

Distribution Future Energy Scenarios 2022

Local Authority:
Worcester

What are Distribution Future Energy Scenarios?

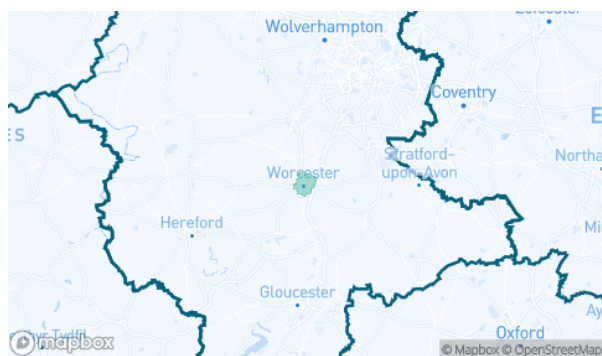
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Worcester 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 Worcester 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	279	1163	904	904	279	29640	15300	15300	279
Domestic	New dwellings	0	1972	2164	2164	2580	4322	4256	4256	4205
Electric vehicles	Electric vehicles	1246	10420	12471	23100	22939	69920	60613	61348	49266
EV Charge Point	EV charge points	599	4739	6684	12695	13904	39026	36435	38493	39074
Heat pumps	Heat pump installations	100	2367	1749	7195	11404	24151	27336	46507	40346
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	17482 1	21303 0	21303 0	23303 5	29051 4	29018 2	29018 2	29051 4
Other Distributed Generation	MW (installed capacity)	0.8	2.3	0.8	0.8	0.4	1.9	0.4	0.4	0.4
Resistive electric heating	Resistive electric heating units	7253	6145	5929	6203	5998	4086	1953	4231	4347
Solar Generation	MW (installed capacity)	6.5	8.9	13.3	20.9	21.0	20.7	40.4	71.4	73.2
Storage	MW (installed capacity)	0.0	0.3	0.9	1.9	2.7	2.8	6.9	17.6	21.9
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.

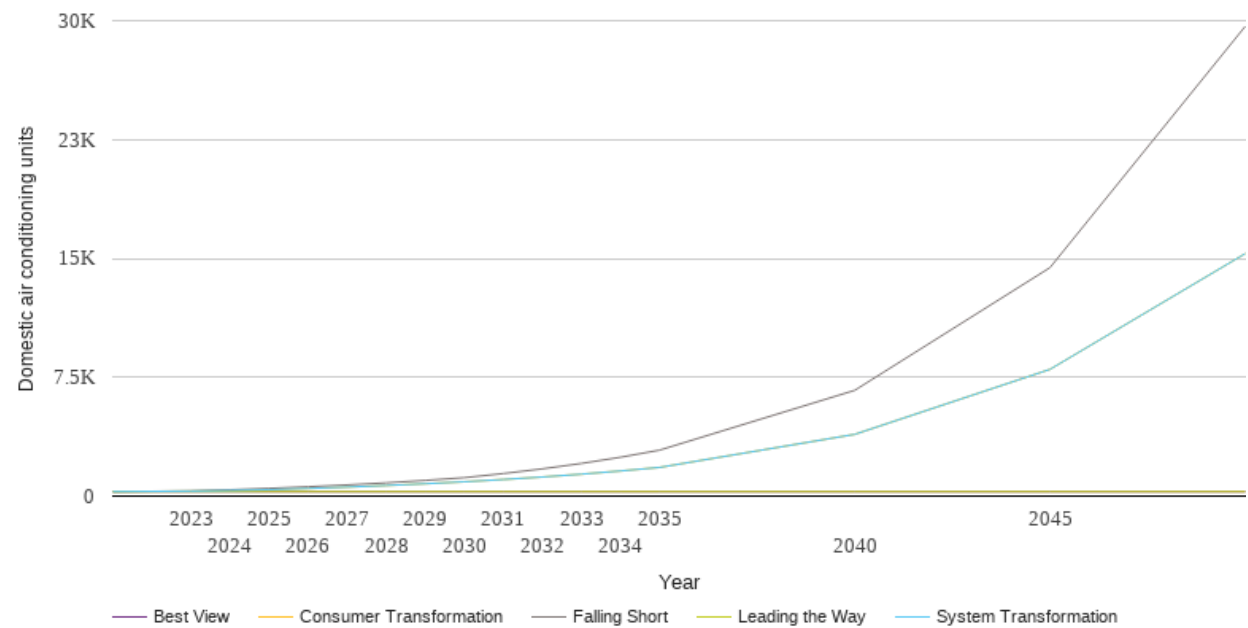
If you have any comments or queries regarding these reports, please contact

nged.energyplanning@nationalgrid.co.uk.

