

Distribution Future Energy Scenarios 2022

Local Authority:
Cotswold

What are Distribution Future Energy Scenarios?

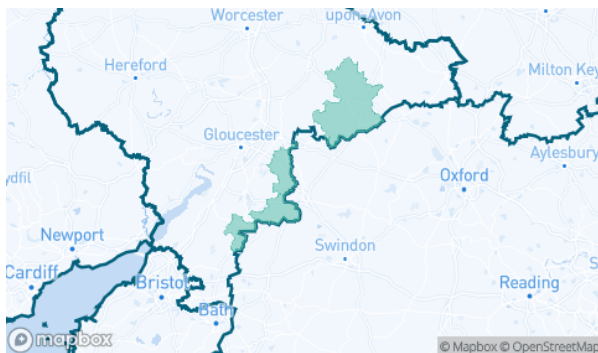
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Cotswold 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 Cotswold 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	1965	837	837	0
Domestic	New dwellings	0	444	493	493	600	644	638	638	633
Electric vehicles	Electric vehicles	363	2997	3614	6782	6721	20352	16222	16490	14788
EV Charge Point	EV charge points	234	1374	1900	3551	3891	10898	10021	10497	10632
Heat pumps	Heat pump installations	433	2389	2636	4061	5561	8946	10137	15533	14592
Hydrogen electrolysis	MW (installed capacity)	0.0	0.3	12.6	1.7	14.8	0.7	13.1	2.0	15.5
Non domestic	Floorspace (metres squared) of new I&C developments	0	2723 5	4206 0	4206 0	4065 7	18463 7	18458 1	18458 1	18463 7
Other Distributed Generation	MW (installed capacity)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Resistive electric heating	Resistive electric heating units	2591	2070	2011	2173	2045	1385	516	1367	1468
Solar Generation	MW (installed capacity)	14.0	15.6	17.5	20.3	19.8	23.9	34.9	46.2	47.3
Storage	MW (installed capacity)	0.0	0.1	0.3	0.6	1.0	1.2	3.0	6.5	7.7
Wind	MW (installed capacity)	0.3	0.3	0.3	0.4	0.4	0.4	0.5	1.0	0.9

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

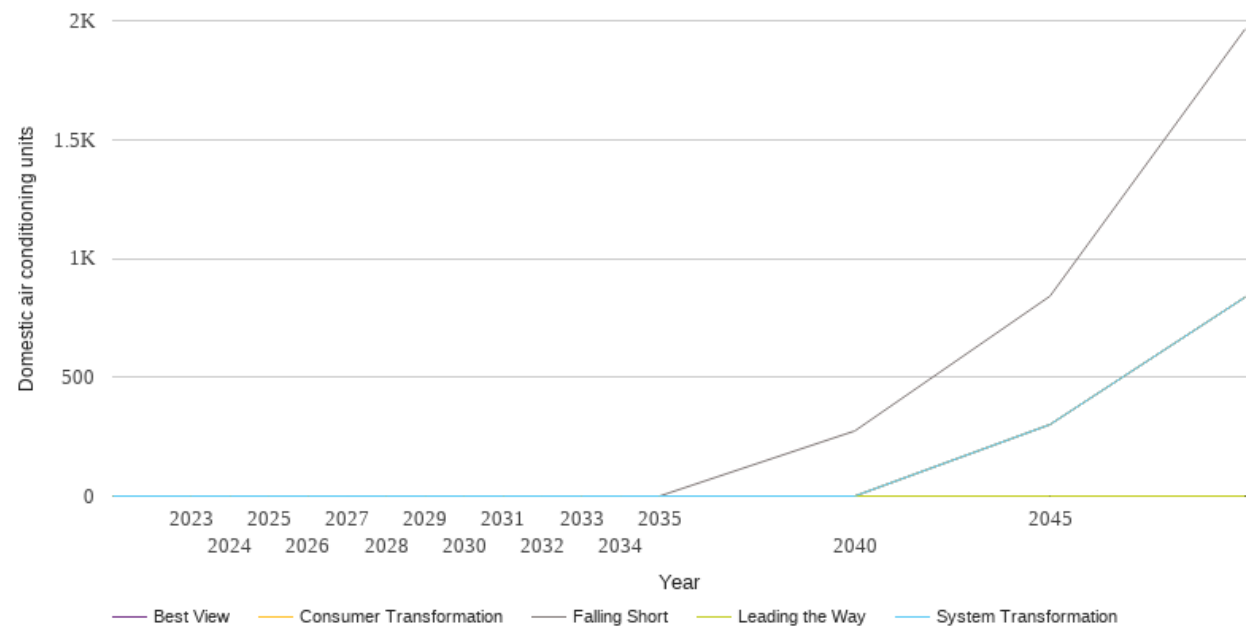
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

