

Distribution Future Energy Scenarios 2022

Local Authority:
Rugby

What are Distribution Future Energy Scenarios?

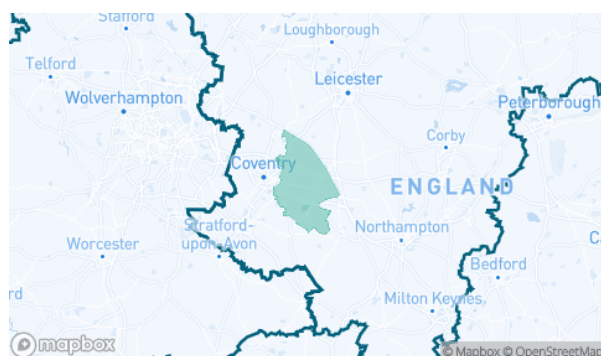
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Rugby 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 Rugby 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	901	537	537	0	24988	13034	13033	0
Domestic	New dwellings	0	4698	5118	5118	6010	10376	10255	10255	10163
Electric vehicles	Electric vehicles	1764	11366	13707	25205	25036	75616	64981	65600	53884
EV Charge Point	EV charge points	942	5243	7436	13903	15322	42244	39926	42695	42568
Heat pumps	Heat pump installations	316	3285	3391	8840	13401	24199	28350	50002	44039
Hydrogen electrolysis	MW (installed capacity)	0.0	3.3	0.8	3.7	0.2	6.7	4.4	14.2	4.4
Non domestic	Floorspace (metres squared) of new I&C developments	0	22710 2	28061 8	28061 8	29875 1	45015 8	44827 1	44827 1	45015 8
Other Distributed Generation	MW (installed capacity)	16.2	18.4	16.2	17.1	17.1	17.0	14.7	6.7	20.2
Resistive electric heating	Resistive electric heating units	7298	6396	6105	6439	6243	4739	2209	4525	4704
Solar Generation	MW (installed capacity)	14.5	22.1	29.8	38.7	36.5	58.2	107.2	142.8	138.5
Storage	MW (installed capacity)	0.0	0.2	1.2	2.5	3.3	3.4	8.8	22.1	29.0
Wind	MW (installed capacity)	0.0	0.1	0.3	1.9	1.7	2.9	8.4	25.8	20.6

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

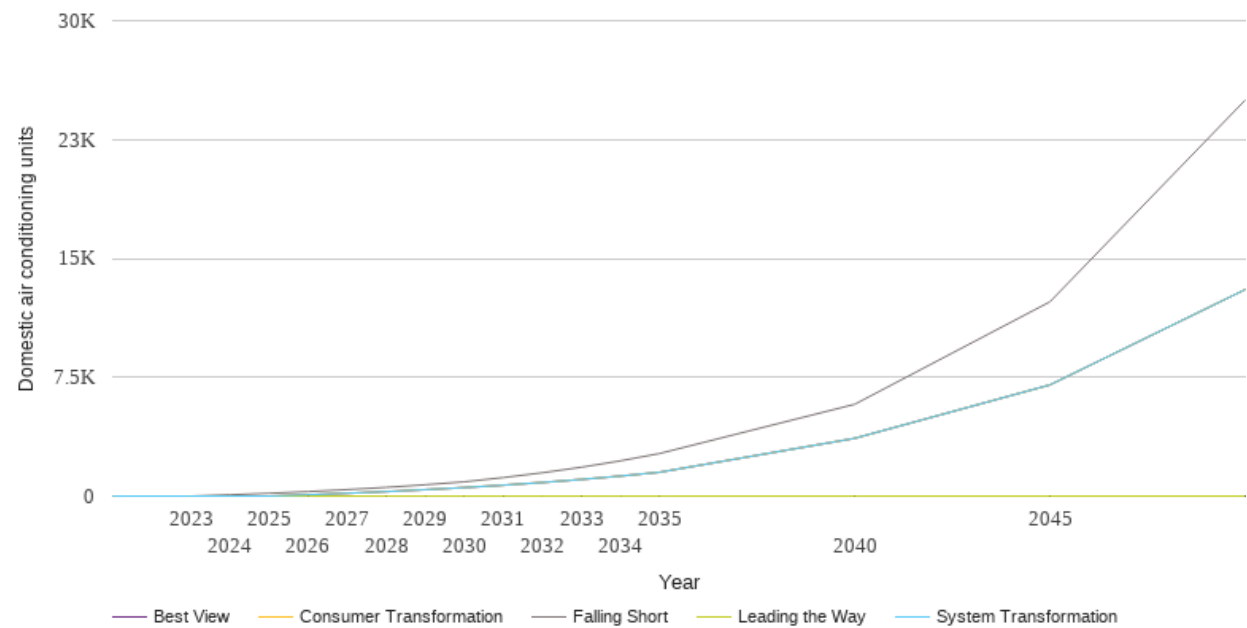
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

