

Distribution Future Energy Scenarios 2022

Local Authority:
Amber Valley

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 Amber Valley 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 Amber Valley 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	301	181	181	0	25534	11597	11597	0
Domestic	New dwellings	0	1732	1784	1784	1942	3207	3107	3107	3042
Electric vehicles	Electric vehicles	2040	13015	16195	29721	29598	90376	78708	78454	65766
EV Charge Point	EV charge points	1021	5975	8865	16655	18364	51773	50836	53942	53448
Heat pumps	Heat pump installations	332	2950	2622	9045	15183	30042	35336	61380	54345
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.1	0.8
Non domestic	Floorspace (metres squared) of new I&C developments	0	286567	318458	318458	335586	401022	401022	401022	401022
Other Distributed Generation	MW (installed capacity)	23.3	23.5	23.5	23.5	23.5	23.1	12.9	0.7	19.0
Resistive electric heating	Resistive electric heating units	6425	5358	5183	5502	5270	3800	1725	3776	3986
Solar Generation	MW (installed capacity)	9.1	16.1	24.1	35.7	33.4	48.0	99.3	149.5	145.6
Storage	MW (installed capacity)	0.0	0.2	1.1	2.6	3.4	4.0	10.2	26.4	34.4
Wind	MW (installed capacity)	0.9	1.0	1.1	3.1	2.6	3.1	7.9	24.2	19.7

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

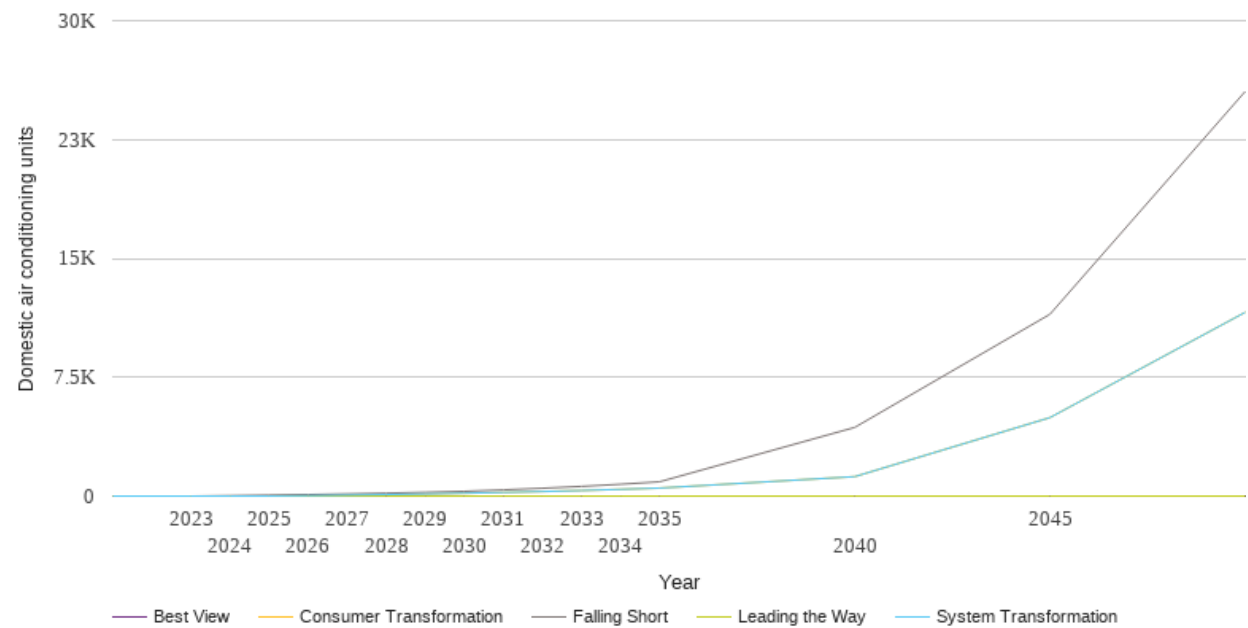
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

