

Distribution Future Energy Scenarios 2022

Local Authority:
Merthyr Tydfil

What are Distribution Future Energy Scenarios?

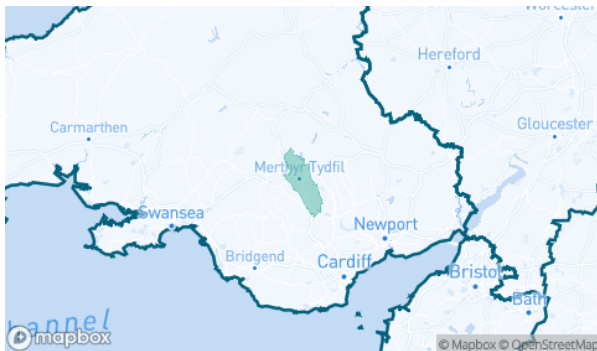
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Merthyr Tydfil 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 Merthyr Tydfil 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	145	425	361	361	145	8207	4223	4223	145
Domestic	New dwellings	0	919	984	984	1132	2011	1972	1972	1947
Electric vehicles	Electric vehicles	278	4329	5700	10671	10668	33012	30452	29499	24581
EV Charge Point	EV charge points	141	1867	2985	5710	6278	18899	19522	19375	20150
Heat pumps	Heat pump installations	61	1113	1064	3590	6418	14464	16431	27627	22630
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.0	0.0	0.7	0.8	1.9	1.3	3.3
Non domestic	Floorspace (metres squared) of new I&C developments	0	66588	77913	77913	85064	99167	99167	99167	99167
Other Distributed Generation	MW (installed capacity)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.3
Resistive electric heating	Resistive electric heating units	814	790	737	765	757	713	386	634	654
Solar Generation	MW (installed capacity)	2.7	4.5	7.8	12.4	11.5	18.2	38.2	57.7	55.6
Storage	MW (installed capacity)	0.0	0.1	0.5	1.1	1.6	1.7	4.2	10.6	13.5
Wind	MW (installed capacity)	3.0	3.0	3.1	4.1	3.9	4.5	8.5	19.0	16.2

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

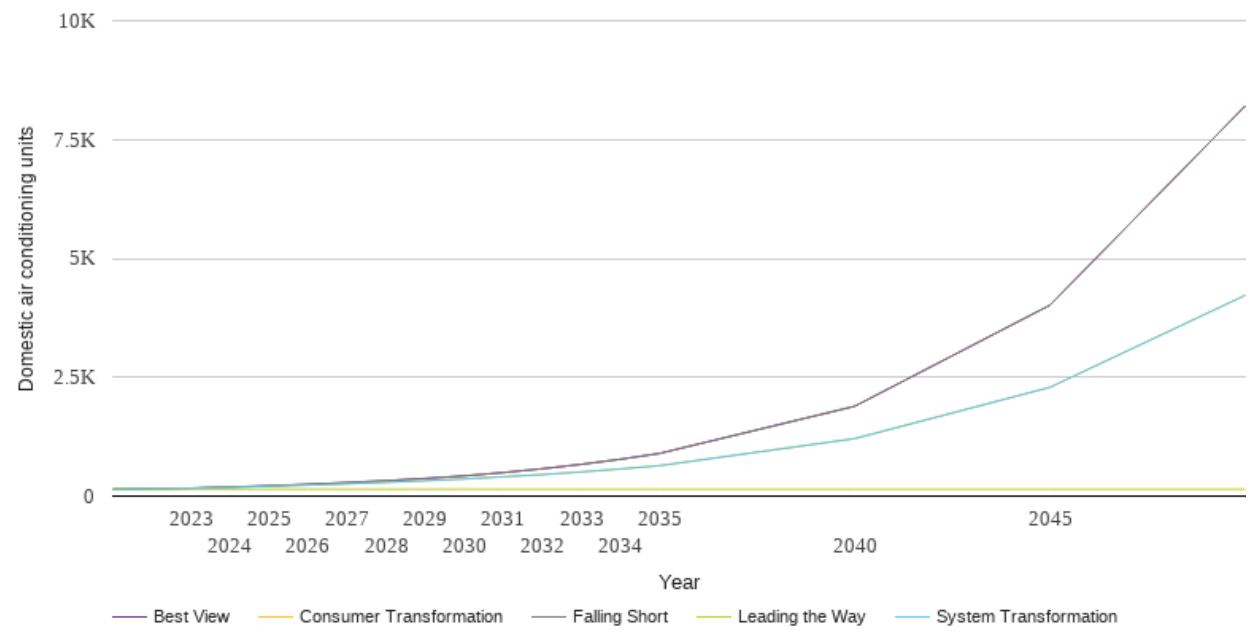
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

