

Distribution Future Energy Scenarios 2022

Local Authority:
Chesterfield

What are Distribution Future Energy Scenarios?

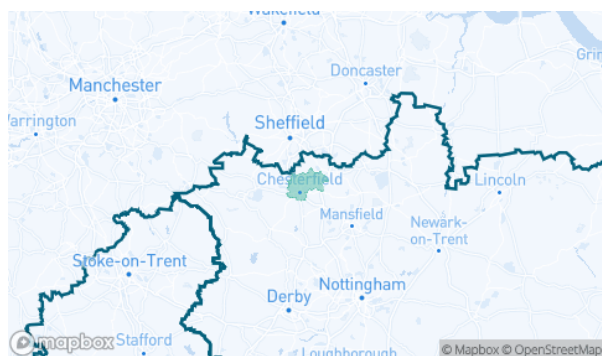
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Chesterfield 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 Chesterfield 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	186	111	111	0	27227	11978	11977	0
Domestic	New dwellings	0	2658	2869	2869	3375	4723	4635	4635	4568
Electric vehicles	Electric vehicles	1729	10881	13955	25583	25595	82455	77090	77683	62270
EV Charge Point	EV charge points	816	4614	7029	13253	14530	41786	42316	44584	44286
Heat pumps	Heat pump installations	131	1918	1815	7511	12807	25284	29908	50654	43608
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3
Non domestic	Floorspace (metres squared) of new I&C developments	0	10905 4	10440 8	10440 8	13796 5	36414 7	35676 8	35676 8	36414 7
Other Distributed Generation	MW (installed capacity)	22.1	22.1	22.1	22.1	22.1	6.5	0.0	0.0	0.0
Resistive electric heating	Resistive electric heating units	3689	3378	3203	3337	3271	2508	1262	2418	2522
Solar Generation	MW (installed capacity)	9.7	13.7	19.5	29.1	29.4	28.2	55.9	97.9	101.4
Storage	MW (installed capacity)	0.5	0.7	1.4	2.6	3.2	4.0	9.3	23.1	29.4
Wind	MW (installed capacity)	1.0	1.0	1.0	1.0	1.0	1.0	1.5	2.0	2.0

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.

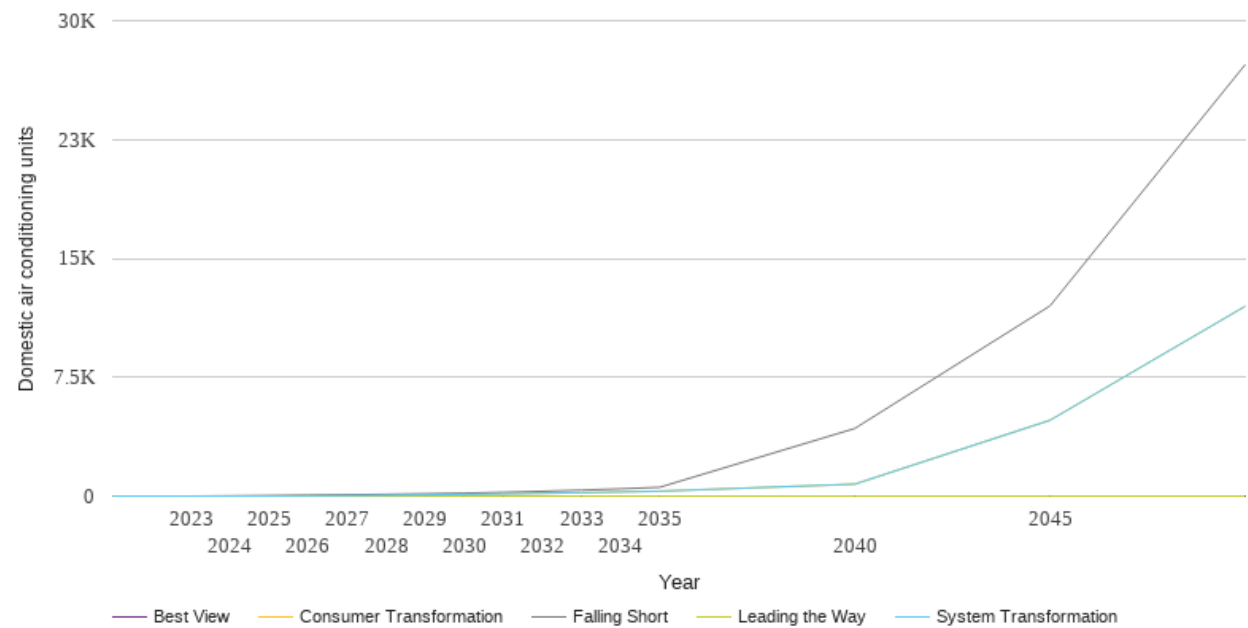
If you have any comments or queries regarding these reports, please contact

nged.energyplanning@nationalgrid.co.uk.

