

Distribution Future Energy Scenarios 2022

Local Authority:
Mansfield

What are Distribution Future Energy Scenarios?

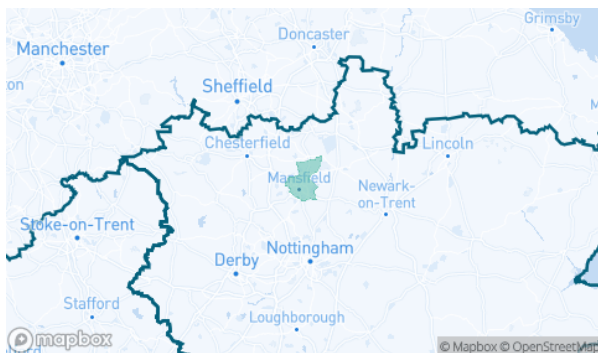
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Mansfield 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 Mansfield 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	743	443	443	0	28775	14190	14190	0
Domestic	New dwellings	0	2555	2791	2791	3284	4110	4055	4055	3997
Electric vehicles	Electric vehicles	1547	9627	12591	23053	23084	74058	71806	71024	56010
EV Charge Point	EV charge points	760	4200	6592	12461	13587	39545	41142	43308	42720
Heat pumps	Heat pump installations	348	2840	3034	8197	13392	27477	31523	52581	46549
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.5
Non domestic	Floorspace (metres squared) of new I&C developments	0	10945 1	13401 7	13401 7	13728 4	19480 8	19480 8	19480 8	19480 8
Other Distributed Generation	MW (installed capacity)	15.6	23.6	20.9	20.9	20.7	18.4	6.2	0.4	9.0
Resistive electric heating	Resistive electric heating units	2566	2434	2283	2374	2345	2213	1150	1951	2081
Solar Generation	MW (installed capacity)	15.6	19.4	24.8	33.9	34.2	32.6	60.8	100.4	105.4
Storage	MW (installed capacity)	0.0	0.1	0.9	2.1	2.7	3.0	7.8	21.0	27.4
Wind	MW (installed capacity)	0.0	0.0	0.0	0.3	0.2	0.2	0.7	2.8	2.3

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

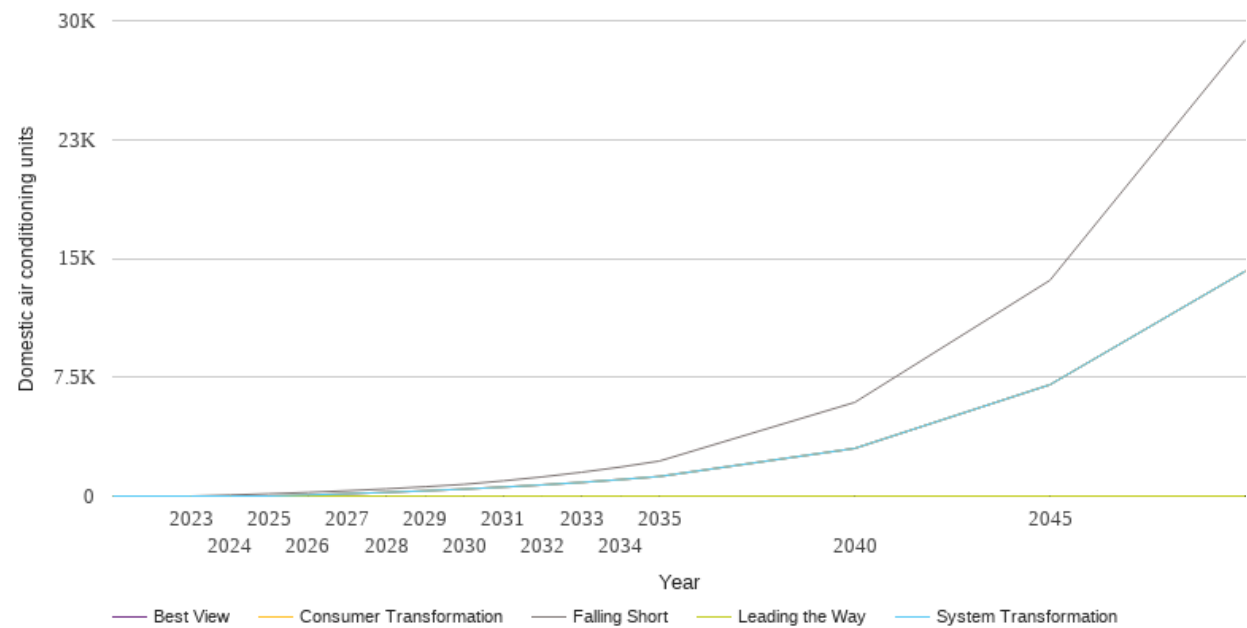
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

