

Distribution Future Energy Scenarios 2022

Local Authority:
Malvern Hills

What are Distribution Future Energy Scenarios?

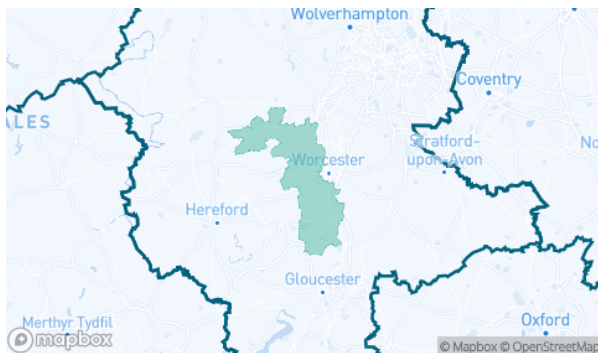
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Malvern Hills 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 Malvern Hills 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	124	74	74	0	12706	5761	5761	0
Domestic	New dwellings	0	1156	1280	1280	1569	1674	1652	1652	1640
Electric vehicles	Electric vehicles	997	8327	9860	18314	18152	52652	41473	41243	36289
EV Charge Point	EV charge points	516	3892	5452	10282	11365	31636	29160	30676	31104
Heat pumps	Heat pump installations	808	4461	4974	7963	11402	21454	23965	36551	33058
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.7	0.0	0.0	2.2	11.6	8.2	8.3
Non domestic	Floorspace (metres squared) of new I&C developments	0	20678	25365	25365	26806	29907	29907	29907	29907
Other Distributed Generation	MW (installed capacity)	1.3	1.3	2.5	4.5	5.0	1.3	2.4	5.0	5.9
Resistive electric heating	Resistive electric heating units	5315	4323	4190	4461	4249	2919	1228	2936	3086
Solar Generation	MW (installed capacity)	13.3	18.0	25.1	32.6	27.7	59.1	114.4	145.0	130.9
Storage	MW (installed capacity)	0.0	0.2	0.9	1.9	2.9	2.9	7.0	17.5	23.2
Wind	MW (installed capacity)	0.0	0.0	0.1	0.8	0.6	0.7	2.2	7.7	6.0

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

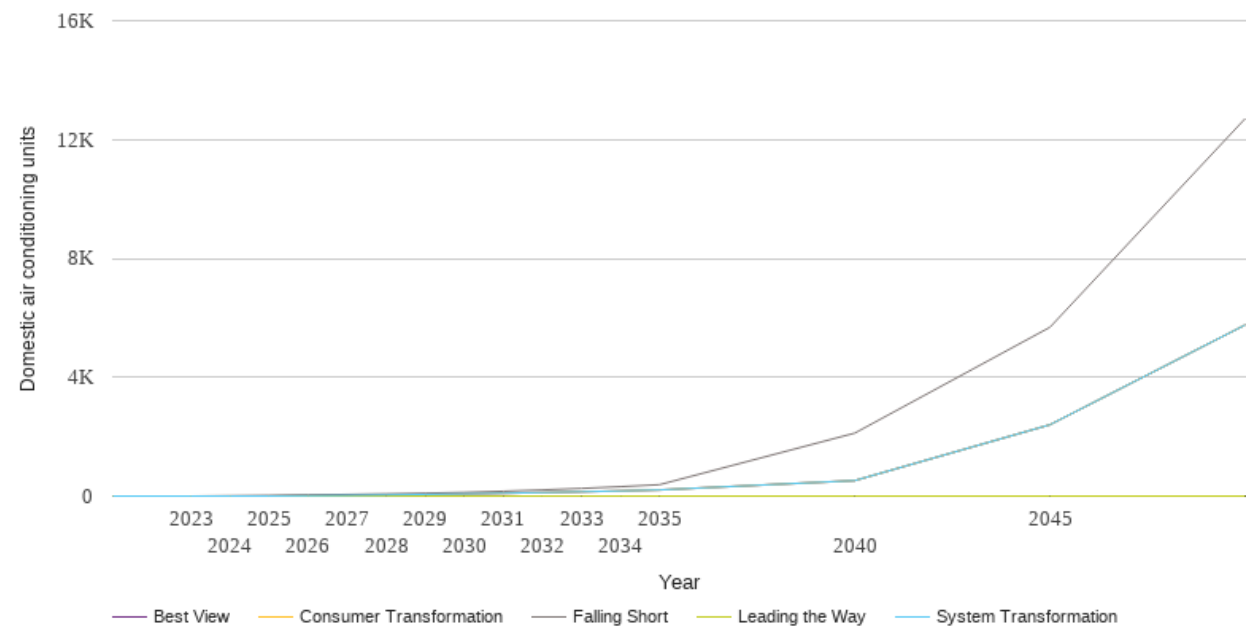
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