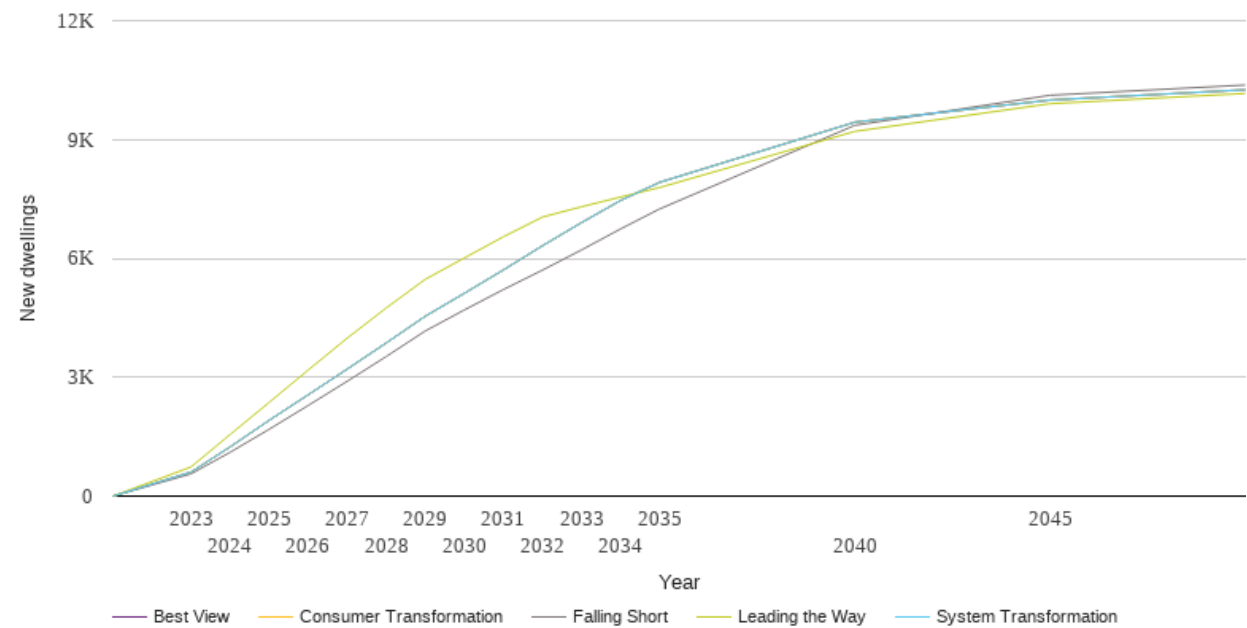
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	81	0	0	0	0
2025	176	0	0	0	0
2026	285	84	84	0	84
2027	410	178	178	0	178
2028	550	285	285	0	285
2029	715	405	405	0	405
2030	901	537	537	0	537
2031	1168	689	689	0	689
2032	1473	859	859	0	859
2033	1823	1049	1049	0	1049
2034	2226	1265	1265	0	1265
2035	2686	1504	1504	0	1504
2040	5795	3645	3645	0	3645
2045	12262	7018	7018	0	7018
2050	24988	13034	13033	0	13033



Technology Summary: Domestic

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

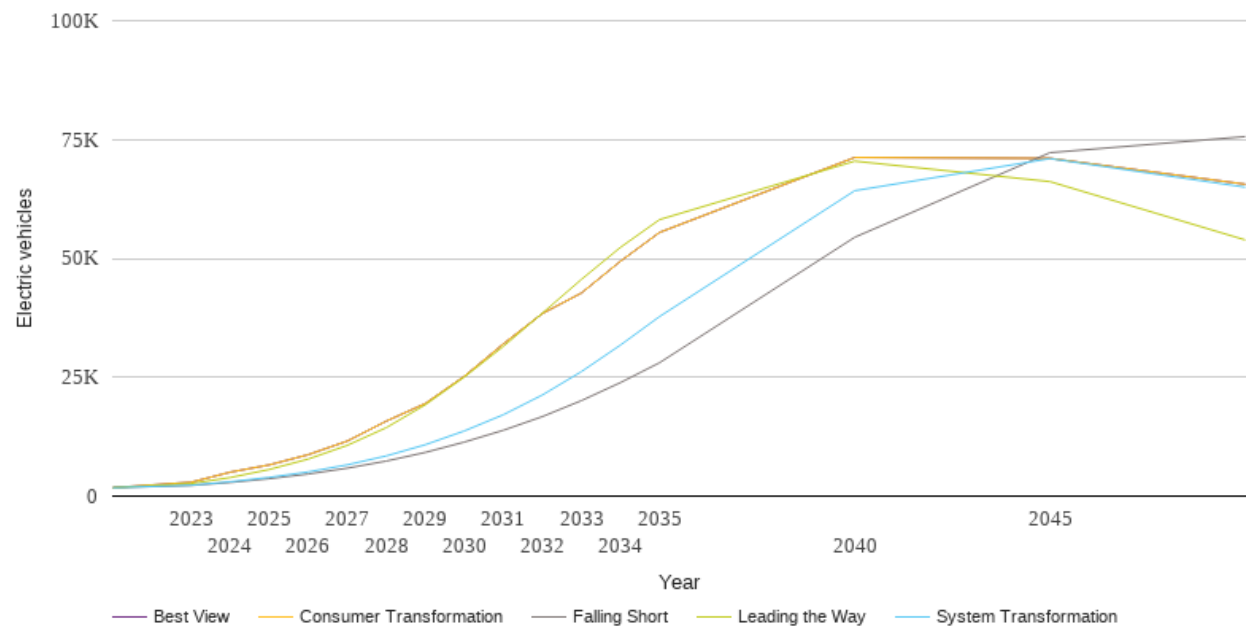
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	562	607	607	736	607
2024	1105	1241	1241	1553	1241
2025	1686	1912	1912	2364	1912
2026	2287	2556	2556	3180	2556
2027	2898	3206	3206	3987	3206
2028	3523	3865	3865	4748	3865
2029	4168	4540	4540	5472	4540
2030	4698	5118	5118	6010	5118
2031	5213	5708	5708	6546	5708
2032	5703	6318	6318	7043	6318
2033	6213	6902	6902	7303	6902
2034	6743	7461	7461	7548	7461
2035	7247	7920	7920	7788	7920
2040	9358	9437	9437	9205	9437
2045	10117	9996	9996	9904	9996
2050	10376	10255	10255	10163	10255



