Distribution Future Energy Scenarios

SP Distribution

May 2026

Contents

Commissioned partners: Baringa

Supported by: Field Dynamics

Welcome to our DFES

Welcome to our Distribution Future Energy Scenarios (DFES). This document sets out our forecasts for how electricity generation and consumption may evolve in Central and Southern Scotland out to 2050.

This document presents our annual update to these DFES forecasts following the publication of the National Energy System Operator's Transitional Regional Energy Strategic Plan (tRESP) process, which will inform network planning for the 2028–33 price control period.

Electricity networks are at the heart of the Net Zero transition. The scale of decarbonisation means that by 2050 the peak demand on our distribution networks is forecast to double, and we could likely see a five-fold increase in connected generation and storage. Over recent years we have seen strong appetite from solar PV and large-scale batteries, and a steady increase in connection rates of domestic, low carbon technologies. These trends are expected to continue, and we forecast that our customers are likely to connect up to eight million electric vehicles and heat-pumps by 2050.

Our role is to provide the safe, efficient, and reliable network capacity needed to enable the decarbonisation route that our customers and communities choose. To achieve this, these DFES forecasts are used to assess future network capacity requirements and plan the delivery of this capacity. We know from detailed modelling that this new demand, generation, and storage will increasingly push the distribution network beyond what it is designed for. In response, we must invest in network capacity, flexibility markets, and operational capabilities to enable our customers' Net Zero transition. Data, visibility, and working with our customers are all essential to enabling us to develop and operate this more active distribution system. It is important that we understand the likely uptake of these technologies, so we know where, when, and how best to respond and invest. That is the purpose of our DFES – to show the possible decarbonisation routes to Net Zero so that we can develop our network accordingly.

This year's DFES is directly driven by NESO's tRESP process, which represents a major shift towards coordinated whole system regional planning. Other the past 18 months, we have worked closely with NESO on a bilateral basis to apply tRESP consistently at distribution level. As a result, forecast low carbon technology uptake derived from tRESP pathways are within 1% of our previous DFES modelling, demonstrating continuity through the transition to tRESP-aligned forecasting, and providing transparent comparison to NESO's tRESP pathways.

It is important that our DFES evolves to reflect changes in how technologies are deployed and adopted by customers. For example, we update efficiency and cost of electric vehicles assumptions throughout the forecasts range to ensure we reflect likely technological improvements. These developments are directly incorporated into DFES through our underlying assumption, drawing on real world advancement and forecasting scenario-based technology advancements. Ensuring our modelling captures how technologies are expected to evolve over time, rather than reflecting current deployment in isolation.

While the overall direction of travel towards Net Zero remains clear, there are still areas where detailed local authority and community action plans are evolving, with several now moving from development into implementation and review cycles. At a wider system level, new drivers continue to emerge, including the government's ongoing reforms to heat decarbonisation policy and the continued evolution of planning frameworks for renewable generation. The Climate Change Committee's 7th Carbon Budget advice, expected later in 2026, may influence the 2038–42 period and beyond. To account for these uncertainties, we set out forecast scenarios that describe a range of credible decarbonisation routes, align with NESO's Future Energy Scenarios (FES) decarbonisation framework

Our customers' requirements continue to be central to our forecasts. That is why stakeholder feedback has been a vital component of every DFES publication. thank those who continue to give up their time to share their views with us every year – it is important and valued – and we look forward to continuing to engage with all stakeholders.

Summary of key forecasts

Holistic Transition	2030	2035	2040	2050
Demand [GW]	4.6	6.1	7.6	8.9
Electric Vehicles (EVs) [Thousands]	758	1,586	2,185	2,221
Heat Pumps (HPs) [Thousands]	220	602	1,030	1,566
District Heating [No. of customers]	30	120	355	622
Generation [GW]	7.7	9.9	11.3	13.3

Electrical Engagement	2030	2035	2040	2050
Demand [GW]	4.7	6.3	8.0	9.7
Electric Vehicles (EVs) [Thousands]	758	1,586	2,188	2,312
Heat Pumps (HPs) [Thousands]	219	590	970	1,475
District Heating [No. of customers]	30	115	287	544
Generation [GW]	7.7	10.2	11.4	13.7

Hydrogen Evolution	2030	2035	2040	2050
Demand [GW]	4.7	6.0	7.1	8.3
Electric Vehicles (EVs) [Thousands]	758	1,585	2,192	2,435
Heat Pumps (HPs) [Thousands]	220	576	886	1,305
District Heating [No. of customers]	30	103	190	338
Generation [GW]	7.7	9.9	10.4	11.5

Falling Short	2030	2035	2040	2050
Demand [GW]	3.9	4.6	5.4	7.1
Electric Vehicles (EVs) [Thousands]	517	1,112	1,872	2,506
Heat Pumps (HPs) [Thousands]	57	120	212	356
District Heating [No. of customers]	26	50	93	298
Generation [GW]	4.8	5.2	5.7	6.6

1. Introduction to SP Distribution

We are SP Energy Networks. We own and operate the electricity distribution network in SP Distribution licence area covering Central and Southern Scotland. It is through this network of underground cables, overhead lines, and substations that 2 million homes, businesses, and public services are provided with a safe, economical, and reliable supply of electricity.

A safe and reliable electricity supply is key to most people's lives – we depend on it to light our homes, keep our food fresh, power our businesses, and enable our connected lifestyle. In the future, we will also increasingly rely on it to heat our homes and power our transport as we decarbonise our society.

To support this transition, SP Distribution must ensure our network has sufficient capacity to meet our customers' changing electricity needs, and that our networks are equipped to facilitate the reaching of Net Zero legislated targets. To do this, we need to understand what our customers' electricity requirements are going to be in the future. This includes how much electricity both existing and new customers might consume (demand) and how much they might produce (generation).

Scotland's electricity is generated from a diverse mix of renewable and conventional sources before being transported across the national transmission system and delivered into our distribution network at grid supply points. From there, power flows through our 132 kV, 33 kV, 11 kV and low-voltage circuits to reach end users. Increasing volumes of distributed generation, storage and low-carbon technologies now connect directly to the distribution network, creating more complex and multi-directional power flows. This shift requires coordinated investment and more active management to maintain a resilient, flexible network that supports Scotland's decarbonisation pathway.

Achieving Net Zero will accelerate these changes, with growth in renewable generation, electrified transport and low-carbon heating placing additional demands on local networks. To enable this transition, the distribution system must operate more dynamically, integrate increasing volumes of clean energy and flexibility, and continue to deliver a secure and reliable service.

Our network areas

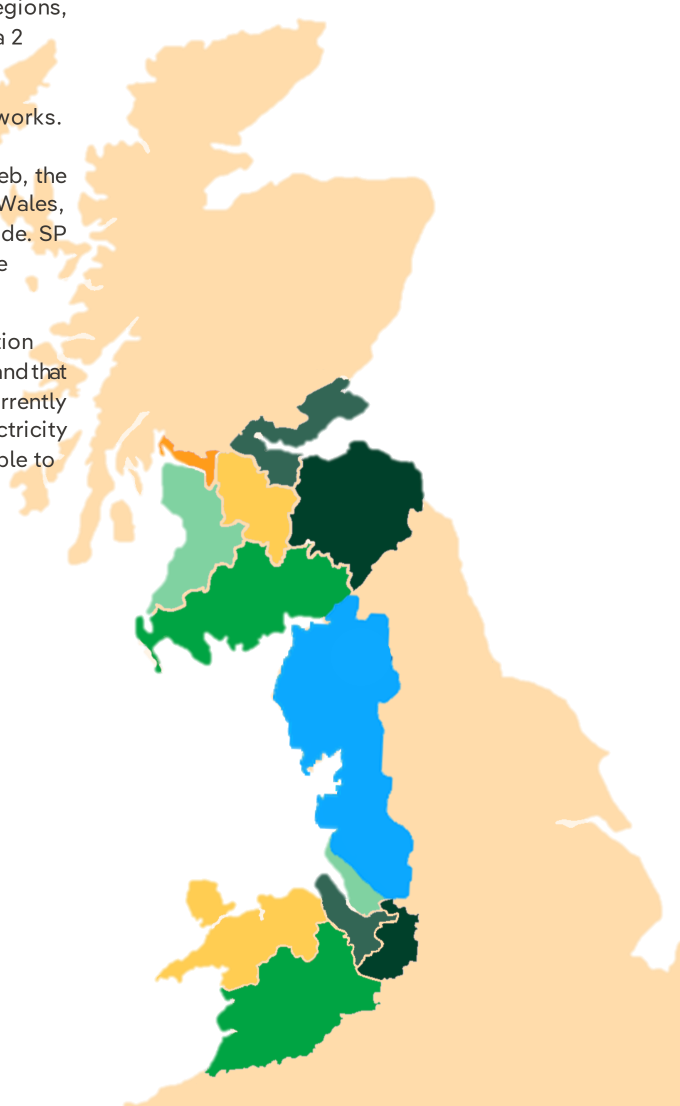
SP Distribution owns and operates the electricity distribution network – the network at 33 thousand volts and below – across Central and Southern Scotland. It has six operating regions: Central & Fife, Glasgow, Ayrshire & Clyde South, Lanarkshire, Edinburgh & Borders, and Dumfries & Galloway. Across these regions, we transport electricity to and from circa 2 million homes and business.

SP Distribution is part of SP Energy Networks. SP Energy Networks includes another distribution network company: SP Manweb, the distribution network operator for North Wales, Cheshire, North Shropshire and Merseyside. SP Manweb has its own forecasts, which are available separately[1].

SP Electricity North West is the distribution network operator for North West of England that is now a part of wider Iberdrola group. Currently it is not covered in this document. SP Electricity North West's DFES publication is available to view here.

SP Energy Networks also comprises SP Transmission, the transmission network owner for Central and Southern Scotland.

The forecasts in this document are for the SP Distribution network only; they are not forecasts for the whole of the UK, or the transmission network.



SP Transmission PLC (SPT)
SP Distribution PLC (SPD)

- Central & Fife
- Glasgow
- Ayrshire & Clyde South
- Lanarkshire
- Edinburgh & Borders
- Dumfries & Galloway

SP Manweb PLC (SPM)

- Merseyside
- Wirral
- Mid Cheshire
- North Wales
- Dee Valley & Mid Wales

2. What is DFES?

The Distribution Future Energy Scenarios (DFES) are our bottom-up, granular forecasts of how electricity demand, distributed generation, storage and low-carbon technologies may develop across the SP Distribution licence area. These forecasts help us understand how customers' energy needs may evolve as Scotland moves towards Net Zero. DFES considers a range of uncertain external drivers – political, economic, social and technological - and translates them into credible scenarios for how local energy systems might develop.

The DFES comprises forecasts of the following key areas:

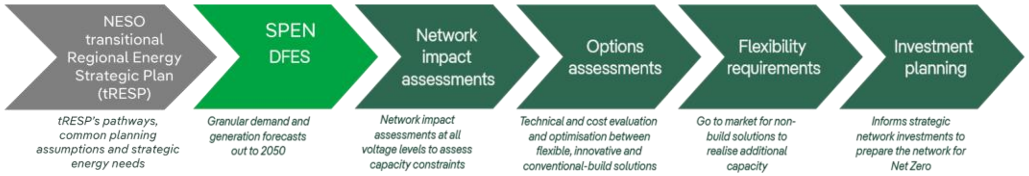
- Growth in the volume of Low Carbon Technologies (LCTs), such as heat pumps, district heating and Electric Vehicles (EVs).
- Changes to demand and consumption as a result of technology and behaviour changes, not least due to the growth in LCTs.
- Growth in and changes to electricity generation and storage[2]. This is generation connected to our distribution network as opposed to the transmission network; we call this Distributed Generation (DG) or embedded generation.

There are multiple pathways that GB could take to meet Net Zero, influenced by a range of external factors. To represent uncertainty, we develop a suite of scenarios aligned with established NESO' Future Energy Scenarios (FES) pathway framework and tRESP pathways. These include:

- **Falling Behind**
- **tRESP Hydrogen Evolution**
- **tRESP Electric Engagement**
- **tRESP Holistic Transition**

Each scenario is produced from a detailed, bottom-up view of expected changes across the distribution network, an aligns top-down with NESO's national level forecasts. This allows us to understand how different futures could impact granular areas, ensuring our planning remains robust against uncertainty, consistent with national modelling (both tRESP and FES), and reflective of local priorities.

Figure 1 | DFES and tRESP are the first steps in our investment planning process



Why DFES matters

We use our DFES forecasts to help us understand where and when we might see constrained network capacity. This informs procurement of flexibility services, as well as where and when we need to increase network capacity through conventional or innovative reinforcement. We explain how we plan to deliver the capacity our customers need to decarbonise, and set out where our network has headroom to accommodate growth in our Network Development Plan (NDP). DFES also provides a consistent evidence base that supports longer-term regulatory planning and ensures our investment decisions remain aligned with national policy and regional development needs, helping us coordinate effectively with wider whole-system partners. In doing so, DFES ensures our network strategy remains transparent, adaptable and responsive to evolving customer and societal expectations.

Ultimately, DFES is the cornerstone of our proactive planning process and underpins the development of our RIIO-ED3 investment plan, as represented by Figure 1.

Incorporating your views

We update our forecasts annually in line with national and regional projections and engage widely with stakeholders to test our data, methodology and outputs. We welcome feedback throughout the year to support continual improvement of our DFES. Engagement ensures our scenarios reflect local ambitions, technology developments and emerging policy signals, while giving stakeholders opportunities to influence how future network needs are represented.

Your insight helps us capture local knowledge, understand emerging trends and incorporate project pipelines into our modelling. Whether you are a local authority, developer, community group or technology provider, your contribution strengthens our forecasts and ensures DFES remains a trusted foundation for long-term planning across our regions.

Please provide your feedback via email to dfes@spenergynetworks.co.uk.

[2] From a technical perspective, storage increases both demand (when it imports electricity) and generation (when it exports), so it could have been included in either group. However, it is legally deemed to be generation, so is included within the generation forecasts.

3. What is tRESP?

The publication of the transitional Regional Strategic Plan (tRESP) by the National Energy System Operator (NESO) in January 2026 represents a major evolution in how GB co-ordinates energy system planning. Introducing a common approach for pathways, assumptions, and strategic need.

The tRESP introduces a transparent framework for understanding future energy needs, bringing greater consistency to how investment decisions are made across the system.

For the first time, a single national body is setting out an integrated picture of future demand, supply and infrastructure requirements, helping to align national decarbonisation goals with the specific needs of regions such as Central and Southern Scotland. By providing clear planning signals and a common evidence base, the tRESP is intended to improve coordination between network operators, local authorities, developers and government, reducing fragmentation and supporting a smoother, more efficient transition to a Net Zero energy system.

The introduction of the tRESP also reflects a broader recognition that achieving Net Zero requires a more coordinated and strategic approach to infrastructure development. Historically, local authorities, network operators, businesses and communities have developed their own plans to support decarbonisation, often without a single framework that shows how these plans interact or compete for network capacity. The tRESP seeks to address this by offering a consistent, whole-system view that can be used by all stakeholders when considering future projects, investment proposals or policy decisions. This enhanced transparency gives stakeholders greater clarity on where the electricity system is likely to need reinforcement, which technologies are expected to grow most rapidly, and where early investment could unlock wider social or economic benefits.

