

Distribution Future Energy Scenarios 2022

Local Authority:
Powys

What are Distribution Future Energy Scenarios?

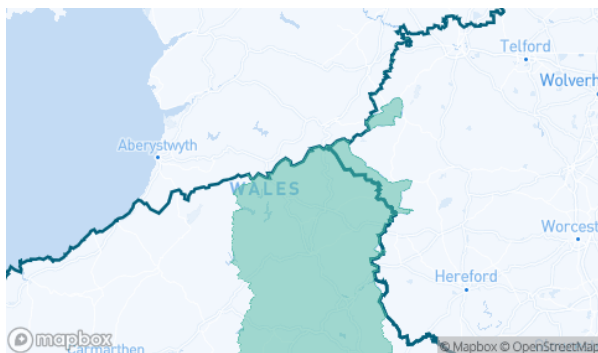
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

The scenarios use a scenario framework consistent with all electricity distribution network operators and the National Grid ESO Future Energy Scenarios. These aim to account for differing uptakes of Electric Vehicles, Heat Pumps, new domestic and I&C developments and distributed generation connections, that NGED use to assess the strategic development of our network.

A summary of the methodology and detailed reports are available on our website. DFES scenario projections are available on the interactive DFES map on the website [here](#).

Geographic Area Covered

This report covers the area of Powys covered by the NGED licence areas.



Scenario Summary

This DFES scenario framework includes three scenarios that are compliant with UK government targets of Net Zero greenhouse gas emissions by 2050. A summary of each scenario is below:

Falling Short (FS) assumes non-compliance with the net zero emissions target. Low levels of decarbonisation and societal change.

System Transformation (ST) has high level of decarbonisation with lower societal change. Larger, more centralised solutions are developed. This scenario has the highest levels of hydrogen deployment.

Consumer Transformation (CT) has high levels of decarbonisation and societal change. Consumers adopt new technologies rapidly, and more decentralised solutions are developed. This scenario has significant electrification of domestic heat.

Leading the Way (LW) has very high levels of decarbonisation and societal change. Consumers adopt new technologies rapidly, and a mix of solutions are developed. This scenario aims for the “fastest credible” decarbonisation pathway.



Scenario Projections: at a glance

The DFES scenario projections at a Local Authority level include all customers connected to the distribution network within the area of the Local Authority at all voltage levels. Customers connected to the transmission network are not included in this analysis. The table below shows a breakdown of the total for Powys for two specific years in the DFES analysis.

NGED also created a 5th 'Best View' forecast for the purposes of regulatory reporting and strategic network planning. This is a hybrid forecast built on local stakeholder engagement and historic performance, which reflects local authority ambition for the technologies where its influence is greatest. The Best View informs the likely amount of investment on the network across a licence area; however, changes in regional growth projections that affect investment requirements are supported through the uncertainty mechanism funding process.

Technology	Units	Baseline Total	2030				2050			
			FS	ST	CT	LW	FS	ST	CT	LW
Air conditioning	Domestic air conditioning units	0	0	0	0	0	5109	2111	2111	0
Domestic	New dwellings	0	812	818	818	835	933	881	881	839
Electric vehicles	Electric vehicles	465	6604	8354	15633	15580	47564	39562	39014	34956
EV Charge Point	EV charge points	277	2756	4142	7837	8643	25229	24920	24924	25838
Heat pumps	Heat pump installations	854	5066	5465	7701	10799	21653	23230	30769	27417
Hydrogen electrolysis	MW (installed capacity)	0.0	0.5	1.8	0.4	0.0	12.6	35.3	23.9	28.9
Non domestic	Floorspace (metres squared) of new I&C developments	0	12390	13253	13253	13648	13648	13253	13253	13648
Other Distributed Generation	MW (installed capacity)	8.4	8.4	8.9	9.5	9.2	8.4	10.4	12.9	10.7
Resistive electric heating	Resistive electric heating units	6885	5391	5315	5698	5380	2771	976	3213	3363
Solar Generation	MW (installed capacity)	13.0	19.5	29.1	35.0	26.5	89.2	183.9	208.4	180.1
Storage	MW (installed capacity)	0.0	0.2	1.2	2.0	3.2	4.2	10.0	20.7	26.8
Wind	MW (installed capacity)	2.3	3.4	4.8	16.6	14.1	36.3	61.7	159.7	122.6

What does this mean for the local distribution network?

As the DFES scenario projections do not imply any electrical behaviour to the base units, electrical profiles are assigned to each technology type for different yearly snapshots. The profiled demand and generation outputs can be overlaid onto a network model and used to identify where there may be future network constraints on the Extra High Voltage (EHV) networks. The customer behaviour assumptions are summarised in the DFES: Customer Behaviour Report, and the detailed network review forms a key input to the NGED investment planning process, which includes the Network Development Plan and Distribution Network Options Assessment.