Technology Summary: Electric vehicles

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

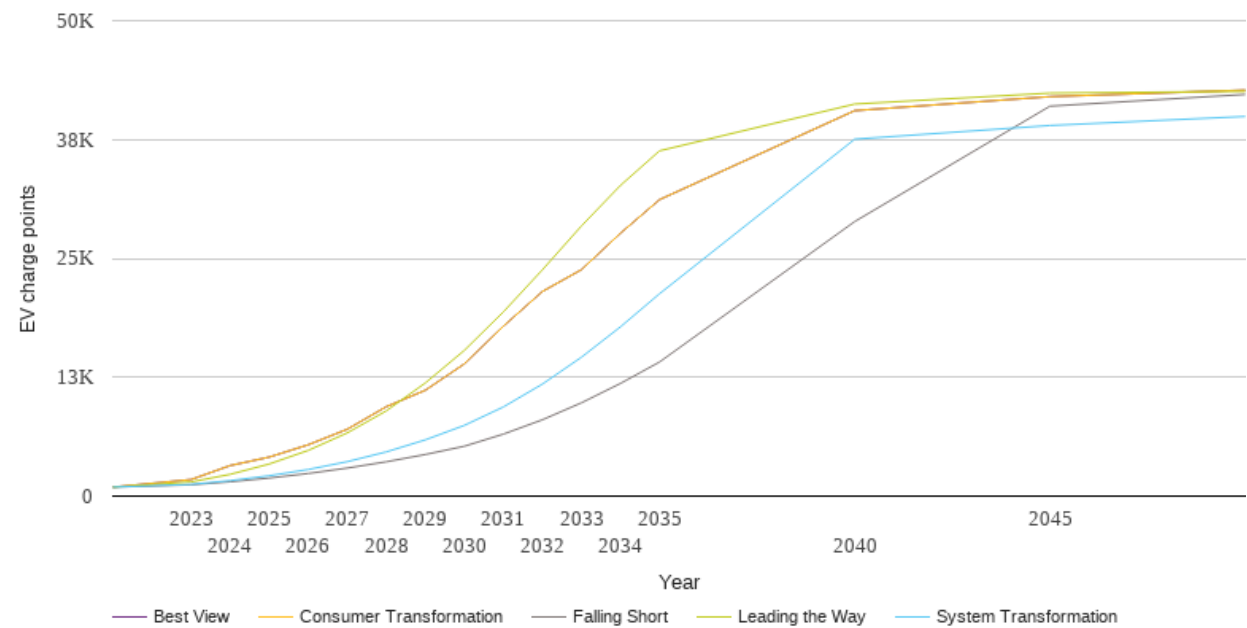
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1764	1764	1764	1764	1764
2023	2245	2286	2908	2629	2908
2024	2870	3006	5025	3889	5025
2025	3656	3932	6557	5589	6557
2026	4641	5084	8711	7783	8711
2027	5869	6569	11567	10664	11567
2028	7364	8448	15765	14389	15765
2029	9184	10802	19472	19200	19472
2030	11366	13707	25205	25036	25205
2031	13845	17116	32036	31487	32036
2032	16723	21273	38404	38485	38404
2033	20087	26188	42724	45586	42724
2034	23878	31774	49407	52323	49407
2035	28057	37765	55459	58153	55459
2040	54446	64237	71232	70457	71232
2045	72238	70985	71042	66152	71042
2050	75616	64981	65600	53884	65600



