

Distribution Future Energy Scenarios 2022

Local Authority:
Bedford

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 Bedford covered by the NGED licence areas.



Scenario Summary

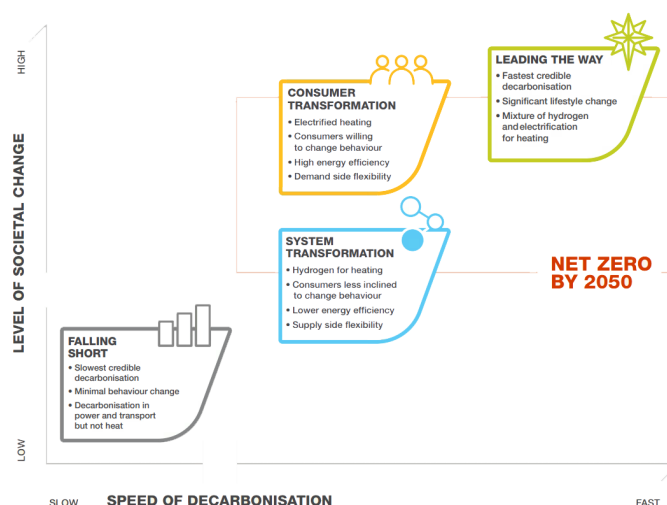
This DFES scenario framework includes three scenarios that are compliant with UK government targets of Net Zero greenhouse gas emissions by 2050. A summary of each scenario is below:

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 Bedford 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	825	345	345	0
Domestic	New dwellings	0	380	429	429	517	554	557	557	554
Electric vehicles	Electric vehicles	171	109 6	128 1	238 5	235 9	750 4	566 5	613 8	550 8
EV Charge Point	EV charge points	74	482	654	122 8	137 0	369 3	323 0	351 3	351 4
Heat pumps	Heat pump installations	65	394	463	887	128 3	213 9	249 1	417 3	390 7
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non domestic	Floorspace (metres squared) of new I&C developments	0	0	0	0	0	0	0	0	0
Other Distributed Generation	MW (installed capacity)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Resistive electric heating	Resistive electric heating units	373	345	322	337	330	316	155	273	294
Solar Generation	MW (installed capacity)	0.8	1.6	2.8	3.8	2.8	9.7	16. 6	20. 6	18. 0
Storage	MW (installed capacity)	0.0	0.0	0.1	0.3	0.4	0.5	1.1	2.3	3.0
Wind	MW (installed capacity)	0.8	0.8	0.9	2.2	1.7	1.5	3.5	11. 5	9.6

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.

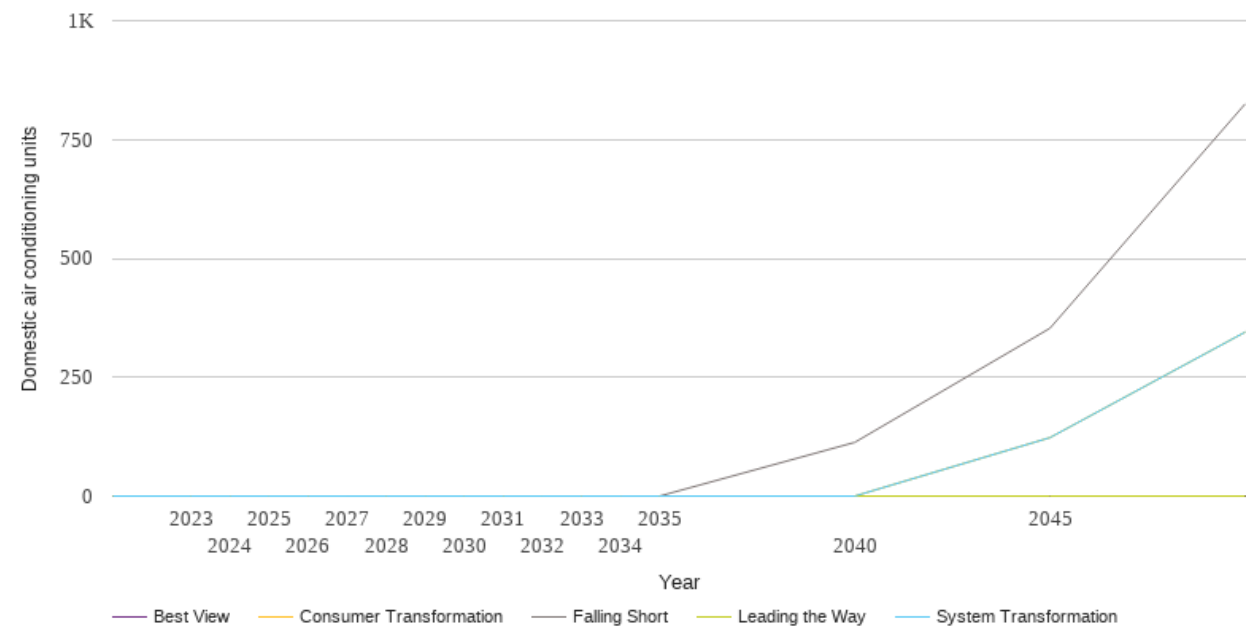
If you have any comments or queries regarding these reports, please contact

nged.energyplanning@nationalgrid.co.uk.