Incorporating your feedback

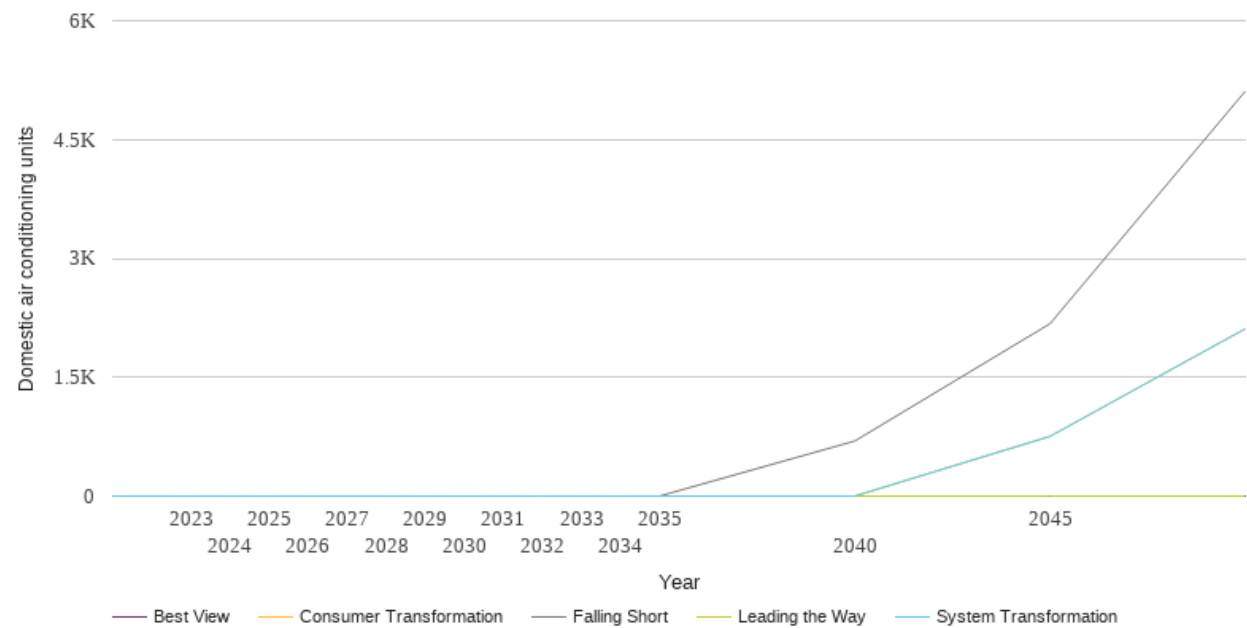
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios analysis.

If you have any comments or queries regarding these reports, please contact nged.energyplanning@nationalgrid.co.uk.

Technology Summary: Air conditioning

The table and graph below show the scenario projections for each of the DFES scenarios.

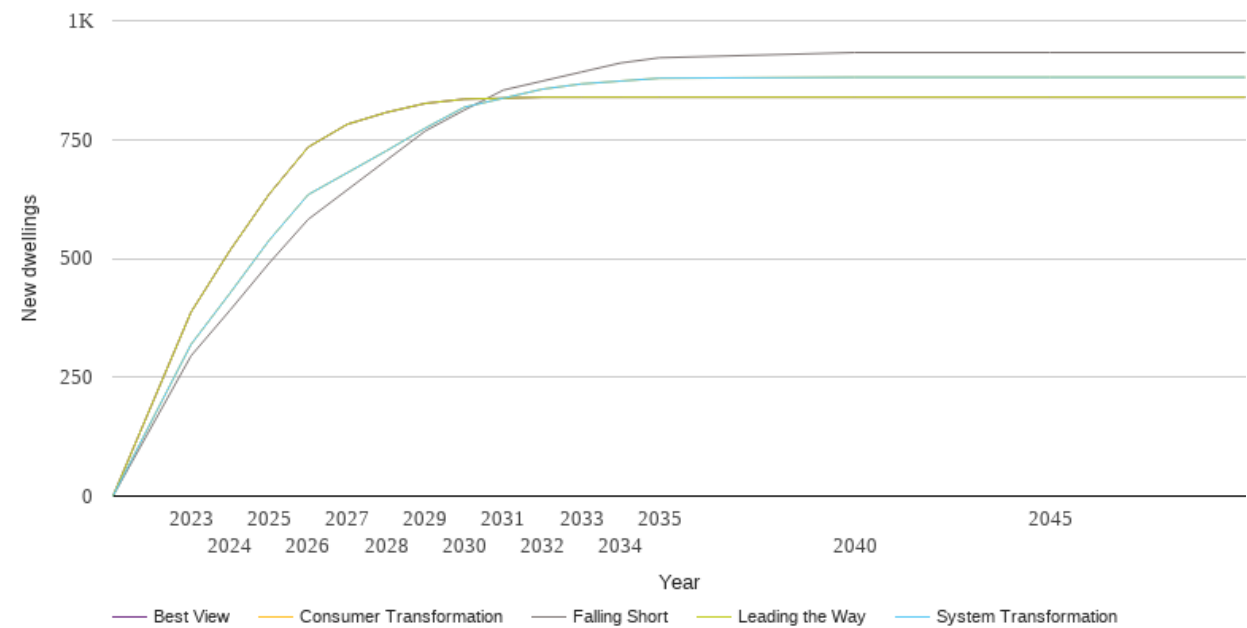
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	0	0	0	0	0
2025	0	0	0	0	0
2026	0	0	0	0	0
2027	0	0	0	0	0
2028	0	0	0	0	0
2029	0	0	0	0	0
2030	0	0	0	0	0
2031	0	0	0	0	0
2032	0	0	0	0	0
2033	0	0	0	0	0
2034	0	0	0	0	0
2035	0	0	0	0	0
2040	695	0	0	0	0
2045	2175	754	754	0	0
2050	5109	2111	2111	0	0



Technology Summary: Domestic

The table and graph below show the scenario projections for each of the DFES scenarios.