Technology Summary: Air conditioning

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

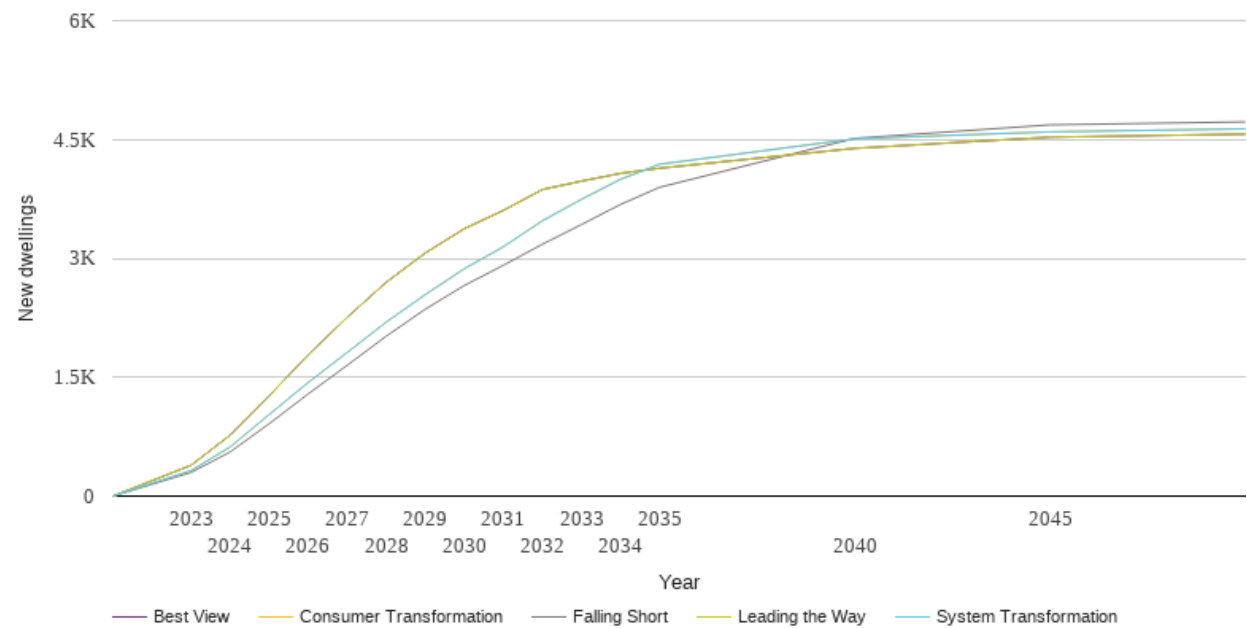
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	17	0	0	0	0
2025	37	0	0	0	0
2026	59	17	17	0	0
2027	85	36	36	0	0
2028	114	58	58	0	0
2029	148	83	83	0	0
2030	186	111	111	0	0
2031	241	142	142	0	0
2032	304	177	177	0	0
2033	376	216	216	0	0
2034	459	261	261	0	0
2035	554	310	310	0	0
2040	4266	754	754	0	0
2045	12001	4786	4785	0	0
2050	27227	11978	11977	0	0



Technology Summary: Domestic

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

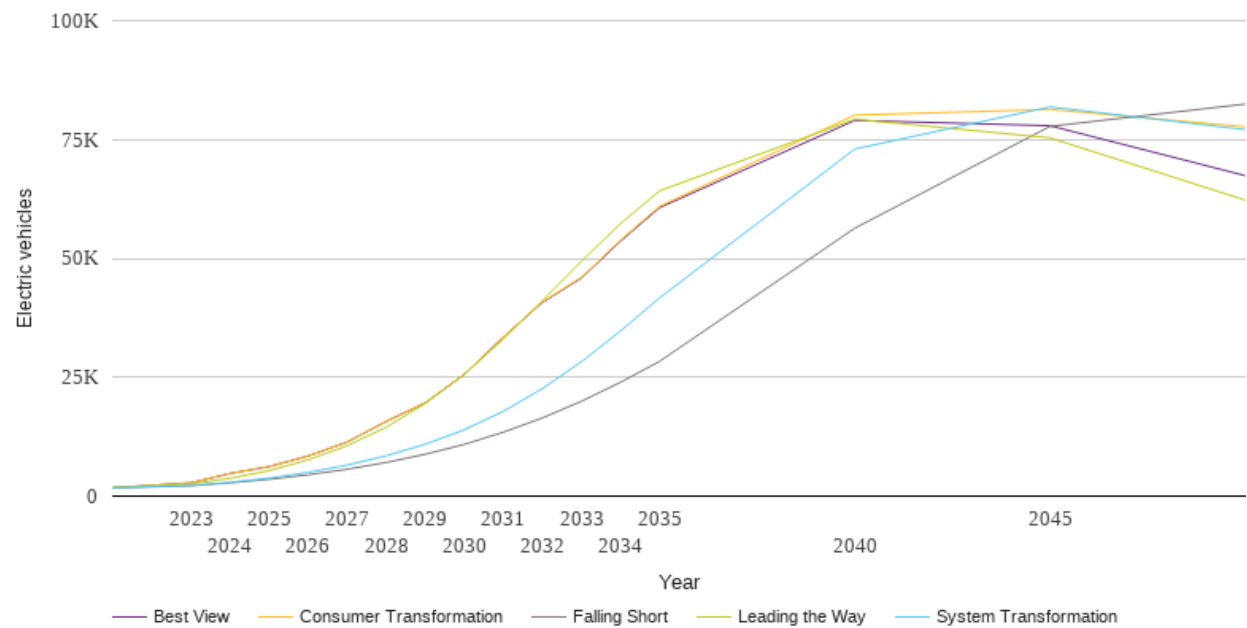
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	299	322	322	389	389
2024	556	619	619	768	768
2025	913	1029	1029	1265	1265
2026	1289	1433	1433	1782	1782
2027	1651	1813	1813	2256	2256
2028	2018	2196	2196	2699	2699
2029	2359	2543	2543	3068	3068
2030	2658	2869	2869	3375	3375
2031	2913	3147	3147	3606	3606
2032	3179	3475	3475	3869	3869
2033	3427	3746	3746	3975	3975
2034	3681	3998	3998	4073	4073
2035	3897	4188	4188	4138	4138
2040	4515	4509	4509	4389	4389
2045	4685	4597	4597	4530	4530
2050	4723	4635	4635	4568	4568