Technology Summary: EV Charge Point

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

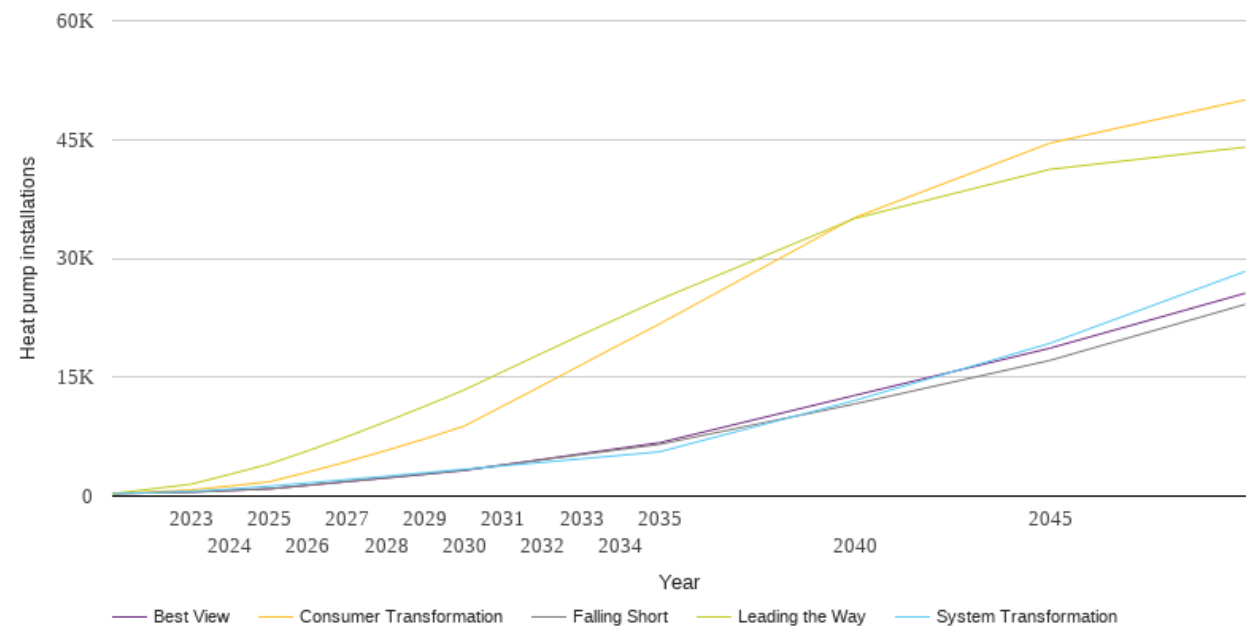
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	942	942	942	942	942
2023	1190	1230	1735	1486	1735
2024	1503	1625	3208	2286	3208
2025	1896	2139	4098	3372	4098
2026	2377	2795	5393	4802	5393
2027	2946	3621	7028	6644	7028
2028	3607	4647	9401	8959	9401
2029	4373	5915	11130	11895	11130
2030	5243	7436	13903	15322	13903
2031	6518	9377	17868	19371	17868
2032	8029	11779	21519	23800	21519
2033	9812	14608	23816	28415	23816
2034	11850	17802	27649	32677	27649
2035	14104	21282	31179	36313	31179
2040	28877	37537	40539	41233	40539
2045	41010	38978	42010	42384	42010
2050	42244	39926	42695	42568	42695



Technology Summary: Heat pumps

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

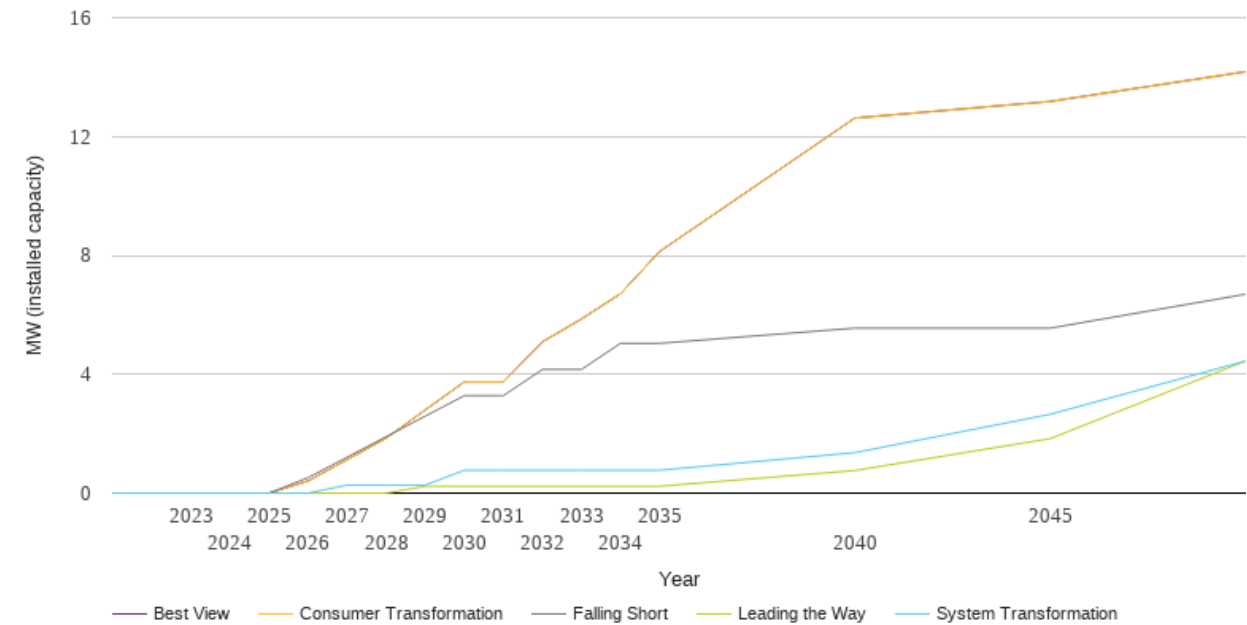
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	316	316	316	316	316
2023	507	583	769	1505	507
2024	708	891	1270	2750	708
2025	912	1241	1805	4048	912
2026	1381	1662	3040	5728	1362
2027	1853	2083	4346	7506	1820
2028	2323	2508	5751	9398	2281
2029	2800	2950	7244	11366	2752
2030	3285	3391	8840	13401	3233
2031	3936	3819	11399	15732	3939
2032	4581	4258	13969	18056	4634
2033	5233	4701	16580	20347	5340
2034	5886	5148	19166	22573	6040
2035	6531	5592	21727	24804	6735
2040	11628	12068	35157	35038	12705
2045	17123	19283	44546	41239	18666
2050	24199	28350	50002	44039	25597



