REGEN

SSEN Distribution Future Energy Scenarios 2025 North of Scotland

MARCH 2026

Technology change logs

Change log detailing key modelling updates, differences with DFES 2024 analysis and NESO tRESP pathway comparison

Scottish & Southern Electricity Networks
DSO Powering Change

About Regen

Regen provides independent, evidence-led insight and advice in support of our mission to transform the UK's energy system for a net zero future. We focus on analysing the systemic challenges of decarbonising power, heat and transport. We know that a transformation of this scale will require engaging the whole of society in a just transition.

This report was sponsored by	Scottish and Southern Electricity Networks (SSEN)
Prepared by	Regen
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Contents

Glossary

Short-form	Definitions
AR7	Allocation Round 7 (of Contracts for Difference)
ASHP	Air Source Heat Pump
BSP	Bulk Supply Point
CfD	Contracts for Difference
CM	Capacity Market
CNDM	Connections Network Design Methodology
CPA	Consistent Planning Assumptions
CP30	Clean Power 2030
DFES	Distribution Future Energy Scenarios
DEC	Display Energy Certificate
DNO	Distribution Network Operator
EPC	Energy Performance Certificate
ESA	Electricity Supply Area
EV	Electric Vehicle
FES	Future Energy Scenarios
GB	Great Britain
GSP	Grid Supply Point
GW	Gigawatt(s)
HAR	Hydrogen Allocation Round
HAR2	Hydrogen Allocation Round 2
HGV	Heavy Goods Vehicle
HVAC	Heating, Ventilation and Air Conditioning
kW	Kilowatt(s)
LAEP	Local Area Energy Plan
LGV	Light Goods Vehicle
MW	Megawatt(s)
NESO	National Energy System Operator

PV	(Solar) Photovoltaics
RESP	Regional Energy Strategic Plan
RIIO-ED3	RIIO: Revenue = Incentives + Innovation + Outputs ED3: The third price control period for Electricity Distribution RIIO-ED3 is Ofgem's upcoming price control framework for GB electricity distribution networks (2028-2033)
SEP	Strategic Energy Plans
sqm	Square metre
SSEN	Scottish and Southern Electricity Networks
TIA	Transmission Impact Assessment
tRESP	Transitional Regional Energy Strategic Plan
UK	United Kingdom

Introduction

Purpose

This report provides a results summary for the 2025 iteration of the Distribution Future Energy Scenarios (DFES) analysis for the Scottish and Southern Electricity Networks (SSEN) North of Scotland licence area.

The DFES comprises spatial projections of electricity generation, demand and storage capacity connecting to the electricity distribution network over the period to 2050. SSEN uses the DFES analysis as part of an integrated network planning, optioneering and investment appraisal process. The DFES projections enable SSEN to model changes in future electricity needs across the network and subsequently assess where network improvements are needed to ensure the capacity is available to meet future demand and deliver government ambitions for both Clean Power 2030 (CP30) and net zero by 2050.

The 2025 iteration of DFES builds closely upon the 2024 analysis, and this report details how and why projections have changed for each technology. This DFES 2025 technology change log report is intended to be read alongside the SSEN DFES 2024 technical reports. The following documentation and data can be accessed via SSEN's DFES webpage:

- DFES 2024 technical reports for each licence area
- Introductory documentation outlining the background, framework and context for the DFES analysis
- DFES 2024 datasets (accessed via the SSEN Data Portal).

Technology scope

The DFES 2025 analysis includes updated projections for a subset of DFES technology building blocks, reflecting a deliberately reduced scope to enable fast-track delivery to provide timely input to tRESP (see page 4), support ED3 planning and allow greater focus on CP30 impact analysis. The updated technologies include:

Electricity generation and storage:

- Large-scale solar PV
- Large-scale battery storage
- Onshore wind
- Small-scale solar PV
- Small-scale battery storage.

Electricity demand:

- Air conditioning
- Electric vehicles (EVs) and EV chargers
- Heat in buildings
- Hydrogen electrolysis
- New property developments.

Projections from DFES 2024 for technologies which have not been updated can be accessed via SSEN's webpage or data portal. For the following technologies, DFES projections remain unchanged since DFES 2024:

- Biomass generation
- Diesel generation
- Fossil gas-fired generation
- Hydrogen-fuelled generation
- Hydropower
- Liquid Air Energy Storage
- Marine generation
- Renewable engines
- Waste-fuelled generation.

The North of Scotland licence area

The North of Scotland electricity distribution licence area refers to the area served by the low-voltage (LV), 11 kV and 33 kV network that is managed by SSEN across the North of Scotland and the Scottish Islands. The licence area comprises 14 local authority regions, either wholly or partially: Aberdeen City, Aberdeenshire, Angus, Argyll and Bute, Dundee City, Highland, Moray, Na h-Eileanan Siar, North Ayrshire, the Orkney Islands, Perth and Kinross, the Shetland Islands, Stirling, and West Dunbartonshire.

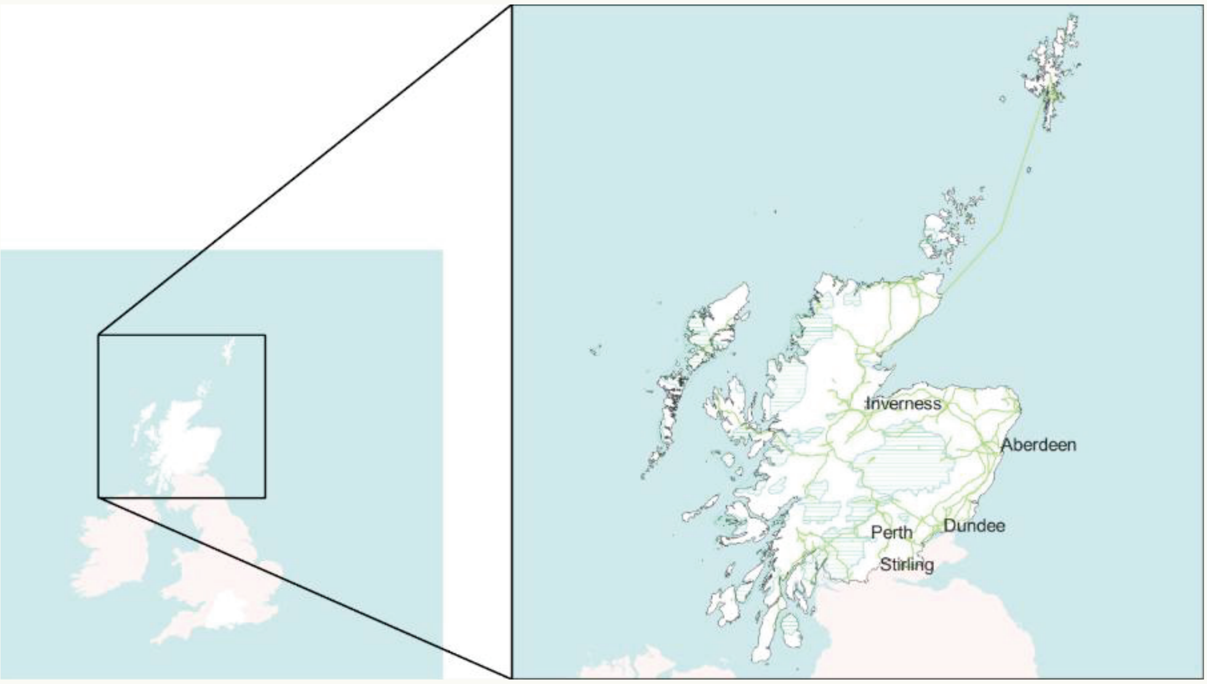


Figure 1: The North of Scotland licence areas with cities, protected areas and grid network infrastructure highlighted | *Source: Regen.*

Policy and scenario environment

Scenario framework

The SSEN DFES 2025 uses the National Energy System Operator's (NESO) Future Energy Scenarios (FES) 2025 framework, adopting the same national-level societal, technological and economic assumptions as the FES under four scenarios. Three of these scenarios are modelled to meet net zero (**Holistic Transition**, **Electric Engagement** and **Hydrogen Evolution**), while **Falling Behind** does not meet net zero. **Falling Behind** is a new FES 2025 scenario and corresponds to the FES 2024 **Counterfactual** scenario.

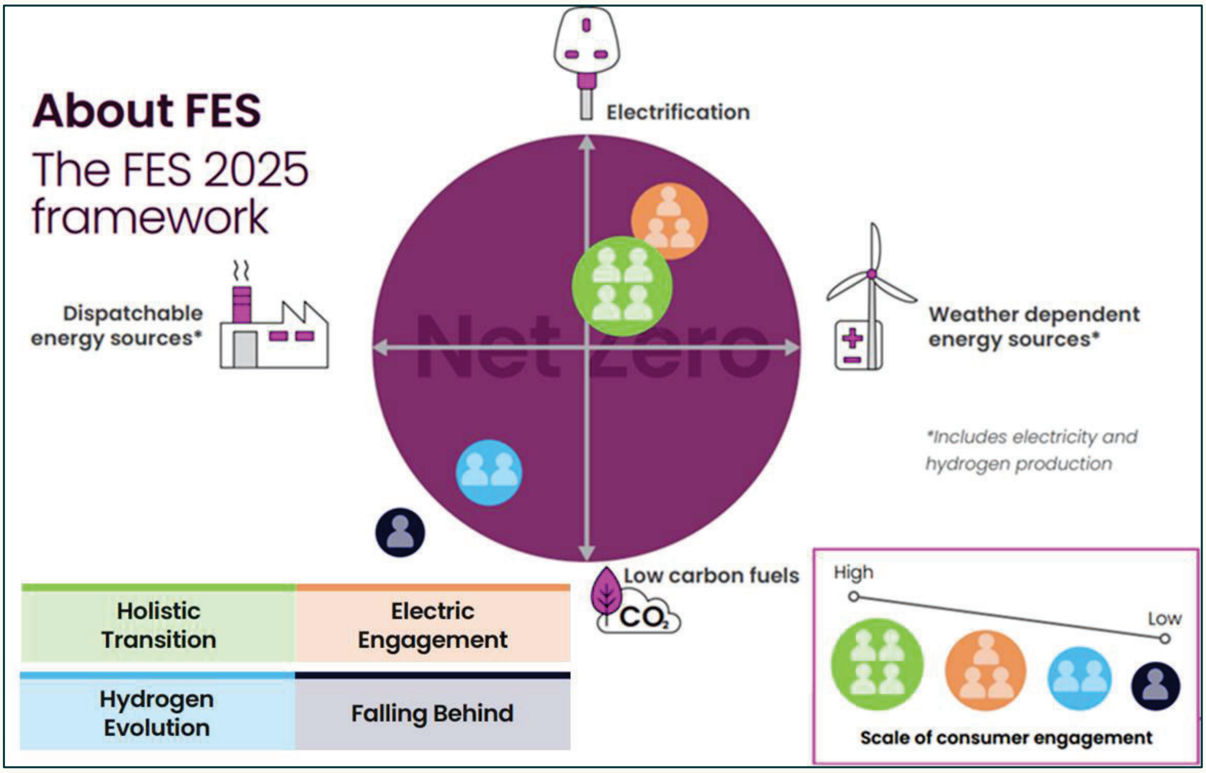


Figure 2: Future Energy Scenarios 2025 framework | *Source & Credit: NESO FES 2025: Pathways to Net Zero.*

The overall trends for each of the technology building blocks in scope for this year's analysis, as well as specific regional (GSP-level) data held within the FES 2025 workbook, have been interrogated and reconciled to the DFES analysis.

Clean Power 2030 and connections reform

The UK government, Ofgem and NESO have worked together to reform and implement significant new policies and processes to address the large queue of projects seeking network connections with SSEN and other network operators across GB. This includes:

- The UK government's CP30 Action Plan, which includes regional technology capacity allocations to 2030 and 2035
- Grid connection reform, including reordering the queue of electricity generation and storage projects via NESO's Connections Network Design Methodology (CNDM) and associated grid code modifications.

As part of the DFES 2025 analysis, Regen undertook detailed site research to identify which onshore wind, solar PV and battery storage projects in SSEN's connections pipeline could potentially secure 'Gate 2' connection offers for connection by 2030 or 2035. This analysis was finalised in August 2025 and has been fed directly into the scenario projections for these technologies.

Transitional RESP (tRESP)

NESO has been appointed to deliver a suite of Strategic Energy Planning (SEP) documents to support a coordinated approach to future energy planning. A core component is the development of Regional Energy Strategic Plans (RESPs), including an early view 'transitional' RESP (tRESP) output to support Distribution Network Operators (DNOs) with business planning for the 2028 – 2033 RIIO-ED3 price control period. The development of these tRESPs (11 publications, covering 11 regions across GB) has involved NESO engaging with network companies and a range of regional stakeholders to define:

- Technology building blocks (defining technologies in scope and the sub-technology categorisations)
- Consistent Planning Assumptions (CPAs) for key low-carbon technologies
- Strategic investment needs and strategically important projects in each region
- Future net zero pathways for key technologies in each region.

The DFES 2025 analysis was provided by SSEN as an input to NESO for the development of tRESP, which was published in early 2026.

The tRESP components have been considered in the DFES analysis in a few different ways:

- The tRESP technology building blocks were already closely aligned to the DFES building blocks. The potential for analysis to be aggregated up for comparison/reconciliation hinges on the granularity of the projections being at the same level.
- The interim CPAs provided by NESO for EVs and heat pumps were considered in the equivalent DFES 2025 modelling assumptions.
- The future net zero pathways for the building blocks published in early 2026 have been interrogated and reconciled to the DFES projections at SSEN's network level. Commentary on the potential reason for any variances has been included in this report as a dedicated tRESP comparison annex.

Stakeholder input

Stakeholder engagement and regional and local input are cornerstones of the DFES analysis. Although based on the national FES framework, the DFES analysis relies on a diverse range of inputs from stakeholders to build regional, sub-regional and local knowledge and insight that informs the DFES modelling assumptions and resultant projections.

Activities to gather information from stakeholders for DFES 2025 included:

- **An interactive online webinar** hosted by SSEN, covering DFES 2025 timelines and opportunities for stakeholder engagement, pathways to net zero within DFES 2024 and DFES 2025, the ED3 price control period, and collaboration with NESO's RESP
- **A local authority data exchange**, facilitating updated input on:
    - New building developments
    - Priorities for low-carbon technologies
    - Local Area Energy Plans (LAEPs)
- **Targeted sector representative and developer engagement** to inform the uptake projections and spatial factors for generation, storage and demand technologies
- **Engagement with NESO** to discuss modelling assumptions, market intelligence and updates to the scenario framework
- **Input from the Scottish government** to inform modelling assumptions.

There are 14 local authorities in the North of Scotland licence area. For DFES 2025, six local authorities provided updated new developments site data, and eight responded to engagement questions. 10 of the 14 local authorities have provided updated new developments data within the past three iterations of the DFES.

Local Authority Energy Plans (LAEPs)

For 2025, LAEPs were provided directly or sourced through direct stakeholder engagement with local authorities and manual web scraping. With the DFES projections modelled to the Electricity Supply Area (ESA) level, a direct comparison is undertaken where:

- LAEP data is provided at the local authority level (or a spatial granularity that can be aggregated up to the local authority level)
- LAEP outputs are summarised at a suitable technology building block level and in a comparable unit used in DFES.

Extracting these relevant technology-specific LAEP datapoints (targets, pathways or projects) enables them to be reconciled with equivalent DFES projections. This process can be applied in three different ways, depending on how the LAEP outputs compare to the DFES modelling:

- Where a LAEP target is within the envelope of DFES scenario outcomes for that technology, no change is made as the DFES already reflects or exceeds the LAEP target

- Where a LAEP target is above the highest DFES scenario by up to 10%, the highest DFES projection for that technology in that area is uplifted to directly reflect the LAEP target
- Where the LAEP target is above the highest DFES scenario by more than 10%, the highest DFES scenario outcome for that technology in that area is uplifted by 10%. This aims to reflect the ambition detailed within the LAEP, but ensures that the wider SSEN DFES projections remain consistent with the overarching NESO FES framework.

The following two LAEPs were considered in the LAEP reconciliation:

Local authority	Input
Perth and Kinross	Perth and Kinross Council LAEP
Dundee City	Dundee City Council LAEP

Highland, Aberdeen and Angus LAs all referred to their LHEES in their DFES responses and so these have been reviewed for DFES 2025.

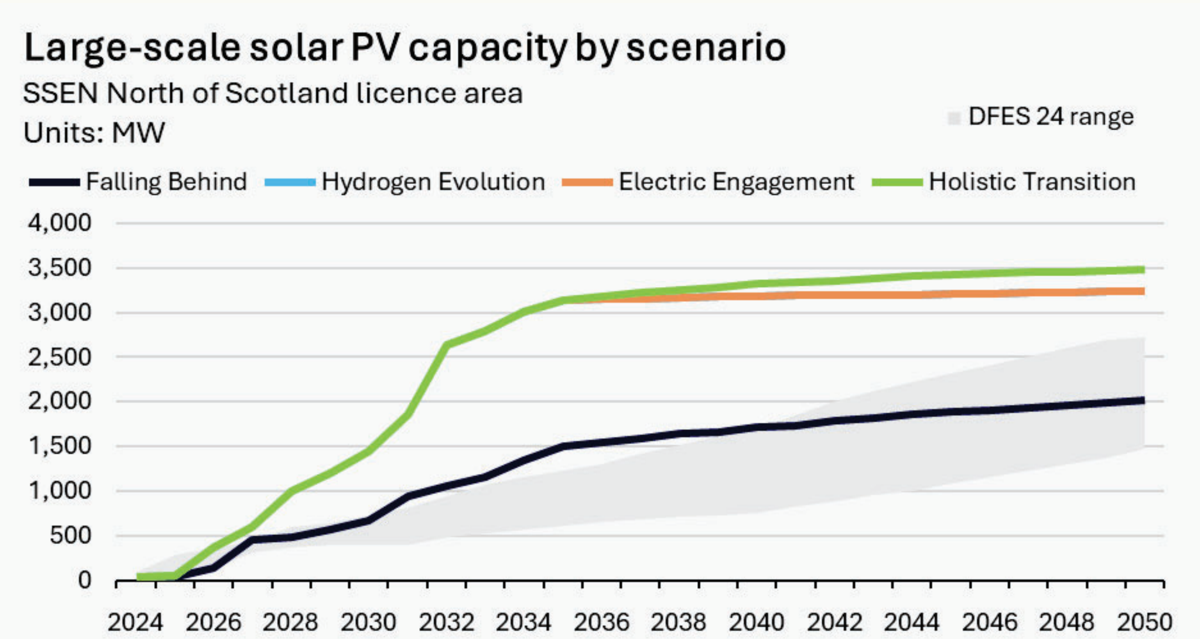
31 individual targets were identified through this LHEES and LAEP review. Two of these targets, for EV chargers and domestic battery storage deployment in Perth and Kinross, were above the highest scenario DFES projections. The highest scenario projection for relevant electricity supply areas was increased to reflect the ambition of these targets.

Generation and storage change logs

Large-scale solar PV

Technical specification	Building blocks
Large solar generation (G99)	Gen_BB012

DFES 2025 scenario projections



Baseline and pipeline

Status	Details	Capacity (MW)	Changes since DFES 2024
Baseline	Connected	42	This is a small decrease in connected capacity from DFES 2024. This is due to a change in methodology for the DFES 2025 analysis, which uses export capacity, rather than installed capacity, to align with SSEN's Embedded Capacity Register (ECR).
Pipeline	Total	4,009	The total installed capacity of pipeline sites has doubled since DFES 2024 (2 GW).
Pipeline	Planning permission granted	645	The total installed capacity of sites with planning permission has also doubled since DFES 2024 (323 MW). This is a firm point of evidence for CP30 connection eligibility.

Pipeline buildout methodology	DFES 2025 reflects NESO's CP30 plan, which includes capacity allocations for large-scale solar PV in SSEN's licence areas by 2030 and 2035. The three net zero compliant scenarios share the same pipeline buildout assumptions. This is a departure from DFES 2024, which projected a greater spread of pipeline buildout capacity.