Technology Summary: Electric vehicles

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

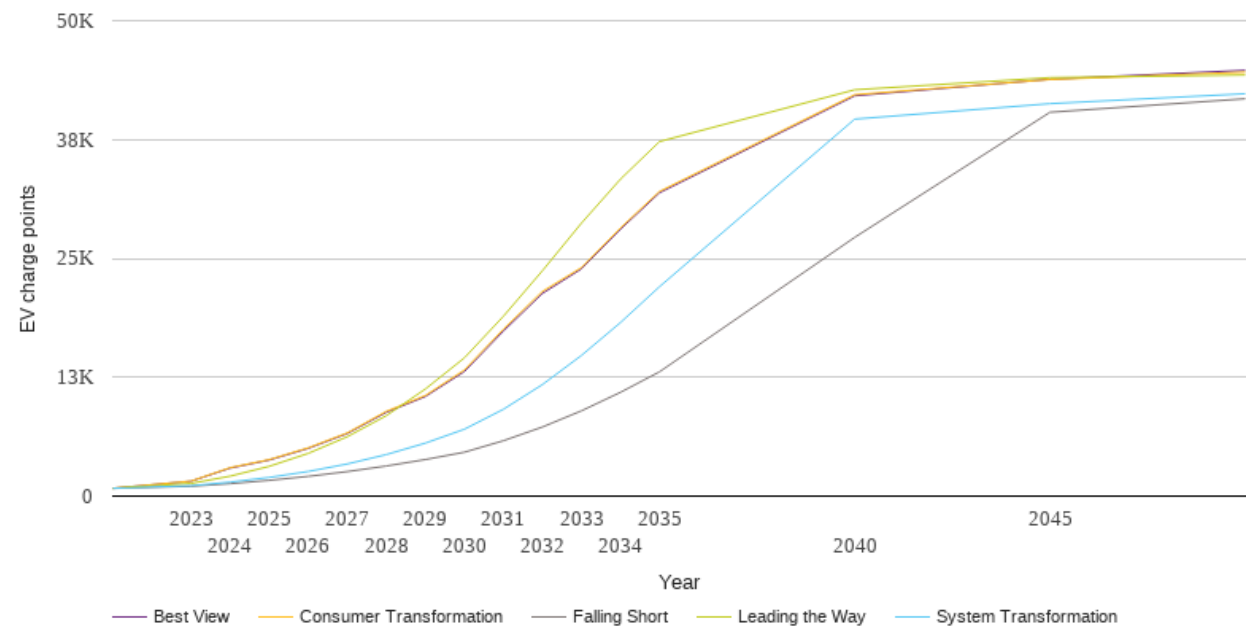
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1729	1729	1729	1729	1729
2023	2190	2227	2796	2553	2796
2024	2783	2908	4756	3747	4756
2025	3531	3785	6198	5356	6201
2026	4474	4974	8419	7629	8427
2027	5644	6520	11368	10614	11378
2028	7071	8471	15709	14487	15719
2029	8804	10920	19601	19497	19613
2030	10881	13955	25583	25595	25598
2031	13442	17843	33431	33006	33448
2032	16440	22607	40845	41094	40736
2033	19947	28265	46007	49395	45868
2034	23930	34715	53827	57310	53625
2035	28337	41681	60955	64209	60668
2040	56348	73003	80147	79271	79027
2045	77766	81865	81332	75357	77905
2050	82455	77090	77683	62270	67412