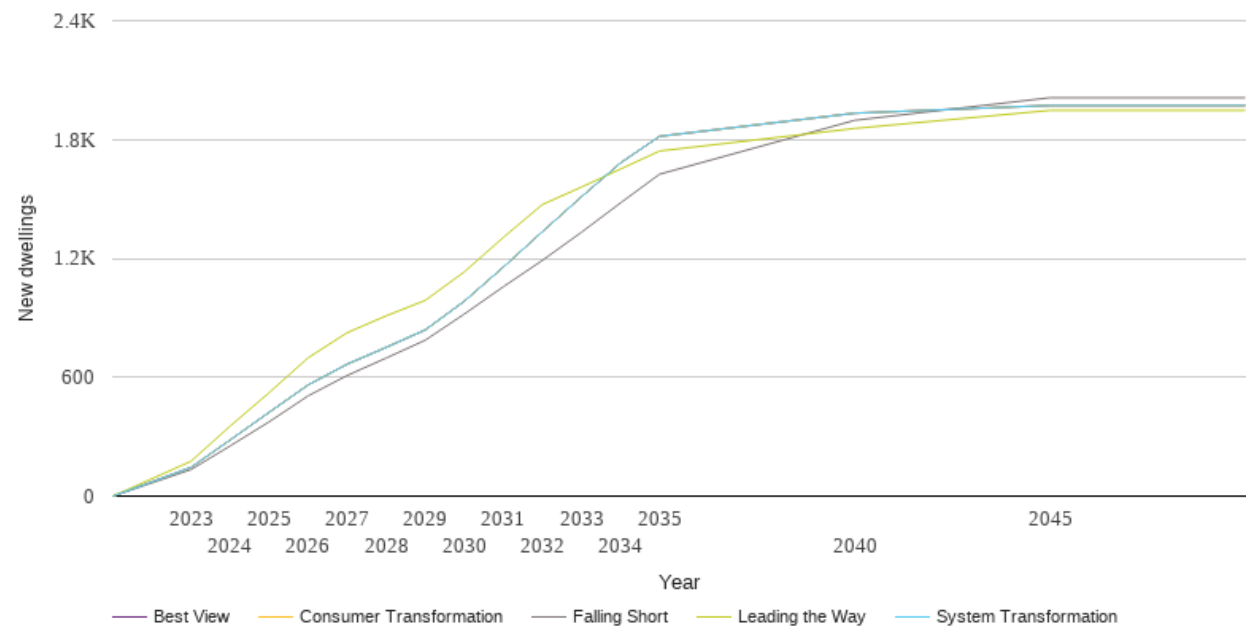
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	145	145	145	145	145
2023	167	164	164	145	167
2024	190	184	184	145	190
2025	217	207	207	145	217
2026	248	231	231	145	248
2027	284	258	258	145	284
2028	324	289	289	145	324
2029	371	323	323	145	371
2030	425	361	361	145	425
2031	495	405	405	145	495
2032	575	453	453	145	575
2033	668	508	508	145	668
2034	775	571	571	145	775
2035	897	640	640	145	897
2040	1890	1209	1209	145	1890
2045	4016	2288	2288	145	4016
2050	8207	4223	4223	145	8207



Technology Summary: Domestic

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

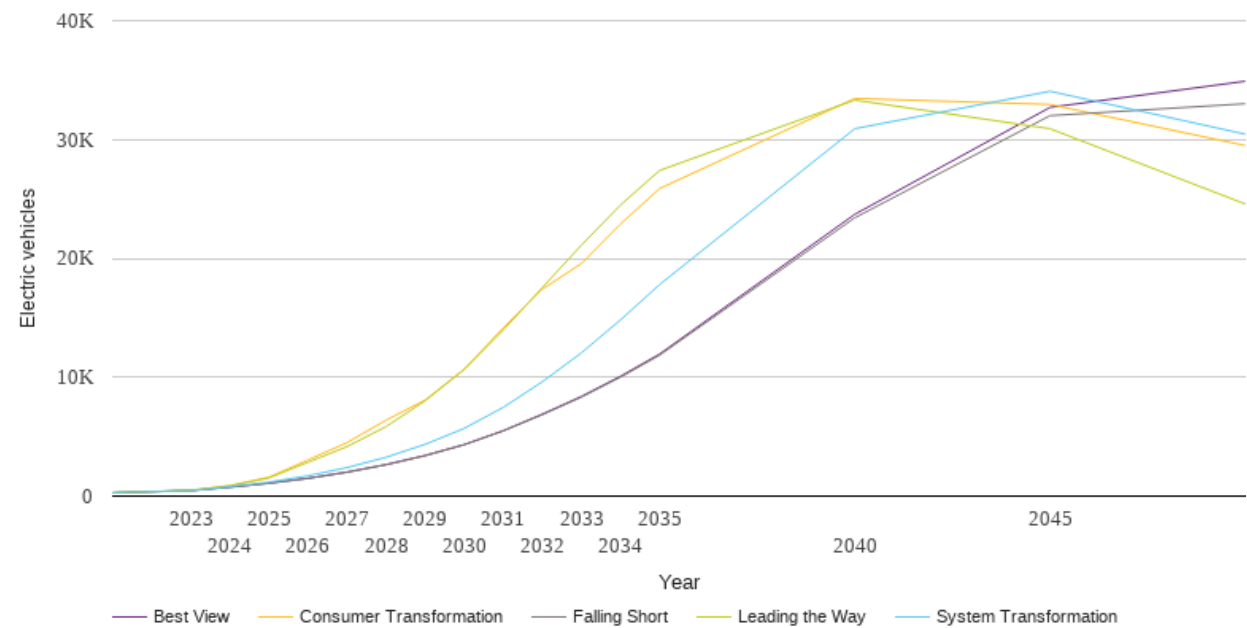
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	134	145	145	176	145
2024	253	283	283	353	283
2025	375	423	423	522	423
2026	506	561	561	698	561
2027	609	666	666	825	666
2028	697	751	751	910	751
2029	787	839	839	988	839
2030	919	984	984	1132	984
2031	1057	1156	1156	1306	1156
2032	1190	1335	1335	1472	1335
2033	1332	1511	1511	1560	1511
2034	1480	1682	1682	1651	1682
2035	1625	1816	1816	1742	1816
2040	1897	1933	1933	1856	1933
2045	2011	1972	1972	1947	1972
2050	2011	1972	1972	1947	1972