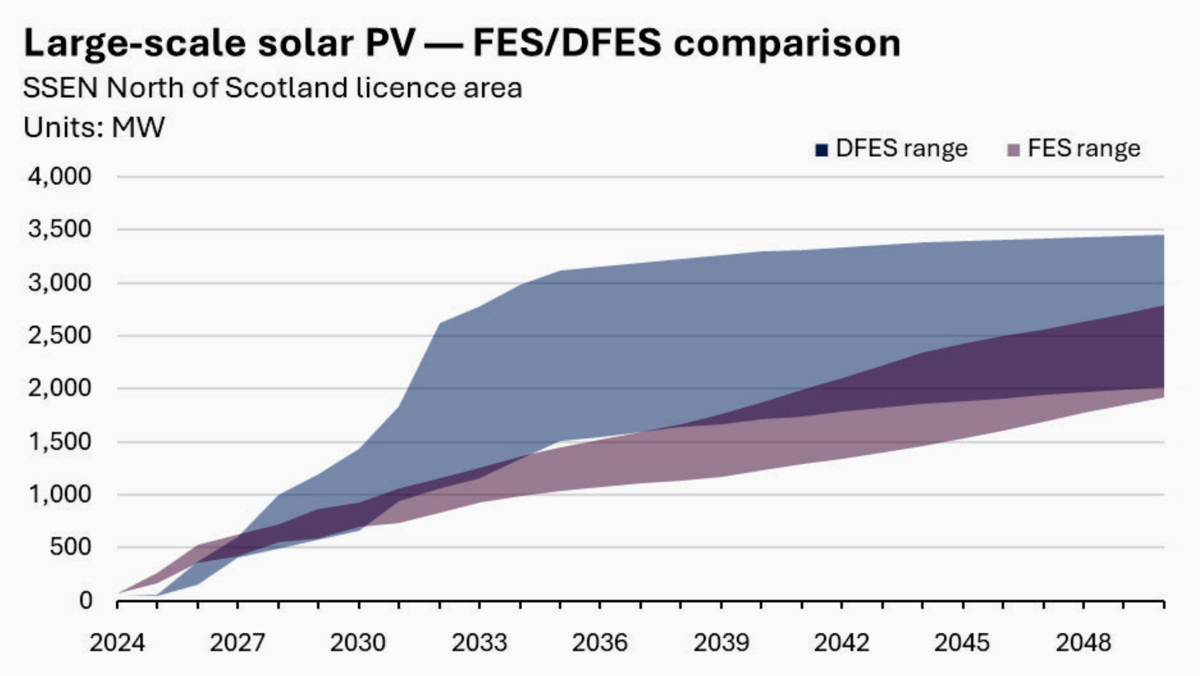
Post-pipeline projections

Scenario	Changes compared to DFES 2024
Holistic Transition	By 2035, the installed capacity is modelled to be 3.1 GW, representing a 1.9 GW increase from the 2024 DFES projections. This increase is associated with the approach for DFES 2025 modelling, aligned with CP30 and connections reform. All sites with a modelled Gate 2 offer are also modelled to connect by 2035. DFES 2025 has a slower uptake post-2035 and reaches 3.4 GW by 2050. The overall capacity is 720 MW higher by 2050 compared to DFES 2024.
Electric Engagement	By 2035, the installed capacity is modelled to be 3.1 GW, representing a 2.2 GW increase from the 2024 DFES projections. This increase is associated with the approach for DFES 2025 modelling, aligned with CP30 and connections reform. All sites with a modelled Gate 2 offer are also modelled to connect by 2035. DFES 2025 has a slower uptake post-2035 and reaches 3.2 GW by 2050. The overall capacity is 820 MW higher by 2050 compared to DFES 2024.
Hydrogen Evolution	By 2035, the installed capacity is modelled to be 3.1 GW, representing a 2.3 GW increase from the 2024 DFES projections. This increase is associated with the approach for DFES 2025 modelling, aligned with CP30 and connections reform. All sites with a modelled Gate 2 offer are also modelled to connect by 2035. DFES 2025 has a slower uptake post-2035 and reaches 3.2 GW by 2050. The overall capacity is 820 MW higher by 2050 compared to DFES 2024.
Falling Behind	By 2035, the installed capacity is projected to be 1.5 GW, representing an increase of 883 MW from the 2024 DFES projections. This increase is associated with the DFES 2025 modelling of the CP30 allocation pot size. DFES 2025 modelled all sites with planning evidence. However, **Falling Behind** still reflects an overall slower deployment of large-scale solar PV out to 2050, including a delayed deployment of CP30 technologies.

Modelling factors

Factor	Impact	Changes compared to DFES 2024
Planning progress and CP30	Uptake modelling	The three net zero scenarios were modelled to align with CP30 capacity allocations and eligible projects in SSEN's licence areas. This differs from DFES 2024, which modelled each scenario individually. Each pipeline site was assessed and researched to determine whether it would receive a Gate 2 connection offer. Sites determined to have received a Gate 2 connection offer (based on site research) were modelled to connect under the three net zero compliant scenarios, using the same methodology as DFES 2024. Delays to pipeline connections are reflected in the least ambitious **Falling Behind** scenario. Sites with no planning evidence were not modelled to connect in any scenario.
Repowering assumptions	Uptake modelling	The following assumptions were used to consider the repowering of solar sites reaching the end of their operational life, out to 2050. In line with DFES 2024 assumptions, baseline sites are modelled to repower with a 25% capacity increase in **Electric Engagement** and **Hydrogen Evolution** after 25 years and a 50% increase in **Holistic Transition** after 20 years. In **Falling Behind**, there is no modelled capacity increase at the end of life. For DFES 2025, only sites reaching the end of life with capacity under 200 kW were modelled to repower with capacity increases before 2035. This is because sites over 200 kW would breach the Transmission Impact Assessment (TIA) threshold and would require a Gate 2 offer.

Reconciliation



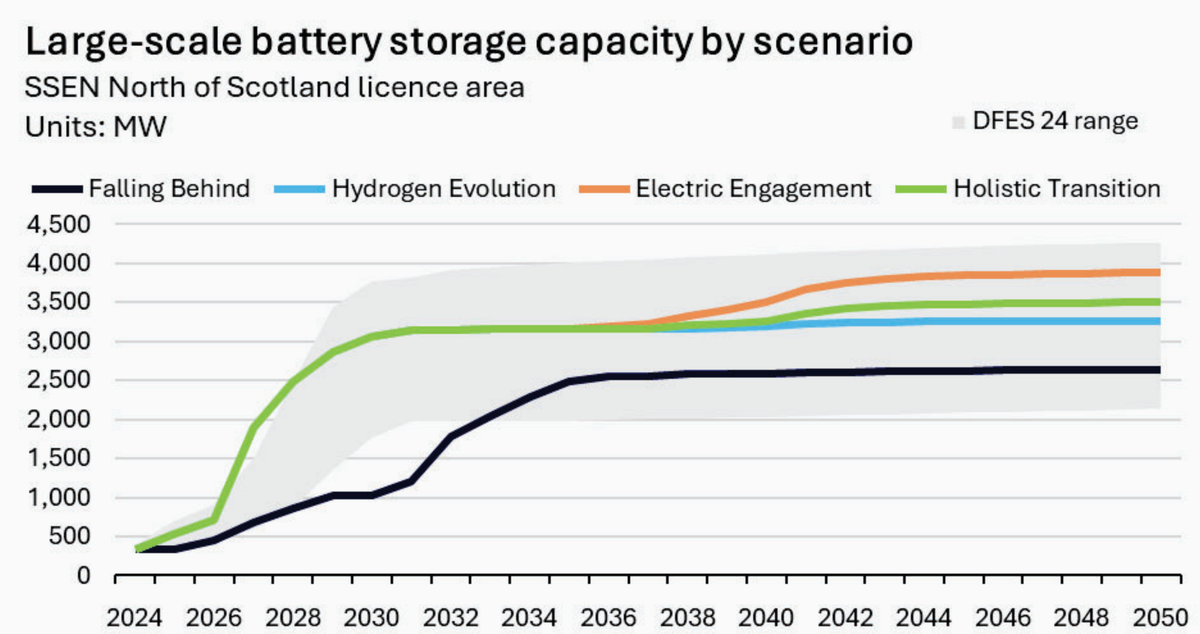
Comparison	Details
DFES 2025 to DFES 2024	DFES 2025 has significantly more capacity connecting in the near term relative to DFES 2024. This is related to a larger pipeline overall and notable capacity of CP30-compliant projects in the licence area. Beyond 2035, the DFES 2025 projections level off; however, due to the pipeline build-out in the 2030s, by 2050, there is between 0.5 GW and 1.1 GW of additional installed capacity modelled in DFES 2025, relative to equivalent DFES 2024 projections.
DFES 2025 to FES 2025	The DFES 2025 near-term uptake reflects the large pipeline of projects and the CP30 allocations for the North of Scotland licence area. The capacity of projects found to be eligible to connect under CP30 and modelled in the DFES analysis is notably above the FES regional projections. The CP30 allocation for large-scale solar is 2.6 GW by 2030 in the North of Scotland licence area. The DFES 2025 analysis models 3.1 GW of CP30 Gate 2 project capacity under the net zero compliant scenarios by 2030, whereas the most ambitious FES scenario only reaches 1.4 GW by 2030.

	Note: CP30 analysis references export capacity. DFES 2025 baseline is reported in terms of export capacity (to align with the ECR) and DFES projections are reported in installed capacity.

Large-scale storage

Technical specification	Building blocks
Standalone grid services	Srg_BB001
Generation co-location	Srg_BB001

DFES 2025 scenario projections



Baseline and pipeline

Status	Details	Capacity (MW)	Changes since DFES 2024
Baseline	Connected	331	The baseline capacity has increased slightly from the 291 MW reported in DFES 2024. This is due to the addition of a new 10 MW project. In addition, DFES 2025 reports baseline export capacity to align with SSEN's ECR, while DFES 2024 reported baseline installed capacity.
Pipeline	Total	10,929	A large (c.11 GW) pipeline of sites with accepted connection offers remains, and has slightly increased from the 9.3 GW reported for DFES 2024.

Pipeline	Planning permission granted	3,011	An additional 652 MW of capacity has secured planning approval compared to the 2.4 GW reported for DFES 2024.
Pipeline	Prequalified for, or have won, Capacity Market (CM) contracts	1,193	An additional 600 MW of capacity has won capacity agreements in recent CM auctions since DFES 2024. These sites are modelled to commission in their T-4 CM delivery year. We are aware of recent developments for a small number of battery storage projects that have relinquished their CM agreements. These updates to individual sites have been reflected in the analysis, but we are continuing to use CM dates as a modelling input for sites that still hold a CM agreement.
Pipeline buildout methodology		DFES 2025 reflects the CP30 plan, with its allocations for battery storage capacity to be deployed in the North of Scotland licence area by 2030 and 2035. The net zero compliant scenarios, **Holistic Transition**, **Electric Engagement** and **Hydrogen Evolution**, share the same pipeline buildout assumptions. This is a departure from DFES 2024, which projected a greater spread of pipeline buildout outcomes across the three net zero scenarios.	

Note: DFES 2025 reports on project export capacity. DFES 2025 reports export capacity for baseline (to align with the ECR) and reports installed capacity for future projections.

Post-pipeline projections

Scenario	Changes compared to DFES 2024
Holistic Transition	By 2050, total large-scale battery storage capacity in the North of Scotland licence area reaches 3.5 GW. This is lower than the 4.3 GW total projected for DFES 2024. This variance is due to reflecting CP30 Gate 2 compliant projects only to 2035 under all net zero scenarios.
Electric Engagement	Following the updated FES 2025 scenario framework, **Electric Engagement** is now the highest growth scenario for large-scale battery storage. Previous FES and DFES projections used **Holistic Transition** as the highest growth scenario.

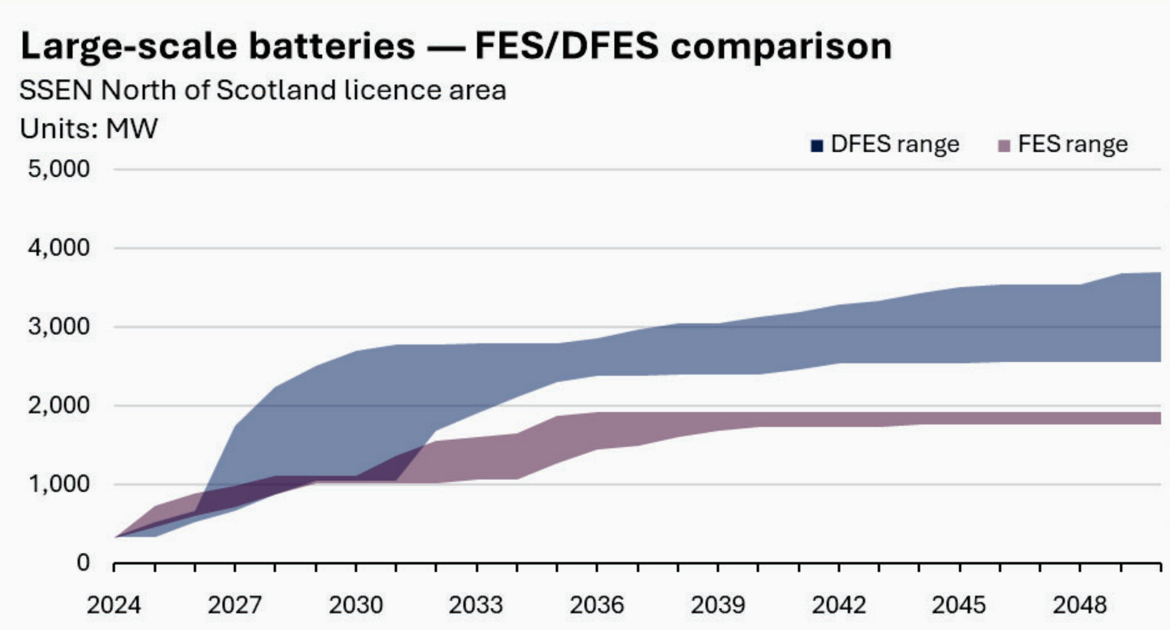
	By 2050, total large-scale battery storage capacity in the North of Scotland licence area reaches 3.9 GW. This is higher than the 3.3 GW total projected for DFES 2024.
Hydrogen Evolution	By 2050, total large-scale battery storage capacity in the North of Scotland licence area reaches 3.3 GW. This is higher than the 2.8 GW total projected for DFES 2024.
Falling Behind	By 2050, total large-scale battery storage capacity in the North of Scotland licence area reaches 2.6 GW. This is higher than the 2.1 GW total projected for DFES 2024.

Modelling factors

Factor	Impact	Changes compared to DFES 2024
Planning progress	Uptake modelling	As part of the ongoing connections reform process, NESO created an allocation for the total battery storage capacity which can connect in the North of Scotland licence area by 2030 and 2035. Under this mechanism, any site which has been granted planning permission or secured a CM agreement is given protected status and guaranteed a Gate 2 connection offer regardless of whether it would exceed the allocated storage capacity for the North of Scotland licence area. In the North of Scotland, the pipeline of projects with protected status significantly exceeds the licence area's battery storage capacity allocation. This leaves no remaining capacity for less advanced sites. As a result, it is assumed that any site which does not yet have protected status will not receive a Gate 2 connection offer, and is not modelled to be built under any scenario. This is a change from the approach used for DFES 2024, whereby projects which had submitted planning permission could build out under high-growth scenarios. In addition, due to the number of sites with planning permission and the resultant scale of the pipeline with Gate 2 offers, sites which received their planning permission before 2021 and with no further evidence of progression are not modelled to be built under the **Falling Behind** scenario. This impacts eight sites, totalling 317 MW.

Co-located projections	Uptake modelling	Reflecting evidence from the pipeline of sites with connection offers, 30-40% of new renewable generation capacity is assumed to co-locate with battery storage under **Holistic Transition** and **Electric Engagement**. This results in higher post-2035 growth relative to DFES 2024, which assumed a 10% co-location rate. **Hydrogen Evolution** and **Falling Behind** maintain the same 10% rate of co-location which was modelled for all scenarios in DFES 2024.

Reconciliation



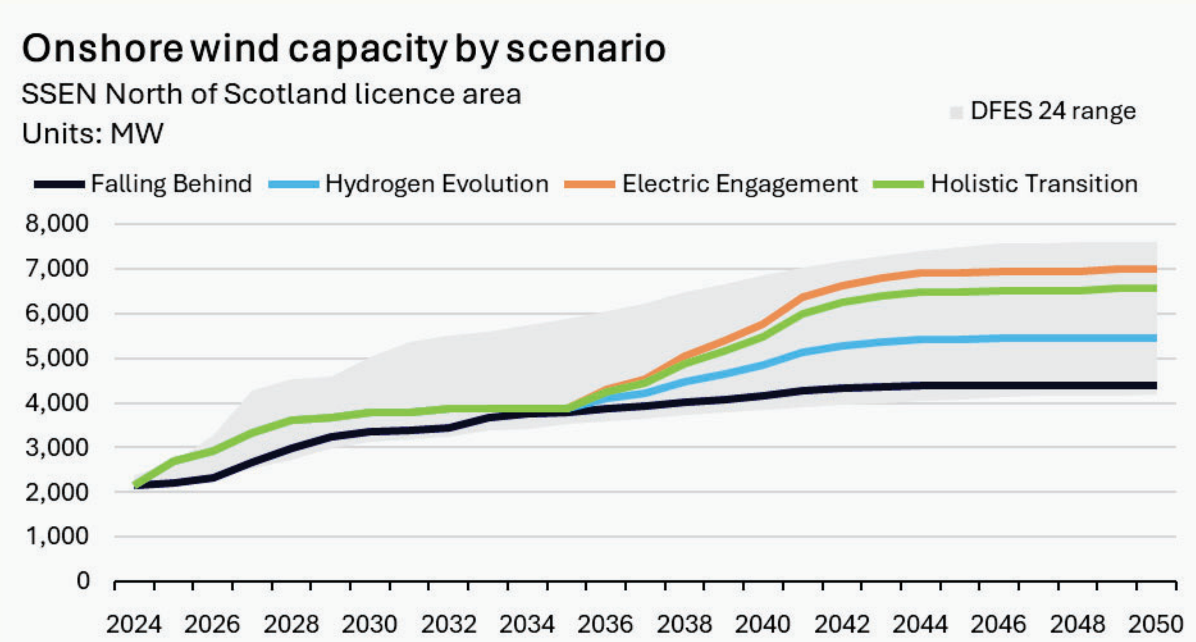
Comparison	Details
DFES 2025 to DFES 2024	DFES 2025 projections are slightly higher in the near term than the DFES 2024 scenario envelope. In the long term, the projections are broadly aligned with DFES 2024, but the DFES 2025 scenario range is tighter. The DFES 2025 **Falling Behind** scenario is broadly aligned with the **Hydrogen Evolution** scenario in DFES 2024. This increase in the lowest growth scenario reflects the overall increase in the FES projection for GB distributed battery storage.
DFES 2025 to FES 2025	The baseline battery storage capacity in the licence area is very closely aligned between the DFES and FES.

	FES 2025 projects significantly lower near-term growth and long-term installed capacity under all scenarios. The DFES projections are informed by the pipeline of projects with planning permission granted and protected status under the CP30 Gate 2 connection offer process.

Onshore wind

Technical specification	Building blocks
Onshore wind >= 1 MW	Gen_BB015
Onshore Wind < 1 MW	Gen_BB016

DFES 2025 scenario projections



Baseline and pipeline

Status	Details	Capacity (MW)	Changes since DFES 2024
Baseline	Connected	2,142	The reported capacity of 2,142 MW is 20 MW lower than the baseline reported for DFES 2024. However, this is due to DFES 2025 reporting baseline export capacity to align with SSEN's ECR, while the DFES 2024 reported baseline installed capacity. If installed capacity is compared, the baseline has grown, with 4 additional sites and totaling an additional 8 MW.

Pipeline	Total	4,647	The pipeline has increased significantly from the 3 GW pipeline reported for DFES 2024. This is due to 24 additional sites. The majority of these pipeline sites have accepted connection offers. 22 sites, totalling 752 MW, have not yet accepted connection offers.
Pipeline	Planning permission granted	1,299	An additional 606 MW of onshore wind capacity has secured planning permission since DFES 2024.
Pipeline	Planning permission submitted	346	There has been no significant change in the total capacity of sites which have submitted full planning applications.
Pipeline buildout methodology			DFES 2025 reflects the CP30 plan, with its allocations for onshore wind capacity to be deployed in the North of Scotland by 2030 and Scotland, more generally, by 2035. The net zero compliant scenarios, **Holistic Transition**, **Electric Engagement** and **Hydrogen Evolution**, share equal pipeline buildout assumptions. This is a departure from DFES 2024, which projected a greater spread of pipeline buildout outcomes.

Post-pipeline projections

Scenario	Changes compared to DFES 2024
Holistic Transition	DFES 2025 models 6.6 GW of onshore wind capacity by 2050 under this scenario. This is 190 MW more than the 6.4 GW projected under the same scenario for DFES 2024. This variance is due to the impact of CP30 allocations for onshore wind in Scotland by 2035, as well as updated repowering assumptions.
Electric Engagement	DFES 2025 models 7 GW of onshore wind capacity by 2050 under this scenario. This is 625 MW less than the 7.6 GW projected under the same scenario for DFES 2024. This variance is due to the impact of CP30 allocations for onshore wind in Scotland by 2035, as well as updated repowering assumptions.
Hydrogen Evolution	DFES 2025 models 5.5 GW of onshore wind capacity by 2050 under this scenario. This is 209 MW more than the 5.2 GW projected under the same

	scenario for DFES 2024. This variance is due to the impact of CP30 allocations for onshore wind in Scotland by 2035, as well as updated repowering assumptions.
Falling Behind	DFES 2025 models 4.4 GW of onshore wind capacity by 2050 under this scenario. This is 205 MW more than the 4.2 GW projected for DFES 2024 under the **Falling Behind** scenario. This variance is due to the impact of CP30 allocations for onshore wind in Scotland by 2035, as well as updated repowering assumptions.

