

Distribution Future Energy Scenarios 2022

Local Authority:
Charnwood

What are Distribution Future Energy Scenarios?

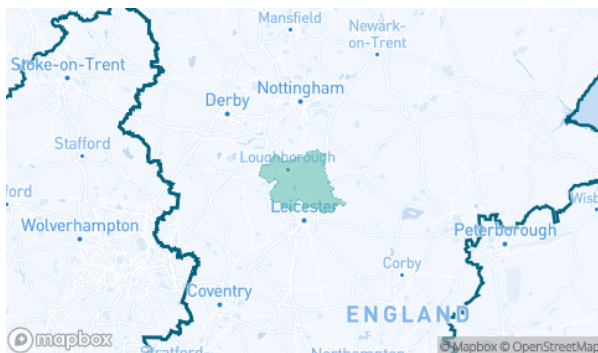
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Charnwood 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 Charnwood 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	326	1517	1151	1151	326	44427	22212	22212	326
Domestic	New dwellings	0	7519	8410	8410	10313	17923	17841	17841	17781
Electric vehicles	Electric vehicles	2795	17922	21778	40037	39833	123706	108596	110701	89584
EV Charge Point	EV charge points	1365	8339	11937	22365	24525	68694	65497	69589	69151
Heat pumps	Heat pump installations	291	4696	5183	14333	22607	40553	47947	86889	76377
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.7	0.0	0.8	1.2	5.1	2.5	6.0
Non domestic	Floorspace (metres squared) of new I&C developments	0	727078	867074	867074	925557	1635801	1634540	1634540	1635801
Other Distributed Generation	MW (installed capacity)	3.8	3.9	3.9	5.4	4.6	3.9	3.1	3.0	5.3
Resistive electric heating	Resistive electric heating units	7007	6478	6071	6388	6273	5774	2729	4965	5218
Solar Generation	MW (installed capacity)	16.7	23.9	34.2	48.6	46.2	66.2	129.5	191.3	188.9
Storage	MW (installed capacity)	0.0	0.2	1.5	3.5	4.6	5.5	14.0	35.3	45.8
Wind	MW (installed capacity)	3.0	3.1	3.2	4.9	4.5	4.9	10.3	25.6	21.7

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

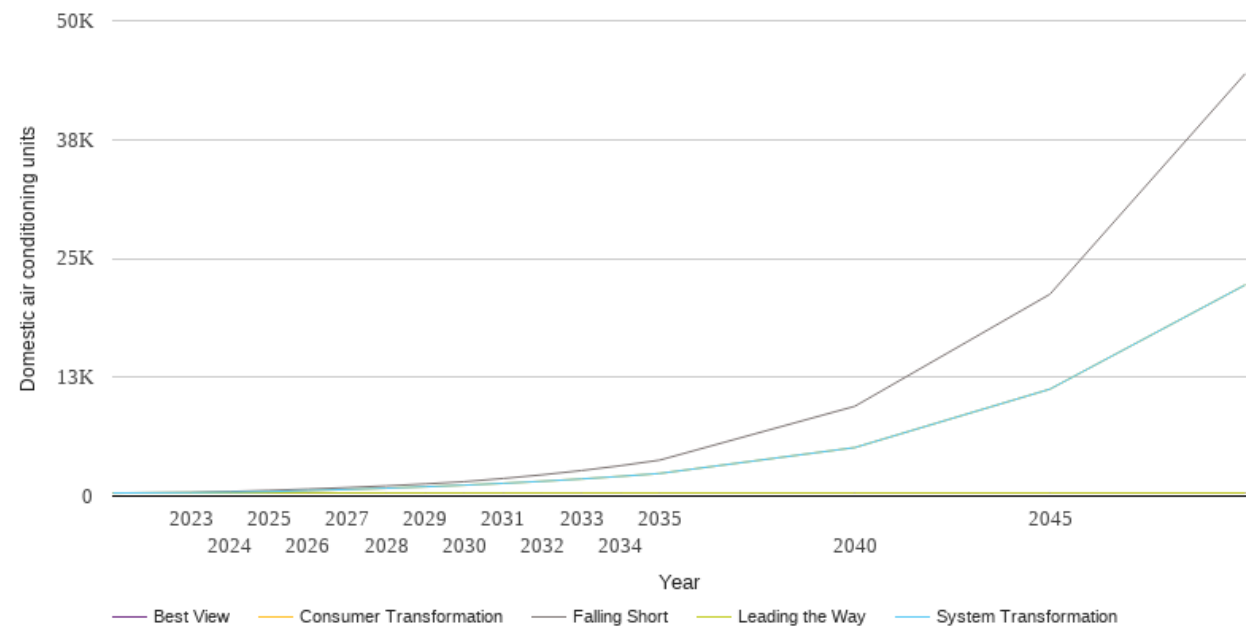
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

