

Distribution Future Energy Scenarios 2022

Local Authority:
Cheltenham

What are Distribution Future Energy Scenarios?

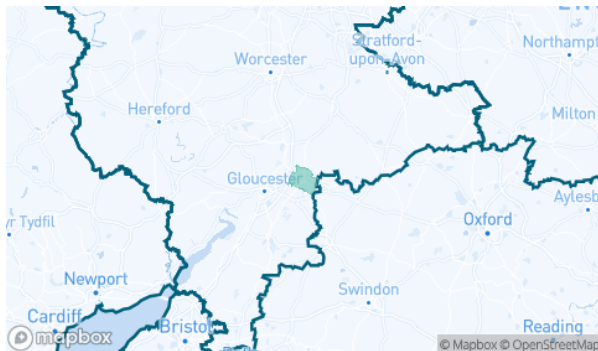
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Cheltenham covered by the NGED licence areas.



Scenario Summary

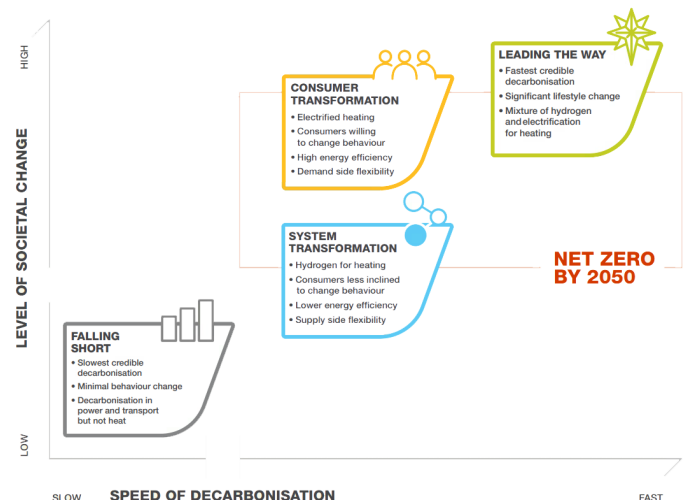
This DFES scenario framework includes three scenarios that are compliant with UK government targets of Net Zero greenhouse gas emissions by 2050. A summary of each scenario is below:

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 Cheltenham 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	869	2417	2094	2094	869	37107	20656	20656	869
Domestic	New dwellings	0	2900	3221	3221	3887	6375	6335	6335	6303
Electric vehicles	Electric vehicles	1666	1396 9	1626 7	3024 4	29987	89804	75108	76802	62102
EV Charge Point	EV charge points	778	6383	8688	1652 0	18102	49891	44795	47814	48628
Heat pumps	Heat pump installations	267	3551	2749	9415	14437	30528	34307	57405	49692
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.6
Non domestic	Floorspace (metres squared) of new I&C developments	0	7855 7	9566 0	9566 0	10228 5	16417 1	16417 1	16417 1	16417 1
Other Distributed Generation	MW (installed capacity)	0.9	0.9	0.9	0.9	0.0	0.5	0.0	0.0	0.0
Resistive electric heating	Resistive electric heating units	9071	7482	7263	7698	7375	4685	1961	4874	5020
Solar Generation	MW (installed capacity)	6.9	9.7	15.2	25.1	25.6	21.6	45.9	86.1	88.3
Storage	MW (installed capacity)	0.0	0.3	1.0	2.3	3.2	3.2	8.1	20.8	25.8
Wind	MW (installed capacity)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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.

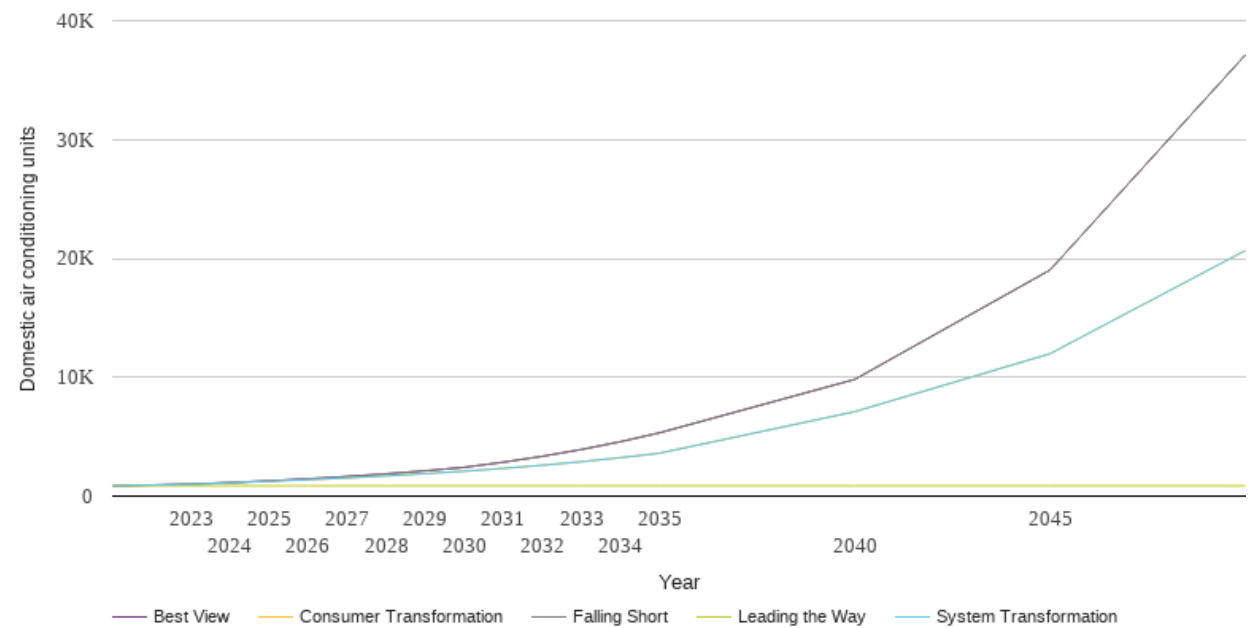
If you have any comments or queries regarding these reports, please contact

nged.energyplanning@nationalgrid.co.uk.