Modelling factors

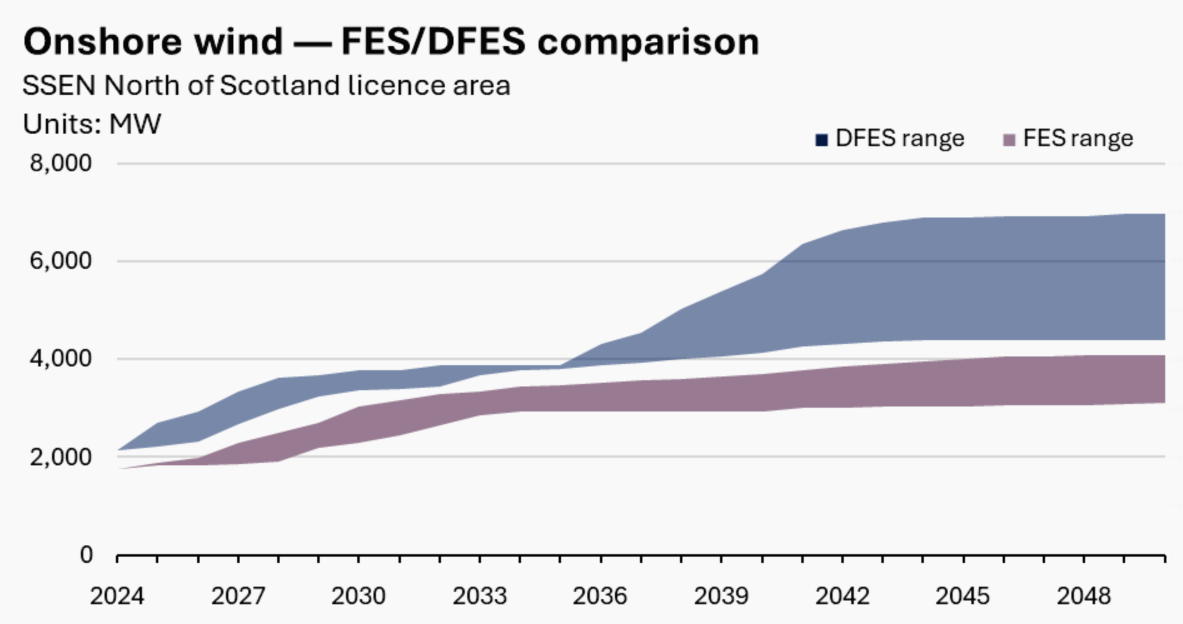
Factor	Impact	Changes compared to DFES 2024
Planning progress and CP30	Uptake modelling	DFES 2024 assumed that even projects with no evidence of progress through planning could eventually be built in the future under more ambitious scenarios. NESO's connections reform process has created allocations for the amount of onshore wind capacity to be connected within SSEN's North of Scotland licence area by 2030 and in Scotland, more generally, by 2035. CP30 allocated capacities for onshore wind in 2030 and 2035 are filled by the pipeline of projects with planning permission granted or that have submitted planning applications. As a result, in DFES 2025, sites with no evidence of progress through planning are not modelled to be built under any scenario. Delays to projects coming online are reflected in the least ambitious **Falling Behind** scenario. Also, sites with connection offers not yet accepted are not modelled to be built under this scenario.
Repowering assumptions	Uptake modelling	Higher uplifts in site capacity due to repowering have been assumed in DFES 2025. This is based on desktop research, evidence from network operators and analysis of sites which have already repowered. Baseline sites are assumed to repower with a percentage of additional capacity, with potential impact at the BSP/GSP level across the onshore wind fleet. The percentage of additional capacity modelled varies by scenario: • **Electric Engagement**: 250% additional capacity • **Holistic Transition**: 200% additional capacity

		• **Hydrogen Evolution**: 100% additional capacity • **Falling Behind**: 50% additional capacity. A more detailed, site-by-site assessment of repowering potential would require a more detailed understanding of constraints, including: • Projected local network capacity • Planning constraints • Site access for larger turbines • Financial feasibility. A maximum repowered capacity of 70 MW has been assumed. This reflects the likelihood that sites will encounter these constraints. 70 MW is an approximate maximum capacity for sites connecting to the 33kV network (whereby 132kV is the transmission voltage in Scotland).
Modelled post pipeline capacity	Uptake modelling	DFES modelling has historically included post-pipeline capacity for large-scale onshore wind in the North of Scotland, connecting in the 2030s and 2040s. This was due to conservative repowering assumptions leaving room for potential additional growth by 2050. For DFES 2025, however, no large-scale post-pipeline capacity additions are modelled. Repowering of older baseline sites is the basis for all modelled post-pipeline additional capacity. The CP30 onshore wind allocation for the North of Scotland is filled in 2030 and 2035 due to the buildout of the known project pipeline. It is highly unlikely that sites not already in the connections queue will connect before 2035. Repowering results in an acceleration in new capacity through the late 2030s and into the 2040s. Repowering of older sites is the most likely source of new capacity in this period. Locations already in use for wind farms are less likely to face local opposition and will benefit from existing infrastructure. The government will be supporting sites to repower through the Contract for Difference (CfD) scheme from Allocation Round 7 (AR7) onwards.[1] This modelled

[1] UK government, Consultation response for Allocation Round 7, July 2025

	capacity incorporates new sites which connect to existing sites, as site extensions.

Reconciliation

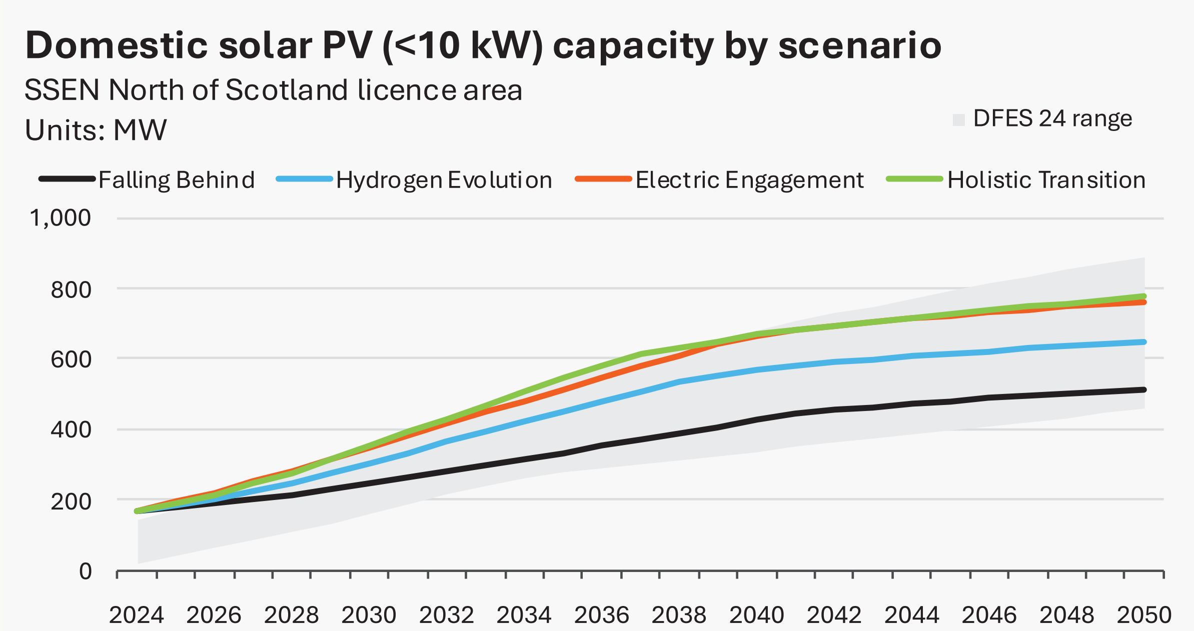


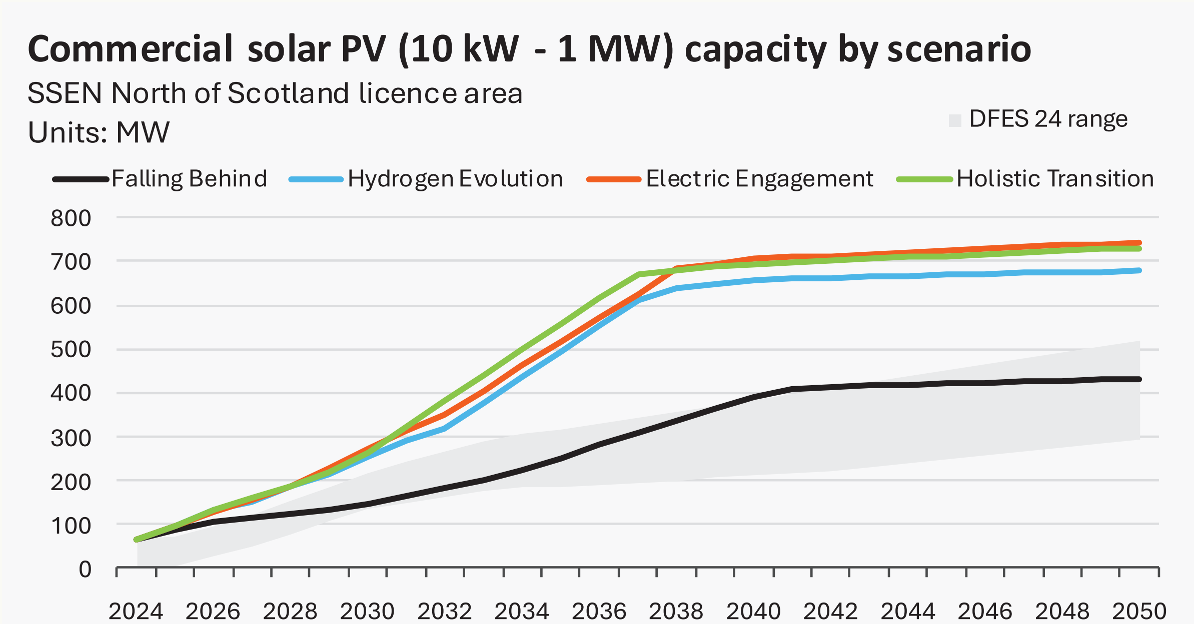
Comparison	Details
DFES 2025 to DFES 2024	Relative to DFES 2024 results, the DFES 2025 analysis considers more constrained near-term capacity growth under **Holistic Transition** and **Electric Engagement**. This is due to the impact of CP30 capacity allocations for onshore wind in the North of Scotland. Post-2035 growth is higher than was modelled for DFES 2024, under all scenarios, due to assumptions around higher repowering factors. The 2050 capacity totals for onshore wind in the North of Scotland licence area are broadly aligned with DFES 2024.
DFES 2025 to FES 2025	DFES 2025 projects much higher onshore wind capacity across the period to 2050 than FES 2025, under all scenarios. This is potentially based on the current pipeline of projects that have secured connection offers with SSEN, CP30 allocations for 2030 and 2035, and the potential for significant additional capacity from repowering older wind farms in the licence area.

Small-scale solar PV

Technical specification	Building blocks
Small solar generation (G98/G83) *Below 1 MW in capacity. Includes domestic rooftop PV (<10kW) and commercial rooftop PV (10kW- 1MW).*	Gen_BB013

DFES 2025 scenario projections





Baseline and pipeline

Status	Details	Capacity (MW)	Changes since DFES 2024
Baseline	Connected	236	Installed capacity has increased by 89 MW since DFES 2024.
Pipeline	Total	37	The pipeline remains very small and has increased by only 5 MW since DFES 2024.

Post-pipeline projections

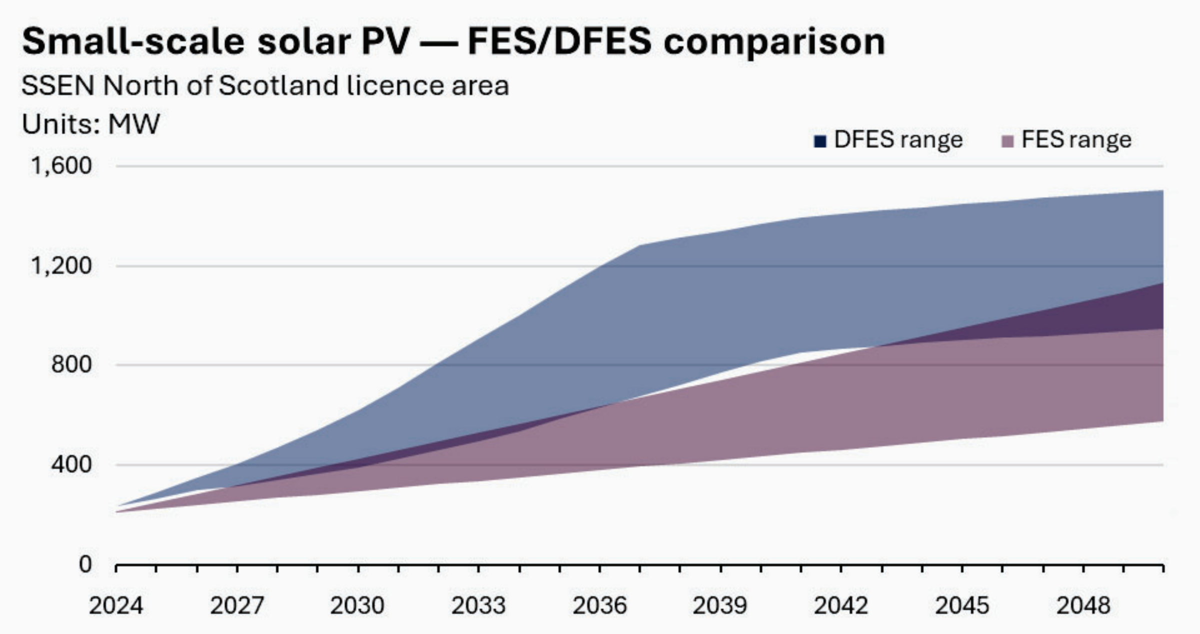
All projections for small-scale solar have increased since DFES 2024, due to updated solar array capacity assumptions (see table below on modelling factors).

Scenario	Changes compared to DFES 2024
Holistic Transition	Total capacity in 2050 is marginally higher in the DFES 2025 than the DFES 2024 under all scenarios due to increased baseline capacity, increased new development projections and updated solar array size assumptions (see table below). The installation rate between 2029 and 2035 under **Holistic Transition** is higher than in the other scenarios. This is driven by the projected uptake of solar on new developments, which are projected to be built out most rapidly under **Holistic Transition**.
Electric Engagement	
Hydrogen Evolution	
Falling Behind	

Modelling factors

Factor	Impact	Changes compared to DFES 2024
Average technology size	Uptake modelling	Reflecting evidence from the most recent baseline data, the average technology sizes of domestic and commercial rooftop solar PV installations have been updated. Average domestic rooftop capacity has increased from 4 kW to 5 kW, and commercial rooftop capacity has increased from 15 kW to 30 kW. This has slightly increased the overall projected capacity out to 2050.

Reconciliation

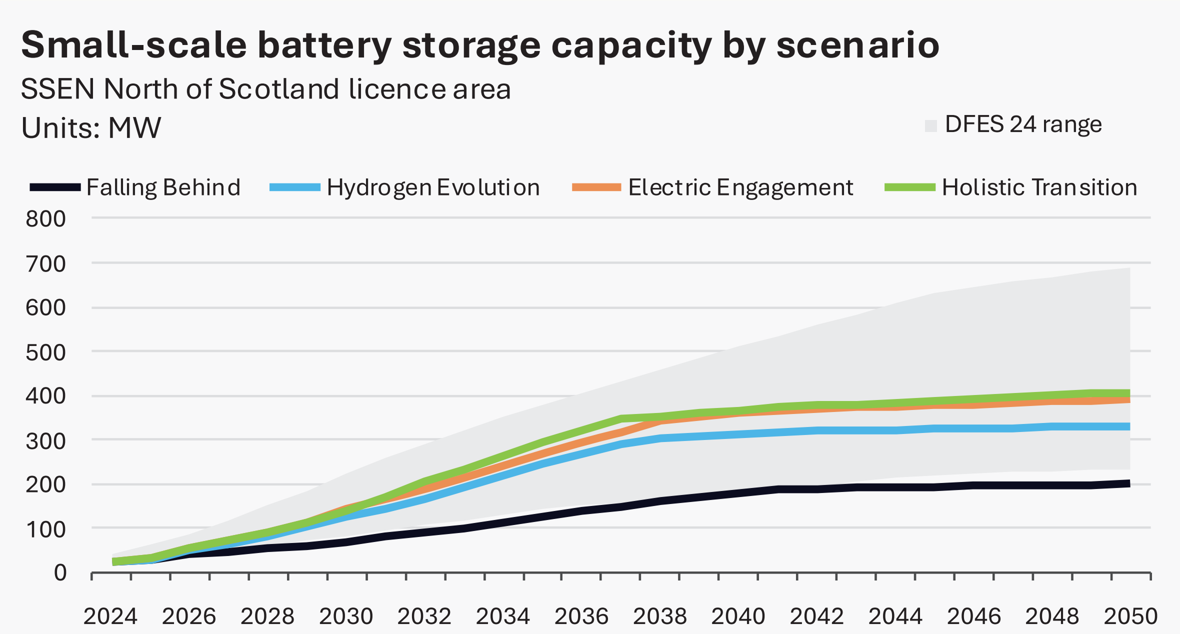


Comparison	Details
DFES 2025 to DFES 2024	Across almost all scenarios, DFES 2025 projects more small-scale solar capacity across the period to 2050, relative to DFES 2024. This is based on the increase in the average technology size of rooftop solar installations. The one exception is for domestic solar PV (<10 kW), which shows less capacity than DFES 2024 post-2040 under **Holistic Transition**. This reflects changes in FES 2025, which now projects greater uptake of domestic solar PV under **Electric Engagement** than **Holistic Transition**.
DFES 2025 to FES 2025	Across all scenarios, DFES 2025 projects higher small-scale solar PV capacity across the period to 2050, relative to FES 2025. This is probably related to differences in the assumed uptake of solar PV on new developments. DFES 2025 projects faster growth in the 2030s, which tapers off in the longer term. This is driven by the projected uptake of solar on new developments, which are projected to be built out rapidly in the near term before tapering off in the longer term. This trend is different to FES 2025, which shows a linear increase out to 2050.

Small-scale storage

Technical specification	Building blocks
Domestic battery storage (G98)	Srg_BB002
High energy user	Srg_BB002

DFES 2025 scenario projections



Baseline and pipeline

Status	Details	Capacity (MW)	Changes since DFES 2024
Baseline	Connected	25	Installed capacity has increased significantly by 23 MW from 2 MW since DFES 2024. This is due to more comprehensive SSEN connections data for baseline battery sites, compared to previous years.
Pipeline	Total	3.5	The pipeline has increased by 3.3 MW since DFES 2024.

Post-pipeline projections

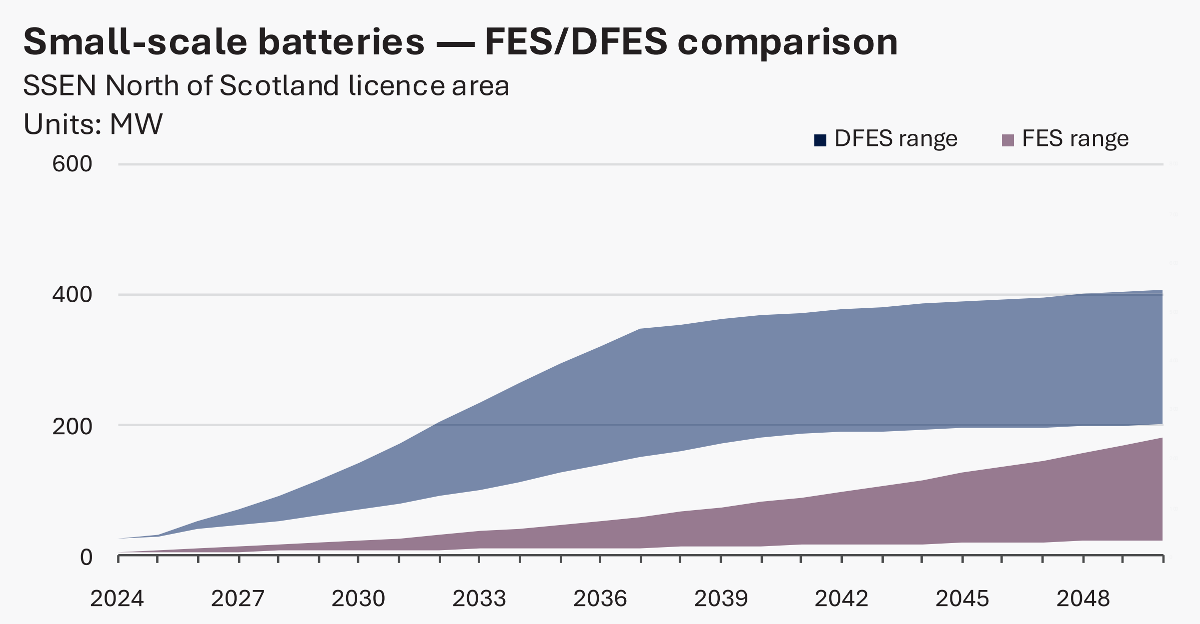
Scenario	Changes compared to DFES 2024
Holistic Transition	By 2050, total small-scale storage capacity reaches 0.4 GW. This is 0.3 GW lower than the total projected for DFES 2024. The reason for the reduced capacity seen across all scenarios is outlined in the modelling factors table below.
Electric Engagement	By 2050, total small-scale storage capacity reaches 0.4 GW. This is 0.2 GW lower than the total projected for DFES 2024.
Hydrogen Evolution	By 2050, total small-scale storage capacity reaches 0.3 GW. This is 0.1 GW lower than the total projected for DFES 2024.
Falling Behind	By 2050, total small-scale storage capacity reaches 0.2 GW. This is marginally lower than the total projected for DFES 2024.