Technology Summary: EV Charge Point

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

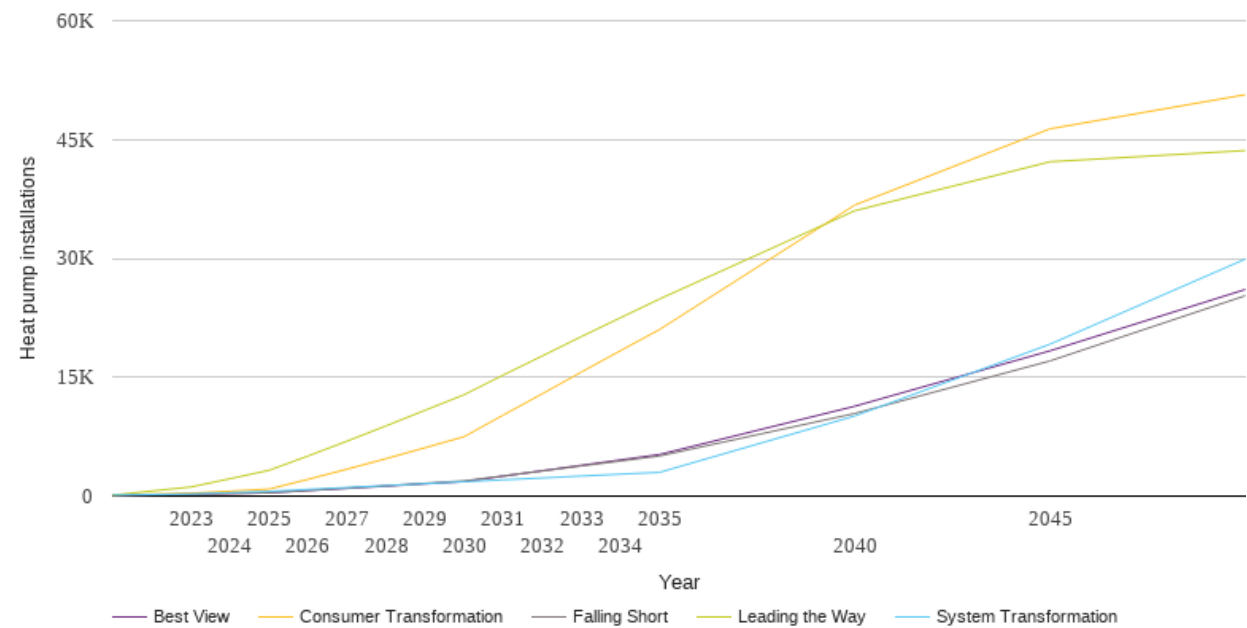
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	816	816	816	816	816
2023	1033	1092	1577	1330	1561
2024	1309	1467	2984	2093	2944
2025	1656	1960	3835	3126	3793
2026	2074	2587	5071	4488	5018
2027	2576	3377	6640	6240	6578
2028	3163	4365	8909	8453	8811
2029	3841	5570	10575	11254	10474
2030	4614	7029	13253	14530	13099
2031	5824	9128	17555	18910	17356
2032	7266	11728	21527	23700	21320
2033	8969	14792	24032	28708	23903
2034	10916	18251	28205	33336	28073
2035	13074	22029	32045	37288	31910
2040	27214	39648	42220	42733	42106
2045	40368	41275	43815	44010	43837
2050	41786	42316	44584	44286	44778



Technology Summary: Heat pumps

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

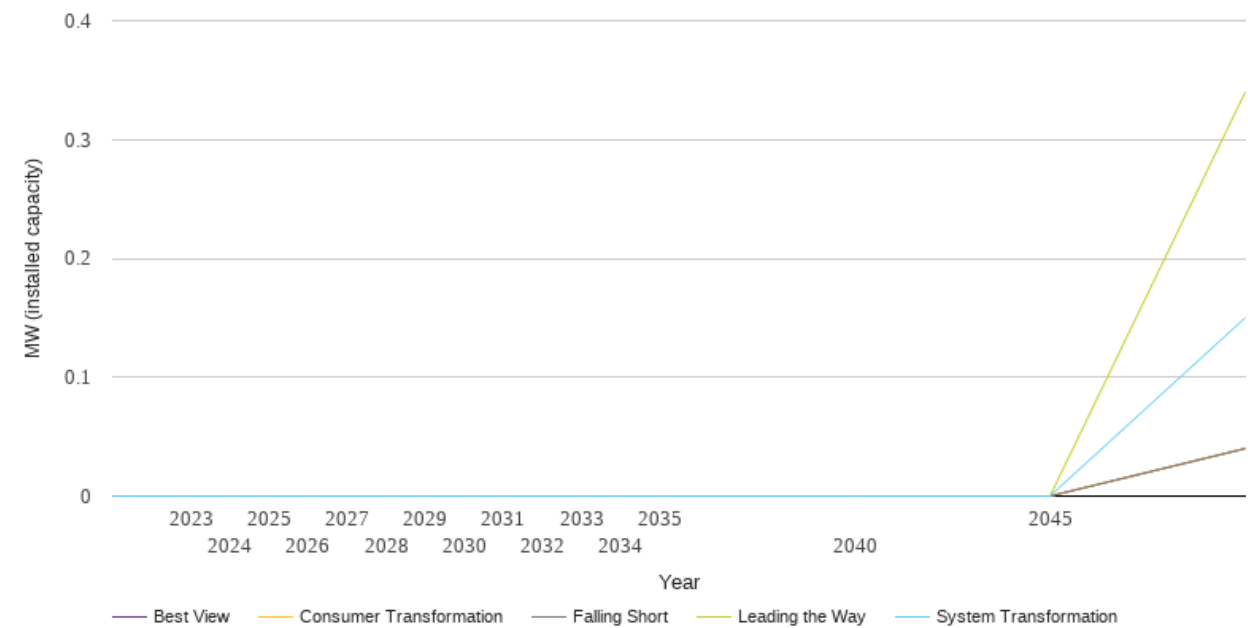
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	131	131	131	131	131
2023	225	272	370	1156	225
2024	321	426	620	2192	321
2025	419	597	883	3256	419
2026	717	842	2121	5071	701
2027	1013	1084	3404	6944	974
2028	1312	1325	4734	8876	1263
2029	1617	1574	6113	10844	1553
2030	1918	1815	7511	12807	1834
2031	2549	2051	10235	15283	2520
2032	3178	2287	12921	17694	3204
2033	3809	2533	15660	20131	3887
2034	4432	2766	18353	22505	4564
2035	5061	2996	21017	24871	5248
2040	10427	10112	36733	36011	11339
2045	17057	19165	46351	42195	18330
2050	25284	29908	50654	43608	26074