Technology Summary: Air conditioning

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

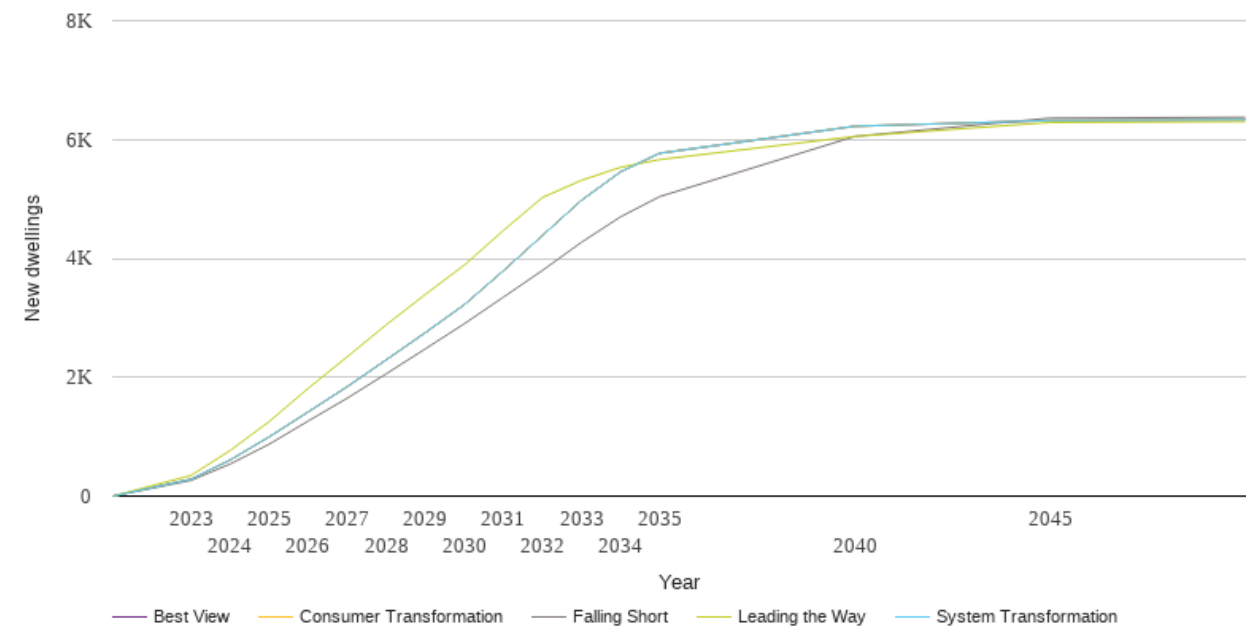
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	869	869	869	869	869
2023	1002	986	986	869	1002
2024	1131	1108	1108	869	1131
2025	1281	1248	1248	869	1281
2026	1452	1380	1380	869	1452
2027	1648	1528	1528	869	1648
2028	1869	1696	1696	869	1869
2029	2127	1885	1885	869	2127
2030	2417	2094	2094	869	2417
2031	2851	2331	2331	869	2851
2032	3349	2597	2597	869	3349
2033	3921	2895	2895	869	3921
2034	4577	3233	3233	869	4577
2035	5326	3608	3608	869	5326
2040	9817	7102	7102	869	9817
2045	19017	11975	11975	869	19017
2050	37107	20656	20656	869	37107