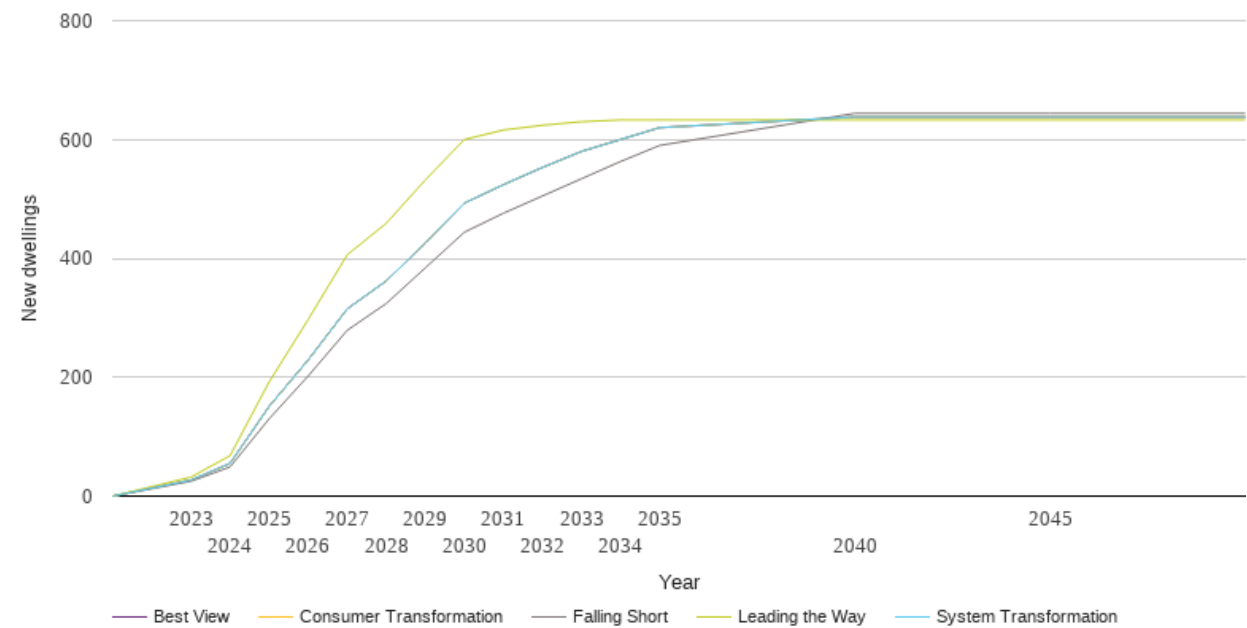
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	0	0	0	0	0
2025	0	0	0	0	0
2026	0	0	0	0	0
2027	0	0	0	0	0
2028	0	0	0	0	0
2029	0	0	0	0	0
2030	0	0	0	0	0
2031	0	0	0	0	0
2032	0	0	0	0	0
2033	0	0	0	0	0
2034	0	0	0	0	0
2035	0	0	0	0	0
2040	274	0	0	0	0
2045	841	301	301	0	301
2050	1965	837	837	0	837



Technology Summary: Domestic

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

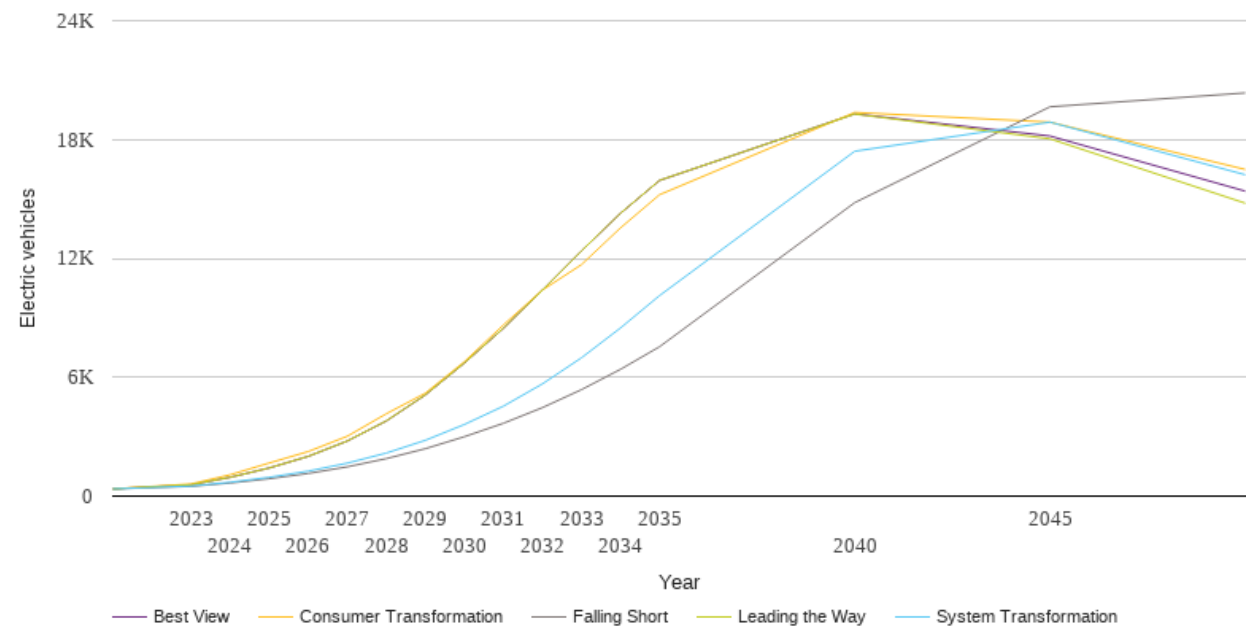
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	25	27	27	32	27
2024	49	55	55	68	55
2025	130	151	151	192	151
2026	202	229	229	297	229
2027	279	315	315	406	315
2028	324	362	362	459	362
2029	384	426	426	532	426
2030	444	493	493	600	493
2031	476	524	524	616	524
2032	505	553	553	624	553
2033	534	580	580	630	580
2034	563	600	600	633	600
2035	590	620	620	633	620
2040	644	638	638	633	638
2045	644	638	638	633	638
2050	644	638	638	633	638