A key feature of the tRESP is its spatial focus. By presenting future energy needs at a regional and sub-regional level, the plan highlights where growth in electric vehicles, heat pumps, renewable generation, storage and new industrial loads is expected to be concentrated. This provides a valuable signal to DNOs such as SP Distribution, enabling us to anticipate the areas that may require significant capacity upgrades or flexibility solutions in the coming years. It also strengthens alignment between regional energy ambitions—including Scottish Government policy targets—and the strategic investment planning carried out by networks.

Importantly, the tRESP is designed to evolve. NESO's transitional plan lays the foundations for the full Regional Energy Strategic Plans (RESPs) that will be published from 2028 onwards. These future plans will become increasingly detailed as more data becomes available, creating a robust, long-term framework that helps ensure infrastructure is delivered in a way that is coordinated, efficient and responsive to customer and societal needs.

tRESP components

- **Pathways:** NESO's pathways provide future trends for key technologies such as EVs, heat pumps, battery storage, and distributed generation at GSP group level. These are aligned with the FES-DFES common scenario framework and adjusted to account for national policy signals such as the Clean Power 2030 Action Plan.

- **Consistent Planning Assumption (CPAs):** The CPAs set out consistent modelling assumptions for key demand drivers such as EVs, domestic heat pumps and appliance efficiencies. NESO provides standardised inputs to convert uptakes to network impact, ensuring a consistent methodology across all DNO ED3 business plans. The CPAs also help align regional forecasts with wider national expectations, improving comparability across networks and supporting a more transparent base for strategic investment planning.

- **Strategic Energy Needs (SENs):** SENs identify strategic projects or areas where early network intervention may be required to support decarbonisation or regional growth. Many of these needs were drawn from information submitted by SP Energy Networks and our stakeholders. SENs do not replace the existing connections process, they instead they focus on broader needs where proactive reinforcement could unlock future opportunities in advance of SEN's connections application.

4. DFES role and tRESP integration

The introduction of NESO's transitional Regional Energy Strategic Plan (tRESP) has evolved how SP Distribution approaches network forecasting. Building on the whole-system context set out in Section 3, tRESP now provides the overarching, top-down view of future energy needs that all DNOs are expected to consider as part of their ED3 planning.

For SP Distribution, this means integrating NESO's Holistic Transition pathway, Consistent Planning Assumptions (CPAs) and Strategic Energy Needs (SENs) directly into our forecasting processes and using them as the primary starting point for our Network Development Plan (NDP). DFES therefore plays a crucial complementary role: validating, refining and translating these national planning signals into the detailed, location-specific insight required to develop and operate a secure, efficient and future-ready distribution network across Central and Southern Scotland.

For many years, the Distribution Future Energy Scenarios (DFES) forecasts have been a cornerstone of how we plan and develop the SP Distribution network. DFES provides the detailed, bottom-up view of how electricity demand, distributed generation, storage and low-carbon technologies may evolve across our regions. Alongside supporting our statutory duties around security of supply and efficient network development, DFES is also a key source of insight for local authorities, developers, communities and wider stakeholders preparing their own energy and decarbonisation plans.

DFES alignment with tRESP, and future RESP

The introduction of NESO's tRESP marks a shift toward a more coordinated whole-system planning framework. NESO's intention is to reduce fragmentation across the energy sector by providing common pathways, modelling assumptions, and a shared view of strategic energy needs. Over time, this will evolve into the full Regional Energy Strategic Plans (RESPs), which NESO will publish from 2028 onwards.

DFES continues to play its central role within this new structure. The RESP will not replace or replicate DFES. Instead, it provides a complementary whole-system view that supports strategic investment planning across Great Britain. DFES remains the primary tool for capturing the local, granular detail needed to understand how energy requirements vary across the SP Distribution licence area. In practice, tRESP and DFES together create a two-layered forecasting approach: a top-down whole-system view from NESO, and a bottom-up local perspective grounded in detailed regional insight. Figure 2 shows the overarching framework on creating DFES using tRESP.

DFES in ED3 planning and NDP development

As DFES data, assumptions and scenario outputs continue to underpin the development of our Network Development Plan (NDP) and our future RIIO-ED3 business plan. **From 2026 onwards, our NDP and RIIO-ED3 business plan will be informed primarily by the tRESP scenario Holistic Transition, CPAs and SENs, combined with our granular DFES forecasts.**

This approach ensures that our network development proposals:

- align with national and regional whole-system priorities
- support local decarbonisation and economic growth
- reflect detailed, bottom-up evidence on future demand and generation

The growing exchange of insight between DFES and the tRESP/RESP processes strengthens both frameworks, helping create a more transparent, coordinated and future-ready energy system for customers, communities and stakeholders across Central and Southern Scotland.

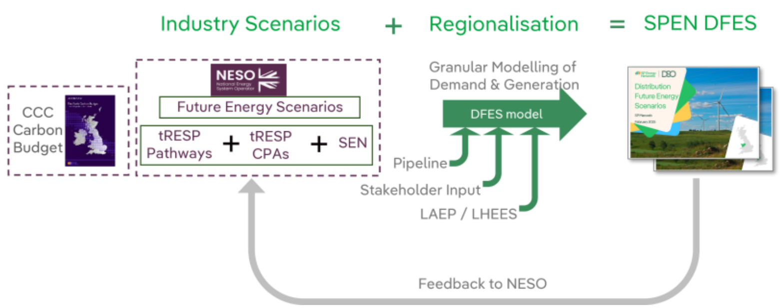
Our continuing responsibilities

As the licensed Distribution Network Operator, SP Distribution retains clear responsibilities to maintain and develop a safe, reliable and efficient network.

Regardless of the wider whole-system planning arrangements introduced through tRESP and the future RESP, we remain accountable for ensuring that our assets are adequately rated, that network constraints are identified and resolved in a timely manner, and that customers receive an economic and secure supply of electricity.

This includes planning reinforcements, managing operational risks, enabling new connections and ensuring that investment decisions reflect both present and future customer needs. DFES and our broader DSO forecasting processes therefore continue to be central tools in meeting these statutory obligations, providing the level of local detail and operational insight required to make sound network development decisions. While tRESP strengthens national coordination, the responsibility for delivering a resilient network remains with SP Distribution.

Figure 2 | Overarching framework of creating DFES using tRESP



5. Creating regionally reflective forecasts

The DFES are long-term forecasts of electricity demand and generation connected across our networks, which we update and publish annually. This year's DFES 2026 publication reflects outputs from NESO's tRESP and updates in the NESO's 2025 FES publication. This section describes how we ensure our DFES forecasts remain regionally reflective.

Our DFES scenarios are aligned to the NESO's FES[3] and tRESP[4]. Through these publications we receive an independent view of how energy demand, supply, flexibility and emissions could evolve from today to 2050 on the route to Net Zero. The FES are a range of GB – wide credible pathways for the GB energy system out to 2050 as shown in Figure 3. The three Net Zero compliant pathways in FES 2025 and tRESP are reflective of whole system strategic transformation and are characterised by:

- The extent to which electrification versus hydrogen is used in system transformation and the shift to renewable energy
- The degree of demand-side flexibility needed for the transition, indicative of consumer engagement within the transition process

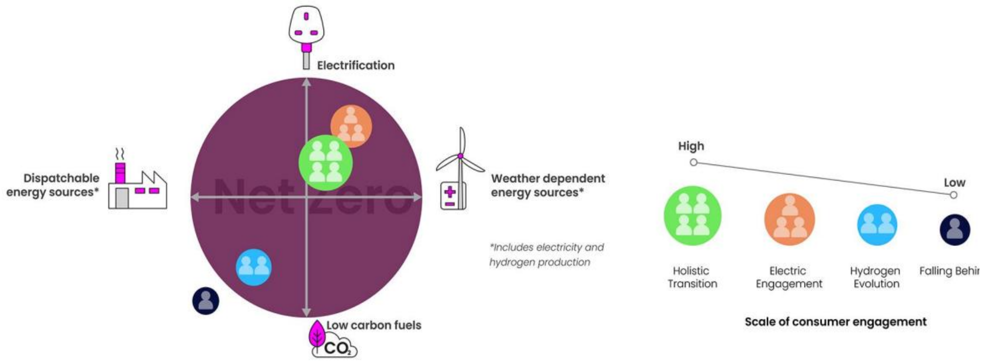
The Falling Behind scenario represents the slowest credible progress towards decarbonisation but does not meet Net Zero by 2050. For this reason Falling Behind does not appear in the tRESP publication.

Creating our DFES

Our forecasts are developed through extensive engagement with stakeholders to ensure they are regionally reflective. They directly draw on the NESO tRESP pathways at GSP group level and building key FES insights which are widely recognised as being an industry reference point.

We begin by assessing medium- and long-term growth patterns at tRESP GSP group level which are taken directly from tRESP Pathways. Evidence is gathered from NESO's FES, UK and Scottish Government legislation, strategic proposals (including Net Zero targets), and local and regional development plans (including LHEES). These strategic inputs are combined with detailed information on our network, including the near-term connections pipeline for large demand and distributed generation projects.

Figure 3 | Overview of the NESO's Future Energy Pathways



The forecasts are then spatially disaggregated to two levels of detail:

- Grid supply point (GSP) level. There are 88 GSP areas across Central and Southern Scotland. Allocating from the 22 tRESP GSP Group, grouped due to the lower transmission voltage in Scotland.
- Primary substation level. There are 390 primary substation network areas across Central and Southern Scotland. These geographic areas cover, on average, approximately 50km^2.

Key metrics are also provided by Local Authority area to support local planning.

To build on local strategies and ambition, our DFES model ensures our bottom-up methodology is driven by granular spatial insights produced through Field Dynamics Accelerated Insights platform, including direct use of SP Energy Networks' EV-Up and Heat-Up tools, alongside other detailed datasets such as building stock, land-use information, and socio-economic profiles.

Stakeholder engagement is incorporated throughout the DFES process. In addition to this feedback to ensure that our process contains regionally reflective plans and ambitions, it also allows us to calibrate our algorithms against real worlds finding. Section 6 describes how stakeholder feedback has shaped this year's updates. We continue to assess feedback dating back to our first DFES in 2020.

DFES 2026 provides regionally reflective, geographically granular forecasts out to 2050 across four scenarios. Forecast development was supported by Baringa, an expert consultancy. Further details on the methodology can be found in the SPEN DFES – Summary of Methodology document, developed in conjunction with Baringa[5].

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[3] Future Energy Scenarios (FES) | National Energy System Operator

[4] transitional Regional Energy Strategic Plan (tRESP) | National Energy System Operator

[5] https://www.spenergynetworks.co.uk/userfiles/file/Annex%204A.6%20-%20DFES%20Methodology.pdf

Scenario overview

Key assumptions characterising each of the scenarios are described as follows.

Falling Behind (FB)

Represents the slowest credible route to decarbonisation and does not meet Net Zero by 2050. It acts as a lower-bound scenario, important for security-of-supply assessments and understanding outcomes with continued reliance on unabated fossil fuels.

tRESP Hydrogen Evolution (HE)

Reaches Net Zero by 2050 via strong deployment of hydrogen technologies, particularly for heating and industry. Hydrogen boilers play a major role, supplemented by high levels of hydrogen dispatchable power plants and storage. Electrification remains important for smaller vehicles and appliances.

tRESP Electric Engagement (EE)

Achieves Net Zero by 2050 primarily through electrification. High uptake of heat pumps and electric vehicles is supported by strong consumer engagement and widespread flexibility. Peak electricity demand is highest in this scenario, and significant renewable and nuclear capacity is required.

tRESP Holistic Transition (HT)

Achieves Net Zero by 2050 through a balanced mix of electrification and hydrogen. Features high renewables deployment, strong consumer flexibility, and moderate nuclear capacity. This is NESO's reference pathway and is widely used by DNOs and NESO as the primary planning scenario for network development.

The tRESP Holistic Transition (HT) scenario is widely adopted by DNOs and tRESP as the network planning scenario.

	Falling Behind	Hydrogen Evolution	Electric Engagement	Holistic Transition
Residential electrical energy efficiency	Low	Medium	Medium	High
Residential consumer engagement	Low	Medium	High	High
Battery electric vehicles (BEVs)	Medium	Medium	High	High
Home EV charging	Medium (High by 2050)	Medium	High	High
Home thermal efficiency levels	Low	Medium	High	High
Heat pumps	Low	Medium	High	High
District heating	Low	Medium	High	High
Solar PV generation (<1MW)	Low	Medium	High	High
Solar PV generation (>1MW)	Low	Medium	Medium	High
Onshore wind	Low	Medium	High	High
Medium duration electricity storage	Low	Medium	Medium	High

Reflecting local ambition

Our DFES is designed to reflect the specific ambitions, development plans and decarbonisation pathways across Central and Southern Scotland. This requires close collaboration with Local Authorities, regional planners and stakeholders to ensure that our forecasts incorporate localised data, planned developments and policy commitments.

Engaging with Local Authorities

Local Authorities (LAs) are central to the accuracy and relevance of our DFES. Their statutory responsibilities for heat decarbonisation, spatial planning, transport strategy and local economic development mean they hold critical insight into how communities and places across Central and Southern Scotland are expected to evolve. To ensure our forecasts fully reflect these regional ambitions, we work closely with all Local Authorities in our licence area throughout the DFES cycle.

This engagement starts with the integration of Local Heat and Energy Efficiency Strategies (LHEES), which every Scottish Local Authority is required to produce. LHEES provide detailed evidence on local building stock, heat demand patterns, zoning proposals, heat network opportunities, and preferred pathways for transitioning homes and businesses to low-carbon heating. We review every published LHEES in detail, extracting spatial information and specific deployment assumptions which directly influence heat pump uptake forecasts, heat network locations, and the timing and scale of future network requirements. This data forms one of the most important local inputs into our DFES.

Beyond LHEES, we collaborate with planning and economic development teams across Local Authorities to gather information on housing growth, major development sites, industrial expansion, and strategic infrastructure proposals. These insights help shape local demand projections, ensuring they reflect real development pipelines rather than purely demographic trends. We also work with transport officers to understand local EV charging strategies, planned mobility hubs, and bus fleet electrification plans, all of which influence future needs.

LAs also provide valuable intelligence on emerging renewable energy and community energy projects, from early-stage feasibility studies to planning submissions and strategic area assessments. This allows us to capture distributed generation potential more accurately and to identify clusters of future technology uptake that may drive localised network reinforcement or flexibility requirements.

Throughout the DFES cycle, we hold bilateral meetings, workshops and information-sharing sessions with Local Authority officers and regional stakeholders. These conversations allow us to test assumptions, clarify uncertainties, and incorporate local understanding of on-the-ground challenges such as land availability, planning constraints, affordability barriers and community readiness. This engagement ensures our DFES reflects not only technical and policy signals but also the practical realities of delivering energy system change in specific local contexts.

By embedding Local Authority evidence and insight into the DFES, we ensure that our forecasts remain grounded in the ambitions and plans of the communities we serve. This strengthens the credibility of our DFES for whole-system planning, for NESO's future RESP process, and for local partners who rely on our data to support their own climate strategies, spatial plans and investment decisions.

Scottish policy landscape – summary of key drivers

Scotland's policy landscape remains one of the most ambitious in the UK, and these commitments play a central role in shaping our DFES. The legally binding target for Scotland to reach Net Zero by 2045, five years ahead of the UK, continues to provide a strong directional signal for local authorities, developers and energy users across our network area. Updated requirements introduced through the Climate Change (Emissions Reduction Targets) (Scotland) Act 2024 establish a carbon-budgeting framework that will drive sustained decarbonisation across successive five-year periods. These targets are supported by Scotland's Draft Climate Change Plan 2026–2040, which sets out policy proposals for emissions reduction across heat, transport, industry and electricity supply, and emphasises the need for rapid deployment of low-carbon technologies, energy efficiency measures and system flexibility.

