

Distribution Future Energy Scenarios 2022

Local Authority:
Wolverhampton

What are Distribution Future Energy Scenarios?

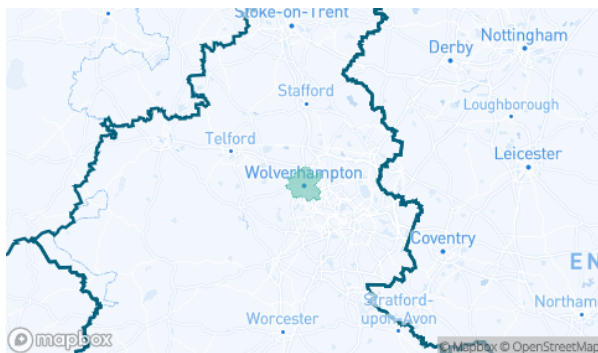
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Wolverhampton 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 Wolverhampton 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	1236	3859	3231	3231	1236	77878	41289	41288	1236
Domestic	New dwellings	0	2685	2826	2826	2893	3031	2963	2963	2893
Electric vehicles	Electric vehicles	2494	20226	26207	48343	48357	153570	145995	144158	114386
EV Charge Point	EV charge points	1159	8343	12971	24786	27017	79805	81594	84463	85439
Heat pumps	Heat pump installations	135	5983	4344	17789	28305	58571	66896	114793	101699
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.2	0.0	0.2	0.1	0.9	0.2	1.4
Non domestic	Floorspace (metres squared) of new I&C developments	0	91390	110335	110335	114930	160919	160620	160620	160919
Other Distributed Generation	MW (installed capacity)	25.0	29.6	29.2	29.2	26.3	29.1	28.3	0.0	42.5
Resistive electric heating	Resistive electric heating units	17763	14515	14089	14927	14283	9628	4302	9953	10284
Solar Generation	MW (installed capacity)	13.8	26.3	35.0	51.4	51.7	46.1	88.6	159.4	165.4
Storage	MW (installed capacity)	5.3	6.1	7.1	9.3	10.9	12.3	22.7	47.3	57.1
Wind	MW (installed capacity)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2

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

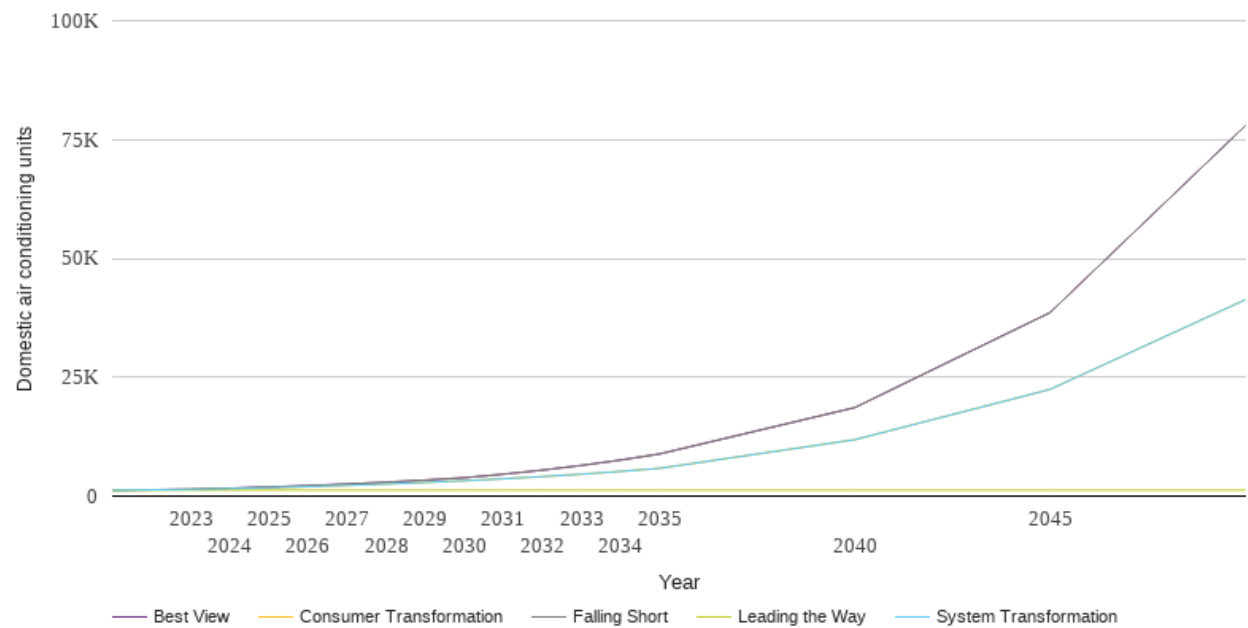
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