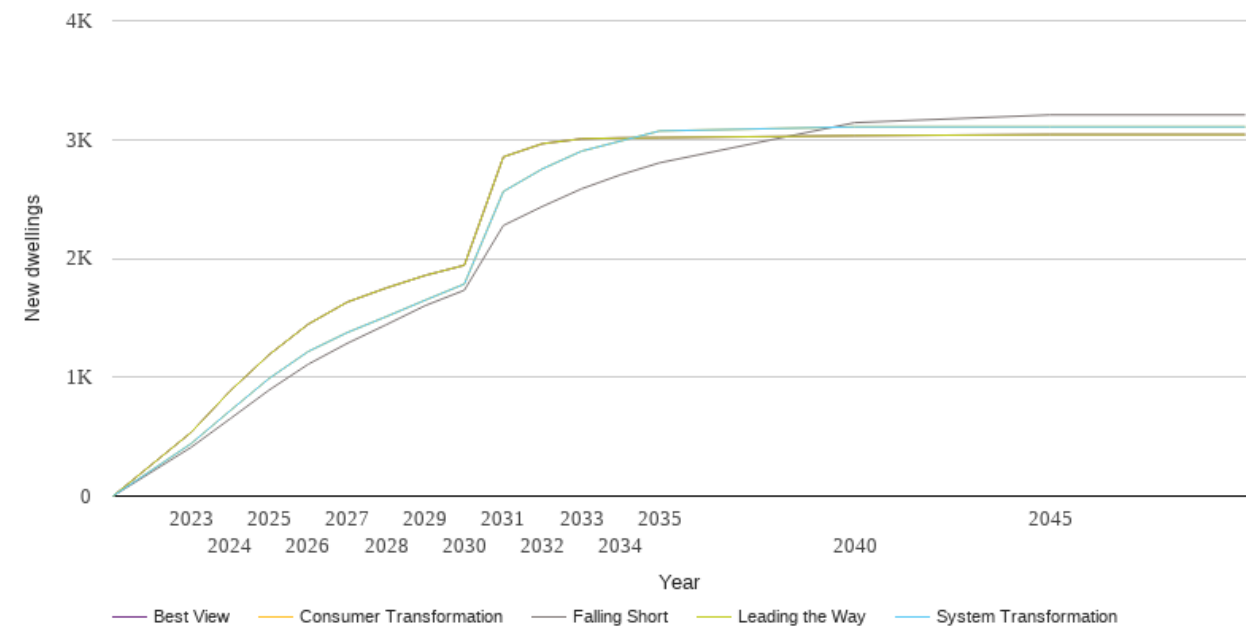
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	28	0	0	0	0
2025	60	0	0	0	0
2026	96	28	28	0	0
2027	137	60	60	0	0
2028	184	96	96	0	0
2029	239	136	136	0	0
2030	301	181	181	0	0
2031	391	232	232	0	0
2032	494	288	288	0	0
2033	612	352	352	0	0
2034	747	425	425	0	0
2035	902	505	505	0	0
2040	4334	1227	1227	0	0
2045	11475	4953	4953	0	0
2050	25534	11597	11597	0	0



Technology Summary: Domestic

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

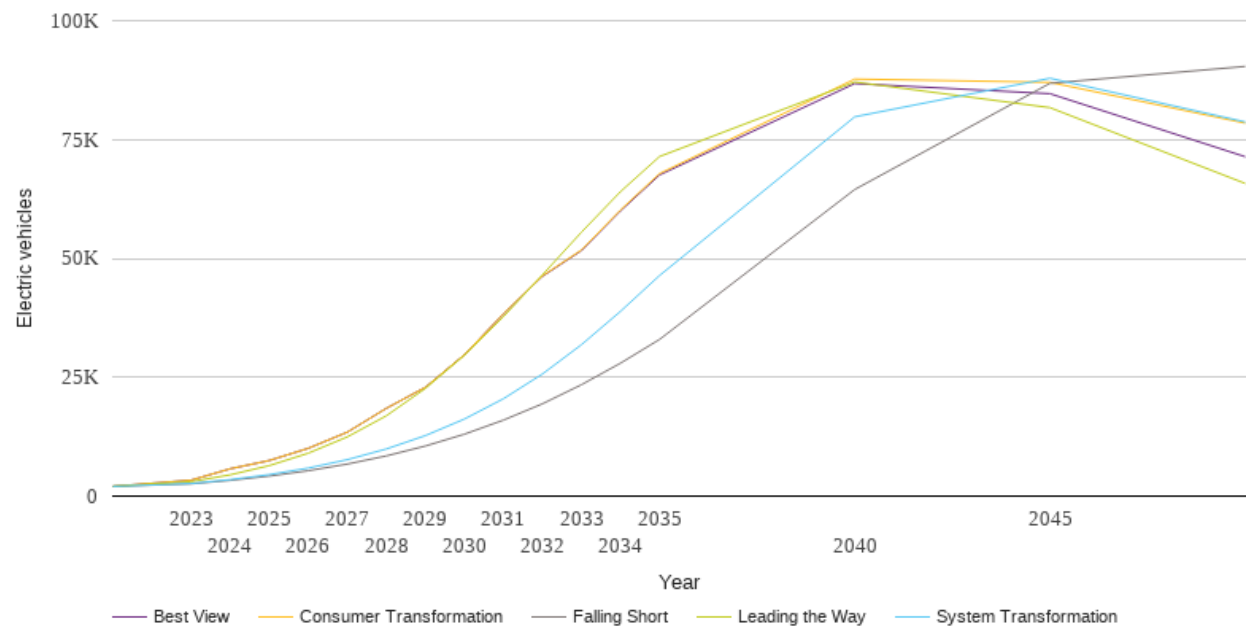
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	410	441	441	535	535
2024	650	718	718	884	884
2025	892	990	990	1190	1190
2026	1109	1216	1216	1446	1446
2027	1285	1376	1376	1632	1632
2028	1442	1510	1510	1751	1751
2029	1603	1649	1649	1857	1857
2030	1732	1784	1784	1942	1942
2031	2277	2563	2563	2854	2854
2032	2437	2753	2753	2965	2965
2033	2585	2902	2902	3006	3006
2034	2703	2987	2987	3013	3013
2035	2804	3072	3072	3016	3016
2040	3142	3107	3107	3032	3032
2045	3207	3107	3107	3042	3042
2050	3207	3107	3107	3042	3042



