

Distribution Future Energy Scenarios 2022

Local Authority:
North Kesteven

What are Distribution Future Energy Scenarios?

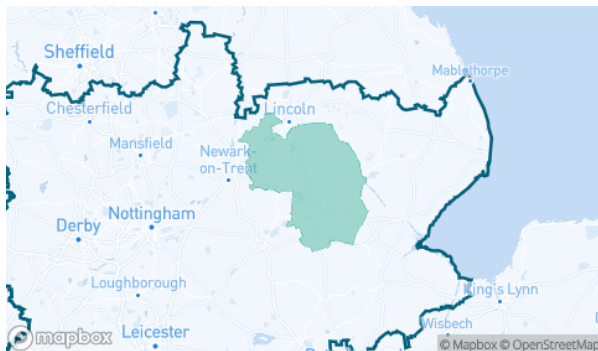
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 North Kesteven 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 North Kesteven 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	1819 6	7651	7650	0
Domestic	New dwellings	0	2982	3231	3231	3736	5615	5551	5551	5486
Electric vehicles	Electric vehicles	1813	1152 6	1435 3	2638 2	2630 3	7961 5	6760 1	6712 9	5802 8
EV Charge Point	EV charge points	890	5234	7764	1459 2	1611 8	4558 3	4470 0	4722 5	4686 2
Heat pumps	Heat pump installations	848	4898	5532	1008 2	1547 0	2904 6	3316 3	5193 7	4693 4
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.9	0.0	0.0	3.4	15.5	7.9	11.5
Non domestic	Floorspace (metres squared) of new I&C developments	0	3520 0	4841 2	4841 2	5021 5	6499 1	6499 1	6499 1	6499 1
Other Distributed Generation	MW (installed capacity)	7.8	7.8	8.5	10.0	10.3	4.7	5.1	7.2	7.8
Resistive electric heating	Resistive electric heating units	5392	4504	4356	4662	4462	3091	1294	3052	3283
Solar Generation	MW (installed capacity)	20.7	31.7	44.2	56.0	47.2	109. 3	200. 0	250. 3	226. 0
Storage	MW (installed capacity)	0.0	0.2	1.7	3.4	5.0	5.0	12.5	30.0	39.7
Wind	MW (installed capacity)	0.5	0.7	1.4	10.2	7.3	7.3	22.6	83.7	67.3

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

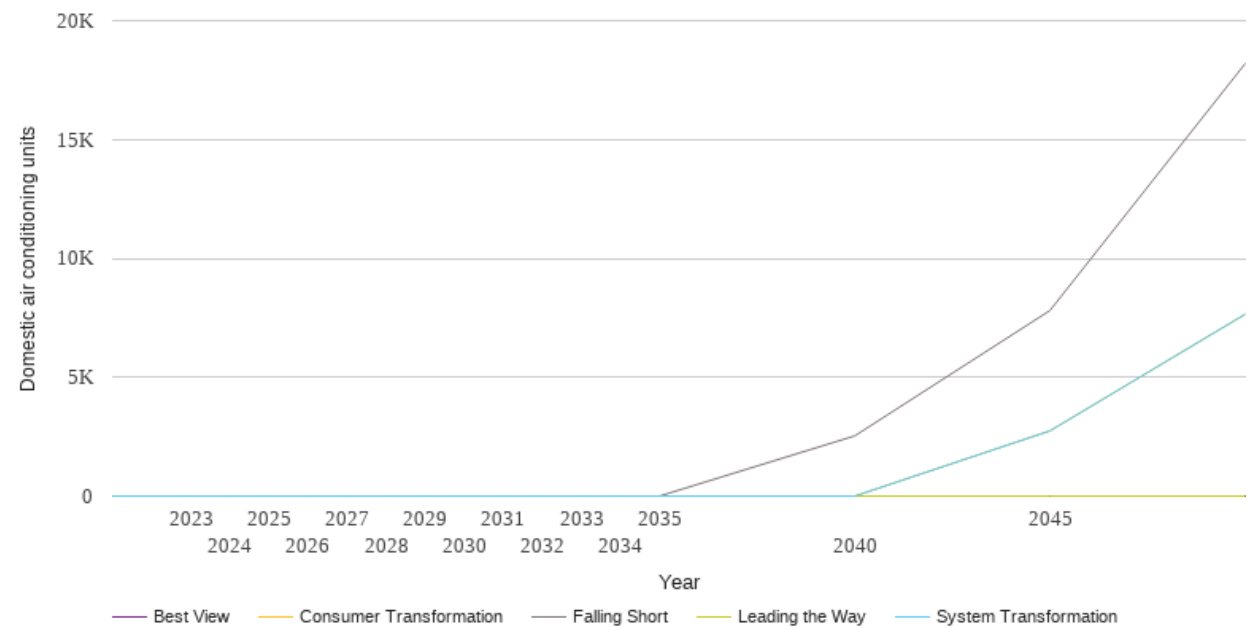
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