Technology Summary: Hydrogen electrolysis

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

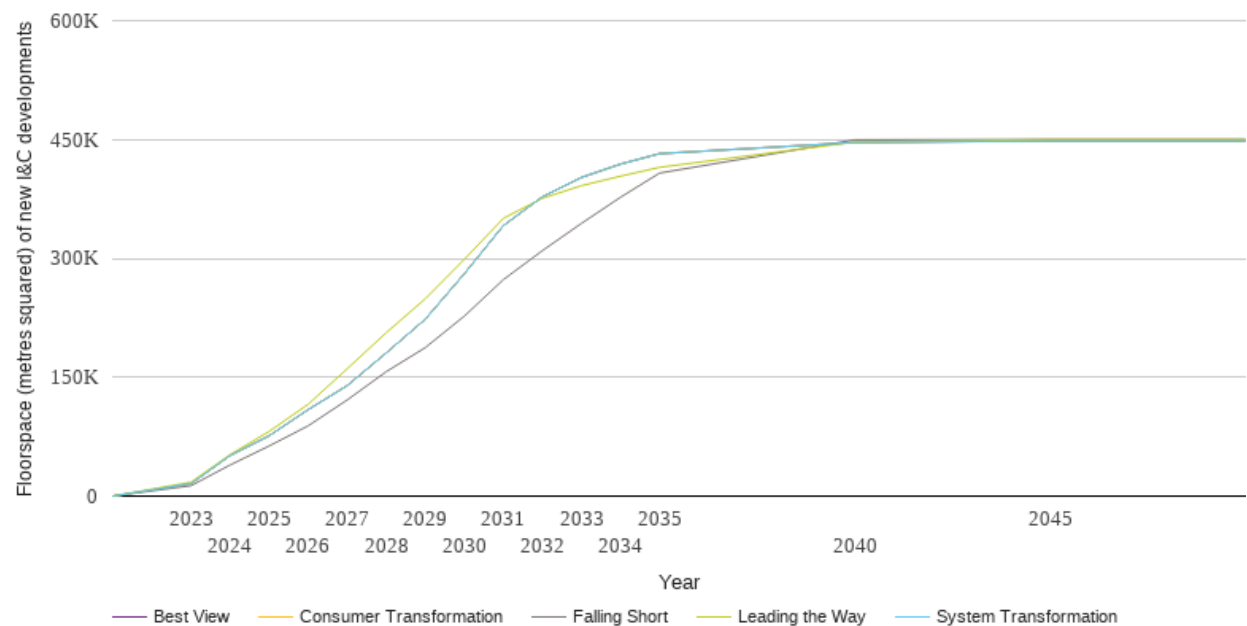
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.5	0.0	0.4	0.0	0.4
2027	1.2	0.3	1.1	0.0	1.1
2028	1.9	0.3	1.9	0.0	1.9
2029	2.6	0.3	2.8	0.2	2.8
2030	3.3	0.8	3.7	0.2	3.7
2031	3.3	0.8	3.7	0.2	3.7
2032	4.2	0.8	5.1	0.2	5.1
2033	4.2	0.8	5.9	0.2	5.9
2034	5.0	0.8	6.7	0.2	6.7
2035	5.0	0.8	8.1	0.2	8.1
2040	5.6	1.4	12.6	0.8	12.6
2045	5.6	2.7	13.2	1.8	13.2
2050	6.7	4.4	14.2	4.4	14.2



Technology Summary: Non domestic

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

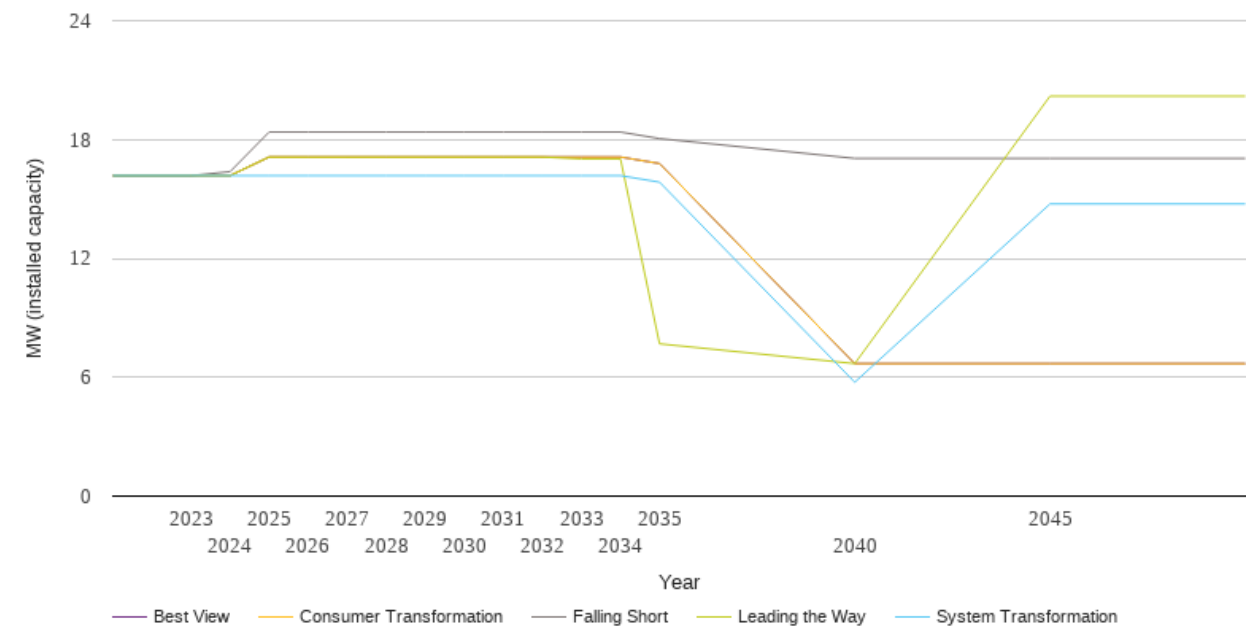
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	13199	15757	15757	17576	15757
2024	39229	51195	51195	52291	51195
2025	63263	76107	76107	81676	76107
2026	88701	109088	109088	115886	109088
2027	121338	139445	139445	160721	139445
2028	157001	180716	180716	206189	180716
2029	187404	223213	223213	249028	223213
2030	227102	280618	280618	298751	280618
2031	273180	341381	341381	350551	341381
2032	309781	377751	377751	375938	377751
2033	344201	402178	402178	391744	402178
2034	377116	419008	419008	403761	419008
2035	407643	432214	432214	414912	432214
2040	449639	446229	446229	446858	446229
2045	450158	448271	448271	450158	448271
2050	450158	448271	448271	450158	448271