Technology Summary: Electric vehicles

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

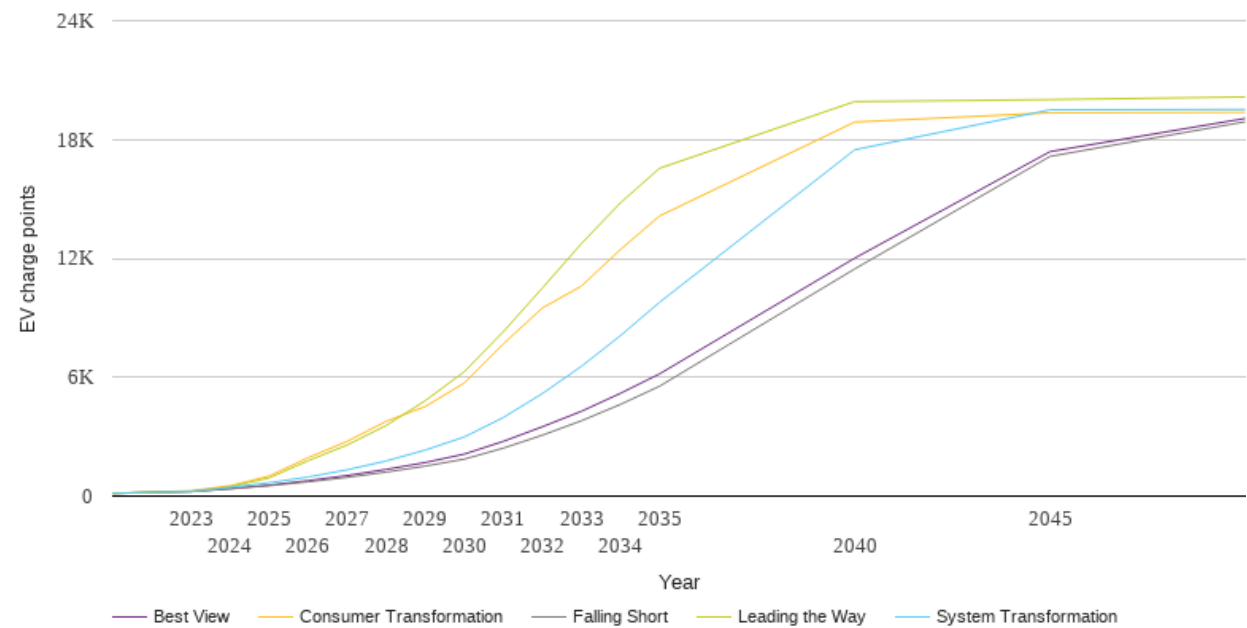
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	278	278	278	278	278
2023	467	466	491	484	467
2024	753	797	882	867	753
2025	1085	1178	1596	1533	1085
2026	1498	1711	3045	2854	1498
2027	2018	2401	4507	4172	2018
2028	2649	3271	6399	5857	2650
2029	3413	4361	8084	8033	3415
2030	4329	5700	10671	10668	4332
2031	5498	7471	14173	13978	5502
2032	6854	9622	17417	17553	6896
2033	8334	12054	19569	21119	8385
2034	10010	14822	22887	24491	10080
2035	11853	17791	25876	27398	11945
2040	23414	30910	33456	33318	23707
2045	32009	34061	32952	30913	32702
2050	33012	30452	29499	24581	34905