Modelling factors

Factor	Impact	Changes compared to DFES 2024
Co-located storage with solar	Uptake modelling	The proportions of baseline domestic and commercial solar sites which are co-located with battery storage were calculated by licence area and used to project capacity until 2030. After 2030, these proportions were linearly decreased to meet the same levels in 2050 as modelled in the DFES 2024. This is a change from the approach used in 2024, which used evidence from a market report to set the proportion in 2025, and then linearly decreased this to meet 2050 levels from this point. The market report rate was higher than that calculated using baseline data, meaning that projections decreased under the new method.
Average technology sizes	Uptake modelling	Reflecting evidence from the most recent baseline data, the average technology sizes of domestic and high-energy-user battery storage installations have been updated. Average domestic battery capacity has increased from 5 kW to 6 kW, and high-energy-user battery capacity has decreased from 120 kW to 30 kW, which now aligns with the average capacity of commercial rooftop solar installations. In DFES 2024, high-energy-user batteries were projected to increase linearly in capacity up to 300 kW in 2050.

Pipeline connection date	Uptake modelling	Projects in the pipeline have been modelled to connect based on the expected connection years provided by SSEN. Sites expected to connect in 2025 have been modelled to do so, and sites expected to connect later have been modelled to connect in 2026. This is a change from the approach used in DFES 2024, which modelled the whole pipeline to connect in the first year of the analysis.

Reconciliation



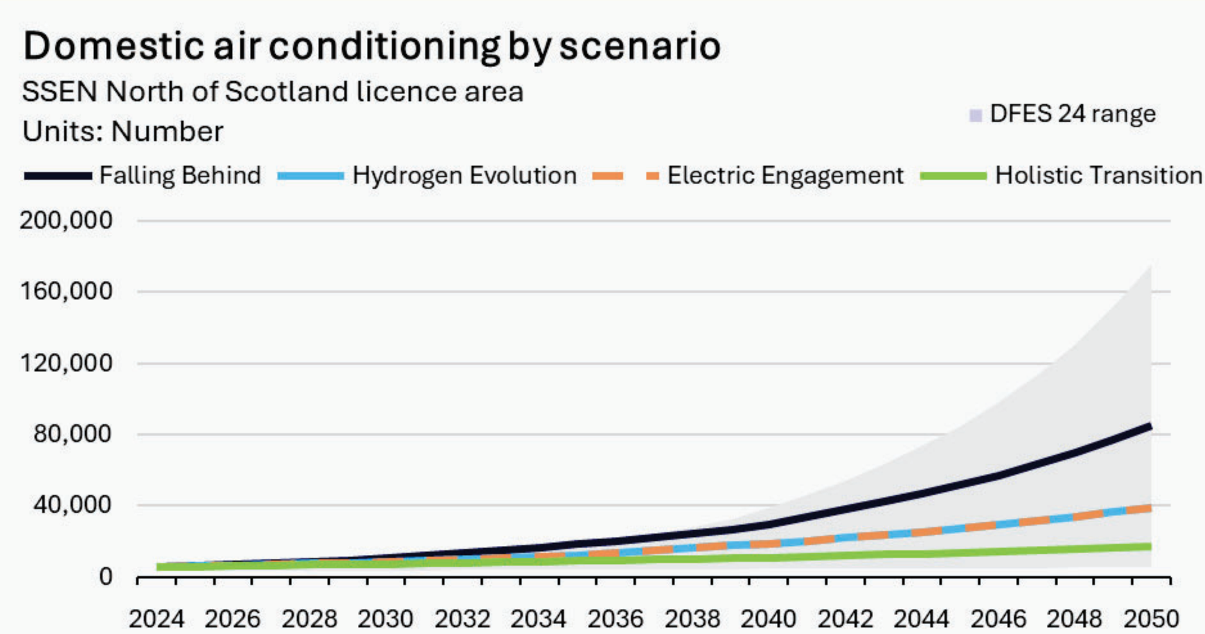
Comparison	Details
DFES 2025 to DFES 2024	Across all scenarios, DFES 2025 projects lower capacity across the period to 2050, relative to DFES 2024. This is due to updated modelling assumptions reflecting current rates of battery co-location with rooftop solar and lower average technology size of high-energy-user installations.
DFES 2025 to FES 2025	Across all scenarios, DFES 2025 projects over double the installed capacity across the period to 2050, relative to FES 2025. This is based on the projected co-location of storage with new rooftop solar sites. DFES 2025 also envisages faster deployment of small-scale storage in the near term, based on projections of co-location with rooftop solar, which is modelled to increase rapidly in the 2030s before tapering off in the longer term. This trend is different to FES 2025, which shows a linear increase out to 2050.

Demand technology change logs

Air conditioning

Technical specification	Building blocks
Air conditioning domestic units	Lct_BB014

DFES 2025 scenario projections



Baseline

Status	Details	Number	Changes since DFES 2024
Baseline	Connected	6,000	There is limited data on current domestic air conditioning levels in the UK. The DFES modelling aligns with FES 2025's estimate of c. 600,000 domestic air conditioning units in the UK in 2024. This is nearly twice the FES 2024 baseline, and this change has been reflected in the DFES modelled baseline.

Projections

Scenario	Changes compared to DFES 2024
Holistic Transition	Following changes to the overall electricity demand from domestic air conditioning in the FES, **Holistic Transition** sees a higher number of homes installing air conditioning across the scenario timeframe in DFES 2025, compared to 2024. However, overall uptake remains very low.
Electric Engagement	Following changes to the overall electricity demand for domestic air conditioning in the FES, these scenarios see a lower number of homes installing air conditioning across the scenario timeframe in DFES 2025, compared to 2024, particularly in the longer term.
Hydrogen Evolution	
Falling Behind	

Modelling factors

Factor	Impact	Changes compared to DFES 2024
Air-to-air heat pumps	Uptake modelling	The domestic heat modelling has been updated in DFES 2025 to include air-to-air heat pumps. As these can provide cooling, homes modelled to install air-to-air heat pumps have been removed from the air conditioning modelling. This only impacts a small proportion of homes, and the impact of this change is substantially outweighed by changes in the overarching FES scenario projections for domestic air conditioning.

Reconciliation

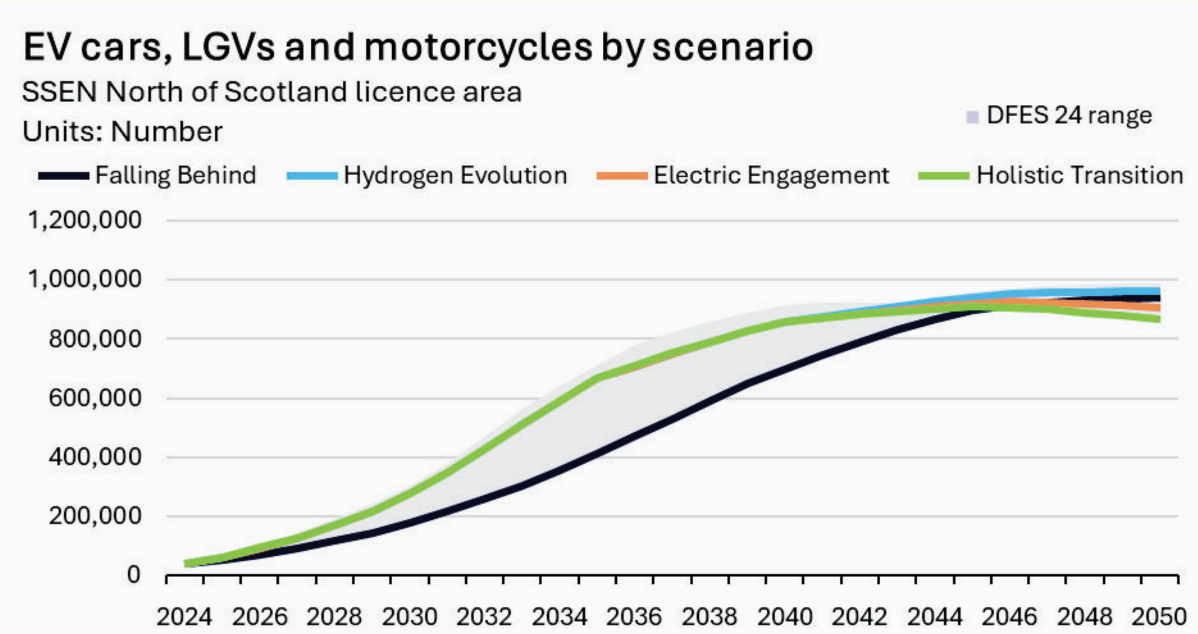
Comparison	Details
DFES 2025 to DFES 2024	DFES 2025 projects a narrower range of outcomes for domestic air conditioning, with fewer units projected in the **Falling Behind** scenario and a greater number of units projected in the **Holistic Transition** scenario. This is driven entirely by similar changes to the FES projections for domestic air conditioning demand across GB.
DFES 2025 to FES 2025	FES 2025 does not detail air conditioning projections by region, so no direct comparison can be made.

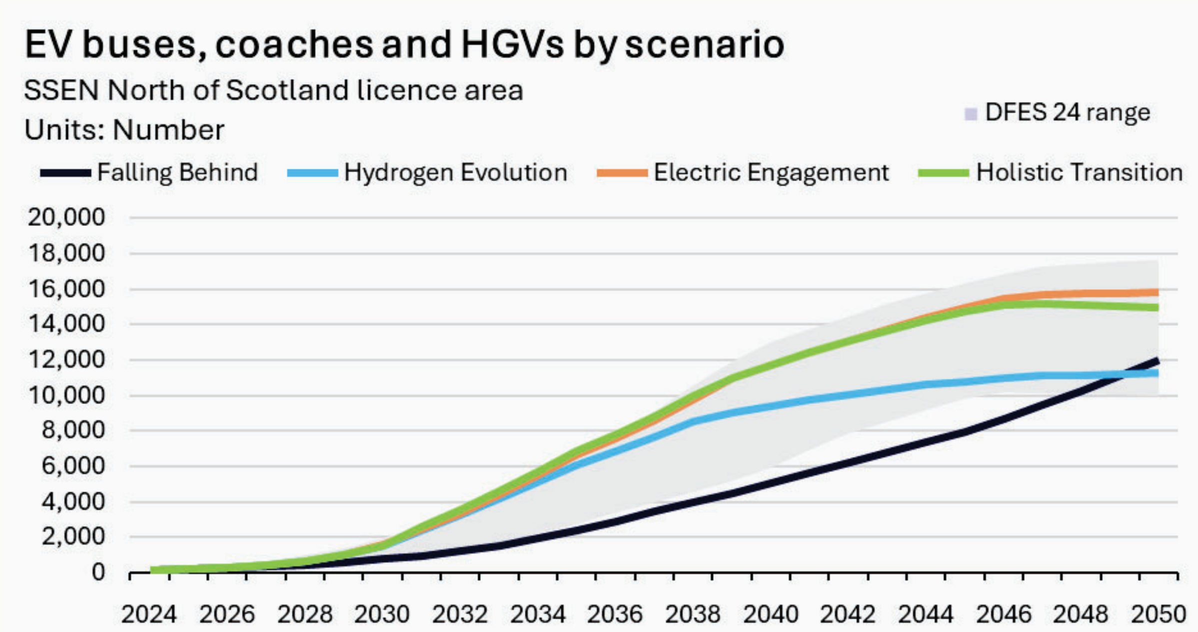
EVs and EV chargers

Technical specification	Building blocks
Electric vehicles (EVs), including vans, cars, motorbikes, HGVs, buses and coaches, covering both pure electric and plug-in hybrid	Lct_BB001 Lct_BB002 Lct_BB003 Lct_BB004
Electric vehicle (EV) charging units, including domestic, workplace, public slow/fast and public rapid	Lct_BB010b Lct_BB011b Lct_BB012b Lct_BB013b

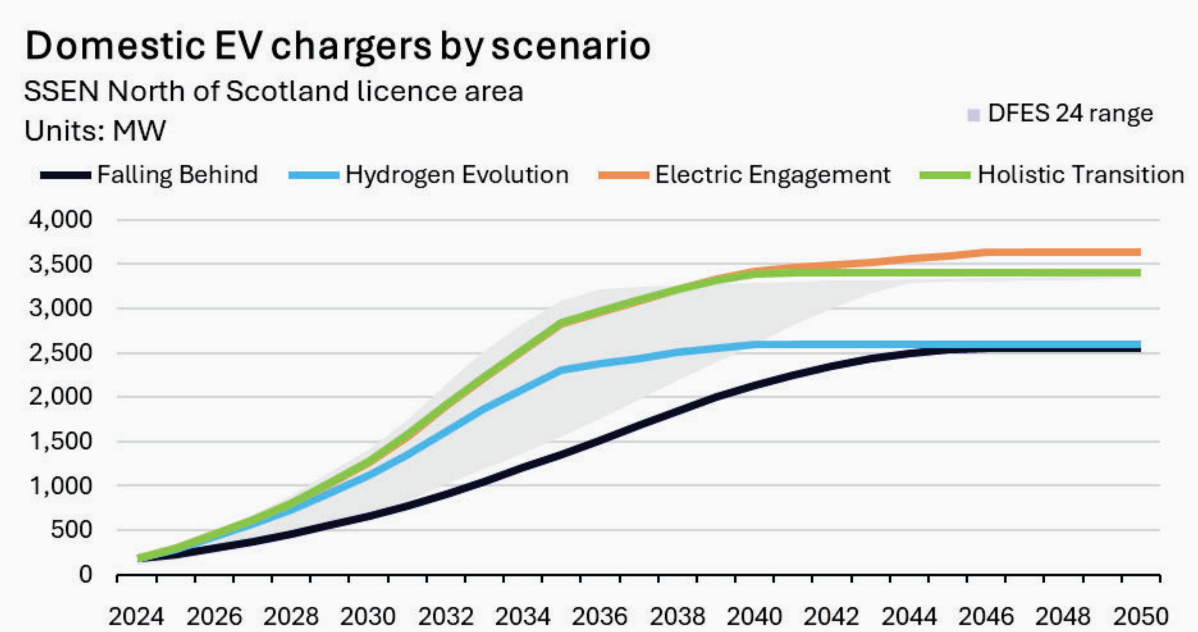
DFES 2025 scenario projections

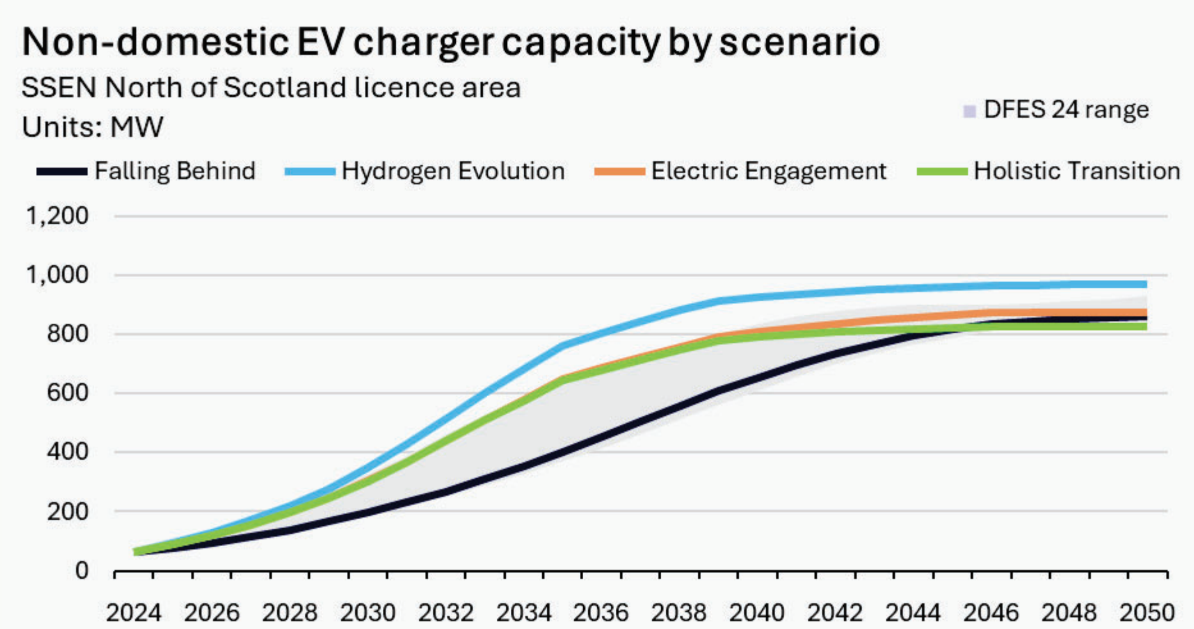
Number of vehicles




EV buses, coaches and HGVs by scenario
SSEN North of Scotland licence area
Units: Number
DFES 24 range
Falling Behind
Hydrogen Evolution
Electric Engagement
Holistic Transition
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2024 2026 2028 2030 2032 2034 2036 2038 2040 2042 2044 2046 2048 2050

EV chargers


Domestic EV chargers by scenario
SSEN North of Scotland licence area
Units: MW
DFES 24 range
Falling Behind
Hydrogen Evolution
Electric Engagement
Holistic Transition
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2024 2026 2028 2030 2032 2034 2036 2038 2040 2042 2044 2046 2048 2050



EV baseline

Status		Vehicles	Changes since DFES 2024
Baseline	Plug-in cars	36,000	The number of EVs in the North of Scotland licence area has increased from 24,000 to 38,000. The total number of vehicles of all fuel types in the North of Scotland licence area decreased by 5.4% from 974,000 to 921,000. This is due to changes in local authority boundaries, which carry through to Regen's analysis of licence area baselines and affect vehicle numbers (and future projections).
	Plug-in LGVs	1,200	
	Other EVs	336	

EV charger baseline

Status	Capacity (MW)		Changes since DFES 2024
Baseline	Domestic (modelled)	177	The calculated baseline charger capacity, based on the number of EVs in the licence area, has increased to 177 MW from 72 MW in DFES 2024. The significant increase is reflective of EV uptake being primarily driven by cars, which have increased by 12,000 in the North of Scotland licence area.
	Domestic (SSEN connections)	46	DFES 2025 is the first time that domestic EV charger baseline data from SSEN has been

Status	Capacity (MW)		Changes since DFES 2024
			available to use. SSEN's connections data includes 46 MW of domestic charger capacity recorded in the licence area. The variance in connected charger capacity could be due to a range of reasons, including: • The data may not capture charging via domestic 3-pin charging • The registered capacity in the SSEN data may not be accurate for all chargers recorded • Installers may not notify SSEN of chargers • There may be differences in the model assumptions applied to calculate baseline charger capacity.
	Non-domestic (OpenChargeMap)	64	Non-domestic charging capacity has increased by 4 MW since DFES 2024. This is a slightly smaller increase than the 6 MW that was modelled to connect in 2025 in the DFES 2024 **Counterfactual** scenario.
	Non-domestic (SSEN connections)	28	SSEN connections data records 28 MW of commercial EV charger capacity in the North of Scotland licence area. The variance is likely due to incomplete customer notifications to SSEN when chargers are installed.

Post-pipeline projections

Scenario	Changes compared to DFES 2024
Holistic Transition	The uptake of EV cars, LGVs and motorcycles is faster compared to DFES 2024. However, from 2042, there are fewer total EVs in DFES 2025 compared to 2024, due to there being 4% fewer vehicles in total by 2050 in the FES under this scenario. EV bus, coach and HGV uptake is also broadly aligned with DFES 2024 up until 2045. By 2050, there are 9% fewer of these vehicles in DFES 2025, due to changes in the overall FES uptake pathways. Domestic EV charger capacity has increased in DFES 2025. This is the result of an increased uptake of EVs relative to DFES 2024 and changes to the domestic charger methodology outlined in the modelling factors section below, which references the tRESP CPAs provided by NESO. The

	difference is greatest in the 2030s, and by 2050, there is an additional 1% of EV charger capacity projected relative to DFES 2024. Non-domestic EV charger uptake is higher than DFES 2024 up until 2043, with a faster deployment of chargers and significantly higher capacity through the 2030s. In the early 2040s, the difference is reduced. By 2045, non-domestic charger capacity in DFES 2025 is slightly lower than in DFES 2024, resulting in 4% less capacity by 2050.
Electric Engagement	Uptake of EV cars, vans and motorcycles in DFES 2025 is slightly slower than in DFES 2024 in the near-to-medium term. However, DFES 2025 has more EVs from 2045 onwards, resulting in 6% more EVs by 2050 for these vehicle classes. EV buses, coaches and HGVs are closely aligned to DFES 2024 until the late 2030s, after which DFES 2025 sees a lesser uptake of EVs for these vehicle types. By 2050, DFES 2025 has 10% fewer EV buses, coaches and HGVs than DFES 2024. This is due to changes in the FES uptake pathways. Domestic EV charger deployment under this scenario is closely aligned to DFES 2024 until the late 2030s, after which it is slightly higher. By 2050, DFES 2025 has 8% more domestic charging capacity than DFES 2024. This is due to changes to the domestic charging methodology, outlined in the modelling factors section below. This is related to the tRESP CPAs provided by NESO. Non-domestic charger uptake closely aligns with DFES 2024 across the modelling period. Overall, DFES 2025 is slightly higher, with an additional 2% capacity compared with DFES 2024.
Hydrogen Evolution	In the short-to-medium term, the uptake of EV cars, vans and motorcycles is significantly higher under this scenario than in DFES 2024. However, there are 3% fewer EVs of this type by 2050. This is due to changes in the FES uptake pathways. EV buses, coaches and HGVs are significantly higher from the 2030s relative to DFES 2024, with 13% more of these vehicles modelled to be on the road by 2050. This is due to a shift away from hydrogen as a potential transport fuel solution for non-domestic vehicles within the FES 2025 assumptions and, as a result, a higher adoption of EVs. Domestic charger deployment is much higher than DFES 2024 up until the late 2030s, but is significantly lower in the longer term, with 22% less charging capacity by 2050. This is due to changes in the overall methodology, outlined in the modelling factors section below. This is related to the tRESP CPAs provided by NESO.