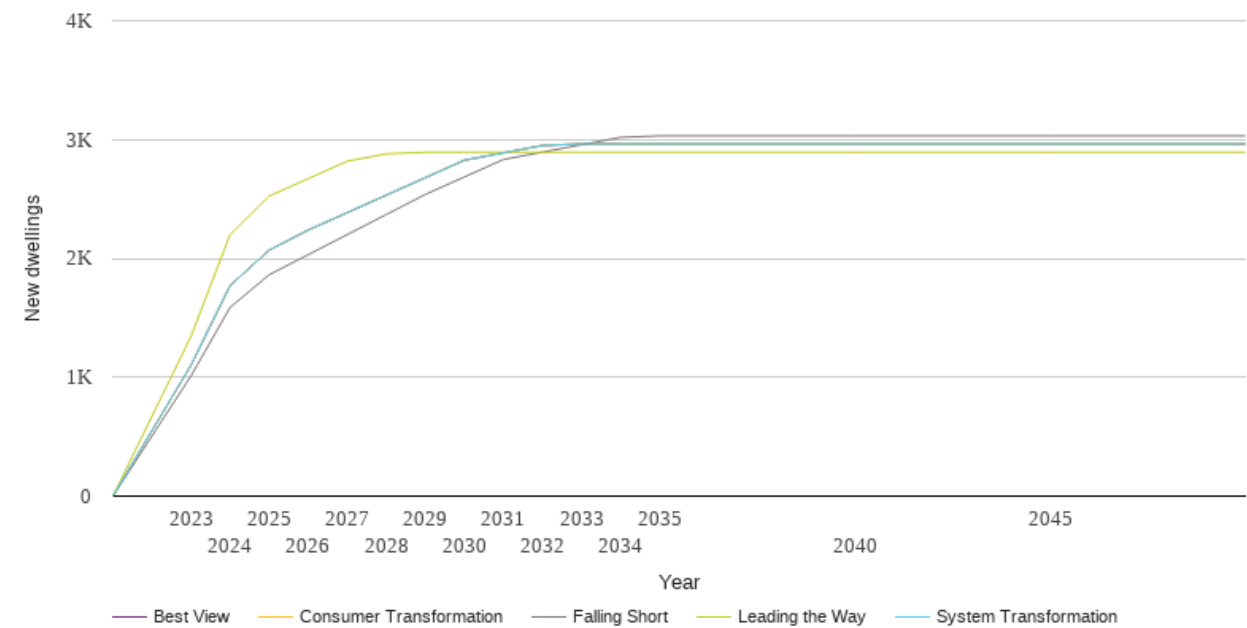
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1236	1236	1236	1236	1236
2023	1426	1402	1402	1236	1426
2024	1647	1575	1575	1236	1647
2025	1905	1775	1775	1236	1905
2026	2200	2001	2001	1236	2200
2027	2536	2257	2257	1236	2536
2028	2914	2547	2547	1236	2914
2029	3358	2871	2871	1236	3358
2030	3859	3231	3231	1236	3859
2031	4608	3641	3641	1236	4608
2032	5465	4098	4098	1236	5465
2033	6449	4612	4612	1236	6449
2034	7578	5195	5195	1236	7578
2035	8868	5840	5840	1236	8868
2040	18615	11864	11864	1236	18615
2045	38590	22443	22443	1236	38590
2050	77878	41289	41288	1236	77878



Technology Summary: Domestic

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

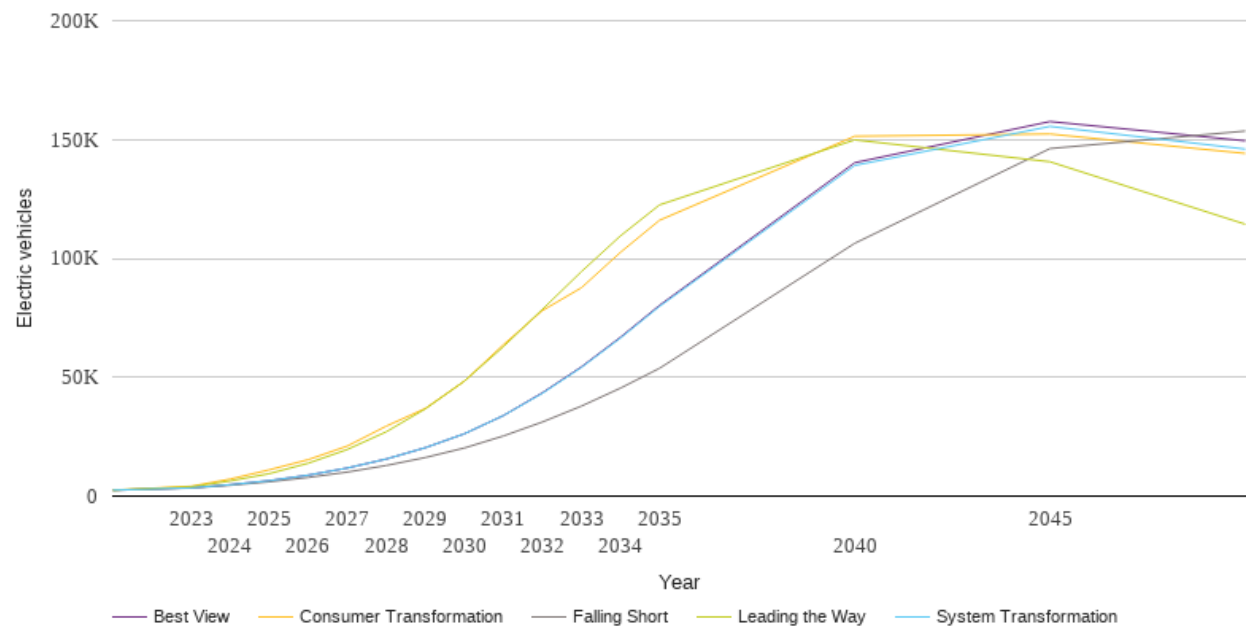
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	1012	1102	1102	1345	1102
2024	1587	1771	1771	2200	1771
2025	1862	2069	2069	2524	2069
2026	2031	2238	2238	2671	2238
2027	2200	2385	2385	2818	2385
2028	2369	2532	2532	2880	2532
2029	2538	2679	2679	2893	2679
2030	2685	2826	2826	2893	2826
2031	2832	2888	2888	2893	2888
2032	2894	2950	2950	2893	2950
2033	2956	2963	2963	2893	2963
2034	3018	2963	2963	2893	2963
2035	3031	2963	2963	2893	2963
2040	3031	2963	2963	2893	2963
2045	3031	2963	2963	2893	2963
2050	3031	2963	2963	2893	2963