Technology Summary: Domestic

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

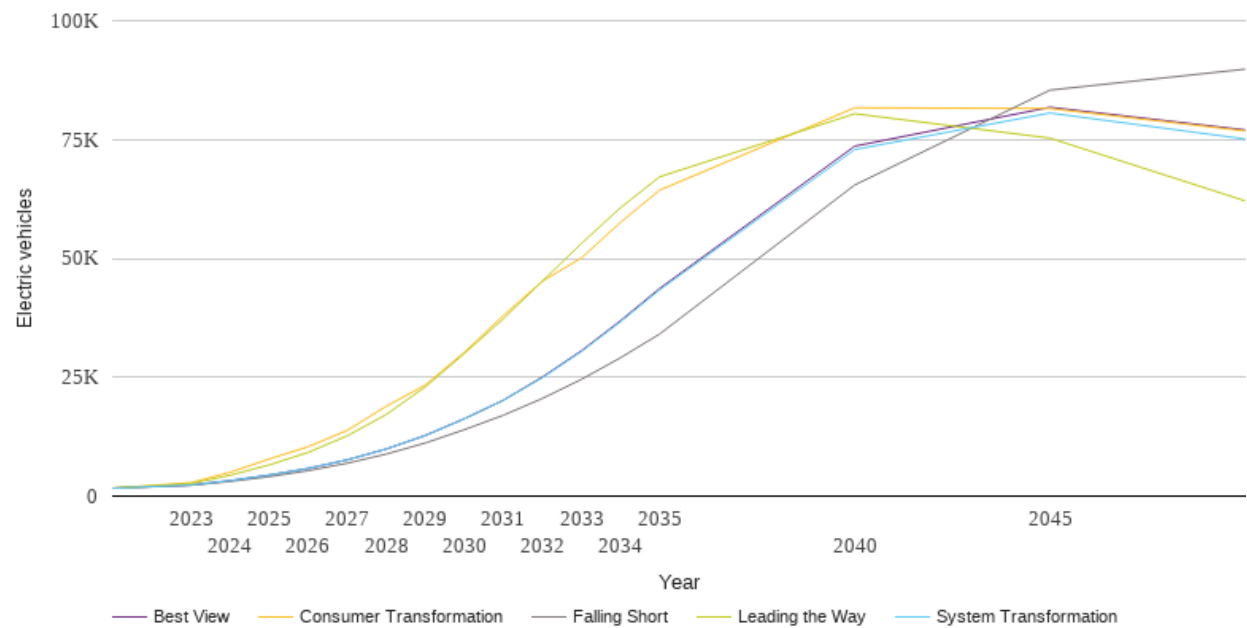
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	265	285	285	348	285
2024	539	607	607	766	607
2025	873	996	996	1253	996
2026	1263	1416	1416	1812	1416
2027	1647	1841	1841	2344	1841
2028	2058	2293	2293	2882	2293
2029	2477	2750	2750	3393	2750
2030	2900	3221	3221	3887	3221
2031	3347	3791	3791	4470	3791
2032	3797	4385	4385	5025	4385
2033	4271	4978	4978	5514	4978
2034	4699	5456	5456	5932	5456
2035	5039	5769	5769	6263	5769
2040	6052	6224	6224	6552	6224
2045	6360	6320	6320	6788	6320
2050	6375	6335	6335	6803	6335



Technology Summary: Electric vehicles

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

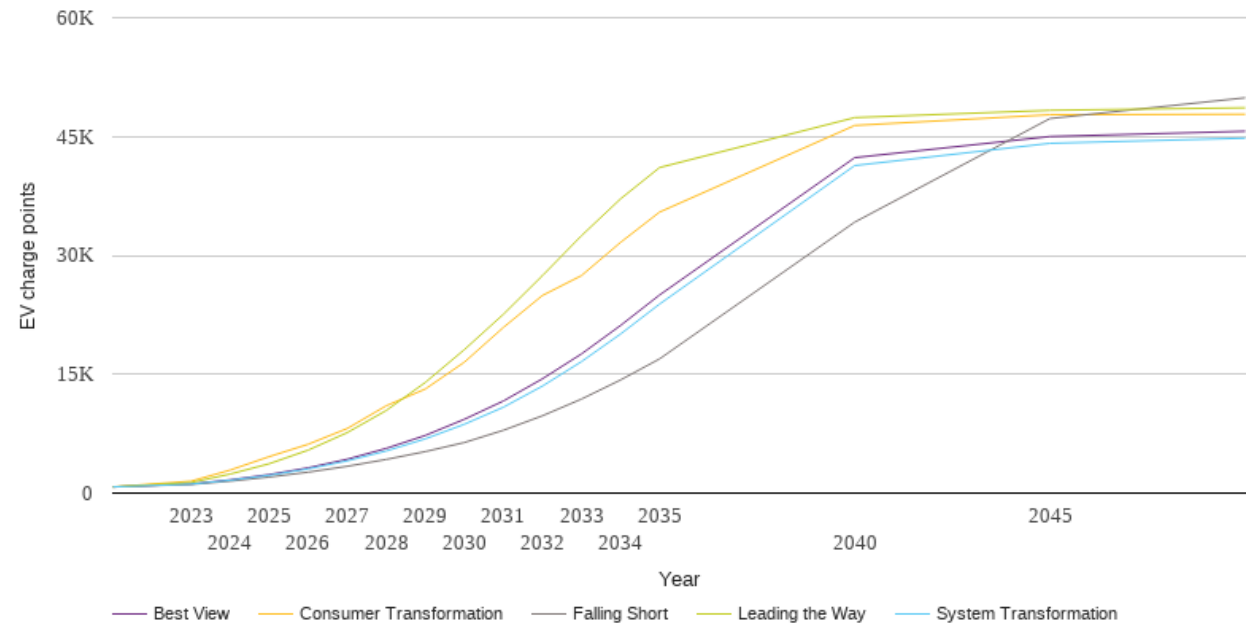
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1666	1666	1666	1666	1666
2023	2279	2335	2822	2639	2335
2024	3075	3244	5000	4383	3244
2025	4082	4418	7792	6553	4418
2026	5341	5815	10385	9201	5815
2027	6916	7619	13825	12675	7619
2028	8837	9898	18887	17164	9898
2029	11169	12750	23347	22965	12752
2030	13969	16267	30244	29987	16271
2031	17007	20159	37976	37295	20165
2032	20544	24908	45214	45203	25038
2033	24559	30411	50089	53138	30571
2034	29088	36664	57579	60657	36876
2035	34077	43378	64342	67155	43647
2040	65446	72890	81679	80428	73608
2045	85394	80576	81527	75299	81787
2050	89804	75108	76802	62102	77016