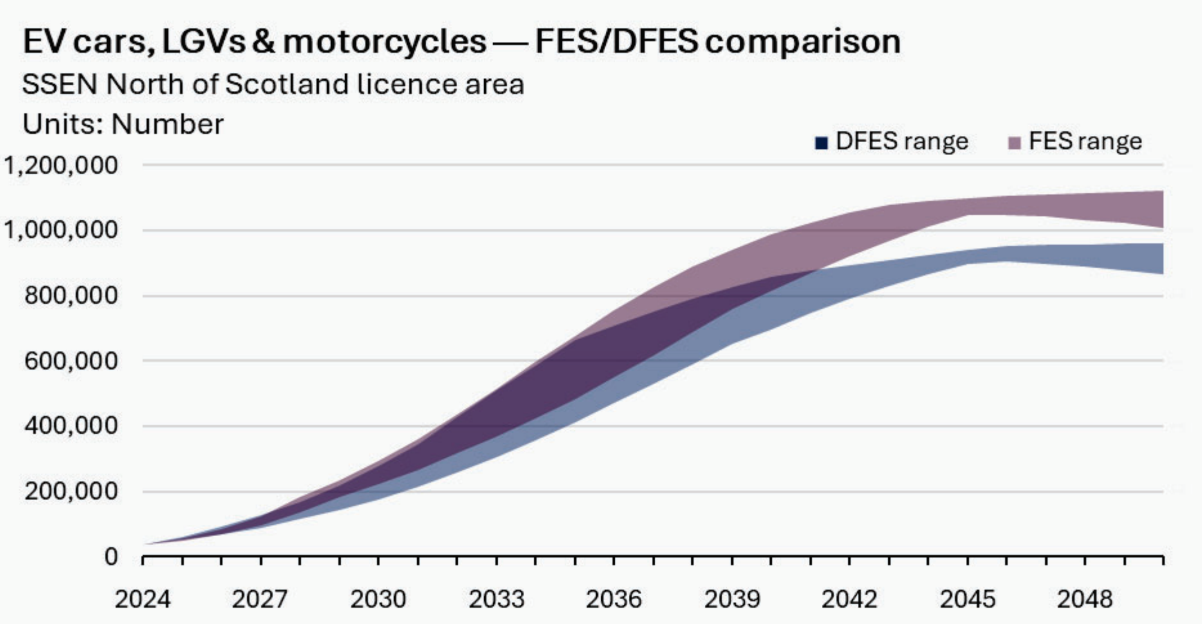
	Non-domestic chargers have a significantly higher deployment under this scenario, with an additional 5% capacity relative to DFES 2024 by 2050. This is due to the shift away from hydrogen as a transport fuel solution for non-domestic vehicles, the higher uptake of EVs in the medium-term and changes to the charging methodology.
Falling Behind	Uptake of EV cars, LGVs and motorcycles in **Falling Behind** is slightly higher than in the DFES 2024 **Counterfactual** scenario, up until 2040. By 2050, there are 3% fewer vehicles on the road than in DFES 2024. The uptake of EV buses, coaches and HGVs in **Falling Behind** is aligned with the DFES 2024 **Counterfactual** up until the early 2040s, after which DFES 2025 is lower. By 2050, there are 13% fewer EVs in these vehicle classes in DFES 2025 compared to DFES 2024. This is due to changes in the FES uptake pathways. Domestic EV charger deployment in DFES 2025 is slightly faster in the near term, but significantly lower in the long term, compared to DFES 2024. By 2050, DFES 2025 has 23% less domestic charging capacity compared to DFES 2024 due to changes in the methodology, as outlined in the modelling factors section. This is related to the tRESP CPAs provided by NESO. Non-domestic charger capacity aligns closely with DFES 2024 throughout the modelling period. While DFES 2025 is broadly higher than DFES 2024, the last three years of the projection period have had a lower non-domestic charging capacity. By 2050, however, DFES 2025 has 7% less capacity for non-domestic chargers than in DFES 2024 due to the decrease in vehicle numbers.

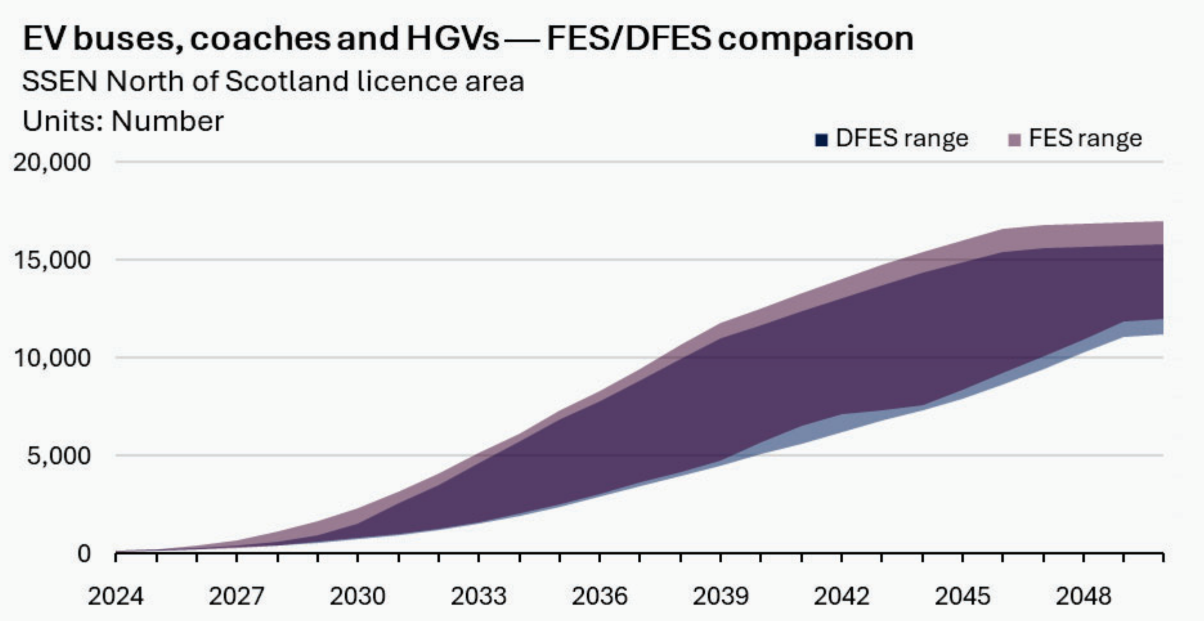
Modelling factors

Factor	Impact	Changes compared to DFES 2024
Vehicle uptake	Number of vehicles	The uptake curves for battery electric and hybrid cars and LGVs under the three net zero scenarios have been taken from the DFES 2024 **Electric Engagement** scenario up to 2040, after which they follow the FES 2025 uptake. The uptake rates under the net zero scenarios in FES 2025 assume that sales of new hybrid vehicles (without a plug) would be phased out from 2030. However, a policy change has since allowed these vehicles to be sold until 2035, delaying the uptake in that period. The DFES 2024 net zero scenarios reflect the latest policy position, whereas the FES 2025 scenarios do not.

Domestic charger methodology	Domestic charger capacity	The methodology for determining domestic charging capacity has been updated to better reflect actual charging demand, in line with the tRESP CPAs published by NESO. This has caused a minor decrease in capacity in the **Electric Engagement** and **Holistic Transition** pathways and a significant decrease in the **Hydrogen Evolution** and **Falling Behind** pathways. Differences across these scenarios are reflective of the underlying assumptions of charging behaviour.
Percentage of miles driven on electricity	Charger capacity	The percentage of miles which hybrid vehicles do on their electric drivetrains has been uplifted from 30% to 50% in line with the tRESP CPAs published by NESO.

Reconciliation





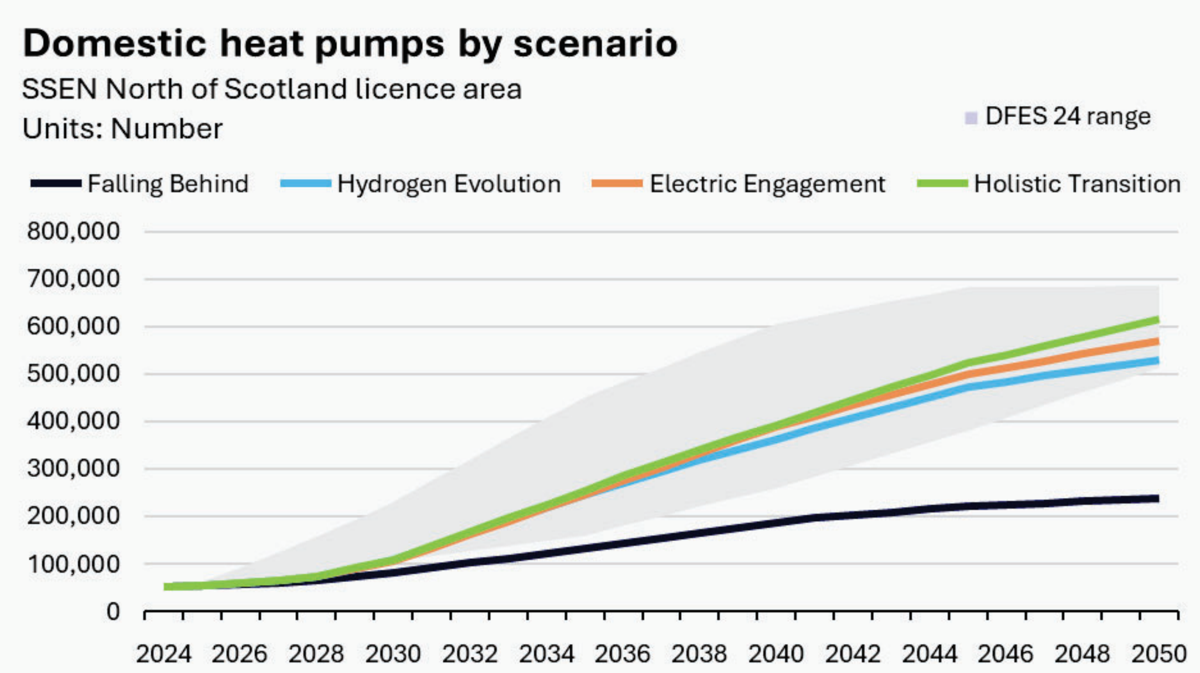
Comparison	Details
DFES 2025 to DFES 2024	The DFES 2025 scenario range for EV cars, vans and motorcycles is closely aligned to the scenario range in DFES 2024 throughout the modelling period, with a slightly narrower scenario range by 2050. The uptake of EV buses, coaches and HGVs is also closely aligned to DFES 2024. The range of final vehicle numbers by 2050 in DFES 2025 is narrower and within the DFES 2024 range. Growth in domestic charger capacity is slower in DFES 2025 than in DFES 2024 for the **Hydrogen Evolution** and **Falling Behind** scenarios. In **Electric Engagement** and **Holistic Transition**, despite a slightly slower uptake by the late 2030s, the final number of chargers by 2050 is higher in DFES 2025. The scenario range by 2050 is also significantly wider in the DFES 2025 due to the significant decrease in capacity in **Hydrogen Evolution** and **Falling Behind** compared to DFES 2024. Non-domestic charger capacity in DFES 2025 is very closely aligned to DFES 2024 for all scenarios except **Hydrogen Evolution**, which has a much greater capacity. The increased capacity in **Hydrogen Evolution** also causes a wider scenario range throughout the whole modelling period.
DFES 2025 to FES 2025	Vehicle adoption for EV cars, vans and motorcycles is aligned with the FES 2025 projections in the near term, though the **Falling Behind** scenario has a much slower uptake. From the 2030s onwards, the DFES

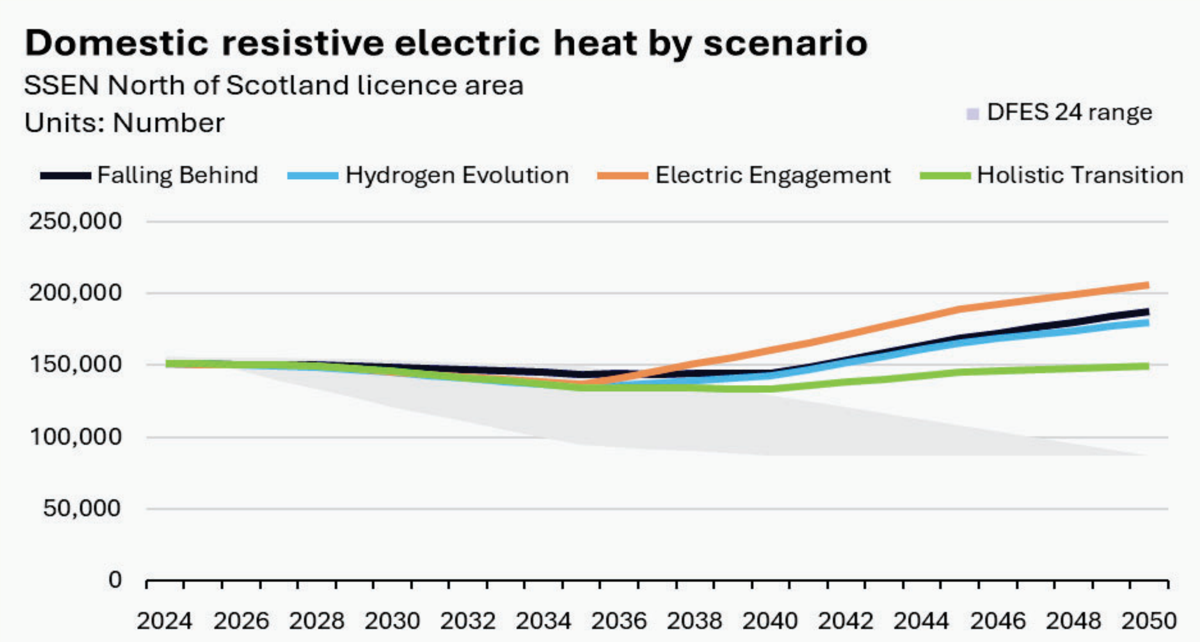
	2025 projections are significantly lower than the FES 2025, with a difference of approximately 150,000 vehicles by 2050. Whilst the reason for this is not fully clear, Regen's analysis draws directly on government statistics for vehicle numbers in the North of Scotland licence area, combined with EV uptake assumptions from the FES 2025. This provides a granular and locally grounded projection that provides an accurate reflection of regional trends out to 2050. For EV buses, coaches and HGVs, projections are slightly lower than FES 2025 throughout the modelling period, but are overall closely aligned. Note: FES does not produce EV charger capacity projections to licence area levels, and so no comparison has been made.

Heat in buildings

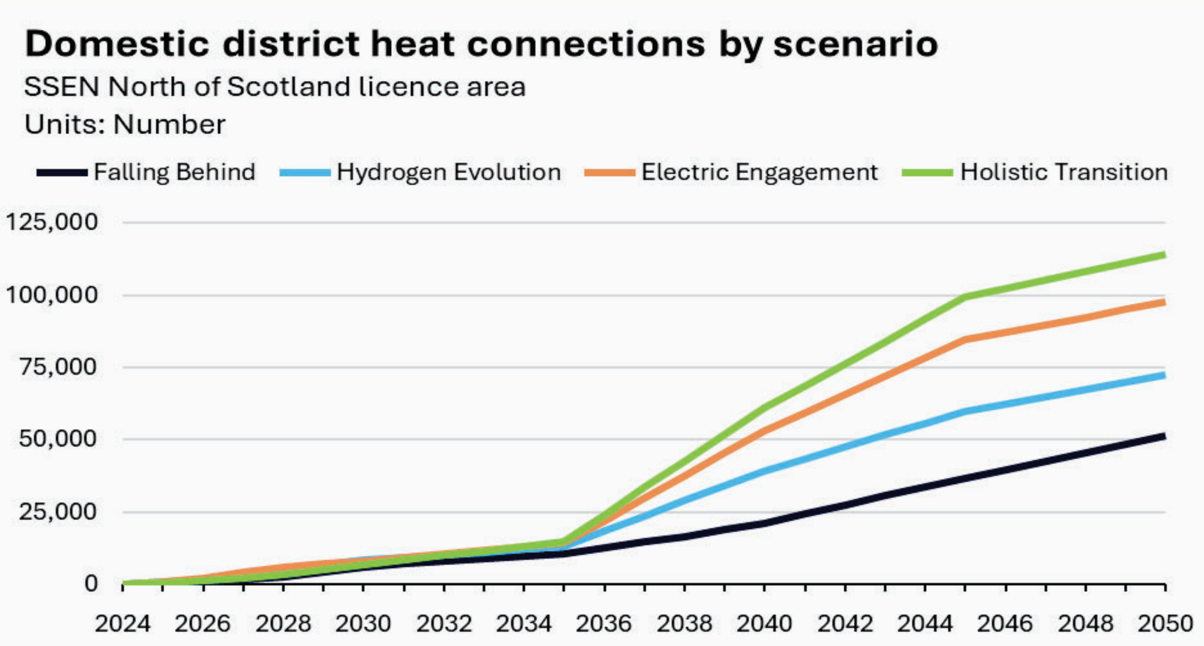
Technical specification	Building blocks
Heat pumps, domestic non-hybrid	Lct_BB005
Heat pumps, domestic hybrid	Lct_BB006
Heat pumps, industrial and commercial hybrid	Lct_BB007
Heat pumps, industrial and commercial non-hybrid	Lct_BB008
District heating	Lct_BB009

DFES 2025 scenario projections

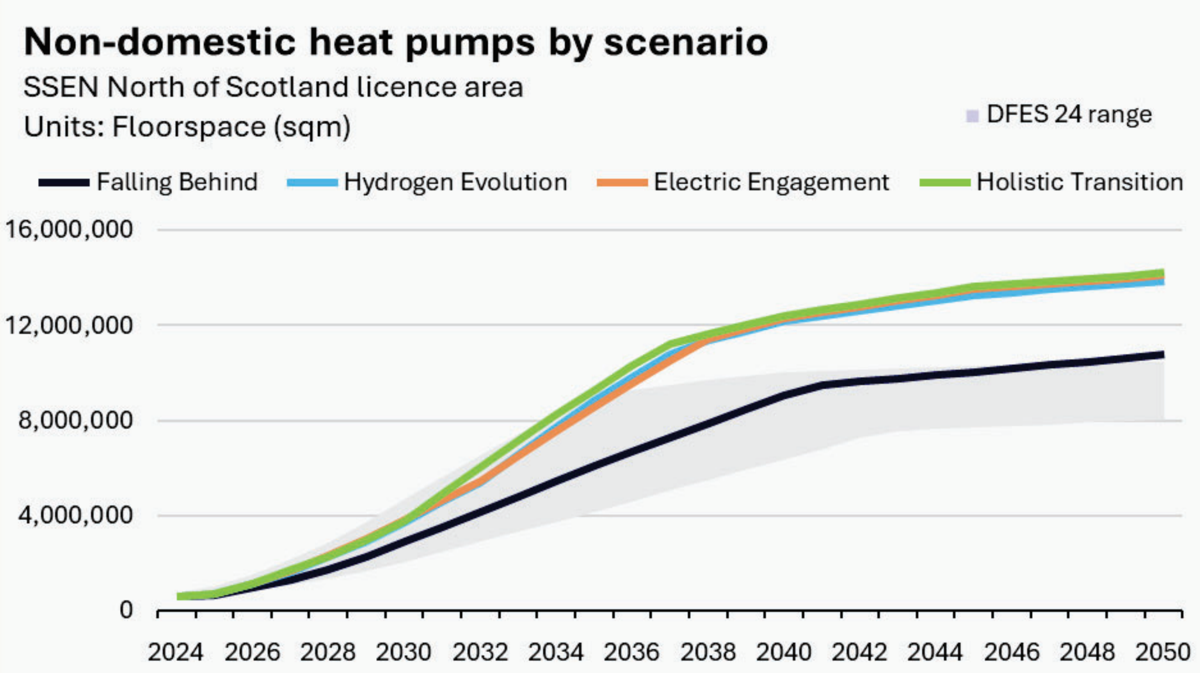


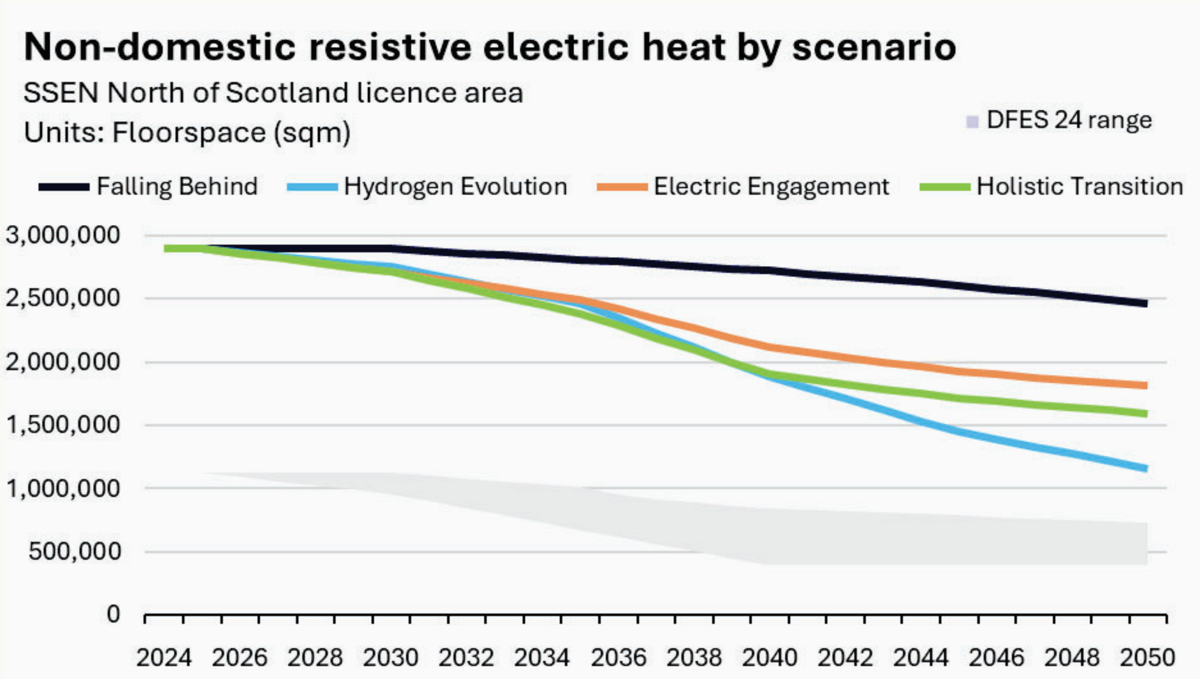


Note: Resistive electric heating is modelled to decline in some types of home (such as where households may be able to shift to a heat pump or district heating connection) and increase in others (such as where a space-constrained home currently fuelled by mains gas or oil may not be able to install a heat pump or connect to a district heat network). This means that different areas will see different trends in the overall licence area trajectory, where the archetype of housing is different. For example, an area with lots of homes with resistive heating will see a decline in resistive heating, as many of these homes adopt more efficient technologies. Another area might have little or no resistive heating, but it does have many small homes with gas or liquid fuel. We assume a portion of these homes (where heat demand is low) will adopt smart resistive heating technologies, rather than heat pumps.