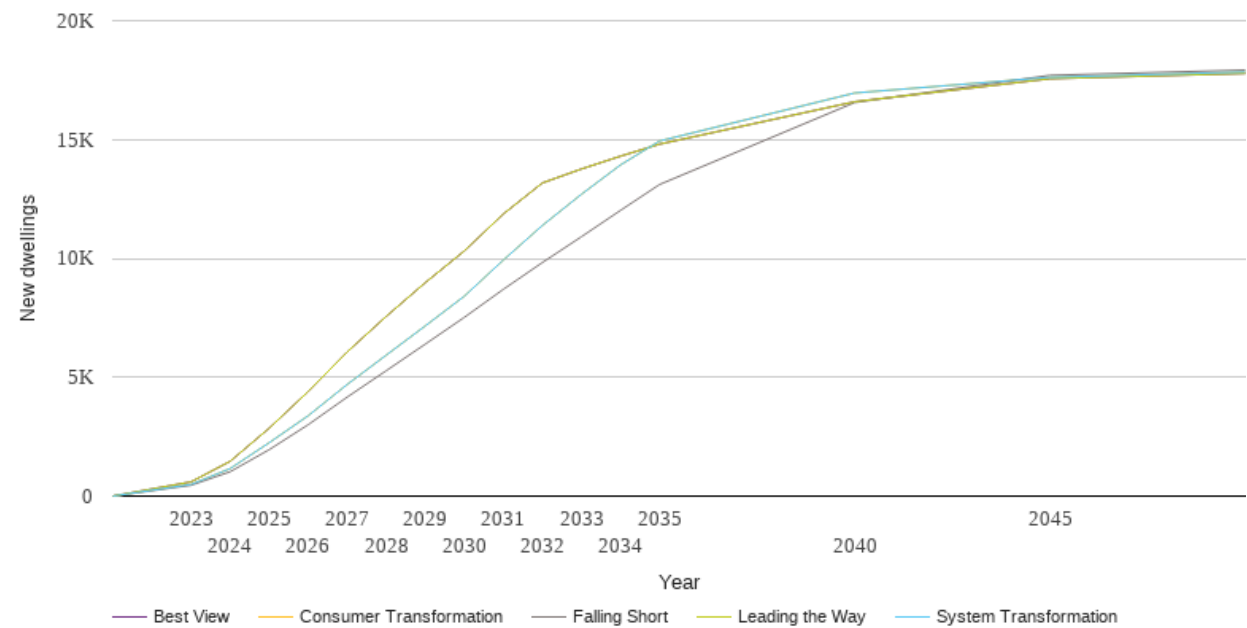
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	326	326	326	326	326
2023	376	370	370	326	326
2024	478	415	415	326	326
2025	600	468	468	326	326
2026	738	575	575	326	326
2027	896	694	694	326	326
2028	1074	829	829	326	326
2029	1282	981	981	326	326
2030	1517	1151	1151	326	326
2031	1854	1344	1344	326	326
2032	2241	1559	1559	326	326
2033	2686	1801	1801	326	326
2034	3196	2075	2075	326	326
2035	3780	2378	2378	326	326
2040	9445	5101	5101	326	326
2045	21234	11250	11250	326	326
2050	44427	22212	22212	326	326



Technology Summary: Domestic

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

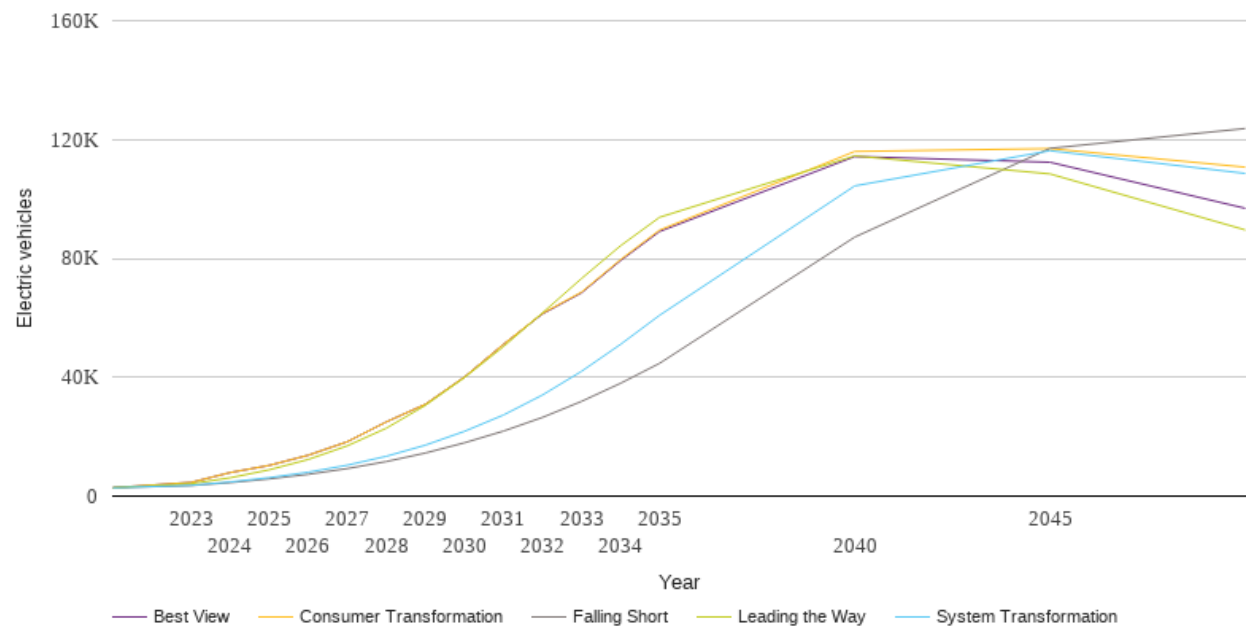
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	455	491	491	598	598
2024	1024	1155	1155	1461	1461
2025	1951	2243	2243	2854	2854
2026	3002	3379	3379	4396	4396
2027	4164	4696	4696	6066	6066
2028	5275	5930	5930	7560	7560
2029	6394	7160	7160	8979	8979
2030	7519	8410	8410	10313	10313
2031	8699	9931	9931	11869	11869
2032	9826	11386	11386	13174	13174
2033	10912	12698	12698	13761	13761
2034	12019	13931	13931	14299	14299
2035	13108	14938	14938	14805	14805
2040	16558	16958	16958	16590	16590
2045	17701	17619	17619	17559	17559
2050	17923	17841	17841	17781	17781