Technology Summary: Air conditioning

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

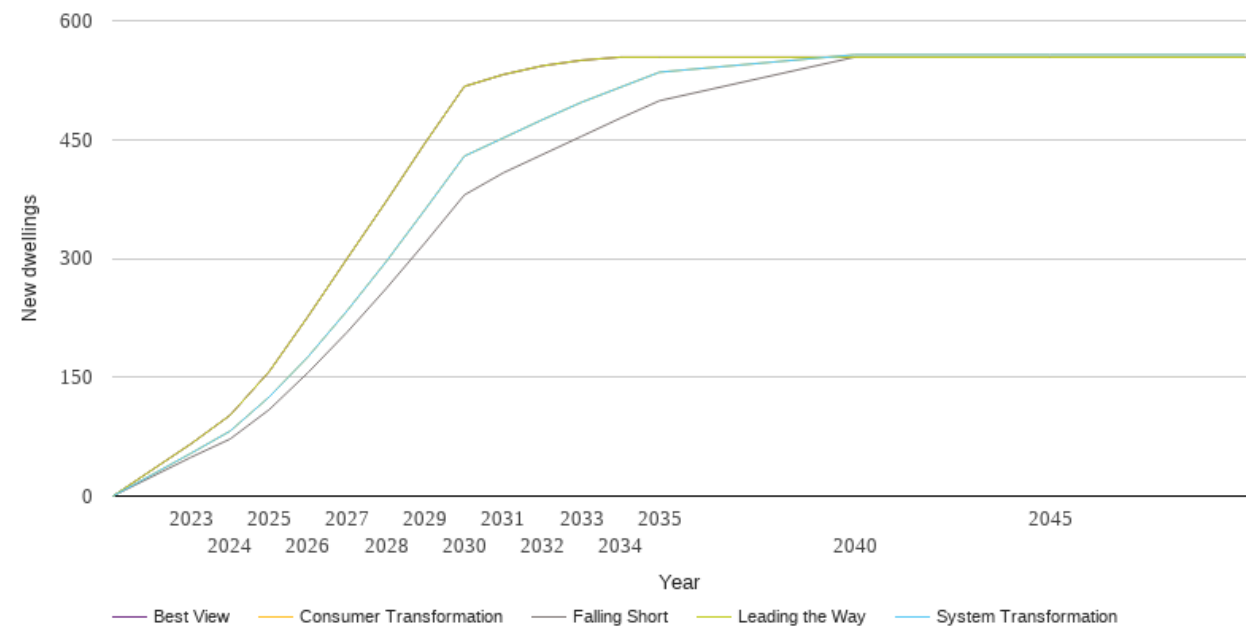
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	0	0	0	0	0
2025	0	0	0	0	0
2026	0	0	0	0	0
2027	0	0	0	0	0
2028	0	0	0	0	0
2029	0	0	0	0	0
2030	0	0	0	0	0
2031	0	0	0	0	0
2032	0	0	0	0	0
2033	0	0	0	0	0
2034	0	0	0	0	0
2035	0	0	0	0	0
2040	113	0	0	0	0
2045	353	123	123	0	0
2050	825	345	345	0	0