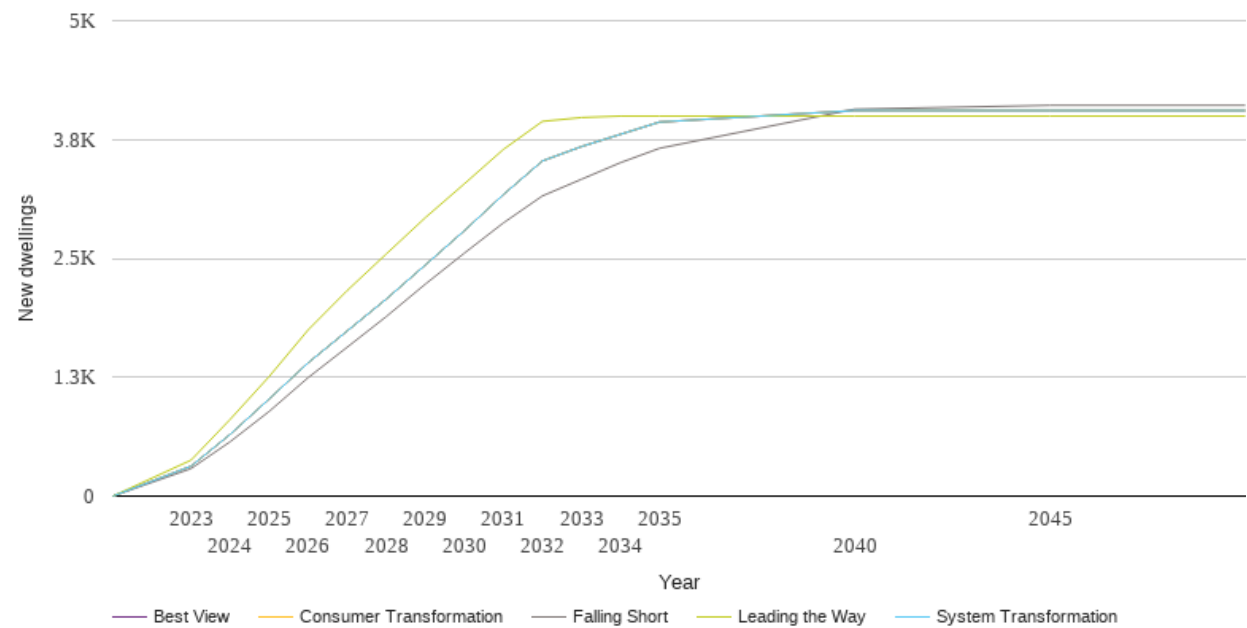
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	67	0	0	0	0
2025	146	0	0	0	0
2026	235	69	69	0	69
2027	338	146	146	0	146
2028	454	235	235	0	235
2029	590	334	334	0	334
2030	743	443	443	0	443
2031	962	568	568	0	568
2032	1213	707	707	0	707
2033	1502	863	863	0	863
2034	1834	1041	1041	0	1041
2035	2213	1239	1239	0	1239
2040	5914	3010	3010	0	3010
2045	13618	7029	7029	0	7029
2050	28775	14190	14190	0	14190



Technology Summary: Domestic

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

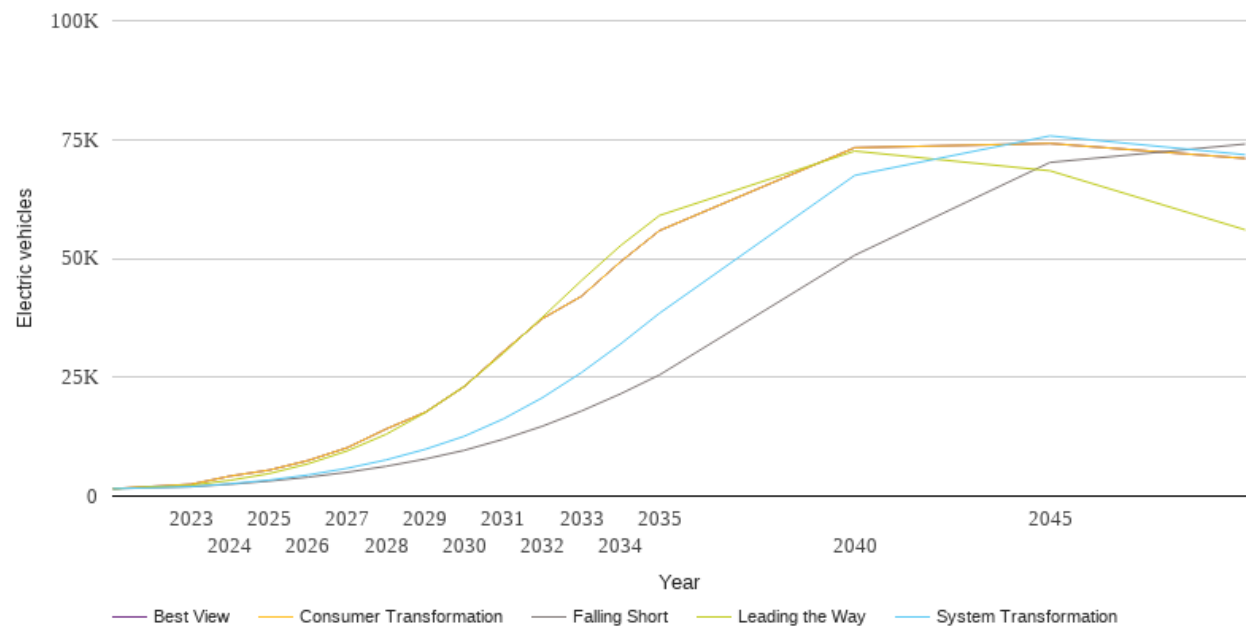
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	289	315	315	378	315
2024	571	648	648	806	648
2025	890	1021	1021	1257	1021
2026	1246	1402	1402	1748	1402
2027	1566	1737	1737	2162	1737
2028	1888	2072	2072	2546	2072
2029	2229	2430	2430	2928	2430
2030	2555	2791	2791	3284	2791
2031	2873	3171	3171	3646	3171
2032	3157	3525	3525	3941	3525
2033	3332	3676	3676	3981	3676
2034	3507	3805	3805	3997	3805
2035	3658	3934	3934	3997	3934
2040	4069	4055	4055	3997	4055
2045	4110	4055	4055	3997	4055
2050	4110	4055	4055	3997	4055