Technology Summary: Electric vehicles

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

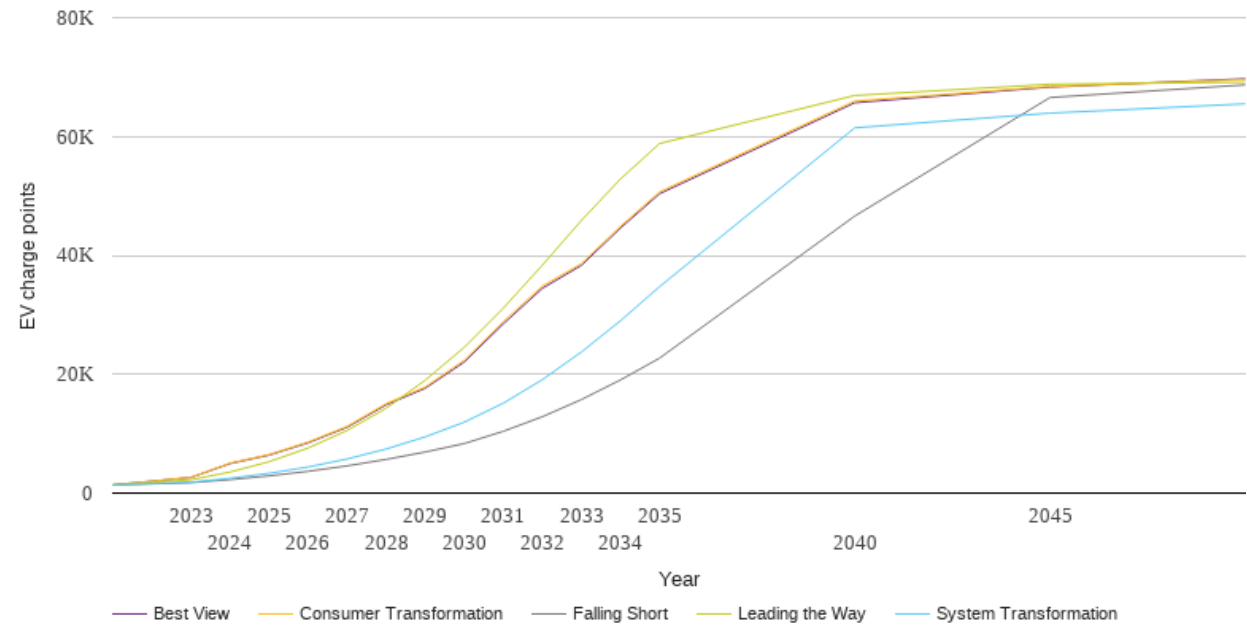
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	2795	2795	2795	2795	2795
2023	3549	3615	4591	4160	4591
2024	4532	4745	7910	6151	7909
2025	5772	6199	10322	8832	10322
2026	7323	8032	13738	12318	13746
2027	9262	10397	18275	16900	18284
2028	11620	13388	24956	22835	24963
2029	14485	17139	30887	30515	30892
2030	17922	21778	40037	39833	40046
2031	21868	27275	51077	50271	51085
2032	26479	34011	61477	61633	61295
2033	31867	41978	68637	73210	68401
2034	37955	51051	79575	84232	79238
2035	44677	60837	89516	93828	89046
2040	87168	104397	115982	114503	114285
2045	117037	116239	116963	108431	112362
2050	123706	108596	110701	89584	96860