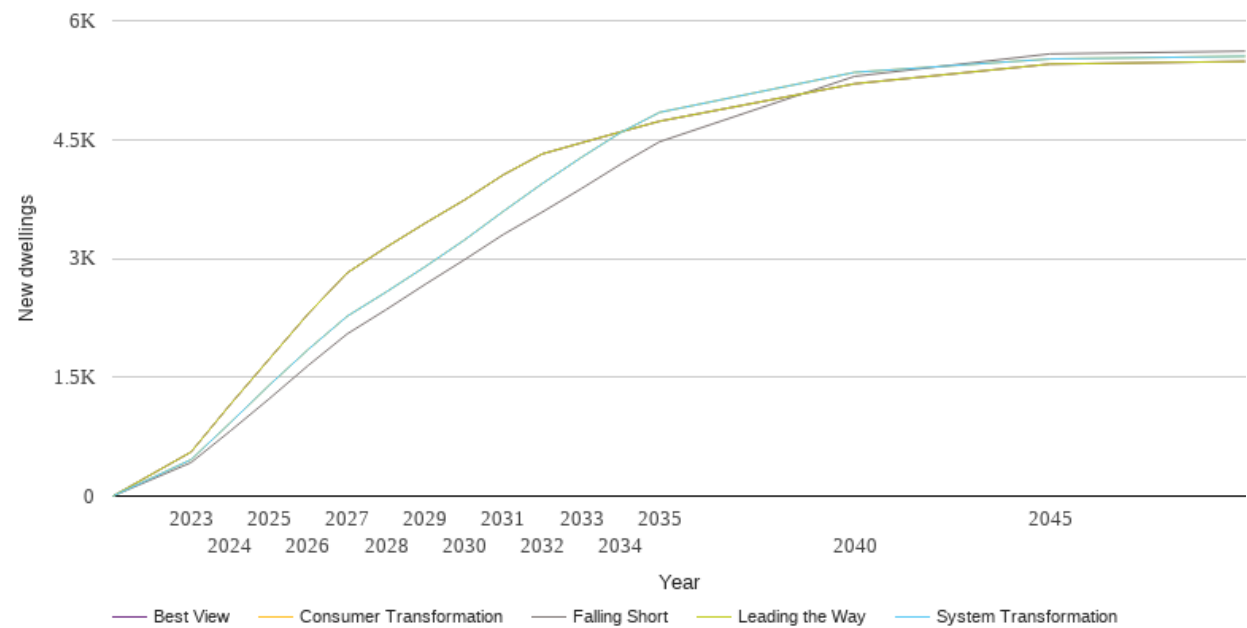
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	0	0	0	0	0
2025	0	0	0	0	0
2026	0	0	0	0	0
2027	0	0	0	0	0
2028	0	0	0	0	0
2029	0	0	0	0	0
2030	0	0	0	0	0
2031	0	0	0	0	0
2032	0	0	0	0	0
2033	0	0	0	0	0
2034	0	0	0	0	0
2035	0	0	0	0	0
2040	2533	0	0	0	0
2045	7808	2745	2745	0	0
2050	18196	7651	7650	0	0



Technology Summary: Domestic

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

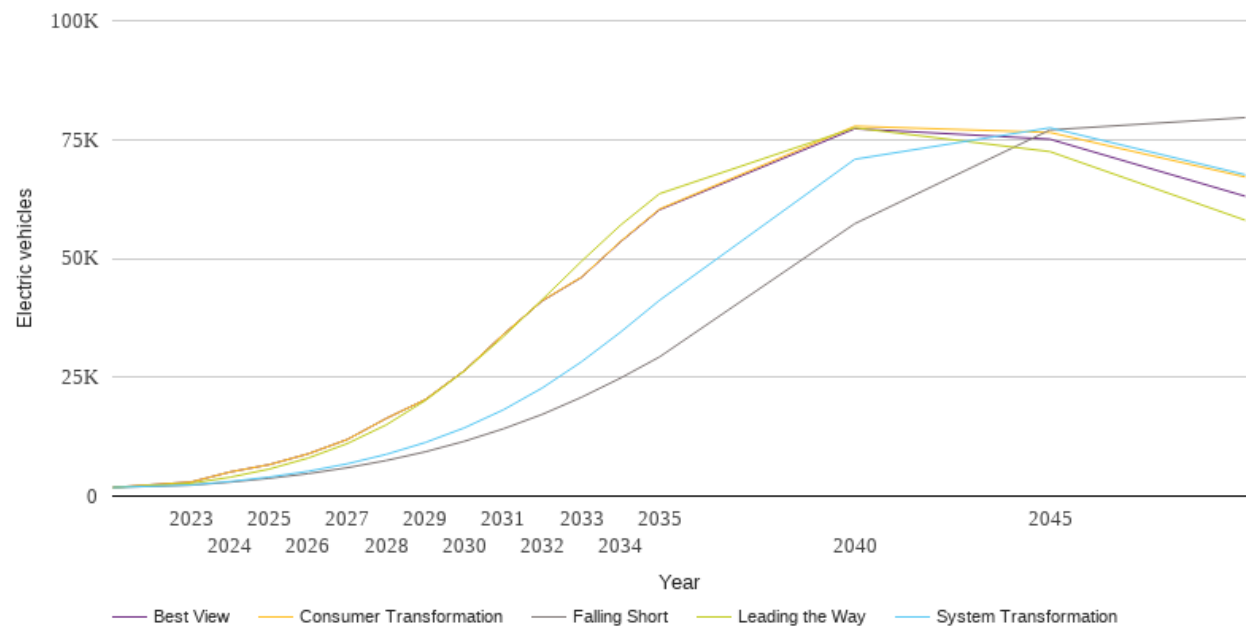
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	423	460	460	556	556
2024	819	923	923	1153	1153
2025	1227	1398	1398	1728	1728
2026	1648	1850	1850	2300	2300
2027	2047	2270	2270	2817	2817
2028	2354	2576	2576	3141	3141
2029	2673	2896	2896	3445	3445
2030	2982	3231	3231	3736	3736
2031	3302	3594	3594	4055	4055
2032	3586	3945	3945	4319	4319
2033	3881	4275	4275	4458	4458
2034	4187	4587	4587	4596	4596
2035	4472	4843	4843	4731	4731
2040	5298	5348	5348	5204	5204
2045	5581	5517	5517	5452	5452
2050	5615	5551	5551	5486	5486



