

Distribution Future Energy Scenarios 2022

Local Authority:
Bristol, City of

What are Distribution Future Energy Scenarios?

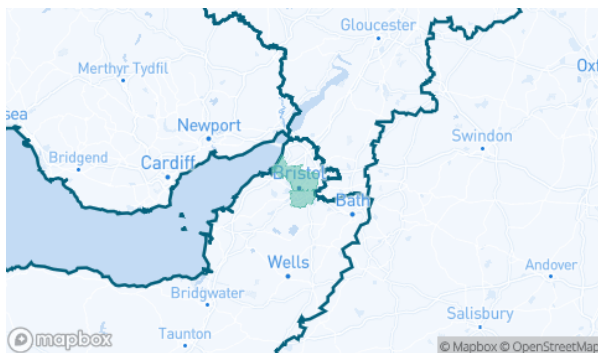
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Bristol, City of 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 Bristol, City of 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	5229	14114	12344	12344	5253	127094	80294	80292	5292
Domestic	New dwellings	0	1046	1029	1029	1063	1217	1125	1125	1067
Electric vehicles	Electric vehicles	5805	49646	59554	109986	109583	341648	304920	313614	248949
EV Charge Point	EV charge points	2730	21089	28862	54709	59636	167505	153261	158427	166036
Heat pumps	Heat pump installations	1346	16570	11390	41425	62219	113649	125060	204264	177647
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	6.3	1.1	9.4	0.4	8.2	2.3	14.6
Non domestic	Floorspace (metres squared) of new I&C developments	0	224937	257887	257887	285423	447325	446400	446400	447325
Other Distributed Generation	MW (installed capacity)	30.7	26.1	30.1	30.1	20.4	16.4	16.4	18.0	29.7
Resistive electric heating	Resistive electric heating units	38015	31962	30848	32127	31090	21352	10393	22238	22914
Solar Generation	MW (installed capacity)	25.4	35.9	56.7	95.3	101.5	77.2	174.3	334.7	356.4
Storage	MW (installed capacity)	0.0	7.8	10.4	15.5	18.1	19.4	39.3	93.1	116.6
Wind	MW (installed capacity)	13.2	19.9	19.9	19.9	19.9	22.0	24.5	29.0	29.0

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

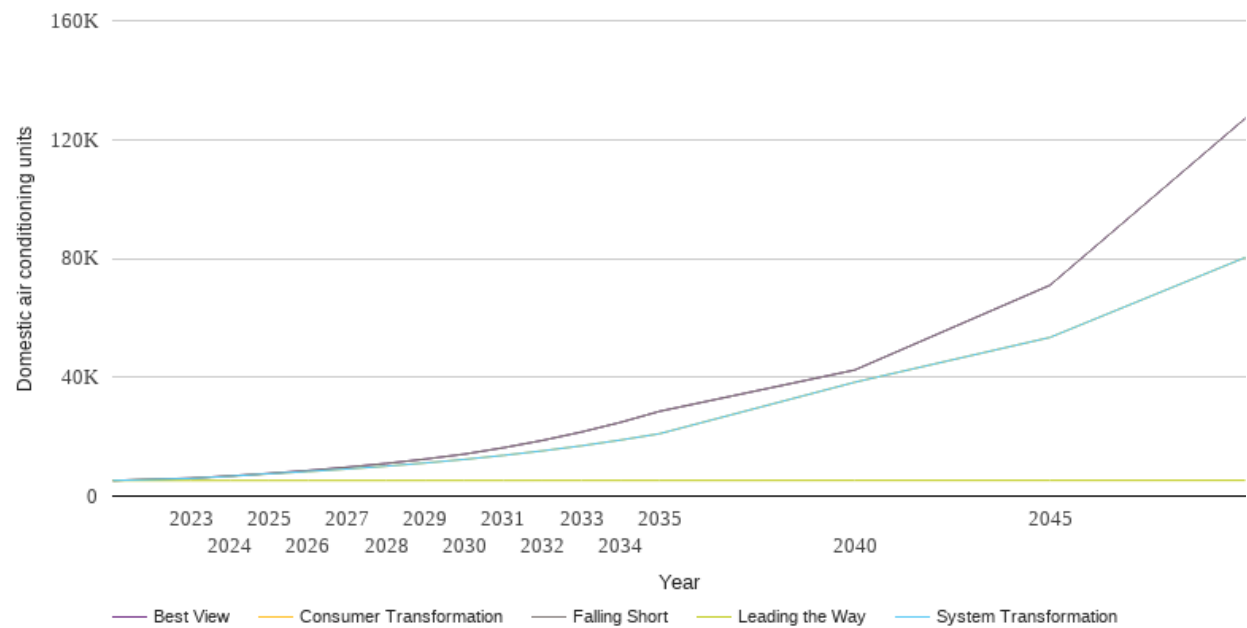
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