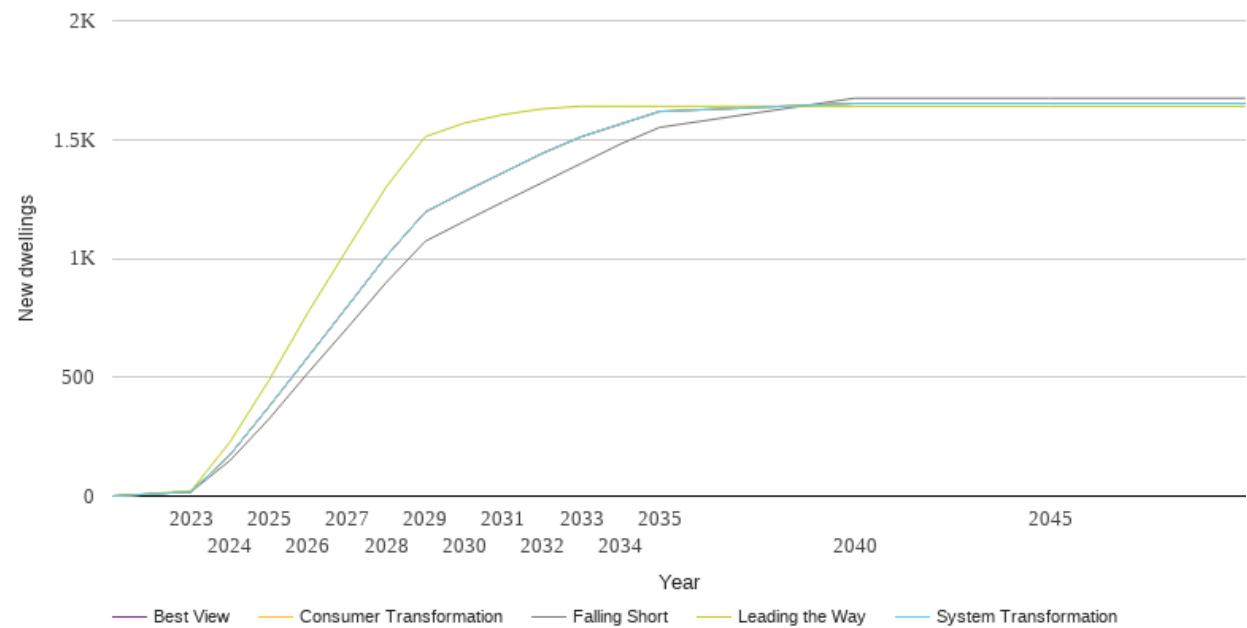
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	11	0	0	0	0
2025	24	0	0	0	0
2026	39	11	11	0	11
2027	56	24	24	0	24
2028	75	39	39	0	39
2029	98	56	56	0	56
2030	124	74	74	0	74
2031	163	95	95	0	95
2032	207	119	119	0	119
2033	258	145	145	0	145
2034	317	175	175	0	175
2035	384	208	208	0	208
2040	2119	521	521	0	521
2045	5683	2402	2402	0	2402
2050	12706	5761	5761	0	5761



Technology Summary: Domestic

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

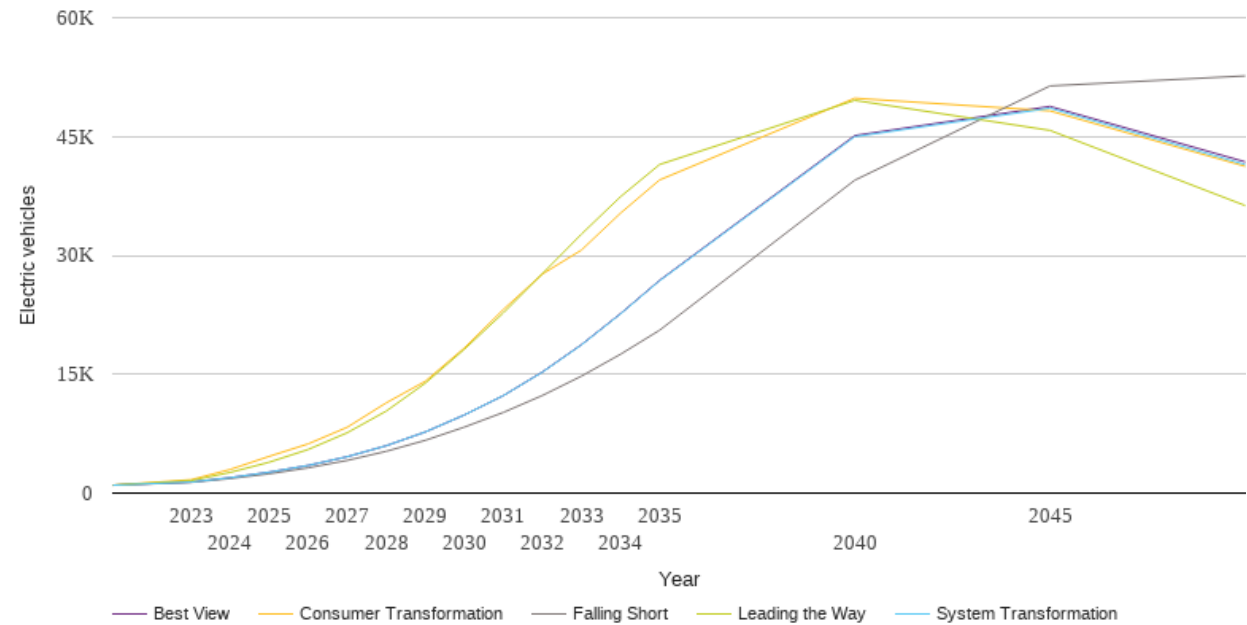
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	18	18	18	22	18
2024	150	174	174	228	174
2025	325	377	377	488	377
2026	519	586	586	773	586
2027	707	797	797	1039	797
2028	899	1009	1009	1301	1009
2029	1072	1195	1195	1512	1195
2030	1156	1280	1280	1569	1280
2031	1238	1361	1361	1605	1361
2032	1319	1442	1442	1629	1442
2033	1400	1512	1512	1640	1512
2034	1481	1565	1565	1640	1565
2035	1551	1618	1618	1640	1618
2040	1674	1652	1652	1640	1652
2045	1674	1652	1652	1640	1652
2050	1674	1652	1652	1640	1652