Technology Summary: Air conditioning

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

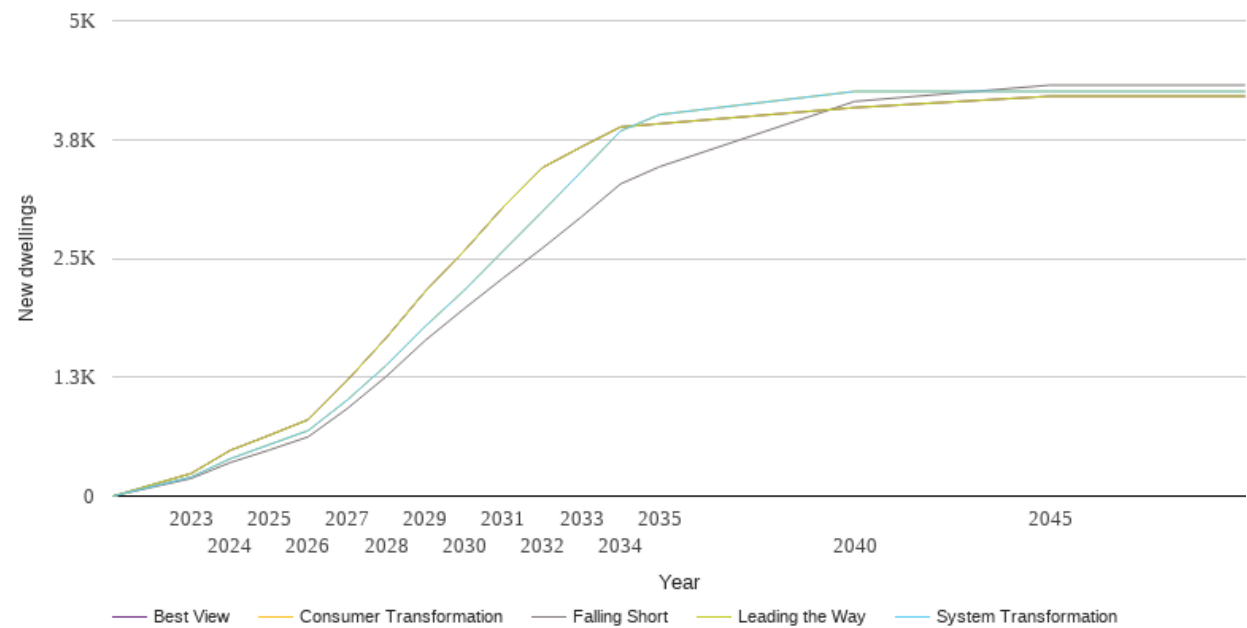
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	279	279	279	279	279
2023	322	316	316	279	279
2024	398	355	355	279	279
2025	488	400	400	279	279
2026	589	479	479	279	279
2027	705	567	567	279	279
2028	836	667	667	279	279
2029	990	780	780	279	279
2030	1163	904	904	279	279
2031	1422	1046	1046	279	279
2032	1719	1205	1205	279	279
2033	2060	1383	1383	279	279
2034	2451	1586	1586	279	279
2035	2899	1809	1809	279	279
2040	6675	3897	3897	279	279
2045	14416	7997	7997	279	279
2050	29640	15300	15300	279	279



Technology Summary: Domestic

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

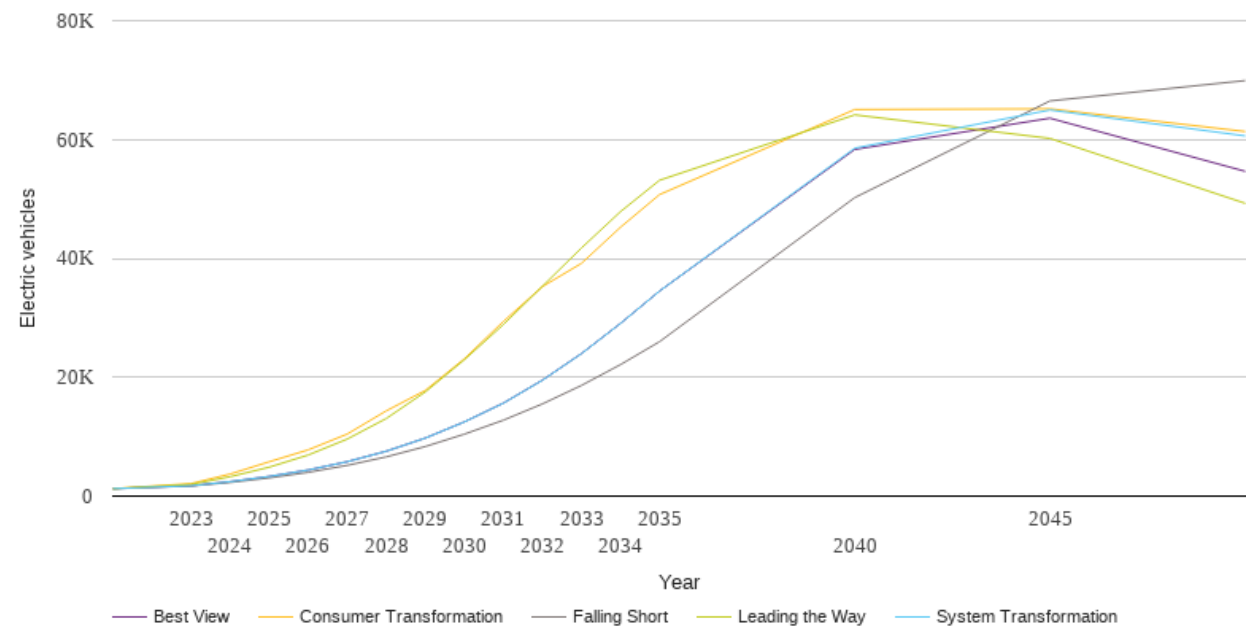
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	185	200	200	238	238
2024	352	392	392	480	480
2025	484	541	541	639	639
2026	623	689	689	804	804
2027	920	1010	1010	1217	1217
2028	1258	1375	1375	1665	1665
2029	1638	1786	1786	2154	2154
2030	1972	2164	2164	2580	2580
2031	2295	2580	2580	3041	3041
2032	2608	2994	2994	3454	3454
2033	2937	3413	3413	3673	3673
2034	3283	3840	3840	3882	3882
2035	3464	4012	4012	3916	3916
2040	4151	4256	4256	4086	4086
2045	4322	4256	4256	4205	4205
2050	4322	4256	4256	4205	4205