Technology Summary: Electric vehicles

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

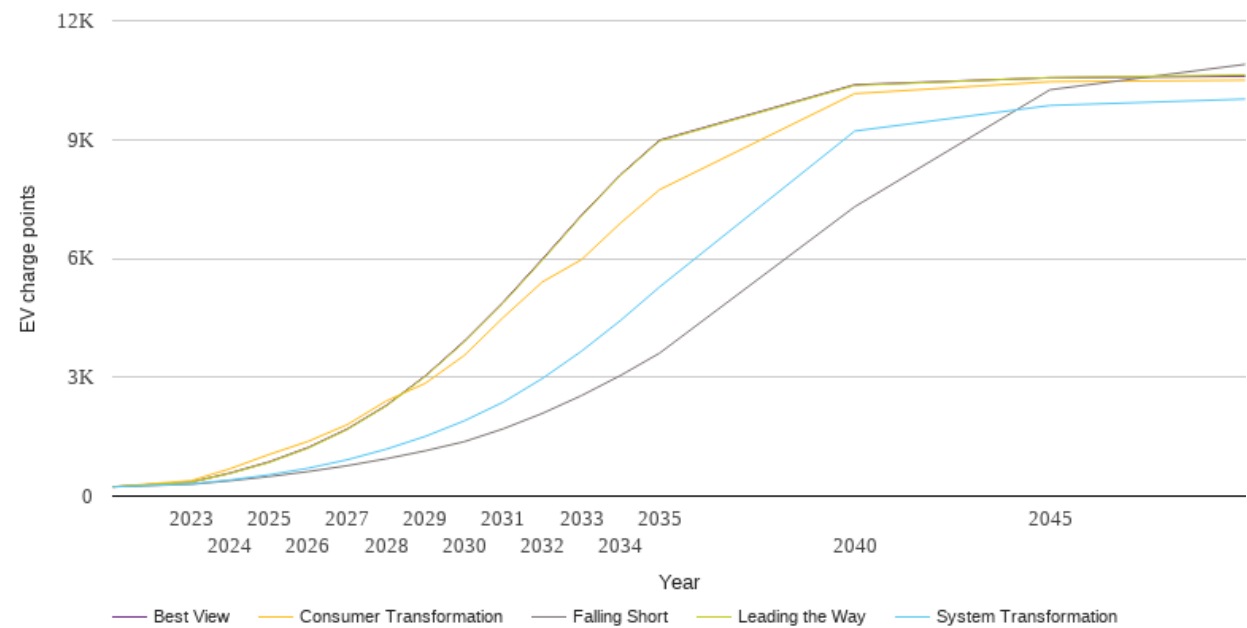
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	363	363	363	363	363
2023	492	506	611	573	573
2024	661	697	1075	948	948
2025	876	948	1669	1418	1418
2026	1142	1258	2248	2005	2004
2027	1477	1662	3020	2780	2778
2028	1891	2171	4154	3795	3790
2029	2392	2815	5194	5110	5103
2030	2997	3614	6782	6721	6713
2031	3675	4540	8639	8476	8467
2032	4466	5664	10400	10397	10396
2033	5373	6981	11685	12379	12376
2034	6400	8488	13539	14279	14275
2035	7541	10122	15215	15939	15934
2040	14815	17409	19369	19288	19296
2045	19652	18877	18878	18038	18178
2050	20352	16222	16490	14788	15396



Technology Summary: EV Charge Point

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

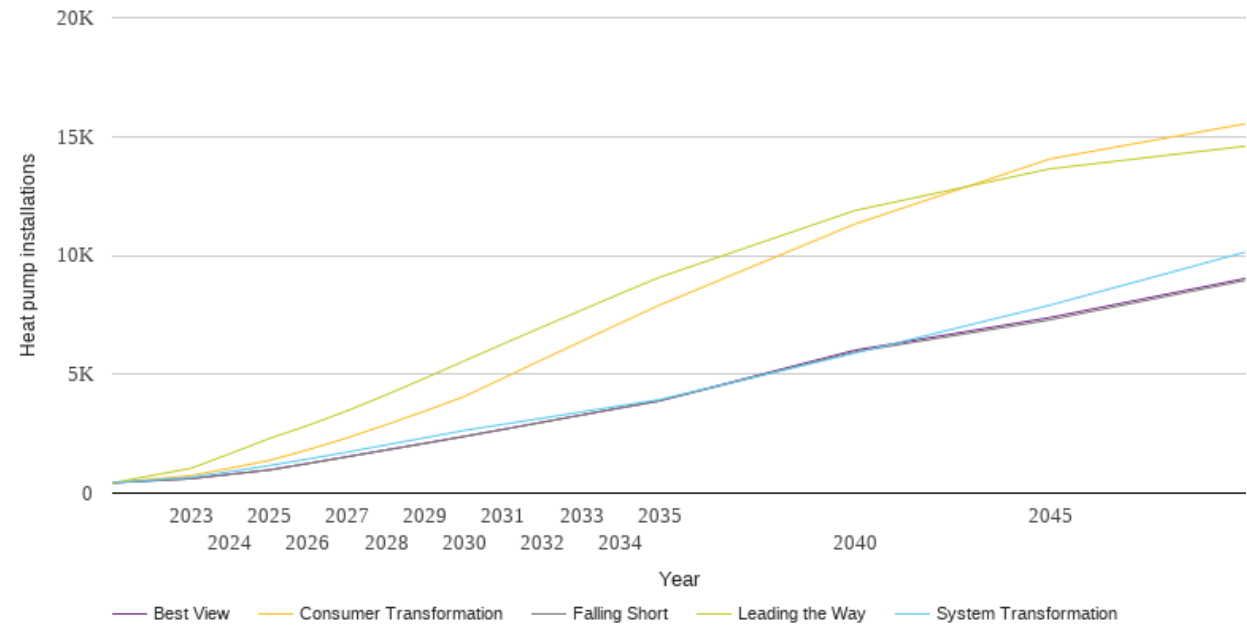
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	234	234	234	234	234
2023	298	306	389	350	352
2024	386	407	690	572	582
2025	493	537	1051	850	863
2026	619	703	1382	1212	1226
2027	767	917	1802	1681	1694
2028	942	1184	2401	2272	2287
2029	1143	1507	2847	3019	3034
2030	1374	1900	3551	3891	3912
2031	1700	2374	4512	4876	4900
2032	2088	2969	5406	5956	5982
2033	2536	3656	5968	7069	7089
2034	3044	4432	6892	8094	8112
2035	3608	5277	7734	8964	8983
2040	7304	9214	10159	10367	10383
2045	10256	9860	10460	10563	10559
2050	10898	10021	10497	10632	10599