Technology Summary: Electric vehicles

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

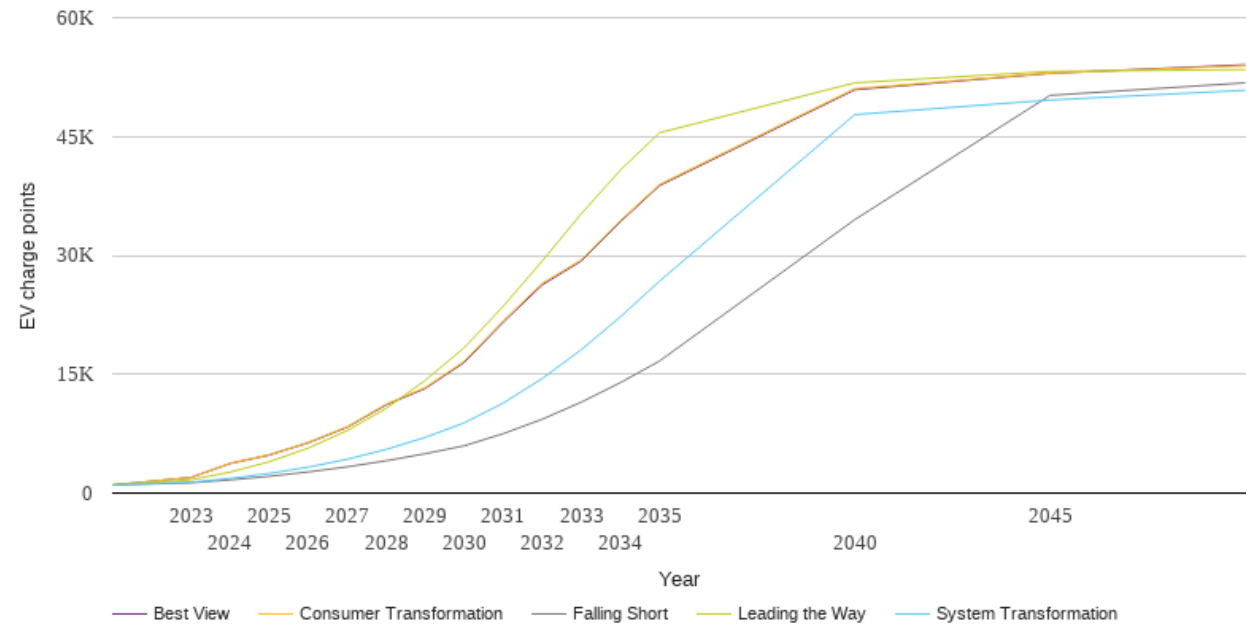
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	2040	2040	2040	2040	2040
2023	2587	2640	3339	3030	3339
2024	3303	3459	5737	4466	5736
2025	4205	4512	7476	6398	7474
2026	5333	5886	10035	9012	10039
2027	6734	7658	13434	12439	13440
2028	8448	9906	18443	16878	18447
2029	10528	12718	22876	22628	22874
2030	13015	16195	29721	29598	29726
2031	15978	20474	38328	37722	38334
2032	19410	25678	46314	46532	46219
2033	23430	31850	51764	55511	51642
2034	27960	38856	60189	64038	60002
2035	32950	46397	67831	71422	67552
2040	64492	79779	87718	87101	86776
2045	86831	87888	87032	81707	84642
2050	90376	78708	78454	65766	71385