Technology Summary: EV Charge Point

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

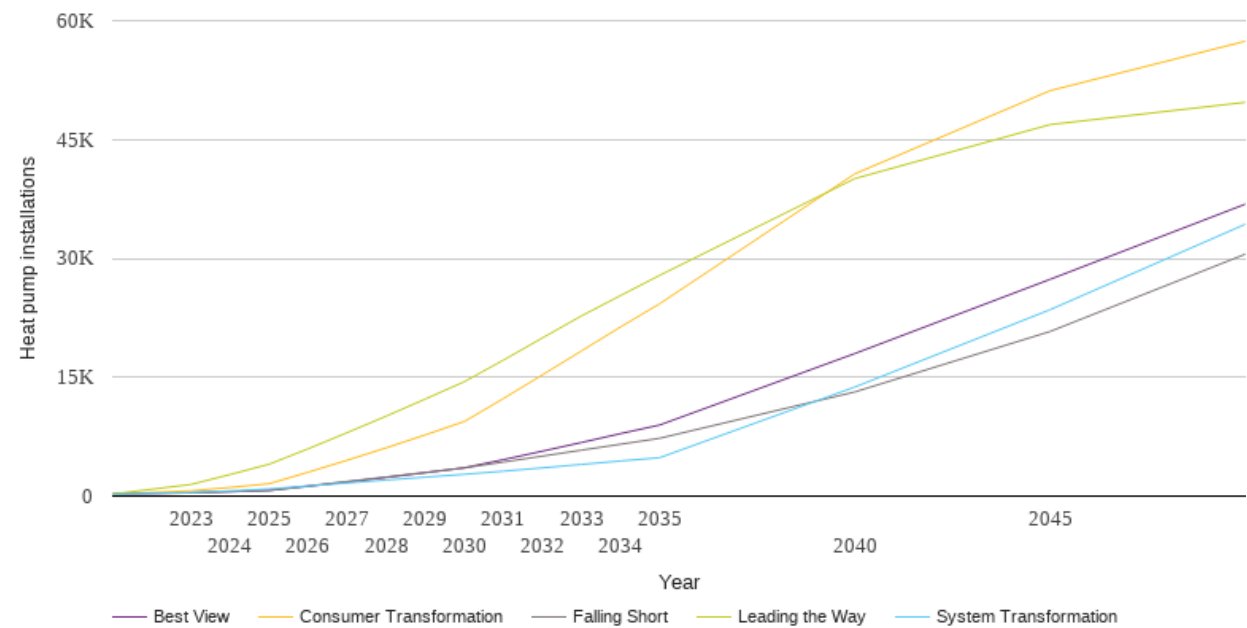
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	778	778	778	778	778
2023	1100	1133	1505	1328	1149
2024	1510	1619	2900	2401	1666
2025	2022	2245	4597	3700	2336
2026	2643	3052	6162	5419	3189
2027	3383	4065	8151	7631	4273
2028	4246	5316	11024	10424	5641
2029	5239	6846	13136	13964	7276
2030	6383	8688	16520	18102	9315
2031	7928	10837	20905	22563	11626
2032	9755	13503	24941	27441	14424
2033	11865	16590	27450	32486	17564
2034	14273	20071	31634	37130	21149
2035	16937	23853	35465	41081	25001
2040	34201	41340	46401	47391	42335
2045	47273	44145	47750	48311	45002
2050	49891	44795	47814	48628	45666



Technology Summary: Heat pumps

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

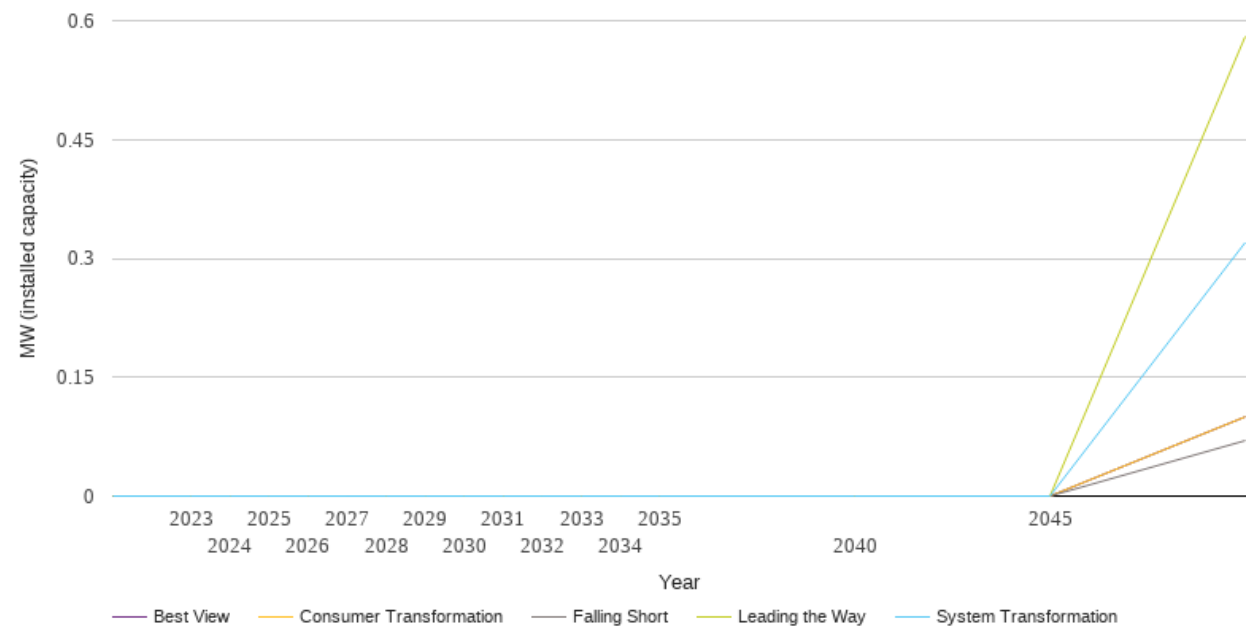
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	267	267	267	267	267
2023	410	441	662	1469	410
2024	563	653	1093	2719	563
2025	714	903	1563	4025	714
2026	1277	1281	3014	5971	1237
2027	1841	1655	4527	8011	1782
2028	2408	2028	6092	10094	2353
2029	2980	2392	7728	12250	2953
2030	3551	2749	9415	14437	3576
2031	4297	3143	12310	17160	4598
2032	5047	3562	15300	19960	5669
2033	5795	3995	18318	22736	6766
2034	6544	4433	21340	25304	7883
2035	7292	4842	24263	27855	8967
2040	13141	13762	40668	40069	17987
2045	20767	23517	51158	46883	27348
2050	30528	34307	57405	49692	36841