Technology Summary: Electric vehicles

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

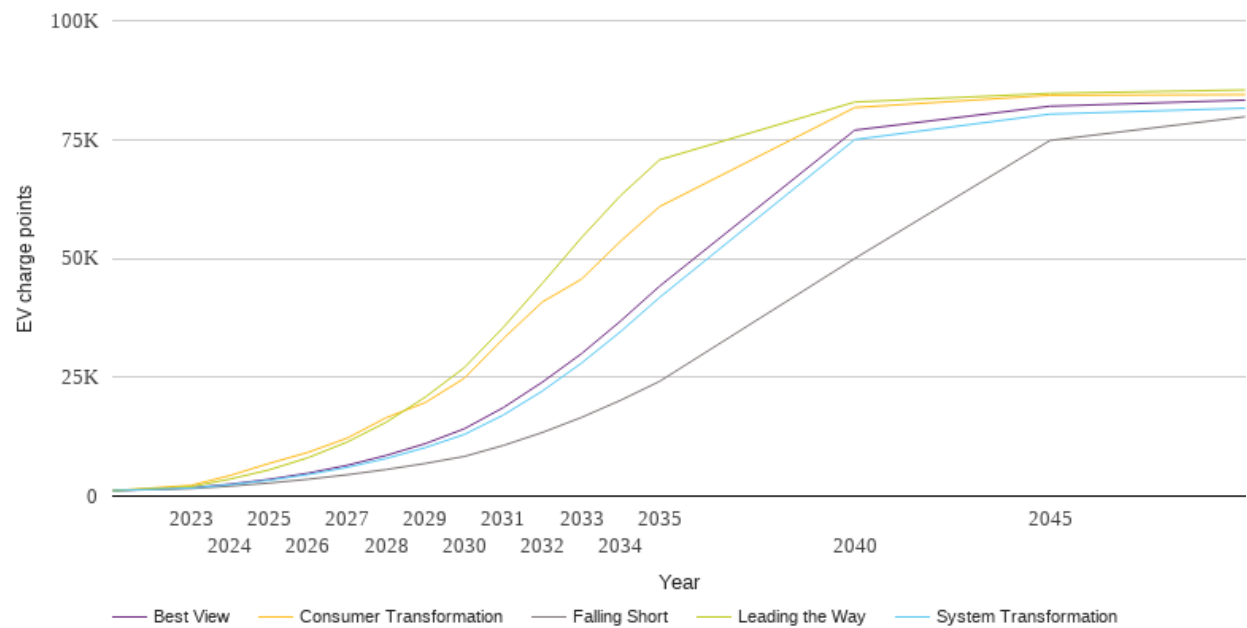
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	2494	2494	2494	2494	2494
2023	3394	3463	4124	3893	3463
2024	4550	4777	7148	6358	4777
2025	6015	6464	11028	9420	6464
2026	7833	8791	15332	13819	8791
2027	10103	11793	21038	19588	11793
2028	12866	15588	29430	27044	15589
2029	16216	20349	36868	36681	20351
2030	20226	26207	48343	48357	26209
2031	25285	33868	63696	62846	33871
2032	31172	43237	78047	78566	43470
2033	37866	54116	87666	94451	54392
2034	45430	66478	102560	109483	66839
2035	53766	79803	116044	122512	80261
2040	106352	139106	151400	149855	140254
2045	146206	155527	152322	140654	157573
2050	153570	145995	144158	114386	149475