Technology Summary: EV Charge Point

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

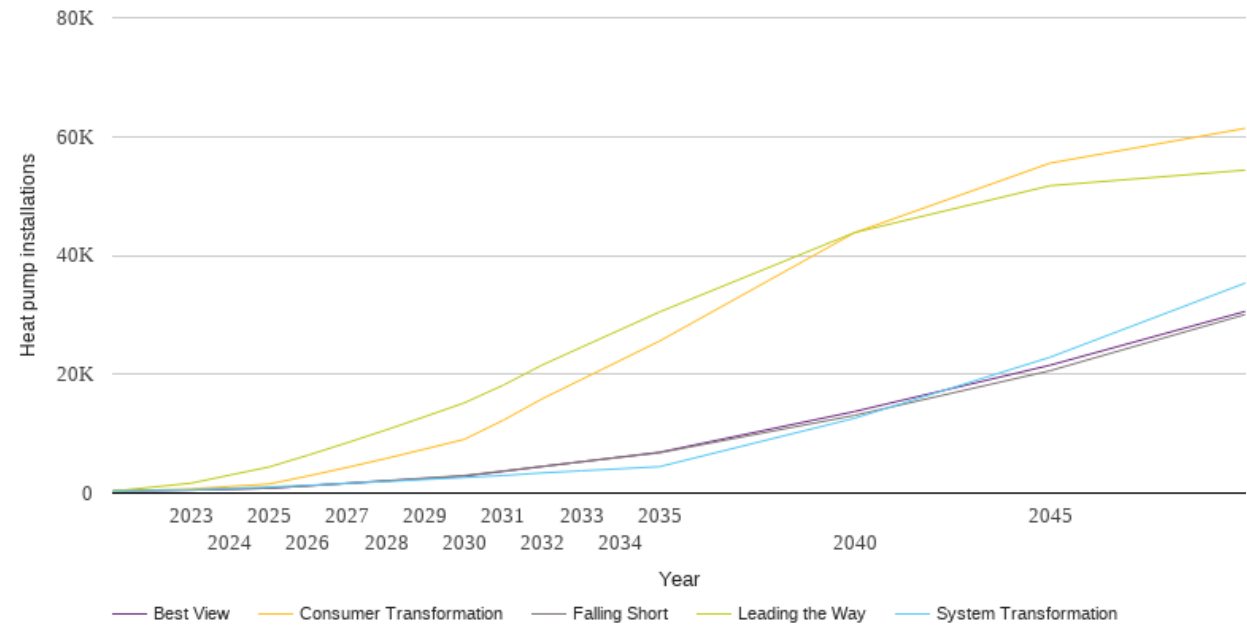
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1021	1021	1021	1021	1021
2023	1302	1374	1981	1679	1973
2024	1664	1853	3762	2646	3735
2025	2118	2478	4836	3951	4803
2026	2667	3273	6392	5676	6347
2027	3317	4271	8373	7889	8313
2028	4084	5513	11236	10689	11140
2029	4972	7032	13321	14234	13215
2030	5975	8865	16655	18364	16499
2031	7509	11368	21773	23594	21582
2032	9331	14469	26493	29320	26298
2033	11487	18120	29457	35286	29318
2034	13946	22252	34404	40786	34265
2035	16665	26755	38960	45478	38818
2040	34511	47768	51039	51776	50912
2045	50194	49604	53014	53223	52985
2050	51773	50836	53942	53448	54052



Technology Summary: Heat pumps

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

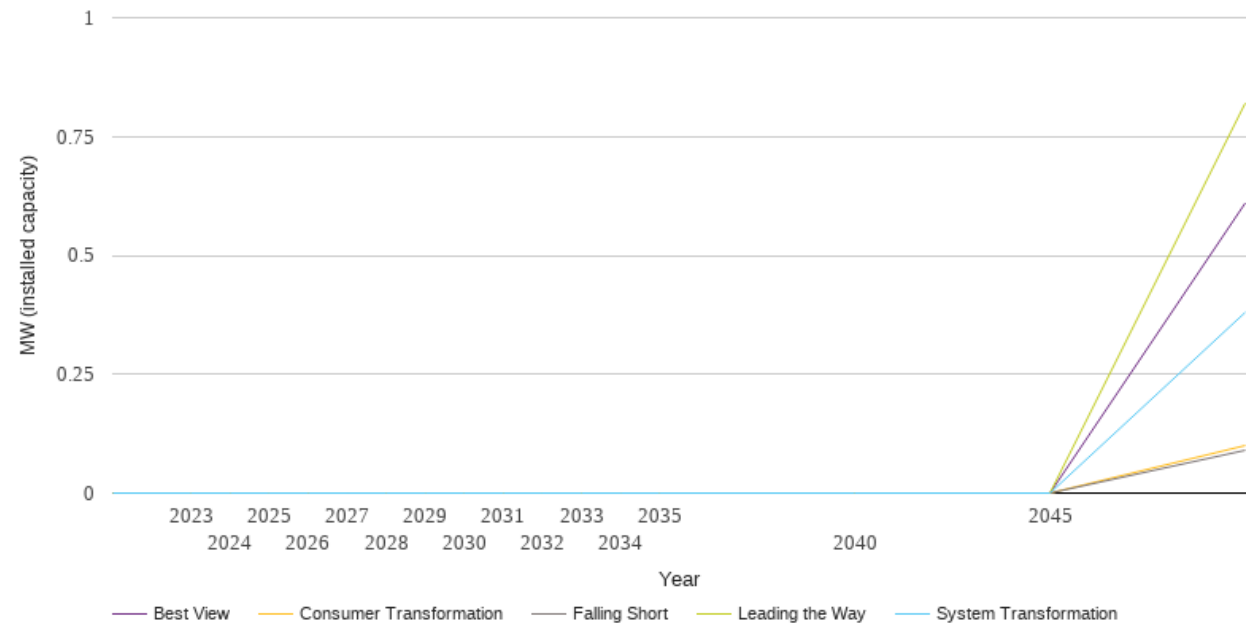
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	332	332	332	332	332
2023	502	554	715	1668	502
2024	665	794	1122	3039	665
2025	831	1029	1522	4396	831
2026	1241	1316	2885	6385	1223
2027	1665	1629	4325	8473	1628
2028	2093	1951	5833	10637	2036
2029	2524	2287	7421	12885	2450
2030	2950	2622	9045	15183	2856
2031	3716	2955	12273	18166	3657
2032	4497	3403	15878	21567	4474
2033	5263	3754	19110	24544	5276
2034	6027	4096	22341	27505	6074
2035	6784	4451	25579	30477	6866
2040	13085	12599	43827	43852	13730
2045	20586	22855	55520	51723	21517
2050	30042	35336	61380	54345	30568