Technology Summary: Hydrogen electrolysis

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

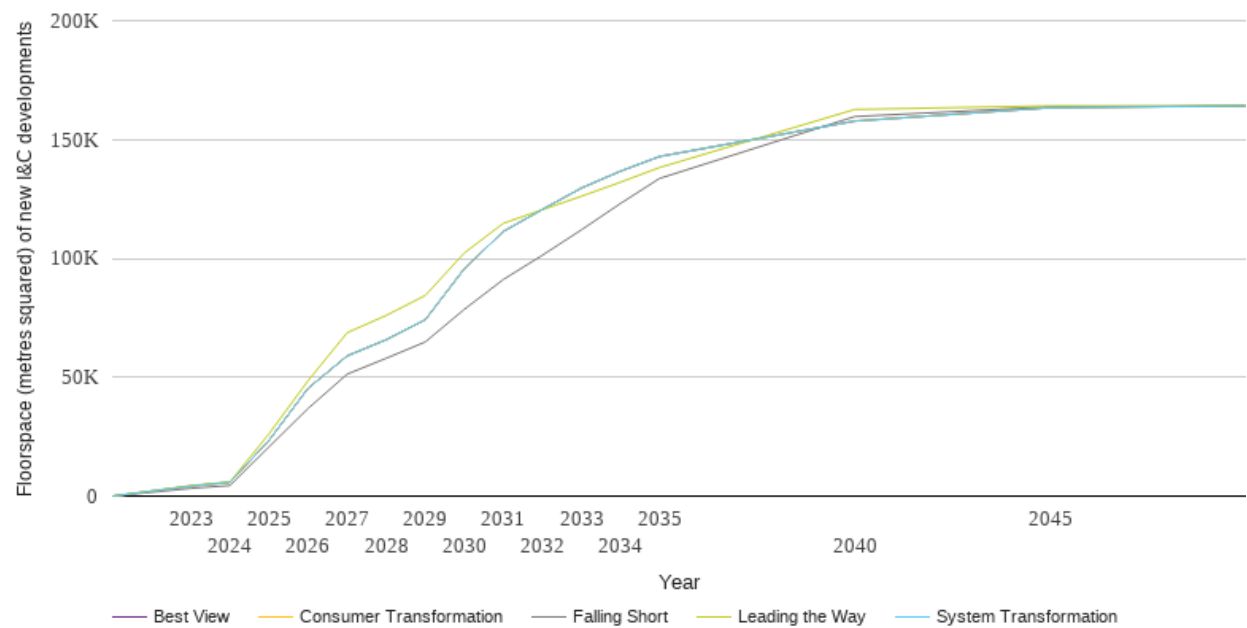
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0	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	0.3	0.1	0.6	0.1