Technology Summary: Heat pumps

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

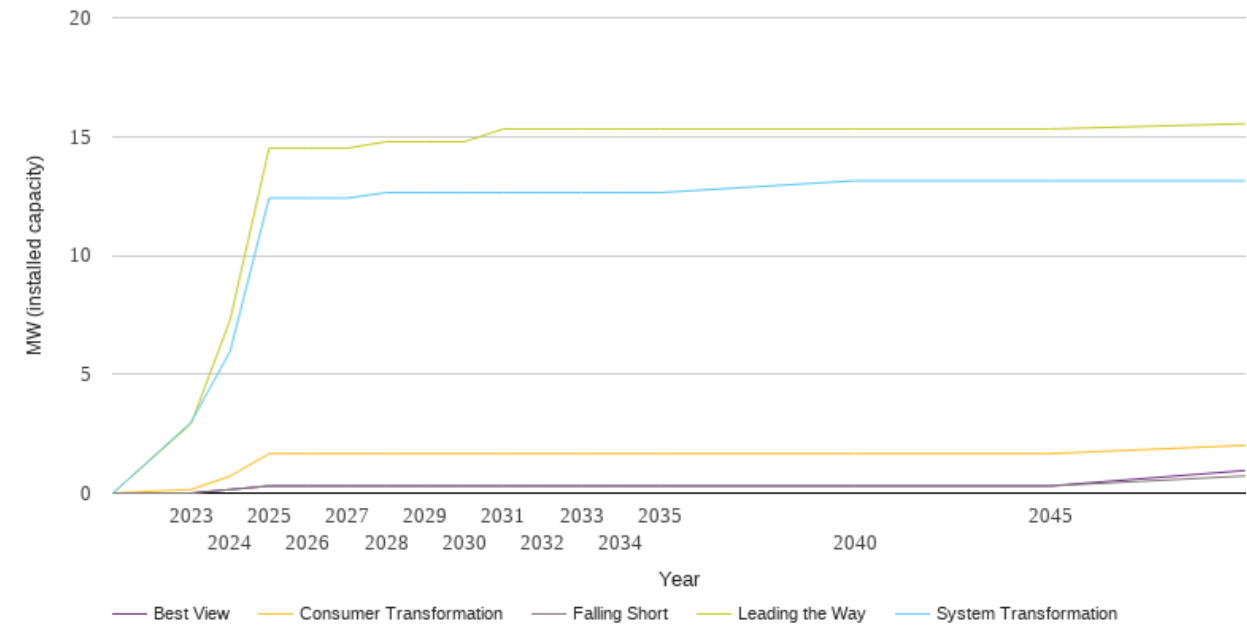
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	433	433	433	433	433
2023	608	664	739	1043	608
2024	792	906	1048	1659	792
2025	971	1156	1371	2292	971
2026	1247	1434	1825	2849	1245
2027	1531	1723	2325	3463	1528
2028	1817	2028	2877	4134	1812
2029	2099	2330	3456	4837	2094
2030	2389	2636	4061	5561	2380
2031	2684	2893	4835	6277	2680
2032	2981	3151	5616	6990	2981
2033	3282	3416	6383	7694	3284
2034	3580	3675	7150	8394	3586
2035	3875	3932	7908	9080	3885
2040	5939	5885	11317	11885	6008
2045	7286	7904	14059	13642	7382
2050	8946	10137	15533	14592	9025