Technology Summary: EV Charge Point

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

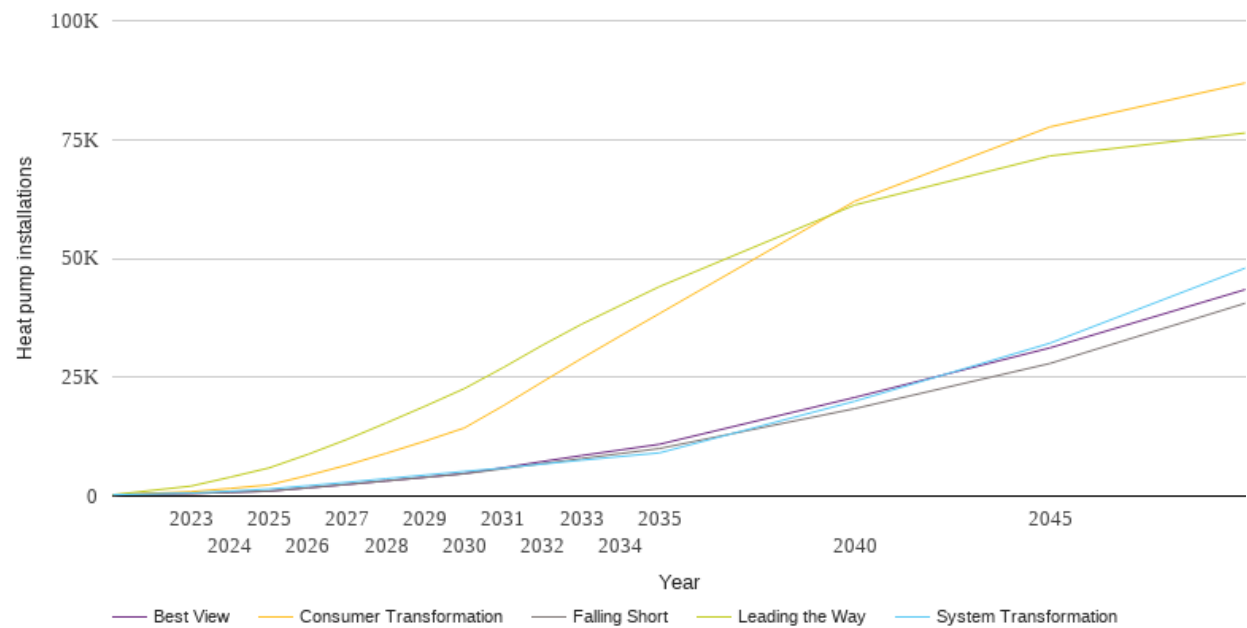
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1365	1365	1365	1365	1365
2023	1761	1839	2654	2247	2630
2024	2266	2485	5044	3542	4972
2025	2896	3326	6482	5283	6401
2026	3668	4393	8579	7584	8471
2027	4584	5742	11231	10544	11098
2028	5667	7422	15059	14281	14864
2029	6915	9468	17861	19002	17653
2030	8339	11937	22365	24525	22066
2031	10405	15130	28862	31129	28489
2032	12854	19087	34844	38363	34466
2033	15743	23743	38613	45898	38337
2034	19043	29005	44895	52864	44612
2035	22701	34731	50674	58819	50382
2040	46622	61464	65976	66910	65692
2045	66560	63938	68427	68797	68328
2050	68694	65497	69589	69151	69716



Technology Summary: Heat pumps

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

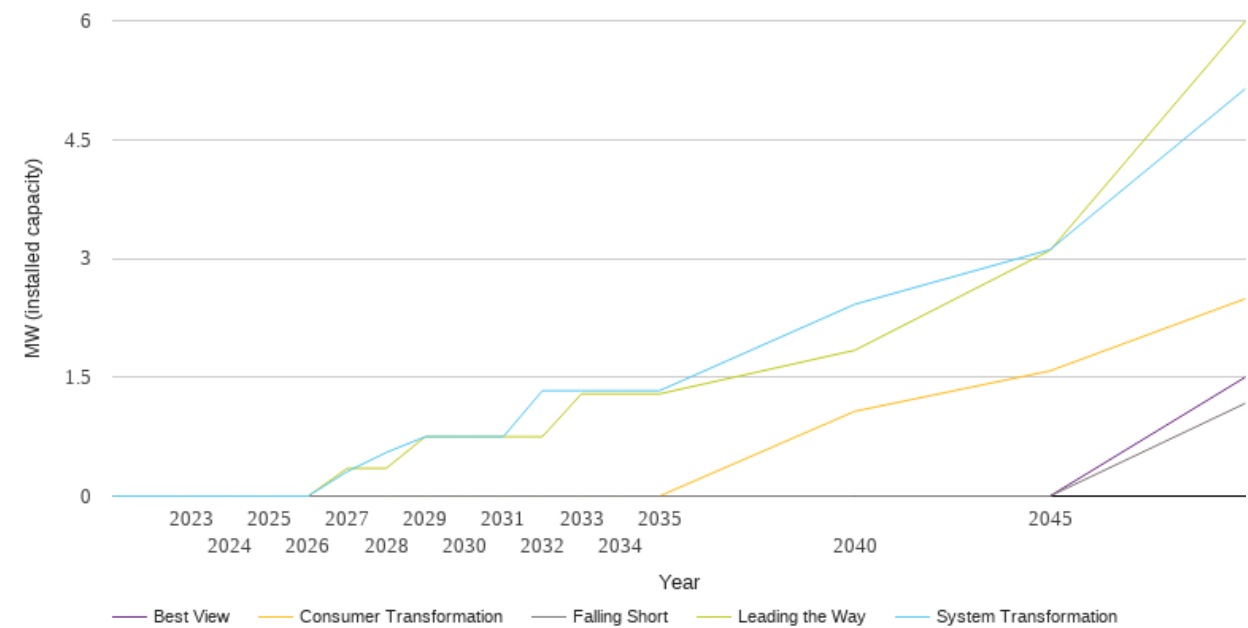
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	291	291	291	291	291
2023	530	639	925	2103	530
2024	779	1030	1606	3970	779
2025	1042	1487	2358	5931	1042
2026	1749	2188	4352	8794	1725
2027	2474	2897	6535	11940	2440
2028	3208	3673	8994	15384	3188
2029	3945	4426	11579	18928	3951
2030	4696	5183	14333	22607	4746
2031	5756	5909	19017	27046	5966
2032	6831	6737	24018	31735	7270
2033	7895	7547	28934	36139	8527
2034	8952	8327	33708	40108	9708
2035	10010	9097	38405	44071	10905
2040	18394	19956	62023	61231	20754
2045	27897	32162	77653	71549	31178
2050	40553	47947	86889	76377	43441