Technology Summary: Electric vehicles

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

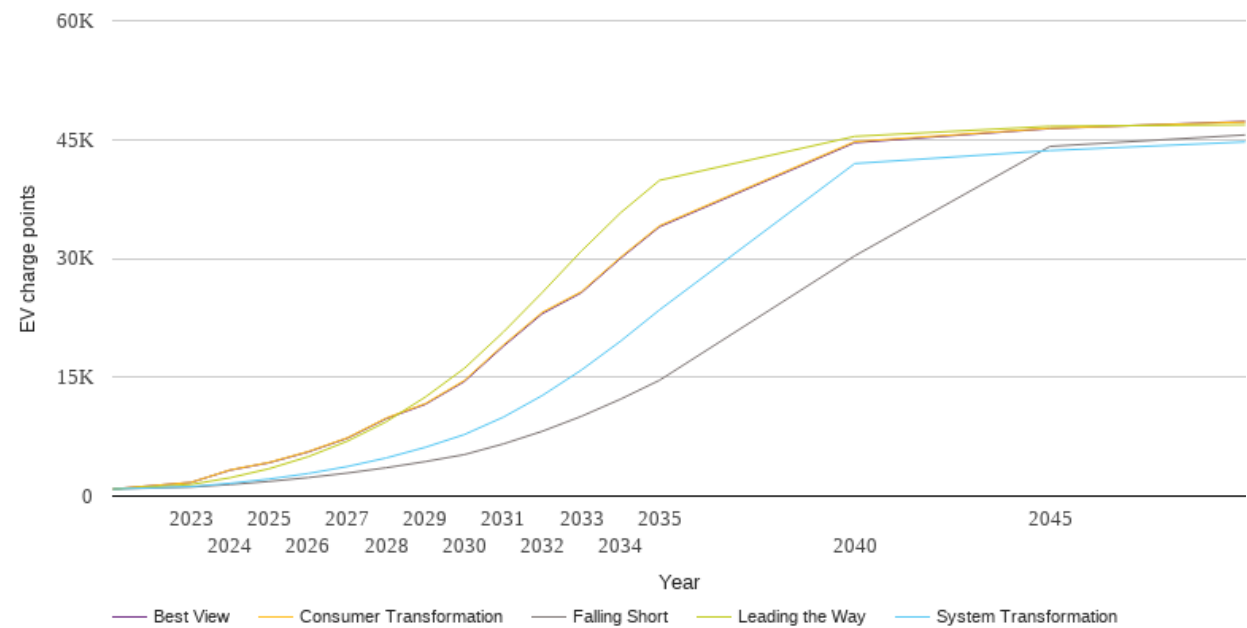
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1813	1813	1813	1813	1813
2023	2298	2345	2957	2693	2957
2024	2934	3066	5070	3962	5070
2025	3727	4000	6610	5677	6612
2026	4723	5220	8881	7996	8885
2027	5963	6787	11898	11039	11902
2028	7480	8775	16336	14980	16340
2029	9315	11271	20292	20096	20296
2030	11526	14353	26382	26303	26388
2031	14154	18144	34029	33527	34035
2032	17203	22762	41127	41363	41072
2033	20783	28246	46063	49381	45993
2034	24820	34478	53574	56984	53471
2035	29275	41187	60370	63605	60225
2040	57295	70845	77809	77466	77281
2045	77026	77475	76487	72457	75071
2050	79615	67601	67129	58028	63074