Technology Summary: Hydrogen electrolysis

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

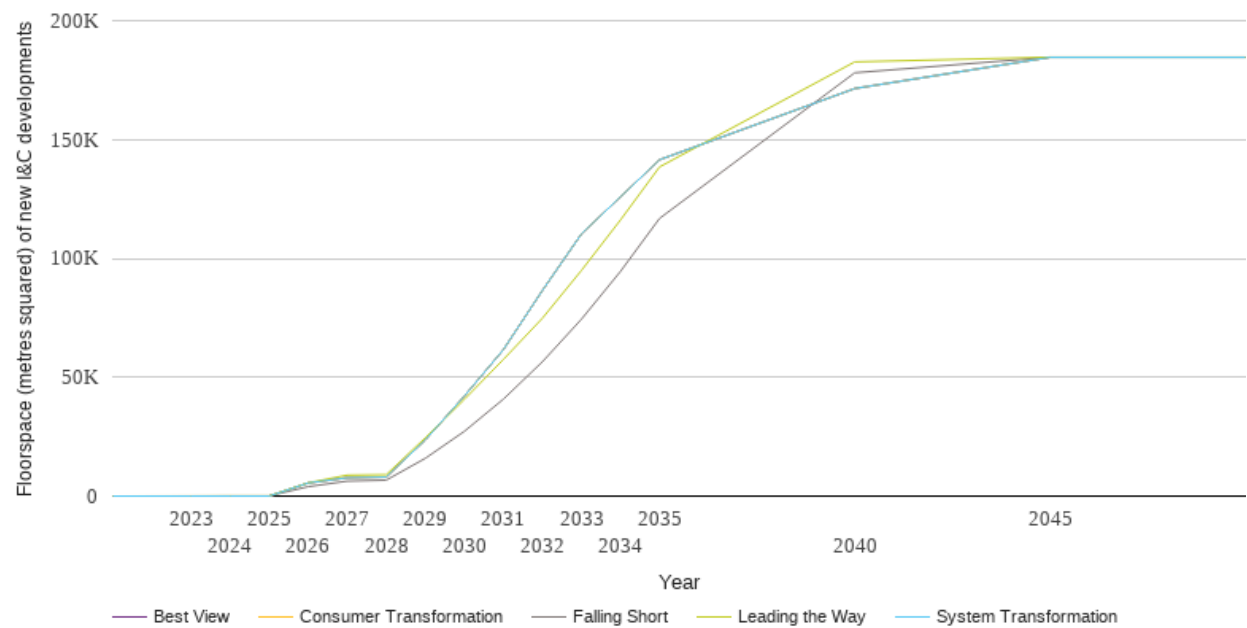
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	3.0	0.2	2.9	0.0
2024	0.2	6.0	0.7	7.3	0.2
2025	0.3	12.4	1.7	14.5	0.3
2026	0.3	12.4	1.7	14.5	0.3
2027	0.3	12.4	1.7	14.5	0.3
2028	0.3	12.6	1.7	14.8	0.3
2029	0.3	12.6	1.7	14.8	0.3
2030	0.3	12.6	1.7	14.8	0.3
2031	0.3	12.6	1.7	15.3	0.3
2032	0.3	12.6	1.7	15.3	0.3
2033	0.3	12.6	1.7	15.3	0.3
2034	0.3	12.6	1.7	15.3	0.3
2035	0.3	12.6	1.7	15.3	0.3
2040	0.3	13.1	1.7	15.3	0.3
2045	0.3	13.1	1.7	15.3	0.3
2050	0.7	13.1	2.0	15.5	1.0



Technology Summary: Non domestic

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

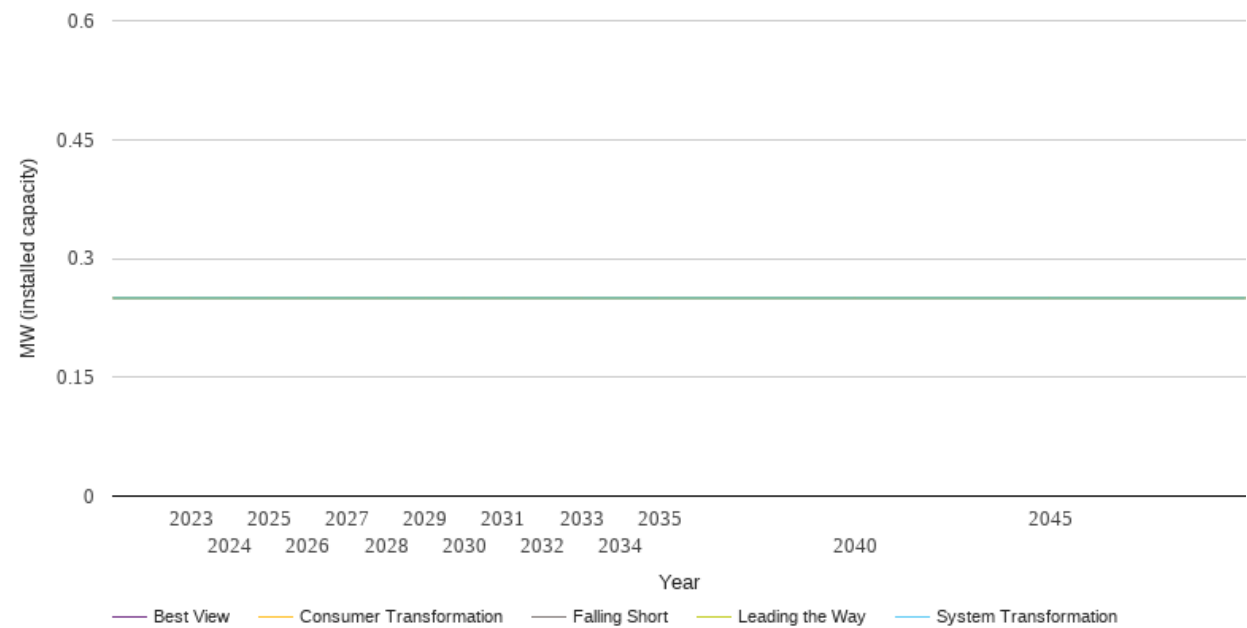
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	28	0	0	28	0
2024	56	0	0	56	0
2025	56	0	0	56	0
2026	3968	5501	5501	5557	5501
2027	6294	7704	7704	8801	7704
2028	6712	8000	8000	8993	8000
2029	15880	23608	23608	24497	23608
2030	27235	42060	42060	40657	42060
2031	40778	61606	61606	57474	61606
2032	56508	86498	86498	74825	86498
2033	74426	110297	110297	94950	110297
2034	94532	125892	125892	116168	125892
2035	116825	141487	141487	138481	141487
2040	178075	171456	171456	182668	171456
2045	184637	184581	184581	184637	184581
2050	184637	184581	184581	184637	184581