Technology Summary: EV Charge Point

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

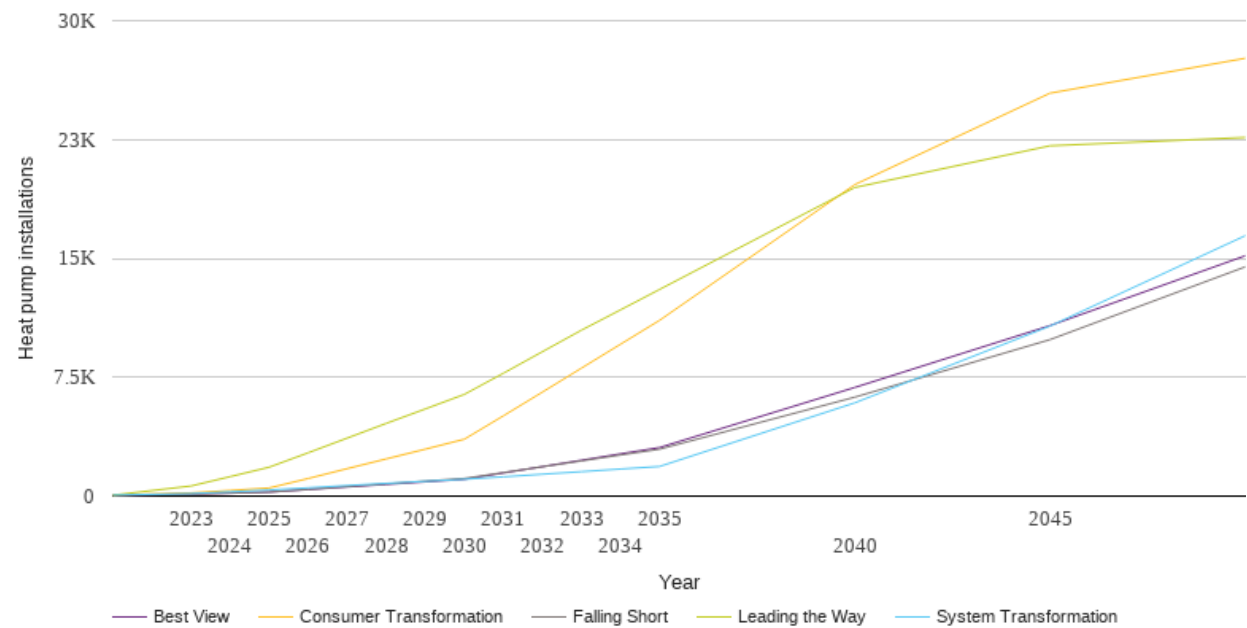
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	141	141	141	141	141
2023	229	238	270	239	230
2024	371	446	522	469	377
2025	528	674	1010	919	553
2026	720	962	1939	1787	779
2027	948	1327	2765	2582	1037
2028	1212	1774	3778	3569	1347
2029	1516	2324	4523	4818	1694
2030	1867	2985	5710	6278	2120
2031	2423	3968	7684	8299	2765
2032	3076	5178	9496	10504	3501
2033	3803	6552	10601	12748	4283
2034	4630	8100	12450	14809	5189
2035	5546	9782	14141	16549	6169
2040	11469	17484	18884	19916	12013
2045	17148	19499	19349	20015	17388
2050	18899	19522	19375	20150	19065



Technology Summary: Heat pumps

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

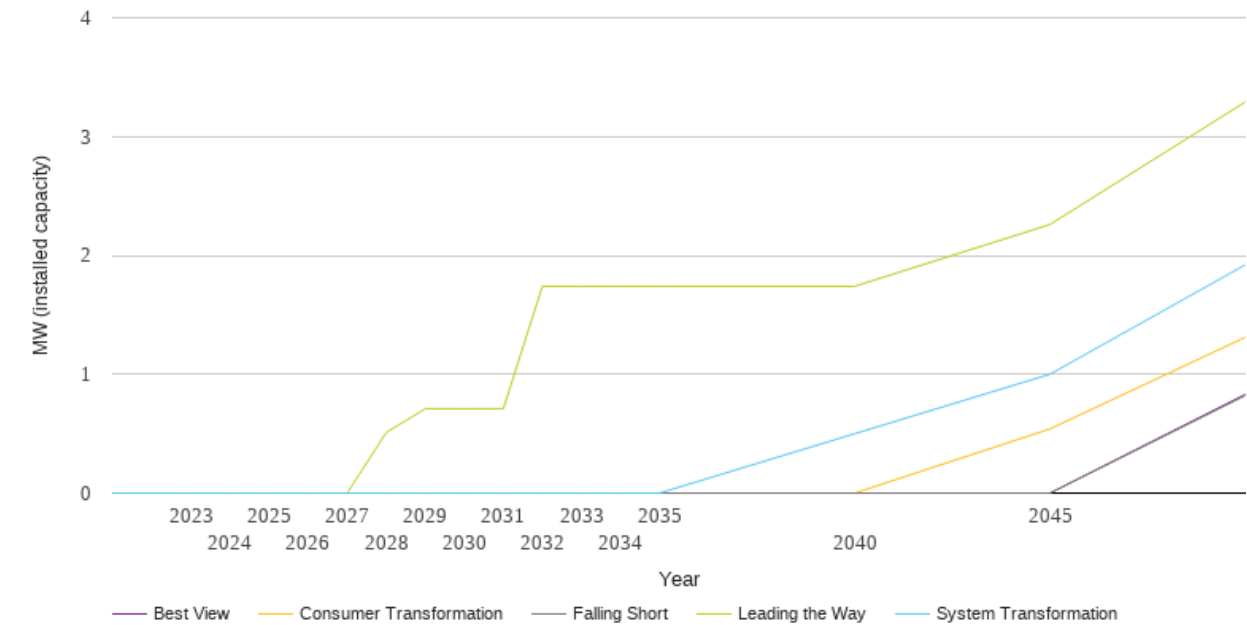
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	61	61	61	61	61
2023	122	159	203	638	122
2024	188	270	353	1225	188
2025	253	386	512	1822	253
2026	426	521	1109	2731	414
2027	600	669	1732	3660	579
2028	774	803	2346	4588	739
2029	946	935	2960	5499	901
2030	1113	1064	3590	6418	1058
2031	1484	1214	5064	7752	1460
2032	1852	1380	6561	9112	1860
2033	2220	1541	8074	10470	2261
2034	2593	1708	9583	11751	2666
2035	2959	1870	11089	13040	3063
2040	6242	5883	19655	19472	6855
2045	9873	10729	25424	22106	10758
2050	14464	16431	27627	22630	15164