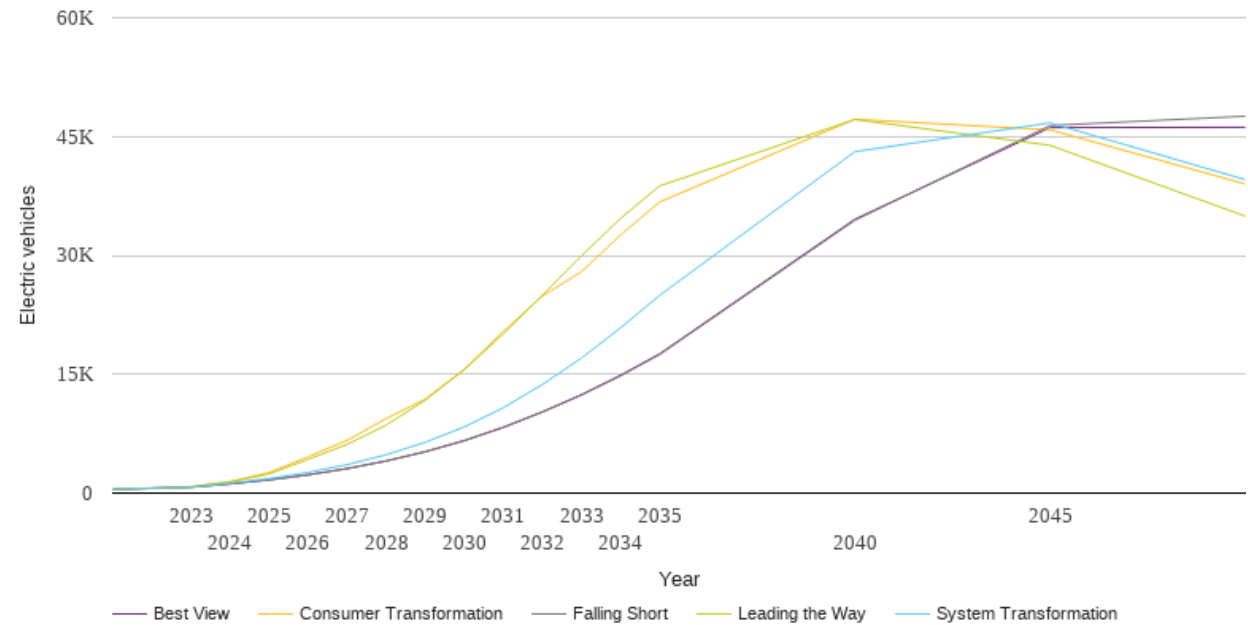
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	295	319	319	387	387
2024	391	427	427	517	517
2025	490	538	538	635	635
2026	582	634	634	734	734
2027	644	680	680	782	782
2028	706	726	726	807	807
2029	768	774	774	826	826
2030	812	818	818	835	835
2031	854	837	837	837	837
2032	873	856	856	839	839
2033	892	867	867	839	839
2034	911	873	873	839	839
2035	922	879	879	839	839
2040	933	881	881	839	839
2045	933	881	881	839	839
2050	933	881	881	839	839



Technology Summary: Electric vehicles

The table and graph below show the scenario projections for each of the DFES scenarios.

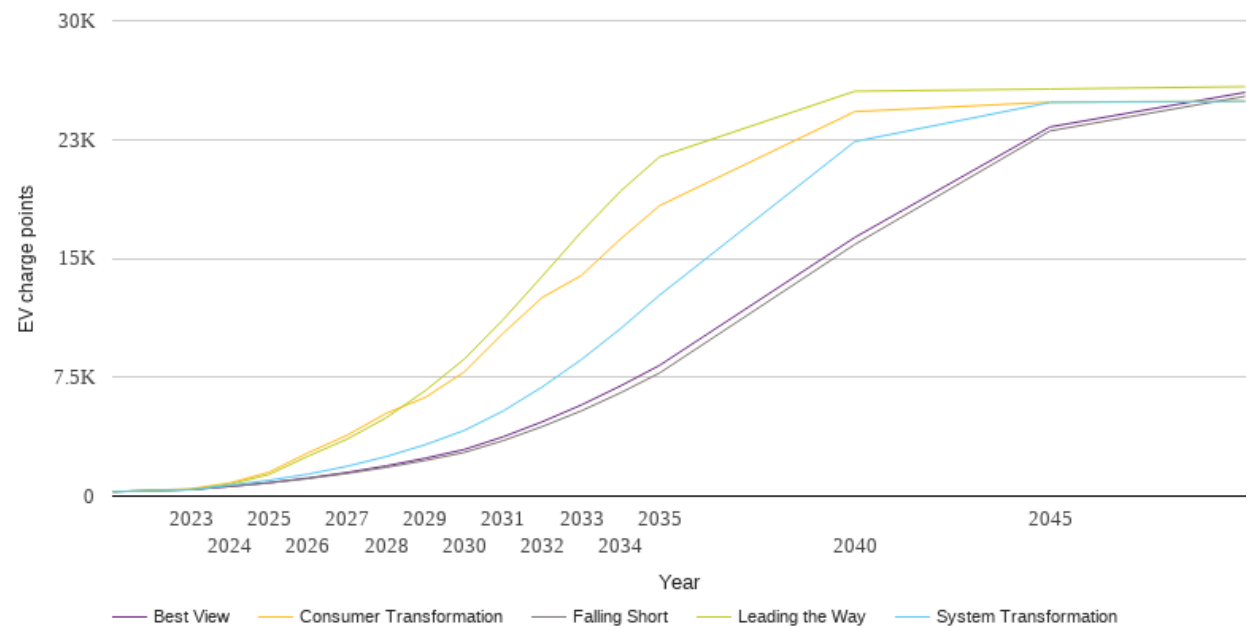
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	465	465	465	465	465
2023	749	751	821	792	749
2024	1168	1251	1463	1395	1170
2025	1671	1834	2587	2429	1675
2026	2300	2604	4584	4260	2306
2027	3089	3594	6666	6155	3098
2028	4046	4842	9399	8587	4058
2029	5209	6417	11865	11742	5229
2030	6604	8354	15633	15580	6636
2031	8275	10776	20413	20098	8317
2032	10213	13701	24863	24990	10260
2033	12359	17043	27946	29946	12422
2034	14785	20848	32566	34667	14867
2035	17466	24942	36739	38758	17567
2040	34412	43082	47178	47150	34549
2045	46388	46723	45844	43891	46127
2050	47564	39562	39014	34956	46175



Technology Summary: EV Charge Point

The table and graph below show the scenario projections for each of the DFES scenarios.