Technology Summary: Domestic

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

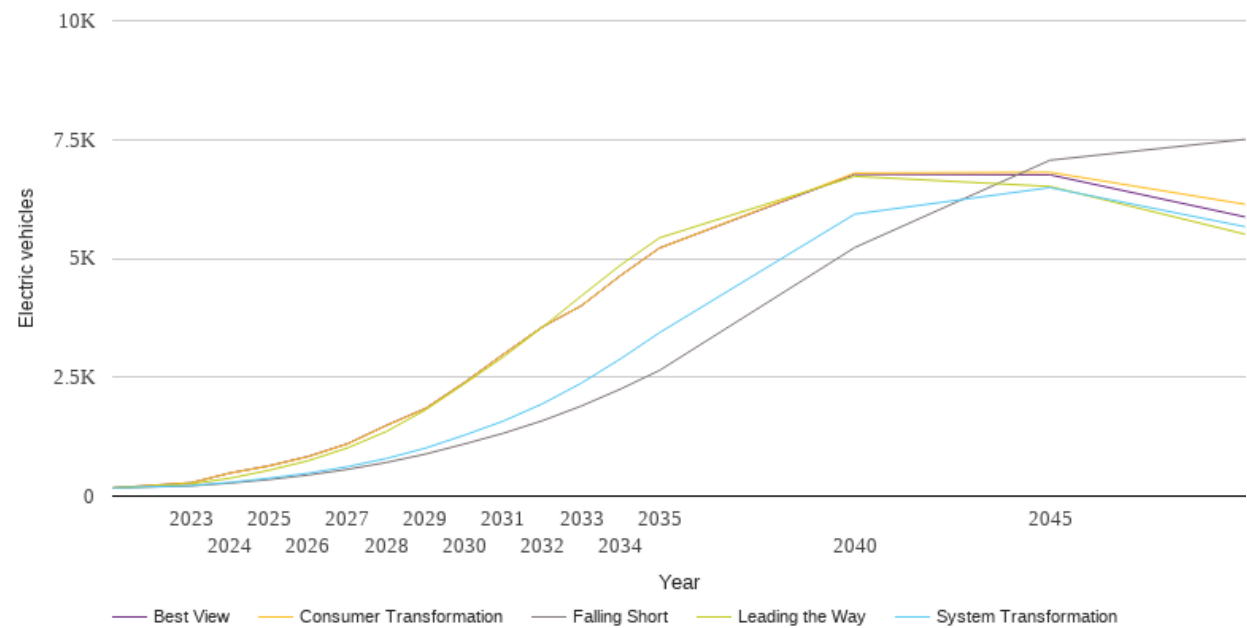
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	49	54	54	66	66
2024	72	82	82	102	102
2025	109	125	125	157	157
2026	156	176	176	227	227
2027	207	234	234	300	300
2028	262	296	296	372	372
2029	320	362	362	446	446
2030	380	429	429	517	517
2031	408	452	452	532	532
2032	431	475	475	543	543
2033	454	497	497	550	550
2034	477	516	516	554	554
2035	499	535	535	554	554
2040	554	557	557	554	554
2045	554	557	557	554	554
2050	554	557	557	554	554



Technology Summary: Electric vehicles

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

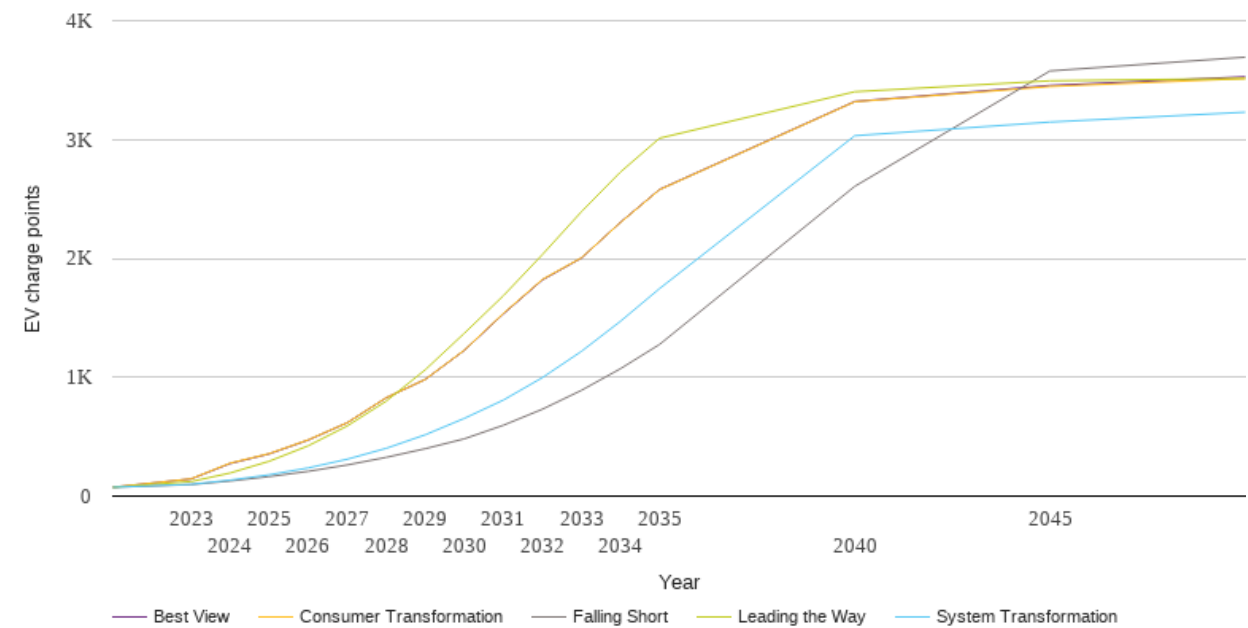
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	171	171	171	171	171
2023	215	221	280	254	280
2024	273	288	484	376	485
2025	347	376	635	543	637
2026	443	480	830	744	834
2027	561	617	1095	1011	1099
2028	707	790	1482	1358	1487
2029	883	1008	1839	1809	1843
2030	1096	1281	2385	2359	2389
2031	1322	1578	2981	2926	2984
2032	1585	1941	3561	3550	3558
2033	1896	2378	4006	4212	4005
2034	2251	2886	4635	4858	4639
2035	2644	3438	5215	5432	5219
2040	5228	5931	6793	6727	6770
2045	7065	6489	6811	6513	6758
2050	7504	5665	6138	5508	5872