Technology Summary: Electric vehicles

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

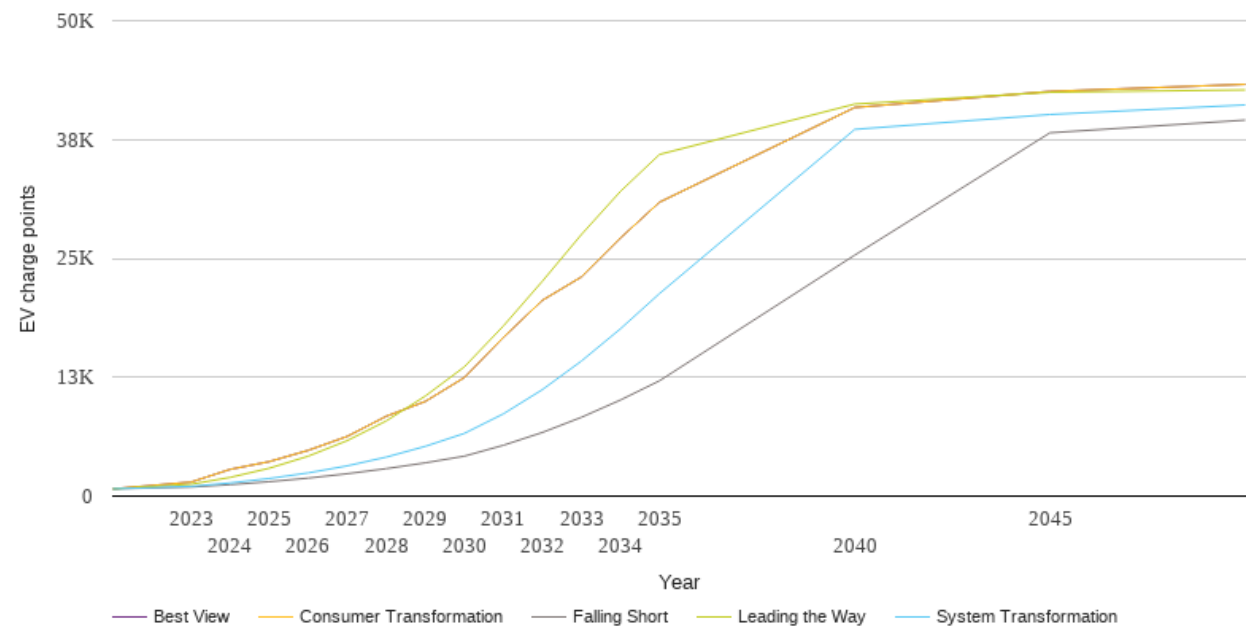
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1547	1547	1547	1547	1547
2023	1960	1990	2483	2273	2483
2024	2491	2591	4204	3320	4204
2025	3153	3362	5466	4729	5466
2026	3981	4448	7488	6794	7488
2027	5015	5851	10172	9505	10172
2028	6275	7624	14122	13015	14122
2029	7800	9847	17634	17566	17634
2030	9627	12591	23053	23084	23053
2031	11969	16238	30418	30040	30418
2032	14702	20699	37332	37612	37332
2033	17893	25982	42035	45337	42035
2034	21503	31992	49279	52674	49279
2035	25495	38475	55851	59035	55851
2040	50663	67458	73291	72574	73291
2045	70184	75767	74176	68427	74176
2050	74058	71806	71024	56010	71024