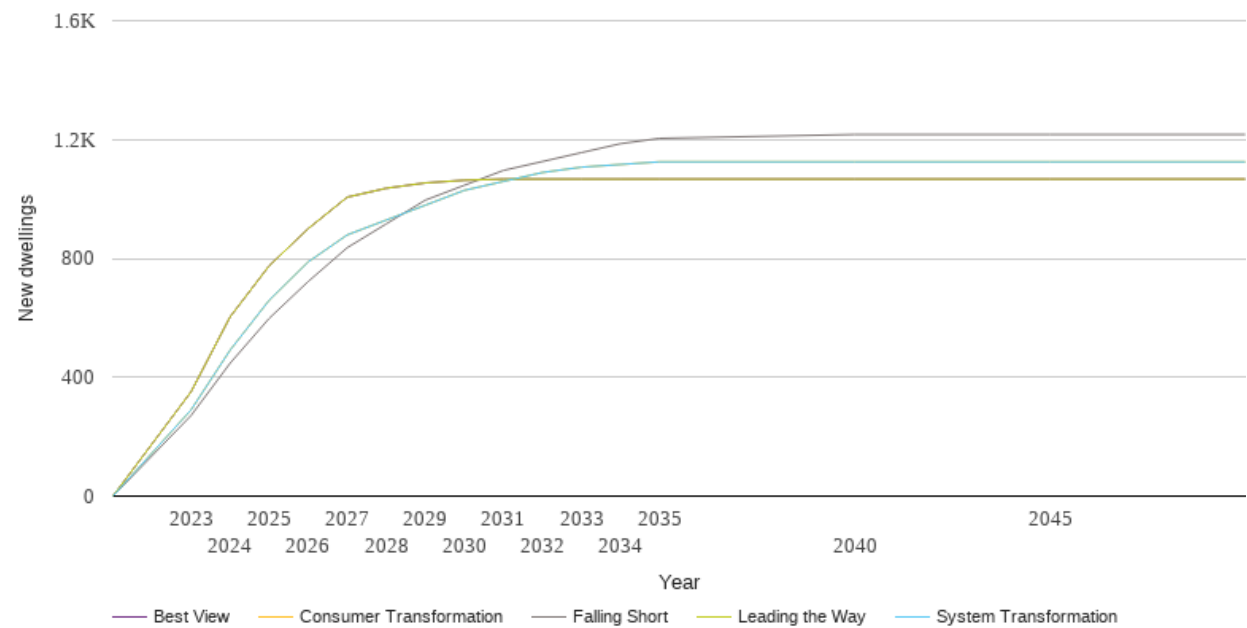
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	5229	5229	5229	5229	5229
2023	6029	5934	5934	5233	6029
2024	6767	6664	6664	5237	6767
2025	7624	7513	7513	5241	7624
2026	8601	8263	8263	5245	8601
2027	9721	9109	9109	5245	9721
2028	10979	10072	10072	5249	10979
2029	12453	11150	11150	5253	12453
2030	14114	12344	12344	5253	14114
2031	16265	13700	13700	5257	16265
2032	18732	15219	15219	5261	18732
2033	21565	16922	16922	5261	21565
2034	24812	18855	18855	5265	24812
2035	28523	20992	20992	5265	28523
2040	42432	38313	38313	5276	42432
2045	70969	53403	53402	5283	70969
2050	127094	80294	80292	5292	127094



Technology Summary: Domestic

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

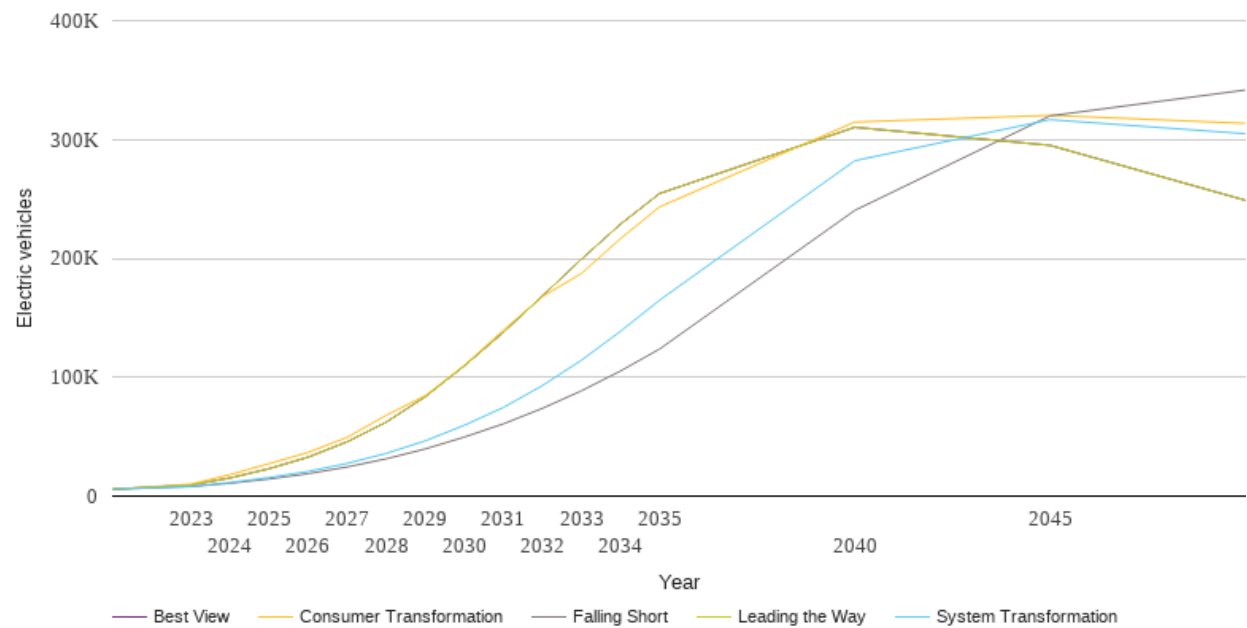
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	271	290	290	351	351
2024	447	491	491	603	603
2025	598	659	659	775	775
2026	722	788	788	900	900
2027	836	879	879	1006	1006
2028	916	929	929	1036	1036
2029	996	979	979	1054	1054
2030	1046	1029	1029	1063	1063
2031	1096	1059	1059	1067	1067
2032	1126	1089	1089	1067	1067
2033	1156	1107	1107	1067	1067
2034	1186	1116	1116	1067	1067
2035	1204	1125	1125	1067	1067
2040	1217	1125	1125	1067	1067
2045	1217	1125	1125	1067	1067
2050	1217	1125	1125	1067	1067