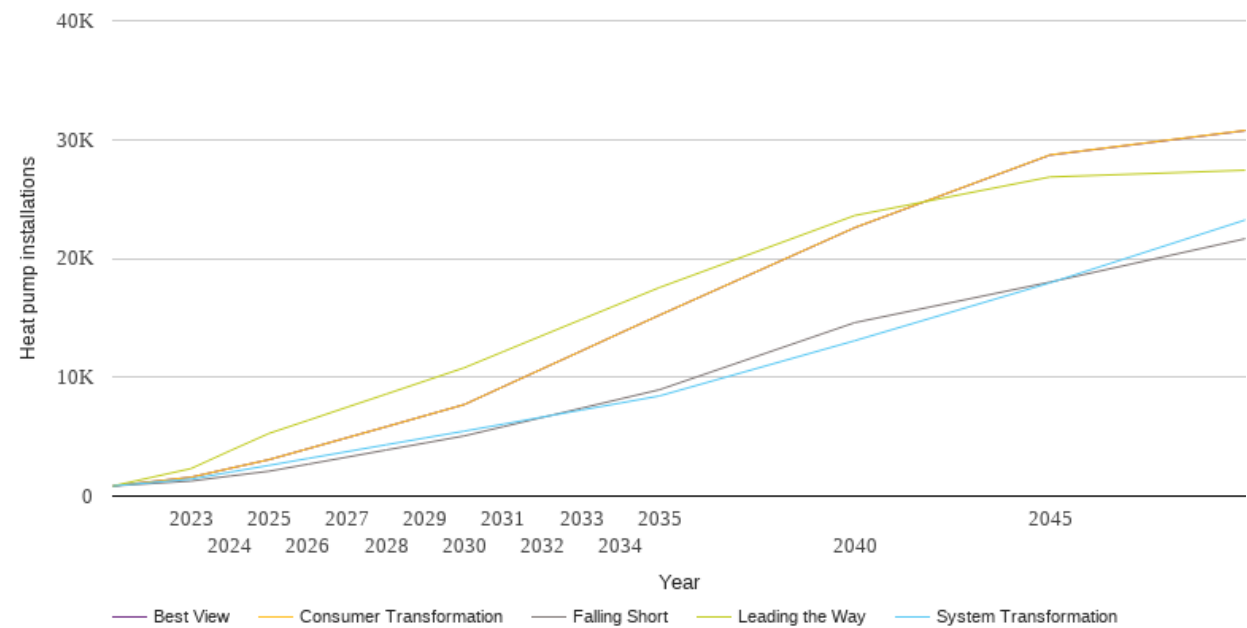
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	277	277	277	277	277
2023	404	412	462	420	405
2024	607	692	833	748	610
2025	832	999	1510	1366	848
2026	1106	1387	2734	2521	1142
2027	1432	1882	3844	3601	1492
2028	1813	2493	5224	4947	1905
2029	2249	3243	6231	6657	2388
2030	2756	4142	7837	8643	2940
2031	3504	5376	10286	11154	3744
2032	4390	6895	12538	13888	4693
2033	5382	8620	13929	16675	5753
2034	6516	10561	16225	19241	6951
2035	7766	12677	18327	21410	8247
2040	15878	22373	24261	25546	16321
2045	23043	24836	24862	25688	23293
2050	25229	24920	24924	25838	25476



Technology Summary: Heat pumps

The table and graph below show the scenario projections for each of the DFES scenarios.

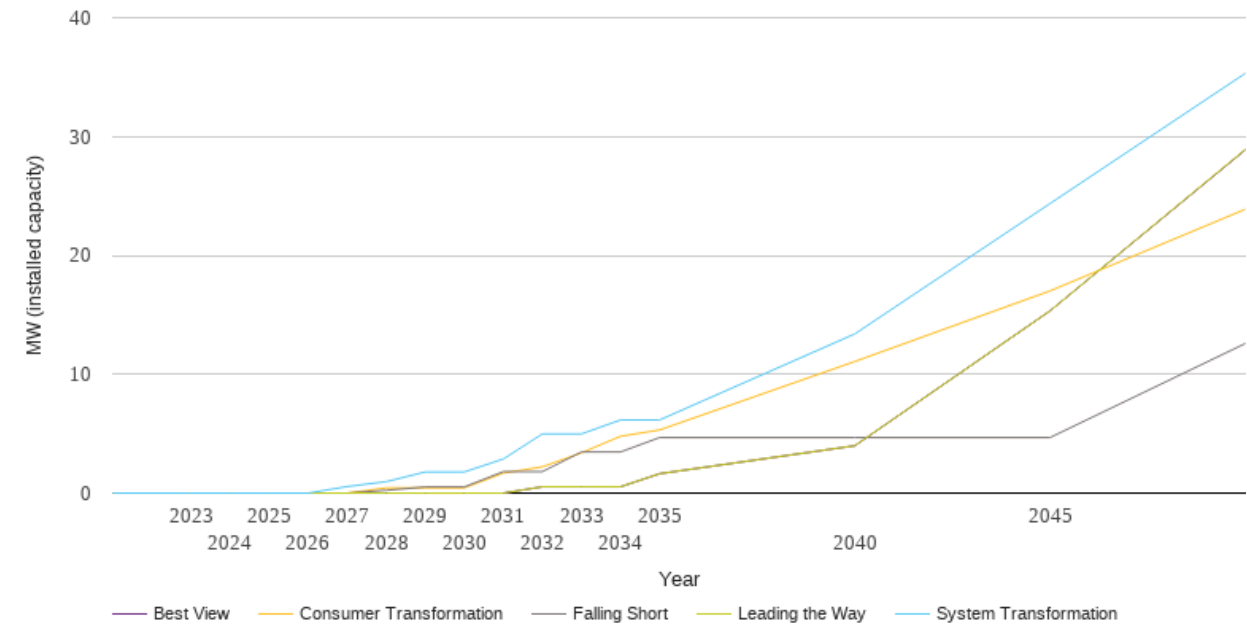
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	854	854	854	854	854
2023	1266	1424	1585	2315	1585
2024	1688	2017	2333	3813	2333
2025	2093	2585	3070	5278	3070
2026	2684	3167	3989	6374	3989
2027	3281	3743	4916	7484	4917
2028	3879	4320	5837	8582	5837
2029	4467	4897	6771	9692	6772
2030	5066	5465	7701	10799	7702
2031	5841	6054	9211	12156	9211
2032	6618	6650	10712	13511	10712
2033	7397	7241	12215	14860	12215
2034	8174	7832	13729	16208	13729
2035	8951	8429	15225	17550	15225
2040	14594	13074	22591	23606	22583
2045	18005	17942	28707	26849	28691
2050	21653	23230	30769	27417	30748