Heat decarbonisation remains a major focus, with the Scottish Government's Heat in Buildings policy framework signalling a long-term shift away from fossil fuel heating. Requirements for all new buildings to use zero-direct-emission heating systems from 2024, combined with plans to phase out polluting heating systems by 2045, imply substantial growth in heat pumps and heat networks. Alongside this, Local Heat and Energy Efficiency Strategies (LHEES) provide a statutory foundation for area-based heat decarbonisation across Scotland. These strategies contain valuable spatial evidence on heat zoning and supply options, influencing both the timing and geography of future demand on our networks.

Transport policy also plays a significant role. Scotland remains committed to accelerating the transition to zero-emission vehicles, supported by investment in public transport, modal shift targets, and tailored support for low-income or rural communities. These strategies inform our assumptions for EV uptake, charger deployment and associated peak demand patterns across our DFES regions.

In electricity supply, the Scottish Government's ambition for significant new renewable generation capacity — including substantial contributions from onshore wind, solar, and hydro — shapes our expectations for distributed generation growth. NESO's Clean Power 2030 advice further reinforces the need to accelerate renewable deployment and unlock the system flexibility required to integrate variable generation, storage and low-carbon dispatchable technologies.

Industrial decarbonisation policy, including targets for reducing industrial emissions and the development of renewable and low-carbon hydrogen, also influences our modelling. This is especially relevant in areas with large industrial loads, where future electrification or hydrogen pathways could materially impact network reinforcement needs.

Overall, the Scottish policy landscape provides a strong and clear direction of travel. These ambitions, when combined with local planning evidence and stakeholder input, form a critical part of the DFES and ensure that our forecasts reflect both national commitments and the practical realities of regional delivery.

How local ambition shapes our modelling

Local ambition is a key driver of our DFES. Scotland's Local Authorities shape heat decarbonisation, spatial planning, transport strategy and economic development, meaning their plans directly influence where future demand and generation emerge. To ensure our forecasts reflect these local priorities, we embed Local Authority evidence throughout the DFES process.

A central input is the suite of Local Heat and Energy Efficiency Strategies (LHEES). These provide detailed, spatial information on heat demand, building stock, heat zones and opportunities for heat networks. We use this insight to refine assumptions on heat pump uptake, heat network growth and energy-efficiency measures at both GSP and primary substation level, improving the spatial accuracy of future heat demand.

We also incorporate Local Development Plans, which identify new housing, commercial development and major infrastructure. This enables us to reflect development-driven load growth and account for areas likely to see concentrated demand increases. Engagement with Local Authority transport teams further informs our assumptions on EV charging deployment, fleet electrification and local mobility strategies.

Local Authorities also contribute valuable intelligence on emerging renewable and community energy projects, informing our view of distributed generation potential even before projects enter the formal planning pipeline. This helps us anticipate localised impacts and identify where future reinforcement or flexibility may be required.

By integrating LHEES, development plans, transport strategies and ongoing engagement, our DFES captures the breadth of local ambition across Central and Southern Scotland. This ensures our forecasts remain grounded in the plans of the communities we serve while staying aligned with wider whole-system pathways.

Developments in industry network planning

In October 2024, the Department for Energy Security and Net Zero (DESNZ) launched the NESO. The NESO are tasked with coordinating planning activities across the energy industry, as well as continuing to operate the electricity network. NESO aims to ensure a secure, resilient, and flexible energy infrastructure to support the transition to a decarbonised energy system.

In August 2023, the new Electricity Networks Commissioner published his recommendations[6] for accelerating the rollout of electricity transmission infrastructure. One of his key recommendations is the development of a Strategic Spatial Energy Plan (SSEP).

The purpose of the SSEP is to define the optimal mix, volumes and locations of generation technologies needed to deliver Net Zero by 2050 to give greater confidence on what needs to be built when and where. The SSEP outputs are intended to act as the first stage of the Centralised Strategic Network Plan (CSNP) – a plan for transmission network infrastructure. The CSNP identifies a delivery pipeline for transmission network development for the first 12 years, and a longer-term pathway covering a 25-year horizon.

Whilst the SSEP and CSNP will focus on the strategic planning of transmission networks, this work will influence our distribution scenario planning. At the distribution level, the introduction of Regional Energy Strategic Plan (RESP) will cement this shift to strategic spatial energy planning. The RESP pathways will be based on a holistic understanding of relevant national and local plans and priorities and will set out, spatially, how energy needs will change in a region.

In July 2025, NESO published their FES 2025 which introduced updated assumptions, modelling improvements and policy alignment (comparing to FES 2024) which materially affect the scale, timing and composition of demand and supply. FES remains an important input for strategic planning to cover longer term uncertainty when developing and assessing onshore electricity, gas and hydrogen infrastructure. So, we have updated our forecasting framework to reflect the FES 2025 forecasting framework and continue to do so for this publication. Further details can be found in the 'Scenario Overview' section.

In November 2024, NESO published Clean Power 2030 (CP2030) providing advice to the Government on the steps needed to achieve clean power by 2030. NESO have derived the 2035 capacity ranges, by technology type, using FES 2024.

Clean Power 2030

NESO's Clean Power 2030 (CP2030) programme sets out the actions required for Great Britain to achieve a predominantly clean electricity system by 2030, defined as renewables and other low-carbon sources meeting annual demand with less than 5% from unabated gas. Since publication in late 2024, CP2030 has moved into early implementation and is now a core element of NESO's wider planning framework. Importantly, CP2030 is already reflected within NESO's tRESP pathways, where assumptions on renewable deployment, flexibility and capacity needs have been integrated into the Holistic Transition scenario and associated planning signals.

NESO highlights three priority areas for delivering clean power:

1. **Connections reform:**
   The GB connections queue has been re-ordered to prioritise deliverable, strategically aligned projects, including solar, storage, data centres and EV super-hubs. The new milestone-based framework replaces the former first-come, first-served approach, introduces evidence requirements and queue cleansing, and aligns strategic prioritisation with CP2030 and the emerging Strategic Spatial Energy Plan (SSEP). Government is consulting on further reforms to reserve capacity for strategic demand such as data centres and electrification projects.
2. **Rising demand:**
   Growth in clean technologies, particularly EVs, heat pumps and increasing industrial electrification, is driving sustained increases in electricity demand. Consumer participation in flexibility through smart tariffs, automation and demand response is increasingly important for managing peak loads and supporting affordability.
3. **Flexibility and system operation:**
   Flexibility is becoming a core system resource as electrification accelerates. NESO emphasises growing the role of storage, smart consumption, and digitalised flexibility markets to ensure supply-demand balance and reduce the need for traditional reinforcement.

NESO stresses the need for rapid delivery of infrastructure and innovation to achieve CP2030, given uncertainties in technology deployment and system demand.

Incorporation of CP2030 in our DFES

Achieving CP2030 will require a more strategic approach to connections, prioritising projects that support government targets and local authority priorities. We have updated our DFES assumptions to reflect CP2030 analysis and the proposed connections reforms, making them a core part of our investment planning. As CP2030 is already embedded within tRESP, we apply these assumptions at GSP level and will refine them as NESO provides further guidance through the SSEP and future RESP processes. We are also assessing how the milestone-based connections framework will shape our pipeline and are engaging closely with customers, Local Authorities and stakeholders as these reforms progress.

6

6. DFES results – electrification of transport

This section presents DFES results for transport electrification, highlighting how adoption patterns vary by location and how Local Authority-level insights support coordinated network planning and local decision making.

Electrification of transport is a central feature of Scotland's transition to a low-carbon energy system and a key component of future electricity demand. Electric vehicle uptake is increasing across all parts of Central and Southern Scotland, reflecting changing consumer preferences, technological maturity and sustained policy ambition. Understanding not only the scale of EV adoption, but where it occurs and how it clusters locally, is therefore critical for effective distribution network planning.

By the end of 2024/25, we estimate that over 100,000 electric vehicles (EVs) were registered within the SP Distribution licence area. This level of uptake is broadly consistent with expectations from the previous DFES cycle and provides increasing confidence in the long-term transition to electric transport across our regions.

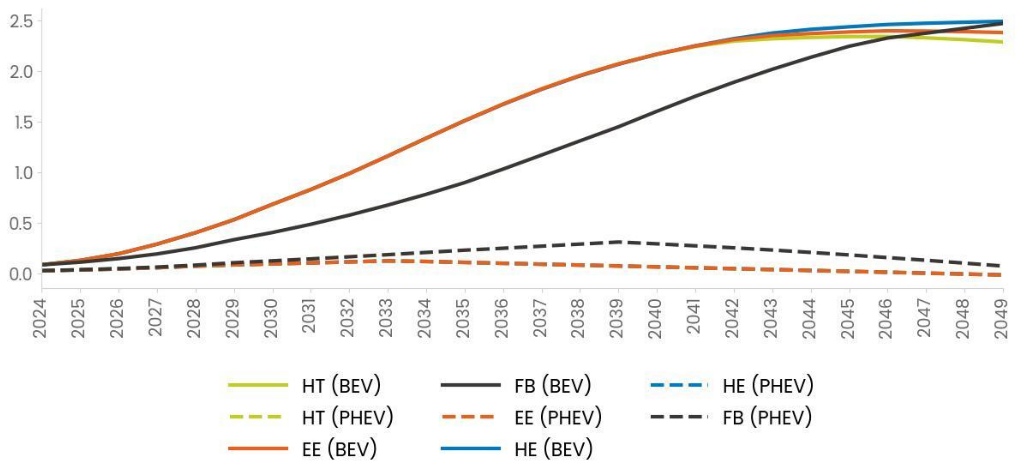
Forecast uptake of electric vehicles

Figure 4 shows the forecast number of Electric Vehicles (EVs) across the SP Distribution area under each DFES scenario. Forecasts have been updated based on the latest **NESO FES** and the **tRESP Pathway** publications. The Net-Zero-compliant scenarios follow a consistent long-term trajectory aligned with the Zero Emission Vehicle (ZEV) mandate, while the Falling Behind scenario reflects slower uptake and does not meet Net Zero.

Compared to the previous DFES, forecasts show **slightly slower uptake in the near term**, reflecting recent market signals including lower EV sales volumes, continued affordability pressures, and a slower transition from hybrid to fully Battery Electric Vehicles (BEV) than previously anticipated. These trends are consistent with national vehicle registration data observed during 2024 and early 2025 and reflect a period of adjustment as consumers respond to vehicle costs, charging availability, incentives and broader economic conditions. Importantly, this near-term moderation does not represent a fundamental change in the long-term outlook for transport electrification.

Across all scenarios, EV adoption accelerates through the 2030s as vehicle availability increases, charging infrastructure expands and policy signals strengthen. By 2030, the number of residential electric vehicles is expected to reach **between 500,000 and 700,000** across the SP Distribution area. All Net-Zero-compliant scenarios exceed **2.1 million electric vehicles by the mid-2040s**, although the timing and pace of uptake vary. In the Holistic Transition, Electric Engagement and Hydrogen Evolution scenarios, the sale of new petrol and diesel cars and vans end in 2030, consistent with NESO's planning assumptions, resulting in rapid growth

Figure 4 | Electric vehicle uptake *Number of vehicles (millions)*

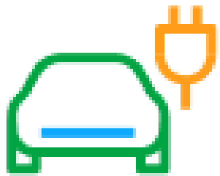


throughout the 2030s. The Falling Behind scenario assumes a slower policy and market response, with adoption increasing later in the forecast period.

Figure 4 presents a breakdown of electric vehicle uptake for both BEVs and PHEVs across scenarios. PHEVs reflects observed market behaviour, where hybrid vehicles continue to play a transitional role for some consumers, particularly in the near to medium term where range confidence, charging access and cost remain important considerations. DFES by recognises that the transition to fully electric transport is not uniform across all households, locations or vehicle types.

Distinguishing between BEVs and PHEVs also supports a more nuanced understanding of how electrification may evolve spatially. PHEVs tend to be adopted earlier in some areas and by certain customer groups, while BEV uptake dominates in areas with better charging access and higher consumer confidence. Over time, Net-Zero-compliant scenarios show a clear shift away from PHEVs towards predominantly battery electric vehicles, aligning with long-term decarbonisation objectives and tightening vehicle emissions standards.

While uncertainty remains around the exact pace of adoption, the convergence of scenarios in the longer term provides confidence in the overall scale of electrification that the electricity network must accommodate.

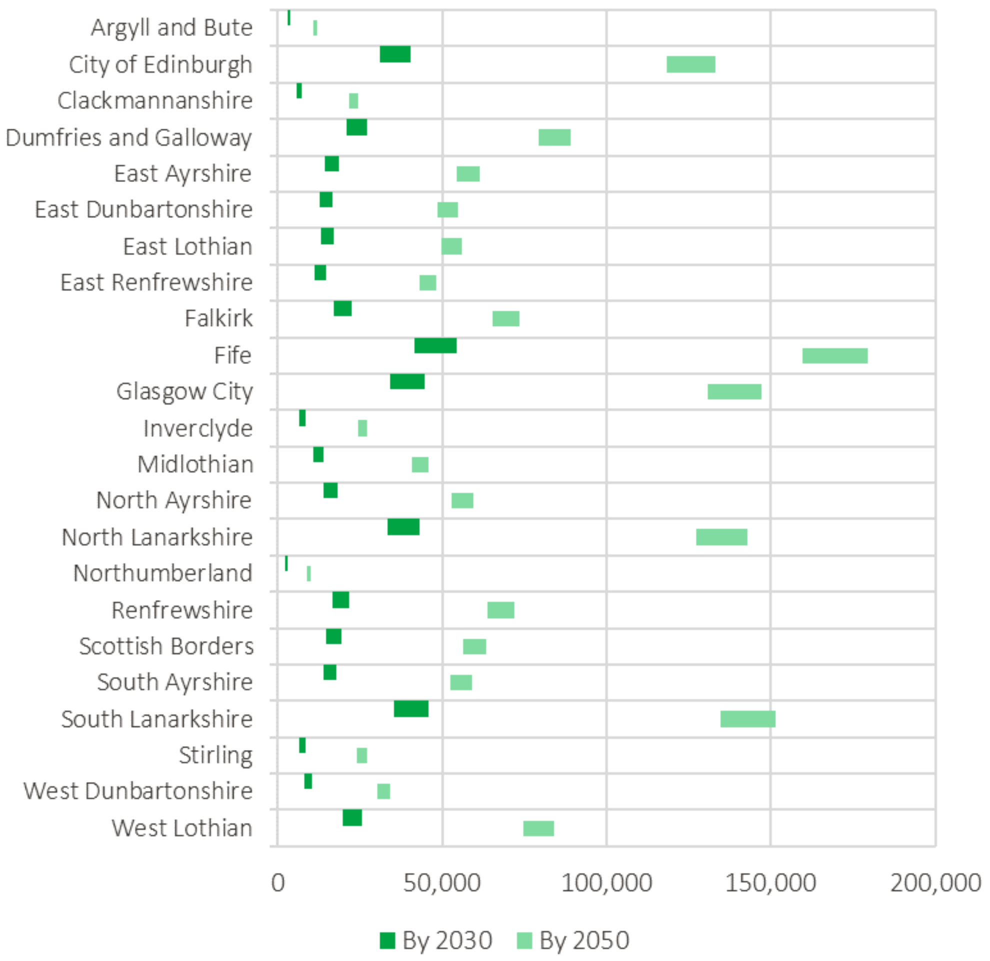


Local Authority level patterns of EV uptake

NESO's tRESP provides a strategic, whole-system view of future energy needs at Grid Supply Point (GSP) group level, which is appropriate for national and regional coordination. Building on this foundation, a core role of the DFES is to translate these high-level pathways into much more granular, locally relevant insights that reflect how electrification is expected to unfold within individual communities.