Technology Summary: Electric vehicles

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

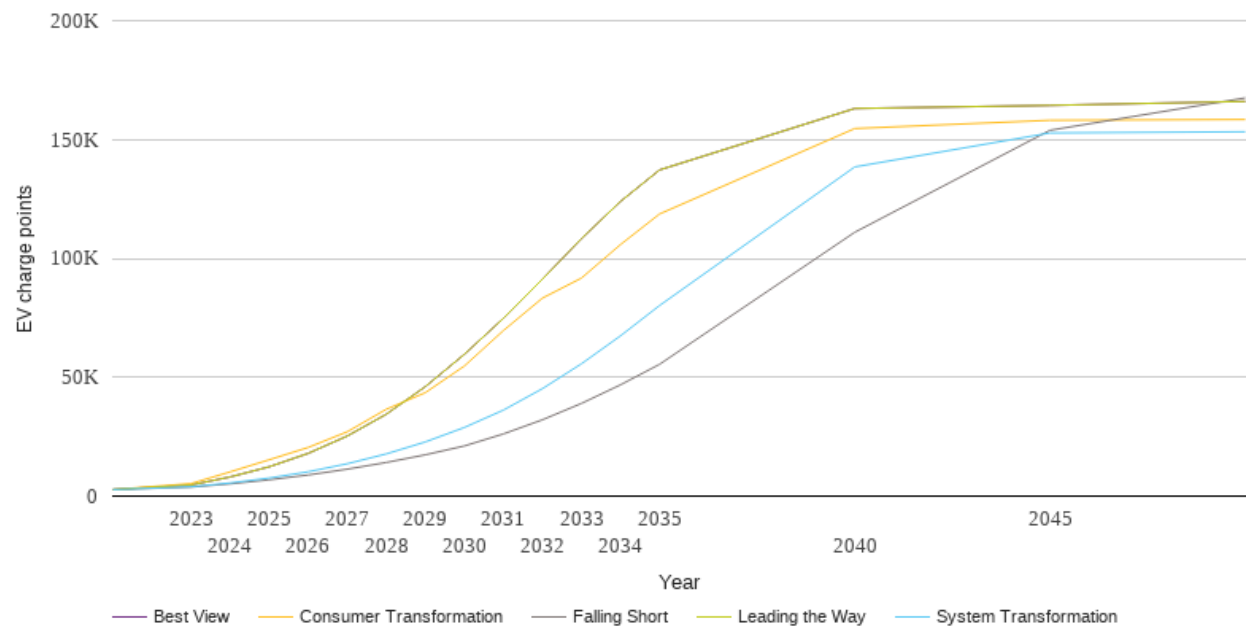
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	5805	5805	5805	5805	5805
2023	7993	8192	10043	9363	9363
2024	10826	11430	18102	15301	15301
2025	14393	15618	27293	23076	23076
2026	18858	20749	36778	32793	32793
2027	24527	27496	49476	45704	45704
2028	31368	35923	67984	62231	62231
2029	39680	46494	84545	83622	83622
2030	49646	59554	109986	109583	109583
2031	60790	74564	139633	137734	137734
2032	73819	92992	167850	168399	168399
2033	88582	114323	187325	199321	199321
2034	105261	138618	216656	228832	228832
2035	123690	164803	243333	254571	254571
2040	240383	282157	314707	310302	310302
2045	319898	316730	320390	295118	295118
2050	341648	304920	313614	248949	248949