Technology Summary: Hydrogen electrolysis

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

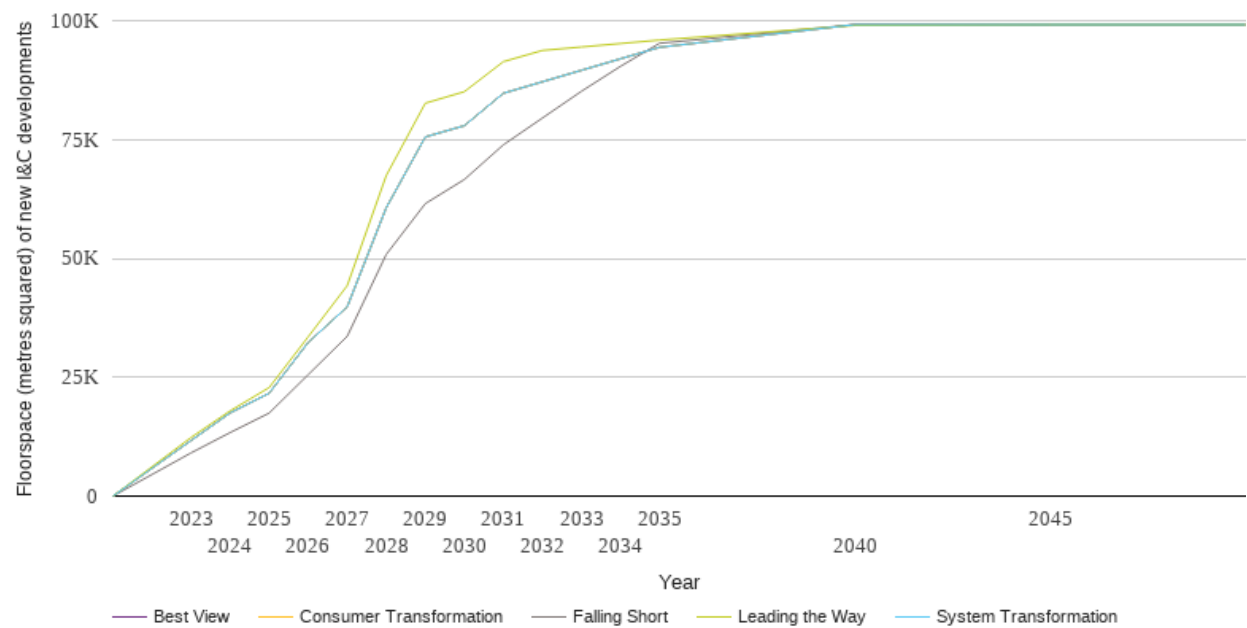
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.5	0.0
2029	0.0	0.0	0.0	0.7	0.0
2030	0.0	0.0	0.0	0.7	0.0
2031	0.0	0.0	0.0	0.7	0.0
2032	0.0	0.0	0.0	1.7	0.0
2033	0.0	0.0	0.0	1.7	0.0
2034	0.0	0.0	0.0	1.7	0.0
2035	0.0	0.0	0.0	1.7	0.0
2040	0.0	0.5	0.0	1.7	0.0
2045	0.0	1.0	0.5	2.3	0.0
2050	0.8	1.9	1.3	3.3	0.8



Technology Summary: Non domestic

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

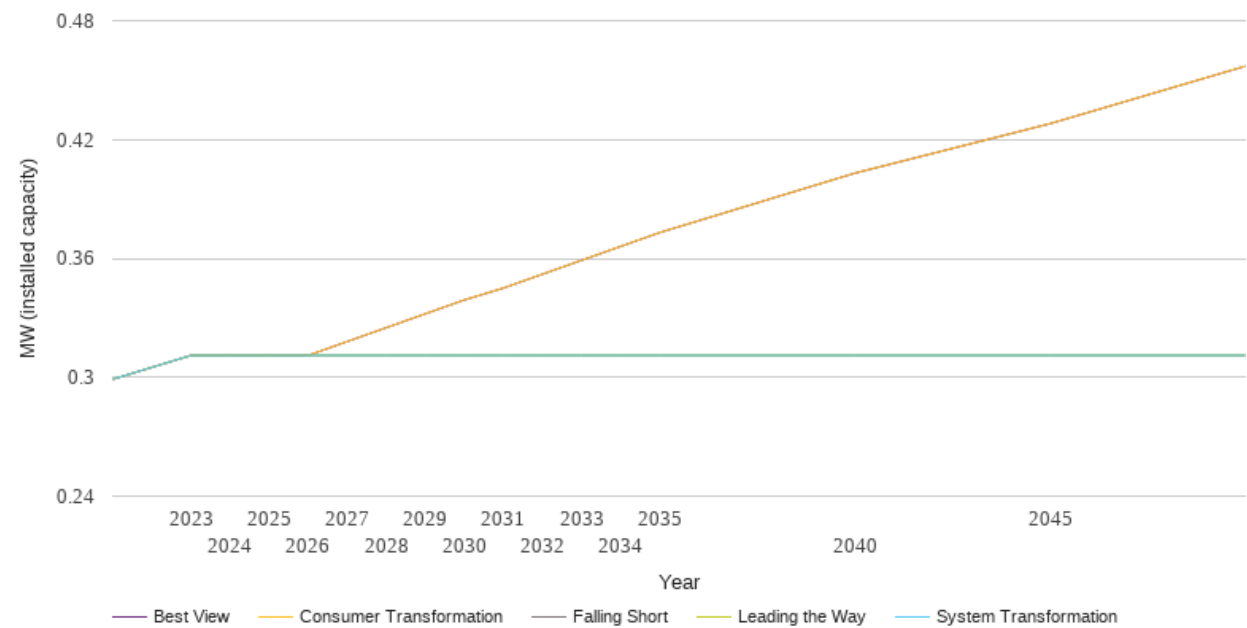
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	9084	11680	11680	12329	11680
2024	13355	17484	17484	17921	17484
2025	17459	21625	21625	22819	21625
2026	25532	32311	32311	33495	32311
2027	33606	39804	39804	44260	39804
2028	50828	60652	60652	67420	60652
2029	61513	75547	75547	82645	75547
2030	66588	77913	77913	85064	77913
2031	73890	84733	84733	91379	84733
2032	79521	87150	87150	93737	87150
2033	85153	89566	89566	94465	89566
2034	90396	91983	91983	95193	91983
2035	95250	94400	94400	95921	94400
2040	99167	99167	99167	99000	99167
2045	99167	99167	99167	99167	99167
2050	99167	99167	99167	99167	99167