Technology Summary: EV Charge Point

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

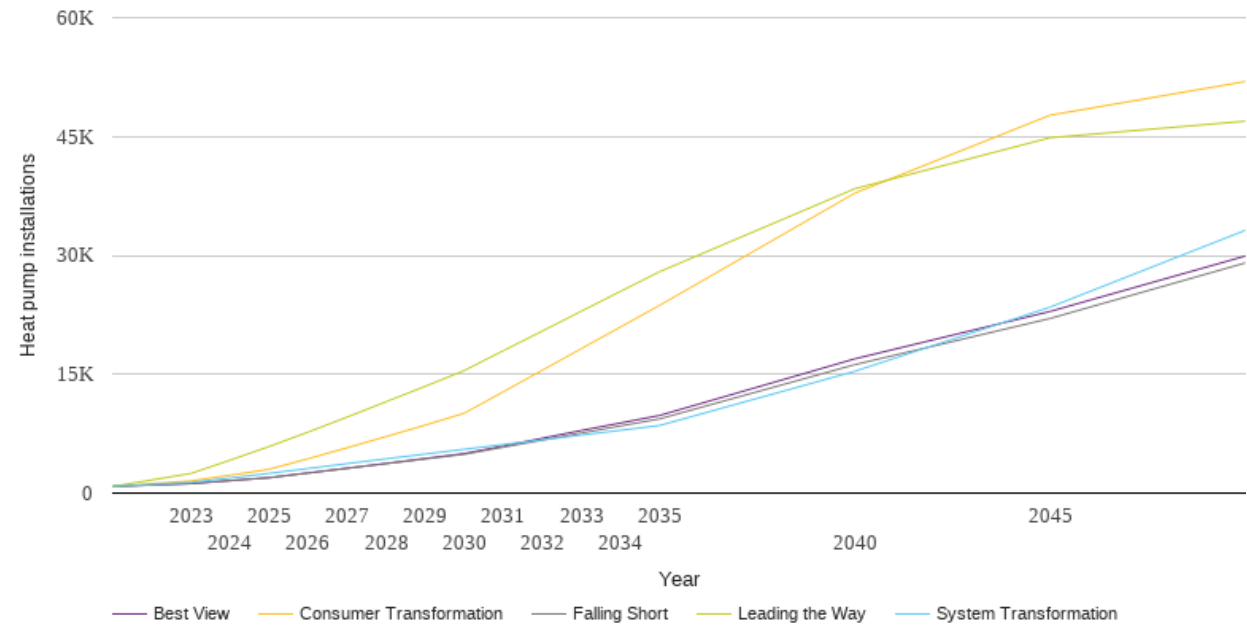
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	890	890	890	890	890
2023	1138	1196	1732	1464	1724
2024	1456	1616	3302	2312	3273
2025	1852	2157	4249	3458	4211
2026	2334	2848	5620	4971	5568
2027	2906	3725	7351	6923	7294
2028	3579	4816	9853	9382	9774
2029	4353	6155	11671	12495	11587
2030	5234	7764	14592	16118	14464
2031	6585	9965	19070	20703	18913
2032	8185	12702	23207	25713	23040
2033	10074	15915	25812	30931	25682
2034	12229	19546	30136	35746	30006
2035	14618	23502	34123	39852	33991
2040	30322	41970	44741	45396	44614
2045	44140	43610	46426	46676	46384
2050	45583	44700	47225	46862	47282



Technology Summary: Heat pumps

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

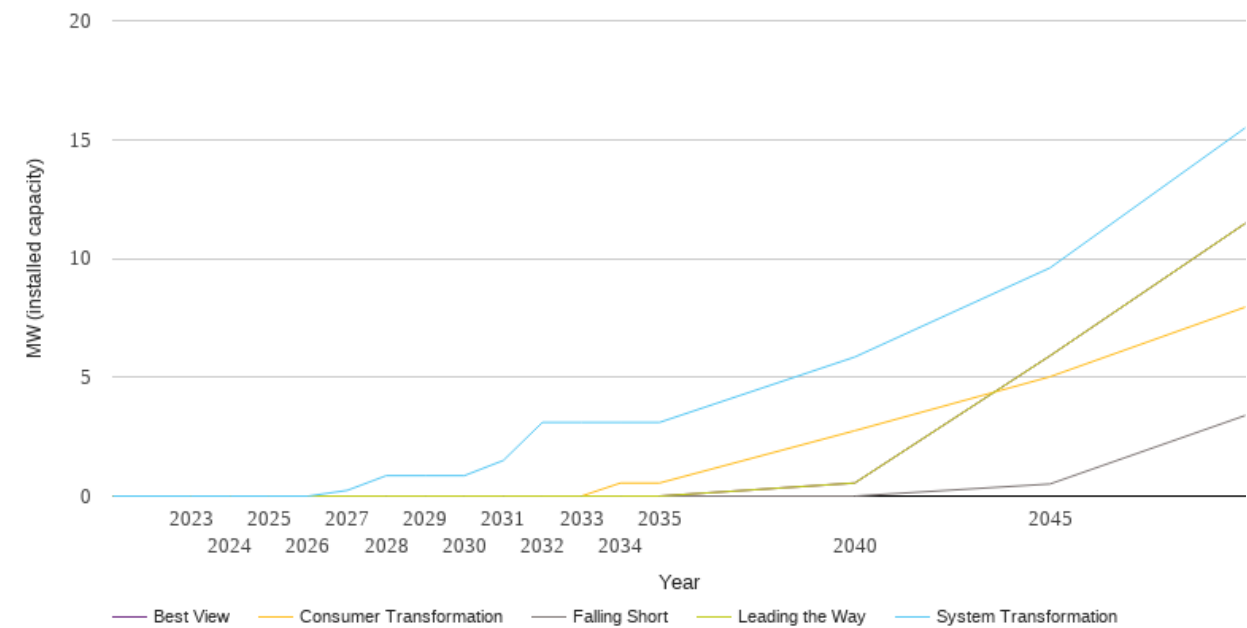
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	848	848	848	848	848
2023	1203	1357	1538	2482	1203
2024	1575	1903	2251	4155	1575
2025	1947	2492	3009	5878	1947
2026	2539	3103	4337	7702	2543
2027	3129	3722	5723	9595	3136
2028	3722	4329	7141	11537	3742
2029	4313	4926	8584	13478	4366
2030	4898	5532	10082	15470	4994
2031	5792	6128	12789	17971	5944
2032	6687	6722	15512	20455	6920
2033	7577	7326	18238	22963	7903
2034	8473	7926	20966	25457	8848
2035	9367	8531	23689	27938	9798
2040	16208	15369	37853	38411	16939
2045	22033	23460	47685	44849	22920
2050	29046	33163	51937	46934	29913