Technology Summary: EV Charge Point

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

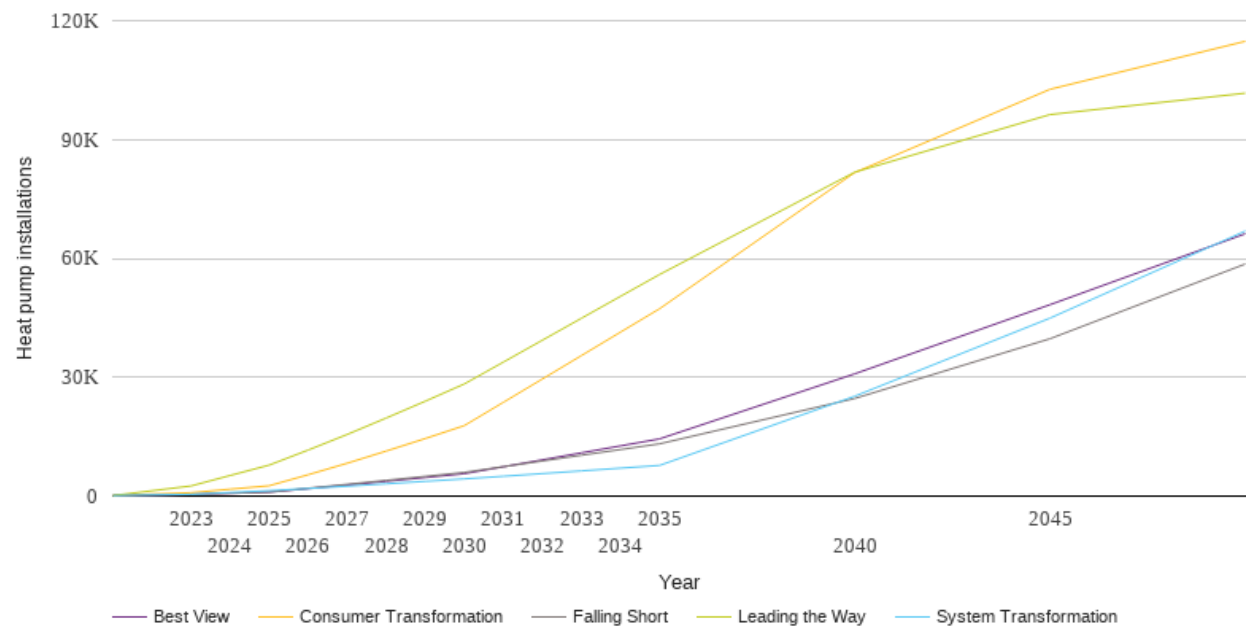
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1159	1159	1159	1159	1159
2023	1568	1685	2255	1979	1730
2024	2094	2406	4334	3578	2513
2025	2748	3336	6867	5517	3529
2026	3542	4537	9211	8080	4824
2027	4486	6043	12196	11376	6470
2028	5591	7912	16500	15544	8558
2029	6865	10203	19680	20825	11034
2030	8343	12971	24786	27017	14158
2031	10653	17058	33140	35497	18617
2032	13385	22107	40835	44767	23976
2033	16543	27966	45626	54356	29952
2034	20142	34578	53596	63203	36802
2035	24132	41770	60895	70734	44143
2040	49974	74987	81724	82881	76973
2045	74802	80346	84310	84708	82009
2050	79805	81594	84463	85439	83290



Technology Summary: Heat pumps

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

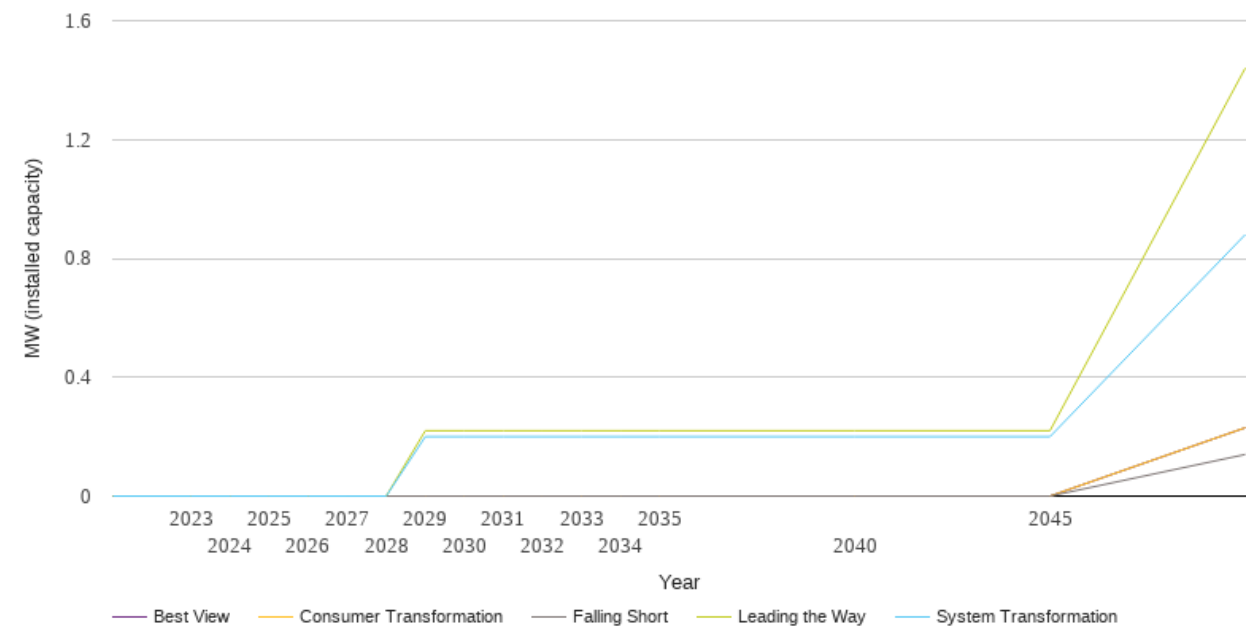
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	135	135	135	135	135
2023	402	436	851	2556	402
2024	711	913	1738	5198	711
2025	1002	1361	2605	7817	1002
2026	1981	1908	5388	11616	1886
2027	2970	2490	8291	15560	2791
2028	3971	3105	11366	19704	3731
2029	4977	3722	14525	23954	4686
2030	5983	4344	17789	28305	5656
2031	7424	5002	23667	33824	7403
2032	8864	5681	29563	39355	9149
2033	10311	6359	35473	44891	10913
2034	11747	7052	41385	50424	12670
2035	13193	7742	47284	55928	14436
2040	24640	25217	81661	81770	30861
2045	39714	44913	102679	96302	48307
2050	58571	66896	114793	101699	66214