Figures 5 and 6 therefore present forecast electric vehicle uptake at Local Authority and primary substation level.

Figure 5 | Range of residential battery EV uptake by Local Authority *Number of vehicles*



This enhanced spatial resolution allows us to understand how national and regional transport decarbonisation pathways are likely to manifest locally, supporting more effective engagement with Local Authorities and enabling place-based network planning.

The heatmaps demonstrate that EV uptake varies across Central and Southern Scotland, influenced by factors such as **population density, housing type, travel behaviour, income and off-street parking availability.** Urban Local Authorities including Glasgow City, Edinburgh, North Lanarkshire, South Lanarkshire and Fife are forecast to see the highest absolute numbers of EVs, driven by population size and early adoption. Several of these areas could exceed 50,000 residential EVs by 2030, increasing to over 125,000 by 2050.

In more rural Local Authorities, absolute EV numbers are typically lower, but uptake can be proportionally high due to continued reliance on private vehicles and greater availability of off-street parking. In these locations, EV adoption may be more geographically dispersed but can still have important implications for local electricity networks, particularly at primary substation and feeder level.

To support interpretation, **Local Authority-level summaries accompany the heatmaps**, providing additional context on how forecast EV uptake aligns with local transport strategies, development patterns and demographic characteristics. This approach ensures that DFES outputs are accessible and meaningful for local stakeholders, supporting constructive dialogue on charging infrastructure, flexibility solutions and future network investment.

Understanding spatial clustering

EV adoption does not occur evenly across regions or communities. While scenario-level forecasts describe overall uptake trajectories, understanding how EV adoption clusters spatially provides important insight into how transport electrification is likely to develop across Central and Southern Scotland.

Clustering occurs where households within the same neighbourhood adopt EVs over a similar period, influenced by shared characteristics such as housing type, parking availability, income and travel behaviour. As a result, uptake can vary significantly at small spatial scales, even within the same Local Authority.

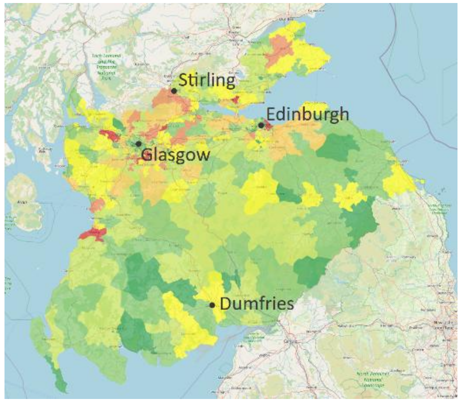
To represent this, we use outputs from our EV-Up modelling framework. **EV-Up combines property-level information on off-street parking with socio-demographic indicators to estimate the likelihood of EV adoption at granular spatial resolution.** This enables us to distinguish between widespread, low-density uptake and more concentrated adoption in specific streets or communities.

The resulting heatmaps in Figure 5 provide a detailed and accessible view of where EV uptake is expected to be most pronounced, supporting clearer interpretation of differences between urban, peri-urban and rural areas. Presenting EV uptake in this way helps ensure DFES forecasts reflect real-world behaviours and local context, supporting informed discussion with Local Authorities and other stakeholders.

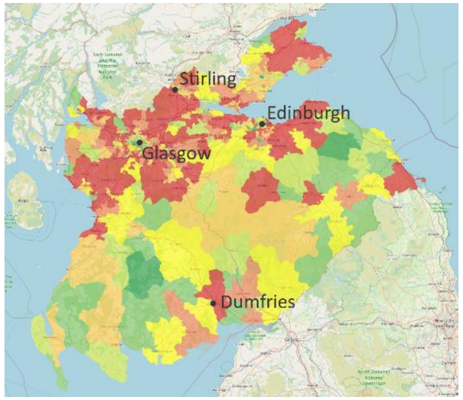
Figure 6 | Residential battery EV uptake numbers by primary substation area *Number of vehicles*

2030 – Counterfactual

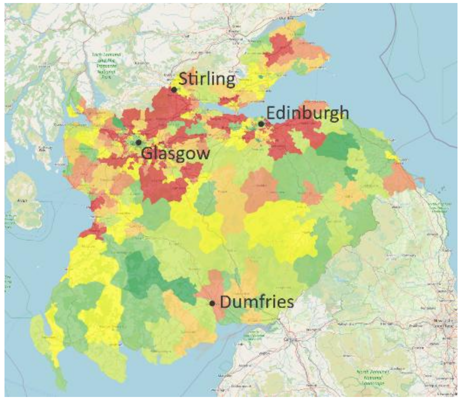
2030– Holistic Transition

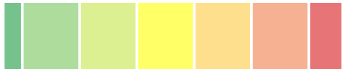


2050 – Counterfactual



2050– Holistic Transition





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7. DFES results - electrification of heat

This section presents DFES results for the electrification of heat, setting out how NESO's tRESP pathways are translated into locally reflective and granularity applied heat pump uptake scenarios across Central and Southern Scotland.

Electrification of heat is a key component of Scotland's Net Zero pathway and represents a significant long-term change in how homes and businesses are heated. While national and regional tRESP pathways define the overall scale of this transition, the deployment of heat pumps is highly dependent on local factors such as housing stock, existing fuel use and delivery approaches, making spatially granular forecasting an essential part of the DFES. The analysis focuses on how uptake varies by Local Authority and housing context, reflecting the strong influence of building characteristics, fuel availability and local heat planning on the pace and pattern of heat electrification.

Forecast uptake of low carbon heating

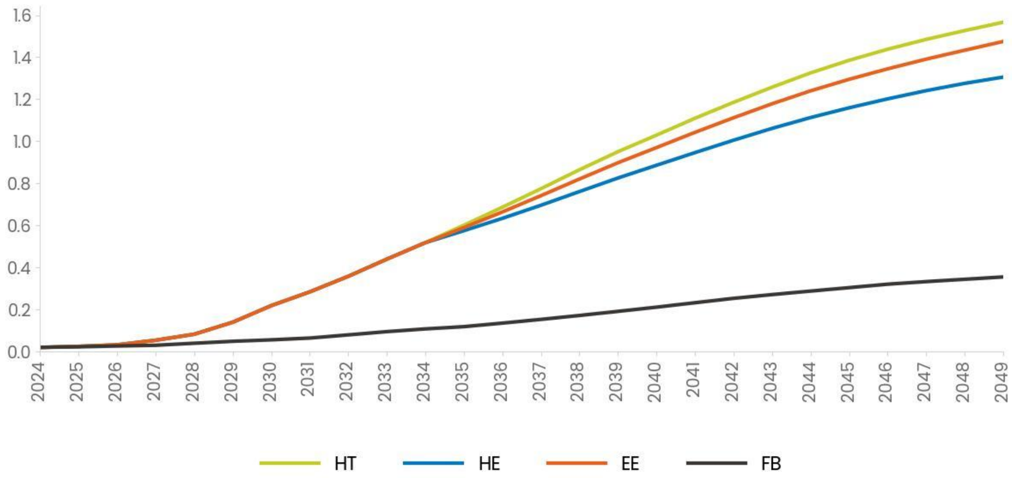
At present, heat pump deployment across the SP Distribution area remains relatively low, with penetration estimated at around 1% of total households within a housing stock of approximately two million properties. This is broadly in line with expectations from the previous DFES cycle. However, uptake is now occurring at a faster pace than in earlier years, particularly within new housing developments. The introduction of the New Build Heat Standard, which will prohibit the installation of polluting heating systems in new buildings, is already driving a shift towards heat pumps across Central and Southern Scotland.

Figure 7 shows the forecast uptake of heat pumps across the SP Distribution area under each DFES scenario. Forecasts have been updated to align with the latest NESO Future Energy Scenarios (FES) and the transitional Regional Energy Strategic Plan (tRESP), incorporating recent policy developments and revised assumptions around the pace of heat decarbonisation.

Compared to previous DFES cycles, the short-term trajectory to 2030 remains broadly similar, with growth initially driven by new-build housing and early adopters. However, updated national policy signals—particularly changes to the timing of restrictions on gas boiler installations—result in a more gradual increase in heat pump uptake through the early 2030s than previously assumed. Despite this adjustment, longer-term deployment levels remain consistent with Net Zero pathways, with acceleration expected as retrofit activity increases and supply chains mature.

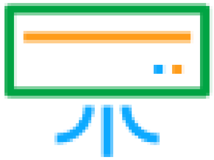
Across the Net-Zero-compliant scenarios, heat pump installation rates rise significantly during the 2030s. In the Electric Engagement scenario, electrification is the primary route to heat decarbonisation, with installation rates exceeding 100,000 heat pumps per year by the mid-2030s, reflecting widespread retrofit alongside continued new-build deployment. The Holistic Transition scenario also shows strong uptake, with a faster move towards non-hybrid heat pumps in the near term, driven by earlier retrofit activity and higher levels of consumer engagement, although total heat pump numbers are moderated in the longer term by the assumed role of alternative heat vectors in some locations.

Figure 7 | heat pump uptake *Number of heat pumps (millions)*



In contrast, the Hydrogen Evolution scenario shows lower heat pump uptake in the early years, as gas heating persists for longer before transitioning to hydrogen-based solutions in the mid-2030s. This pathway includes a higher proportion of hybrid heat pump systems during the transition period. The Falling Behind scenario, which does not meet Net Zero by 2050, assumes substantially lower installation rates throughout the forecast horizon.

By 2030, the proportion of homes with a heat pump could reach around 14% across the SP Distribution area, with significant variation between Local Authorities depending on housing characteristics, fuel type and local policy ambition.

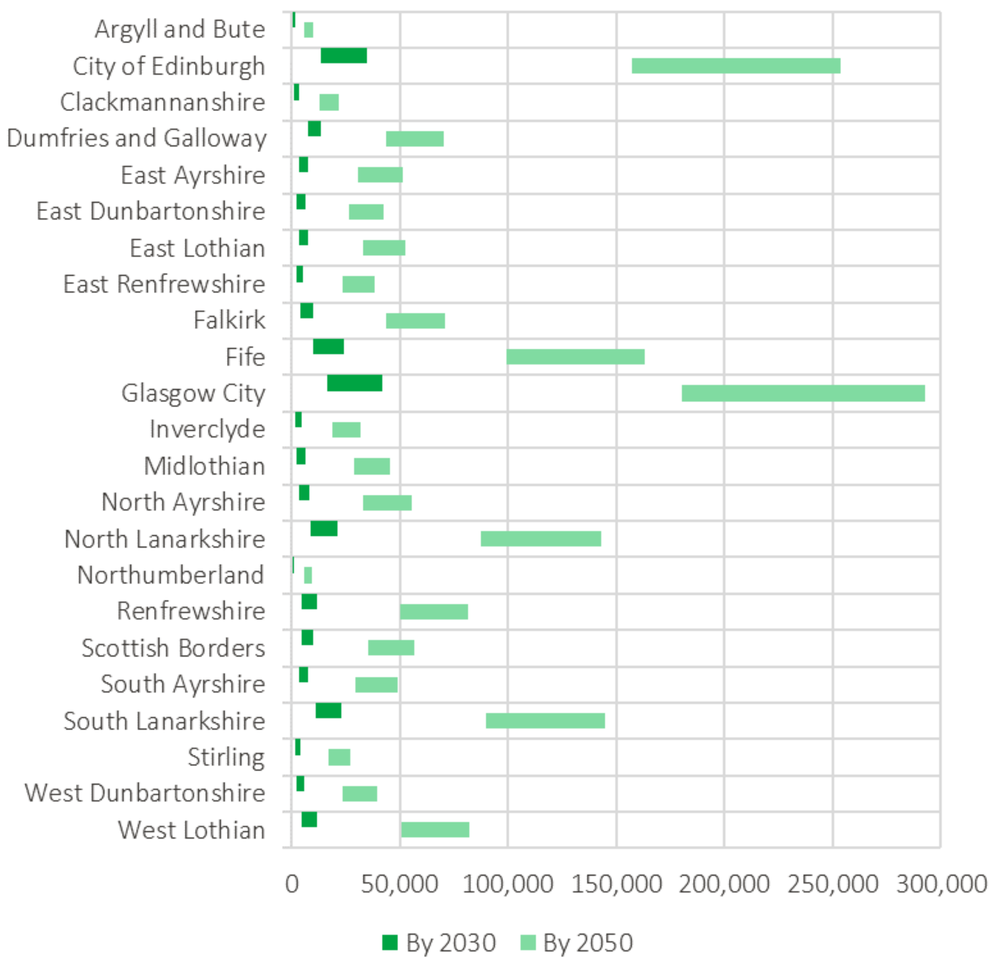


Local Authority level patterns of heat pump uptake

NESO's tRESP provides a strategic view of heat decarbonisation pathways at GSP group level, supporting national and regional coordination. Building on this, the DFES translates these pathways into Local Authority- and primary-level forecasts, enabling a more detailed understanding of how heat electrification is expected to develop within individual communities.

Figures 8 and 9 present forecast heat pump uptake at Local Authority and primary substation level.

Figure 8 | Range of heat pump uptake by Local Authority *Number of heat pumps*



This level of detail reflects the fact that decisions on heat decarbonisation are increasingly shaped locally, through housing policy, fuel-poverty considerations and Local Heat and Energy Efficiency Strategies (LHEES). Presenting results at this spatial resolution allows locally driven factors to be more accurately reflected in the forecasts and illustrates how national heat decarbonisation pathways translate into different outcomes across communities with varying housing stock, fuel types and delivery approaches.

The results show that while more densely populated Local Authorities naturally see higher absolute numbers of heat pumps, uptake density is often higher in rural and semi-rural areas, particularly where properties are off the gas grid. Local Authorities such as Dumfries and Galloway and the Scottish Borders are forecast to see a relatively high proportion of properties adopting heat pumps, reflecting both the suitability of heat pumps for these housing types and the more limited applicability of heat networks in dispersed communities.

In contrast, urban Local Authorities typically show larger absolute volumes of heat pump installations, driven by population size and new-build development, but with greater variation in uptake density due to a more diverse housing stock and wider mix of heat decarbonisation options. Differences in building age, tenure and retrofit suitability all influence how adoption progresses across these areas.

Local Authority-level summaries provide additional context on how forecast heat pump uptake aligns with LHEES, housing characteristics and local decarbonisation priorities. This ensures DFES outputs continue to support local understanding how heat electrification is likely to evolve across granular geographies.

Understanding spatial clustering of heat pump uptake

Heat pump adoption does not occur uniformly across regions or communities. While scenario-level forecasts describe overall trajectories, understanding how uptake clusters spatially provides important insight into how heat electrification is likely to develop in practice across Central and Southern Scotland.

Clustering arises where groups of properties with similar characteristics—such as building type, tenure or fuel source—transition to heat pumps over similar timeframes. This can result in areas of concentrated uptake within particular areas or settlements, alongside others where adoption progresses more gradually, even within the same Local Authority.

DFES outputs reflect these patterns through spatially disaggregated modelling informed by housing stock characteristics and local context. The resulting heatmaps illustrate where heat pump uptake is expected to be most pronounced, supporting interpretation of differences between urban, peri-urban and rural areas and reinforcing the importance of place-based analysis when considering heat electrification.