Technology Summary: EV Charge Point

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

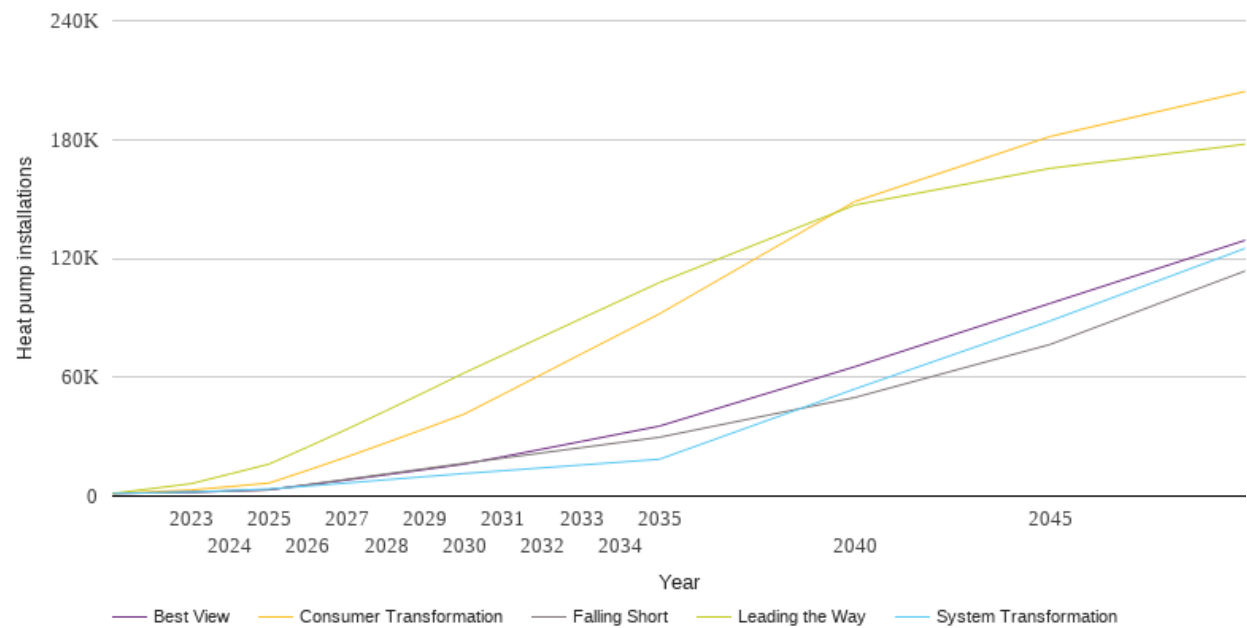
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	2730	2730	2730	2730	2730
2023	3801	3910	5266	4663	4663
2024	5161	5514	10175	8040	8040
2025	6847	7585	15274	12316	12316
2026	8881	10232	20460	17964	17964
2027	11326	13607	27056	25260	25260
2028	14132	17742	36526	34426	34426
2029	17370	22780	43502	46030	46030
2030	21089	28862	54709	59636	59636
2031	26145	36171	69620	74768	74768
2032	32103	45202	83283	91272	91272
2033	38989	55656	91713	108302	108302
2034	46809	67415	105808	123951	123951
2035	55438	80164	118680	137205	137205
2040	110992	138478	154626	163061	163061
2045	153893	152777	158109	164364	164364
2050	167505	153261	158427	166036	166036



Technology Summary: Heat pumps

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

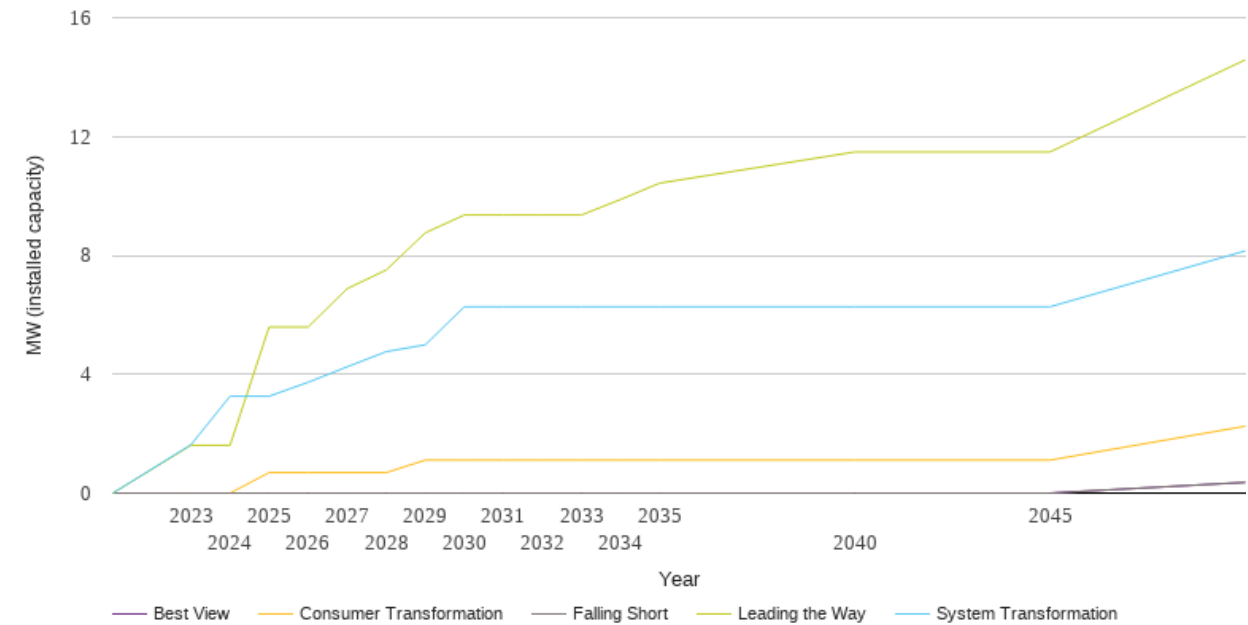
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1346	1346	1346	1346	1346
2023	1958	2064	3063	6261	1958
2024	2567	2789	4785	11184	2567
2025	3183	3592	6590	16189	3183
2026	5831	5078	13116	24883	5635
2027	8500	6622	19858	33833	8153
2028	11192	8236	26918	43143	10774
2029	13876	9828	34087	52590	13432
2030	16570	11390	41425	62219	16154
2031	19194	12810	51484	71312	19912
2032	21824	14251	61635	80490	23734
2033	24456	15703	71777	89631	27584
2034	27081	17150	81877	98712	31446
2035	29705	18621	92017	107822	35349
2040	49758	54059	148714	146930	65298
2045	76528	88389	181513	165448	97250
2050	113649	125060	204264	177647	129136