Technology Summary: Other Distributed Generation

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

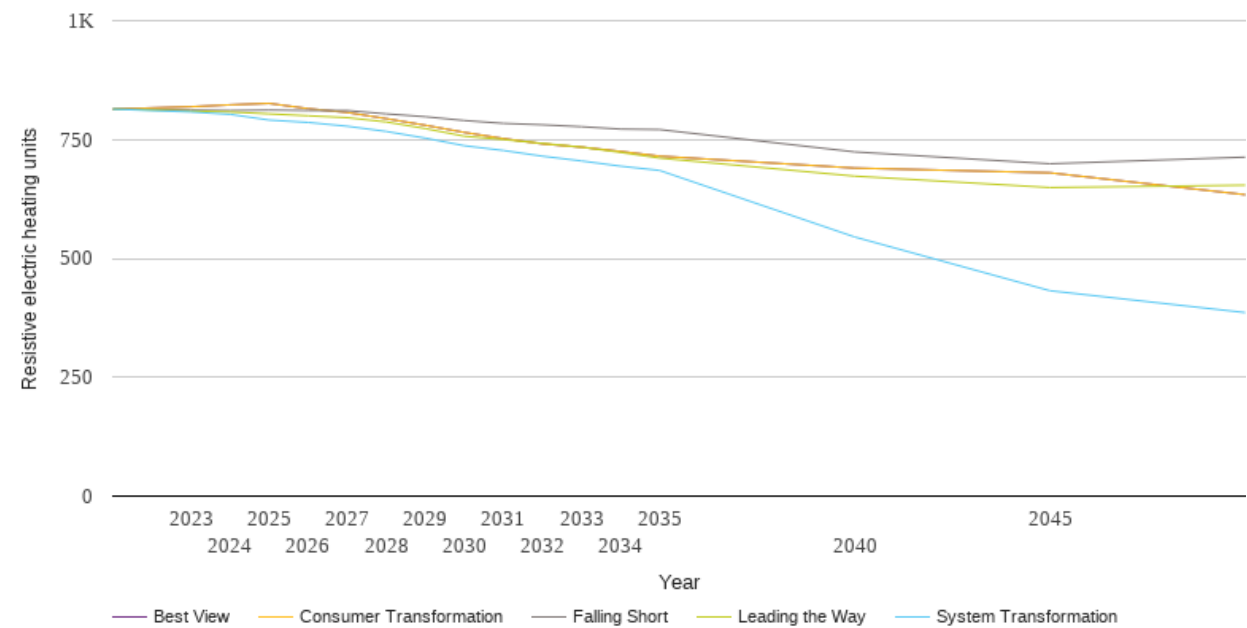
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.3	0.3	0.3	0.3	0.3
2023	0.3	0.3	0.3	0.3	0.3
2024	0.3	0.3	0.3	0.3	0.3
2025	0.3	0.3	0.3	0.3	0.3
2026	0.3	0.3	0.3	0.3	0.3
2027	0.3	0.3	0.3	0.3	0.3
2028	0.3	0.3	0.3	0.3	0.3
2029	0.3	0.3	0.3	0.3	0.3
2030	0.3	0.3	0.3	0.3	0.3
2031	0.3	0.3	0.3	0.3	0.3
2032	0.3	0.3	0.4	0.3	0.4
2033	0.3	0.3	0.4	0.3	0.4
2034	0.3	0.3	0.4	0.3	0.4
2035	0.3	0.3	0.4	0.3	0.4
2040	0.3	0.3	0.4	0.3	0.4
2045	0.3	0.3	0.4	0.3	0.4
2050	0.3	0.3	0.5	0.3	0.5