Presenting heat pump uptake in this way ensures DFES forecasts reflect real-world behaviours and the diversity of local circumstances across the region, providing a transparent and credible evidence base for understanding how the electrification of heat is likely to evolve over time.

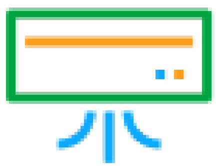
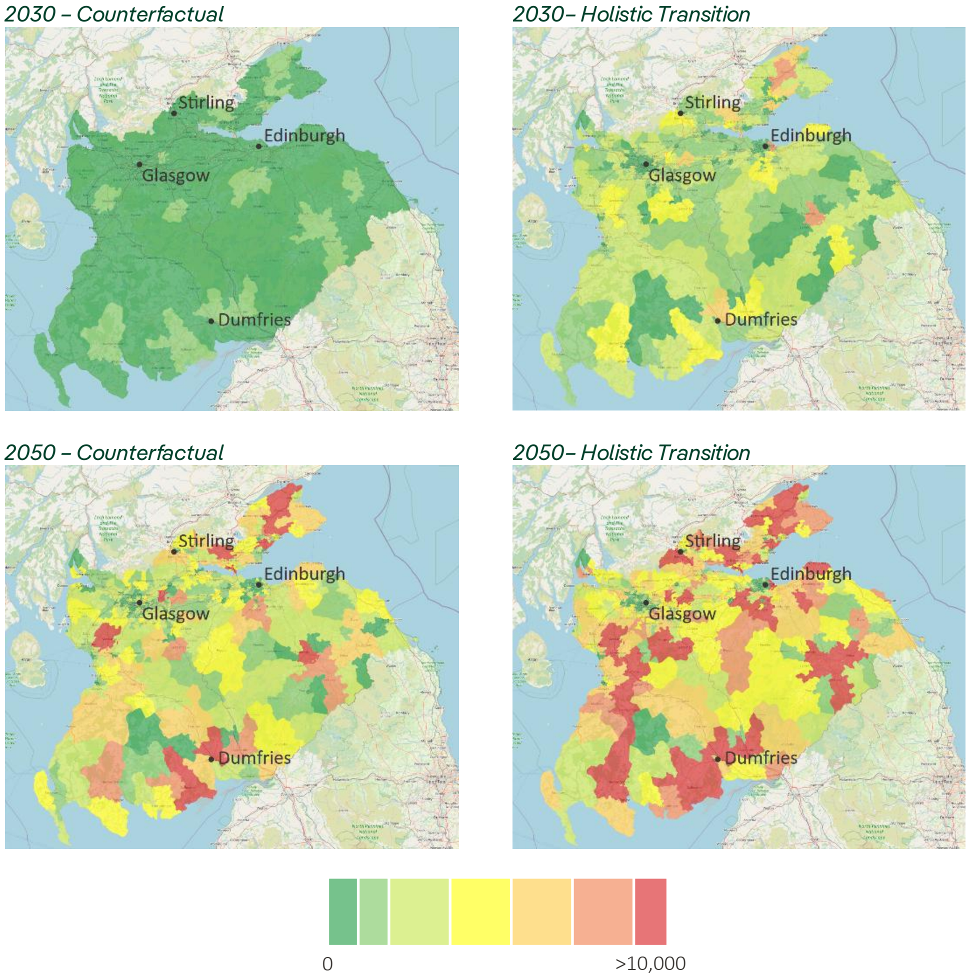


Figure 9 | Heat pump numbers by primary substation area *Number of heat pumps*



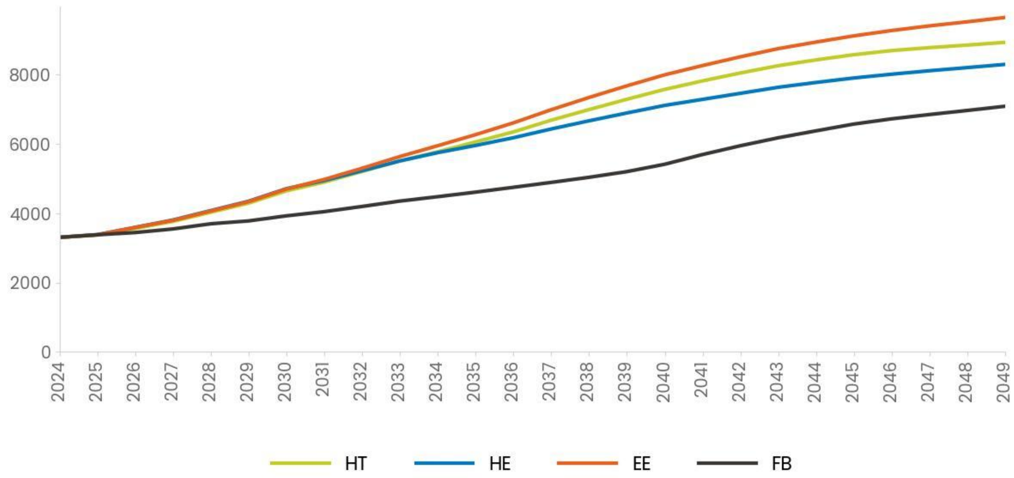
8. DFES results – impact on network demand

Building on the electrification of transport and heat described in Sections 6 and 7, this section sets out how electricity demand evolves at times of system peak. Peak demand is a key metric for understanding future system requirements, reflecting the combined impact of low-carbon technology uptake and changes in underlying electricity consumption across domestic and industrial and commercial customers.

In this DFES, results are presented primarily in terms of **peak electricity demand (MW)**, as this provides a clear and consistent way of illustrating how changes in customer behaviour and technology uptake manifest at times of highest system use. Peak demand impacts from low-carbon technologies are calculated using **NESO's Consistent Planning Assumptions (CPAs)**, which define standardised demand profiles for technologies such as **battery electric vehicles (BEVs)** and low-carbon heating, including assumptions on usage patterns and embedded flexibility. By adopting the CPA framework, **DFES results are directly aligned with tRESP pathways** and provide a consistent, whole-system representation of how electrification influences demand at peak.

Electricity demand at peak reflects both new sources of demand from low-carbon technologies and structural changes in underlying demand. Underlying demand includes domestic and industrial and commercial electricity use, influenced by a combination of energy efficiency improvements, housing growth, and the electrification of industrial and commercial processes. The results presented in this section therefore reflect the interaction between these drivers, rather than any single source of demand growth in isolation.

Figure 10 | Electricity peak demand *Peak demand (MW)*



Peak demand outlook

Figure 10 shows the forecast evolution of total peak electricity demand (MW) across the SP Distribution area under each DFES scenario. Peak demand is calculated as the sum of GSP maximum half-hourly demands, representing the 'true' demand placed on the system by customers. This includes electricity supplied from the transmission network as well as demand met by embedded generation connected directly to the distribution network.

The figure shows that peak demand increases across all scenarios over the long term, with the timing and scale of growth varying by pathway. Net-Zero-compliant scenarios exhibit stronger growth through the 2030s and 2040s, reflecting higher uptake of BEVs and low-carbon heating, while the Falling Behind scenario shows slower growth consistent with lower levels of electrification.

When comparing against our previous forecasts, observed peak demand remains within the previously forecasted range. The updated DFES shows a tightening, particularly to 2035 driven by the single LCT tRESP pathways until 2035. This change reflects updated assumptions on the contribution of energy efficiency at peak times and the revised treatment of low-carbon heating technologies, including the electrical impact of hybrid systems, aligned with NESO's FES and tRESP assumptions. By 2050, forecast peak demand growth remains broadly aligned with previous long-term expectations. While the near-term profile has evolved, the overall scale of peak demand remains within the planning envelope previously identified.

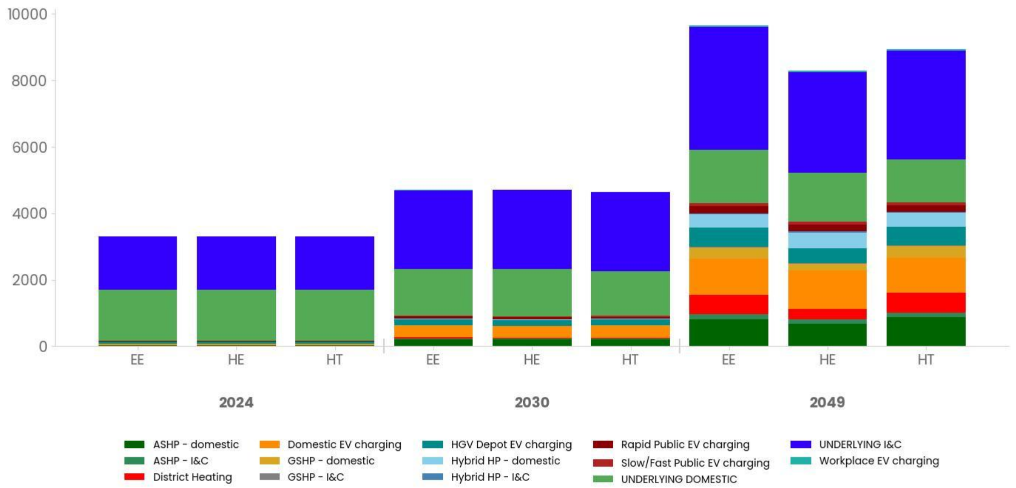
Drivers of peak demand

Figure 11 decomposes total peak electricity demand into its principal components, showing the relative contribution from:

- **Underlying electricity demand** (domestic and industrial & commercial combined)
- **Electric vehicle demand**
- **Low-carbon heating demand**

The results show that future growth in peak demand is increasingly driven by low-carbon technologies, particularly battery electric vehicles (BEVs) and low-carbon heating, which become the dominant contributors to incremental peak demand beyond 2030. This reflects the accelerating electrification of transport and heat described in Sections 6 and 7, with the relative contribution of each technology varying by scenario depending on the assumed pace and scale of uptake.

Figure 11 | Demand breakdown *Peak demand (MW)*



Electric vehicle demand contributes to peak growth primarily through the increasing number of BEVs connected to the system. As uptake accelerates through the 2030s, EV demand forms a growing share of peak electricity demand across all Net-Zero-compliant scenarios. While individual charging behaviours vary between customers and locations, the application of NESO's tRESP CPAs ensures that peak impacts are assessed consistently, capturing typical usage patterns and the embedded flexibility expected within the future system.

Low-carbon heating demand also becomes an increasingly significant driver of peak demand as electrification of heat expands across the region. This contribution reflects electrically driven heating in both new-build properties and the retrofit of existing buildings, including the impact of hybrid systems where electricity contributes at times of peak demand. Differences between scenarios are influenced by assumptions around the balance between electrification and alternative heat vectors, as well as the timing and scale of retrofit activity.

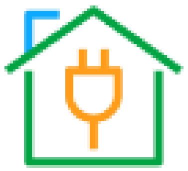
Underlying electricity demand follows a more complex trajectory and plays a different role over time. **Reductions in underlying domestic demand from energy efficiency are driven directly by tRESP CPAs**, which include assumptions on improvements in building fabric, appliance efficiency and changes in consumption patterns. These CPA-defined efficiency improvements moderate underlying demand at peak in the near term and are applied consistently across all scenarios.

Over time, this **efficiency-driven reduction is offset by growth associated with new housing development and the electrification of industrial and commercial processes**. New homes add to baseline demand, while businesses and industry increasingly switch from fossil fuels to electricity as part of wider decarbonisation strategies. Electricity demand associated with electrolysers, hydrogen production and data centres is included within this underlying industrial and commercial demand and therefore contributes implicitly to peak demand growth, rather than being shown as a separate component.

Taken together, the decomposition highlights that peak demand growth is shaped by the interaction between CPA-defined efficiency improvements, electrification of transport and heat, and structural growth in underlying demand, rather than by any single driver acting in isolation. This integrated view provides a clear link between the technology uptake trajectories set out earlier in the DFES and the resulting peak demand outcomes observed across the scenarios.

These DFES peak demand results provide the demand-led input to subsequent network constraint analysis undertaken through the Network Development Plan (NDP). By translating tRESP pathways into spatially granular, CPA-aligned peak demand forecasts, DFES establishes a consistent evidence base for assessing future network utilisation and identifying where constraints may emerge. This ensures that longer-term network planning and investment decisions are grounded in a transparent, whole-system view of future electricity demand.

> With the impact from LCTs such as battery electric vehicles and low carbon heating, and the impact from industrial decarbonisation, peak demand is likely to double by 2050.



9. DFES results - growth of generation and storage

This section sets out how distributed electricity generation and storage connected to the SP Distribution network are expected to grow over the long term. Forecasts are taken directly from NESO's tRESP pathways, which already incorporate the outcomes of Clean Power 2030 and Gate 2 connections reform. By applying these pathways consistently within DFES with national policy and whole-system planning.

Building on the growth of electricity demand described in Section 8, distributed generation and storage represent the generation-side component of the future electricity system. Understanding the scale and spatial distribution of this growth is essential for interpreting how local energy systems may evolve across Central and Southern Scotland and how generation and demand interact over time.

Overall growth of distributed generation and storage

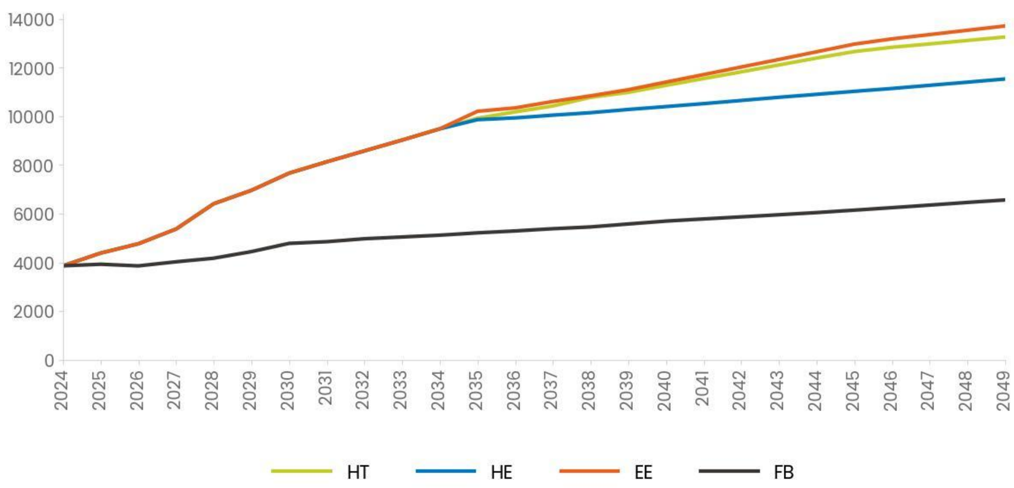
Figure 12 shows the forecast growth of total distributed generation and storage capacity (MW) connected to the SP Distribution network under each DFES scenario. This figure represents the aggregate envelope of generation and storage growth derived directly from tRESP pathways and applied consistently across all scenarios.

Across all pathways, distributed generation and storage capacity increases significantly over the forecast horizon. **By 2030, total connected capacity is forecast to be approximately double current levels**, reflecting the delivery of near-term renewable and storage deployment assumed within tRESP. Growth continues beyond 2030, with more ambitious Net-Zero-compliant scenarios indicating that **total distributed generation and storage capacity could reach around four times today's level by 2050**.