Technology Summary: Hydrogen electrolysis

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

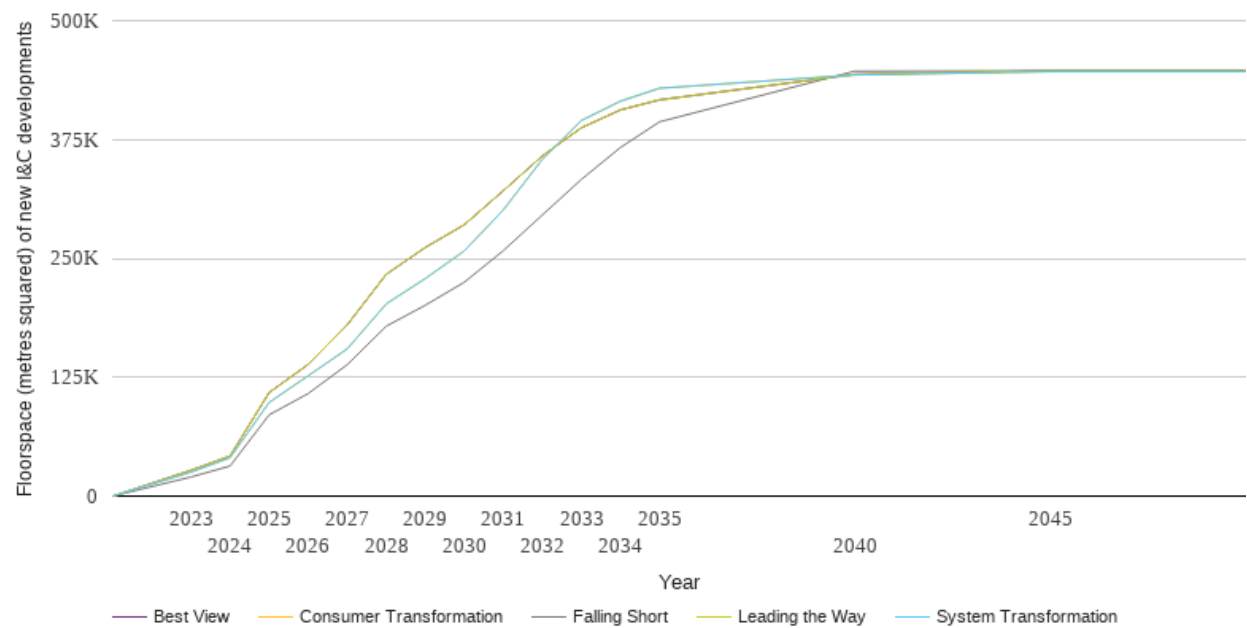
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	1.6	0.0	1.6	0.0
2024	0.0	3.3	0.0	1.6	0.0
2025	0.0	3.3	0.7	5.6	0.0
2026	0.0	3.7	0.7	5.6	0.0
2027	0.0	4.3	0.7	6.9	0.0
2028	0.0	4.8	0.7	7.5	0.0
2029	0.0	5.0	1.1	8.8	0.0
2030	0.0	6.3	1.1	9.4	0.0
2031	0.0	6.3	1.1	9.4	0.0
2032	0.0	6.3	1.1	9.4	0.0
2033	0.0	6.3	1.1	9.4	0.0
2034	0.0	6.3	1.1	9.9	0.0
2035	0.0	6.3	1.1	10.4	0.0
2040	0.0	6.3	1.1	11.5	0.0
2045	0.0	6.3	1.1	11.5	0.0
2050	0.4	8.2	2.3	14.6	0.4



Technology Summary: Non domestic

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

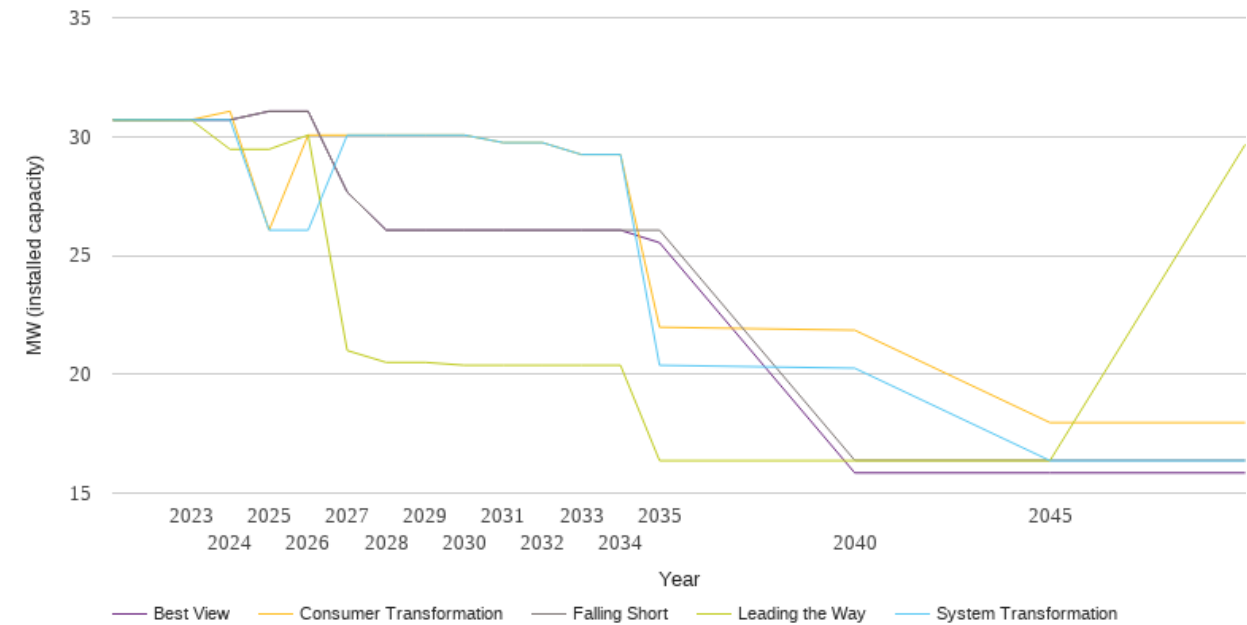
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	20110	25261	25261	27127	27127
2024	31613	40392	40392	42133	42133
2025	85421	98406	98406	108859	108859
2026	107830	126527	126527	138424	138424
2027	138147	154748	154748	180045	180045
2028	178694	202149	202149	233260	233260
2029	200694	228762	228762	261476	261476
2030	224937	257887	257887	285423	285423
2031	258197	301029	301029	321267	321267
2032	295718	354268	354268	357832	357832
2033	333149	395040	395040	387429	387429
2034	366689	415355	415355	406168	406168
2035	393628	428953	428953	416716	416716
2040	446832	442987	442987	443490	443490
2045	447325	446400	446400	447325	447325
2050	447325	446400	446400	447325	447325