Technology Summary: Hydrogen electrolysis

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

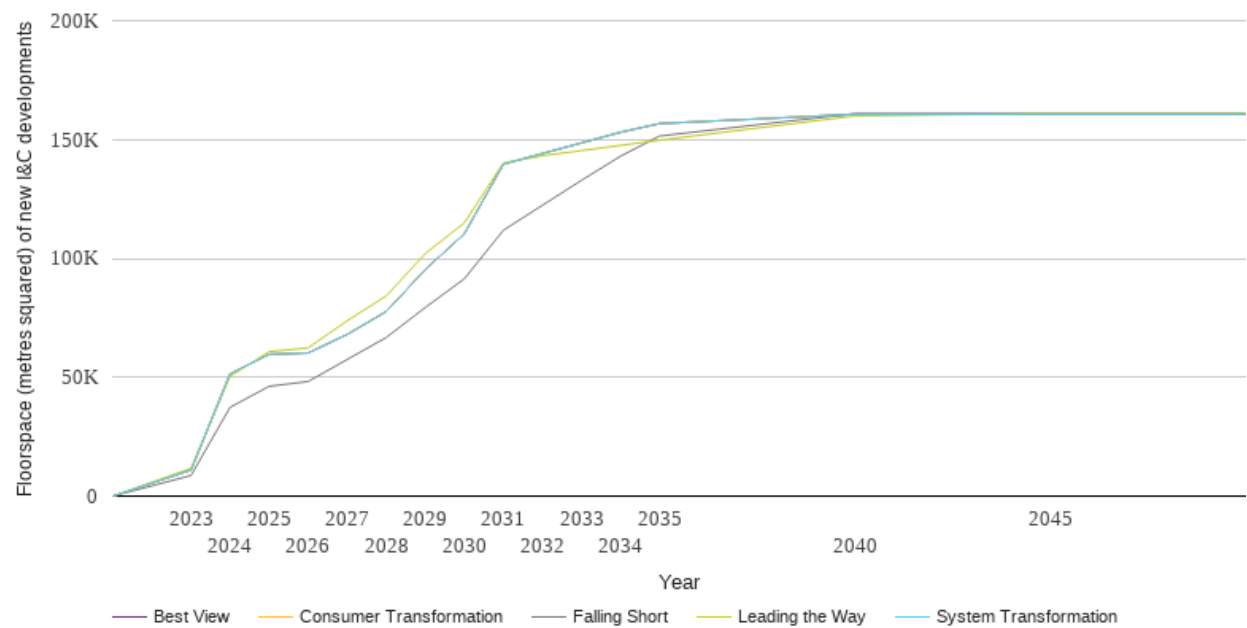
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0	0.0
2029	0.0	0.2	0.0	0.2	0.0
2030	0.0	0.2	0.0	0.2	0.0
2031	0.0	0.2	0.0	0.2	0.0
2032	0.0	0.2	0.0	0.2	0.0
2033	0.0	0.2	0.0	0.2	0.0
2034	0.0	0.2	0.0	0.2	0.0
2035	0.0	0.2	0.0	0.2	0.0
2040	0.0	0.2	0.0	0.2	0.0
2045	0.0	0.2	0.0	0.2	0.0
2050	0.1	0.9	0.2	1.4	0.2



Technology Summary: Non domestic

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

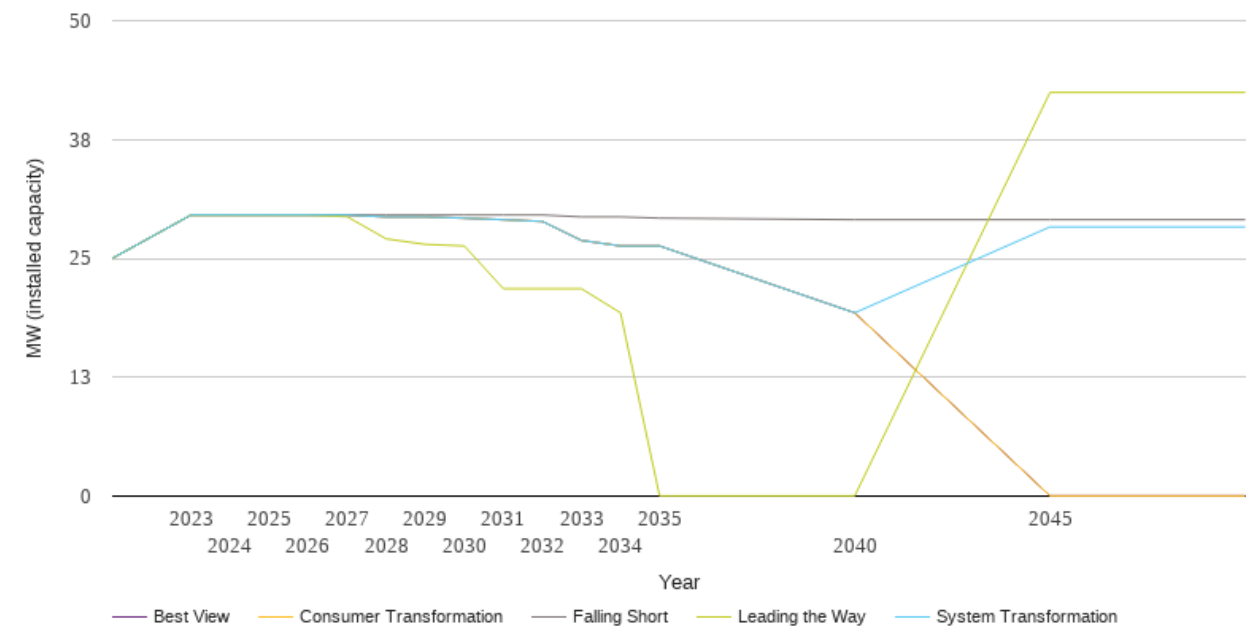
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	8666	10949	10949	11707	10949
2024	37356	51444	51444	50399	51444
2025	46177	59615	59615	60771	59615
2026	48203	60198	60198	62343	60198
2027	57458	68011	68011	73754	68011
2028	66713	77631	77631	84201	77631
2029	79330	95361	95361	102037	95361
2030	91390	110335	110335	114930	110335
2031	111830	139637	139637	140136	139637
2032	122338	144110	144110	143163	144110
2033	132846	148583	148583	145346	148583
2034	142990	153057	153057	147530	153057
2035	151472	156720	156720	149713	156720
2040	160919	160620	160620	159926	160620
2045	160919	160620	160620	160919	160620
2050	160919	160620	160620	160919	160620