Technology Summary: Hydrogen electrolysis

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

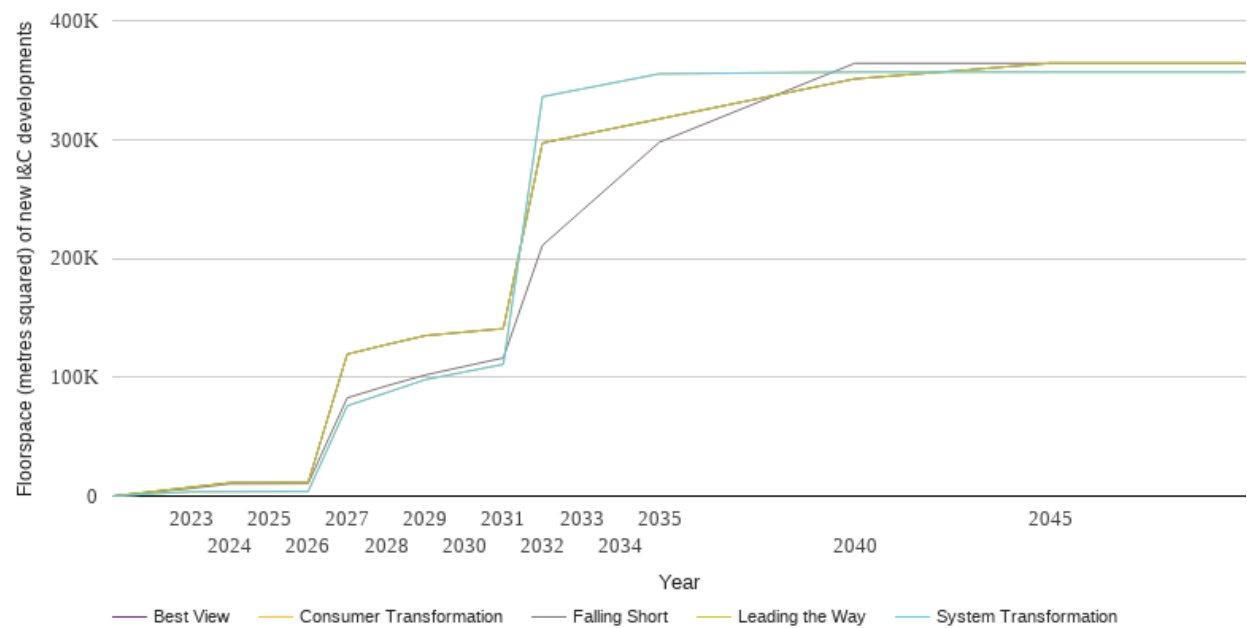
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0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



Technology Summary: Non domestic

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

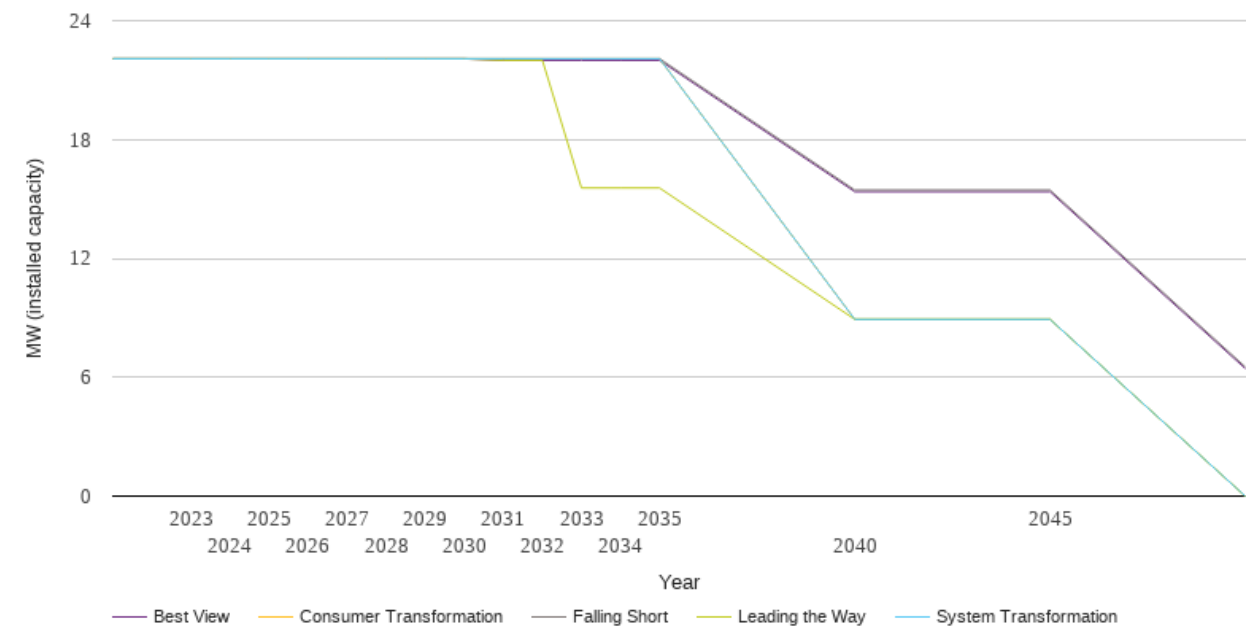
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	6496	3607	3607	7498	7498
2024	10306	3687	3687	11288	11288
2025	10426	3768	3768	11388	11388
2026	10546	3848	3848	11388	11388
2027	82667	75928	75928	119388	119388
2028	92626	86894	86894	127372	127372
2029	101887	97989	97989	135007	135007
2030	109054	104408	104408	137965	137965
2031	116221	110827	110827	140923	140923
2032	210908	336045	336045	297042	297042
2033	239956	342464	342464	303815	303815
2034	268883	348883	348883	310589	310589
2035	297810	355302	355302	317362	317362
2040	364147	356768	356768	351019	351019
2045	364147	356768	356768	364147	364147
2050	364147	356768	356768	364147	364147