Technology Summary: Hydrogen electrolysis

The table and graph below show the scenario projections for each of the DFES scenarios.

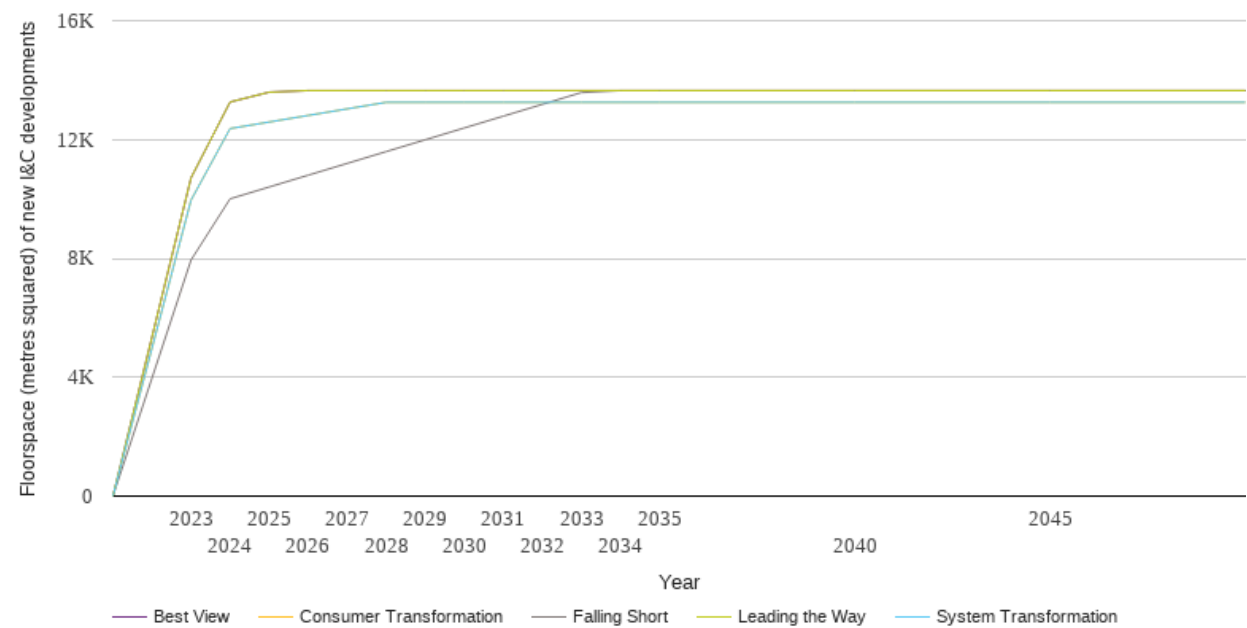
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.6	0.0	0.0	0.0
2028	0.2	1.0	0.4	0.0	0.0
2029	0.5	1.8	0.4	0.0	0.0
2030	0.5	1.8	0.4	0.0	0.0
2031	1.8	2.9	1.7	0.0	0.0
2032	1.8	5.0	2.2	0.5	0.5
2033	3.5	5.0	3.4	0.5	0.5
2034	3.5	6.2	4.8	0.5	0.5
2035	4.7	6.2	5.3	1.6	1.6
2040	4.7	13.4	11.1	4.0	4.0
2045	4.7	24.4	17.0	15.3	15.3
2050	12.6	35.3	23.9	28.9	28.9



Technology Summary: Non domestic

The table and graph below show the scenario projections for each of the DFES scenarios.