Technology Summary: Resistive electric heating

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

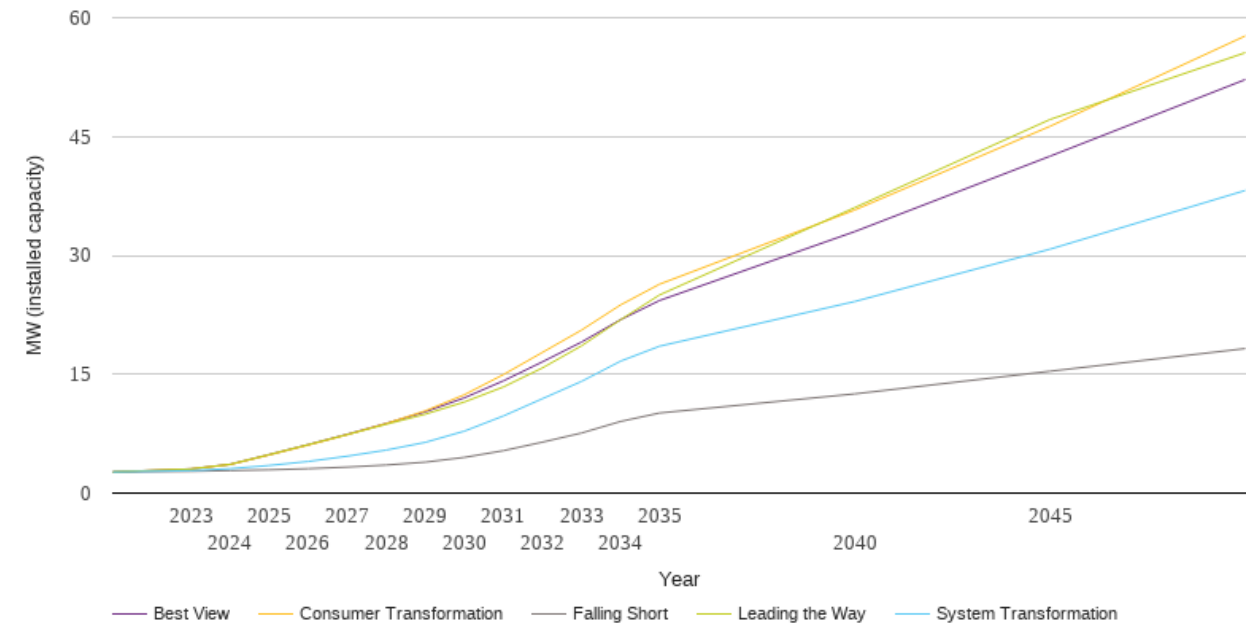
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	814	814	814	814	814
2023	812	808	819	810	819
2024	811	803	823	808	823
2025	812	791	826	804	826
2026	811	786	815	800	815
2027	811	778	807	796	807
2028	804	767	794	787	794
2029	798	753	780	773	780
2030	790	737	765	757	765
2031	784	727	752	750	752
2032	781	715	741	742	741
2033	777	705	734	734	734
2034	772	694	725	723	725
2035	771	685	715	711	715
2040	724	545	690	673	690
2045	699	432	680	649	680
2050	713	386	634	654	634



Technology Summary: Solar Generation

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

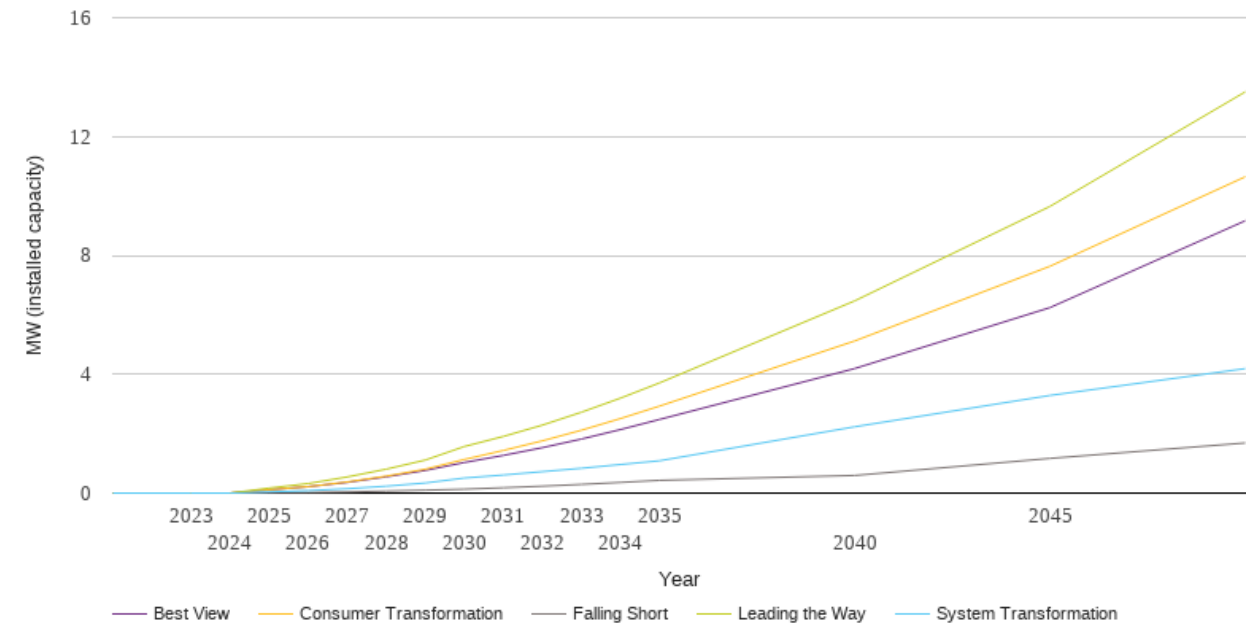
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	2.7	2.7	2.7	2.7	2.7
2023	2.7	2.8	3.0	3.0	3.0
2024	2.8	3.1	3.6	3.6	3.6
2025	2.9	3.5	4.8	4.9	4.9
2026	3.1	4.0	6.1	6.1	6.1
2027	3.3	4.7	7.4	7.4	7.4
2028	3.5	5.4	8.8	8.7	8.8
2029	3.9	6.4	10.4	10.0	10.3
2030	4.5	7.8	12.4	11.5	12.0
2031	5.4	9.7	15.0	13.4	14.2
2032	6.4	11.9	17.8	15.8	16.6
2033	7.6	14.1	20.6	18.6	19.1
2034	9.0	16.6	23.7	21.9	21.9
2035	10.1	18.5	26.4	25.0	24.3
2040	12.5	24.2	35.7	36.0	33.0
2045	15.4	30.8	46.3	47.1	42.5
2050	18.2	38.2	57.7	55.6	52.2