Technology Summary: EV Charge Point

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

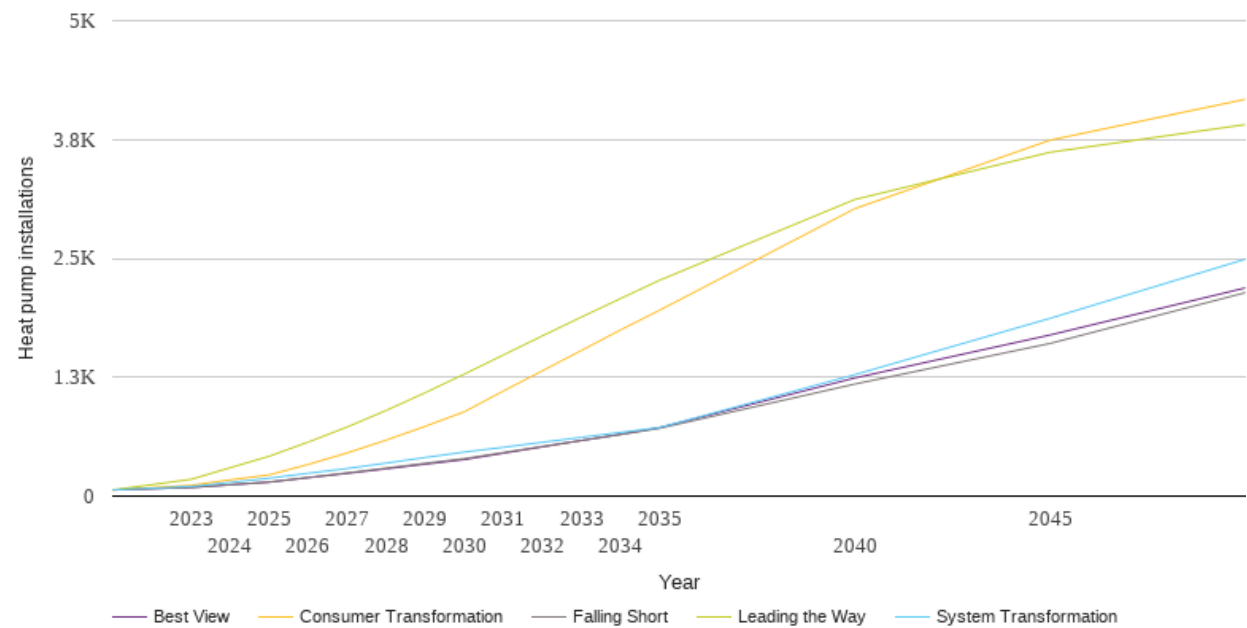
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	74	74	74	74	74
2023	97	99	145	122	144
2024	127	134	277	194	274
2025	164	179	357	293	355
2026	208	237	473	423	471
2027	262	310	617	590	617
2028	326	402	828	799	827
2029	399	516	982	1063	982
2030	482	654	1228	1370	1226
2031	596	808	1537	1686	1533
2032	731	997	1823	2032	1819
2033	890	1218	2005	2393	2003
2034	1072	1471	2302	2727	2304
2035	1276	1746	2578	3011	2580
2040	2606	3032	3318	3402	3320
2045	3577	3147	3446	3494	3455
2050	3693	3230	3513	3514	3528