Note: Domestic district heat connections were not included in DFES 2024 as a direct output. As a result, the above graph has no DFES 2024 range.





Baseline and pipeline

Status	Details	Number of homes	Changes since DFES 2024
Baseline	Heat pumps	53,000	The heat pump baseline has increased by c. 10% since DFES 2024, reflecting the uptake of heat pumps in new and existing properties over the last year.
	Resistive electric heating	151,000	The resistive electric heating baseline has remained largely unchanged since DFES 2024.

Non-domestic heat baseline

Status	Details	Floorspace (million sqm)	Changes since DFES 2024
Baseline	Heat pumps	0.6	While uptake of non-domestic heat pumps has increased across GB, this is countered by the identification and removal of additional duplicate certificates in the EPC data used to model non-domestic heat. As a result, the overall modelled baseline is similar to DFES 2024.
	Resistive electric heating	2.9	Updates to the classification of the main heating fuel and heating, ventilation and air conditioning (HVAC) environment described in Scottish EPC data has resulted in a proportion of buildings previously categorised as 'unheated' or 'air conditioning only' being recategorised as resistive electric heating. As a result, the baseline position has more than doubled compared to DFES 2024.

Projections

Scenario	Changes compared to DFES 2024
Holistic Transition	The uptake of domestic heat pumps in the three net zero scenarios occurs more slowly than in DFES 2024. This is the product of two changes to the modelling. First, the overarching FES framework has been updated to project a slower uptake of heat pumps in the near term, reflecting current uptake rates. This has been reflected in the DFES modelling. Second, the DFES no longer directly meets the previous Scottish Government Heat in Buildings target of over one million homes converted to low-carbon heating systems by 2030, approximately 170,000 low-carbon heating systems installed per year. This is based on this target not being included in the Scottish Government's latest Heat in Buildings: progress report 2025 and appearing to have been dropped. This results in a much slower uptake of heat pumps compared to DFES 2024 in these scenarios. In the longer term, updates to the FES modelling framework for resistive electric heating result in a greater proportion of homes remaining on or switching to resistive electric heating compared to DFES 2024. The proportion of homes using resistive electric heating is much higher in the North of Scotland licence area compared to the GB average, and as a result, the uptake of heat pumps in the licence area is lower compared to other areas of GB. By 2050, the total number of homes using electric heating (through heat pumps or resistive electric heating) is similar between DFES 2024 and DFES 2025 in the three net zero scenarios. For domestic resistive electric heating, the DFES projections have been updated to align with the FES 2025 pathways. FES 2025 now reflects a more significant role for resistive electric heating in the longer term, as supported by the findings of Public First's report for NESO.[2] In the decade up to 2035, this additional electric heating is in the context of lower heat pump deployment and a slower transition more generally. By 2050, it goes alongside fewer hybrid heat pumps and hydrogen or biofuel boilers in FES 2025, as compared to FES 2024. For non-domestic heat pumps, a slower uptake is modelled in the near term, compared to DFES 2024. Similar to domestic heat, this is a reflection of limited uptake rates currently. In the longer term, the DFES 2025 projections see an increased level of uptake compared to DFES 2024; however, this is almost entirely related to the increased projected

[2] Domestic Heat Decarbonisation Insight, Public First, April 2025

Scenario	Changes compared to DFES 2024
	floorspace of new non-domestic developments. Outside of heat pumps associated with new developments, the DFES 2024 and DFES 2025 outcomes are similar in the long term. Other than the increased baseline, resistive electric heat follows the same trend as in DFES 2024.
Electric Engagement	The uptake of domestic heat pumps in the three net zero scenarios occurs more slowly than in DFES 2024 due to changes in the overarching FES framework, combined with changes to how the Scottish Government targets have been reflected in the DFES scenarios. This results in a slower uptake of heat pumps in the near term, reflecting current uptake trends. For domestic resistive electric heating, the DFES projections have been updated to consider the FES 2025 pathways. This now reflects a significantly larger role for resistive electric heating in the longer term, rather than alternative low-carbon heating technologies, such as bioenergy, that featured more heavily in this scenario in FES 2024 and DFES 2024. For non-domestic heat pumps, a slower uptake is modelled in the near term, compared to DFES 2024. Similar to domestic heat, this is a reflection of limited uptake rates currently. In the longer term, the DFES 2025 projections see an increased level of uptake compared to DFES 2024; however, this is almost entirely related to the increased projected floorspace of new non-domestic developments. Outside of heat pumps associated with new developments, the DFES 2024 and DFES 2025 outcomes are similar in the long term. Other than the increased baseline, resistive electric heat follows the same trend as in DFES 2024.
Hydrogen Evolution	The uptake of domestic heat pumps in the three net zero scenarios occurs more slowly than in DFES 2024 due to changes in the overarching FES framework, combined with changes to how the Scottish Government targets have been reflected in the DFES scenarios. This results in a slower uptake of heat pumps in the near term, reflecting current uptake trends. Within the domestic heat pump sub-technologies, the DFES 2025 projects a greater number of standalone heat pumps and a smaller number of hybrid heat pumps compared to DFES 2024. This reflects changes in the FES scenarios, where NESO has shifted its assumptions on consumer demand from hydrogen to electrification across all scenarios.

Scenario	Changes compared to DFES 2024
	For domestic resistive electric heating, the DFES projections have been updated to consider the FES 2025 pathways. This now reflects a significantly larger role for resistive electric heating in the longer term, rather than alternative low-carbon heating technologies, such as hydrogen and bioenergy, that featured more heavily in this scenario in FES 2024 and DFES 2024. For non-domestic heat pumps, a slower uptake is modelled in the near term, compared to DFES 2024. Similar to domestic heat, this is a reflection of limited uptake rates currently. In the longer term, the DFES 2025 projections see an increased level of uptake compared to DFES 2024; however, this is almost entirely related to the increased projected floorspace of new non-domestic developments. Outside of heat pumps associated with new developments, the DFES 2024 and DFES 2025 outcomes are similar in the long term. Other than the increased baseline, resistive electric heat follows the same trend as in DFES 2024.
Falling Behind	For domestic heat pumps, the scenario projection has changed significantly in the longer term compared to DFES 2024. This reflects changes in FES 2025 pathways, which project a longer period of low heat pump uptake under this non-net zero compliant scenario, resulting in more homes left with gas boilers to 2050. For domestic resistive electric heating and heat networks, the DFES projections have been updated to consider the FES 2025 pathways. This now shows a significantly larger role for both technologies in the longer term, rather than alternative low-carbon heating technologies, such as heat pumps, that featured more heavily in this scenario in FES 2024 and DFES 2024. For non-domestic heat pumps, a slower uptake is modelled in the near term, compared to DFES 2024. Similar to domestic heat, this is a reflection of limited uptake rates currently. In the longer term, the DFES 2025 projections see an increased level of uptake compared to DFES 2024; however, this is almost entirely related to the increased projected floorspace of new non-domestic developments. Outside of heat pumps associated with new developments, the DFES 2024 and DFES 2025 outcomes are similar in the long term. Other than the increased baseline, resistive electric heat follows the same trend as in DFES 2024.

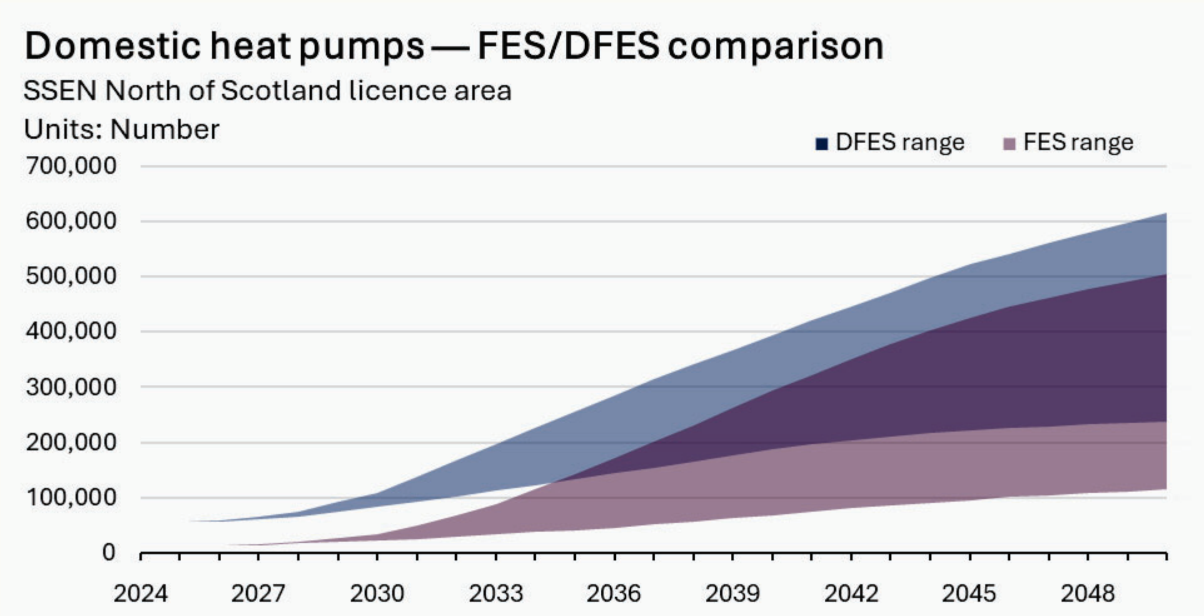
Modelling factors

Factor	Impact	Changes compared to DFES 2024
Projected technology uptake by building archetype	Domestic uptake modelling	Regen has undertaken a full review of our technology distribution across all archetypes and scenarios. This reflects changes to the FES, the latest evidence on current heat pump uptake and new insight from the retrofit sector. The overall methodological approach is unchanged.
Modelled technologies	Domestic uptake modelling and spatial distribution	The non-hybrid heat pump sub-technology has been subdivided into hydronic (air-to-water) heat pumps and air-to-air heat pumps. This reflects underlying modelling in previous iterations of the DFES that reflected the potential for air-to-air heat pump systems in some buildings, such as flats.
Modelled archetypes	Domestic uptake modelling and spatial distribution	A new archetype has been created for existing communal heating – modelled to remain communal and be decarbonised with district heating heat pumps over time, with the rate of conversion depending on the scenario.
Electric heating in new build homes	Domestic uptake modelling and spatial distribution	Updated the proportion of new build properties that have ASHPs installed, reflecting the latest data that 25% of new builds are built with ASHPs already. This is based on EPC data, as processed by Ambient.[3] This is projected to increase to 100% by 2027 due to Scotland's New Build Heat Standard.
Non-domestic building stock	Non-domestic uptake modelling and spatial distribution	The non-domestic building stock in DFES is modelled based on location, HVAC, heating fuel and floorspace data from non-domestic EPCs and Display Energy Certificates (DECs). The updated non-domestic building stock modelling has led to an increased proportion of properties modelled as having resistive electric heating. This is due to updated certificates for some buildings, alongside updated classification of building HVAC environment descriptions, classifying more buildings as resistive electric heating that were previously classified as other non-electric heating types, air conditioning or unheated.

[3] August Electrification of Heat Tracker (EHTT), Ambient, 28 August 2025.

Factor	Impact	Changes compared to DFES 2024
Projected technology uptake by building archetype	Non-domestic uptake modelling	The DFES methodology categorises non-domestic buildings into archetypes, based on each building's current HVAC system, heating fuel and location within a potential district heating or hydrogen supply zone. The uptake rates for heat pumps and resistive electric heating in each of these archetypes have been updated to reflect the FES 2025 pathways.

Reconciliation



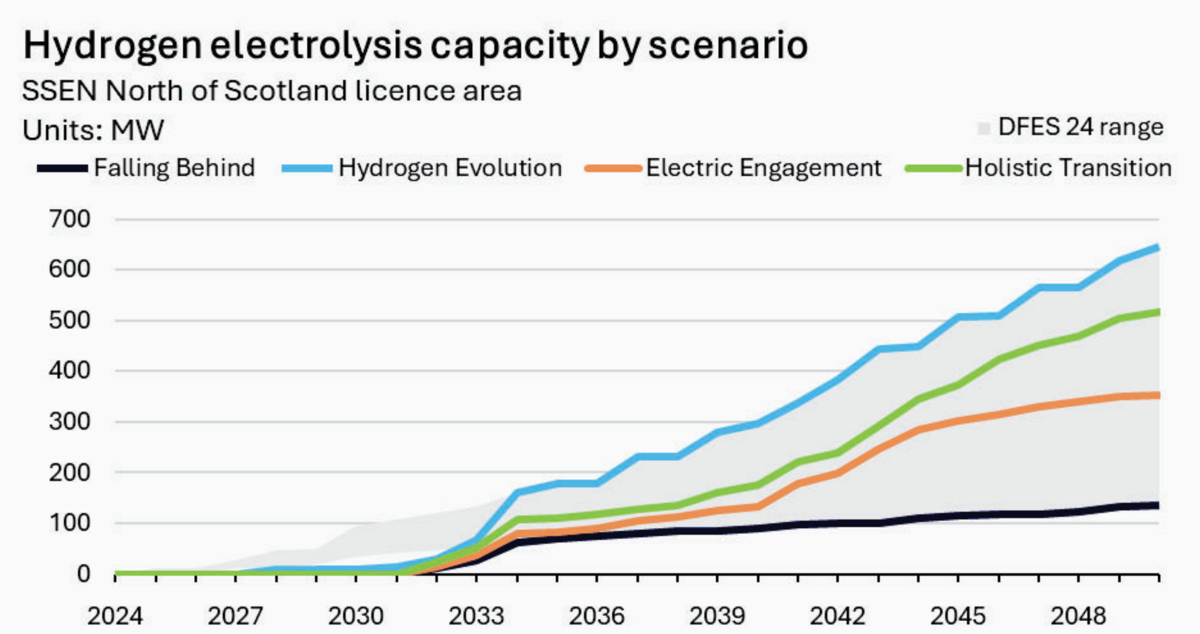
Comparison	Details
DFES 2025 to DFES 2024	The uptake of domestic heat pumps in the three net zero scenarios occurs more slowly than in DFES 2024 due to changes in the overarching FES framework, combined with changes to how the Scottish Government targets have been reflected in the DFES scenarios. By 2050, the total number of homes using electric heating (through heat pumps or resistive electric heating) is similar between DFES 2024 and DFES 2025 in the three net zero scenarios. The **Falling Behind** scenario models much lower uptake by 2050, reflecting a change in the FES 2025 scenario framework.

	The longer-term scenario outcomes for domestic resistive electric heating are much higher than projected in DFES 2024, with increasing projections from 2035 onwards under all scenarios, compared to the decline previously projected. Again, this reflects changes to the overarching FES 2025 framework, where resistive heating has a much stronger role in heat decarbonisation in the long term. This has been carried over into the DFES 2025 modelling. For non-domestic heating, the uptake of heat pumps and resistive electric heating follows a similar trend to DFES 2024 under each scenario, albeit with resistive electric heating starting from a much higher baseline position.
DFES 2025 to FES 2025	The DFES heat pump baseline is around 40,000 higher than the FES baseline for the North of Scotland licence area. This is likely due to the use of EPC data to inform the DFES baseline, which may capture heat pumps installed outside of registers, such as MCS. Throughout the projections, the DFES follows a similar overall trend to the FES scenarios, but reflects the higher baseline position throughout the scenario timeframe. There is no regional FES data for resistive electric heating. The regional FES data for non-domestic electric heating is by number of properties rather than floorspace, and as such, a direct comparison cannot be made.

Hydrogen electrolysis

Technical specification	Building blocks
Distribution-connected hydrogen electrolysis	Dem_BB009

DFES 2025 scenario projections



Baseline and pipeline

Status	Details	Capacity (MW)	Changes since DFES 2024
Baseline	Connected	0 MW	In DFES 2024, no operational hydrogen electrolyser projects were found to be connected. There has been no change to this baseline in DFES 2025.
Pipeline	Planning permission granted	0 MW	As seen in DFES 2024, there are currently no projects in development that have received planning approval.
Pipeline	Planning permission submitted	0 MW	There are currently no projects in development with planning permission submitted. This is lower than in DFES 2024, which included a 10.4 MW project at Cromarty Distilleries. This has

			now been identified as connecting directly to generation and will not have a distribution network connection.
Pipeline	No information	14 MW	Two further projects have been identified as possibly seeking to connect to the distribution network in the North of Scotland. These include: • Binn Eco Park (10 MW) • H2Malt Protium Arbroath (4 MW). These have been assumed to connect in the **Hydrogen Evolution** scenario only. Whilst the Binn Eco Park project has been shortlisted in the second Hydrogen Allocation Round (HAR2), it has not been included in the other net zero scenarios as it does not currently have a connection offer to connect to SSEN's distribution network.