Differences between scenarios are primarily driven by variation in the timing and pace of deployment rather than by fundamentally different roles for distributed generation and storage. In all cases, the direction of travel is consistent, reflecting the strategic signals embedded within tRESP rather than any locally derived adjustments within DFES.

This licence-level view provides the context for understanding how distributed generation and storage contribute to the overall electricity system before considering the technologies involved and where this growth is expected to occur.

Figure 12 | Total distributed generation and storage *Installed capacity (MW)*



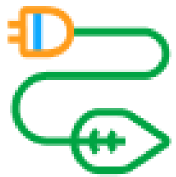
Technology breakdown of distributed generation and storage

Figure 13 shows the breakdown of total distributed generation and storage capacity by technology, for key milestone years such as 2030 and 2050. This figure explains how the aggregate growth shown in Figure 19 is composed across different technologies.

The breakdown demonstrates that onshore wind remains the largest contributor to distributed generation capacity across all scenarios. Wind continues to underpin the distributed renewable generation mix, reflecting Scotland's strong wind resource and the established role of onshore wind within the electricity system.

Solar PV and electricity storage show the strongest relative growth from a smaller initial base. Solar PV expands rapidly across both rooftop and ground-mounted installations, while storage becomes an increasingly material component of total distributed capacity by 2030. Other distributed generation technologies contribute a comparatively smaller share of total capacity across all scenarios.

Together, Figures 13 and 14 provide a clear picture of both the scale of distributed generation and storage growth and the technologies that underpin it, before considering the geographic distribution of this growth.



Spatial distribution of distributed generation and storage

Figure 14 presents a heatmap of total distributed generation and storage capacity growth across the SP Distribution licence area. This spatial view shows how the licence-level growth described in Figures 13 and 14 is expected to be distributed geographically, translating overall capacity growth into locally differentiated outcomes.

The heatmap highlights that growth in distributed generation and storage is not uniform across Central and Southern Scotland. Spatial variation reflects a combination of renewable resource availability, land use, planning context and existing infrastructure. Rural and semi-rural areas tend to see higher concentrations of wind and ground-mounted solar PV, while urban and peri-urban areas show greater levels of rooftop solar PV and smaller-scale storage deployment.

In addition to highlighting broad regional patterns, the spatial distribution provides insight into how different technologies contribute to growth in different locations. Areas with strong wind resources typically dominate total capacity growth, while solar PV and storage contribute more incrementally across a wider range of locations. This helps illustrate how licence-level growth translates into locally distinct generation and storage profiles.

This spatial perspective complements the demand patterns set out in Sections 6–8 and provides important regional context for understanding how distributed generation and storage growth may shape local energy systems over time.

Figure 13 | Distributed generation and storage breakdown *Installed capacity (MW)*

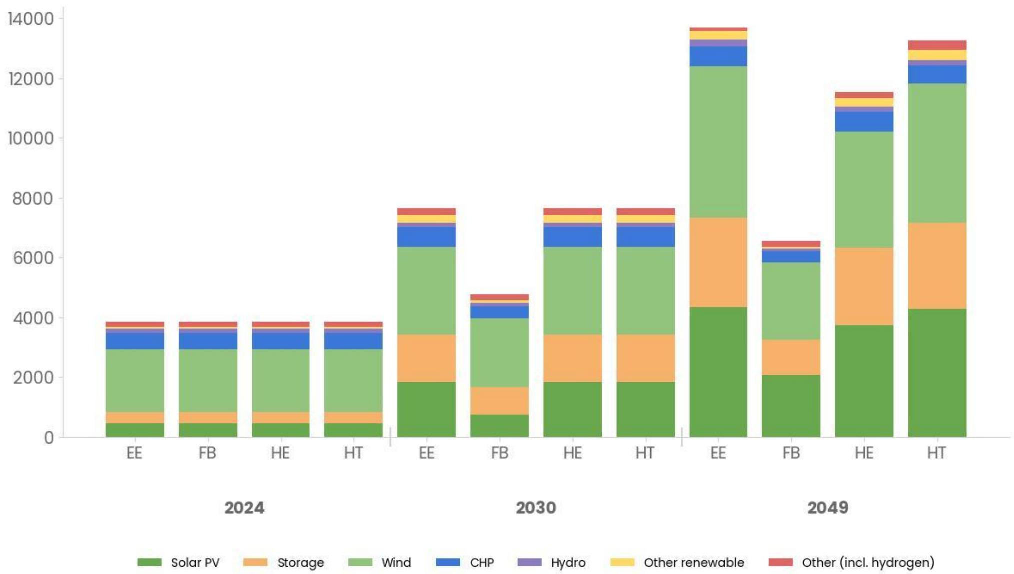
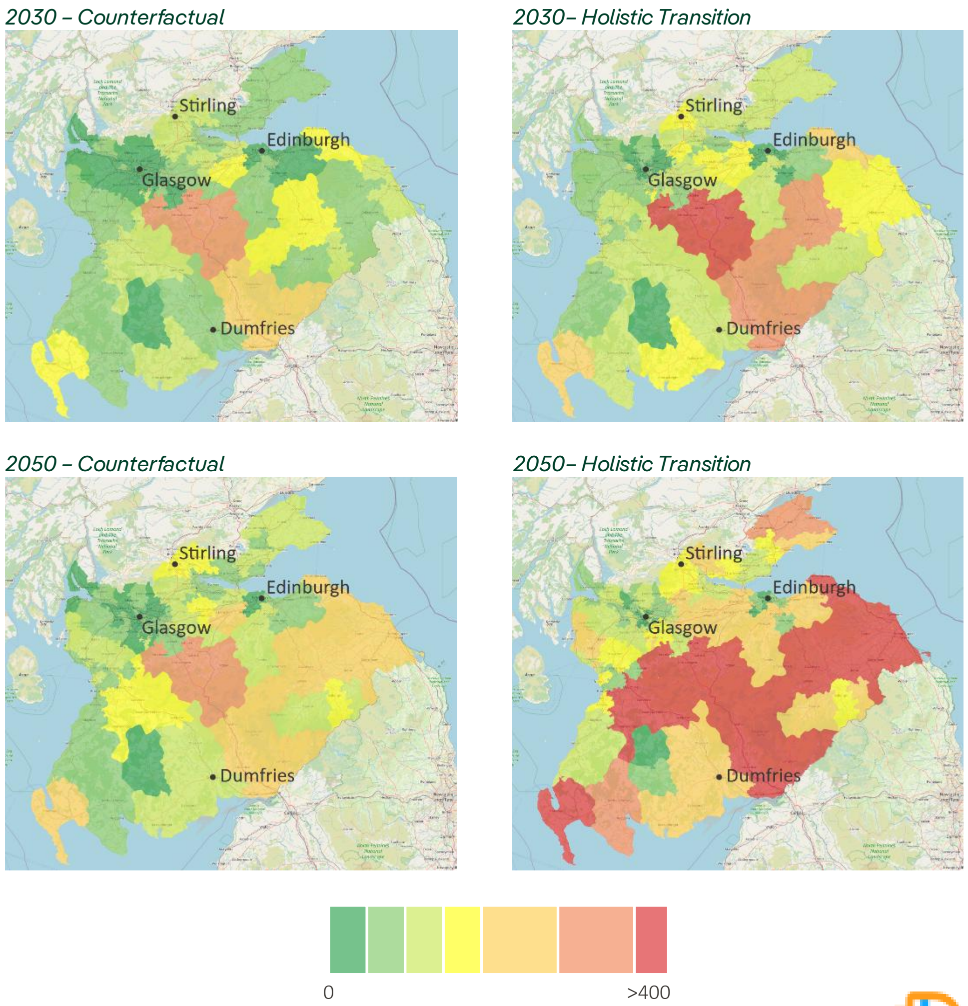


Figure 14 | Installed generation and storage capacity by GSP area *Installed capacity (MW)*



Wind generation

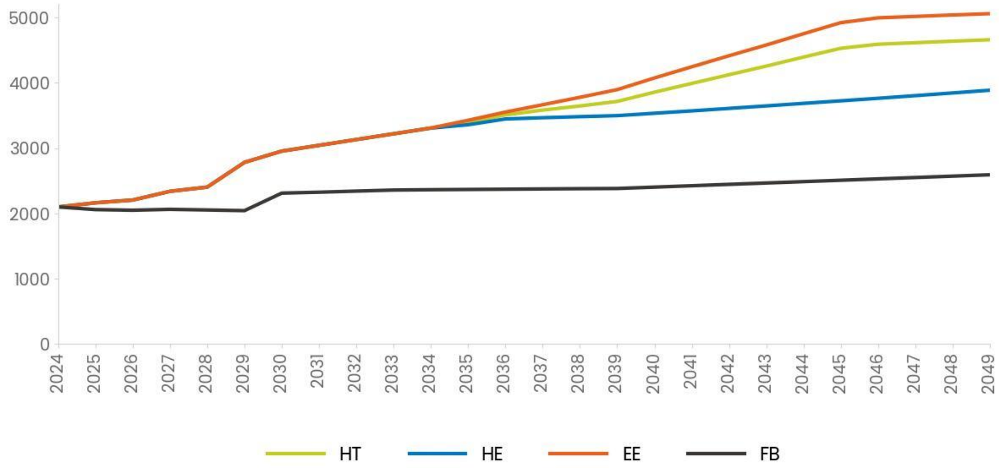
Figure 15 shows the forecast growth of distribution-connected onshore wind capacity (MW) across the SP Distribution network under each DFES scenario. **Onshore wind remains the largest contributor to distributed generation capacity in all futures considered**, reflecting both Scotland's strong wind resource and the established role of onshore wind within the electricity system.

Forecasts for onshore wind are taken directly from NESO's tRESP pathways. These pathways already reflect the outcomes of Clean Power 2030, including assumptions on the scale of renewable generation required to meet Net Zero targets and the balance between transmission- and distribution-connected assets. As a result, the DFES does not independently derive or uplift wind capacity trajectories, but applies NESO's nationally consistent assumptions at distribution-network scale, ensuring alignment between whole-system planning and regional forecasting.

Across all scenarios, onshore wind capacity continues to grow through the 2030s. In the more ambitious Net-Zero-compliant pathways, growth extends into the 2040s, maintaining alignment with Scotland's 2045 Net Zero target. Differences between scenarios are primarily driven by variation in the pace and duration of deployment, rather than by a change in the long-term role of wind, which remains central in all pathways. Even in less ambitious scenarios, wind retains the largest share of distributed generation capacity.

The timing of wind deployment reflects both near-term delivery of schemes assumed within tRESP and longer-term assumptions on planning consent rates, repowering of existing sites and continued policy support. In later years, growth moderates as suitable sites become scarcer and deployment increasingly depends on repowering and incremental capacity additions rather than entirely new developments.

Figure 15 | Total wind generation on distribution network *Installed capacity (MW)*



The spatial pattern of wind generation is predominantly rural, driven by wind resource availability, land use and planning considerations. While this section focuses on capacity growth rather than site-specific outcomes, the resulting distribution of wind generation aligns closely with the spatial patterns illustrated in the total distributed generation heatmap earlier in this section. Areas with strong wind resources account for a significant proportion of overall capacity growth, contributing disproportionately to the licence-level totals shown in Figure 15.

Wind generation is forecast to be the most prevalent renewable technology in Central and Southern Scotland with installed capacity potentially reaching over 5GW

From a DFES perspective, onshore wind provides a stable and predictable backbone to distributed renewable generation across Central and Southern Scotland. While other technologies such as solar PV and storage grow more rapidly in relative terms, wind continues to underpin the distributed generation mix in all tRESP-aligned futures. Its sustained presence across scenarios reinforces the importance of wind generation as a foundational element of the future electricity supply, shaping both the scale and geographic distribution of distributed generation connected to the SP Distribution network.

Solar PV generation

Figure 16 shows the forecast growth of solar PV capacity (MW) connected to the SP Distribution network, with results explicitly split between:

- **Behind-the-meter (G98) solar PV,** and
- **Larger-scale distribution-connected solar PV**.

This distinction is intentionally maintained within DFES, as these two categories are driven by different deployment dynamics and are used by stakeholders for different planning and engagement purposes.

Solar PV shows strong growth across all scenarios, reflecting its declining costs, modular deployment and broad applicability across domestic, commercial and utility-scale settings. Forecasts are taken directly from NESO's tRESP pathways, which already incorporate the outcomes of Clean Power 2030 for the SP Distribution licence area. DFES therefore applies these assumptions consistently, without additional local uplift or reinterpretation.

Behind-the-meter solar PV growth is driven primarily by domestic and commercial rooftop installations, particularly in urban and peri-urban areas. This growth includes assumptions around technology improvements, such as the advancements in plug-in solar panels.

Uptake reflects customer-led investment decisions, supported by improving economics, greater familiarity with the technology and increasing alignment with wider electrification trends. Behind-the-meter solar PV is also closely associated with the uptake of complementary technologies, most notably battery storage, as customers seek to maximise on-site consumption of generated electricity.

Figure 16 | Total solar generation on distribution network *Installed capacity (MW)*

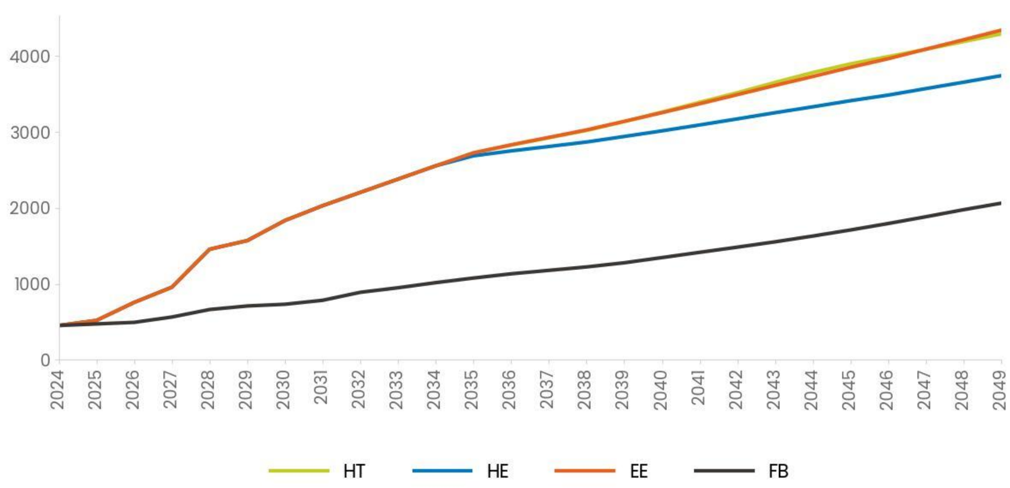
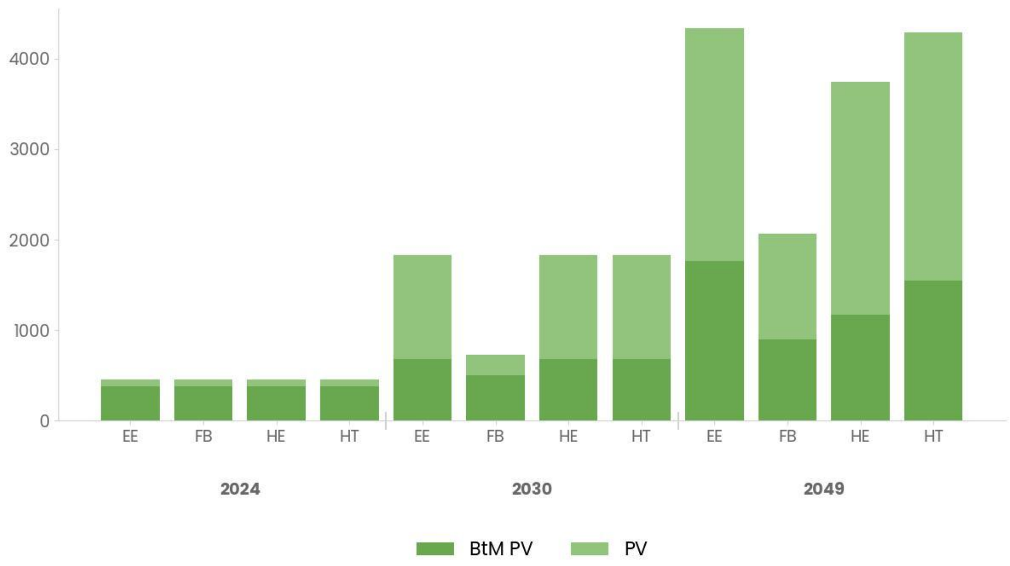


Figure 17 | Solar generation breakdown *Installed capacity (MW)*

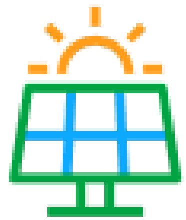


Larger-scale solar PV accounts for the majority of new capacity growth shown in Figure 17. These schemes are typically ground-mounted and located in more rural areas where land availability, grid proximity and economics are most favourable. As illustrated by the forecast trajectories, larger-scale installations dominate total solar PV capacity across all scenarios by 2030 and continue to grow through to 2050 in the more ambitious Net-Zero-compliant pathways.