Technology Summary: Electric vehicles

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

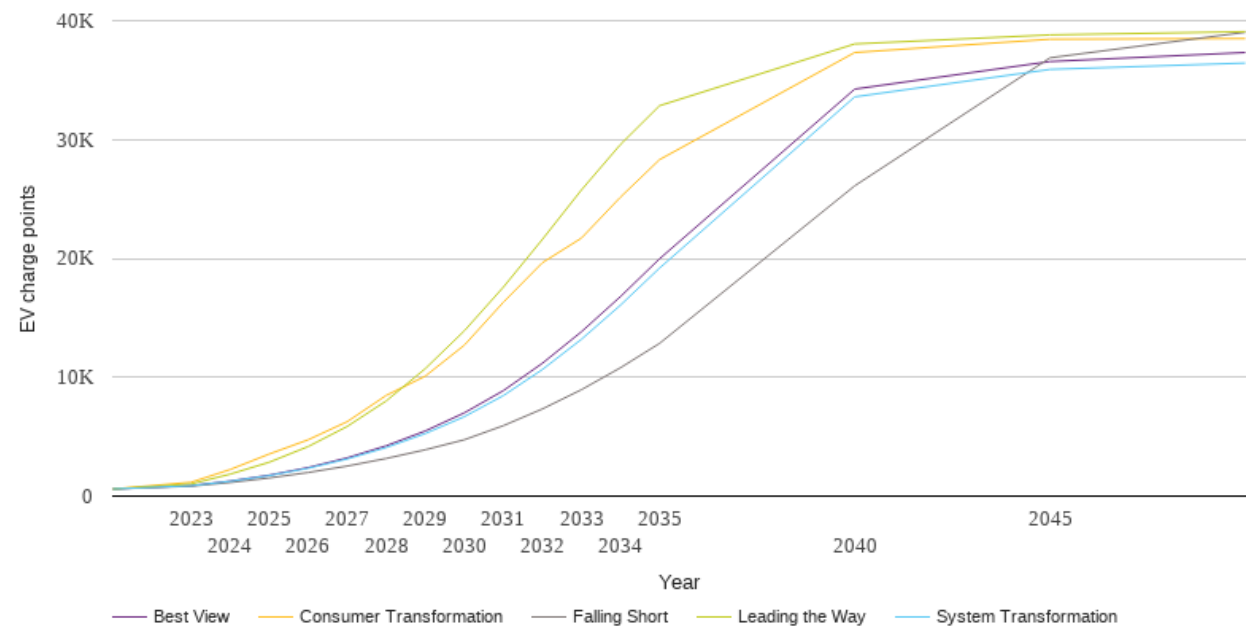
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1246	1246	1246	1246	1246
2023	1706	1742	2101	1966	1742
2024	2303	2424	3709	3257	2424
2025	3056	3298	5771	4862	3299
2026	3994	4382	7776	6909	4387
2027	5168	5780	10435	9591	5786
2028	6600	7545	14343	13055	7552
2029	8338	9754	17780	17527	9763
2030	10420	12471	23100	22939	12484
2031	12773	15634	29390	28871	15652
2032	15513	19494	35258	35298	19511
2033	18622	23970	39165	41754	23987
2034	22126	29048	45242	47866	29061
2035	25985	34499	50739	53144	34503
2040	50228	58547	65054	64153	58336
2045	66493	64967	65169	60190	63588
2050	69920	60613	61348	49266	54651