Technology Summary: Other Distributed Generation

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

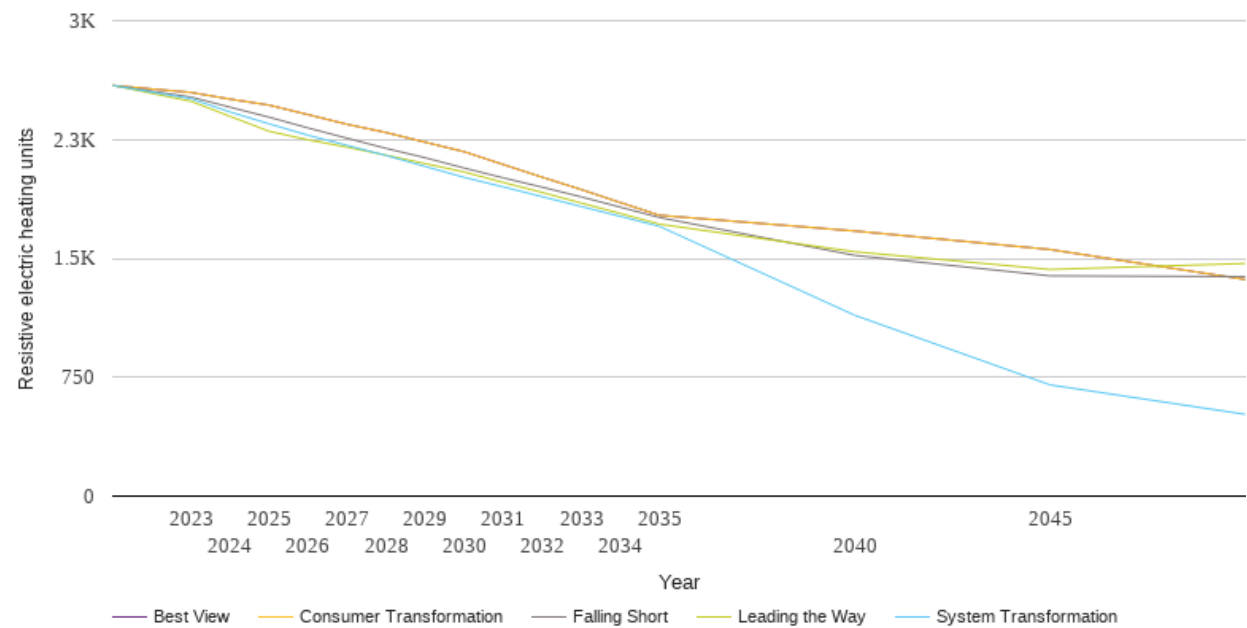
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.3	0.3	0.3	0.3	0.3
2023	0.3	0.3	0.3	0.3	0.3
2024	0.3	0.3	0.3	0.3	0.3
2025	0.3	0.3	0.3	0.3	0.3
2026	0.3	0.3	0.3	0.3	0.3
2027	0.3	0.3	0.3	0.3	0.3
2028	0.3	0.3	0.3	0.3	0.3
2029	0.3	0.3	0.3	0.3	0.3
2030	0.3	0.3	0.3	0.3	0.3
2031	0.3	0.3	0.3	0.3	0.3
2032	0.3	0.3	0.3	0.3	0.3
2033	0.3	0.3	0.3	0.3	0.3
2034	0.3	0.3	0.3	0.3	0.3
2035	0.3	0.3	0.3	0.3	0.3
2040	0.3	0.3	0.3	0.3	0.3
2045	0.3	0.3	0.3	0.3	0.3
2050	0.3	0.3	0.3	0.3	0.3