Technology Summary: Other Distributed Generation

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

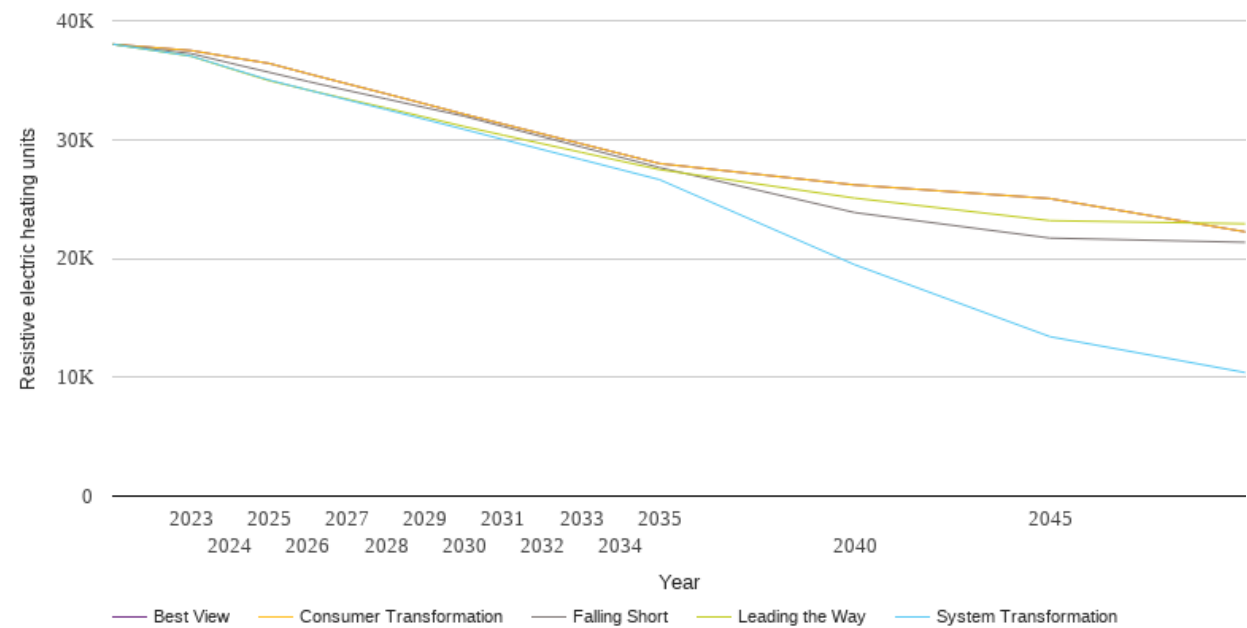
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	30.7	30.7	30.7	30.7	30.7
2023	30.7	30.7	30.7	30.7	30.7
2024	30.7	30.7	31.1	29.5	30.7
2025	31.1	26.1	26.1	29.5	31.1
2026	31.1	26.1	30.1	30.1	31.1
2027	27.7	30.1	30.1	21.0	27.7
2028	26.1	30.1	30.1	20.5	26.1
2029	26.1	30.1	30.1	20.5	26.1
2030	26.1	30.1	30.1	20.4	26.1
2031	26.1	29.7	29.7	20.4	26.1
2032	26.1	29.7	29.7	20.4	26.1
2033	26.1	29.2	29.2	20.4	26.1
2034	26.1	29.2	29.2	20.4	26.1
2035	26.1	20.4	22.0	16.4	25.5
2040	16.4	20.3	21.9	16.4	15.8
2045	16.4	16.4	18.0	16.4	15.8
2050	16.4	16.4	18.0	29.7	15.8