Technology Summary: Hydrogen electrolysis

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

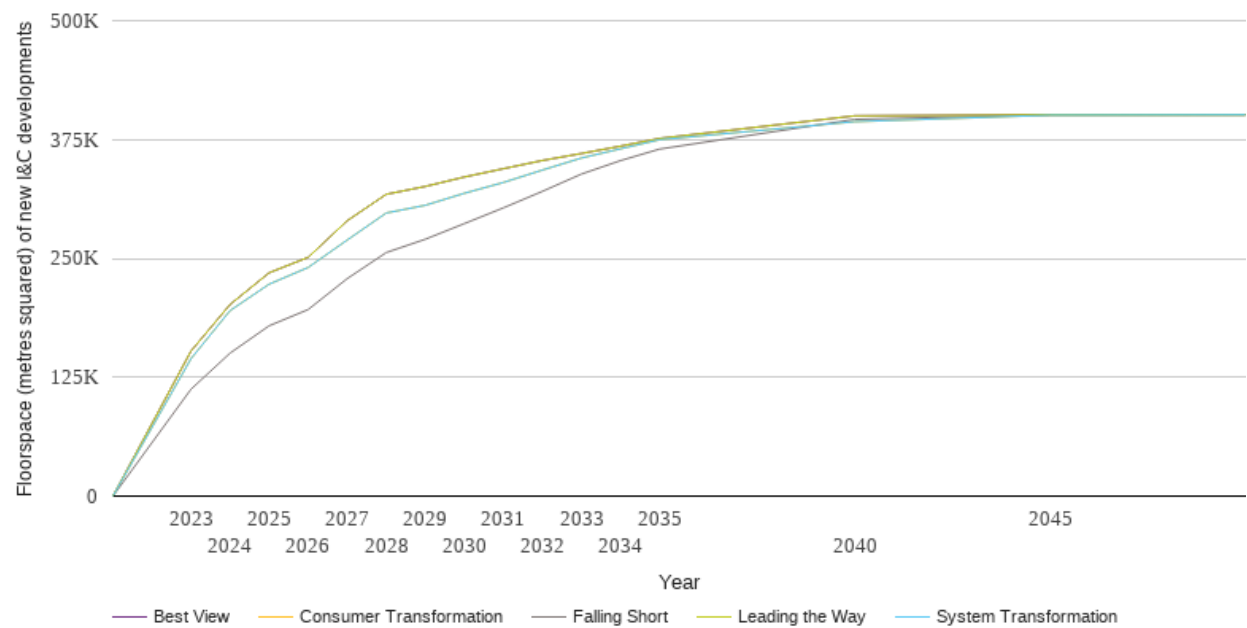
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0	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	0.1	0.4	0.1	0.8	0.6



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	112454	144584	144584	152617	152617
2024	150356	195058	195058	201530	201530
2025	179087	222873	222873	234845	234845
2026	196189	240442	240442	251086	251086
2027	228727	269309	269309	289594	289594
2028	256136	297723	297723	317401	317401
2029	270139	305857	305857	325647	325647
2030	286567	318458	318458	335586	335586
2031	303141	329827	329827	344307	344307
2032	320513	342896	342896	352972	352972
2033	338684	355566	355566	360306	360306
2034	352833	365242	365242	368039	368039
2035	364957	374809	374809	376171	376171
2040	396232	393837	393837	399904	399904
2045	401022	400623	400623	401022	401022
2050	401022	401022	401022	401022	401022