Technology Summary: Resistive electric heating

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

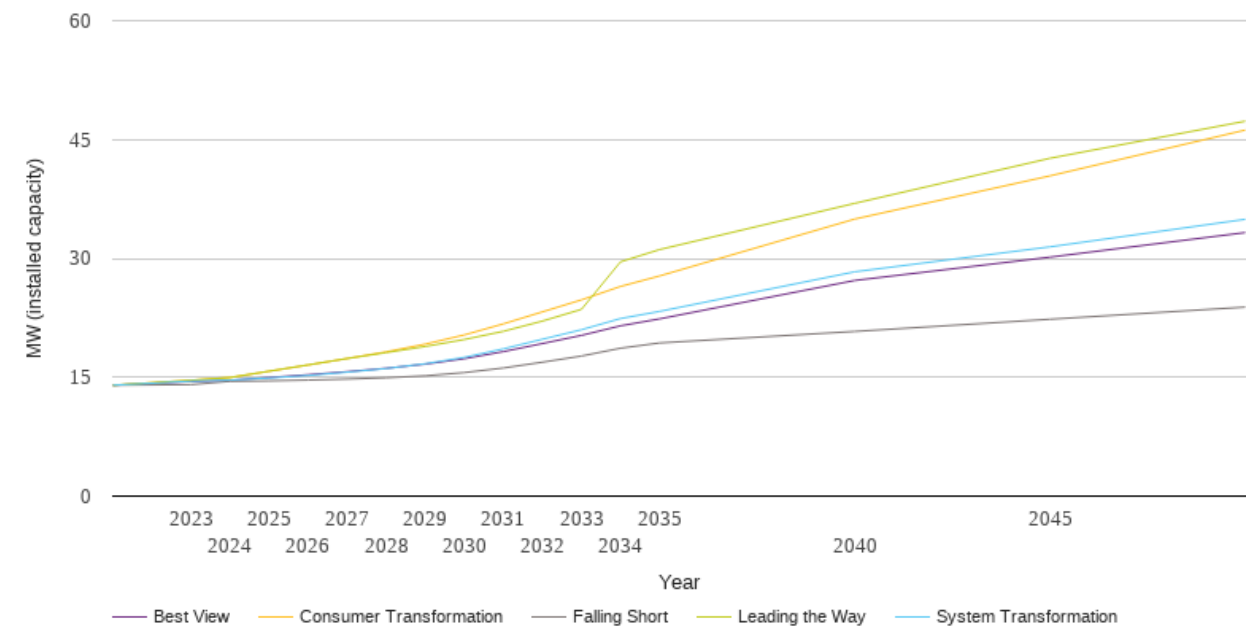
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	2591	2591	2591	2591	2591
2023	2518	2507	2547	2491	2547
2024	2454	2424	2505	2396	2505
2025	2391	2349	2467	2302	2467
2026	2323	2277	2407	2248	2407
2027	2258	2213	2346	2202	2346
2028	2194	2149	2294	2151	2294
2029	2135	2080	2233	2098	2233
2030	2070	2011	2173	2045	2173
2031	2008	1951	2092	1979	2092
2032	1949	1889	2012	1916	2012
2033	1888	1827	1934	1849	1934
2034	1823	1765	1852	1783	1852
2035	1758	1702	1772	1716	1772
2040	1519	1141	1673	1542	1673
2045	1390	702	1556	1430	1556
2050	1385	516	1367	1468	1367



Technology Summary: Solar Generation

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

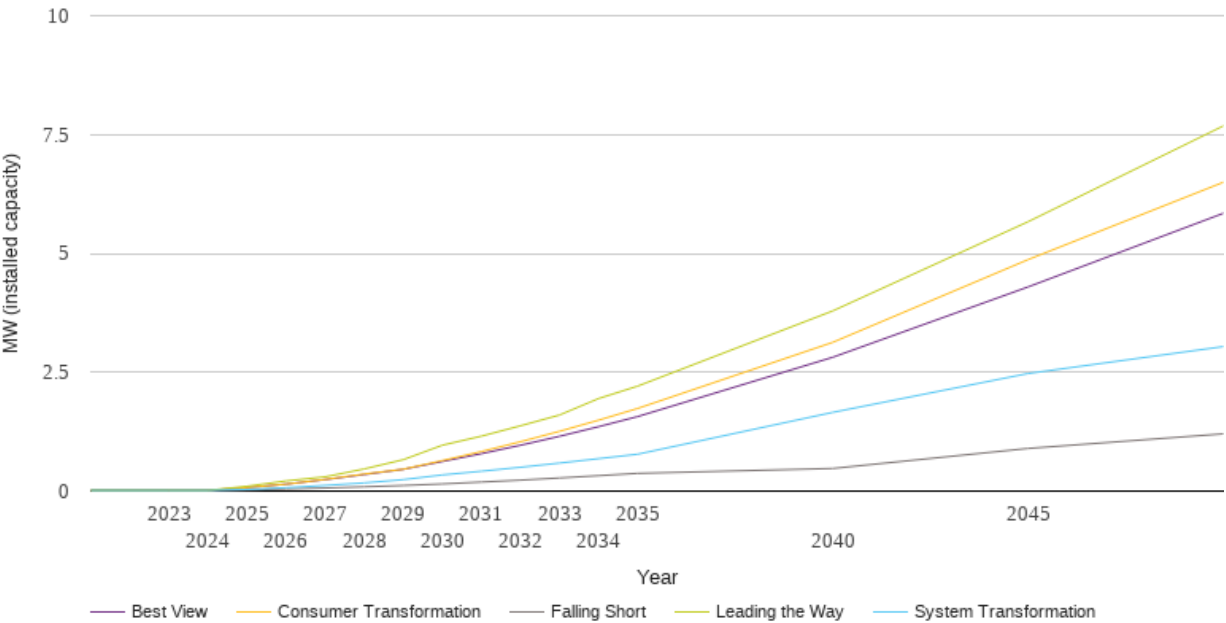
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	14.0	14.0	14.0	14.0	14.0
2023	14.1	14.5	14.6	14.6	14.5
2024	14.5	14.6	15.0	15.0	14.6
2025	14.5	14.9	15.8	15.8	15.0
2026	14.6	15.2	16.5	16.6	15.3
2027	14.8	15.6	17.4	17.4	15.7
2028	14.9	16.1	18.2	18.1	16.1
2029	15.2	16.7	19.2	18.9	16.7
2030	15.6	17.5	20.3	19.8	17.3
2031	16.2	18.6	21.7	20.8	18.2
2032	16.9	19.8	23.3	22.1	19.3
2033	17.7	21.0	24.8	23.6	20.3
2034	18.7	22.4	26.5	29.6	21.5
2035	19.3	23.3	27.8	31.1	22.4
2040	20.8	28.3	35.0	36.9	27.2
2045	22.3	31.5	40.4	42.6	30.2
2050	23.9	34.9	46.2	47.3	33.3