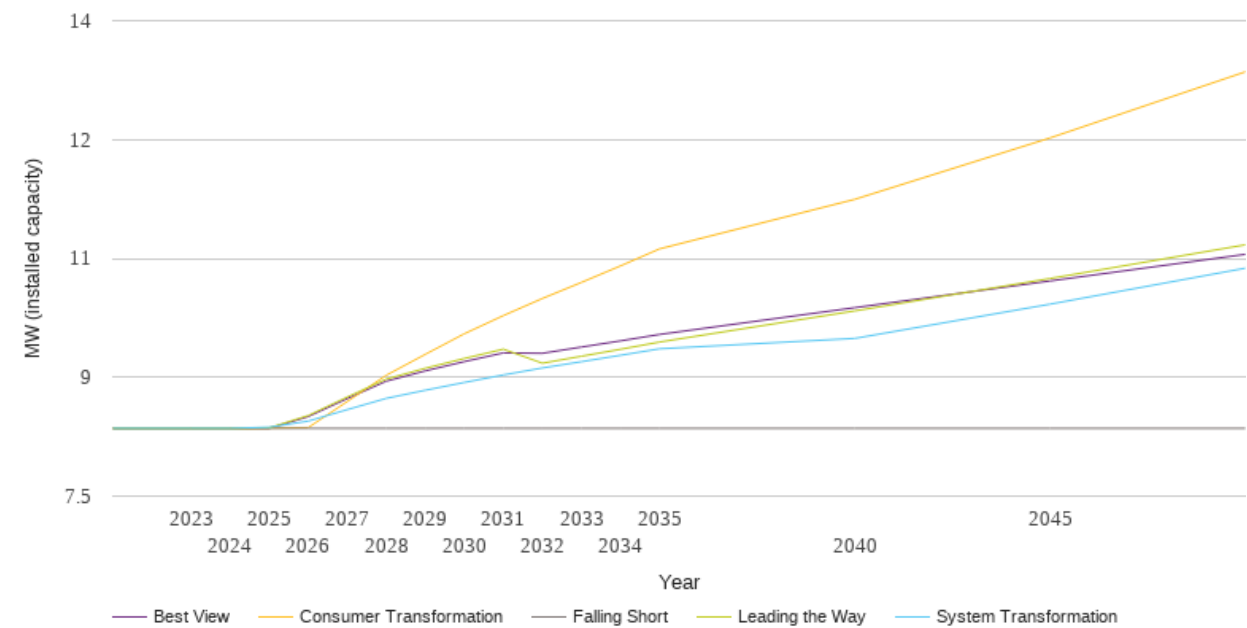
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	7944	9960	9960	10711	10711
2024	10004	12368	12368	13262	13262
2025	10402	12589	12589	13594	13594
2026	10799	12811	12811	13648	13648
2027	11197	13032	13032	13648	13648
2028	11595	13253	13253	13648	13648
2029	11992	13253	13253	13648	13648
2030	12390	13253	13253	13648	13648
2031	12787	13253	13253	13648	13648
2032	13185	13253	13253	13648	13648
2033	13583	13253	13253	13648	13648
2034	13648	13253	13253	13648	13648
2035	13648	13253	13253	13648	13648
2040	13648	13253	13253	13648	13648
2045	13648	13253	13253	13648	13648
2050	13648	13253	13253	13648	13648



Technology Summary: Other Distributed Generation

The table and graph below show the scenario projections for each of the DFES scenarios.

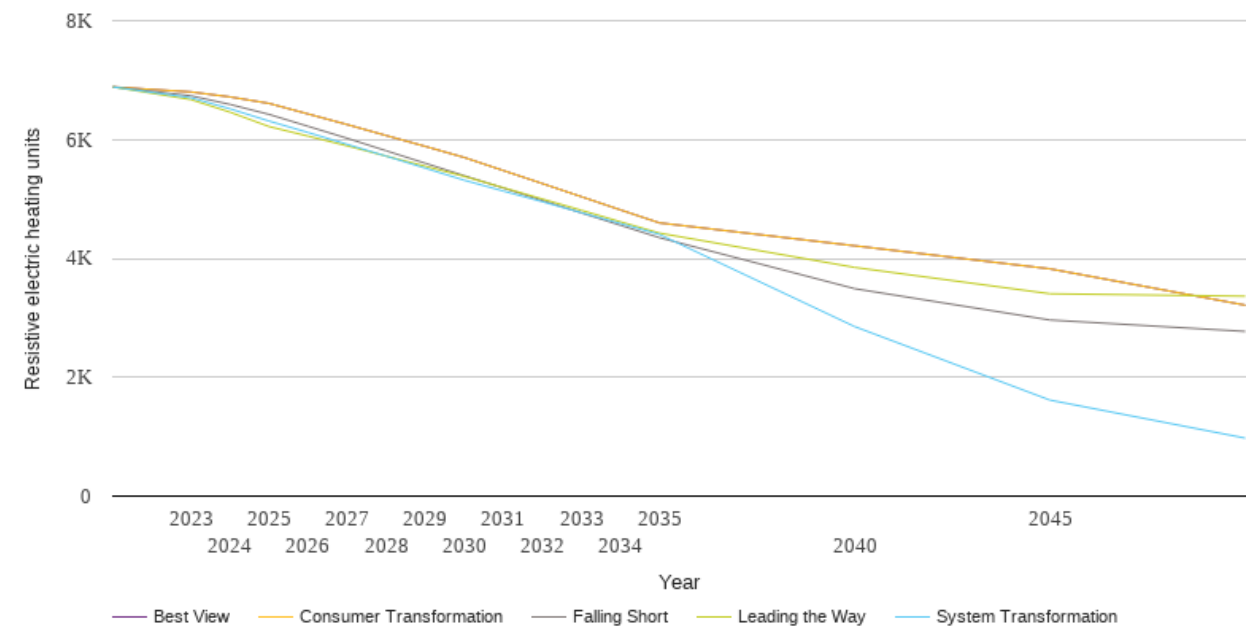
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	8.4	8.4	8.4	8.4	8.4
2023	8.4	8.4	8.4	8.4	8.4
2024	8.4	8.4	8.4	8.4	8.4
2025	8.4	8.4	8.4	8.4	8.4
2026	8.4	8.4	8.4	8.5	8.5
2027	8.4	8.6	8.7	8.8	8.7
2028	8.4	8.7	9.0	9.0	8.9
2029	8.4	8.8	9.3	9.1	9.1
2030	8.4	8.9	9.5	9.2	9.2
2031	8.4	9.0	9.8	9.4	9.3
2032	8.4	9.1	10.0	9.2	9.3
2033	8.4	9.2	10.2	9.3	9.4
2034	8.4	9.3	10.4	9.4	9.5
2035	8.4	9.4	10.6	9.4	9.5
2040	8.4	9.5	11.2	9.8	9.9
2045	8.4	9.9	12.0	10.2	10.2
2050	8.4	10.4	12.9	10.7	10.6



Technology Summary: Resistive electric heating

The table and graph below show the scenario projections for each of the DFES scenarios.