Technology Summary: Resistive electric heating

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

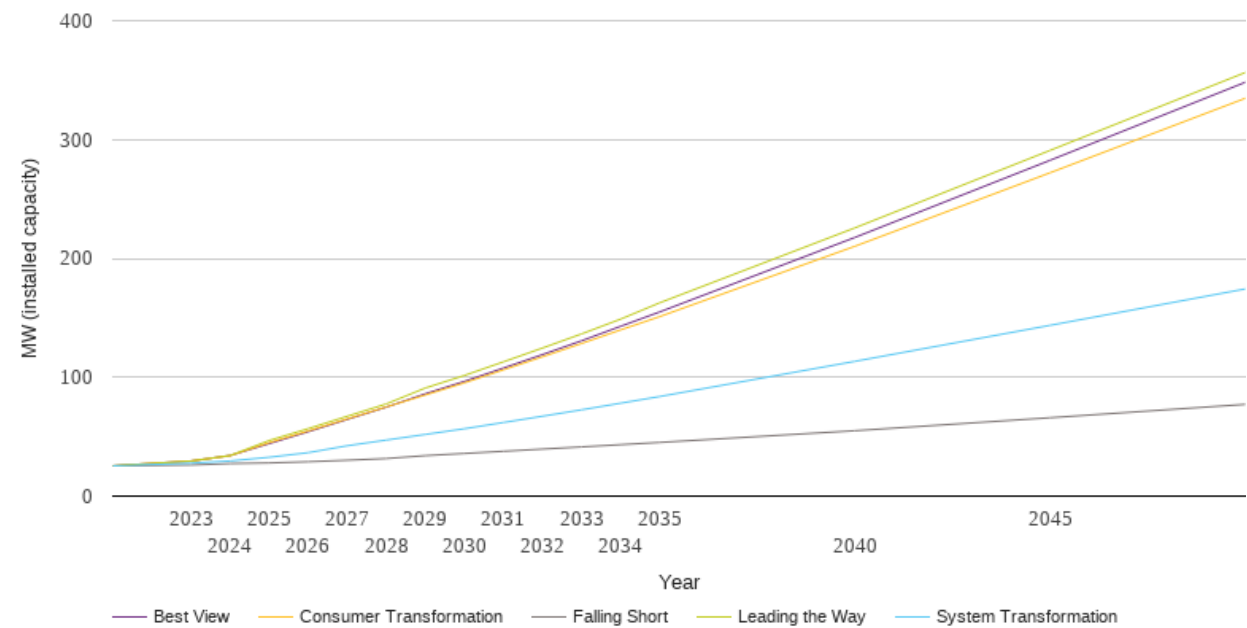
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	38015	38015	38015	38015	38015
2023	37234	37025	37490	37008	37490
2024	36433	36007	36938	35974	36938
2025	35658	35010	36403	34953	36403
2026	34882	34165	35539	34169	35539
2027	34133	33338	34687	33401	34687
2028	33417	32522	33849	32649	33849
2029	32686	31688	32993	31875	32993
2030	31962	30848	32127	31090	32127
2031	31091	30001	31297	30365	31297
2032	30237	29155	30469	29644	30469
2033	29376	28315	29640	28921	29640
2034	28508	27469	28808	28195	28808
2035	27646	26626	27979	27469	27979
2040	23855	19465	26179	25071	26179
2045	21709	13415	25033	23177	25033
2050	21352	10393	22238	22914	22238



Technology Summary: Solar Generation

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

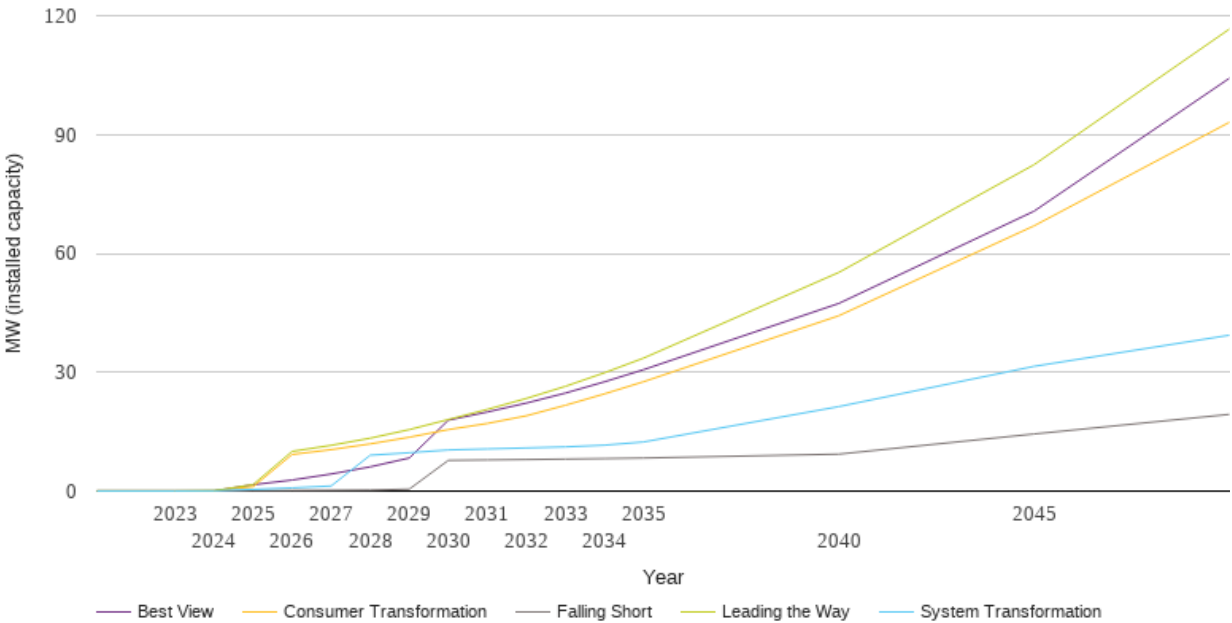
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	25.4	25.4	25.4	25.4	25.4
2023	26.2	27.7	29.5	29.5	29.5
2024	27.4	29.5	34.0	34.1	34.1
2025	27.9	32.7	44.9	46.7	44.1
2026	28.9	36.5	54.8	56.8	54.2
2027	30.2	42.3	64.9	67.2	64.5
2028	31.6	47.1	75.0	77.5	74.8
2029	34.0	51.9	85.0	90.9	86.1
2030	35.9	56.7	95.3	101.5	96.5
2031	37.7	61.9	106.2	112.9	107.7
2032	39.5	67.2	117.2	124.5	119.0
2033	41.4	72.6	128.3	136.4	130.6
2034	43.3	78.1	139.8	148.9	142.8
2035	45.1	83.8	151.0	162.6	154.9
2040	55.0	113.3	210.1	225.6	217.6
2045	65.9	143.7	272.0	290.8	282.5
2050	77.2	174.3	334.7	356.4	348.2