Technology Summary: Other Distributed Generation

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

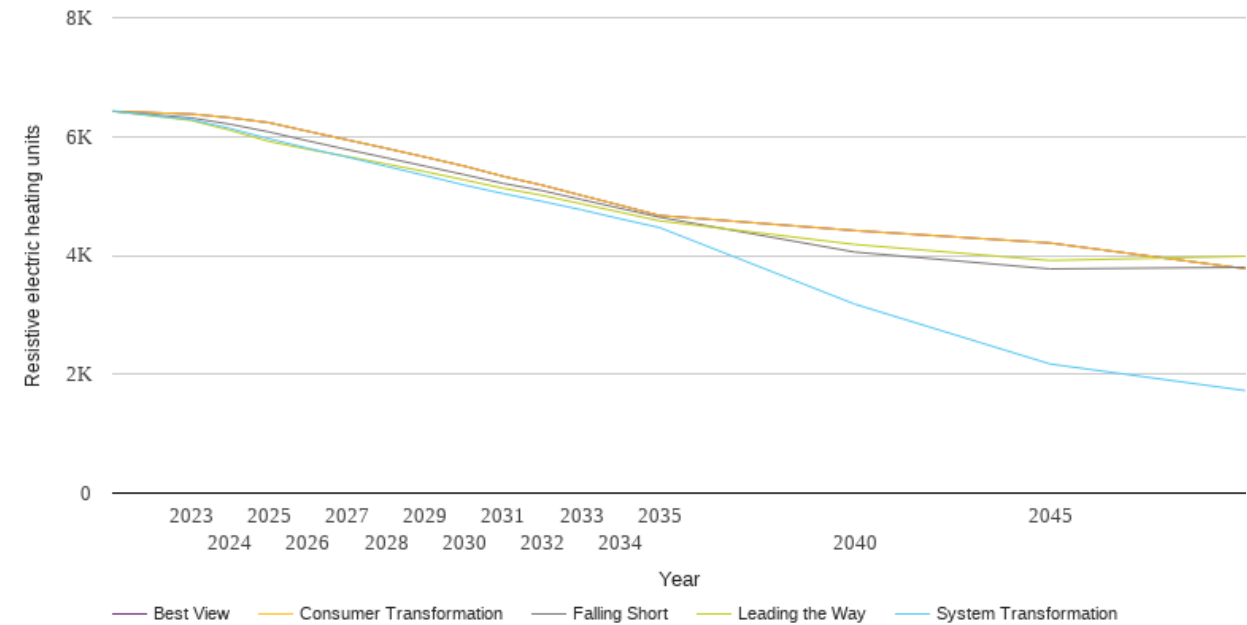
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	23.3	23.3	23.3	23.3	23.3
2023	23.5	23.5	23.5	23.5	23.5
2024	23.5	23.5	23.5	23.5	23.5
2025	23.5	23.5	23.5	23.5	23.5
2026	23.5	23.5	23.5	23.5	23.5
2027	23.5	23.5	23.5	23.5	23.5
2028	23.5	23.5	23.5	23.5	23.5
2029	23.5	23.5	23.5	23.5	23.5
2030	23.5	23.5	23.5	23.5	23.5
2031	23.5	23.5	23.5	18.5	18.5
2032	23.5	23.5	23.5	8.3	18.5
2033	23.5	23.5	23.5	1.1	11.3
2034	23.1	23.1	23.1	0.7	10.9
2035	23.1	23.1	23.1	0.7	10.9
2040	23.1	0.7	0.7	0.7	10.9
2045	23.1	12.9	0.7	19.0	29.2
2050	23.1	12.9	0.7	19.0	29.2