Technology Summary: Heat pumps

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

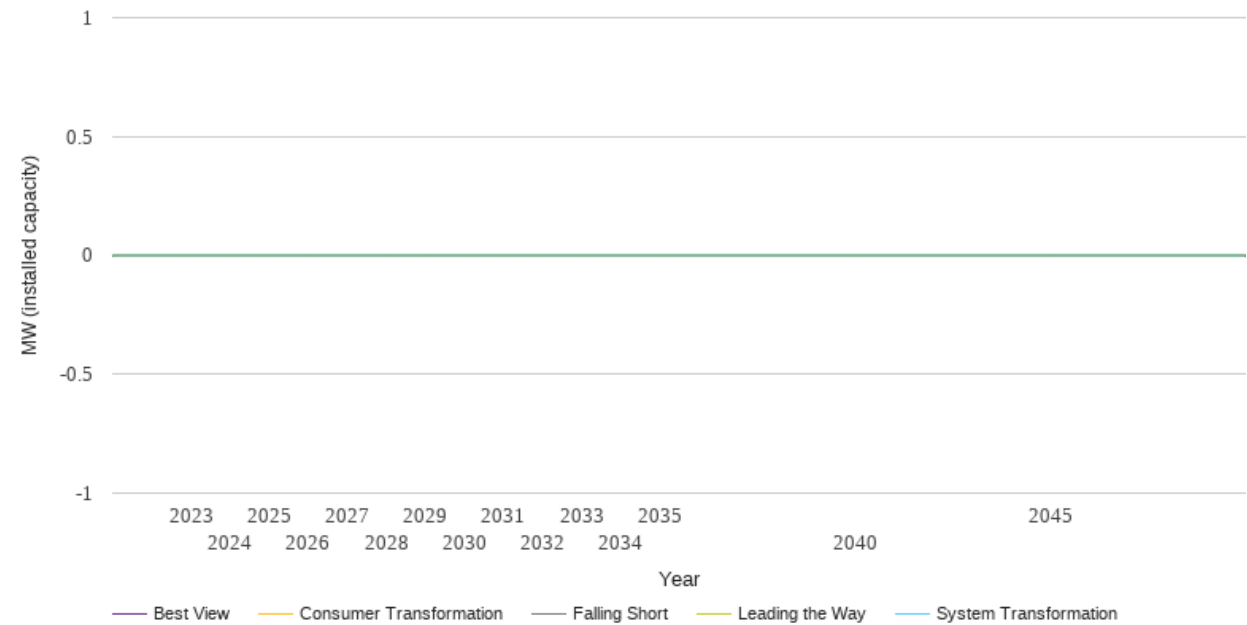
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	65	65	65	65	65
2023	91	101	113	176	91
2024	119	143	170	298	119
2025	147	188	223	419	147
2026	195	240	333	568	194
2027	244	290	454	727	239
2028	294	347	589	901	287
2029	345	406	734	1088	336
2030	394	463	887	1283	384
2031	458	513	1105	1484	451
2032	522	566	1318	1685	518
2033	585	618	1532	1883	585
2034	647	670	1747	2077	650
2035	713	720	1954	2270	720
2040	1178	1277	3023	3119	1242
2045	1605	1869	3743	3616	1694
2050	2139	2491	4173	3907	2189



Technology Summary: Hydrogen electrolysis

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

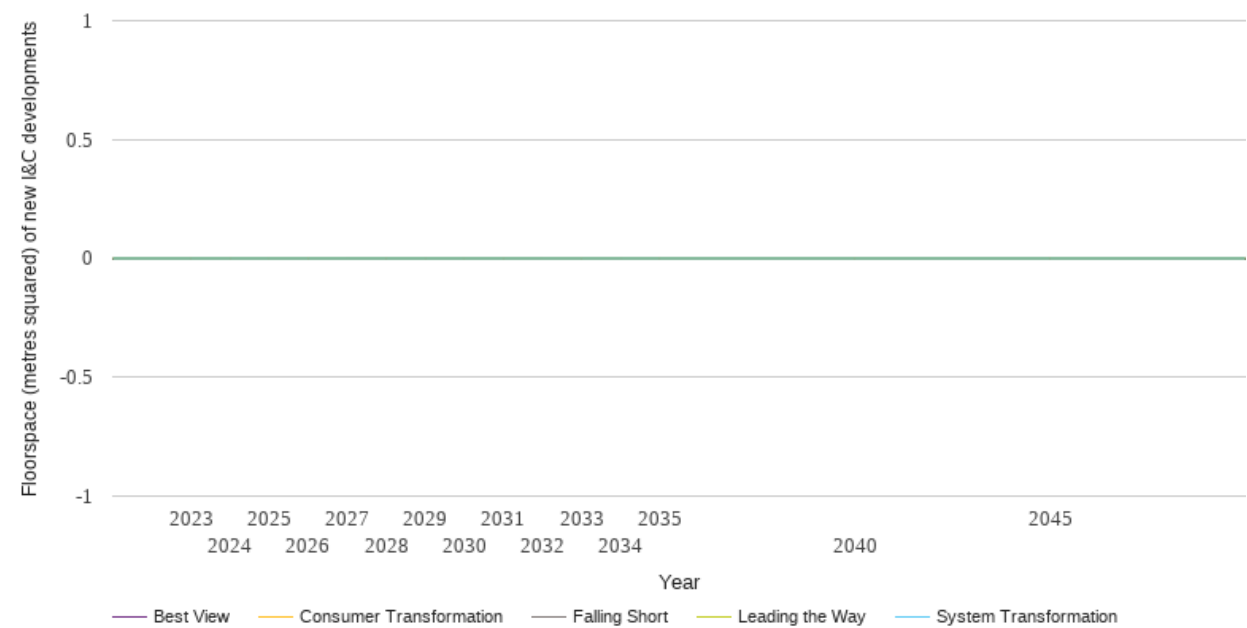
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0	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	0.0	0.0	0.0	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	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	0	0	0	0	0
2045	0	0	0	0	0
2050	0	0	0	0	0