Technology Summary: Other Distributed Generation

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

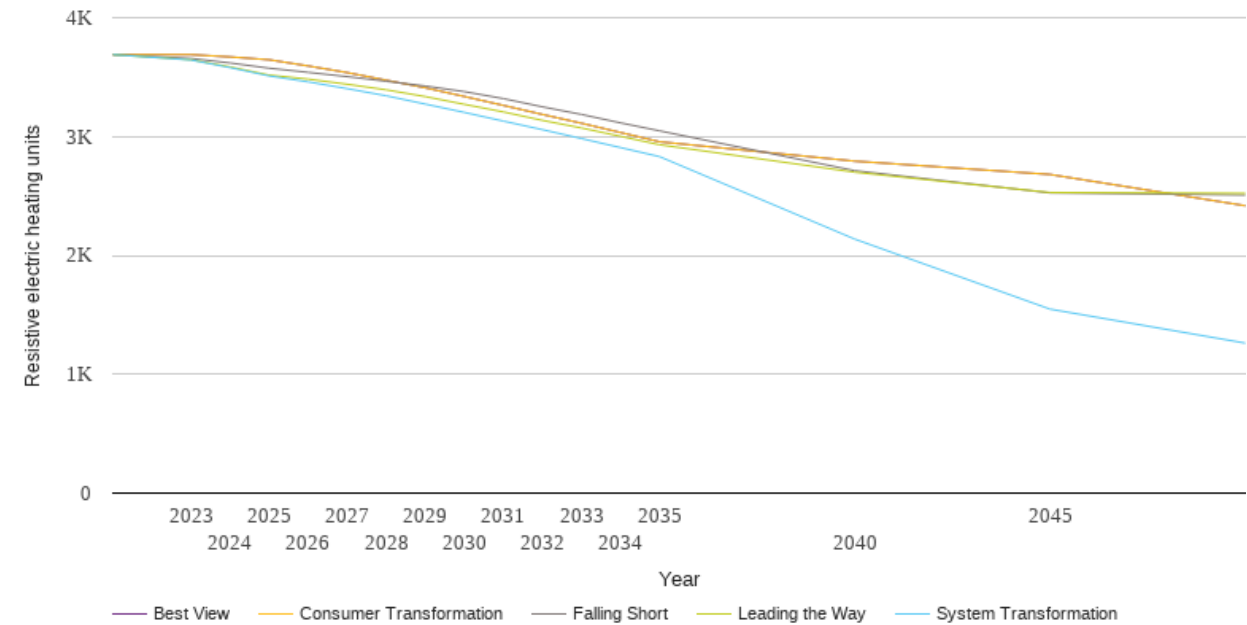
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	22.1	22.1	22.1	22.1	22.1
2023	22.1	22.1	22.1	22.1	22.1
2024	22.1	22.1	22.1	22.1	22.1
2025	22.1	22.1	22.1	22.1	22.1
2026	22.1	22.1	22.1	22.1	22.1
2027	22.1	22.1	22.1	22.1	22.1
2028	22.1	22.1	22.1	22.1	22.1
2029	22.1	22.1	22.1	22.1	22.1
2030	22.1	22.1	22.1	22.1	22.1
2031	22.1	22.1	22.1	22.0	22.0
2032	22.1	22.1	22.1	22.0	22.0
2033	22.1	22.1	22.1	15.6	22.0
2034	22.1	22.1	22.1	15.6	22.0
2035	22.1	22.1	22.1	15.6	22.0
2040	15.4	8.9	8.9	8.9	15.4
2045	15.4	8.9	8.9	8.9	15.4
2050	6.5	0.0	0.0	0.0	6.4