Technology Summary: EV Charge Point

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

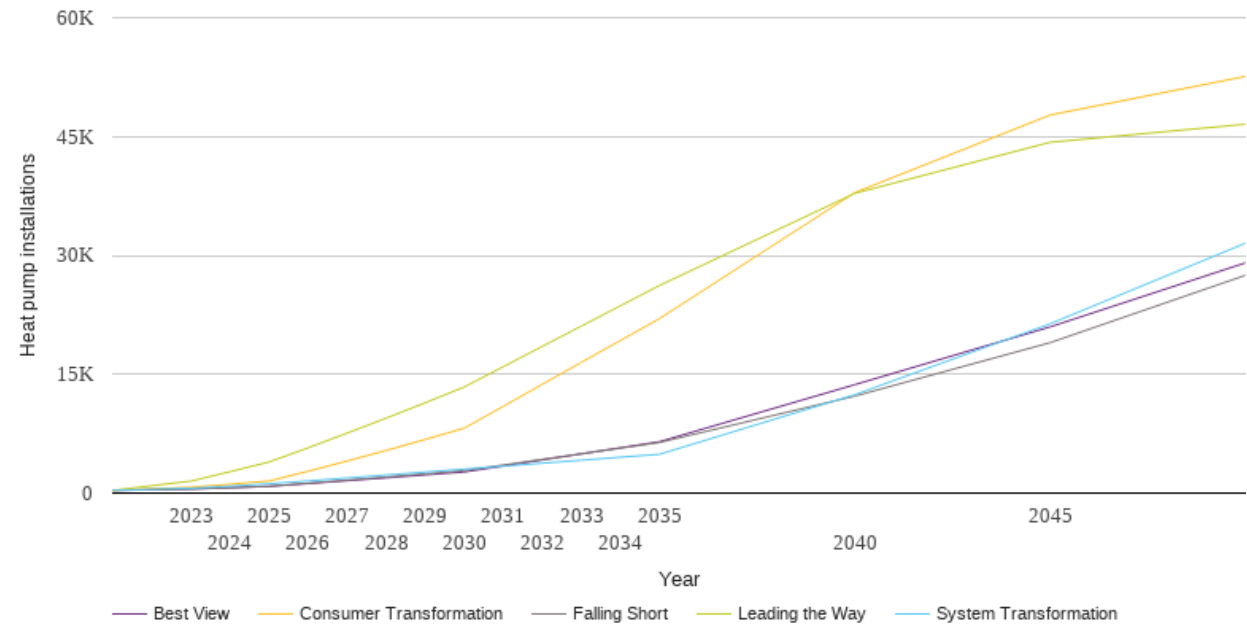
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	760	760	760	760	760
2023	952	1022	1472	1248	1472
2024	1201	1380	2807	1963	2807
2025	1512	1847	3623	2925	3623
2026	1891	2440	4808	4195	4808
2027	2352	3178	6277	5833	6277
2028	2886	4101	8396	7902	8396
2029	3498	5232	9953	10520	9953
2030	4200	6592	12461	13587	12461
2031	5344	8649	16690	17891	16690
2032	6695	11201	20594	22602	20594
2033	8289	14207	23053	27515	23053
2034	10107	17597	27147	32054	27147
2035	12129	21303	30911	35933	30911
2040	25344	38568	40870	41230	40870
2045	38208	40136	42558	42471	42558
2050	39545	41142	43308	42720	43308



Technology Summary: Heat pumps

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

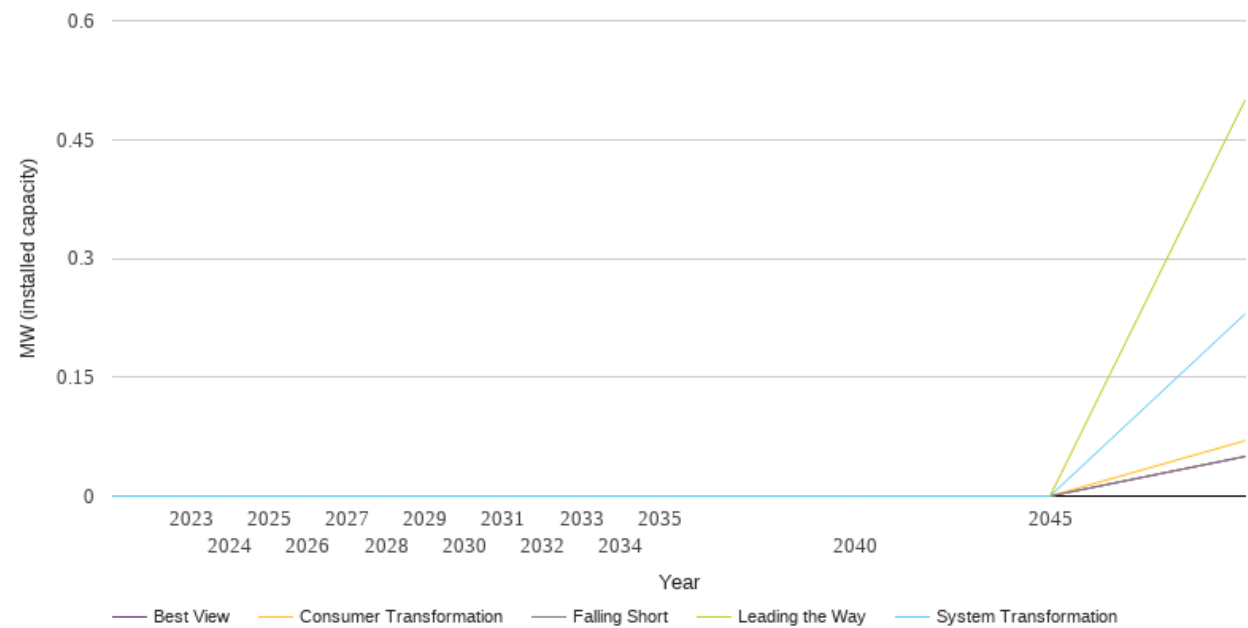
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	348	348	348	348	348
2023	517	604	725	1517	517
2024	680	881	1115	2704	680
2025	853	1171	1525	3926	853
2026	1243	1537	2761	5711	1207
2027	1637	1908	4054	7575	1567
2028	2033	2283	5386	9462	1931
2029	2436	2654	6767	11401	2299
2030	2840	3034	8197	13392	2668
2031	3544	3395	10953	15953	3426
2032	4255	3777	13737	18524	4192
2033	4966	4148	16499	21080	4957
2034	5673	4530	19261	23644	5720
2035	6384	4900	22026	26205	6485
2040	12236	12416	37916	37831	13683
2045	18976	21357	47704	44270	20968
2050	27477	31523	52581	46549	29047