Technology Summary: Hydrogen electrolysis

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

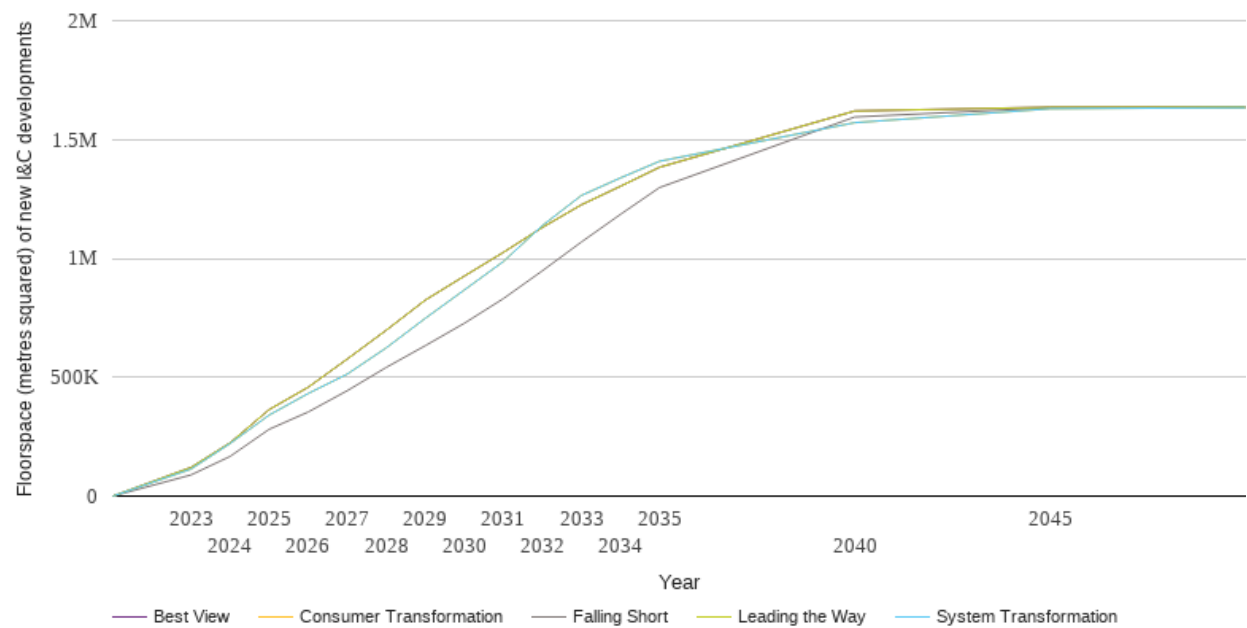
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.3	0.0	0.3	0.0
2028	0.0	0.5	0.0	0.3	0.0
2029	0.0	0.7	0.0	0.8	0.0
2030	0.0	0.7	0.0	0.8	0.0
2031	0.0	0.7	0.0	0.8	0.0
2032	0.0	1.3	0.0	0.8	0.0
2033	0.0	1.3	0.0	1.3	0.0
2034	0.0	1.3	0.0	1.3	0.0
2035	0.0	1.3	0.0	1.3	0.0
2040	0.0	2.4	1.1	1.8	0.0
2045	0.0	3.1	1.6	3.1	0.0
2050	1.2	5.1	2.5	6.0	1.5



Technology Summary: Non domestic

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

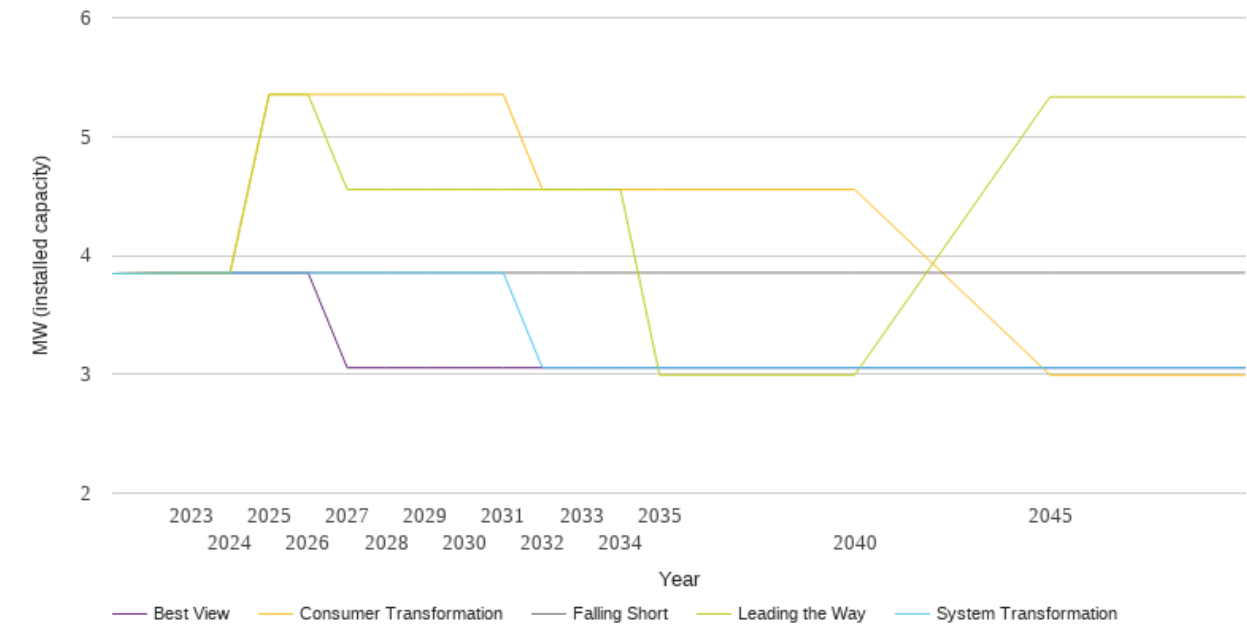
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	89065	113701	113701	120648	120648
2024	166852	221036	221036	224005	224005
2025	280953	340776	340776	363743	363743
2026	353703	431462	431462	457871	457871
2027	443256	513084	513084	576428	576428
2028	541344	623628	623628	697772	697772
2029	632807	747908	747908	824508	824508
2030	727078	867074	867074	925557	925557
2031	830749	986739	986739	1025366	1025366
2032	947920	1138308	1138308	1130277	1130277
2033	1069092	1264876	1264876	1225586	1225586
2034	1185273	1338544	1338544	1303496	1303496
2035	1298012	1408612	1408612	1383405	1383405
2040	1594801	1570990	1570990	1620151	1620151
2045	1633801	1629540	1629540	1635801	1635801
2050	1635801	1634540	1634540	1635801	1635801