Technology Summary: Storage

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

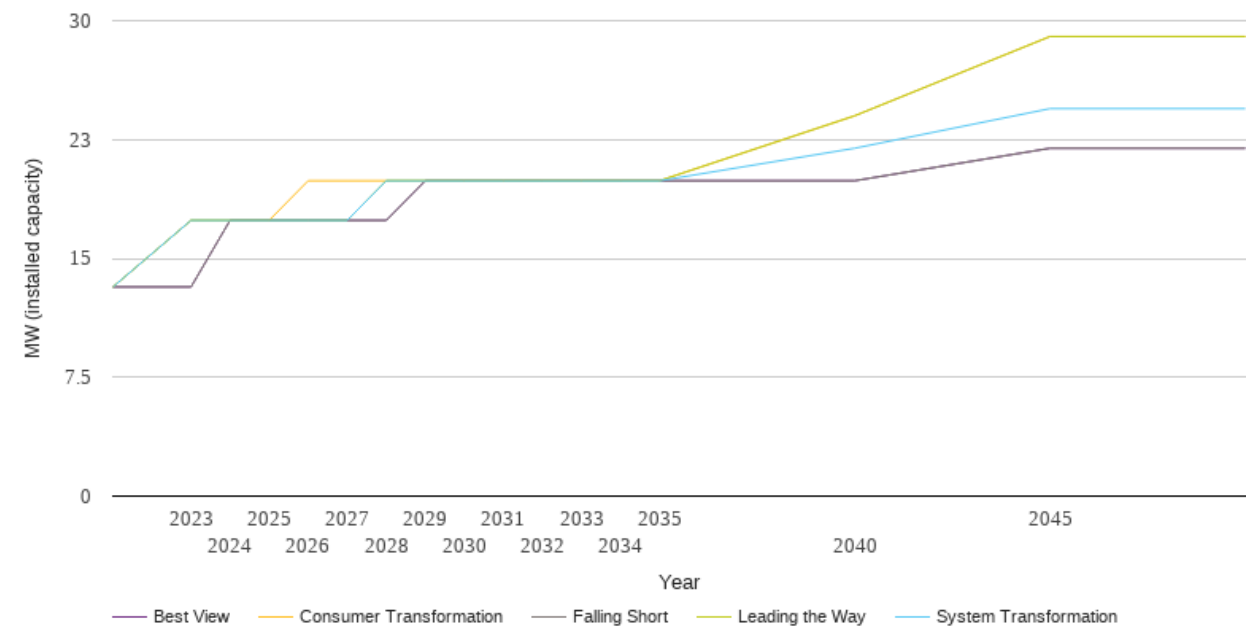
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.1	0.1	0.1	0.0
2025	0.1	0.4	1.1	1.6	1.6
2026	0.2	0.8	9.2	10.0	2.8
2027	0.2	1.3	10.5	11.6	4.3
2028	0.3	9.1	11.9	13.4	6.1
2029	0.5	9.7	13.6	15.5	8.3
2030	7.8	10.4	15.5	18.1	17.9
2031	7.9	10.6	17.1	20.6	20.0
2032	8.0	10.9	19.0	23.4	22.2
2033	8.1	11.2	21.7	26.4	24.7
2034	8.2	11.6	24.5	29.9	27.6
2035	8.3	12.4	27.6	33.6	30.6
2040	9.3	21.3	44.3	55.2	47.4
2045	14.4	31.5	66.9	82.4	70.6
2050	19.4	39.3	93.1	116.6	104.2



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	13.2	13.2	13.2	13.2	13.2
2023	13.2	17.4	17.4	17.4	13.2
2024	17.4	17.4	17.4	17.4	17.4
2025	17.4	17.4	17.4	17.4	17.4
2026	17.4	17.4	19.9	17.4	17.4
2027	17.4	17.4	19.9	17.4	17.4
2028	17.4	19.9	19.9	19.9	17.4
2029	19.9	19.9	19.9	19.9	19.9
2030	19.9	19.9	19.9	19.9	19.9
2031	19.9	19.9	19.9	19.9	19.9
2032	19.9	19.9	19.9	19.9	19.9
2033	19.9	19.9	19.9	19.9	19.9
2034	19.9	19.9	19.9	19.9	19.9
2035	19.9	19.9	19.9	19.9	19.9
2040	19.9	22.0	24.0	24.0	19.9
2045	22.0	24.5	29.0	29.0	22.0
2050	22.0	24.5	29.0	29.0	22.0



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))
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