Technology Summary: Other Distributed Generation

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

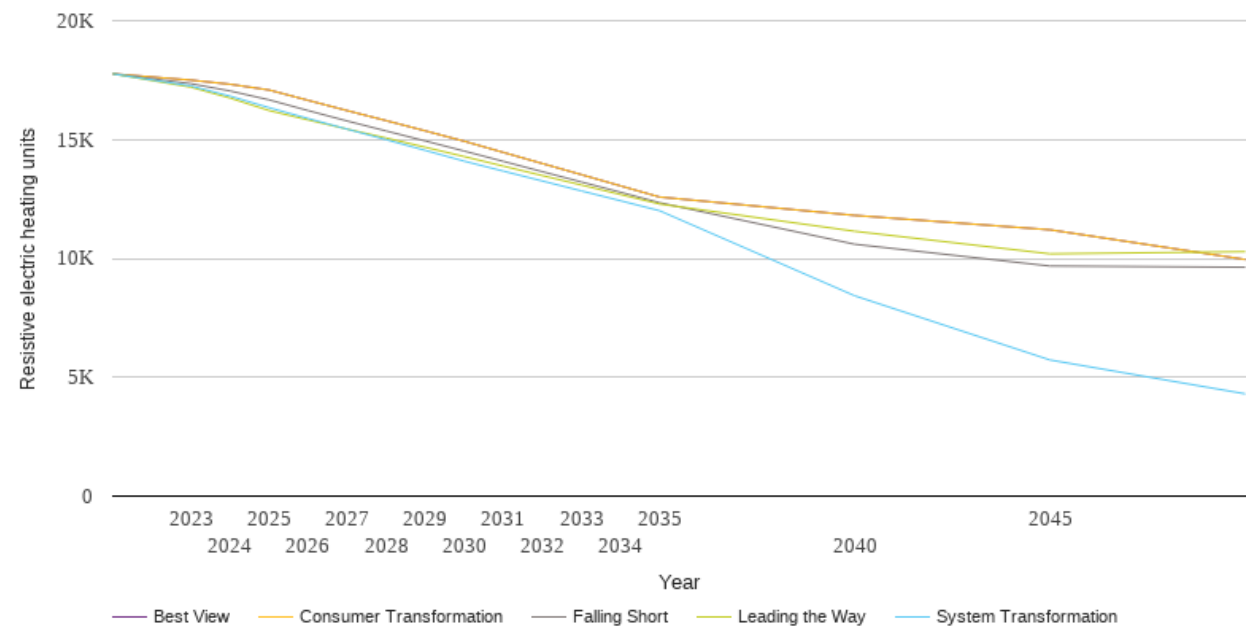
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	25.0	25.0	25.0	25.0	25.0
2023	29.6	29.6	29.6	29.6	29.6
2024	29.6	29.6	29.6	29.6	29.6
2025	29.6	29.6	29.6	29.6	29.6
2026	29.6	29.6	29.6	29.6	29.6
2027	29.6	29.6	29.6	29.6	29.6
2028	29.6	29.4	29.4	27.1	29.4
2029	29.6	29.4	29.4	26.5	29.4
2030	29.6	29.2	29.2	26.3	29.2
2031	29.6	29.1	29.1	21.8	29.1
2032	29.6	28.9	28.9	21.8	28.9
2033	29.4	26.9	26.9	21.8	26.9
2034	29.4	26.3	26.3	19.3	26.3
2035	29.2	26.3	26.3	0.0	26.3
2040	29.1	19.3	19.3	0.0	19.3
2045	29.1	28.3	0.0	42.5	0.0
2050	29.1	28.3	0.0	42.5	0.0