Technology Summary: Other Distributed Generation

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

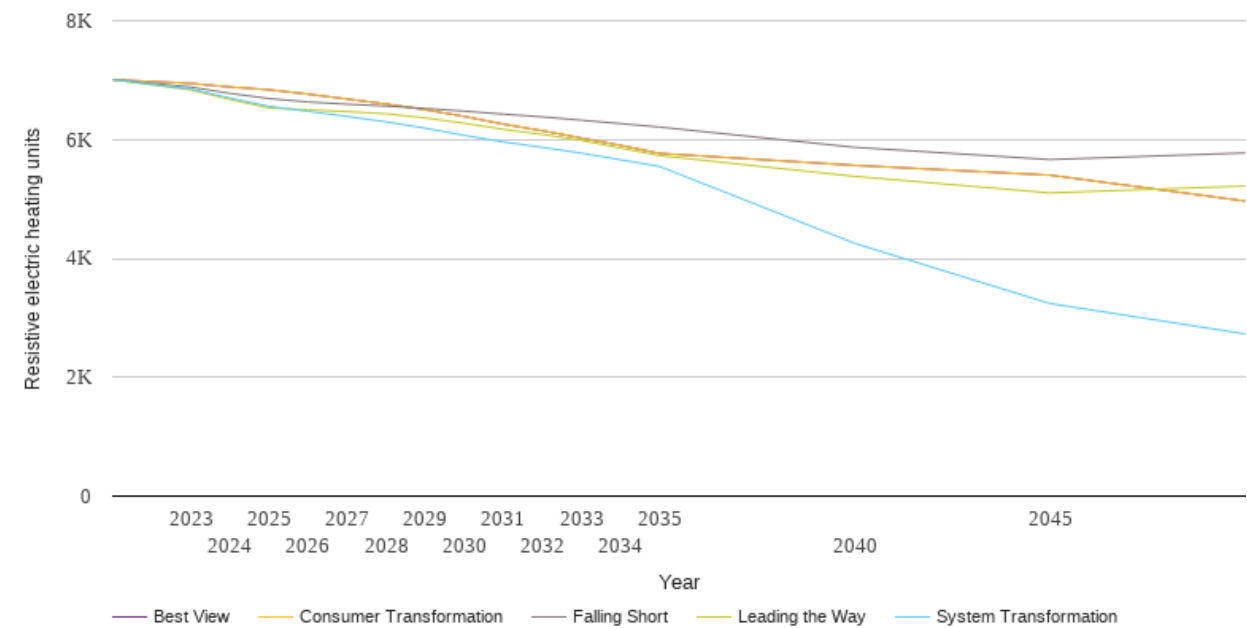
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	3.8	3.8	3.8	3.8	3.8
2023	3.9	3.9	3.9	3.9	3.9
2024	3.9	3.9	3.9	3.9	3.9
2025	3.9	3.9	5.4	5.4	3.9
2026	3.9	3.9	5.4	5.4	3.9
2027	3.9	3.9	5.4	4.6	3.1
2028	3.9	3.9	5.4	4.6	3.1
2029	3.9	3.9	5.4	4.6	3.1
2030	3.9	3.9	5.4	4.6	3.1
2031	3.9	3.9	5.4	4.6	3.1
2032	3.9	3.1	4.6	4.6	3.1
2033	3.9	3.1	4.6	4.6	3.1
2034	3.9	3.1	4.6	4.6	3.1
2035	3.9	3.1	4.6	3.0	3.1
2040	3.9	3.1	4.6	3.0	3.1
2045	3.9	3.1	3.0	5.3	3.1
2050	3.9	3.1	3.0	5.3	3.1