Technology Summary: Electric vehicles

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

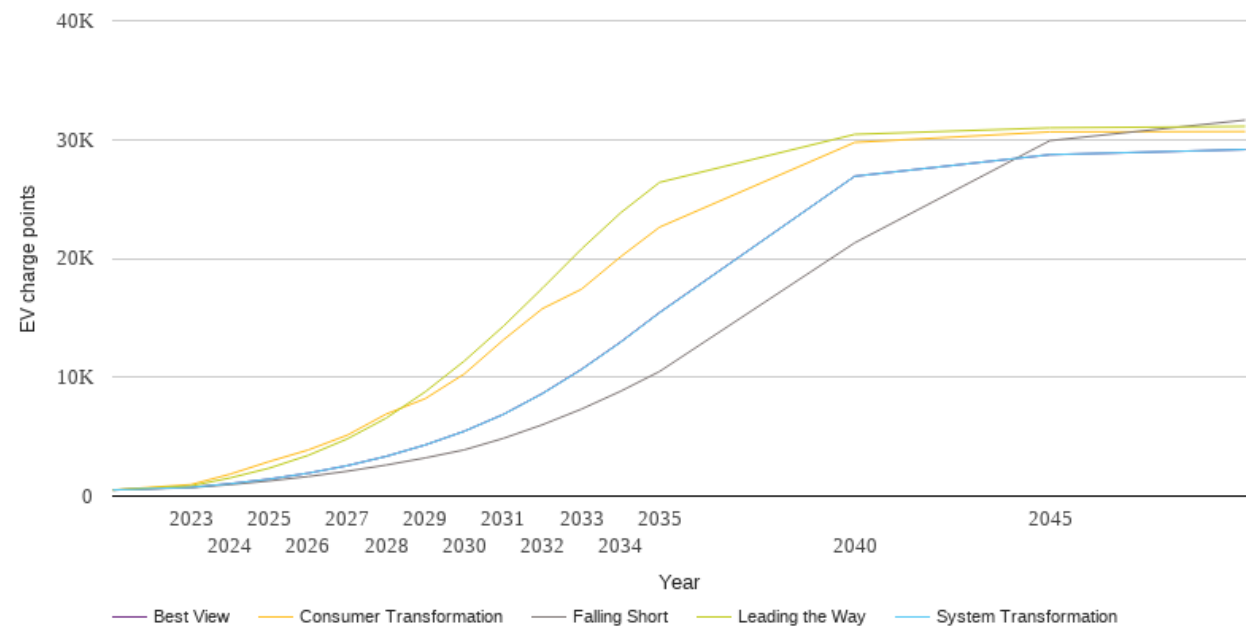
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	997	997	997	997	997
2023	1361	1394	1686	1571	1394
2024	1832	1938	2978	2608	1938
2025	2433	2635	4633	3894	2635
2026	3186	3488	6211	5500	3488
2027	4125	4590	8308	7616	4590
2028	5272	5977	11390	10347	5977
2029	6659	7716	14111	13874	7716
2030	8327	9860	18314	18152	9860
2031	10181	12304	23176	22746	12304
2032	12320	15261	27651	27693	15290
2033	14763	18703	30672	32683	18738
2034	17519	22603	35328	37402	22650
2035	20551	26789	39517	41465	26848
2040	39490	44980	49834	49566	45124
2045	51384	48583	48238	45776	48798
2050	52652	41473	41243	36289	41806