Technology Summary: Resistive electric heating

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

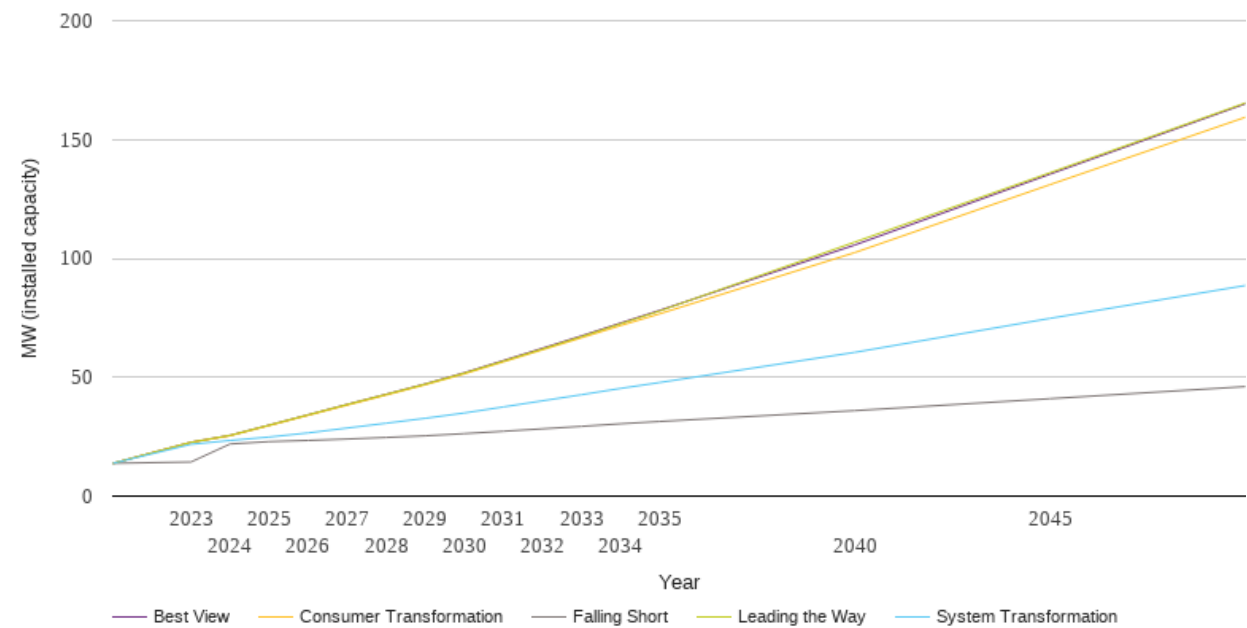
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	17763	17763	17763	17763	17763
2023	17349	17253	17500	17202	17500
2024	17044	16826	17326	16746	17326
2025	16670	16340	17085	16219	17085
2026	16218	15885	16649	15825	16649
2027	15780	15436	16217	15440	16217
2028	15360	14993	15795	15063	15795
2029	14940	14543	15365	14676	15365
2030	14515	14089	14927	14283	14927
2031	14082	13671	14458	13882	14458
2032	13648	13255	13990	13484	13990
2033	13214	12838	13523	13087	13523
2034	12784	12425	13051	12688	13051
2035	12344	12006	12582	12288	12582
2040	10595	8427	11809	11141	11809
2045	9679	5727	11204	10192	11204
2050	9628	4302	9953	10284	9953



Technology Summary: Solar Generation

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

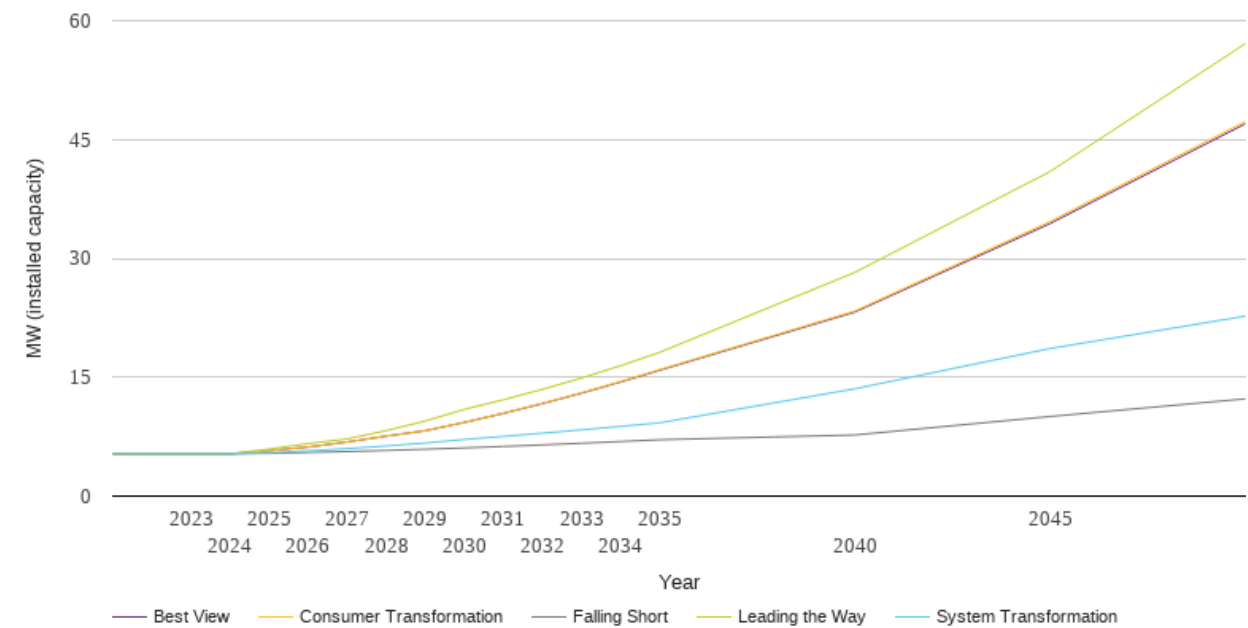
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	13.8	13.8	13.8	13.8	13.8
2023	14.4	21.8	22.6	22.6	22.6
2024	21.9	23.4	25.4	25.5	25.5
2025	22.9	24.8	29.6	29.8	29.8
2026	23.4	26.6	34.0	34.2	34.2
2027	24.0	28.6	38.3	38.5	38.5
2028	24.7	30.7	42.5	42.8	42.8
2029	25.4	32.7	46.8	47.1	47.2
2030	26.3	35.0	51.4	51.7	51.9
2031	27.3	37.5	56.5	56.8	57.0
2032	28.3	40.1	61.5	61.9	62.2
2033	29.3	42.7	66.6	67.1	67.4
2034	30.4	45.3	71.7	72.5	72.8
2035	31.4	47.8	76.7	77.9	78.1
2040	35.9	60.5	102.4	106.8	105.6
2045	41.0	74.8	131.0	136.0	135.4
2050	46.1	88.6	159.4	165.4	165.0