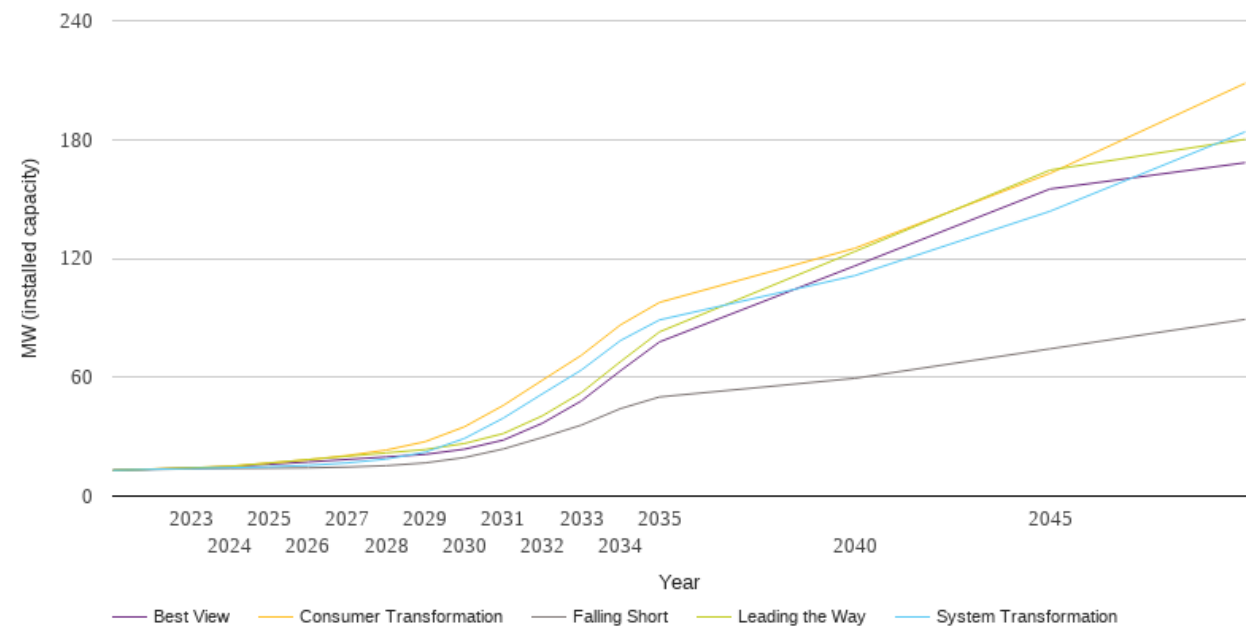
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	6885	6885	6885	6885	6885
2023	6736	6702	6801	6672	6801
2024	6591	6517	6717	6460	6717
2025	6423	6311	6608	6218	6608
2026	6222	6118	6430	6057	6430
2027	6021	5919	6252	5894	6252
2028	5811	5721	6067	5721	6067
2029	5601	5518	5885	5551	5885
2030	5391	5315	5698	5380	5698
2031	5184	5133	5478	5189	5478
2032	4974	4954	5259	4999	5259
2033	4765	4769	5038	4809	5038
2034	4557	4587	4816	4615	4816
2035	4348	4403	4597	4425	4597
2040	3490	2852	4212	3848	4212
2045	2963	1615	3824	3405	3824
2050	2771	976	3213	3363	3213



Technology Summary: Solar Generation

The table and graph below show the scenario projections for each of the DFES scenarios.

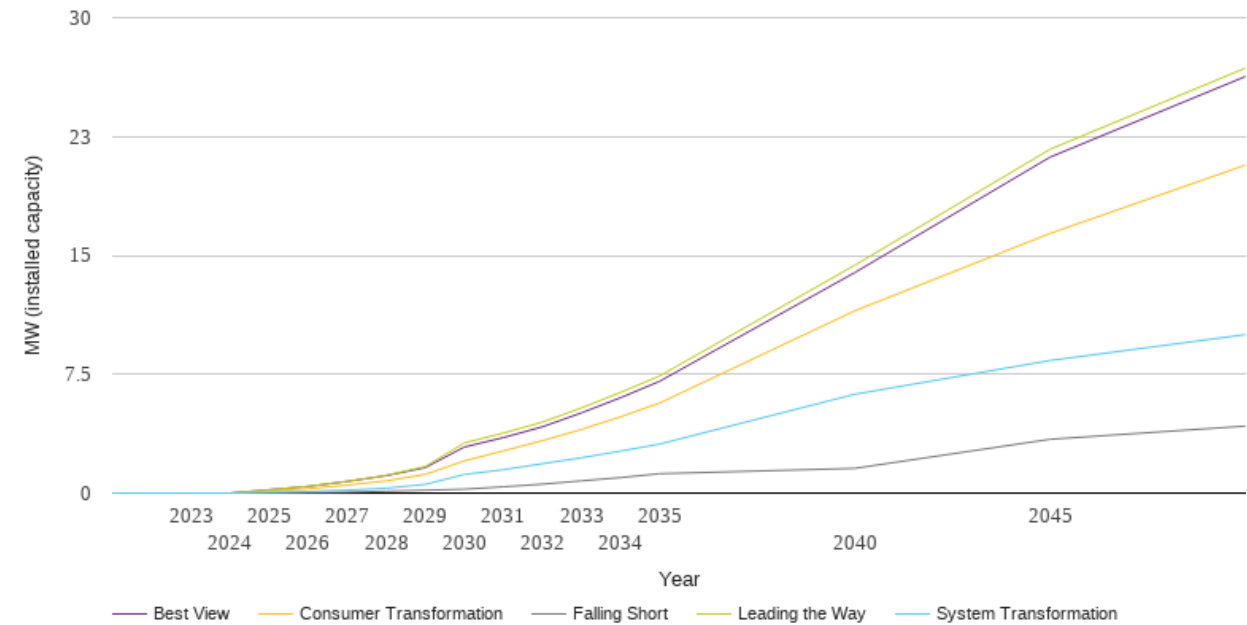
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	13.0	13.0	13.0	13.0	13.0
2023	13.8	14.0	14.2	14.3	14.1
2024	13.9	14.3	15.0	15.0	14.8
2025	14.1	14.8	16.7	16.7	16.0
2026	14.3	15.5	18.4	18.4	17.2
2027	14.7	16.7	20.5	20.1	18.5
2028	15.4	18.7	23.2	21.8	19.8
2029	16.8	22.2	27.5	23.5	21.1
2030	19.5	29.1	35.0	26.5	23.7
2031	23.8	39.4	45.8	31.6	28.3
2032	29.6	51.6	58.5	40.5	36.8
2033	35.9	63.7	71.1	52.3	48.1
2034	44.1	78.5	86.4	67.9	63.3
2035	50.0	88.9	97.8	82.9	77.8
2040	59.4	111.3	125.1	123.5	116.2
2045	74.3	143.8	162.9	164.6	155.0
2050	89.2	183.9	208.4	180.1	168.3