Technology Summary: Other Distributed Generation

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

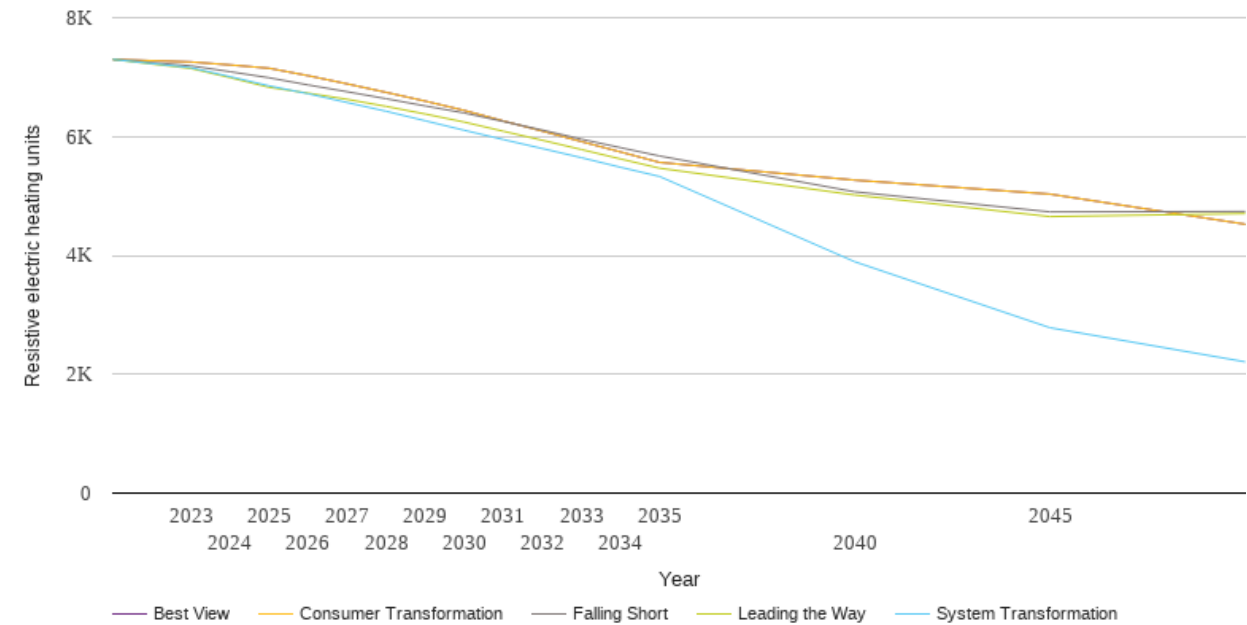
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	16.2	16.2	16.2	16.2	16.2
2023	16.2	16.2	16.2	16.2	16.2
2024	16.4	16.2	16.2	16.2	16.2
2025	18.4	16.2	17.1	17.1	17.1
2026	18.4	16.2	17.1	17.1	17.1
2027	18.4	16.2	17.1	17.1	17.1
2028	18.4	16.2	17.1	17.1	17.1
2029	18.4	16.2	17.1	17.1	17.1
2030	18.4	16.2	17.1	17.1	17.1
2031	18.4	16.2	17.1	17.1	17.1
2032	18.4	16.2	17.1	17.1	17.1
2033	18.4	16.2	17.1	17.0	17.1
2034	18.4	16.2	17.1	17.0	17.1
2035	18.0	15.8	16.8	7.7	16.8
2040	17.0	5.7	6.7	6.7	6.7
2045	17.0	14.7	6.7	20.2	6.7
2050	17.0	14.7	6.7	20.2	6.7