Technology Summary: Hydrogen electrolysis

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

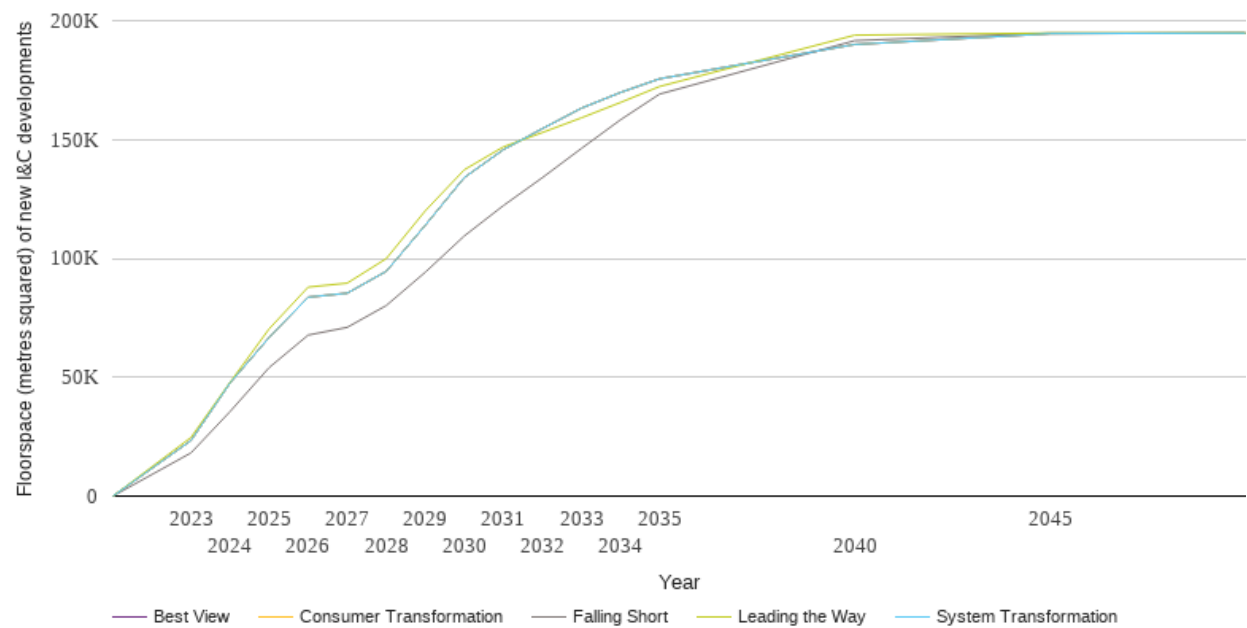
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0	0.0	0.0
2030	0.0	0.0	0.0	0.0	0.0
2031	0.0	0.0	0.0	0.0	0.0
2032	0.0	0.0	0.0	0.0	0.0
2033	0.0	0.0	0.0	0.0	0.0
2034	0.0	0.0	0.0	0.0	0.0
2035	0.0	0.0	0.0	0.0	0.0
2040	0.0	0.0	0.0	0.0	0.0
2045	0.0	0.0	0.0	0.0	0.0
2050	0.0	0.2	0.1	0.5	0.0



Technology Summary: Non domestic

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

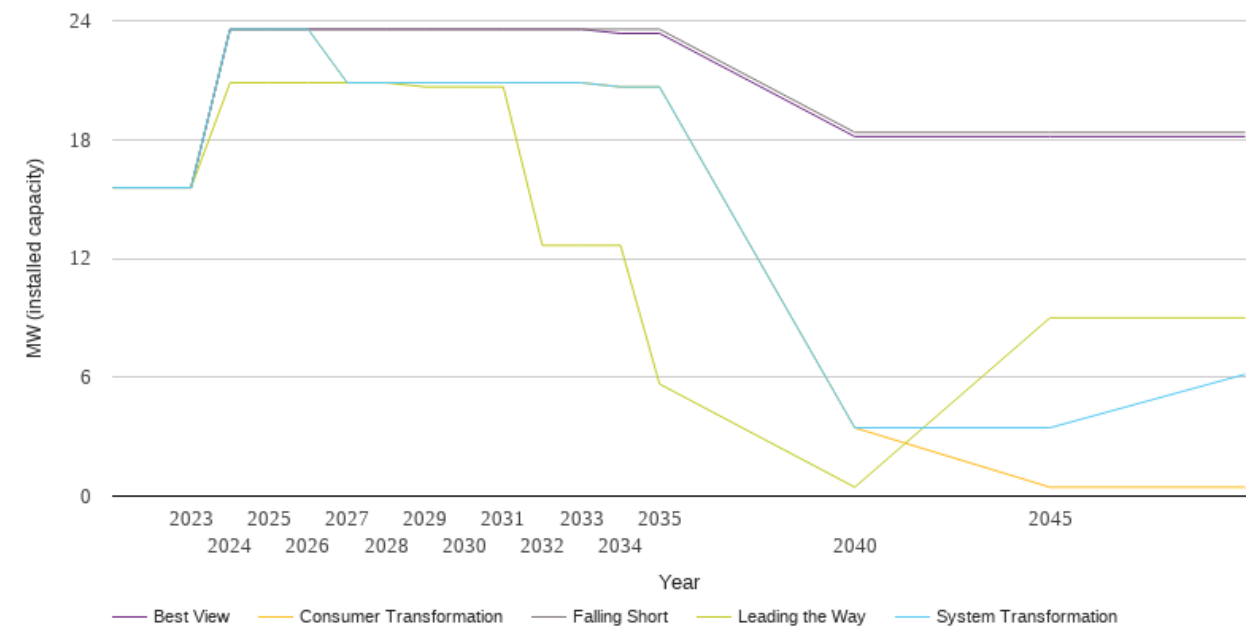
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	18190	23388	23388	24687	23388
2024	35561	47609	47609	47853	47609
2025	54063	66734	66734	70359	66734
2026	67732	83683	83683	87912	83683
2027	70981	85347	85347	89588	85347
2028	80163	94564	94564	99895	94564
2029	94186	113943	113943	120022	113943
2030	109451	134017	134017	137284	134017
2031	122209	145731	145731	146926	145731
2032	133967	154598	154598	152954	154598
2033	146260	163198	163198	159137	163198
2034	158307	169796	169796	165587	169796
2035	169113	175545	175545	172304	175545
2040	191603	190001	190001	193907	190001
2045	194808	194541	194541	194808	194541
2050	194808	194808	194808	194808	194808