Technology Summary: EV Charge Point

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

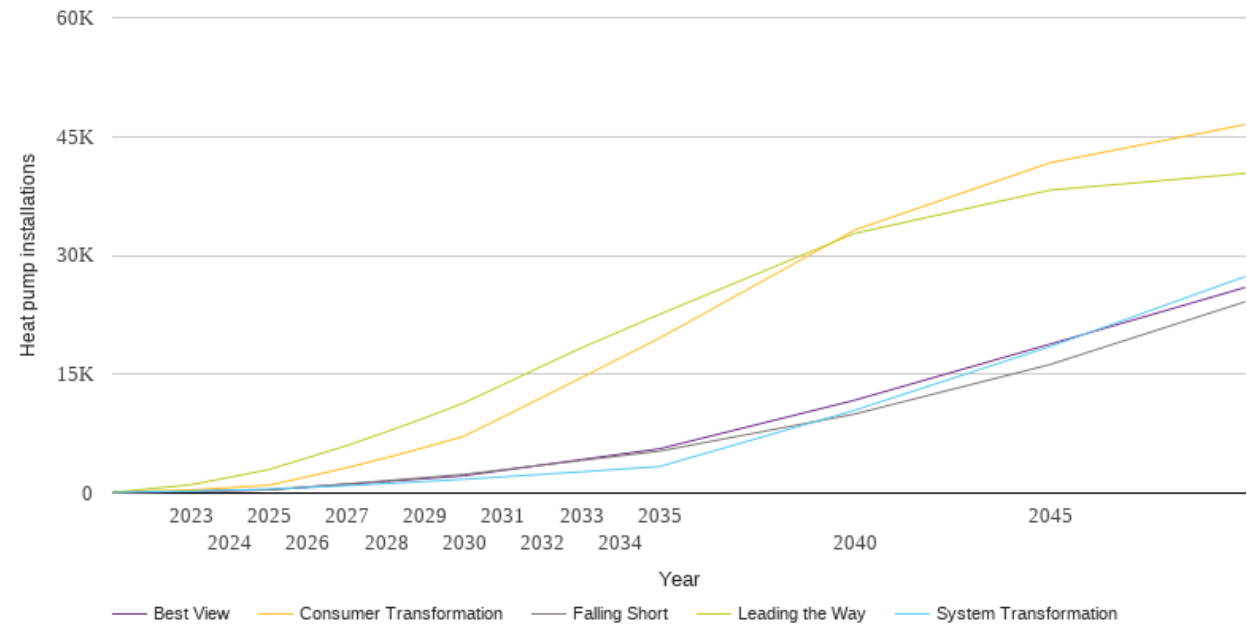
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	599	599	599	599	599
2023	837	871	1161	1020	875
2024	1142	1244	2232	1845	1260
2025	1523	1724	3535	2845	1757
2026	1984	2342	4737	4167	2401
2027	2527	3122	6263	5861	3215
2028	3165	4085	8472	8007	4231
2029	3897	5261	10094	10724	5480
2030	4739	6684	12695	13904	7003
2031	5926	8456	16311	17583	8874
2032	7333	10652	19640	21603	11175
2033	8954	13196	21709	25759	13828
2034	10800	16065	25155	29587	16788
2035	12847	19184	28310	32845	19965
2040	26106	33590	37324	38044	34244
2045	36875	35900	38441	38806	36564
2050	39026	36435	38493	39074	37321



Technology Summary: Heat pumps

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

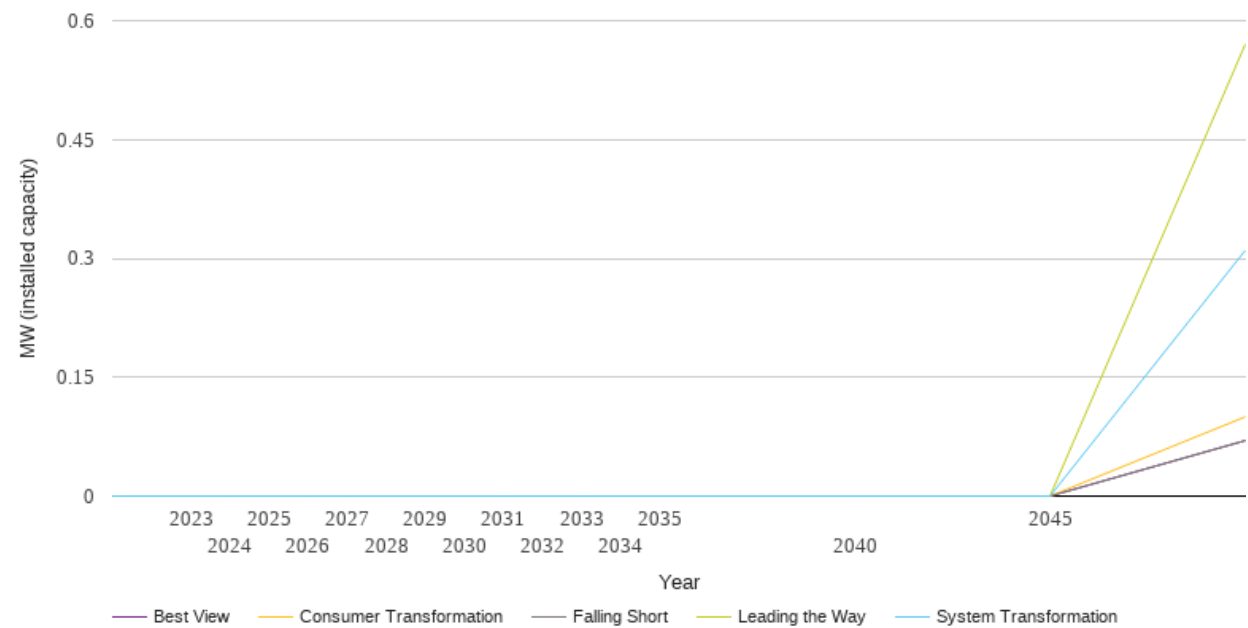
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	100	100	100	100	100
2023	205	239	400	1057	205
2024	305	369	691	2008	305
2025	409	511	993	2976	409
2026	790	722	2097	4483	755
2027	1171	936	3212	6016	1102
2028	1564	1195	4459	7722	1462
2029	1964	1466	5783	9515	1828
2030	2367	1749	7195	11404	2198
2031	2952	2051	9623	13705	2875
2032	3535	2370	12095	16034	3553
2033	4120	2688	14568	18323	4232
2034	4706	3016	17054	20441	4910
2035	5290	3349	19549	22558	5589
2040	9974	10455	33205	32776	11723
2045	16220	18480	41684	38231	18791
2050	24151	27336	46507	40346	25955