Technology Summary: EV Charge Point

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

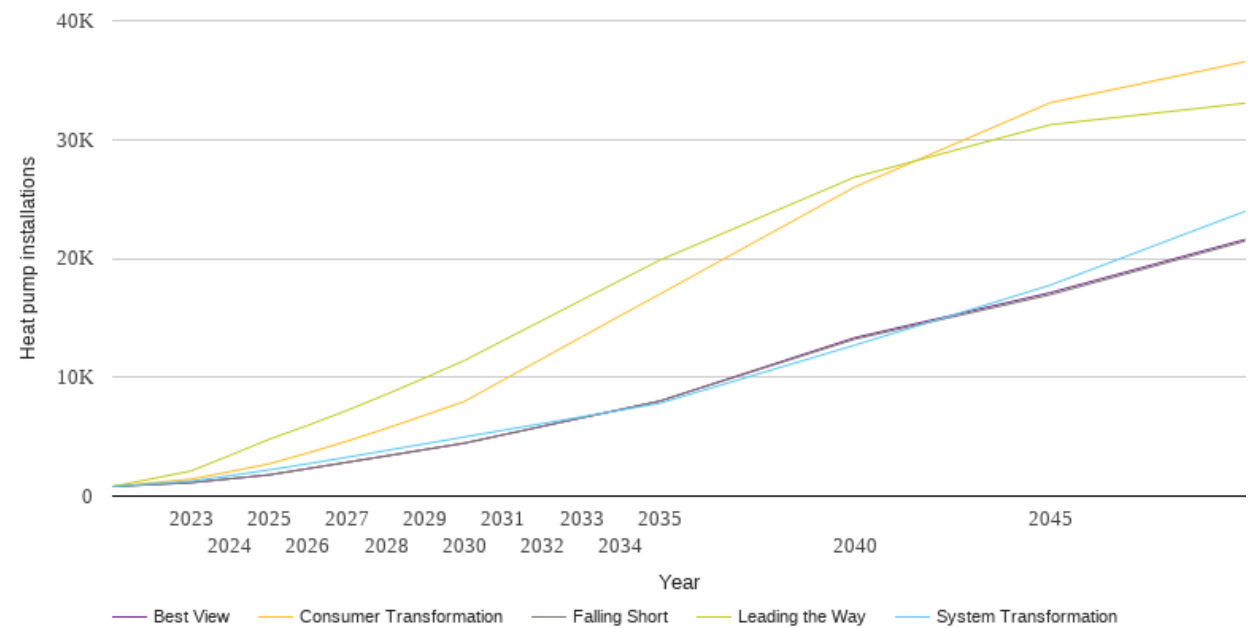
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	516	516	516	516	516
2023	711	737	971	860	737
2024	963	1040	1845	1530	1041
2025	1274	1426	2905	2347	1428
2026	1647	1928	3879	3425	1930
2027	2091	2558	5122	4810	2560
2028	2613	3343	6904	6563	3346
2029	3211	4305	8204	8779	4307
2030	3892	5452	10282	11365	5459
2031	4857	6867	13140	14293	6879
2032	6002	8616	15770	17491	8633
2033	7319	10643	17408	20789	10668
2034	8818	12930	20128	23824	12959
2035	10483	15418	22627	26395	15449
2040	21309	26910	29759	30436	26914
2045	29907	28730	30644	30984	28724
2050	31636	29160	30676	31104	29156



Technology Summary: Heat pumps

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

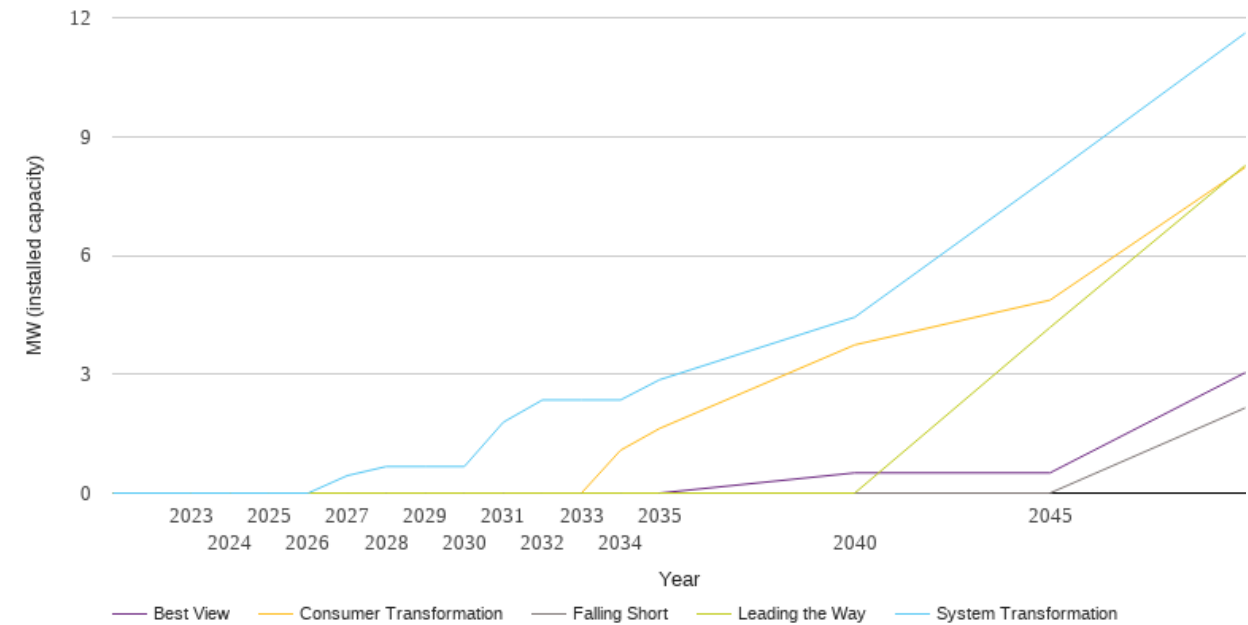
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	808	808	808	808	808
2023	1131	1259	1431	2115	1131
2024	1457	1719	2056	3430	1457
2025	1787	2200	2713	4782	1787
2026	2316	2723	3636	5960	2313
2027	2849	3270	4623	7214	2841
2028	3382	3836	5695	8559	3373
2029	3923	4402	6815	9959	3913
2030	4461	4974	7963	11402	4446
2031	5165	5542	9773	13103	5156
2032	5872	6102	11569	14785	5869
2033	6580	6666	13378	16481	6581
2034	7280	7234	15182	18166	7283
2035	7984	7803	16983	19837	7994
2040	13202	12698	26004	26836	13323
2045	16936	17740	33085	31245	17106
2050	21454	23965	36551	33058	21591