Technology Summary: Hydrogen electrolysis

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

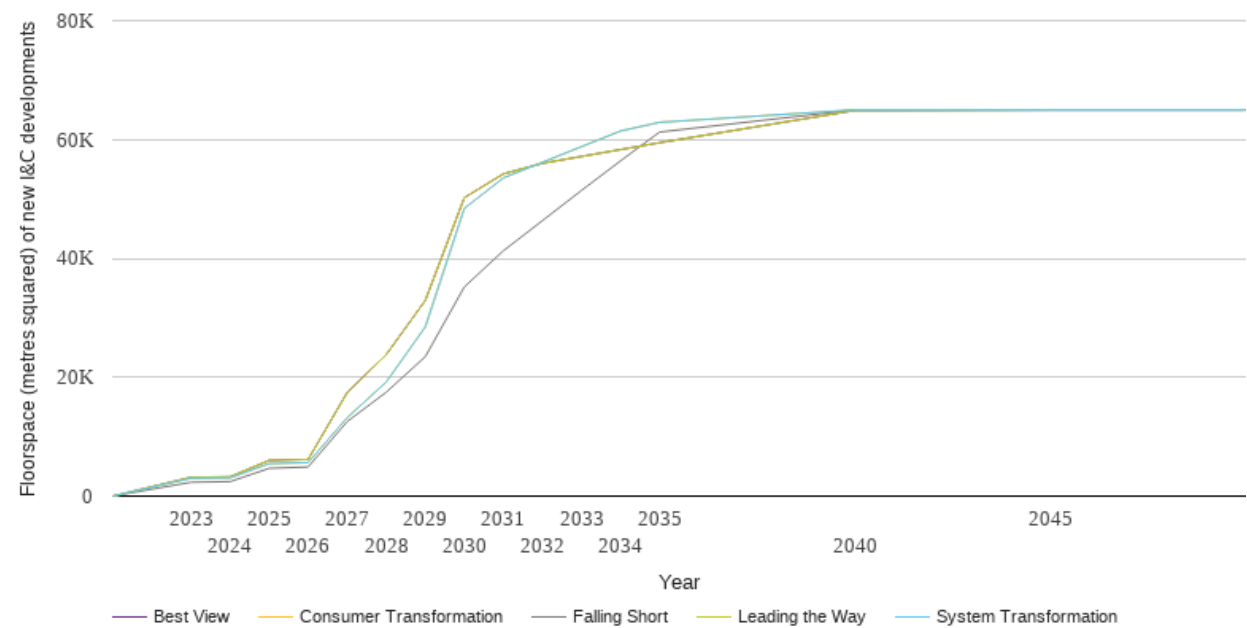
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.2	0.0	0.0	0.0
2028	0.0	0.9	0.0	0.0	0.0
2029	0.0	0.9	0.0	0.0	0.0
2030	0.0	0.9	0.0	0.0	0.0
2031	0.0	1.5	0.0	0.0	0.0
2032	0.0	3.1	0.0	0.0	0.0
2033	0.0	3.1	0.0	0.0	0.0
2034	0.0	3.1	0.6	0.0	0.0
2035	0.0	3.1	0.6	0.0	0.0
2040	0.0	5.8	2.8	0.6	0.6
2045	0.5	9.6	5.0	5.9	5.9
2050	3.4	15.5	7.9	11.5	11.5



Technology Summary: Non domestic

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

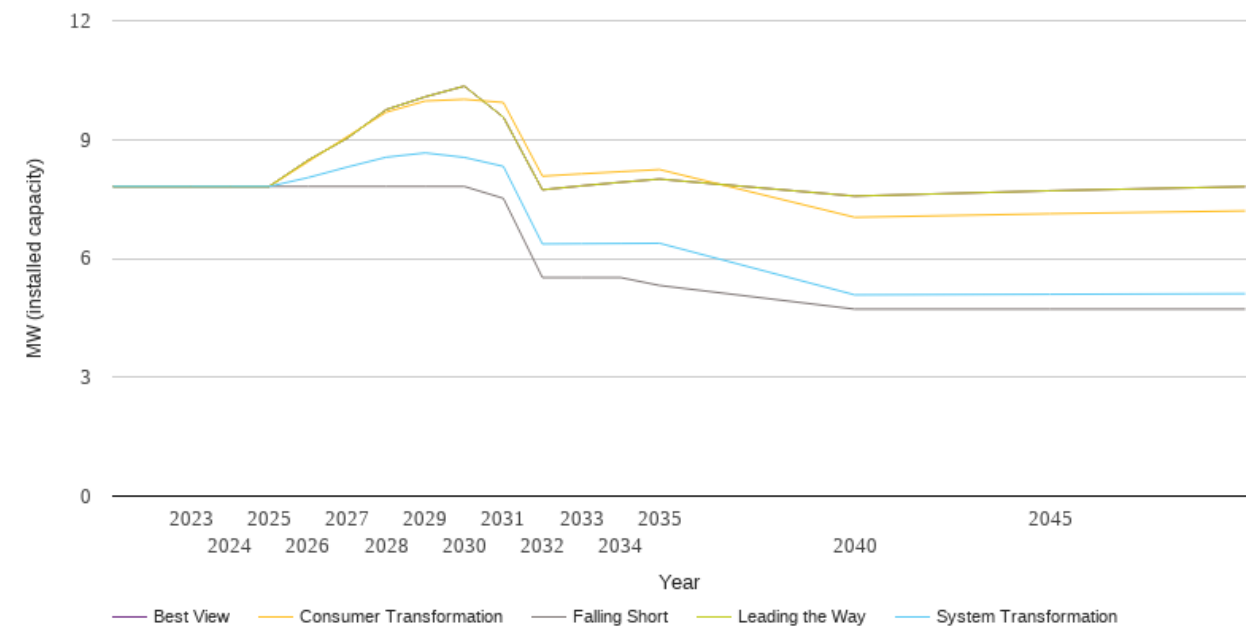
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	2333	3000	3000	3167	3167
2024	2433	3067	3067	3250	3250
2025	4667	5467	5467	6000	6000
2026	4900	5633	5633	6167	6167
2027	12542	13209	13209	17447	17447
2028	17481	19195	19195	23806	23806
2029	23464	28467	28467	32922	32922
2030	35200	48412	48412	50215	50215
2031	41277	53541	53541	54223	54223
2032	46353	56171	56171	55998	55998
2033	51430	58801	58801	57154	57154
2034	56407	61430	61430	58310	58310
2035	61250	62894	62894	59467	59467
2040	64991	64991	64991	64891	64891
2045	64991	64991	64991	64991	64991
2050	64991	64991	64991	64991	64991