Post-pipeline projections

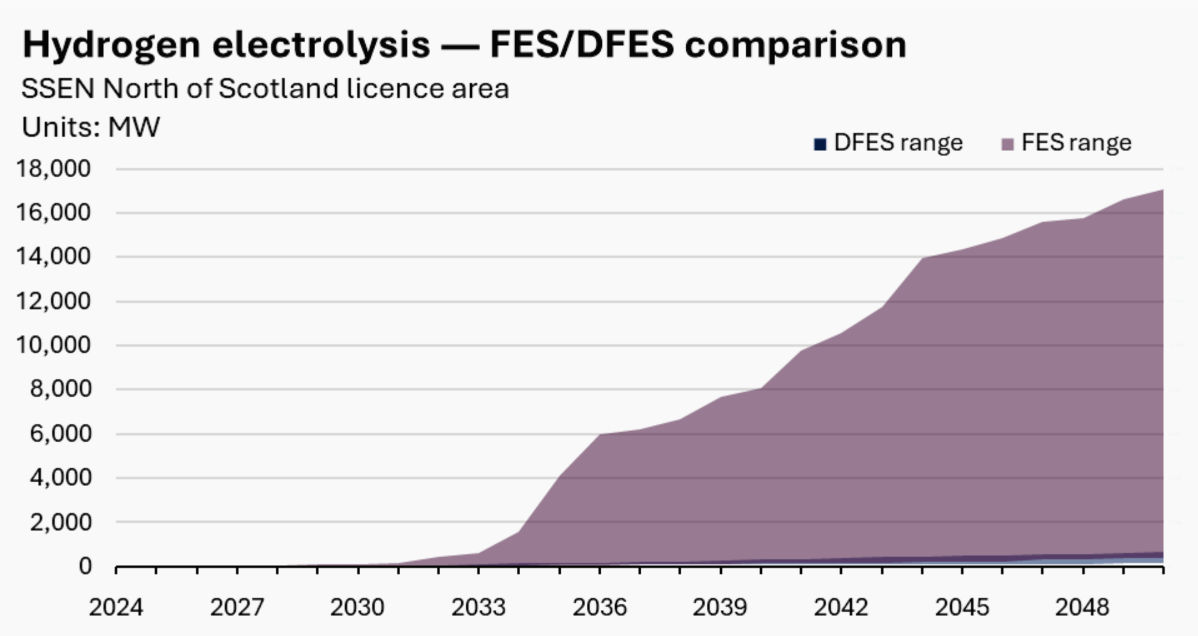
Scenario	Changes compared to DFES 2024
Holistic Transition	In the near term, capacity projections are based solely on known pipeline sites (see more information in the modelling factors table below). This results in lower near-term figures across all scenarios. This provides a more accurate picture of the currently limited development of distributed electrolysers. In the medium and long term, capacity projections remain unchanged from DFES 2024.
Electric Engagement	
Hydrogen Evolution	
Falling Behind	

Modelling factors

Factor	Impact	Changes compared to DFES 2024
Hydrogen Allocation Rounds (HARs)	Uptake modelling	Feedback received in 2024 indicated that commercial electrolysis projects would not be feasible in the near term without HAR support. Four projects in the North of Scotland licence area have won or have been shortlisted for HAR funding. However, none of these are currently anticipated to connect to the

		distribution network. As mentioned in the previous section, the Binn Eco Park project has been assumed to connect to the distribution network in the **Hydrogen Evolution** scenario only, despite not currently holding a connection offer with SSEN, as this is the scenario that is most supportive of decentralised green hydrogen production.
Long-term growth in electrolysis capacity	Uptake modelling	In DFES 2025, the long-term projections are based on DFES 2024. These projections are based on FES projections for national networked electrolysis, paired with a regional analysis of potential supply and demand drivers for hydrogen.

Reconciliation



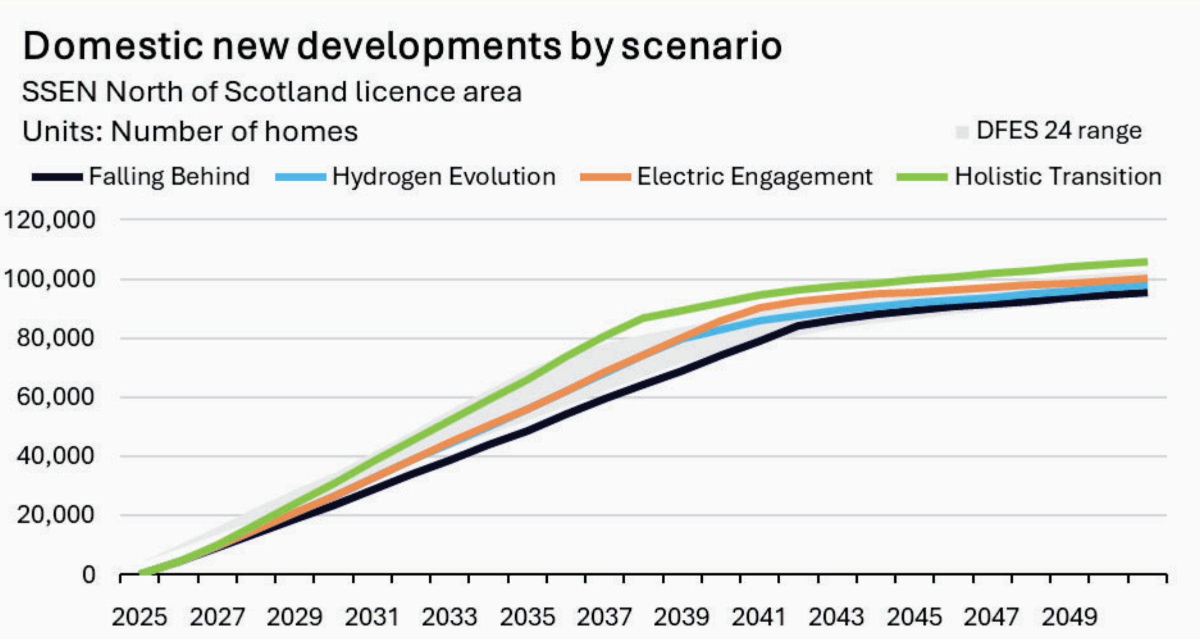
Comparison	Details
DFES 2025 to DFES 2024	In the near-term, DFES 2025 projections are lower than DFES 2024, reflecting more limited sector development in the licence area. In the long term, DFES 2025 projections are based on DFES 2024 projections.
DFES 2025 to FES 2025	Throughout the period to 2050, the DFES 2025 projections are significantly lower than the FES 2025. In the near term, this reflects the lack of upcoming development activity.

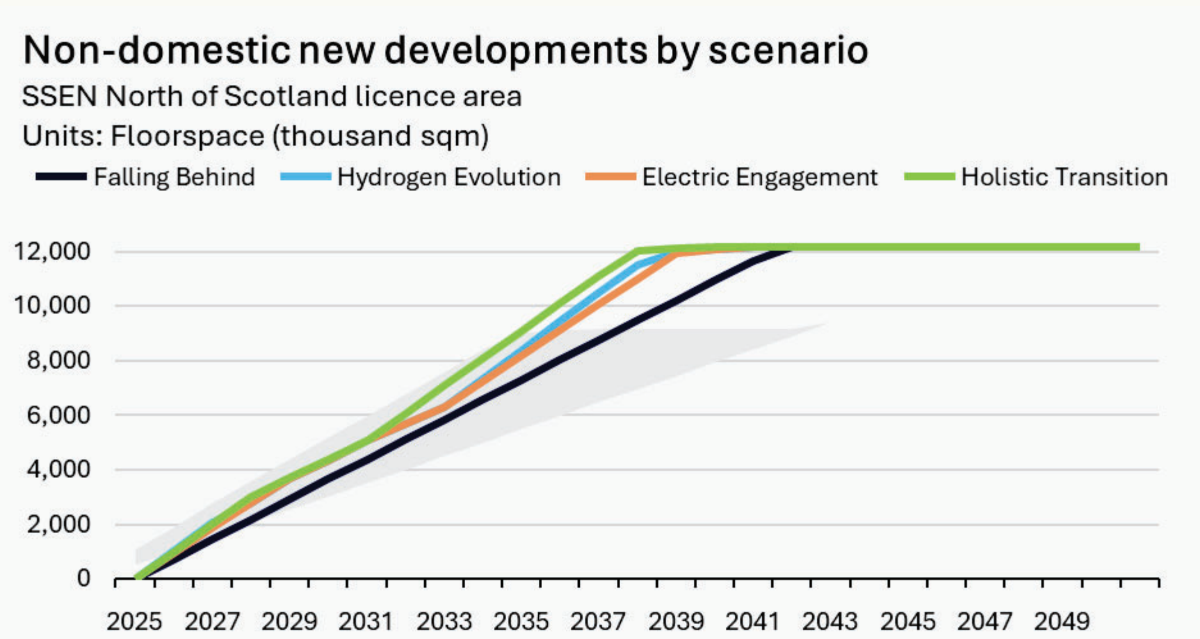
	In the medium and long term, the main driver of this difference is the method used to apportion capacity between licence areas in the FES. This results in more than half of GB electrolysis capacity being allocated to just three licence areas in the net zero scenarios, with minimal capacity assigned elsewhere. In FES 2025, under the **Hydrogen Evolution** scenario, over 17 GW (out of the total GB electrolysis capacity projection of 39 GW) is allocated to SSEN's North of Scotland licence area. Being that the distribution network in the North of Scotland operates at 11 kV and 33 kV only, 17 GW of capacity would reflect a significant deployment of electrolyser projects across many areas of the North of Scotland licence area. The DFES applies Regen's regional analysis of hydrogen supply and demand drivers, resulting in a more even distribution of capacity across areas where localised factors could drive project development. For the North of Scotland licence area, this approach produces significantly lower DFES projections than FES.

New developments

Technical specification	Building blocks
Number of domestic customers	Dem_BB001a
Floor area of industrial and commercial customers	Dem_BB002b

DFES 2025 scenario projections





Baseline and pipeline

Status	Development status	Number of domestic sites *(homes)*	Changes since DFES 2024, sites *(homes)*	Number of non-domestic sites *(sqm)*	Changes since DFES 2024, sites *(sqm)*
Baseline	The analysis of new developments in the DFES focuses on additional future domestic and non-domestic buildings. Therefore, no baseline is defined.				
Pipeline	Total sites (No. of homes/sqm)	601 (83,747)	- 17 (- 2,772)	1,002 (12,189,810)	+ 450 (+ 2,518,029)
Pipeline	Buildout provided by local authority (No. of homes/sqm)	466 (64,008)	+ 43 (- 435)	389 (7,047,197)	- 27 (- 1,399,557)
Additional sites provided by the local authority with no buildout profile provided:					
Pipeline	Under construction	9 (442)	+ 2 (+ 149)	2 (61,389)	No Change
	Granted	24 (5,768)	+ 5 (+ 3,611)	67 (346,976)	+ 39 (+ 259,261)
	Submitted	n/a	n/a	3 (+ 4,925)	No Change
	Allocated/pre-planning	96 (13,179)	- 73 (- 6,447)	541 (4,729,322)	+ 438 (+ 3,822,325)

Local authority data

New development type	Local authorities updated	Changes compared to DFES 2024
The DFES projections for new developments focus on data for new homes and non-domestic floorspace provided by local authority planning departments, including the location, size and buildout rates for new housing developments, alongside the type of property for non-domestic developments.		

Domestic properties	43%	DFES 2025 saw one fewer local authority update its domestic new developments pipeline data compared to DFES 2024.
Non-domestic floorspace	36%	DFES 2025 saw two more local authorities update their non-domestic new developments pipeline data compared to DFES 2024.

Post-pipeline projections

Post-pipeline projections are only modelled for domestic new developments, as there are no reliable data sources for non-domestic building targets.

Scenario	Changes compared to DFES 2024
Holistic Transition	By 2050, DFES 2025 projects between 92,000 and 103,000 new homes to be built in the SHPED licence area. There is no significant difference when compared to DFES 2024.
Electric Engagement	
Hydrogen Evolution	
Falling Behind	

Modelling factors

There have been no updates to the modelling factors in DFES 2025 for the North of Scotland licence area.

Reconciliation

Comparison	Details
DFES 2025 to DFES 2024	The domestic model aligns with DFES 2024. No modelling assumptions have been changed, and there have been minimal changes to the pipeline of new developments provided by local authorities. The non-domestic projections slightly exceed the DFES 2024 projections, but are broadly aligned. This slight increase is driven by the updated data sets provided by local authorities, adding 2.5 million sqm of additional development floorspace to the pipeline analysis. The range of the three scenarios has also narrowed in the DFES 2025 projections.
DFES 2025 to FES 2025	There is no variation for future housing growth or non-domestic floorspace under the four FES scenarios. The equivalent of non-domestic

	floorspace is also not modelled within the FES framework. Therefore, the new development outputs have not been reconciled against the FES 2024 data.

tRESP comparison annex

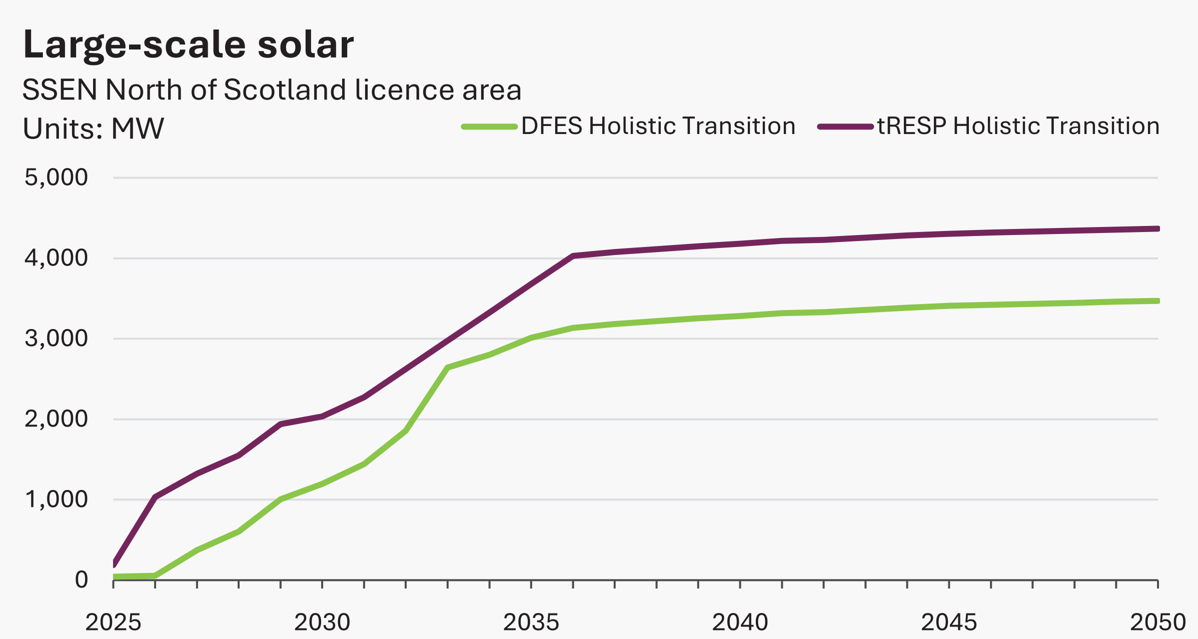
tRESP comparison

This annex has been included to provide a comparative assessment of DFES 2025 outputs and the transitional RESP (tRESP) pathways following the publication of tRESP in early 2026. It presents a technology-by-technology comparison of projections at licence area level, using the technology building block classifications applied within the DFES.

Comparison method

tRESP has been published in fiscal years (April to March) whilst SSEN DFES is published in calendar years (January to December). For the purposes of this comparison, tRESP fiscal years have been compared to SSEN calendar years. For example, DFES 2025 (Jan to Dec 2025) is compared against tRESP 2025 (Apr 2025 to Mar 2026). For technologies like onshore wind, large-scale solar and large-scale storage this may drive some near-term discrepancies, where large projects are energised in the same month but this is tagged to different years.

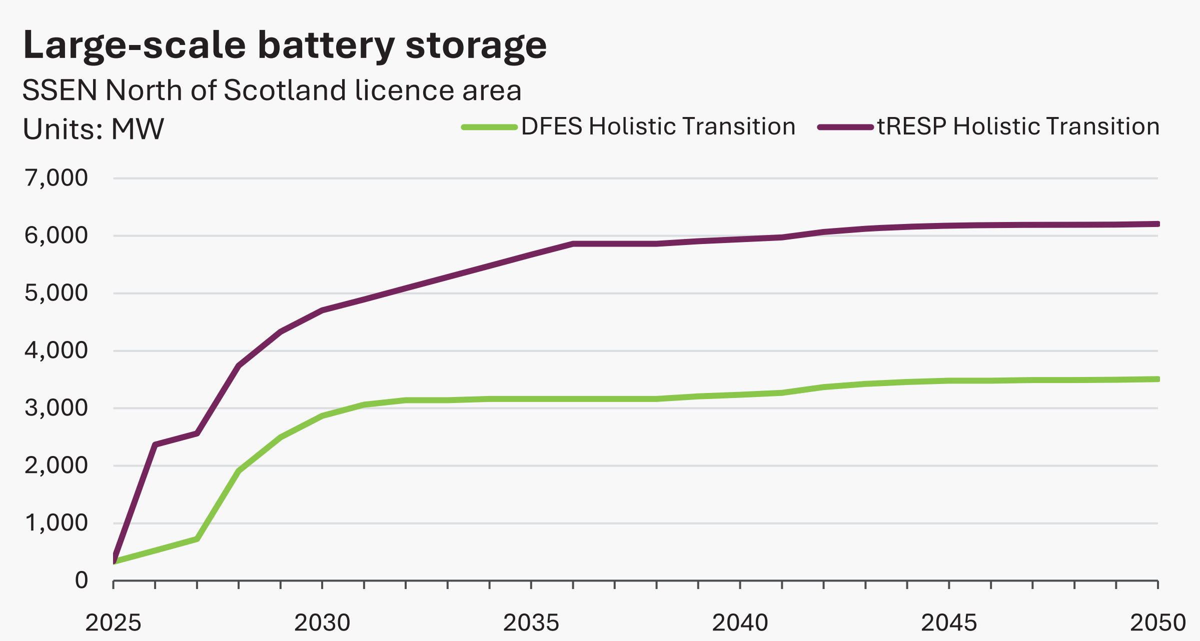
Large-scale solar PV



Comparison	Details
DFES 2025 to tRESP	The tRESP pathway is higher than DFES across the projection period. This is particularly notable in the near-term; by 2030 the tRESP pathway has over 2 GW of large-scale solar PV capacity in the North of Scotland, compared to the 1.2 GW in DFES. In the longer term (2035-2050), solar

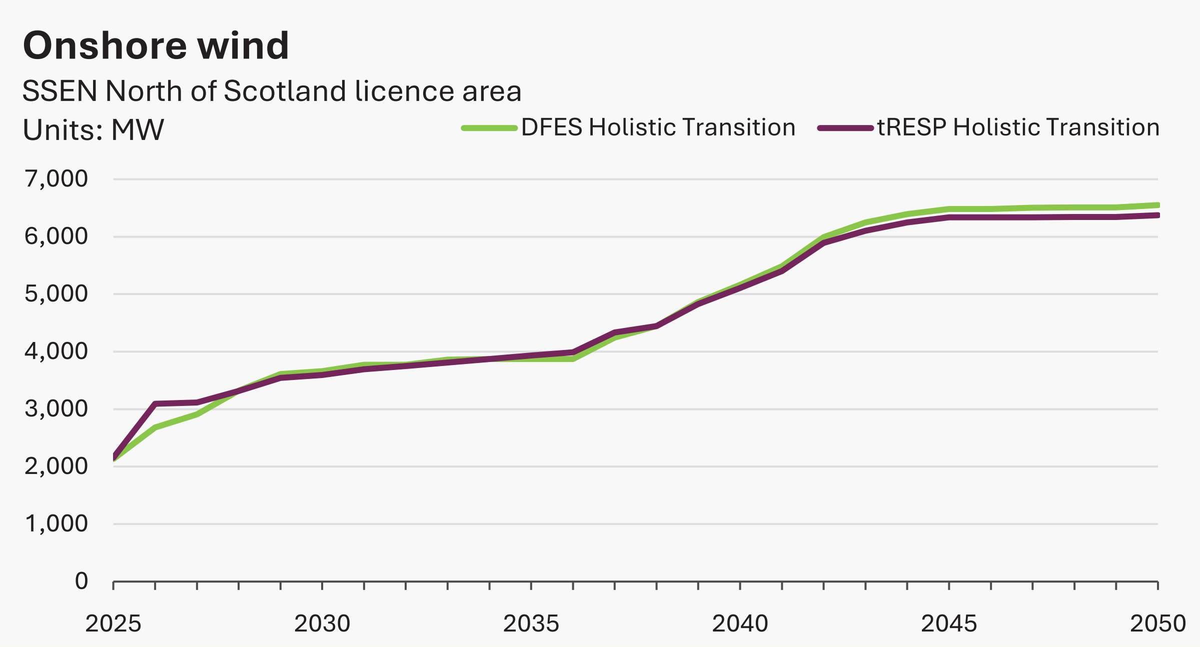
	capacity is c.25% higher in tRESP than in DFES. The tRESP modelling was finalised after the production of DFES 2025 and therefore likely reflects more recent information on the connections pipeline, particularly with regards to Connections Reform status. This has resulted in more large-scale solar projects receiving Gate 2 offers than was projected in the DFES modelling.