Technology Summary: Other Distributed Generation

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

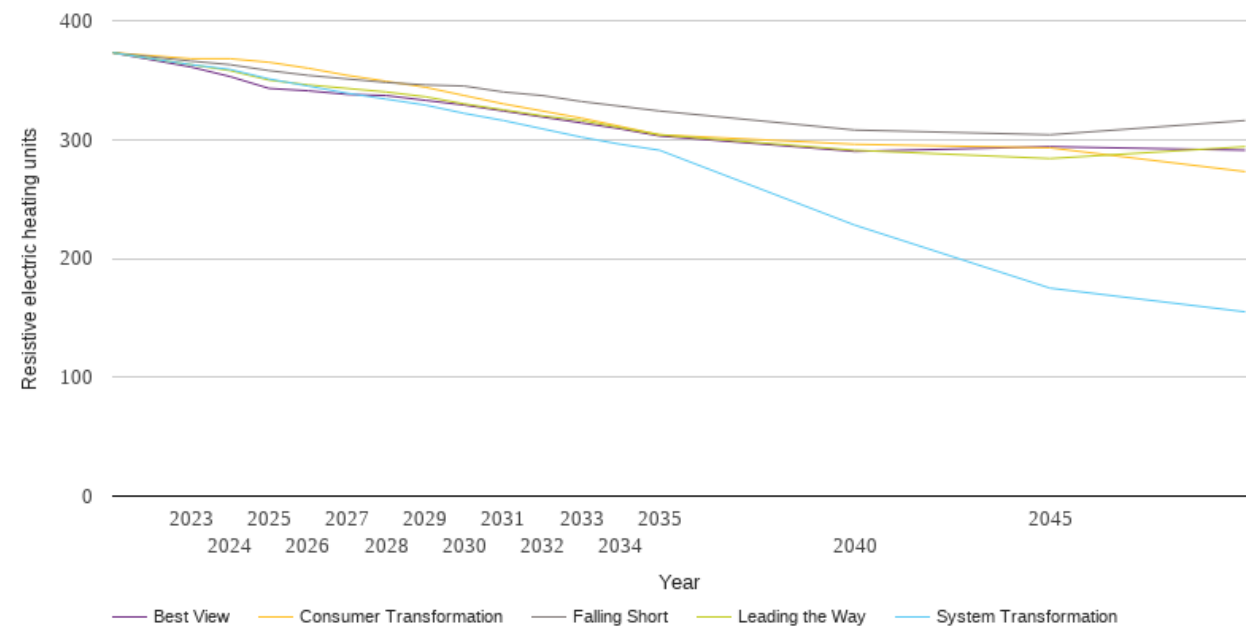
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0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



Technology Summary: Resistive electric heating

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

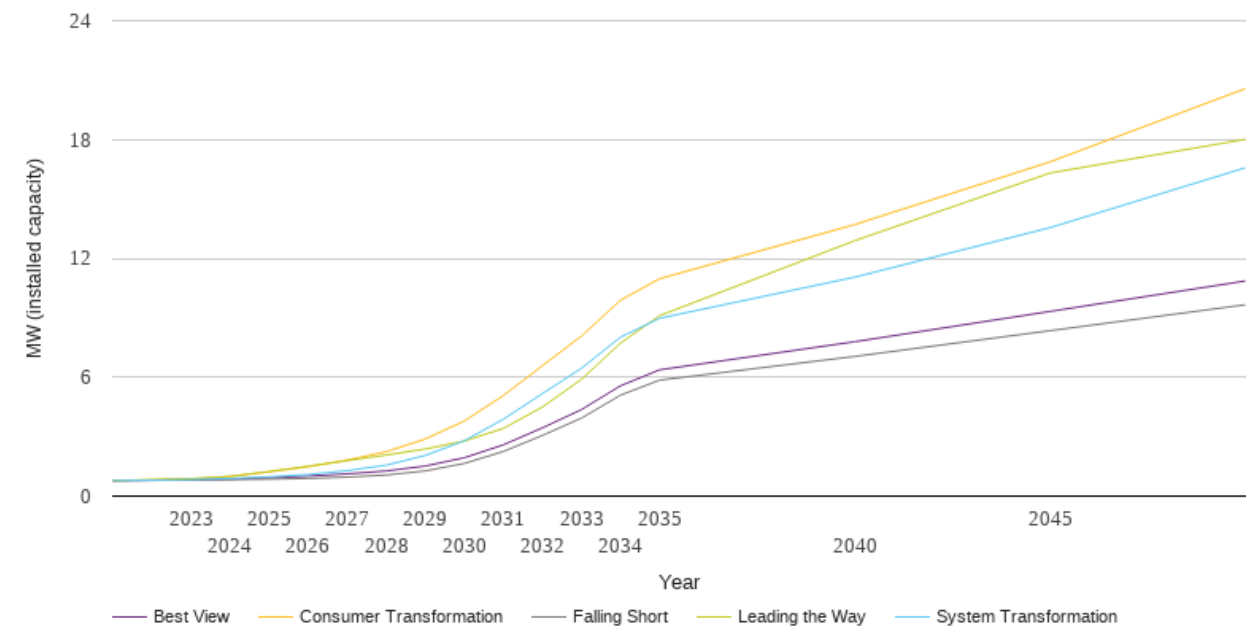
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	373	373	373	373	373
2023	366	363	368	363	361
2024	363	359	368	358	353
2025	358	351	365	350	343
2026	354	345	360	346	341
2027	351	339	354	343	338
2028	348	334	349	340	337
2029	346	329	344	336	333
2030	345	322	337	330	329
2031	340	316	330	325	324
2032	337	309	324	320	319
2033	332	302	318	316	314
2034	328	296	311	310	309
2035	324	291	304	304	303
2040	308	228	296	291	290
2045	304	175	293	284	294
2050	316	155	273	294	291