Technology Summary: Resistive electric heating

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

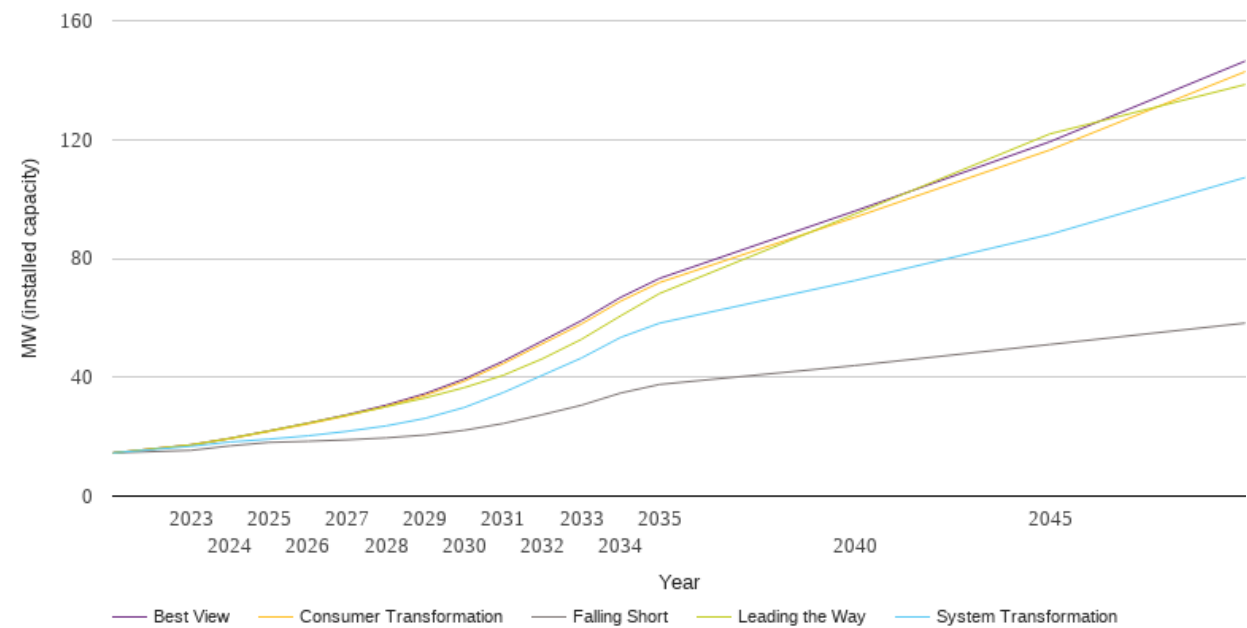
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	7298	7298	7298	7298	7298
2023	7190	7158	7255	7145	7255
2024	7091	7008	7205	6991	7205
2025	6989	6853	7149	6828	7149
2026	6868	6720	7024	6730	7024
2027	6754	6572	6886	6626	6886
2028	6636	6425	6743	6507	6743
2029	6515	6265	6596	6379	6596
2030	6396	6105	6439	6243	6439
2031	6253	5949	6262	6089	6262
2032	6109	5798	6091	5937	6091
2033	5956	5644	5915	5781	5915
2034	5813	5483	5741	5623	5741
2035	5673	5328	5565	5467	5565
2040	5070	3893	5267	5016	5267
2045	4732	2783	5031	4653	5031
2050	4739	2209	4525	4704	4525



Technology Summary: Solar Generation

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

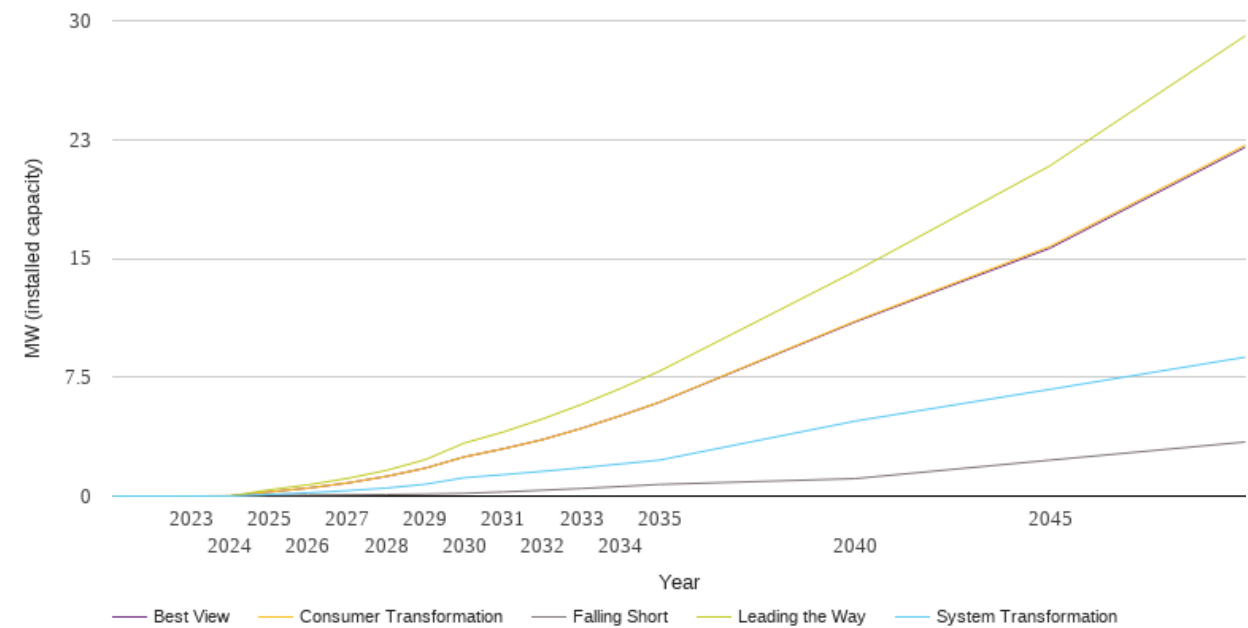
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	14.5	14.5	14.5	14.5	14.5
2023	15.4	16.8	17.2	17.2	17.2
2024	16.9	18.2	19.3	19.4	19.4
2025	18.1	19.2	21.8	21.9	21.9
2026	18.4	20.3	24.3	24.6	24.6
2027	18.9	21.8	27.1	27.3	27.4
2028	19.6	23.6	30.2	30.1	30.6
2029	20.6	26.2	33.9	33.1	34.5
2030	22.1	29.8	38.7	36.5	39.4
2031	24.4	34.8	44.6	40.7	45.4
2032	27.4	40.7	51.2	46.2	52.2
2033	30.6	46.5	57.9	52.8	59.1
2034	34.7	53.4	65.6	60.6	66.9
2035	37.6	58.2	71.9	68.2	73.3
2040	43.9	72.5	93.8	94.9	95.9
2045	51.0	88.1	116.5	121.9	119.3
2050	58.2	107.2	142.8	138.5	146.4