Technology Summary: Hydrogen electrolysis

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

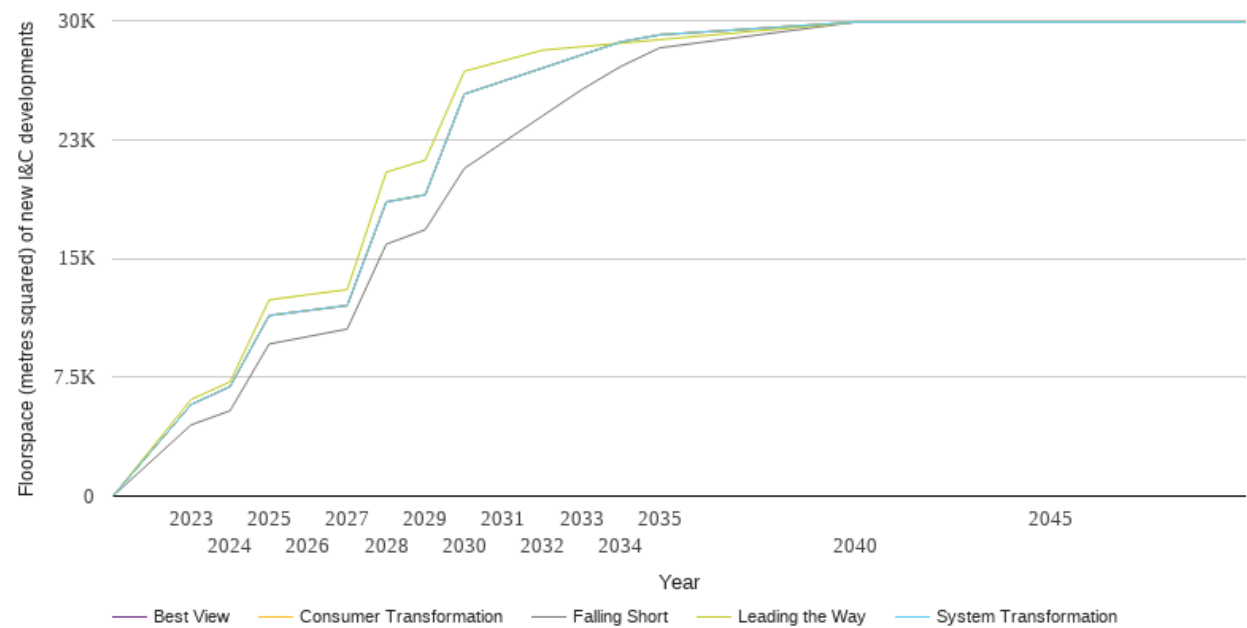
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.4	0.0	0.0	0.0
2028	0.0	0.7	0.0	0.0	0.0
2029	0.0	0.7	0.0	0.0	0.0
2030	0.0	0.7	0.0	0.0	0.0
2031	0.0	1.8	0.0	0.0	0.0
2032	0.0	2.4	0.0	0.0	0.0
2033	0.0	2.4	0.0	0.0	0.0
2034	0.0	2.4	1.1	0.0	0.0
2035	0.0	2.9	1.6	0.0	0.0
2040	0.0	4.4	3.7	0.0	0.5
2045	0.0	8.0	4.9	4.2	0.5
2050	2.2	11.6	8.2	8.3	3.0



Technology Summary: Non domestic

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

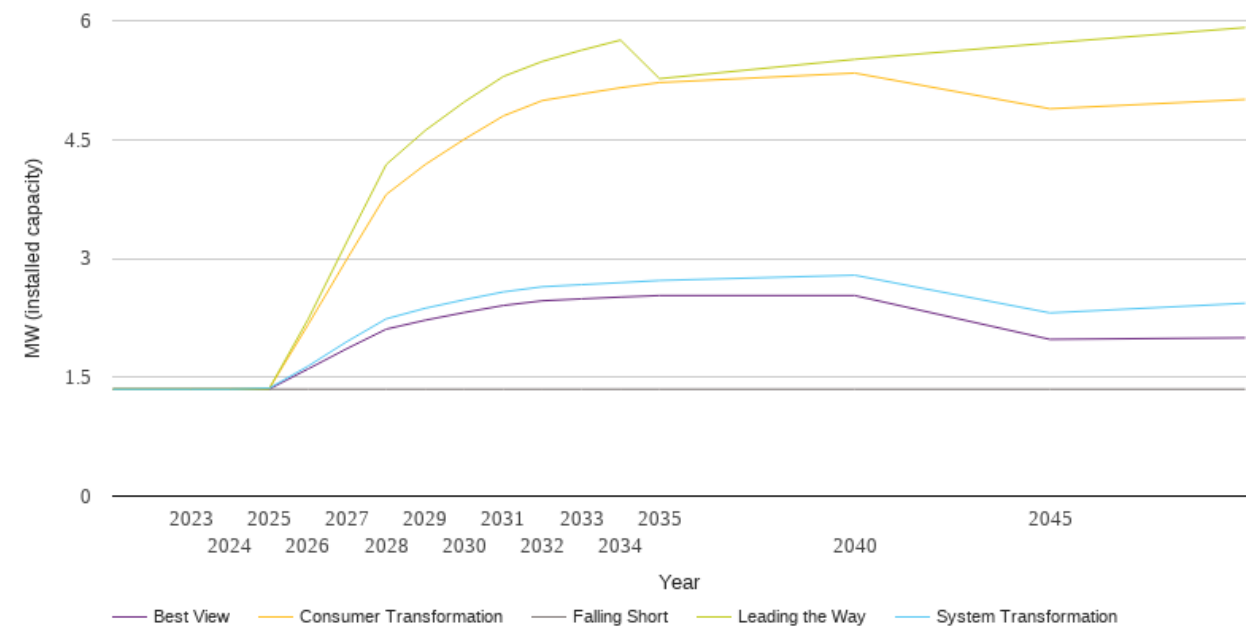
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	4493	5777	5777	6098	5777
2024	5386	6905	6905	7208	6905
2025	9595	11394	11394	12378	11394
2026	10067	11710	11710	12714	11710
2027	10539	12025	12025	13025	12025
2028	15895	18557	18557	20442	18557
2029	16811	19010	19010	21198	19010
2030	20678	25365	25365	26806	25365
2031	22331	26188	26188	27471	26188
2032	23985	27010	27010	28136	27010
2033	25638	27832	27832	28358	27832
2034	27099	28654	28654	28579	28654
2035	28281	29108	29108	28800	29108
2040	29907	29907	29907	29907	29907
2045	29907	29907	29907	29907	29907
2050	29907	29907	29907	29907	29907