Technology Summary: Other Distributed Generation

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

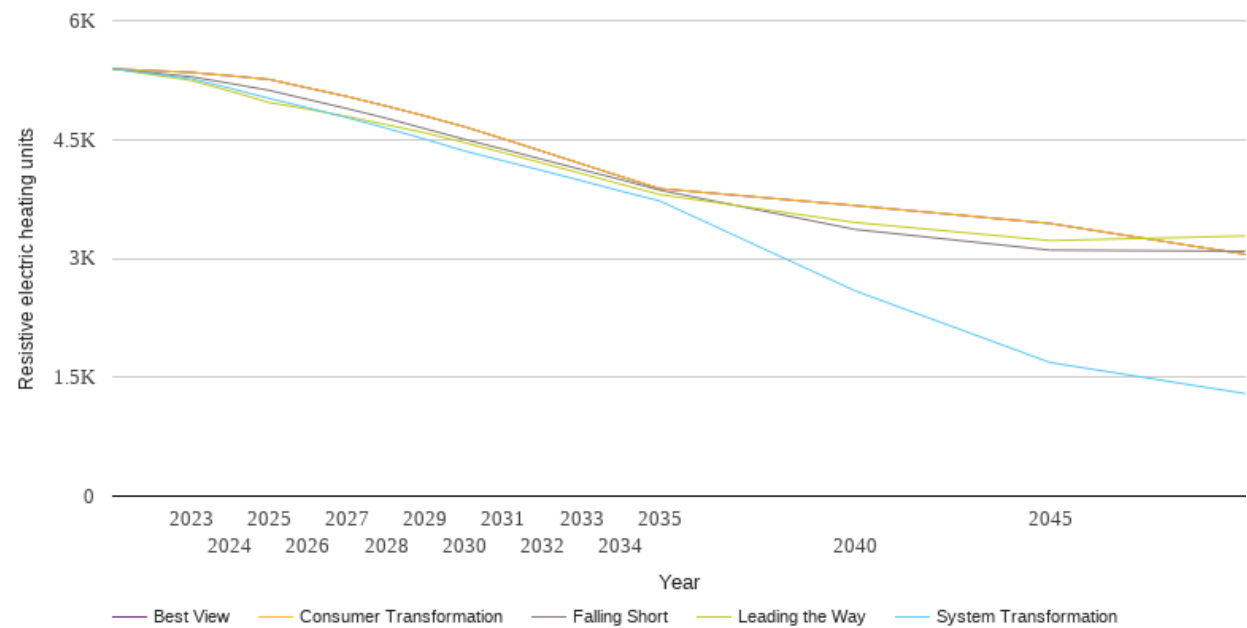
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	7.8	7.8	7.8	7.8	7.8
2023	7.8	7.8	7.8	7.8	7.8
2024	7.8	7.8	7.8	7.8	7.8
2025	7.8	7.8	7.8	7.8	7.8
2026	7.8	8.0	8.4	8.5	8.5
2027	7.8	8.3	9.1	9.0	9.0
2028	7.8	8.6	9.7	9.8	9.8
2029	7.8	8.7	10.0	10.1	10.1
2030	7.8	8.5	10.0	10.3	10.3
2031	7.5	8.3	9.9	9.6	9.6
2032	5.5	6.4	8.1	7.7	7.7
2033	5.5	6.4	8.1	7.8	7.8
2034	5.5	6.4	8.2	7.9	7.9
2035	5.3	6.4	8.2	8.0	8.0
2040	4.7	5.1	7.0	7.6	7.6
2045	4.7	5.1	7.1	7.7	7.7
2050	4.7	5.1	7.2	7.8	7.8