Technology Summary: Non domestic

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

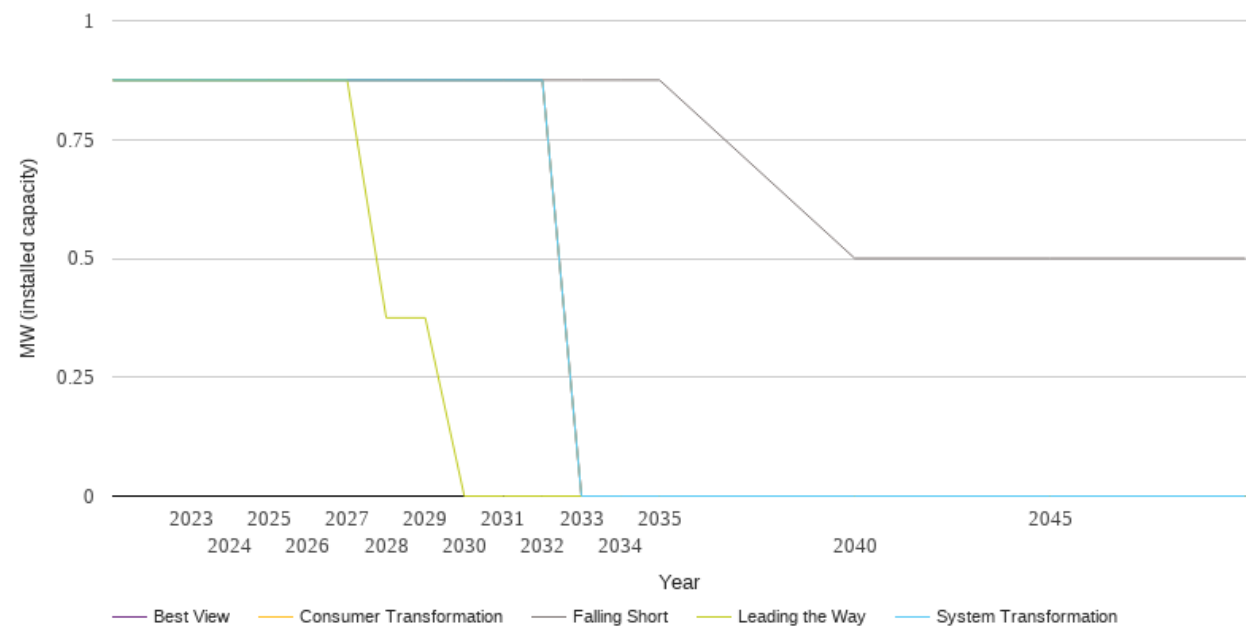
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	3271	4206	4206	4439	4206
2024	4461	5799	5799	5981	5799
2025	20754	23510	23510	26269	23510
2026	36892	45377	45377	48584	45377
2027	51310	58985	58985	68748	58985
2028	57976	65798	65798	75996	65798
2029	64849	74192	74192	84405	74192
2030	78557	95660	95660	102285	95660
2031	91129	111336	111336	114774	111336
2032	101322	120597	120597	120492	120597
2033	112027	129602	129602	126146	129602
2034	123104	136685	136685	132056	136685
2035	133642	142852	142852	138223	142852
2040	159663	157767	157767	162652	157767
2045	163761	163403	163403	164171	163403
2050	164171	164171	164171	164171	164171



Technology Summary: Other Distributed Generation

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

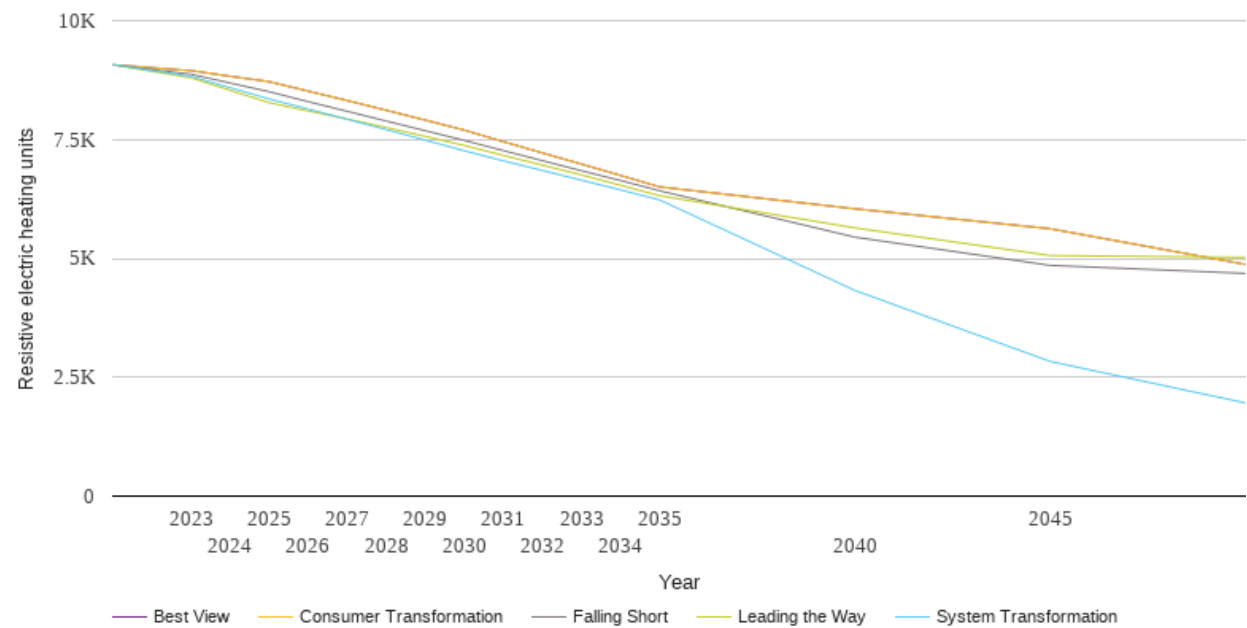
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.9	0.9	0.9	0.9	0.9
2023	0.9	0.9	0.9	0.9	0.9
2024	0.9	0.9	0.9	0.9	0.9
2025	0.9	0.9	0.9	0.9	0.9
2026	0.9	0.9	0.9	0.9	0.9
2027	0.9	0.9	0.9	0.9	0.9
2028	0.9	0.9	0.9	0.4	0.9
2029	0.9	0.9	0.9	0.4	0.9
2030	0.9	0.9	0.9	0.0	0.9
2031	0.9	0.9	0.9	0.0	0.9
2032	0.9	0.9	0.9	0.0	0.9
2033	0.9	0.0	0.0	0.0	0.0
2034	0.9	0.0	0.0	0.0	0.0
2035	0.9	0.0	0.0	0.0	0.0
2040	0.5	0.0	0.0	0.0	0.0
2045	0.5	0.0	0.0	0.0	0.0
2050	0.5	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.