Technology Summary: Hydrogen electrolysis

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

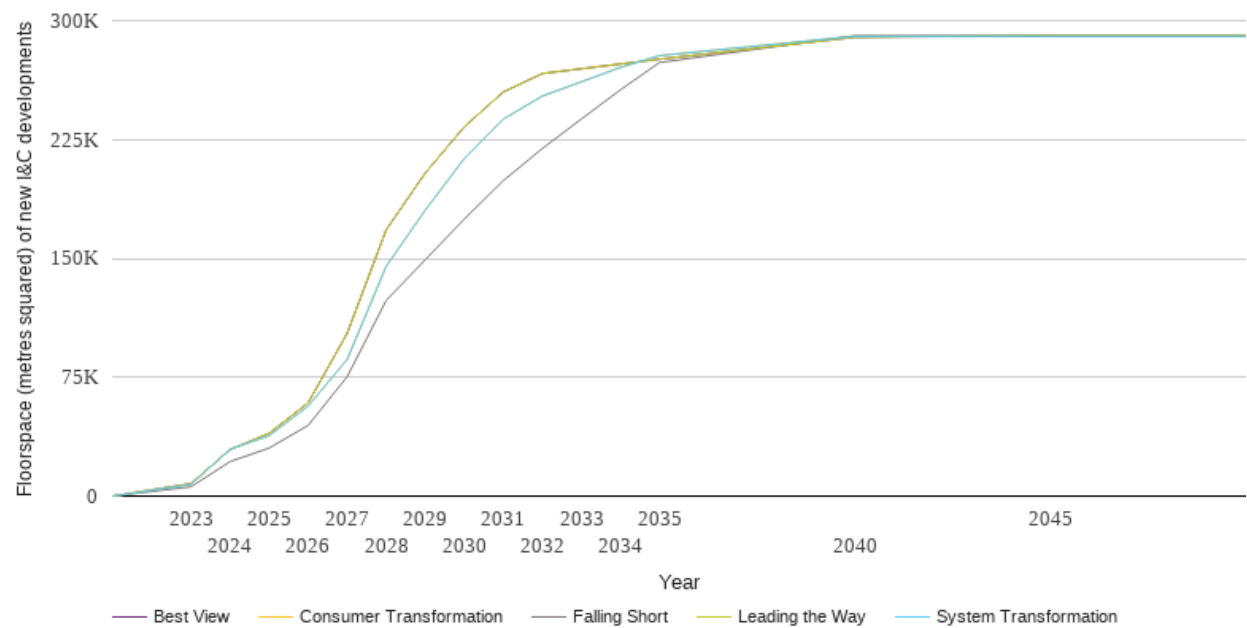
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0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

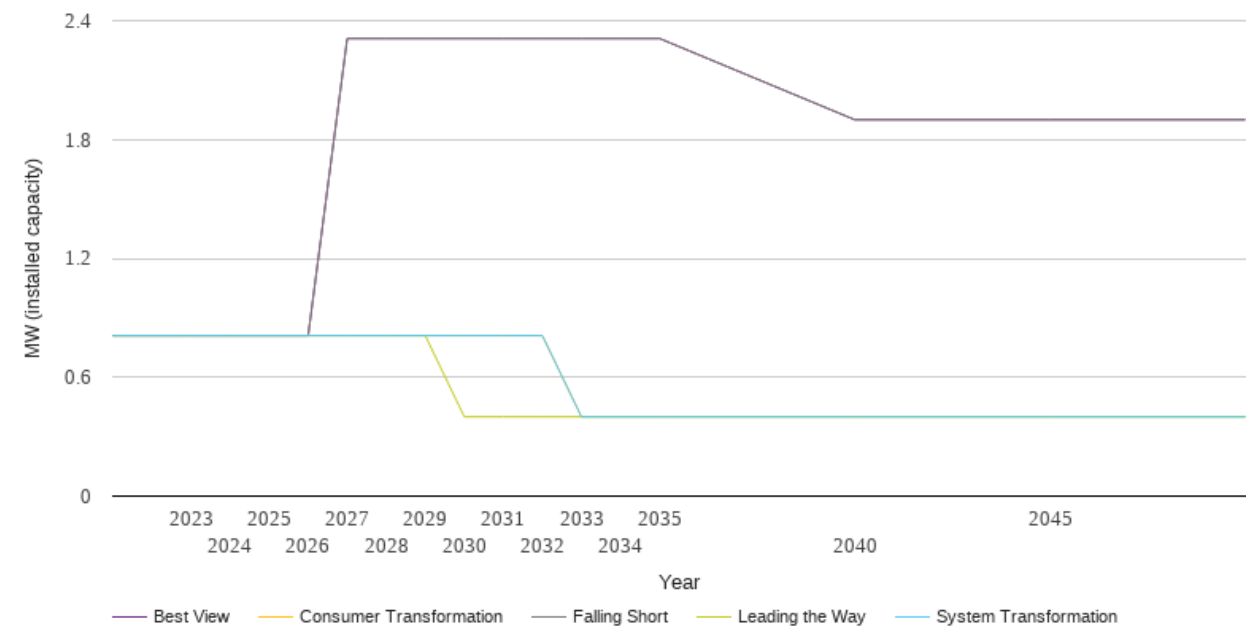
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	5878	7344	7344	7918	7918
2024	21785	29645	29645	29319	29319
2025	30302	38130	38130	39586	39586
2026	44574	56773	56773	58858	58858
2027	75367	86298	86298	102759	102759
2028	123534	145087	145087	168118	168118
2029	149145	180488	180488	203912	203912
2030	174821	213030	213030	233035	233035
2031	199093	237939	237939	255036	255036
2032	219355	252420	252420	266627	266627
2033	237984	261458	261458	269655	269655
2034	256368	270497	270497	272683	272683
2035	273613	277927	277927	275711	275711
2040	290514	290182	290182	289569	289569
2045	290514	290182	290182	290514	290514
2050	290514	290182	290182	290514	290514