Technology Summary: Other Distributed Generation

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

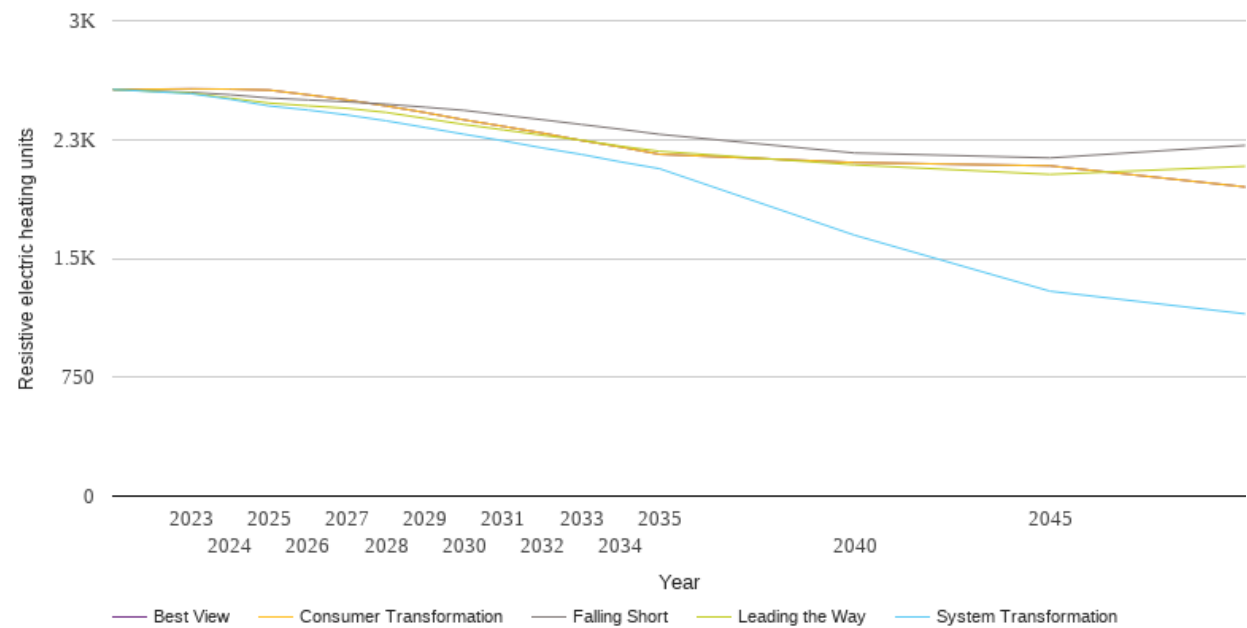
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	15.6	15.6	15.6	15.6	15.6
2023	15.6	15.6	15.6	15.6	15.6
2024	23.6	23.6	23.6	20.9	23.6
2025	23.6	23.6	23.6	20.9	23.6
2026	23.6	23.6	23.6	20.9	23.6
2027	23.6	20.9	20.9	20.9	23.6
2028	23.6	20.9	20.9	20.9	23.6
2029	23.6	20.9	20.9	20.7	23.6
2030	23.6	20.9	20.9	20.7	23.6
2031	23.6	20.9	20.9	20.7	23.6
2032	23.6	20.9	20.9	12.7	23.6
2033	23.6	20.9	20.9	12.7	23.6
2034	23.6	20.7	20.7	12.7	23.4
2035	23.6	20.7	20.7	5.7	23.4
2040	18.4	3.4	3.4	0.4	18.2
2045	18.4	3.4	0.4	9.0	18.2
2050	18.4	6.2	0.4	9.0	18.2