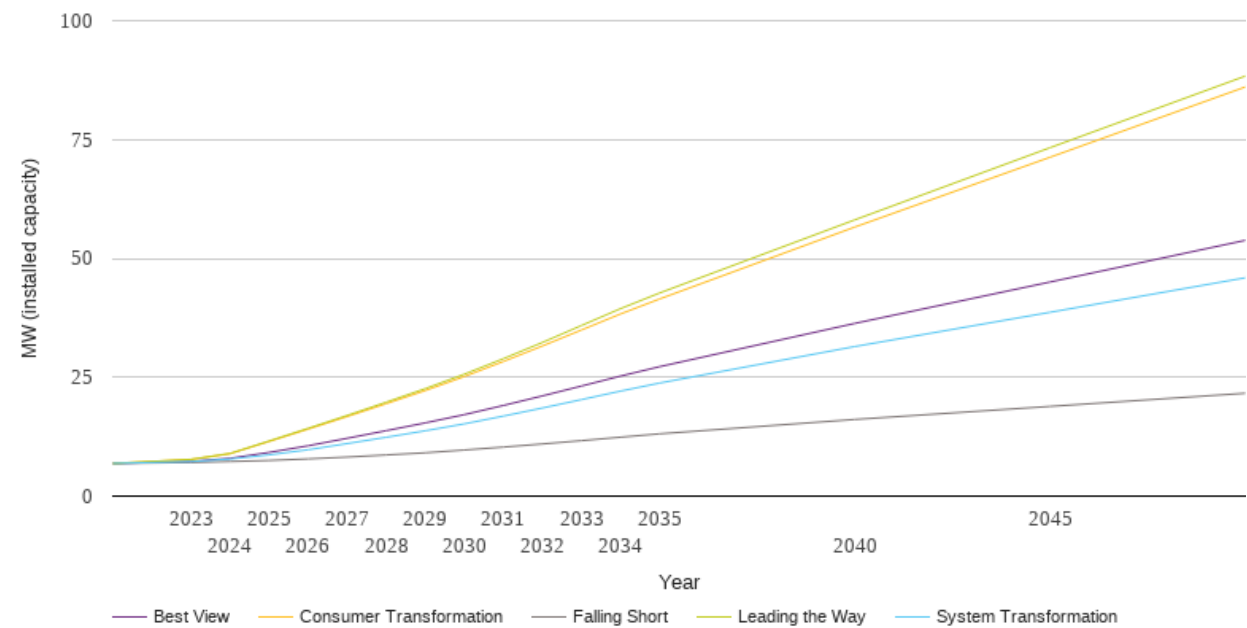
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	9071	9071	9071	9071	9071
2023	8872	8828	8949	8798	8949
2024	8689	8590	8831	8535	8831
2025	8506	8352	8717	8275	8717
2026	8296	8141	8518	8102	8518
2027	8094	7927	8320	7931	8320
2028	7889	7709	8116	7752	8116
2029	7686	7488	7909	7567	7909
2030	7482	7263	7698	7375	7698
2031	7267	7052	7456	7167	7456
2032	7056	6849	7218	6962	7218
2033	6844	6645	6983	6756	6983
2034	6638	6441	6746	6538	6746
2035	6423	6231	6504	6319	6504
2040	5447	4327	6044	5642	6044
2045	4853	2833	5624	5061	5624
2050	4685	1961	4874	5020	4874



Technology Summary: Solar Generation

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

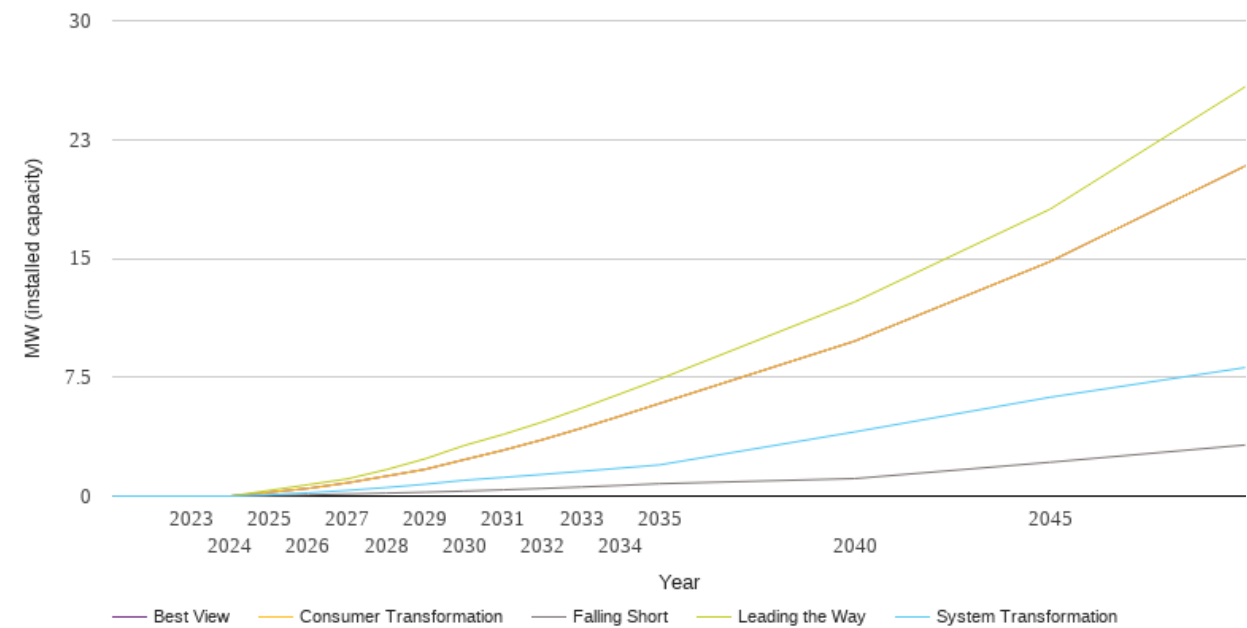
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	6.9	6.9	6.9	6.9	6.9
2023	7.1	7.3	7.7	7.7	7.3
2024	7.3	7.8	8.9	9.0	7.9
2025	7.5	8.7	11.5	11.6	9.2
2026	7.8	9.7	14.1	14.3	10.6
2027	8.2	11.0	16.7	17.0	12.2
2028	8.7	12.4	19.4	19.8	13.8
2029	9.1	13.7	22.2	22.6	15.4
2030	9.7	15.2	25.1	25.6	17.1
2031	10.3	16.8	28.3	28.9	19.1
2032	11.0	18.5	31.6	32.3	21.1
2033	11.7	20.3	34.9	35.9	23.1
2034	12.4	22.1	38.3	39.4	25.2
2035	13.1	23.8	41.5	42.7	27.2
2040	16.1	31.5	56.6	58.1	36.3
2045	18.9	38.7	71.3	73.3	45.0
2050	21.6	45.9	86.1	88.3	53.8