Technology Summary: Storage

The table and graph below show the scenario projections for each of the DFES scenarios.

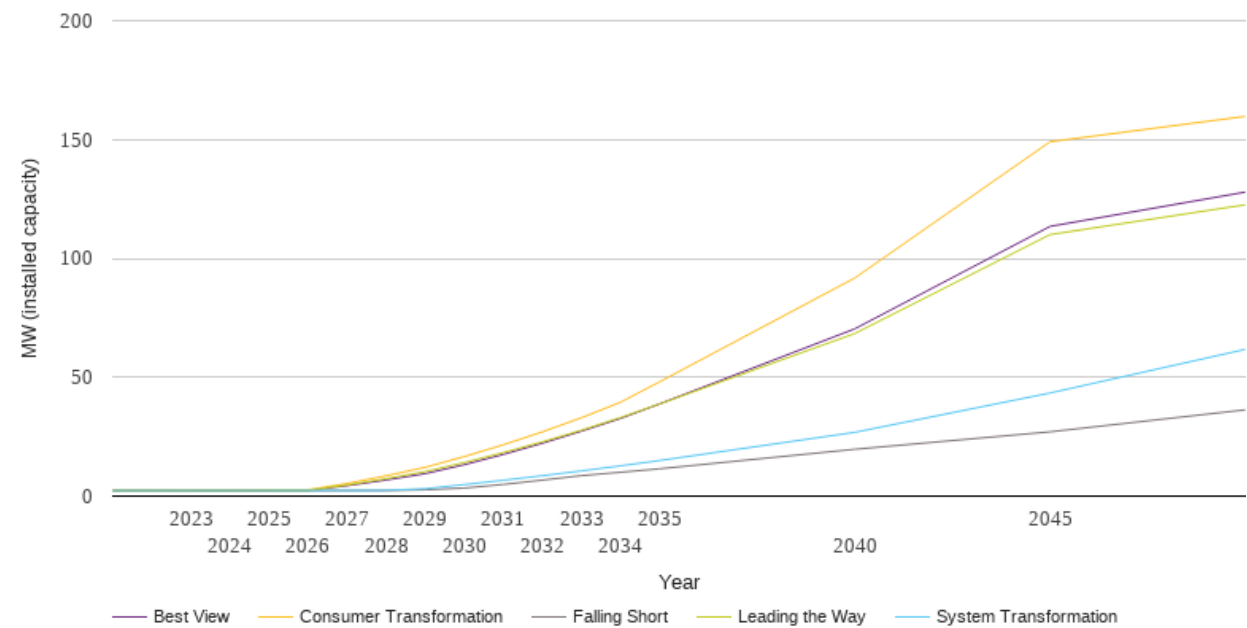
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.1	0.2	0.2
2026	0.0	0.1	0.3	0.4	0.4
2027	0.1	0.2	0.5	0.7	0.7
2028	0.1	0.3	0.8	1.1	1.1
2029	0.2	0.6	1.2	1.7	1.6
2030	0.2	1.2	2.0	3.2	2.9
2031	0.4	1.5	2.7	3.8	3.5
2032	0.6	1.9	3.3	4.5	4.2
2033	0.8	2.2	4.0	5.4	5.1
2034	1.0	2.7	4.8	6.4	6.0
2035	1.2	3.1	5.7	7.4	7.1
2040	1.6	6.2	11.5	14.4	13.9
2045	3.4	8.4	16.4	21.7	21.2
2050	4.2	10.0	20.7	26.8	26.3



Technology Summary: Wind

The table and graph below show the scenario projections for each of the DFES scenarios.

Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	2.3	2.3	2.3	2.3	2.3
2023	2.3	2.3	2.4	2.3	2.3
2024	2.3	2.3	2.5	2.4	2.4
2025	2.3	2.3	2.6	2.4	2.4
2026	2.3	2.4	2.7	2.4	2.4
2027	2.3	2.4	5.3	4.6	4.4
2028	2.4	2.4	8.6	7.4	6.8
2029	2.6	3.1	12.1	10.3	9.4
2030	3.4	4.8	16.6	14.1	13.2
2031	4.9	6.7	21.6	18.3	17.5
2032	6.7	8.6	27.0	22.8	22.2
2033	8.6	10.6	33.0	27.7	27.3
2034	10.0	12.7	39.5	33.0	32.7
2035	11.5	15.0	48.1	38.8	38.8
2040	19.7	26.8	91.7	68.4	70.4
2045	27.0	43.4	149.1	110.0	113.4
2050	36.3	61.7	159.7	122.6	127.9



National Grid Electricity Distribution PLC 09223384)
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National Grid Electricity Distribution (West Midlands) Plc (company number 03600574))
National Grid Electricity Distribution (South West) Plc (company number 02366894))
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