Technology Summary: Other Distributed Generation

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

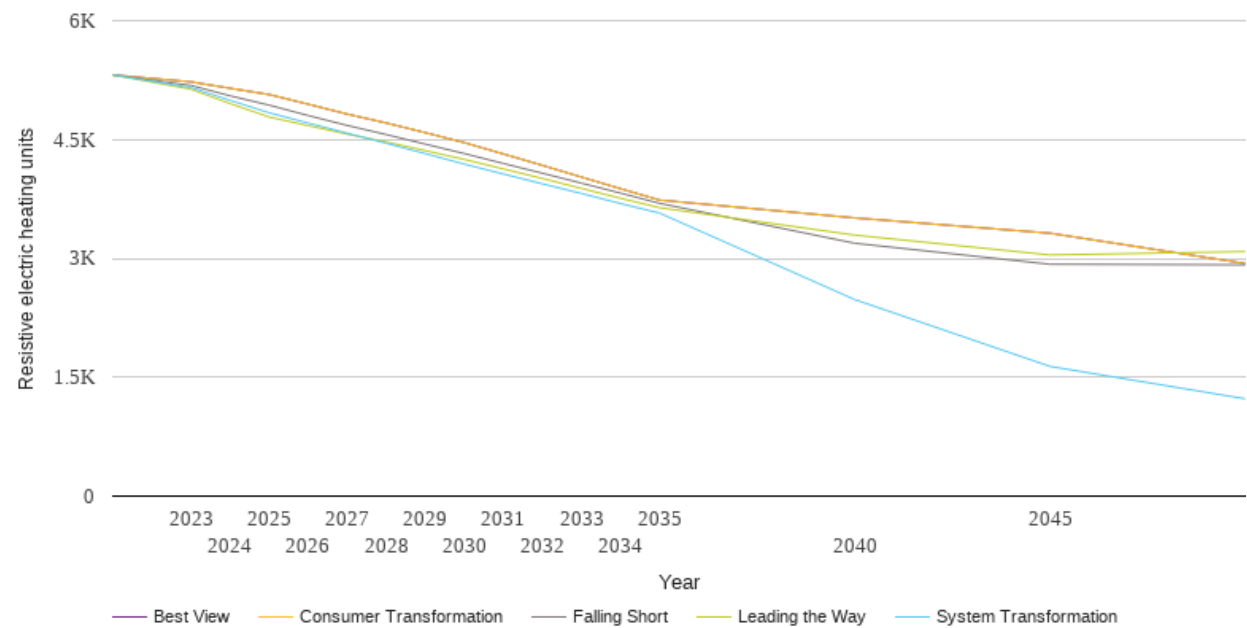
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1.3	1.3	1.3	1.3	1.3
2023	1.3	1.3	1.3	1.3	1.3
2024	1.3	1.3	1.3	1.3	1.3
2025	1.3	1.4	1.4	1.4	1.3
2026	1.3	1.6	2.2	2.2	1.6
2027	1.3	2.0	3.0	3.2	1.9
2028	1.3	2.2	3.8	4.2	2.1
2029	1.3	2.4	4.2	4.6	2.2
2030	1.3	2.5	4.5	5.0	2.3
2031	1.3	2.6	4.8	5.3	2.4
2032	1.3	2.6	5.0	5.5	2.5
2033	1.3	2.7	5.1	5.6	2.5
2034	1.3	2.7	5.2	5.8	2.5
2035	1.3	2.7	5.2	5.3	2.5
2040	1.3	2.8	5.3	5.5	2.5
2045	1.3	2.3	4.9	5.7	2.0
2050	1.3	2.4	5.0	5.9	2.0