Technology Summary: Resistive electric heating

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

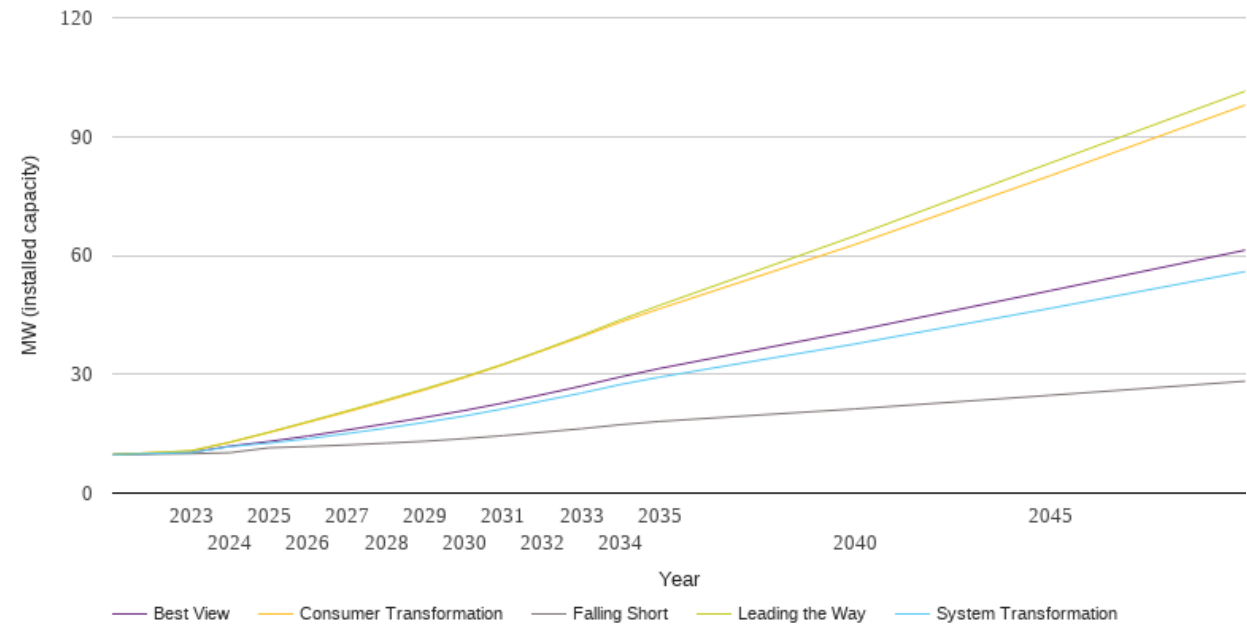
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	3689	3689	3689	3689	3689
2023	3657	3644	3689	3646	3689
2024	3619	3580	3670	3586	3670
2025	3575	3510	3646	3517	3646
2026	3540	3460	3594	3483	3594
2027	3504	3403	3538	3440	3538
2028	3465	3343	3474	3393	3474
2029	3425	3273	3410	3336	3410
2030	3378	3203	3337	3271	3337
2031	3319	3130	3262	3207	3262
2032	3250	3058	3186	3136	3186
2033	3186	2983	3112	3072	3112
2034	3115	2907	3034	3002	3034
2035	3048	2831	2956	2931	2956
2040	2713	2137	2793	2700	2793
2045	2526	1548	2681	2529	2681
2050	2508	1262	2418	2522	2418



Technology Summary: Solar Generation

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

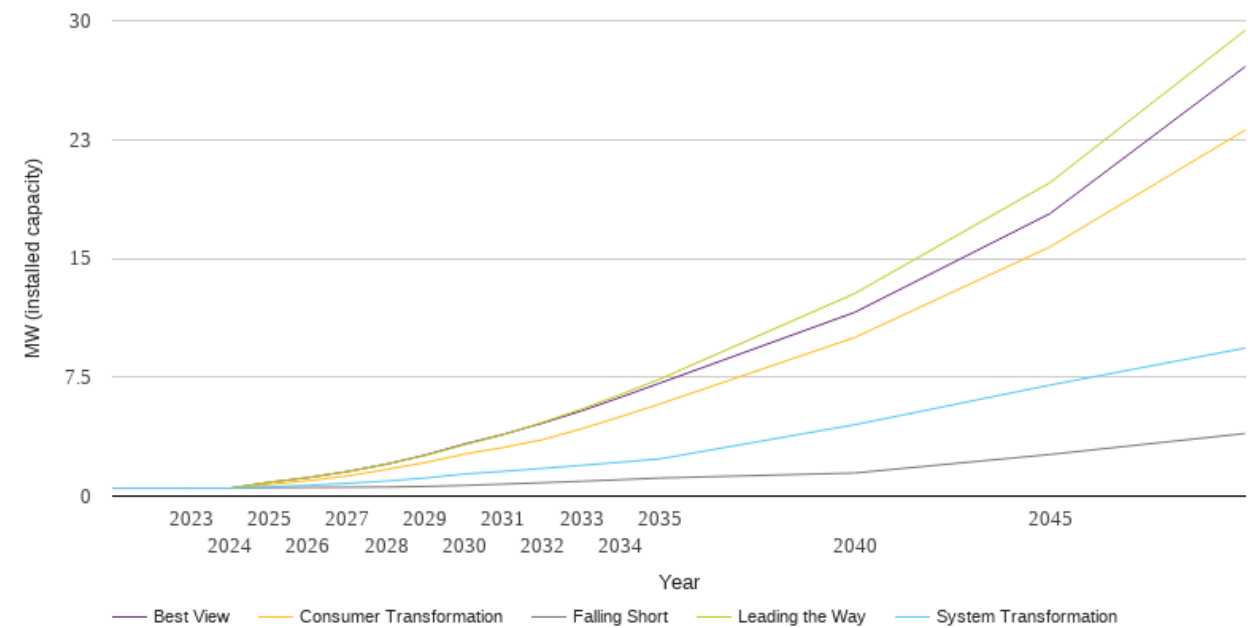
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	9.7	9.7	9.7	9.7	9.7
2023	9.9	10.2	10.6	10.7	10.2
2024	10.2	11.7	12.8	12.9	11.9
2025	11.4	12.6	15.3	15.4	13.0
2026	11.8	13.7	17.9	18.1	14.4
2027	12.1	15.0	20.5	20.8	15.9
2028	12.6	16.4	23.2	23.5	17.5
2029	13.1	17.9	26.1	26.4	19.1
2030	13.7	19.5	29.1	29.4	20.8
2031	14.5	21.3	32.4	32.6	22.8
2032	15.4	23.2	35.9	36.1	24.8
2033	16.2	25.2	39.5	39.8	27.0
2034	17.3	27.4	43.2	43.7	29.3
2035	18.1	29.3	46.5	47.4	31.5
2040	21.2	37.6	62.7	64.9	41.0
2045	24.7	46.6	80.1	83.3	51.1
2050	28.2	55.9	97.9	101.4	61.3