Technology Summary: Resistive electric heating

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

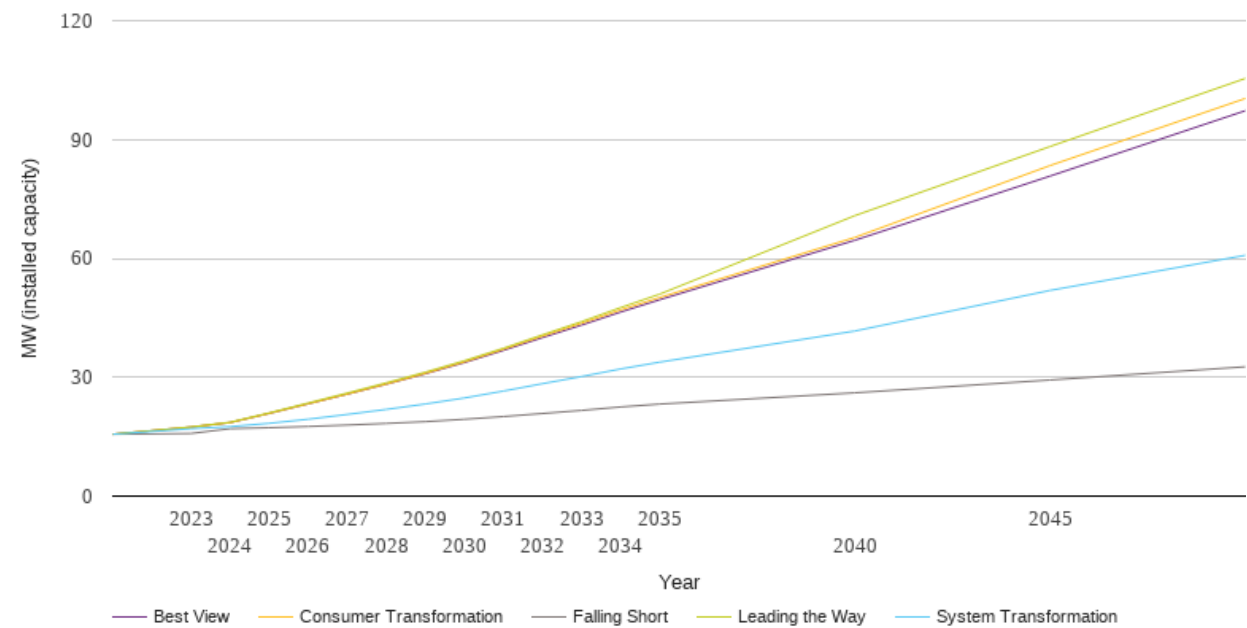
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	2566	2566	2566	2566	2566
2023	2548	2539	2570	2543	2570
2024	2533	2504	2568	2511	2568
2025	2512	2462	2562	2480	2562
2026	2500	2436	2532	2463	2532
2027	2488	2405	2500	2447	2500
2028	2473	2368	2462	2421	2462
2029	2454	2326	2420	2383	2420
2030	2434	2283	2374	2345	2374
2031	2404	2242	2333	2311	2333
2032	2375	2197	2291	2277	2291
2033	2345	2156	2244	2246	2244
2034	2315	2109	2203	2208	2203
2035	2283	2066	2157	2176	2157
2040	2165	1646	2105	2090	2105
2045	2134	1293	2084	2030	2084
2050	2213	1150	1951	2081	1951



Technology Summary: Solar Generation

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

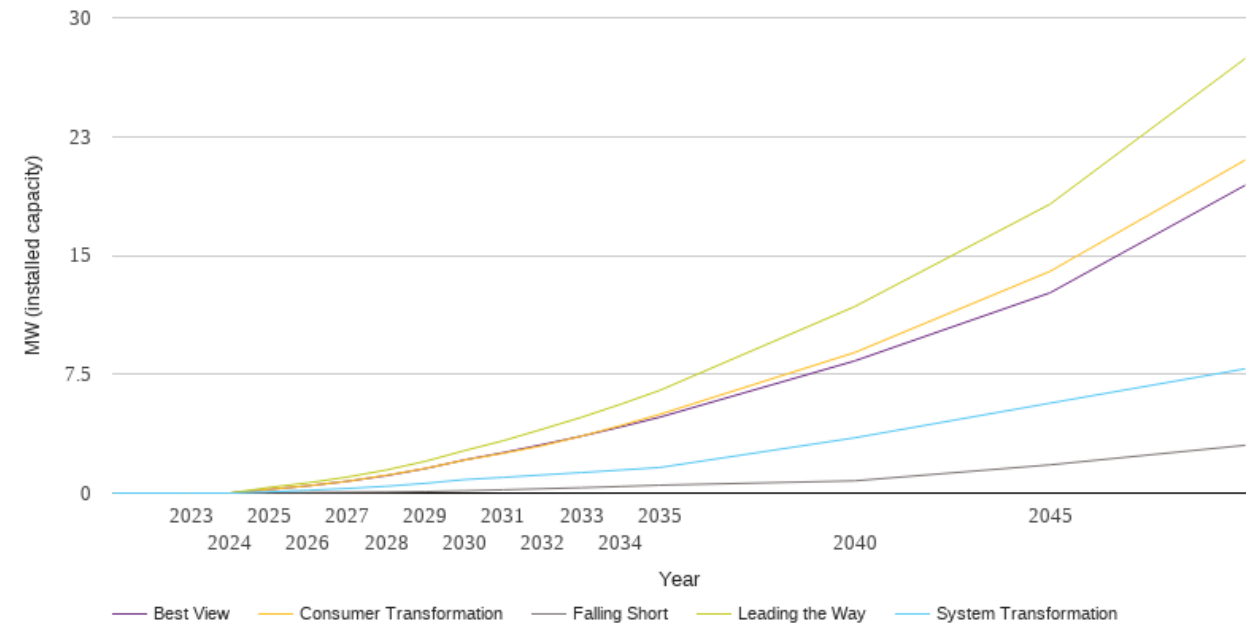
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	15.6	15.6	15.6	15.6	15.6
2023	15.8	17.0	17.4	17.4	17.4
2024	17.0	17.5	18.6	18.6	18.6
2025	17.3	18.4	20.9	21.0	20.9
2026	17.6	19.4	23.3	23.5	23.3
2027	17.9	20.6	25.7	26.0	25.7
2028	18.3	21.9	28.3	28.6	28.2
2029	18.8	23.2	31.0	31.3	30.9
2030	19.4	24.8	33.9	34.2	33.7
2031	20.1	26.5	37.1	37.3	36.8
2032	20.8	28.4	40.4	40.7	40.0
2033	21.6	30.2	43.6	44.0	43.2
2034	22.5	32.1	47.0	47.6	46.4
2035	23.2	33.8	50.1	51.0	49.6
2040	26.1	41.7	65.3	70.8	64.6
2045	29.3	51.9	83.4	88.2	80.8
2050	32.6	60.8	100.4	105.4	97.3