Technology Summary: Resistive electric heating

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

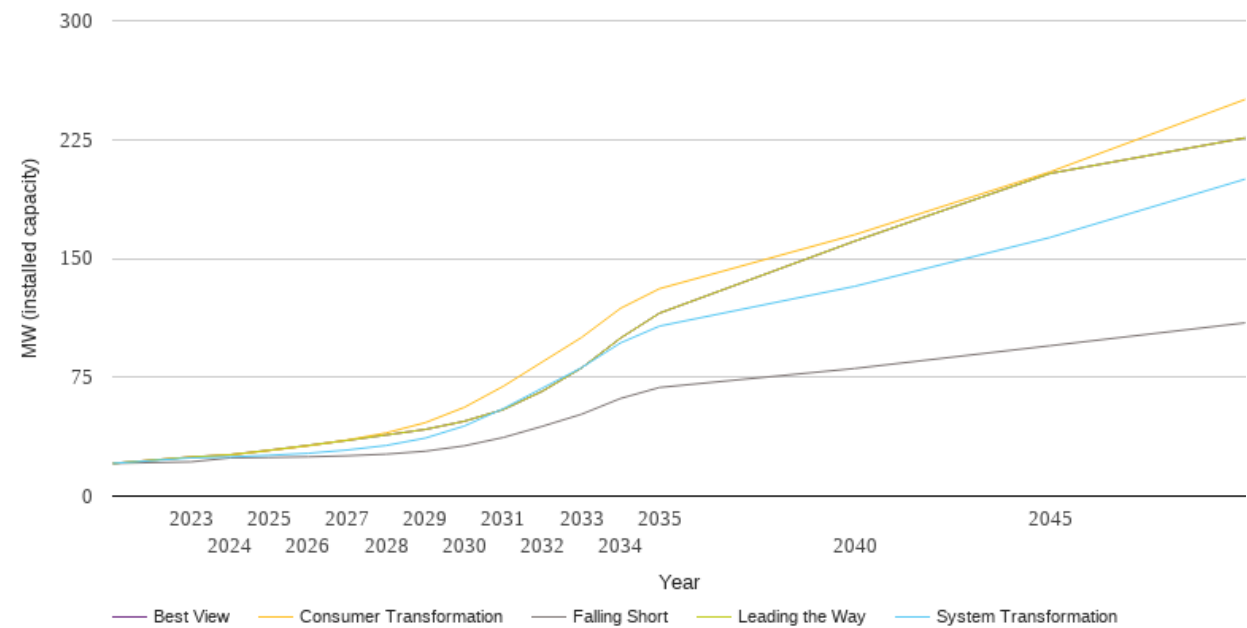
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	5392	5392	5392	5392	5392
2023	5293	5269	5347	5246	5347
2024	5208	5147	5305	5111	5305
2025	5121	5019	5259	4967	5259
2026	5005	4900	5150	4883	5150
2027	4890	4776	5043	4790	5043
2028	4769	4643	4922	4688	4922
2029	4636	4504	4796	4584	4796
2030	4504	4356	4662	4462	4662
2031	4378	4231	4509	4333	4509
2032	4249	4108	4351	4203	4351
2033	4121	3980	4193	4071	4193
2034	3995	3850	4035	3938	4035
2035	3862	3726	3881	3807	3881
2040	3366	2592	3667	3454	3667
2045	3104	1686	3441	3225	3441
2050	3091	1294	3052	3283	3052



Technology Summary: Solar Generation

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

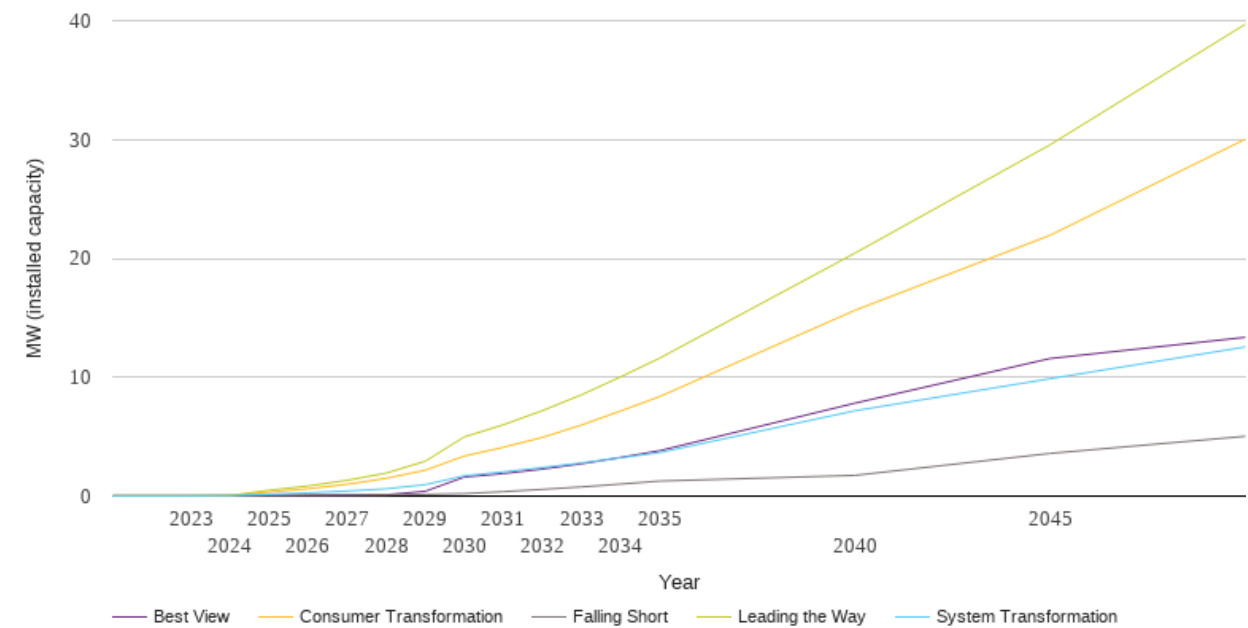
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	20.7	20.7	20.7	20.7	20.7
2023	21.6	24.1	24.6	24.6	24.6
2024	24.1	24.7	26.0	26.1	26.1
2025	24.4	25.7	28.8	28.9	28.9
2026	24.8	27.0	31.7	32.0	32.0
2027	25.5	29.1	35.4	35.2	35.2
2028	26.5	31.9	39.9	38.6	38.6
2029	28.3	36.6	46.3	42.1	42.1
2030	31.7	44.2	56.0	47.2	47.2
2031	37.0	55.2	69.3	54.6	54.6
2032	44.0	68.2	84.7	66.2	66.2
2033	51.6	81.0	100.1	80.8	80.8
2034	61.6	96.7	118.5	99.7	99.7
2035	68.5	107.3	130.9	115.5	115.5
2040	80.5	132.4	164.9	160.9	160.9
2045	94.9	163.2	204.6	203.6	203.6
2050	109.3	200.0	250.3	226.0	226.0