Technology Summary: Resistive electric heating

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

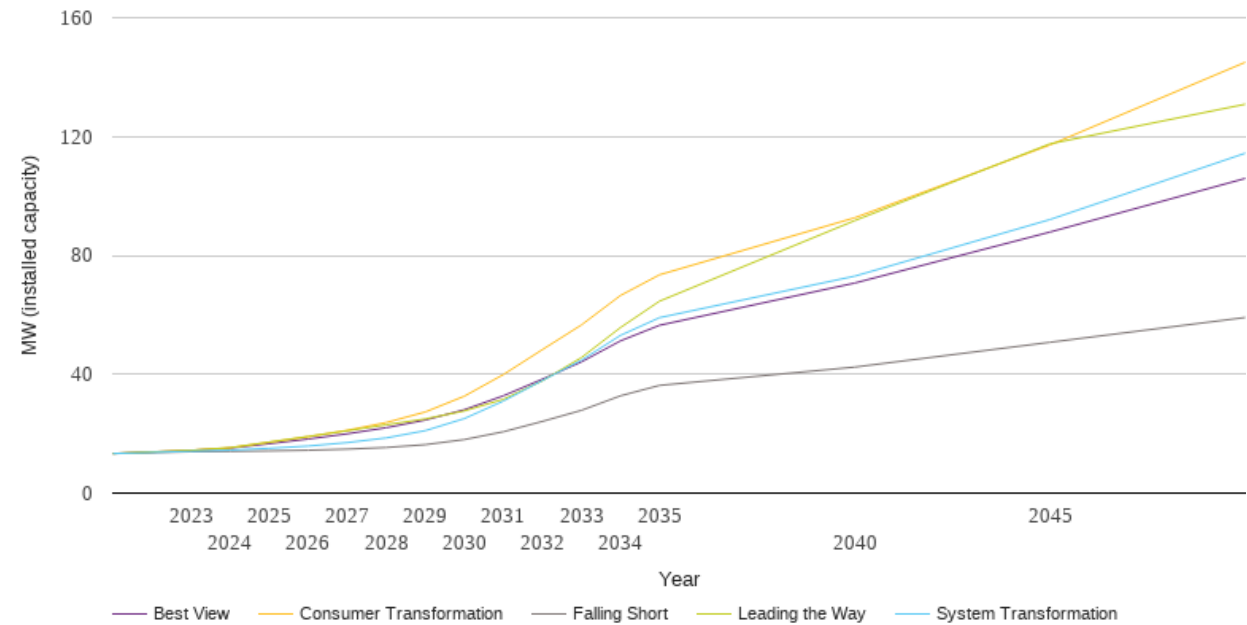
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	5315	5315	5315	5315	5315
2023	5182	5155	5228	5134	5228
2024	5052	4994	5147	4954	5147
2025	4934	4838	5068	4784	5068
2026	4803	4708	4946	4676	4946
2027	4678	4580	4821	4568	4821
2028	4563	4453	4709	4469	4709
2029	4442	4322	4587	4360	4587
2030	4323	4190	4461	4249	4461
2031	4198	4065	4318	4129	4318
2032	4075	3941	4174	4009	4174
2033	3950	3819	4026	3883	4026
2034	3824	3692	3880	3759	3880
2035	3695	3572	3736	3640	3736
2040	3191	2480	3511	3294	3511
2045	2926	1637	3318	3043	3318
2050	2919	1228	2936	3086	2936



Technology Summary: Solar Generation

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

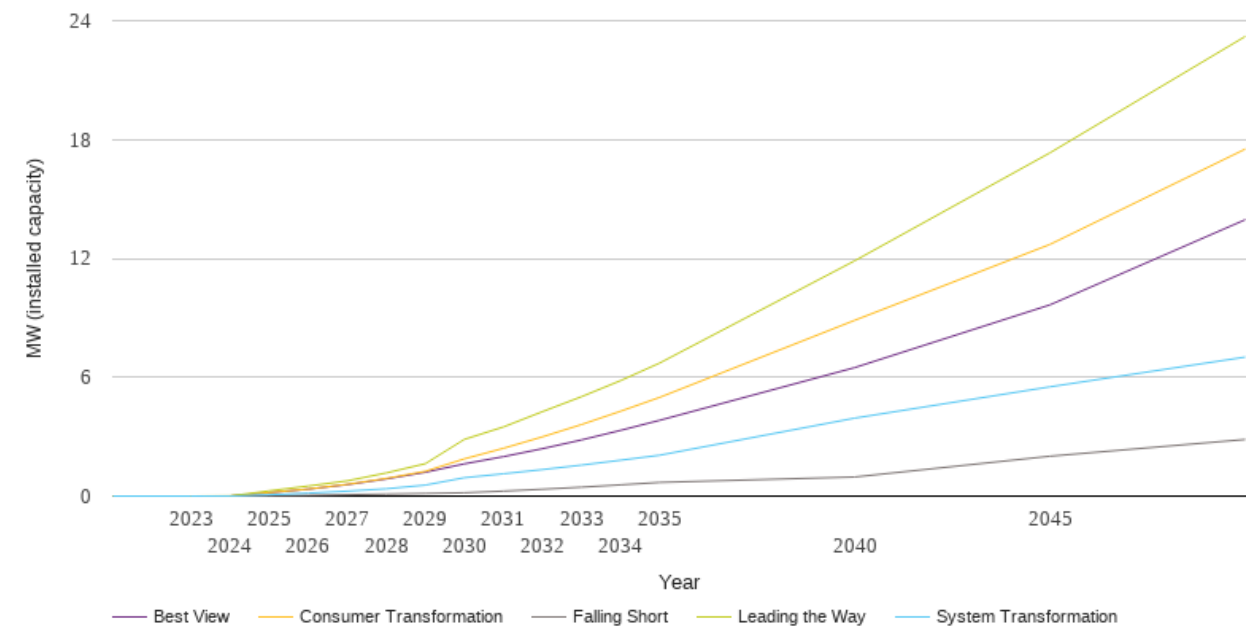
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	13.3	13.3	13.3	13.3	13.3
2023	13.9	14.1	14.4	14.4	14.4
2024	14.0	14.4	15.2	15.3	15.1
2025	14.2	15.1	17.1	17.2	16.6
2026	14.4	15.8	19.0	19.0	18.2
2027	14.8	17.0	21.1	21.0	19.9
2028	15.3	18.6	23.7	23.0	22.0
2029	16.3	21.0	27.3	25.0	24.6
2030	18.0	25.1	32.6	27.7	28.1
2031	20.7	31.0	39.9	31.6	32.7
2032	24.1	37.9	48.3	37.8	38.4
2033	27.9	44.7	56.6	45.6	44.2
2034	32.7	53.1	66.5	55.7	51.2
2035	36.2	59.0	73.5	64.6	56.5
2040	42.4	73.0	92.7	91.7	70.7
2045	50.8	92.1	117.2	117.5	87.9
2050	59.1	114.4	145.0	130.9	105.9