Technology Summary: Storage

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

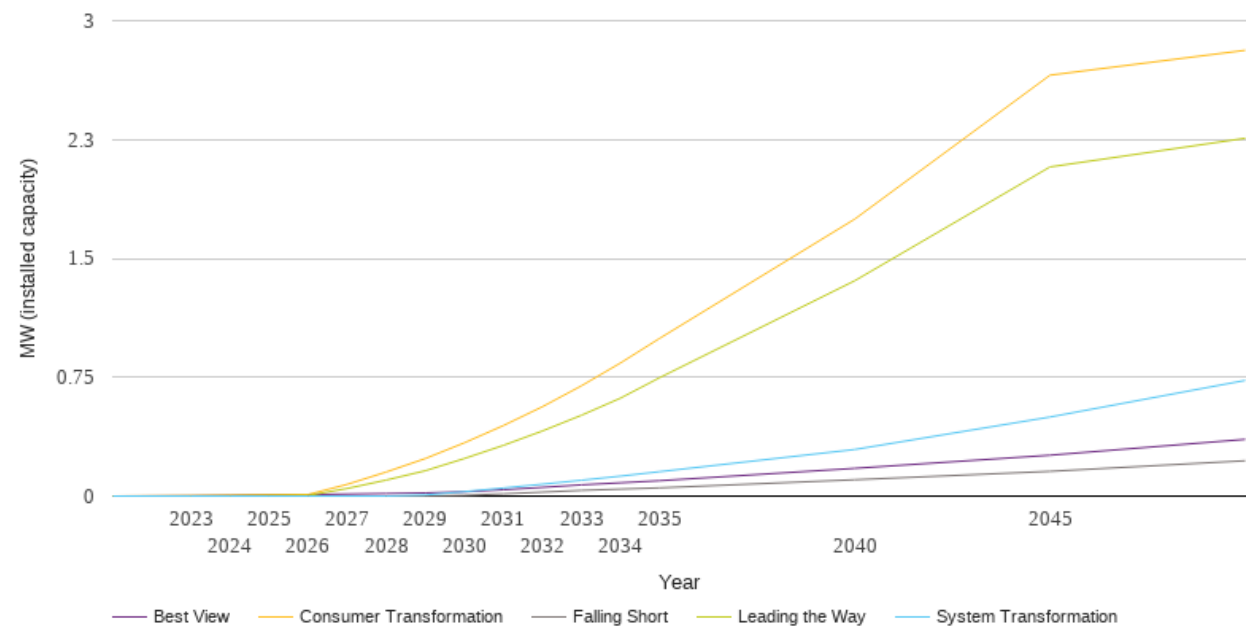
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.1	0.2	0.4	0.2
2026	0.0	0.2	0.5	0.6	0.5
2027	0.1	0.3	0.7	1.0	0.7
2028	0.1	0.4	1.1	1.5	1.1
2029	0.1	0.6	1.6	2.0	1.5
2030	0.1	0.9	2.1	2.7	2.1
2031	0.2	1.0	2.5	3.3	2.6
2032	0.3	1.1	3.0	4.0	3.1
2033	0.3	1.3	3.6	4.8	3.6
2034	0.4	1.5	4.3	5.6	4.2
2035	0.5	1.6	5.0	6.5	4.8
2040	0.8	3.5	8.9	11.8	8.3
2045	1.8	5.7	14.0	18.2	12.6
2050	3.0	7.8	21.0	27.4	19.4



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	0.1	0.0	0.0
2028	0.0	0.0	0.2	0.1	0.0
2029	0.0	0.0	0.2	0.2	0.0
2030	0.0	0.0	0.3	0.2	0.0
2031	0.0	0.1	0.4	0.3	0.0
2032	0.0	0.1	0.6	0.4	0.1
2033	0.0	0.1	0.7	0.5	0.1
2034	0.0	0.1	0.8	0.6	0.1
2035	0.1	0.2	1.0	0.7	0.1
2040	0.1	0.3	1.7	1.4	0.2
2045	0.2	0.5	2.7	2.1	0.3
2050	0.2	0.7	2.8	2.3	0.4



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