Technology Summary: Resistive electric heating

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

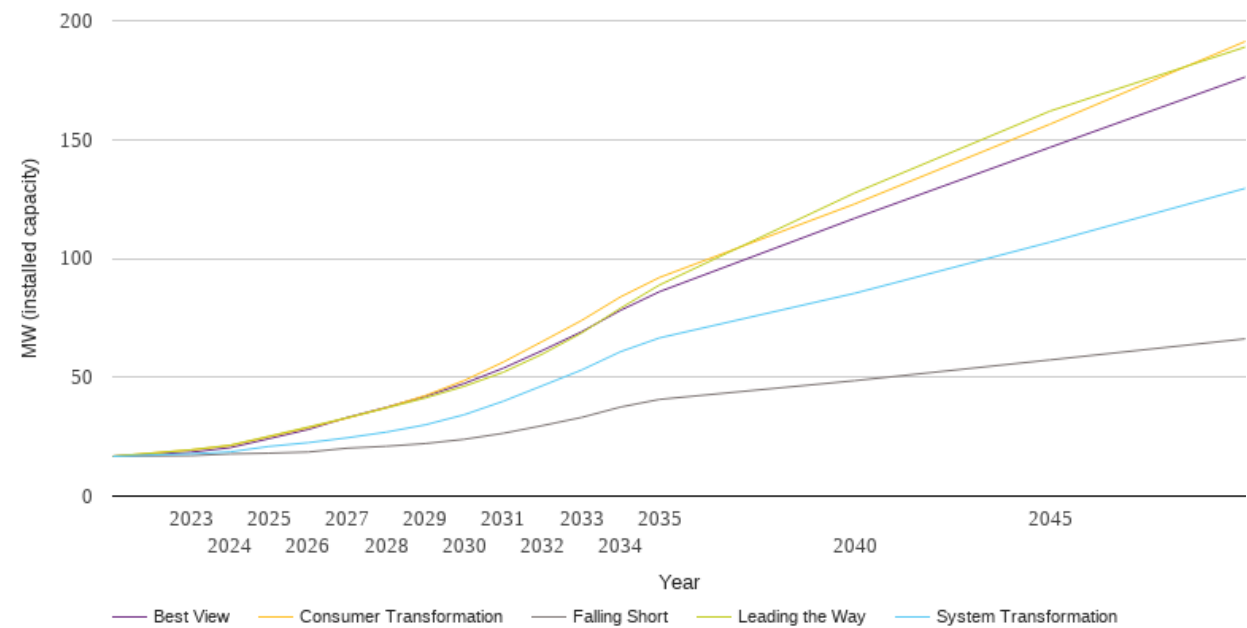
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	7007	7007	7007	7007	7007
2023	6882	6849	6944	6834	6944
2024	6777	6699	6885	6673	6885
2025	6689	6557	6837	6532	6837
2026	6632	6475	6764	6500	6764
2027	6595	6388	6681	6470	6681
2028	6563	6297	6598	6434	6598
2029	6523	6191	6502	6363	6502
2030	6478	6071	6388	6273	6388
2031	6427	5959	6258	6171	6258
2032	6381	5868	6148	6086	6148
2033	6325	5771	6024	5986	6024
2034	6268	5659	5902	5857	5902
2035	6210	5548	5767	5729	5767
2040	5869	4253	5566	5380	5566
2045	5663	3240	5401	5102	5401
2050	5774	2729	4965	5218	4965



Technology Summary: Solar Generation

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

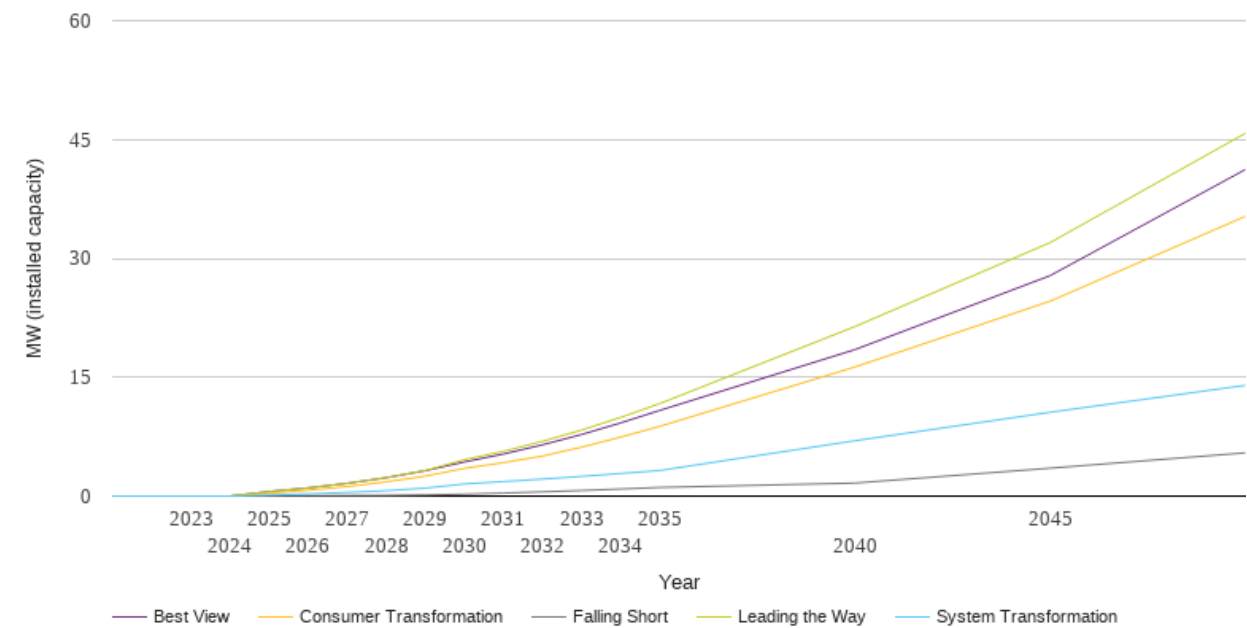
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	16.7	16.7	16.7	16.7	16.7
2023	17.0	17.8	19.4	19.5	18.5
2024	17.7	18.6	21.3	21.4	20.4
2025	18.1	20.9	25.0	25.2	24.2
2026	18.5	22.5	28.8	29.0	28.0
2027	20.2	24.5	32.8	33.0	33.0
2028	21.0	26.9	37.2	37.1	37.3
2029	22.1	30.0	42.3	41.3	42.0
2030	23.9	34.2	48.6	46.2	47.4
2031	26.4	39.9	56.4	52.1	53.8
2032	29.6	46.4	65.1	59.8	61.2
2033	33.1	53.0	73.8	68.6	69.1
2034	37.4	60.7	83.8	79.0	78.1
2035	40.7	66.6	92.0	88.8	86.0
2040	48.6	85.3	122.9	127.5	116.9
2045	57.3	106.8	156.5	162.0	146.7
2050	66.2	129.5	191.3	188.9	176.3