Technology Summary: Other Distributed Generation

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

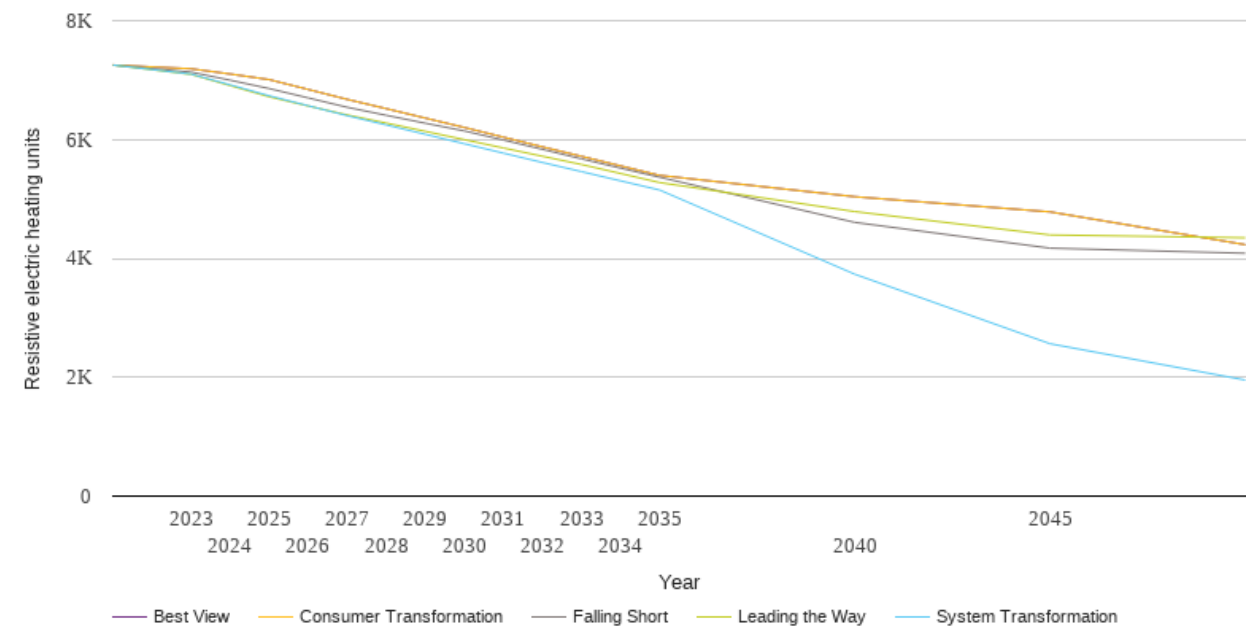
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.8	0.8	0.8	0.8	0.8
2023	0.8	0.8	0.8	0.8	0.8
2024	0.8	0.8	0.8	0.8	0.8
2025	0.8	0.8	0.8	0.8	0.8
2026	0.8	0.8	0.8	0.8	0.8
2027	2.3	0.8	0.8	0.8	2.3
2028	2.3	0.8	0.8	0.8	2.3
2029	2.3	0.8	0.8	0.8	2.3
2030	2.3	0.8	0.8	0.4	2.3
2031	2.3	0.8	0.8	0.4	2.3
2032	2.3	0.8	0.8	0.4	2.3
2033	2.3	0.4	0.4	0.4	2.3
2034	2.3	0.4	0.4	0.4	2.3
2035	2.3	0.4	0.4	0.4	2.3
2040	1.9	0.4	0.4	0.4	1.9
2045	1.9	0.4	0.4	0.4	1.9
2050	1.9	0.4	0.4	0.4	1.9