Installed capacity Solar PV generation could reach over 4GW by 2050, this is greater than 10x the currently installed levels within our SP Distribution network area.

Over time, the balance between behind-the-meter and larger-scale solar PV evolves. While behind-the-meter installations grow steadily and contribute increasingly to overall capacity, larger-scale schemes remain the primary driver of MW growth. This reflects the differing roles solar PV plays at household, commercial and system scale within tRESP-aligned futures.

By 2050, solar PV capacity is forecast to be several times higher than today across all Net-Zero-compliant scenarios. Solar PV therefore plays an increasingly important role in shaping the distributed generation mix connected to the SP Distribution network.



Storage

Figure 18 shows the forecast growth of electricity storage capacity (MW) connected to the SP Distribution network, with results split between:

- **Behind-the-meter storage**, typically co-located with rooftop solar PV, and
- **Network-connected storage**, including larger standalone battery installations.

Electricity storage is treated as a first-class component of the distributed energy system within DFES, alongside wind and solar PV. Storage capacity trajectories are taken directly from NESO's tRESP pathways, which already incorporate the outcomes of Clean Power 2030 and Gate 2 connections reform. As with other technologies, DFES applies these assumptions consistently without local adjustment, ensuring alignment with whole-system planning.

Across all Net-Zero-compliant scenarios, storage growth is front-loaded to 2030, reflecting the rapid increase in renewable generation and the corresponding need for balancing capability within the future electricity system. Network-connected storage accounts for the majority of installed capacity, driven by larger-scale projects that contribute significantly to overall MW totals. These installations dominate capacity growth in the near term and underpin the sharp increase observed in the forecasts to 2030.

Behind-the-meter storage grows steadily over time and is closely linked to the uptake of rooftop solar PV across domestic and commercial premises. While individual installations are relatively small, their cumulative contribution increases as customer adoption of co-located solar and storage systems becomes more widespread. This trend is evident across all scenarios, although total installed capacity remains significantly lower than network-connected storage.

Figure 18 | Total storage on distribution network *Installed capacity (MW)*

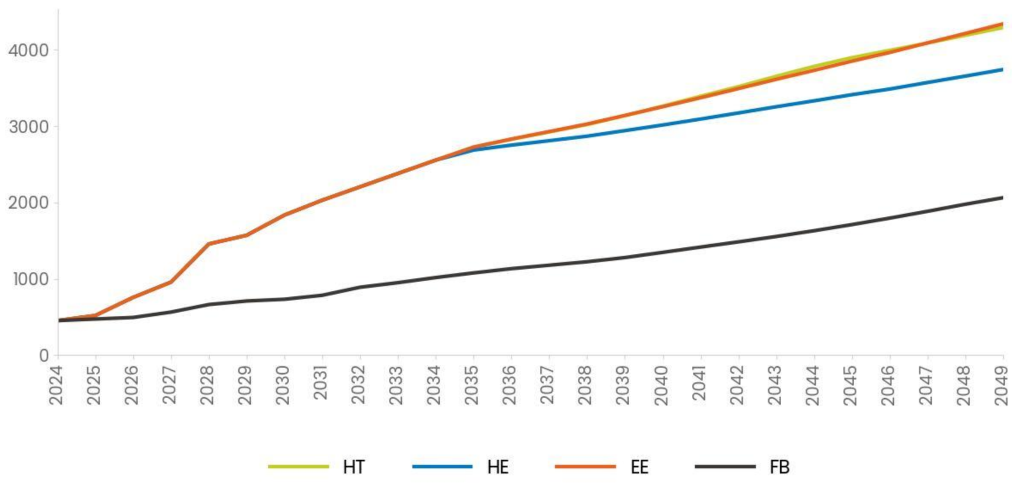
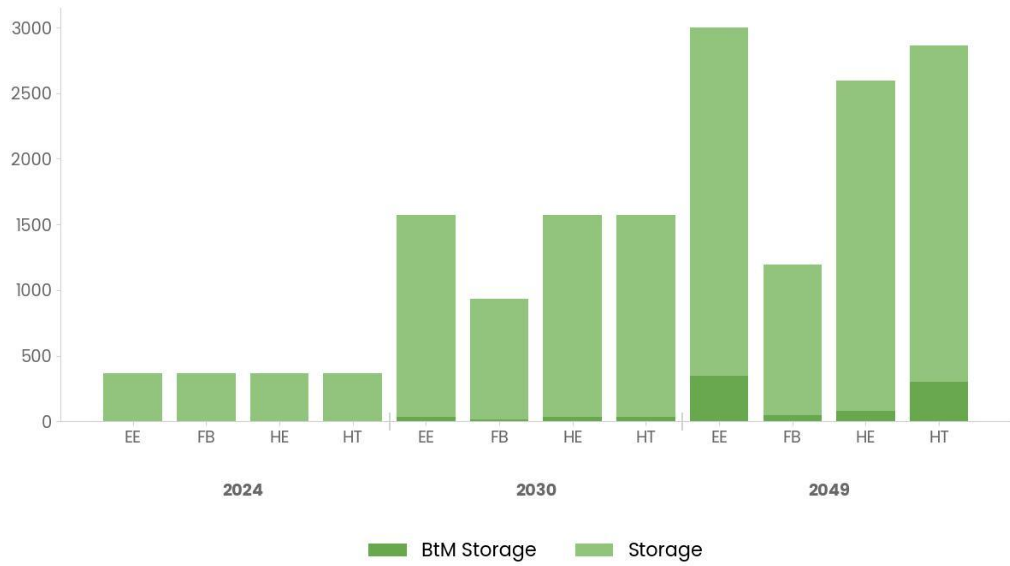


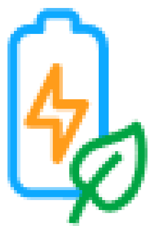
Figure 19 | Storage breakdown *Installed capacity (MW)*



Beyond 2030, storage growth moderates across most scenarios. This reflects the balance of system needs, technology costs and policy assumptions embedded within tRESP pathways, rather than a reduced role for storage within the energy system.

Storage export and import will be an important factor in balancing the future network, installed capacity could reach as great as 4GW by 2050.

Even with this moderation, storage remains a significant and enduring feature of the distributed energy landscape through to 2050, shaping the overall capacity mix connected to the SP Distribution network and supporting the integration of high levels of distributed renewable generation.



10. Alignment with NESO's tRESP

This section demonstrates how the DFES aligns with NESO's tRESP. DFES applies tRESP pathways directly and consistently, using NESO's CPAs to translate technology uptake into network-relevant impacts, while adding the spatial resolution required for distribution-level planning. The purpose of this section is to confirm consistency, rather than to compare or justify alternative futures.

NESO's tRESP defines the strategic, whole-system pathways for future electricity demand, generation and storage at Grid Supply Point (GSP) group level, incorporating national and devolved government policy, including the outcomes of Clean Power 2030.

DFES adopts these pathways as its starting point and applies them at greater spatial granularity across Central and Southern Scotland.

Electrification of transport – DFES and tRESP pathways

Figure 20 compares battery electric vehicle (BEV) uptake under the Holistic Transition pathway in DFES and tRESP. The trajectories align closely over time, reflecting the fact that DFES uses tRESP assumptions for EV uptake and applies CPAs to convert these into network-relevant demand profiles.

Any minor differences between the curves reflect the additional spatial resolution applied within DFES, rather than differences in underlying ambition or policy interpretation. This confirms that DFES faithfully represents tRESP expectations for transport electrification while enabling Local Authority- and primary-level analysis.

Electrification of heat – DFES and tRESP pathways

Figure 21 shows the comparison between DFES and tRESP outcomes for low-carbon heating under the Holistic Transition pathway. DFES adopts tRESP assumptions for heat pump and hybrid heating uptake, alongside CPA-defined assumptions for energy efficiency and heating behaviour.

The close alignment between DFES and tRESP trajectories demonstrates that DFES does not reinterpret heat decarbonisation pathways. Instead, it applies tRESP assumptions consistently and adds spatial detail to reflect housing stock characteristics, Local Heat and Energy Efficiency Strategies (LHEES), and regional context across Central and Southern Scotland.

Figure 20 | EV uptake comparison to tRESP *Number of vehicles*

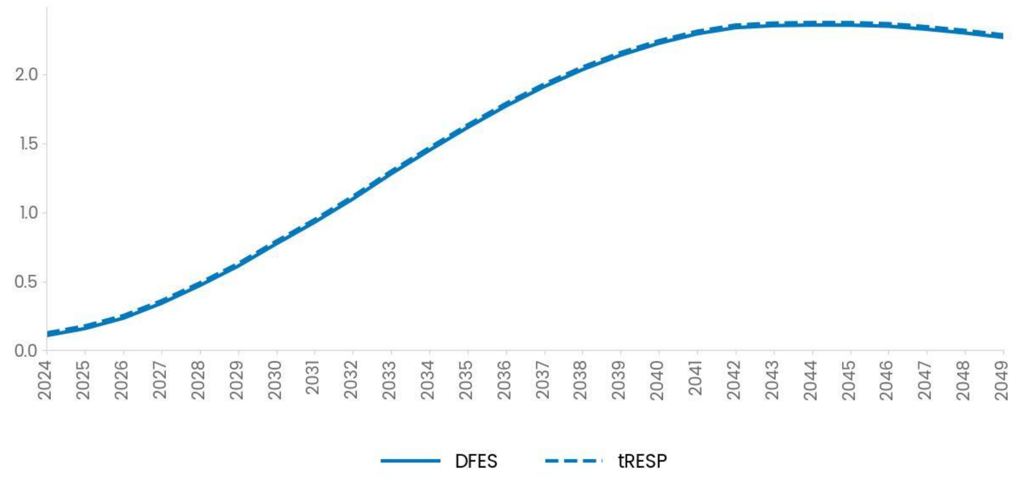
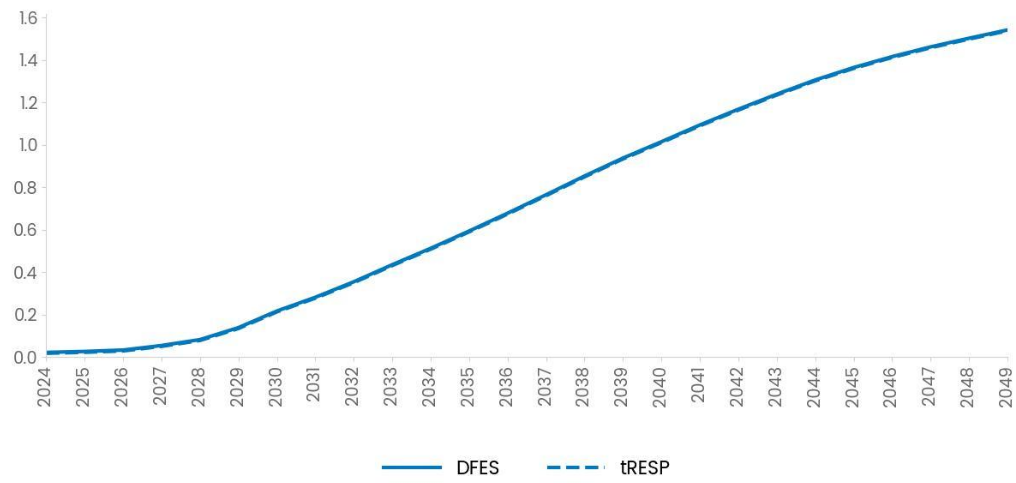


Figure 21 | HP uptake comparison to tRESP *Number of heat pumps*



Electrification of transport – DFES and tRESP pathways

Figure 22 compares total distributed generation and storage capacity under the Holistic Transition pathway in DFES and tRESP. DFES applies tRESP assumptions directly, including the embedded outcomes of Clean Power 2030 and Gate 2, to determine capacity growth for wind, solar PV and electricity storage.

The alignment of DFES and tRESP trajectories confirms that distributed generation and storage forecasts are consistent with NESO's whole-system planning view. DFES extends these forecasts spatially, enabling analysis at Local Authority, GSP and primary substation level, but does not alter the scale or direction of growth defined within tRESP.