Technology Summary: Storage

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

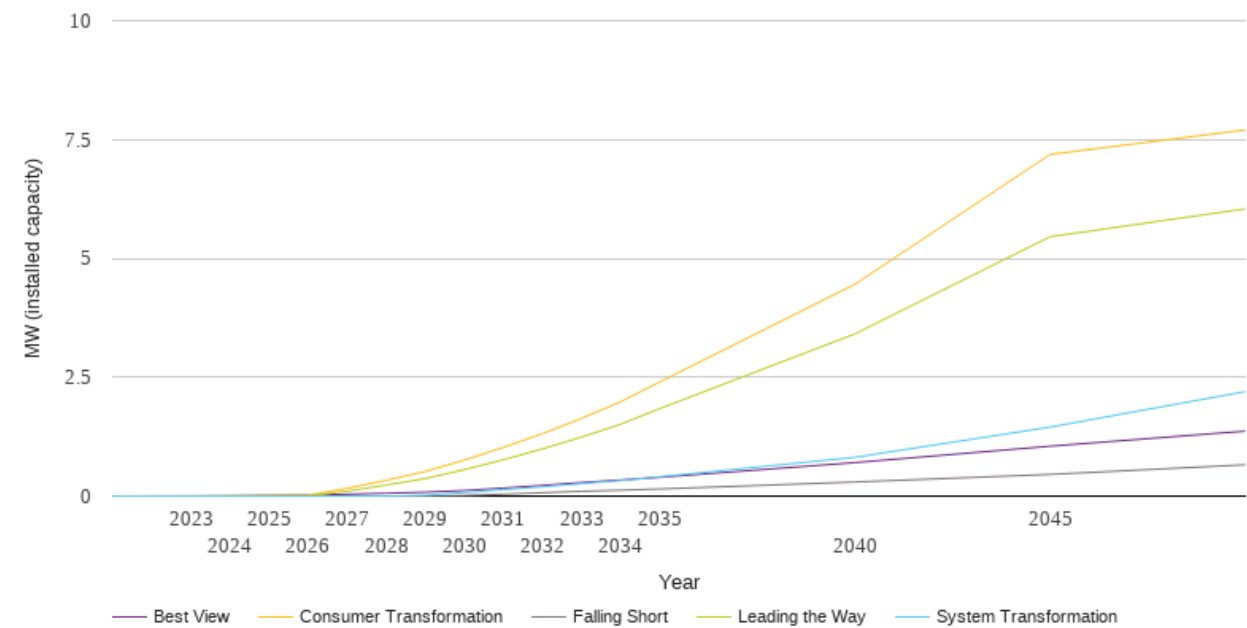
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.1	0.2	0.3	0.2
2026	0.0	0.1	0.4	0.5	0.3
2027	0.1	0.2	0.6	0.8	0.6
2028	0.1	0.4	0.9	1.2	0.9
2029	0.1	0.6	1.3	1.6	1.2
2030	0.2	0.9	1.9	2.9	1.6
2031	0.3	1.1	2.4	3.5	2.0
2032	0.3	1.3	3.0	4.3	2.4
2033	0.4	1.6	3.6	5.0	2.8
2034	0.6	1.8	4.3	5.8	3.3
2035	0.7	2.1	5.0	6.7	3.8
2040	1.0	3.9	8.9	11.9	6.5
2045	2.0	5.5	12.7	17.3	9.7
2050	2.9	7.0	17.5	23.2	14.0



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	0.0	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	0.0	0.2	0.1	0.0
2028	0.0	0.0	0.3	0.2	0.1
2029	0.0	0.0	0.5	0.4	0.1
2030	0.0	0.1	0.8	0.6	0.1
2031	0.0	0.1	1.0	0.8	0.2
2032	0.1	0.2	1.3	1.0	0.2
2033	0.1	0.3	1.6	1.2	0.3
2034	0.1	0.3	2.0	1.5	0.3
2035	0.1	0.4	2.4	1.8	0.4
2040	0.3	0.8	4.5	3.4	0.7
2045	0.5	1.5	7.2	5.5	1.0
2050	0.7	2.2	7.7	6.0	1.4



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))
National Grid Electricity Distribution (South Wales) Plc (company number 02366985))
(collectively, “NGED”)

nged.networkstrategy@nationalgrid.co.uk