Technology Summary: Resistive electric heating

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

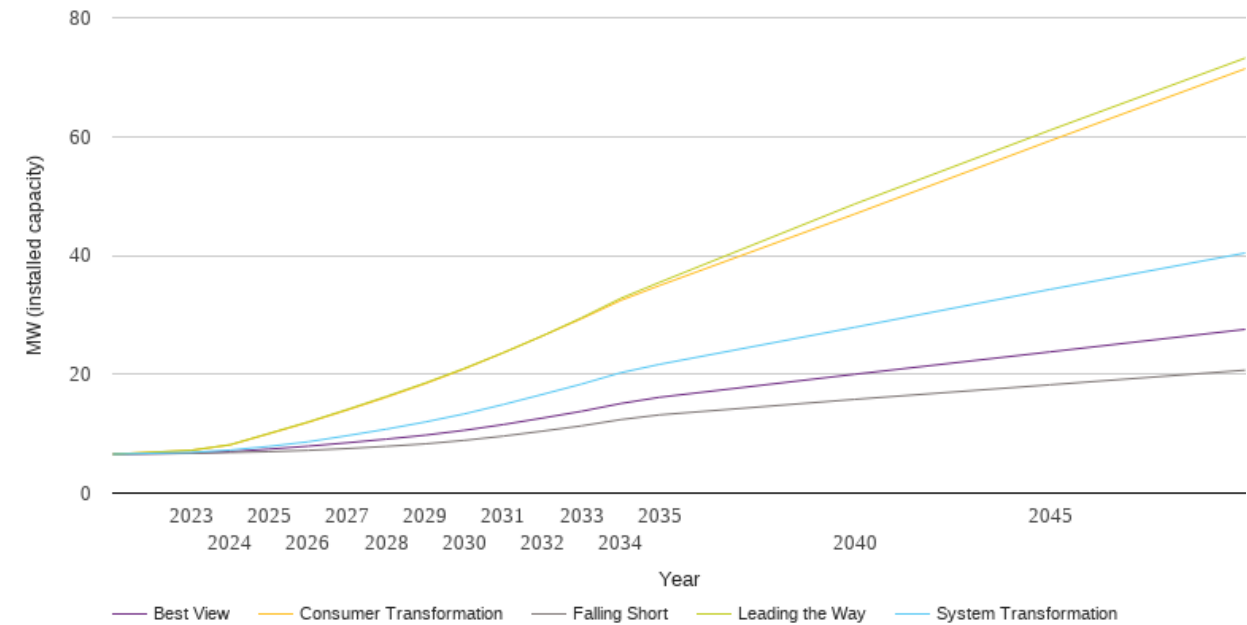
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	7253	7253	7253	7253	7253
2023	7135	7102	7191	7097	7191
2024	6999	6921	7103	6908	7103
2025	6858	6737	7009	6719	7009
2026	6701	6569	6843	6565	6843
2027	6543	6401	6676	6414	6676
2028	6408	6246	6520	6277	6520
2029	6275	6088	6361	6138	6361
2030	6145	5929	6203	5998	6203
2031	5992	5771	6040	5858	6040
2032	5835	5614	5877	5719	5877
2033	5675	5460	5718	5580	5718
2034	5519	5305	5557	5429	5557
2035	5366	5151	5397	5276	5397
2040	4606	3734	5038	4788	5038
2045	4172	2564	4783	4395	4783
2050	4086	1953	4231	4347	4231



Technology Summary: Solar Generation

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

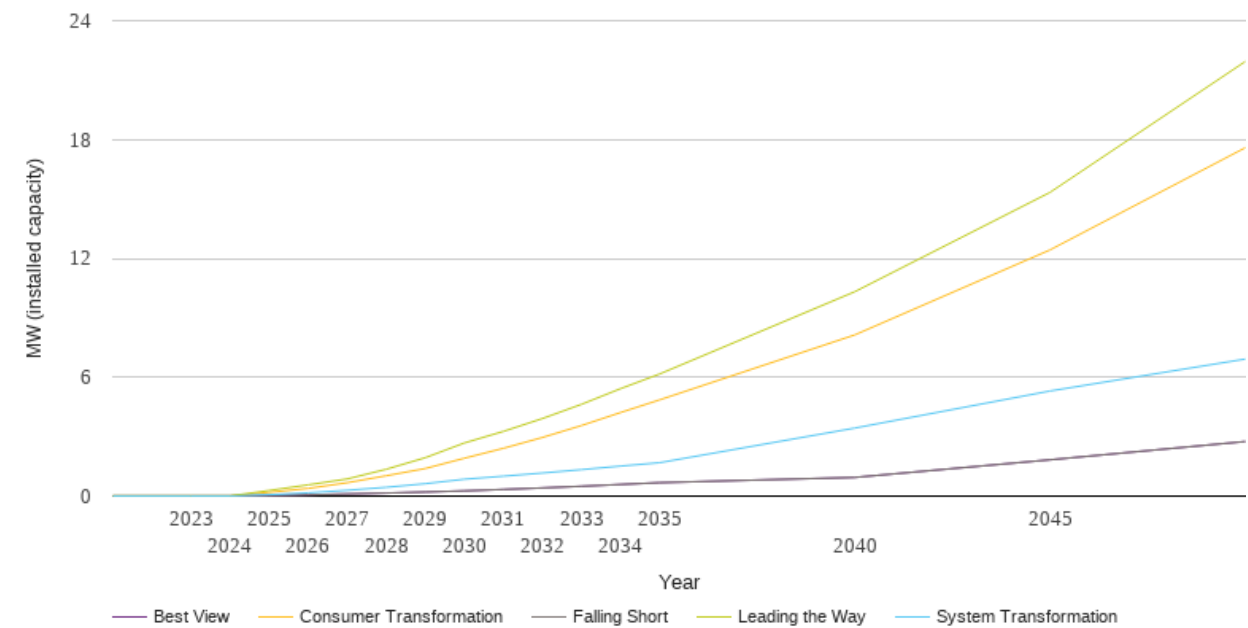
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	6.5	6.5	6.5	6.5	6.5
2023	6.7	6.9	7.2	7.2	6.7
2024	6.8	7.2	8.1	8.1	7.0
2025	7.0	7.9	10.0	10.1	7.4
2026	7.2	8.6	11.9	12.0	7.9
2027	7.5	9.7	14.0	14.1	8.5
2028	7.9	10.8	16.1	16.3	9.1
2029	8.3	12.0	18.4	18.5	9.7
2030	8.9	13.3	20.9	21.0	10.6
2031	9.6	14.9	23.6	23.6	11.5
2032	10.4	16.6	26.4	26.5	12.6
2033	11.3	18.3	29.3	29.5	13.8
2034	12.4	20.2	32.4	32.8	15.1
2035	13.2	21.7	34.9	35.5	16.1
2040	15.8	27.9	47.0	48.6	20.0
2045	18.2	34.3	59.3	61.1	23.8
2050	20.7	40.4	71.4	73.2	27.6