Technology Summary: Solar Generation

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

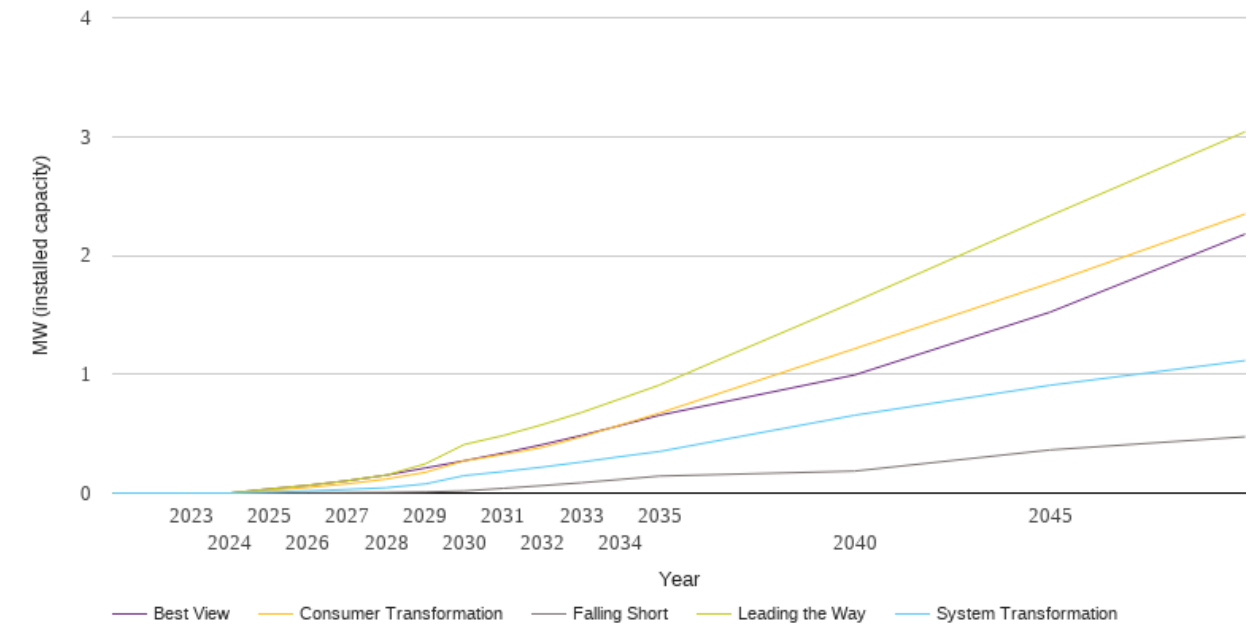
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.8	0.8	0.8	0.8	0.8
2023	0.8	0.8	0.9	0.9	0.8
2024	0.8	0.9	1.0	1.0	0.9
2025	0.9	1.0	1.2	1.2	0.9
2026	0.9	1.1	1.5	1.5	1.0
2027	1.0	1.3	1.8	1.8	1.1
2028	1.1	1.6	2.2	2.1	1.3
2029	1.3	2.1	2.9	2.4	1.5
2030	1.6	2.8	3.8	2.8	1.9
2031	2.3	3.9	5.1	3.4	2.6
2032	3.1	5.2	6.6	4.5	3.4
2033	3.9	6.5	8.1	5.9	4.4
2034	5.1	8.0	9.9	7.7	5.6
2035	5.9	9.0	11.0	9.1	6.4
2040	7.0	11.1	13.7	12.9	7.8
2045	8.4	13.6	16.9	16.3	9.3
2050	9.7	16.6	20.6	18.0	10.9