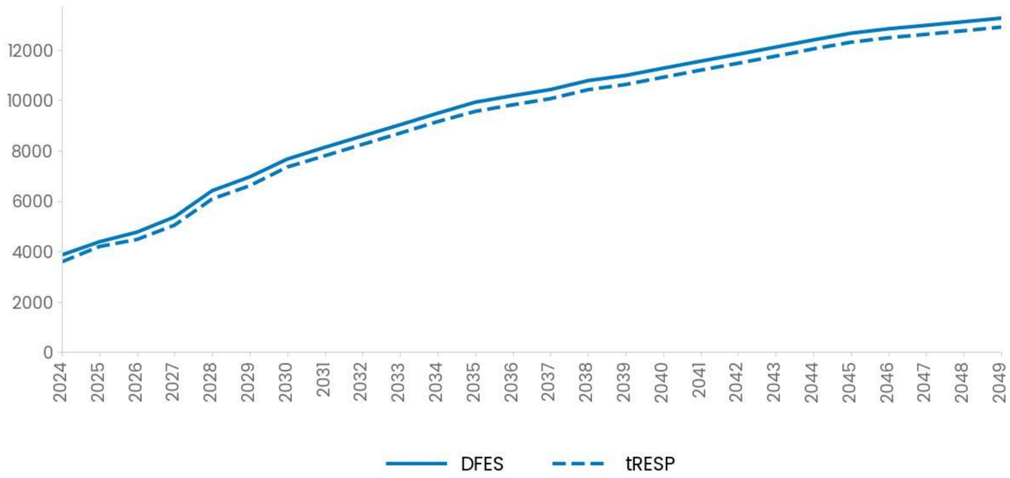
Role of DFES within the planning framework

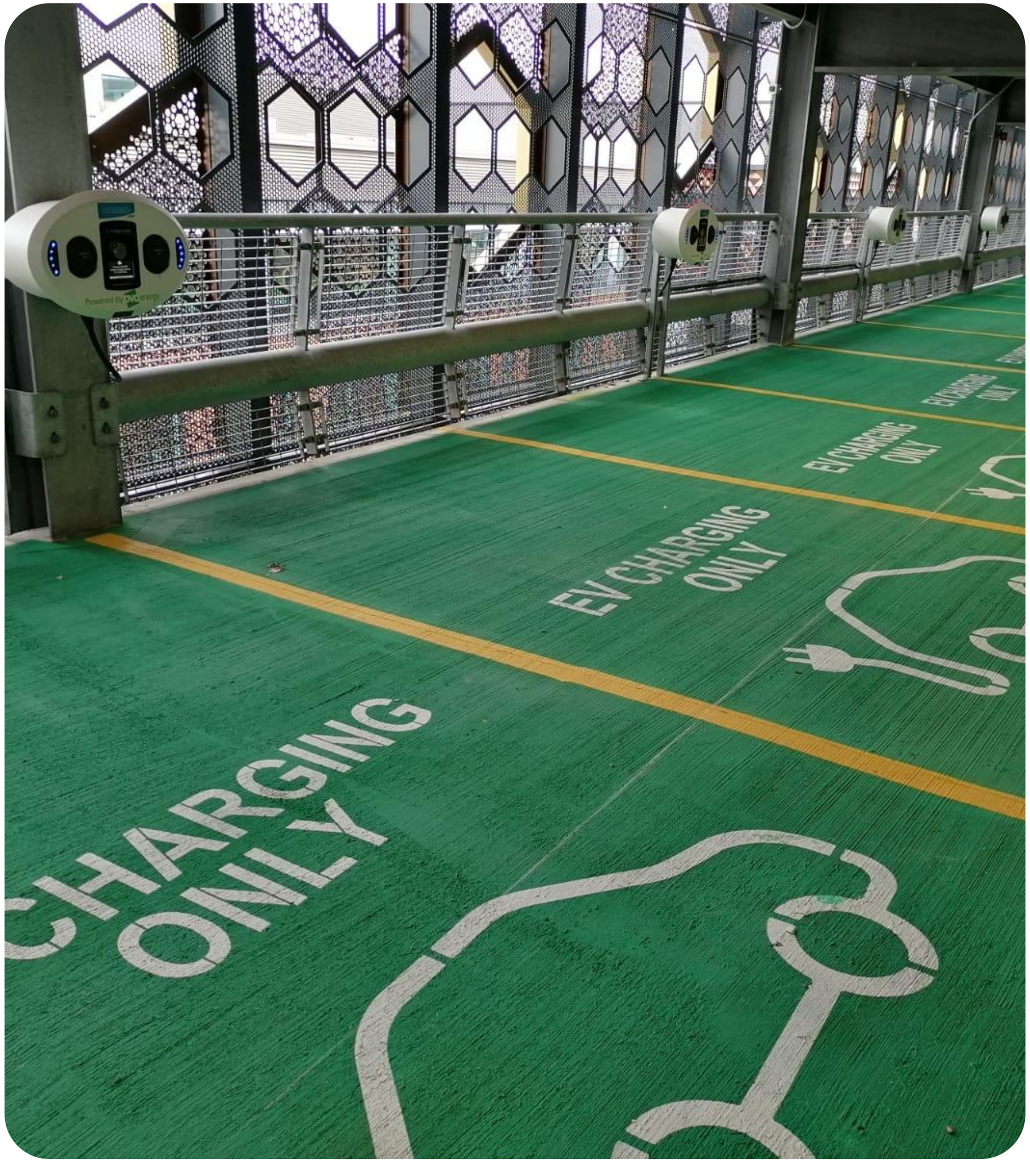
Together, these comparisons show that DFES is aligned with tRESP by construction. NESO sets the strategic pathways and common assumptions through tRESP and CPAs, while DFES translates these pathways into a distribution-level evidence base.

The additional spatial resolution provided by DFES supports:

- Local Authority engagement and granular planning.
- Distribution-level constraint assessment within the Network Development Plan.
- Justification of investment proposals within RIIO-ED3.

Figure 22 | Generation uptake comparison to tRESP *Installed capacity (MW)*





We intend to publish a separate tRESP consistency report later this year which will provide detailed mapping and formal assurance of alignment between DFES and tRESP across key technologies.

11. Working with our Stakeholders

This section describes how SP Distribution works with stakeholders across the energy system planning process and how stakeholder input has directly shaped this DFES. DFES is developed as a collaborative planning tool, informed by local insight and used to support coordinated decision-making across national, regional and local levels.

Since the publication of our first DFES in 2020, SP Distribution has engaged with a wide range of stakeholders, including Local Authorities, developers, community energy groups, consumer bodies, system planners and other interested parties. Engagement takes place through ongoing bilateral discussions, workshops, consultations and structured data sharing. Stakeholder involvement is embedded throughout the DFES cycle, ensuring forecasts remain relevant, trusted and informed by local context and delivery considerations.

Supporting stakeholders across the planning process

DFES provides a shared planning framework that supports engagement between stakeholders operating at different stages of the energy system transition. NESO's tRESP establishes the strategic regional direction for future electricity demand, generation and storage, while DFES provides the distribution-level context that allows stakeholders to understand how those pathways may play out locally. By presenting a consistent view of future demand and generation aligned with tRESP, DFES enables Local Authorities, developers and regional partners to engage with SP Distribution using a common evidence base.

This supports more effective early-stage conversations, reduces uncertainty around future network requirements, and helps ensure that local ambition is considered within the wider context of regional and national system planning.

For Local Authorities, DFES supports the development of LHEES, EV charging strategies, climate action plans and wider spatial planning

by providing transparent, accessible forecasts aligned with national direction. For developers and commercial stakeholders, DFES improves clarity on the scale, timing and location of anticipated growth, supporting earlier engagement and more informed decision-making.

DFES also provides a key interface between stakeholder engagement and SP Distribution's own planning activities. It forms an important bridge between national strategy, stakeholder-led regional ambition and the longer-term planning processes that support network development and investment.

Supporting local needs

Through engagement since the first DFES publication in 2020, stakeholders have consistently emphasised the importance of forecasts reflecting local ambition and strategic projects, particularly where these act as catalysts for decarbonisation and economic growth. In response, SP Distribution has developed targeted approaches to ensure that place-based ambition is identified early, and we are proactively working with the Regional Transport Partnerships, Regional Growth Deals, Investment Zones, Freeports and Scottish Local Authorities. This engagement ensures that emerging local priorities and strategic developments are captured early and incorporated within DFES and wider network planning.

Register of strategic projects
Some developments have strategic importance beyond their individual scale, particularly where they enable cross-vector decarbonisation, industrial clustering or regional transformation. To improve early visibility of such activity, SP Distribution has worked with stakeholders to develop a register of projects with strategic significance. This register includes major regional investment zones, freeports, industrial clusters and strategic decarbonisation programmes identified through our engagement. This provides early insight into emerging strategic zones and supports more coordinated consideration of local ambition within DFES.

Supporting local authorities
SP Distribution works closely with all 22 Scottish Local Authorities to support the development of Local Heat and Energy Efficiency Strategies (LHEES) and wider decarbonisation plans. This includes providing network data, analytical tools and high-level assessments to inform heat and transport electrification, alongside support for identifying suitable EV charging and heat-electrification connection locations, costs and timescales. Insights from Local Authority development plans and LHEES outputs have directly informed this DFES.

Low Carbon Technology (LCT) is central to achieving Net Zero. Our Strategic Optimiser team helps Local Authorities identify and optimise opportunities for EV charging, heat pumps and renewable generation within their networks, and supports the development and

delivery of local decarbonisation projects. This work spans most Scottish Local Authorities and is increasingly supporting Combined Authorities and transport bodies. Key SPD projects include the evaluation of 1,780 EV charging sites across eight Local Authorities within the Glasgow City Region. They also provide tools and services to help Local Authorities develop and inform local and regional energy strategies. Central to this is our enhanced Local Authority Network Insight Tool (LANIT), which gives Authorities clearer visibility of existing network conditions and the potential impact of their LCT plans.

Supporting regional transport partnerships
Our Strategic optimiser team supports Scotland's regional transport partnerships to support the strategic rollout of low-carbon transport infrastructure. Through the Electric Vehicle Infrastructure Fund (EVIF), they have supported Transport Scotland and Local Authorities by providing network insight and indicative costing via LANIT. They also contribute to discussions on lamppost charging, cross-pavement solutions and unlooping requirements to support equitable EV access.

Supporting regional economic growth and investment plans
Our Strategic Optimiser team continue to work with regional planning teams to understand long-term economic priorities and ensure associated electricity network needs are reflected in our investment plans. All identified projects have been added to the register of strategic projects and incorporated within DFES. Key areas of engagement include the Glasgow City Region Investment Zone, the Forth Green Freeport and other regional growth initiatives expected to unlock significant investment and support industrial decarbonisation.
They continue to support regional partners in progressing heat and wider decarbonisation initiatives. In Fife, they contributed indicative Air Source Heat Pump (ASHP) reinforcement modelling to the Council's LHEES and supported district energy assessments delivered with the Danish Energy Agency, leading to our participation in a national roundtable on district heating.

Supporting regional industrial cluster decarbonisation plans
Our Strategic Optimiser team continue to work with Scotland's major industrial clusters to ensure their decarbonisation pathways are fully reflected with DFES and ED3 investment planning. This includes engagement with the Grangemouth Industrial Cluster Strategy and the Net Zero Industrial Pathways (NZIP) project, which is generating whole-system industrial demand forecasts across the SPD region.

Together, these activities demonstrate how DFES supports local needs in practice, translating stakeholder insight into a coherent, regionally grounded view of the future energy system.

Supporting tRESP Strategic Energy Need

As part of NESO's transitional Regional Energy Strategic Plan (tRESP) process, SP Distribution has worked closely with Local Authorities, developers and regional partners to identify and support Strategic Energy Needs (SENs) that reflect credible, place-based demand and generation ambitions.

Through this engagement, 207 stakeholder plans within our SP Distribution area were submitted to NESO for consideration within the tRESP process. Of these, 7 were recognised or approved by NESO as Strategic Energy Needs, with a further set identified as strategically important for the region subject to validation and evidence requirements. These submissions reflect NESO's recognition of the quality and maturity of stakeholder engagement across the licence area.

The SEN process provides a clear mechanism for ensuring that locally identified strategic projects are visible within national planning frameworks. Where approved, these needs are reflected within tRESP pathways and therefore flow directly into DFES forecasts. This strengthens alignment between local ambition, regional planning and national strategy.

Engagement through the SEN process also supports downstream planning. Strategic needs identified and validated through tRESP provide an evidence base for subsequent consideration within network development and investment planning, ensuring long-term decisions remain aligned with both national objectives and regional priorities.

7

plans have achieved NESO SEN approval status

207

local stakeholder plans submitted to NESO as part of the tRESP process

184

projects assigned 'Strategic for the Region' status

Glossary

Behind the meter (BtM) – generation and storage which is connected within a domestic, commercial, or industrial building as part of that site's internal electricity system (e.g. rooftop solar PV panels on a domestic property). This is as opposed to a dedicated generation or storage site (e.g. a wind farm) which has no other major demands or processes within the same site.

Decarbonisation – the process to reduce the amount of carbon dioxide (CO^2) and other greenhouse gas emissions by introducing new low carbon alternatives and technologies. Much of the decarbonisation strategy is based on switching carbon energy vectors (e.g. petrol and diesel for transport, and natural gas and oil for heating) to electricity, and then using renewable generation to provide zero carbon electricity.

Decentralisation – this reflects the extent to which generation is sited closer to demand consumption (or is even undertaken by consumers themselves) via the use of smaller-scale technologies such as solar PV and local energy storage. A less decentralised system would be characterised by fewer, larger-scale generators sited further from where the electricity is ultimately consumed (demand); a more decentralised system would be characterised by more smaller-scale generators sited closer to demand.

Distributed generation – generation connected to the distribution network, as opposed to the transmission network.

Distribution network – in England and Wales this consists of overhead lines, underground cables and other network infrastructure that operate at 132kV and below; in Scotland this is the infrastructure that operates at 33kV and below. The distribution network delivers electricity from the transmission network and distributed generation to end users (consumers/demand). Nearly all demand in the UK is connected to the distribution network; only very large demand users (e.g. the rail network) are connected to the transmission network. Nearly all medium-scale and smaller scale generation in the UK is connected to the distribution network; typically only large fossil fuel power stations, offshore generation, and large onshore generation are connected to the transmission network.

Flexibility – the ability of a consumer or generator to change their operation (i.e. their generation/consumption levels) in response to an external signal. With the push towards the electrification of heat and transport, being able to flexibly utilise demand and generation will help minimise the amount of additional network capacity required, balance the system and provide system stability – these can all help reduce customer electricity bills.

GW – gigawatt - 1,000MW (see 'MW)

Grid Supply Point (GSP) – an interface point between the transmission network and the distribution network.

kW – kilowatt – 0.001MW (see 'MW')

MW – megawatt is a unit of power (not energy). It is the amount of electricity that is flowing at any instant. We can measure both the amount of power that a demand user is consuming at any instant (e.g. "this town's peak demand has increased by 3MW due to an increase in electric vehicles and heat pumps"), and the amount of power that a generator is producing (e.g. "3MW of solar PV generation has been installed in this area"). For scale, 1MW is about 400 full kettles all boiling at once. The largest onshore wind turbines in GB are about-3-4MW in size.

Minimum demand – the point in the year, typically during the summer months, when our distribution network as a whole sees the lowest demand (measured in MW). It is an important study condition (along with peak demand) as a network with low demand can experience voltage control issues.

Peak demand – the point in the year, typically during the winter months, when our distribution network as a whole sees the highest demand (measured in MW). It is an important study condition (along with minimum demand) as it places the greatest need on network capacity – our network must be sized to accommodate peak demand.

Primary substation – an interface point between the 33kV and 11kV networks.

SP Distribution (SPD) – the Distribution Network Operator for Central and Southern Scotland, that owns the distribution network at 33kV, 11kV and LV into the home.

SP Manweb (SPM) – the Distribution Network Operator for Merseyside, Cheshire, North Shropshire and North Wales, that owns the distribution network at 132kV, 33kV, 11kV and LV into the home.

SP Transmission (SPT) – the Transmission Network Owner for Central and Southern Scotland, that owns the transmission network at 132kV, 275kV and 400kV.

Transmission Network – the high voltage electricity network used for the bulk transfer of electrical energy across large distances. The transmission network takes electricity from large generators (e.g. coal, gas, nuclear and offshore wind) to supply large industrial customers and the distribution network.

True Demand – the total demand used by our customers. This includes the gross power provided by both the transmission system, via our Grid Supply Points, and that provided by embedded generation connected directly to our distribution network.

Vehicle to grid (V2G) – this is where plug-in electric vehicles, such as battery electric vehicles, plug-in hybrids or hydrogen fuel cell electric vehicles, can flexibly alter their demand consumption, either by reducing their charging rate or exporting their stored electricity back onto the network. Like other flexibility, this can help reduce the need for new network capacity, balance the system and provide system stability – these can all help reduce customer electricity bills.

Get in touch

DFES is updated annually and will continue to evolve as policies mature, data quality improves, and stakeholder plans develop. we remain committed to ongoing engagement to ensure future DFES publications remain relevant, transparent and useful.

If you have any question, suggestions, or data that you feel would benefit our forecasting, please contact us:

Dfes@spenergynetworks.co.uk

Distribution Future Energy Scenarios - SP Energy Networks