Technology Summary: Storage

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

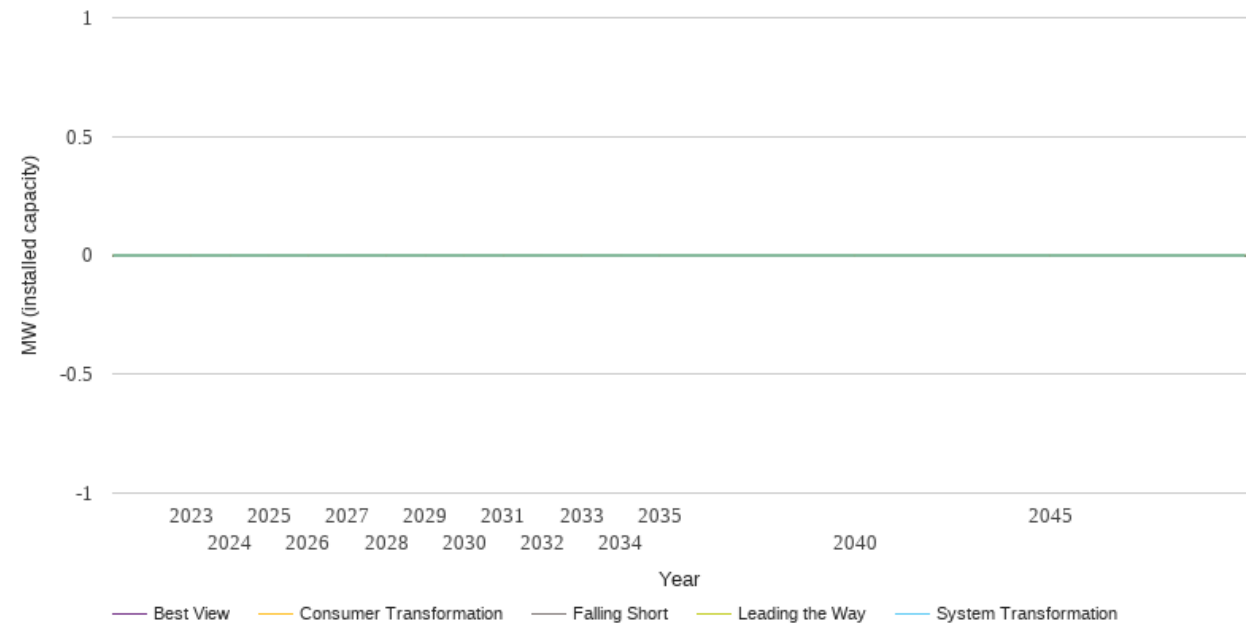
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.1	0.2	0.3	0.0
2026	0.1	0.2	0.4	0.6	0.1
2027	0.1	0.3	0.7	0.9	0.1
2028	0.2	0.4	1.0	1.4	0.2
2029	0.2	0.6	1.4	1.9	0.2
2030	0.3	0.9	1.9	2.7	0.3
2031	0.3	1.0	2.4	3.3	0.3
2032	0.4	1.2	3.0	3.9	0.4
2033	0.5	1.3	3.6	4.6	0.5
2034	0.6	1.5	4.2	5.4	0.6
2035	0.7	1.7	4.9	6.2	0.7
2040	0.9	3.4	8.1	10.3	0.9
2045	1.8	5.3	12.4	15.3	1.8
2050	2.8	6.9	17.6	21.9	2.8



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)
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))
National Grid Electricity Distribution (South Wales) Plc (company number 02366985))
(collectively, “NGED”)

nged.networkstrategy@nationalgrid.co.uk