Large-scale battery storage



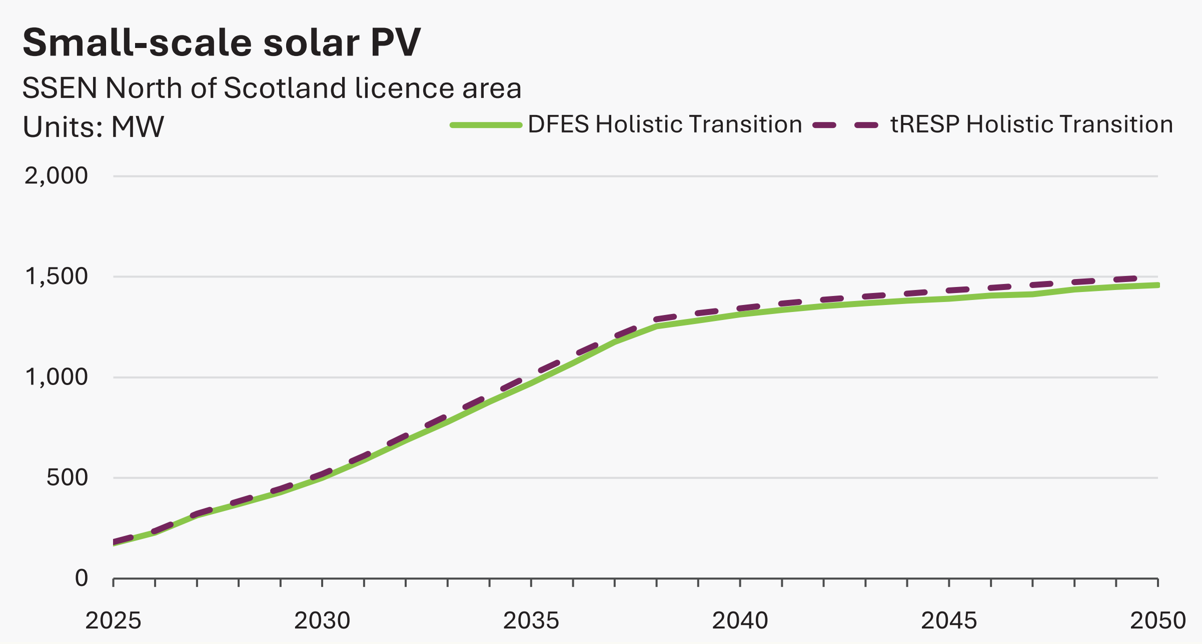
Comparison	Details
DFES 2025 to tRESP	The tRESP outcome for large-scale battery storage in the North of Scotland is significantly higher than the DFES projection under the Holistic Transition pathway. The absolute reason for this variance is unclear, however, the tRESP modelling was finalised after the production of DFES 2025 and therefore reflects more recent information on the connections pipeline, particularly with regards to Connections Reform status. This resulted in a larger number of battery storage projects receiving Gate 2 offers than was projected in the DFES modelling.

Onshore wind



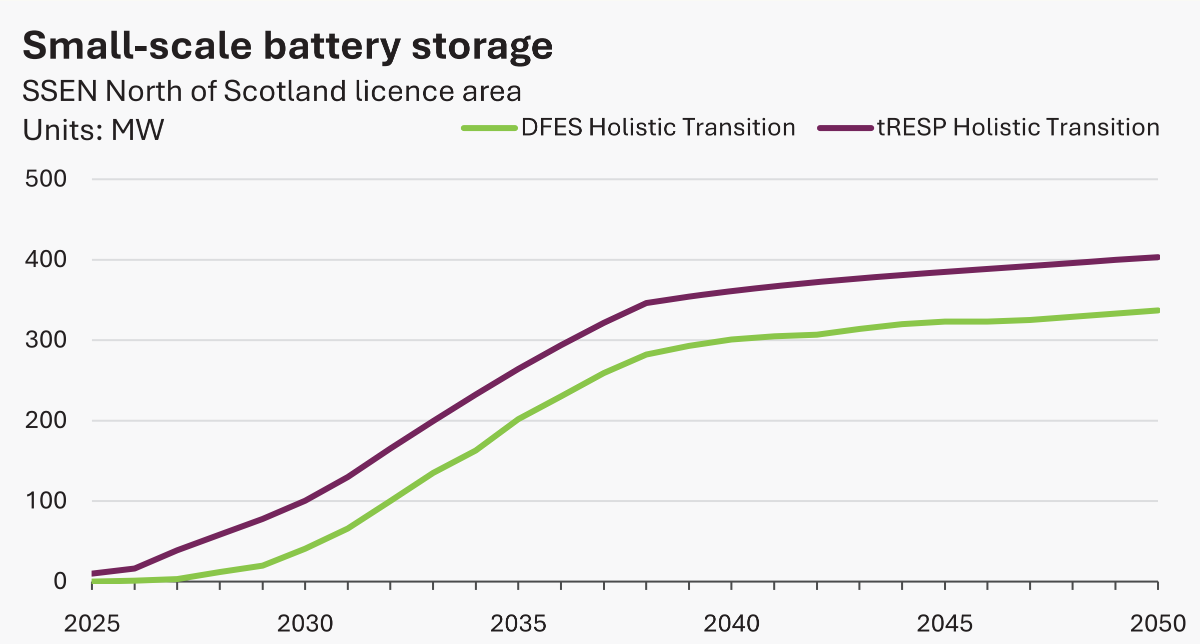
Comparison	Details
DFES 2025 to tRESP	Onshore wind is very closely aligned across the DFES 2025 and tRESP Holistic Transition pathways. The tRESP pathway envisages a more rapid deployment across 2026 than the DFES.

Small-scale solar PV



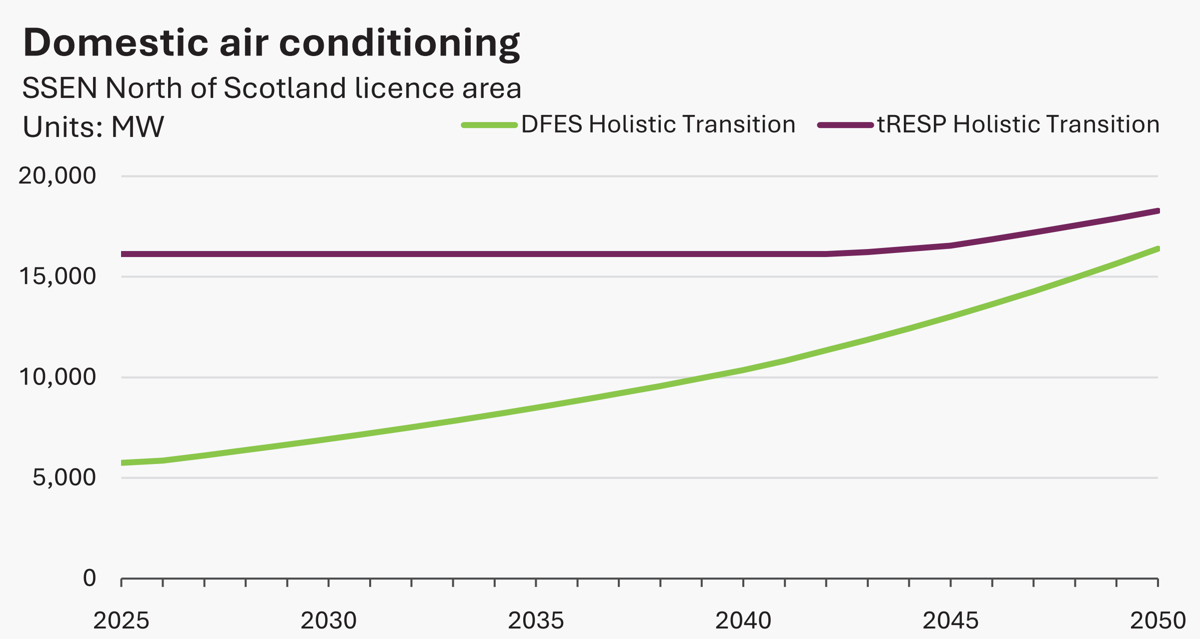
Comparison	Details
DFES 2025 to tRESP	Small-scale solar PV is nearly identical across the DFES 2025 and tRESP Holistic Transition pathways.

Small-scale storage



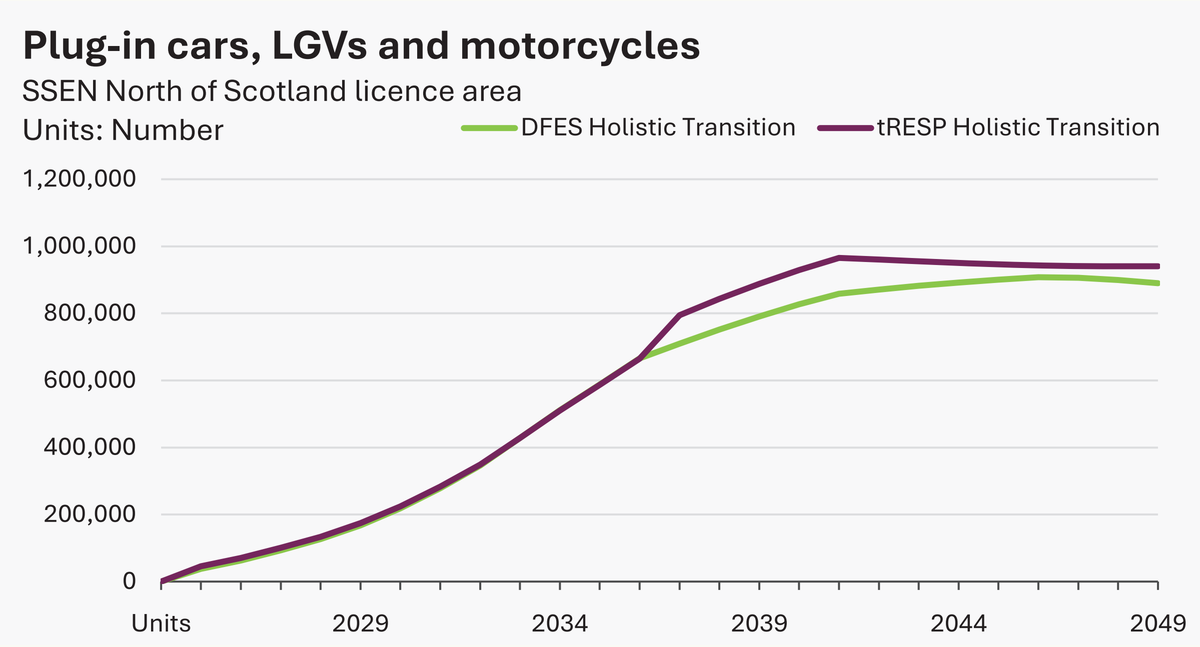
Comparison	Details
DFES 2025 to tRESP	Small-scale battery storage is broadly aligned across the DFES 2025 and tRESP Holistic Transition pathways, however the tRESP pathway has an additional c.80 MW small-scale battery storage capacity than DFES from the late 2020s.

Air conditioning

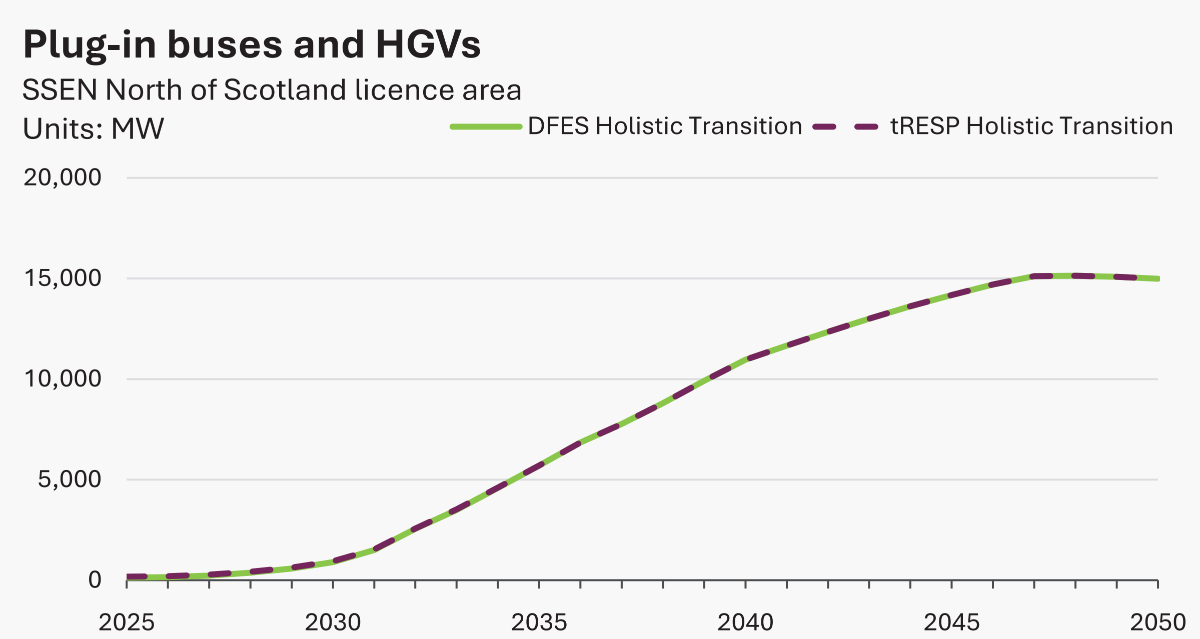


Comparison	Details
DFES 2025 to tRESP	The tRESP baseline for domestic air conditioning in the North of Scotland is much higher than the DFES. Due to lack of regional data on domestic air conditioning uptake, the DFES methodology uses regional cooling demand data to disaggregate national domestic air conditioning baseline data down to regional level. The tRESP methodology for modelling the domestic air conditioning baseline does not account for regional cooling demand, resulting in the higher baseline. Both pathways align closely towards 2050.

EVs and EV chargers

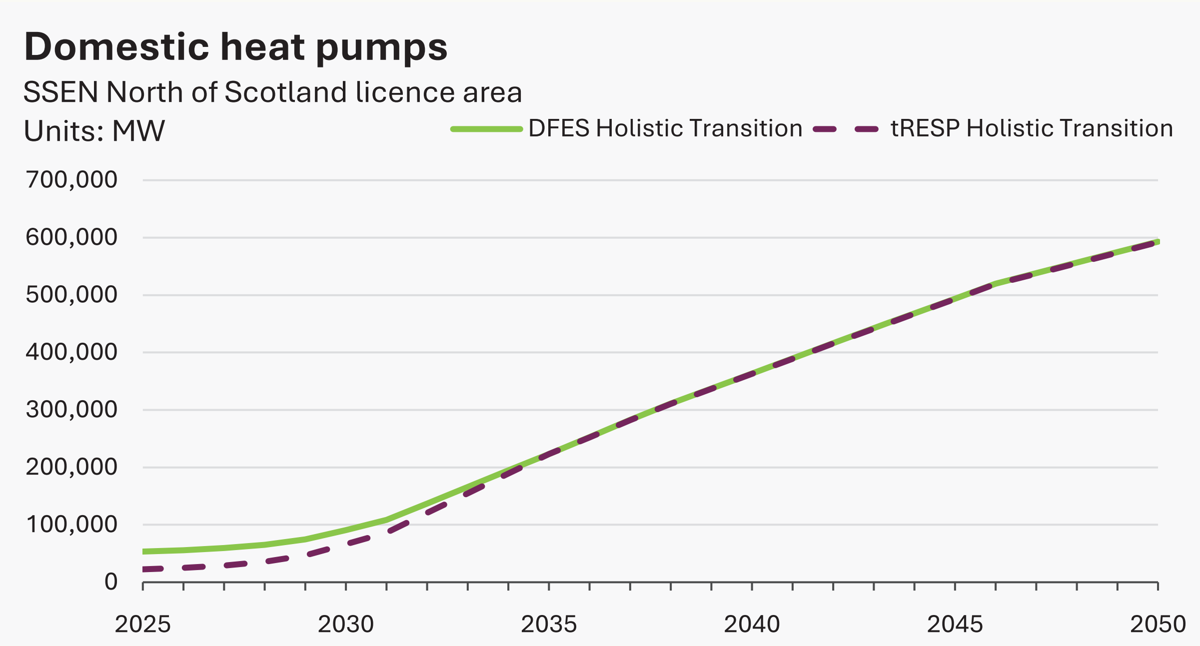


Comparison	Details
DFES 2025 to tRESP	Uptake of plug-in cars, LGVs and motorcycles is closely aligned across the DFES 2025 and tRESP Holistic Transition pathways.

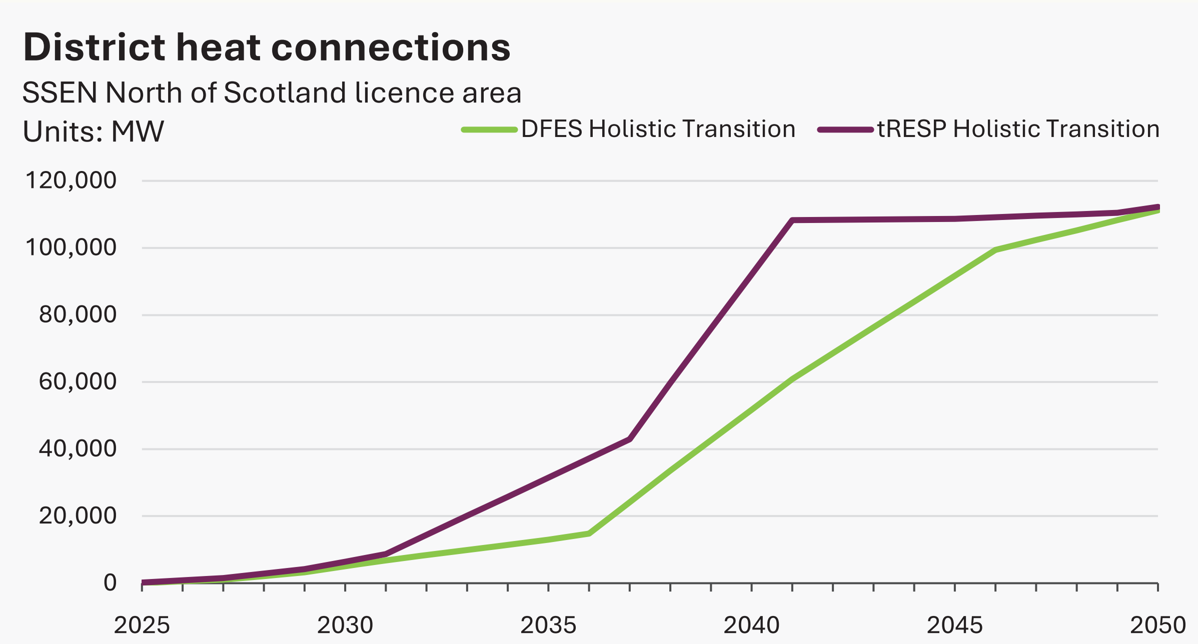


Comparison	Details
DFES 2025 to tRESP	Uptake of plug-in cars, LGVs and motorcycles is nearly identical across the DFES 2025 and tRESP Holistic Transition pathways.

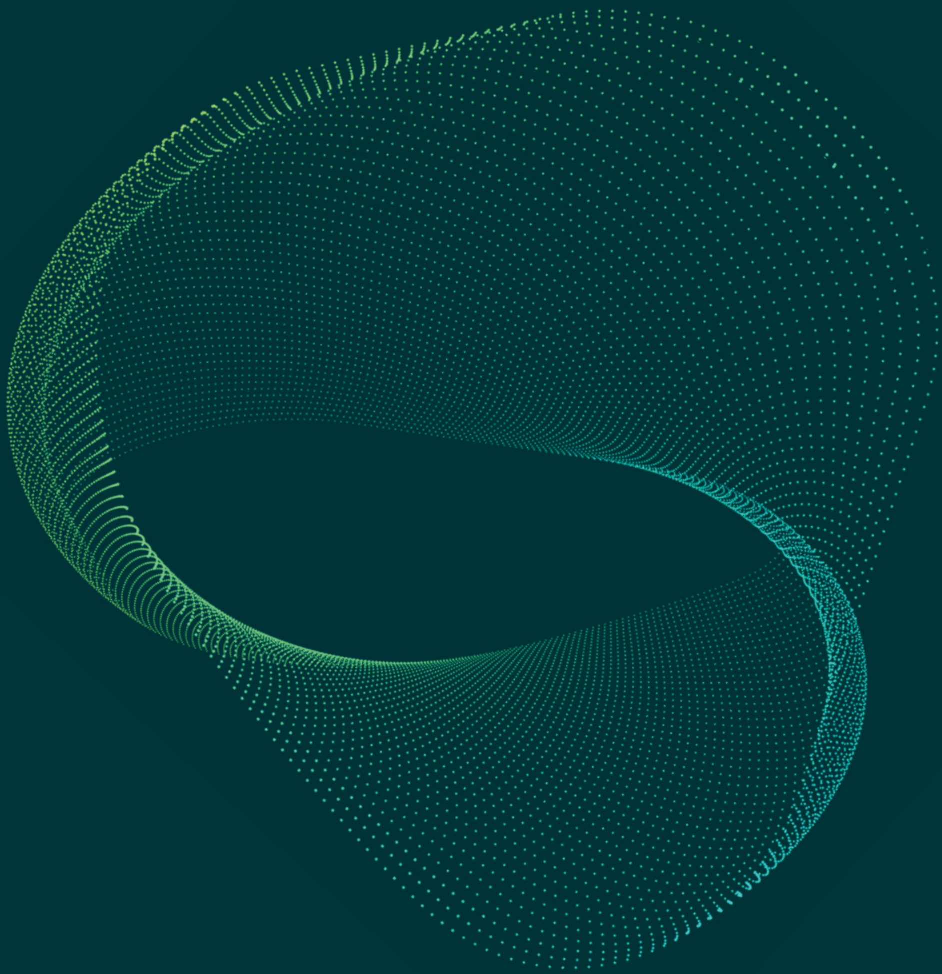
Heat in buildings



Comparison	Details
DFES 2025 to tRESP	Domestic heat pump uptake in the DFES 2025 and tRESP Holistic Transition pathway is almost identical.



Comparison	Details
DFES 2025 to tRESP	The number of district heat connections is broadly aligned across the DFES 2025 and tRESP Holistic Transition scenarios in the near term and by 2050. Across the late 2030s and 2040s, tRESP pathways see a more accelerated deployment of heat networks that flatlines from 2040.



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March 2026

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