Technology Summary: Storage

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

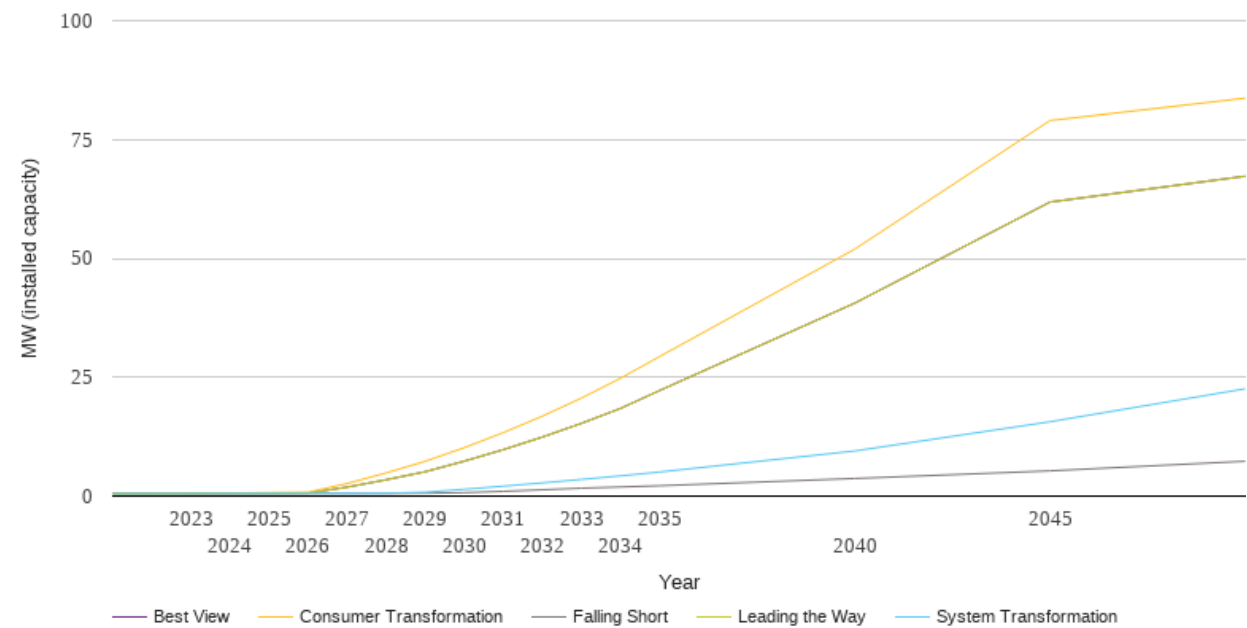
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.1	0.1	0.3	0.5	0.1
2026	0.1	0.3	0.6	0.9	0.1
2027	0.1	0.4	1.0	1.3	0.1
2028	0.1	0.6	1.5	1.9	0.1
2029	0.1	1.0	2.2	2.9	0.4
2030	0.2	1.7	3.4	5.0	1.6
2031	0.4	2.0	4.1	6.0	1.9
2032	0.6	2.4	4.9	7.2	2.3
2033	0.8	2.8	6.0	8.5	2.7
2034	1.0	3.2	7.2	10.0	3.2
2035	1.3	3.7	8.4	11.6	3.8
2040	1.7	7.2	15.6	20.4	7.8
2045	3.6	9.9	21.9	29.6	11.6
2050	5.0	12.5	30.0	39.7	13.4



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	0.5	0.5	0.5	0.5	0.5
2023	0.5	0.5	0.6	0.5	0.5
2024	0.5	0.5	0.6	0.6	0.6
2025	0.5	0.6	0.7	0.6	0.6
2026	0.5	0.6	0.8	0.6	0.6
2027	0.5	0.6	2.6	1.9	1.9
2028	0.5	0.6	4.9	3.4	3.4
2029	0.6	0.8	7.3	5.1	5.1
2030	0.7	1.4	10.2	7.3	7.3
2031	1.0	2.1	13.4	9.8	9.8
2032	1.3	2.8	16.8	12.4	12.4
2033	1.7	3.5	20.6	15.3	15.3
2034	1.9	4.3	24.8	18.4	18.4
2035	2.2	5.1	29.3	22.2	22.2
2040	3.7	9.5	51.9	40.6	40.6
2045	5.3	15.6	79.0	61.8	61.8
2050	7.3	22.6	83.7	67.3	67.3



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