Technology Summary: Storage

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

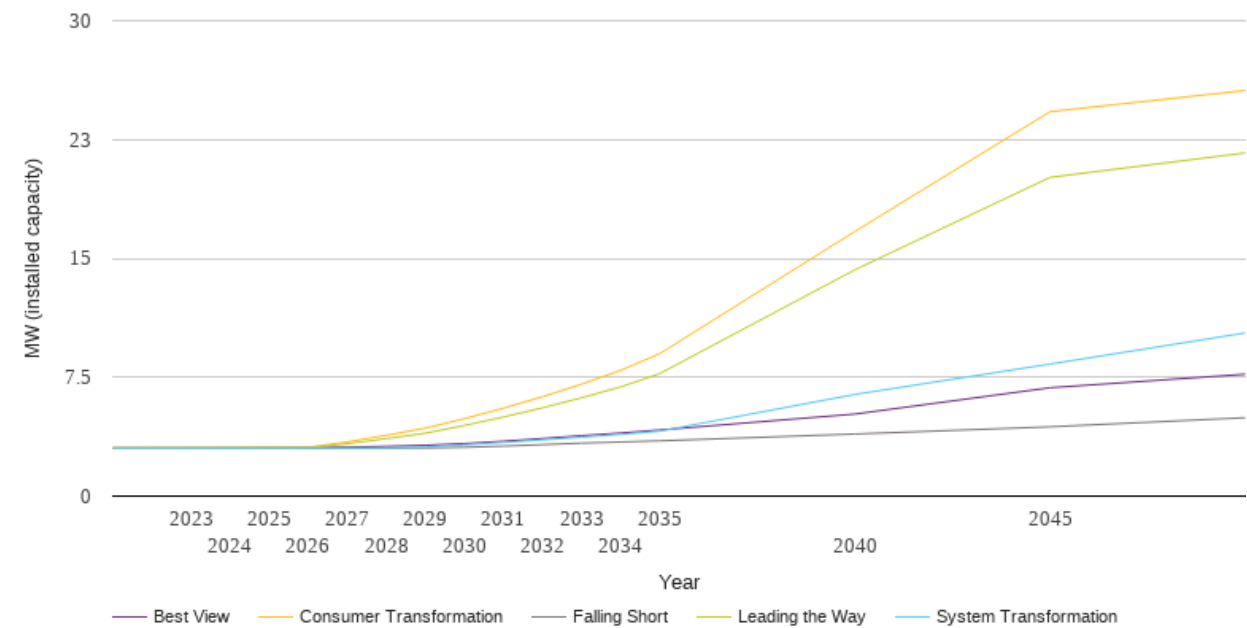
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.1	0.1	0.4	0.6	0.6
2026	0.1	0.3	0.7	1.0	1.0
2027	0.1	0.5	1.2	1.6	1.6
2028	0.1	0.7	1.8	2.3	2.3
2029	0.1	1.0	2.5	3.2	3.2
2030	0.2	1.5	3.5	4.6	4.3
2031	0.4	1.8	4.2	5.6	5.3
2032	0.5	2.1	5.0	6.9	6.5
2033	0.7	2.5	6.2	8.3	7.8
2034	0.9	2.9	7.4	9.9	9.2
2035	1.1	3.2	8.8	11.7	10.8
2040	1.6	7.0	16.3	21.4	18.5
2045	3.5	10.6	24.6	32.0	27.8
2050	5.5	14.0	35.3	45.8	41.2



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	3.1	3.0	3.0
2026	3.0	3.0	3.1	3.0	3.0
2027	3.0	3.0	3.4	3.3	3.1
2028	3.0	3.0	3.8	3.6	3.1
2029	3.0	3.1	4.3	4.0	3.2
2030	3.1	3.2	4.9	4.5	3.3
2031	3.2	3.4	5.5	5.0	3.5
2032	3.2	3.5	6.3	5.6	3.6
2033	3.3	3.7	7.1	6.2	3.8
2034	3.4	3.9	7.9	6.9	4.0
2035	3.5	4.1	9.0	7.7	4.2
2040	3.9	6.4	16.7	14.3	5.2
2045	4.4	8.3	24.3	20.1	6.8
2050	4.9	10.3	25.6	21.7	7.7



National Grid Electricity Distribution PLC 09223384)
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