Technology Summary: Storage

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

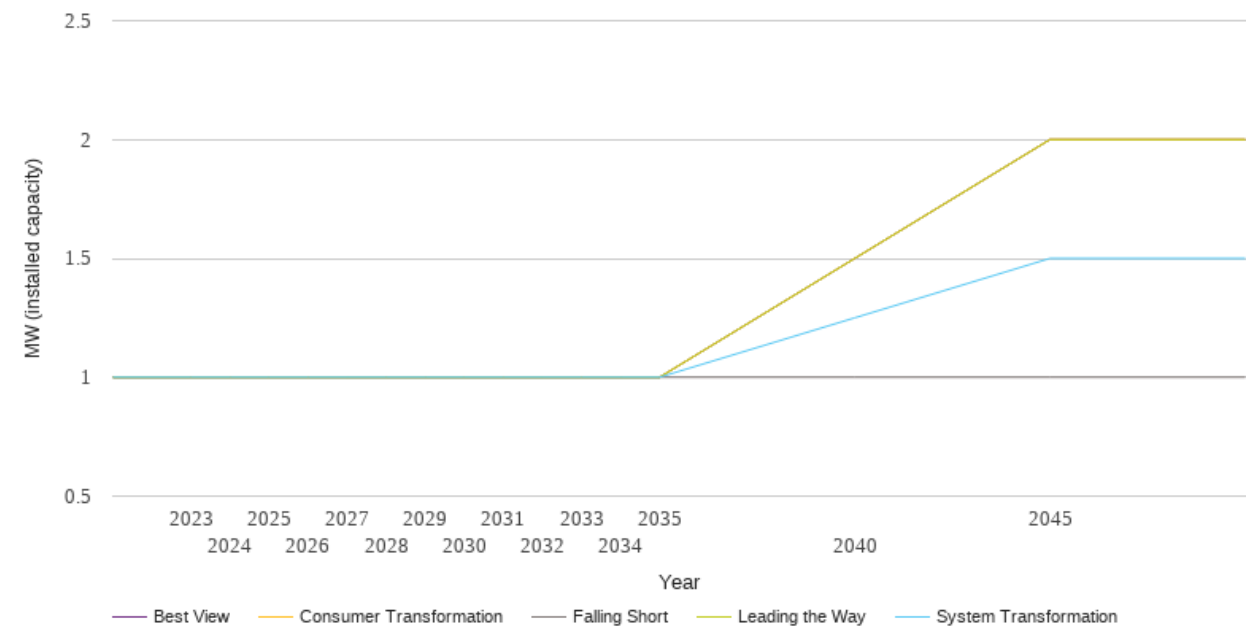
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.5	0.5	0.5	0.5	0.5
2023	0.5	0.5	0.5	0.5	0.5
2024	0.5	0.5	0.5	0.5	0.5
2025	0.5	0.6	0.7	0.9	0.9
2026	0.5	0.7	1.0	1.2	1.2
2027	0.6	0.8	1.3	1.5	1.5
2028	0.6	0.9	1.7	2.0	2.0
2029	0.6	1.1	2.1	2.6	2.6
2030	0.7	1.4	2.6	3.2	3.3
2031	0.8	1.6	3.1	3.9	3.9
2032	0.8	1.7	3.6	4.6	4.6
2033	0.9	1.9	4.2	5.5	5.4
2034	1.0	2.1	5.0	6.4	6.2
2035	1.1	2.3	5.8	7.4	7.1
2040	1.5	4.5	10.0	12.8	11.6
2045	2.6	7.0	15.7	19.8	17.8
2050	4.0	9.3	23.1	29.4	27.1



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	1.0	1.0	1.0	1.0	1.0
2023	1.0	1.0	1.0	1.0	1.0
2024	1.0	1.0	1.0	1.0	1.0
2025	1.0	1.0	1.0	1.0	1.0
2026	1.0	1.0	1.0	1.0	1.0
2027	1.0	1.0	1.0	1.0	1.0
2028	1.0	1.0	1.0	1.0	1.0
2029	1.0	1.0	1.0	1.0	1.0
2030	1.0	1.0	1.0	1.0	1.0
2031	1.0	1.0	1.0	1.0	1.0
2032	1.0	1.0	1.0	1.0	1.0
2033	1.0	1.0	1.0	1.0	1.0
2034	1.0	1.0	1.0	1.0	1.0
2035	1.0	1.0	1.0	1.0	1.0
2040	1.0	1.3	1.5	1.5	1.5
2045	1.0	1.5	2.0	2.0	2.0
2050	1.0	1.5	2.0	2.0	2.0



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))
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