Technology Summary: Storage

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

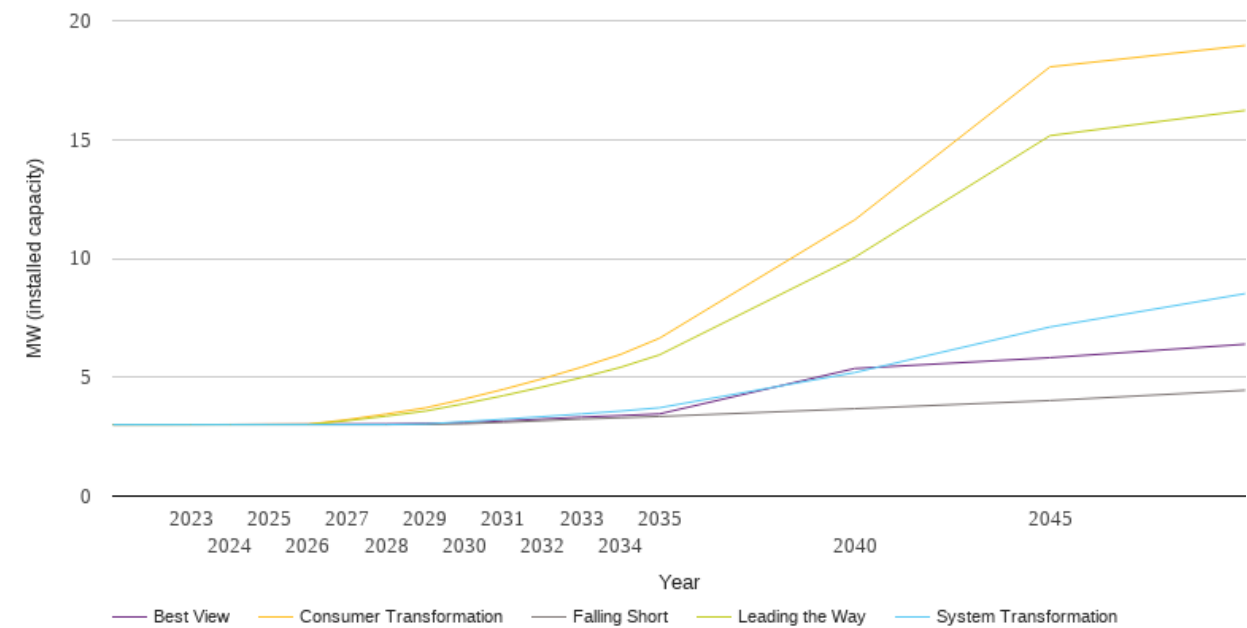
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.1	0.2	0.1
2026	0.0	0.1	0.2	0.3	0.2
2027	0.0	0.1	0.4	0.5	0.4
2028	0.1	0.2	0.6	0.8	0.5
2029	0.1	0.3	0.8	1.1	0.8
2030	0.1	0.5	1.1	1.6	1.0
2031	0.2	0.6	1.4	1.9	1.3
2032	0.2	0.7	1.8	2.3	1.5
2033	0.3	0.8	2.1	2.7	1.8
2034	0.4	1.0	2.5	3.2	2.1
2035	0.4	1.1	2.9	3.7	2.5
2040	0.6	2.2	5.1	6.5	4.2
2045	1.2	3.3	7.6	9.6	6.2
2050	1.7	4.2	10.6	13.5	9.2



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	3.0	3.0	3.0	3.0	3.0
2023	3.0	3.0	3.0	3.0	3.0
2024	3.0	3.0	3.0	3.0	3.0
2025	3.0	3.0	3.0	3.0	3.0
2026	3.0	3.0	3.0	3.0	3.0
2027	3.0	3.0	3.2	3.2	3.0
2028	3.0	3.0	3.5	3.4	3.0
2029	3.0	3.0	3.7	3.6	3.1
2030	3.0	3.1	4.1	3.9	3.1
2031	3.1	3.2	4.5	4.2	3.2
2032	3.2	3.3	4.9	4.6	3.2
2033	3.2	3.5	5.4	5.0	3.3
2034	3.3	3.6	6.0	5.4	3.4
2035	3.3	3.7	6.6	5.9	3.5
2040	3.7	5.2	11.6	10.0	5.4
2045	4.0	7.1	18.1	15.2	5.8
2050	4.5	8.5	19.0	16.2	6.4



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))
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