Technology Summary: Storage

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

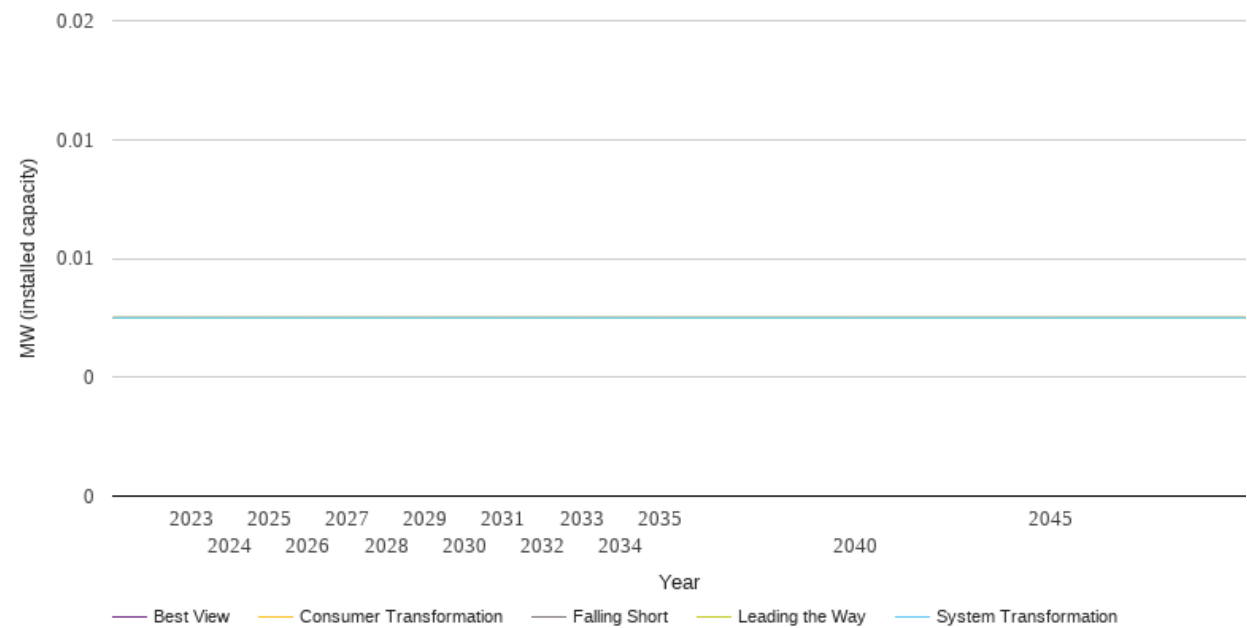
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.1	0.2	0.4	0.2
2026	0.1	0.2	0.5	0.7	0.5
2027	0.1	0.4	0.8	1.1	0.8
2028	0.2	0.5	1.3	1.7	1.3
2029	0.2	0.7	1.7	2.4	1.7
2030	0.3	1.0	2.3	3.2	2.3
2031	0.4	1.2	2.9	3.9	2.9
2032	0.5	1.4	3.6	4.7	3.6
2033	0.6	1.6	4.3	5.5	4.3
2034	0.7	1.8	5.1	6.5	5.1
2035	0.8	2.0	5.8	7.4	5.8
2040	1.1	4.1	9.8	12.3	9.8
2045	2.1	6.2	14.8	18.1	14.8
2050	3.2	8.1	20.8	25.8	20.8



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	0.0	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



National Grid Electricity Distribution PLC 09223384)
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National Grid Electricity Distribution (West Midlands) Plc (company number 03600574))
National Grid Electricity Distribution (South West) Plc (company number 02366894))
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