Technology Summary: Storage

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

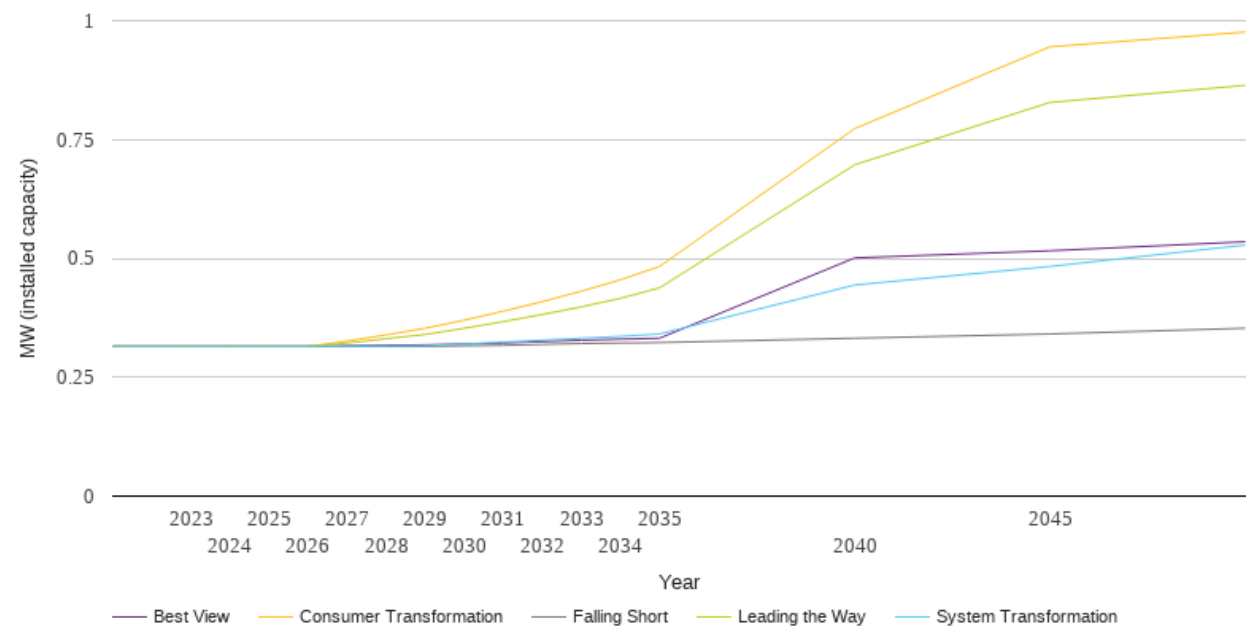
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.1	0.1	0.1
2026	0.0	0.1	0.1	0.2	0.1
2027	0.1	0.1	0.2	0.3	0.2
2028	0.1	0.2	0.4	0.5	0.3
2029	0.1	0.2	0.5	0.7	0.5
2030	0.1	0.3	0.6	1.0	0.6
2031	0.2	0.4	0.8	1.2	0.8
2032	0.2	0.5	1.0	1.4	1.0
2033	0.3	0.6	1.3	1.6	1.2
2034	0.3	0.7	1.5	1.9	1.4
2035	0.4	0.8	1.7	2.2	1.6
2040	0.5	1.7	3.1	3.8	2.8
2045	0.9	2.5	4.9	5.7	4.3
2050	1.2	3.0	6.5	7.7	5.8



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	0.3	0.3	0.3	0.3	0.3
2023	0.3	0.3	0.3	0.3	0.3
2024	0.3	0.3	0.3	0.3	0.3
2025	0.3	0.3	0.3	0.3	0.3
2026	0.3	0.3	0.3	0.3	0.3
2027	0.3	0.3	0.3	0.3	0.3
2028	0.3	0.3	0.3	0.3	0.3
2029	0.3	0.3	0.4	0.3	0.3
2030	0.3	0.3	0.4	0.4	0.3
2031	0.3	0.3	0.4	0.4	0.3
2032	0.3	0.3	0.4	0.4	0.3
2033	0.3	0.3	0.4	0.4	0.3
2034	0.3	0.3	0.5	0.4	0.3
2035	0.3	0.3	0.5	0.4	0.3
2040	0.3	0.4	0.8	0.7	0.5
2045	0.3	0.5	0.9	0.8	0.5
2050	0.4	0.5	1.0	0.9	0.5



National Grid Electricity Distribution PLC 09223384)
National Grid Electricity Distribution (East Midlands) Plc (company number 02366923))
National Grid Electricity Distribution (West Midlands) Plc (company number 03600574))
National Grid Electricity Distribution (South West) Plc (company number 02366894))
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