Technology Summary: Resistive electric heating

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

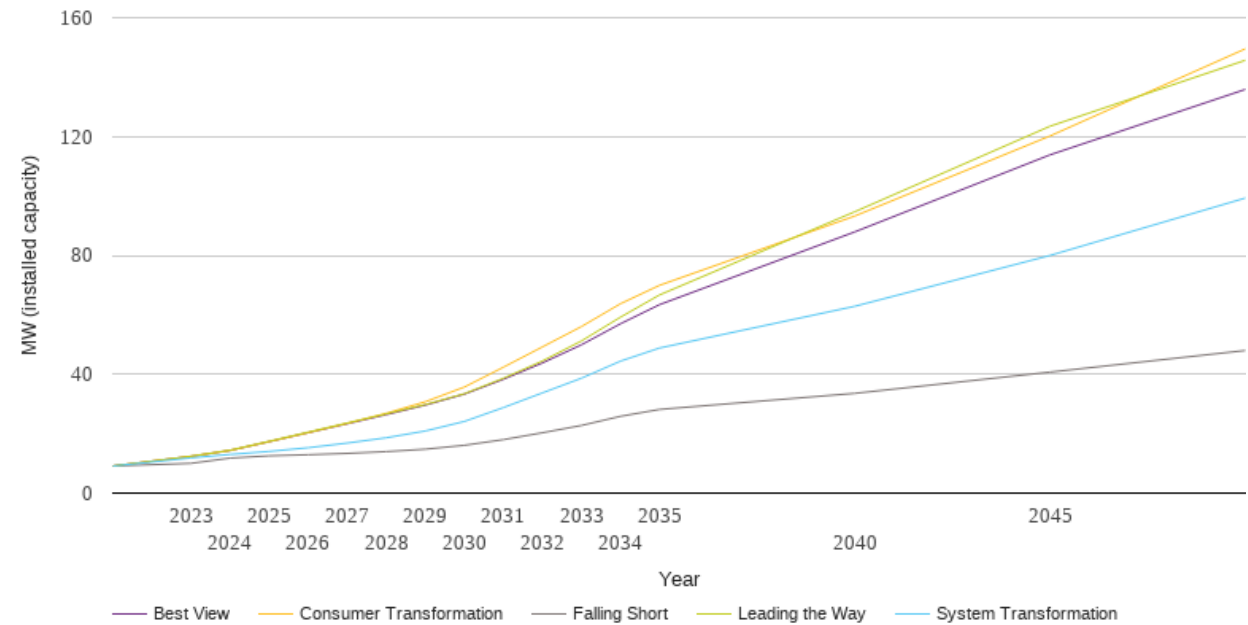
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	6425	6425	6425	6425	6425
2023	6314	6285	6379	6271	6379
2024	6207	6136	6317	6105	6317
2025	6077	5962	6233	5917	6233
2026	5926	5803	6087	5785	6087
2027	5781	5654	5944	5665	5944
2028	5642	5499	5801	5538	5801
2029	5501	5343	5654	5409	5654
2030	5358	5183	5502	5270	5502
2031	5211	5039	5330	5129	5330
2032	5089	4908	5181	5010	5181
2033	4939	4767	5010	4867	5010
2034	4791	4614	4842	4725	4842
2035	4642	4468	4671	4581	4671
2040	4056	3180	4418	4184	4418
2045	3772	2173	4209	3914	4209
2050	3800	1725	3776	3986	3776



Technology Summary: Solar Generation

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

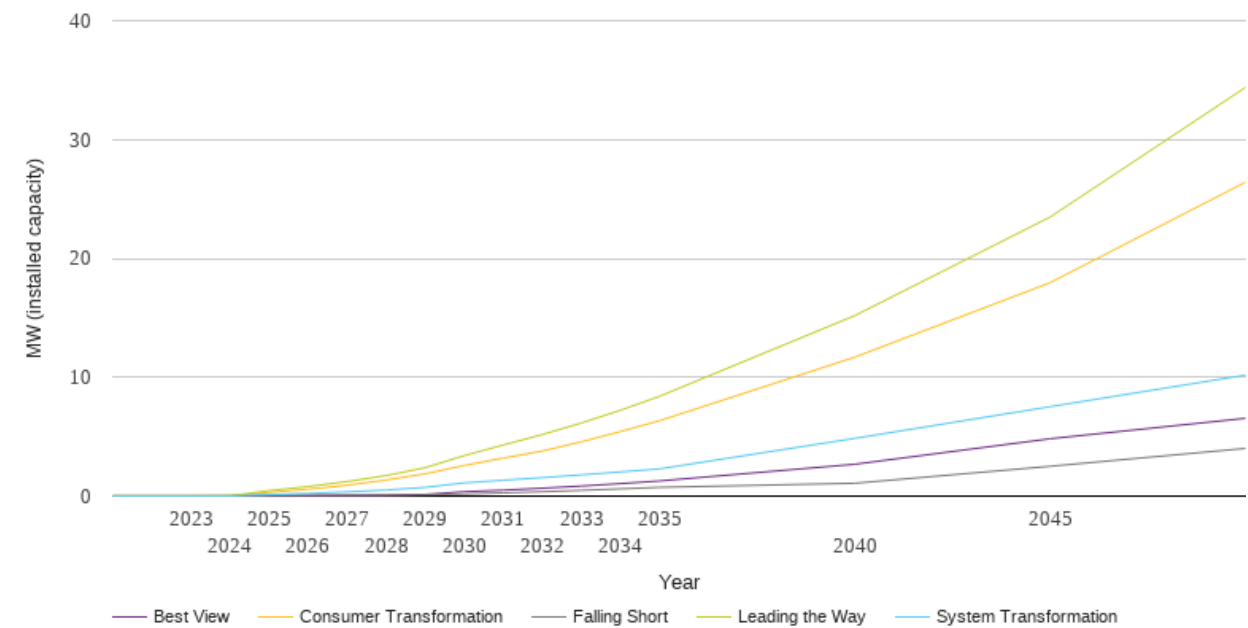
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	9.1	9.1	9.1	9.1	9.1
2023	10.0	11.8	12.4	12.4	12.4
2024	11.8	13.0	14.3	14.4	14.3
2025	12.5	14.0	17.3	17.4	17.3
2026	12.9	15.3	20.3	20.5	20.3
2027	13.4	16.8	23.5	23.6	23.3
2028	14.0	18.6	26.8	26.6	26.4
2029	14.8	20.9	30.7	29.8	29.6
2030	16.1	24.1	35.7	33.4	33.3
2031	18.0	28.8	42.4	38.6	38.3
2032	20.3	33.7	49.2	44.5	43.8
2033	22.8	38.7	56.1	51.2	49.9
2034	25.8	44.4	63.7	59.2	57.0
2035	28.2	48.8	69.9	66.7	63.4
2040	33.6	62.9	93.2	94.7	87.9
2045	40.7	80.0	120.2	123.5	113.8
2050	48.0	99.3	149.5	145.6	135.9