Technology Summary: Storage

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

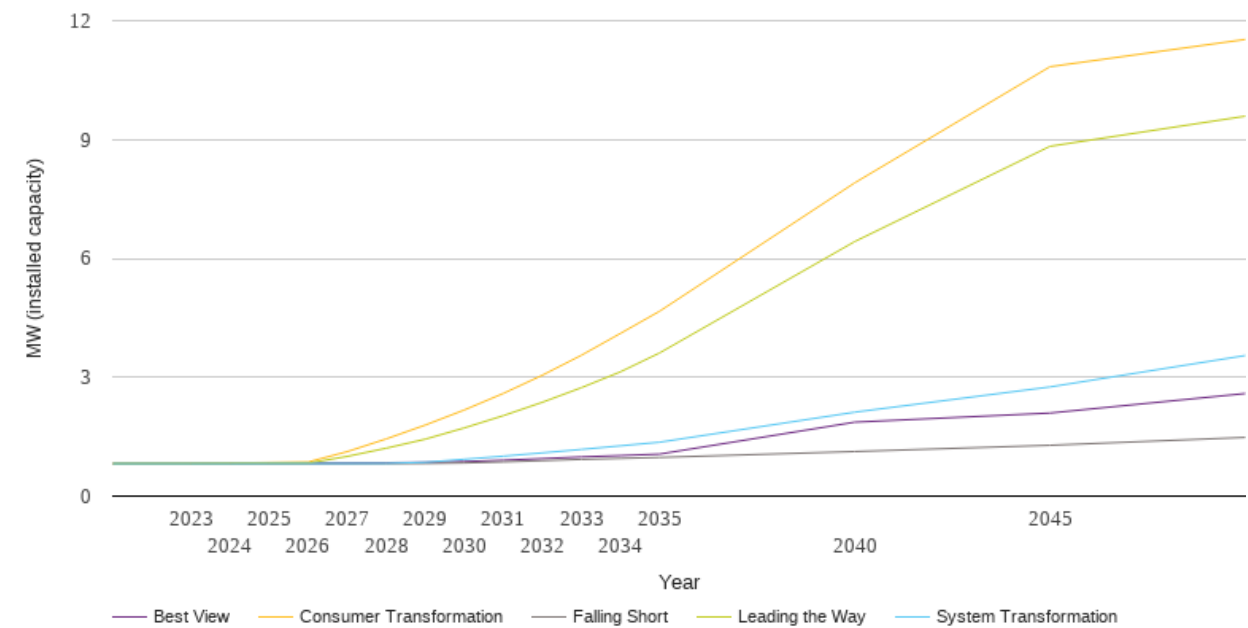
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.1	0.1
2027	0.0	0.0	0.1	0.1	0.1
2028	0.0	0.0	0.1	0.2	0.2
2029	0.0	0.1	0.2	0.2	0.2
2030	0.0	0.1	0.3	0.4	0.3
2031	0.0	0.2	0.3	0.5	0.3
2032	0.1	0.2	0.4	0.6	0.4
2033	0.1	0.3	0.5	0.7	0.5
2034	0.1	0.3	0.6	0.8	0.6
2035	0.1	0.4	0.7	0.9	0.7
2040	0.2	0.7	1.2	1.6	1.0
2045	0.4	0.9	1.8	2.3	1.5
2050	0.5	1.1	2.3	3.0	2.2



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	0.8	0.8	0.8	0.8	0.8
2023	0.8	0.8	0.8	0.8	0.8
2024	0.8	0.8	0.8	0.8	0.8
2025	0.8	0.8	0.8	0.8	0.8
2026	0.8	0.8	0.9	0.8	0.8
2027	0.8	0.8	1.1	1.0	0.8
2028	0.8	0.8	1.4	1.2	0.8
2029	0.8	0.9	1.8	1.4	0.9
2030	0.8	0.9	2.2	1.7	0.9
2031	0.9	1.0	2.6	2.0	0.9
2032	0.9	1.1	3.1	2.4	0.9
2033	0.9	1.2	3.6	2.7	1.0
2034	1.0	1.3	4.1	3.1	1.0
2035	1.0	1.4	4.7	3.6	1.1
2040	1.1	2.1	7.9	6.4	1.9
2045	1.3	2.8	10.8	8.8	2.1
2050	1.5	3.5	11.5	9.6	2.6



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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