Recommendation G98 • Renewable DG not connected under Engineering Recommendation G98
LHEES	Local Heat and Energy Efficiency Strategy
LSOA	Lower layer Super Output Area (England and Wales)
MCS	Microgeneration Certification Scheme
MW	Megawatt
MWh	Megawatt-hours
NA	Not applicable

NESO	National Energy System Operator
OCGT	Open Cycle Gas Turbine
OFGEM	Office of Gas and Electricity Markets
ONS	Office for National Statistics
REPD	Renewable Energy Planning Database
RESP	Regional Energy Strategic Plan
RFI	Request for Information
SI Need	Strategic Investment Need
srg	Storage (in relation to building block list)
TIA	Transmission Impact Assessment
tRESP	Transitional Regional Energy Strategic Plan
V2G	Vehicle to Grid