Technology Summary: Storage

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

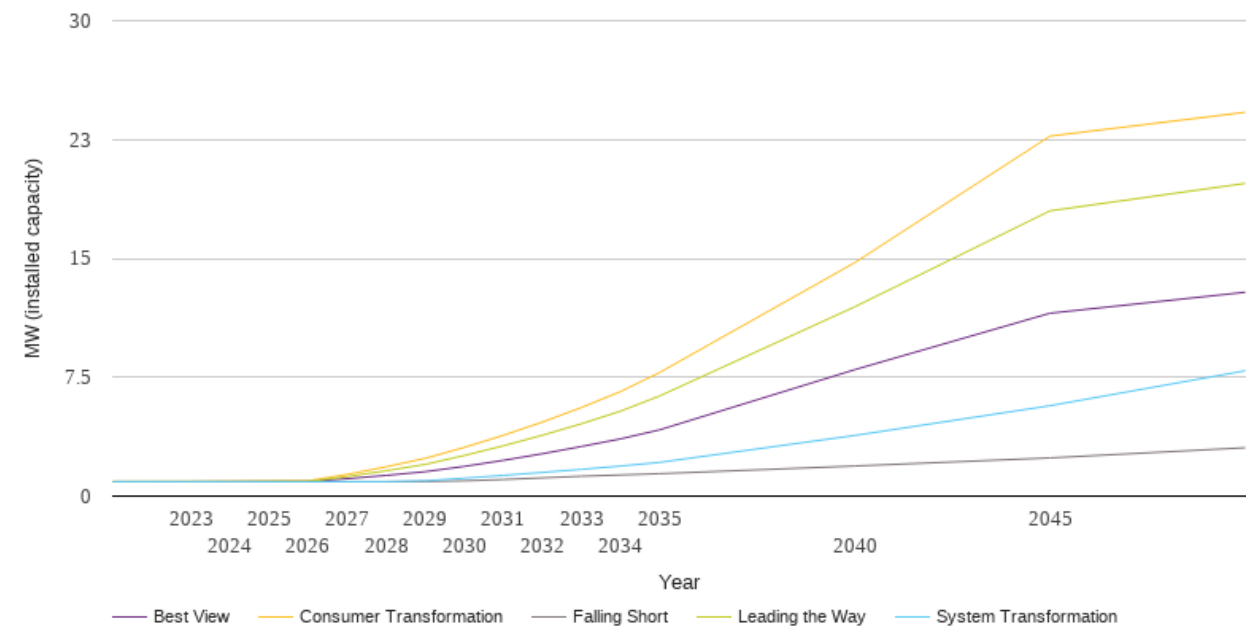
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.1	0.3	0.5	0.0
2026	0.1	0.2	0.6	0.8	0.1
2027	0.1	0.4	0.9	1.2	0.1
2028	0.1	0.5	1.4	1.7	0.1
2029	0.1	0.7	1.9	2.4	0.1
2030	0.2	1.1	2.6	3.4	0.4
2031	0.3	1.3	3.2	4.3	0.5
2032	0.4	1.6	3.8	5.2	0.7
2033	0.5	1.8	4.6	6.2	0.8
2034	0.6	2.0	5.4	7.2	1.1
2035	0.7	2.3	6.3	8.4	1.3
2040	1.1	4.9	11.7	15.2	2.7
2045	2.5	7.5	17.9	23.5	4.8
2050	4.0	10.2	26.4	34.4	6.5



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	0.9	0.9	0.9	0.9	0.9
2023	0.9	0.9	0.9	0.9	0.9
2024	0.9	0.9	0.9	0.9	0.9
2025	0.9	0.9	0.9	0.9	0.9
2026	0.9	0.9	1.0	0.9	0.9
2027	0.9	0.9	1.4	1.2	1.1
2028	0.9	0.9	1.9	1.6	1.3
2029	0.9	1.0	2.4	2.0	1.5
2030	1.0	1.1	3.1	2.6	1.9
2031	1.0	1.3	3.8	3.2	2.3
2032	1.1	1.5	4.7	3.8	2.7
2033	1.3	1.7	5.6	4.6	3.1
2034	1.3	1.9	6.6	5.4	3.6
2035	1.4	2.1	7.8	6.3	4.2
2040	1.9	3.8	14.7	11.9	8.0
2045	2.4	5.7	22.7	18.0	11.5
2050	3.1	7.9	24.2	19.7	12.9



National Grid Electricity Distribution PLC 09223384)
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