Technology Summary: Storage

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

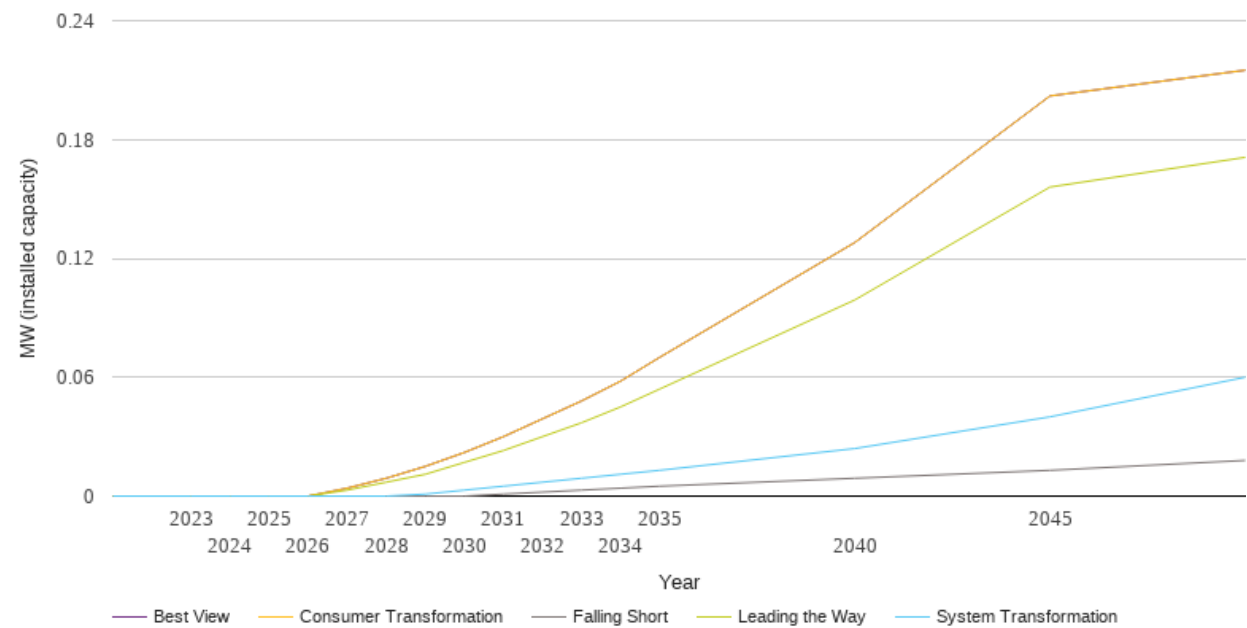
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	5.3	5.3	5.3	5.3	5.3
2023	5.3	5.3	5.3	5.3	5.3
2024	5.3	5.3	5.3	5.3	5.3
2025	5.4	5.5	5.7	5.9	5.7
2026	5.5	5.7	6.2	6.6	6.2
2027	5.6	6.0	6.8	7.2	6.8
2028	5.8	6.3	7.6	8.3	7.6
2029	5.9	6.7	8.3	9.5	8.3
2030	6.1	7.1	9.3	10.9	9.3
2031	6.3	7.5	10.5	12.2	10.4
2032	6.5	7.9	11.7	13.5	11.7
2033	6.7	8.4	13.0	14.9	13.0
2034	6.9	8.8	14.5	16.4	14.4
2035	7.1	9.2	16.0	18.1	15.9
2040	7.7	13.5	23.3	28.2	23.2
2045	10.0	18.6	34.6	41.0	34.4
2050	12.3	22.7	47.3	57.1	47.0



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	0.0	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	0.1	0.0	0.1
2035	0.0	0.0	0.1	0.1	0.1
2040	0.0	0.0	0.1	0.1	0.1
2045	0.0	0.0	0.2	0.2	0.2
2050	0.0	0.1	0.2	0.2	0.2



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