Technology Summary: Storage

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

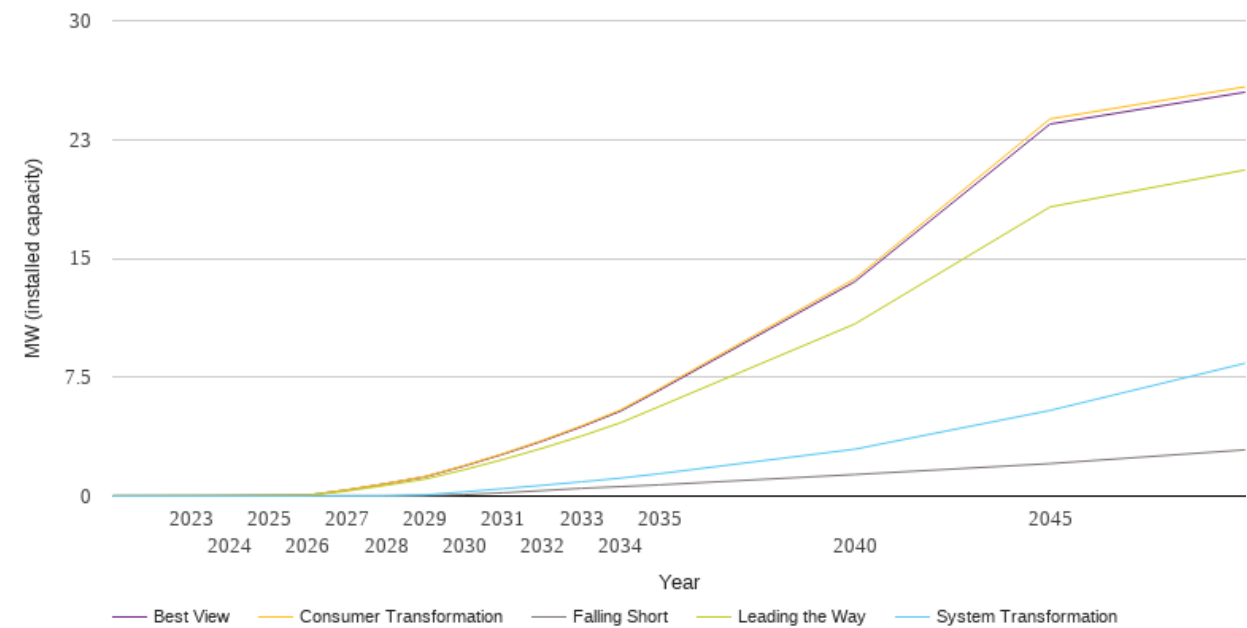
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.1	0.1	0.3	0.4	0.3
2026	0.1	0.2	0.5	0.7	0.5
2027	0.1	0.3	0.8	1.1	0.8
2028	0.1	0.5	1.2	1.6	1.2
2029	0.1	0.7	1.8	2.3	1.8
2030	0.2	1.2	2.5	3.3	2.5
2031	0.3	1.4	3.0	4.0	3.0
2032	0.4	1.6	3.6	4.9	3.6
2033	0.5	1.8	4.3	5.8	4.3
2034	0.6	2.0	5.1	6.8	5.1
2035	0.7	2.3	5.9	7.9	5.9
2040	1.1	4.7	11.0	14.2	11.0
2045	2.3	6.7	15.8	20.8	15.6
2050	3.4	8.8	22.1	29.0	22.0



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	0.1	0.0	0.1
2027	0.0	0.0	0.4	0.3	0.4
2028	0.0	0.0	0.8	0.7	0.8
2029	0.0	0.1	1.2	1.1	1.2
2030	0.1	0.3	1.9	1.7	1.9
2031	0.2	0.5	2.7	2.3	2.7
2032	0.3	0.7	3.5	3.0	3.5
2033	0.5	0.9	4.4	3.8	4.4
2034	0.6	1.1	5.4	4.6	5.4
2035	0.7	1.4	6.8	5.7	6.7
2040	1.4	3.0	13.7	10.9	13.5
2045	2.1	5.4	23.8	18.2	23.5
2050	2.9	8.4	25.8	20.6	25.5



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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