

Distribution Future Energy Scenarios 2022

Local Authority:
Dudley

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 Dudley covered by the NGED licence areas.



Scenario Summary

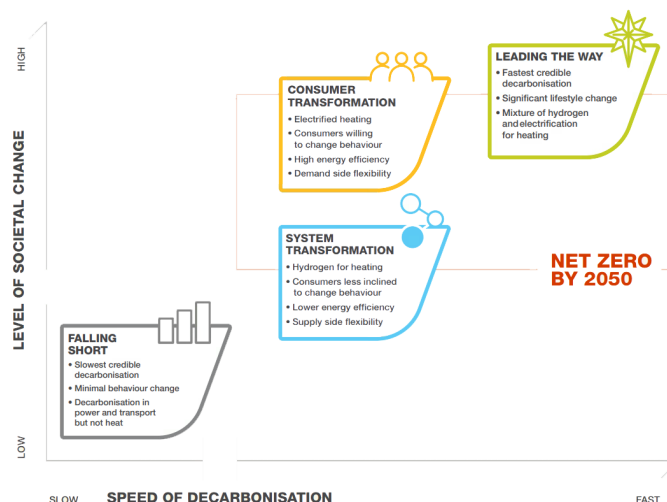
This DFES scenario framework includes three scenarios that are compliant with UK government targets of Net Zero greenhouse gas emissions by 2050. A summary of each scenario is below:

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 Dudley 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	996	3359	2751	2751	996	93713	47188	47187	996
Domestic	New dwellings	0	5305	5673	5673	6485	7197	7009	7009	6869
Electric vehicles	Electric vehicles	3380	27515	34936	64529	64507	202146	183624	182669	149122
EV Charge Point	EV charge points	1688	12541	18954	35949	39357	114764	114287	118417	119710
Heat pumps	Heat pump installations	129	5673	3899	19444	32384	65876	76388	132636	117693
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.6	0.2	1.1	0.5	2.3	1.1	4.2
Non domestic	Floorspace (metres squared) of new I&C developments	0	76856	89193	89193	94031	122810	122157	122157	122810
Other Distributed Generation	MW (installed capacity)	15.2	15.0	15.0	15.0	14.7	3.0	4.0	2.7	3.3
Resistive electric heating	Resistive electric heating units	18860	15627	15124	15974	15339	10446	4787	10768	11197
Solar Generation	MW (installed capacity)	12.1	19.0	32.1	56.5	57.3	45.9	105.3	206.8	214.0
Storage	MW (installed capacity)	0.0	1.1	2.8	6.0	8.5	10.0	25.0	60.1	73.5
Wind	MW (installed capacity)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1

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.

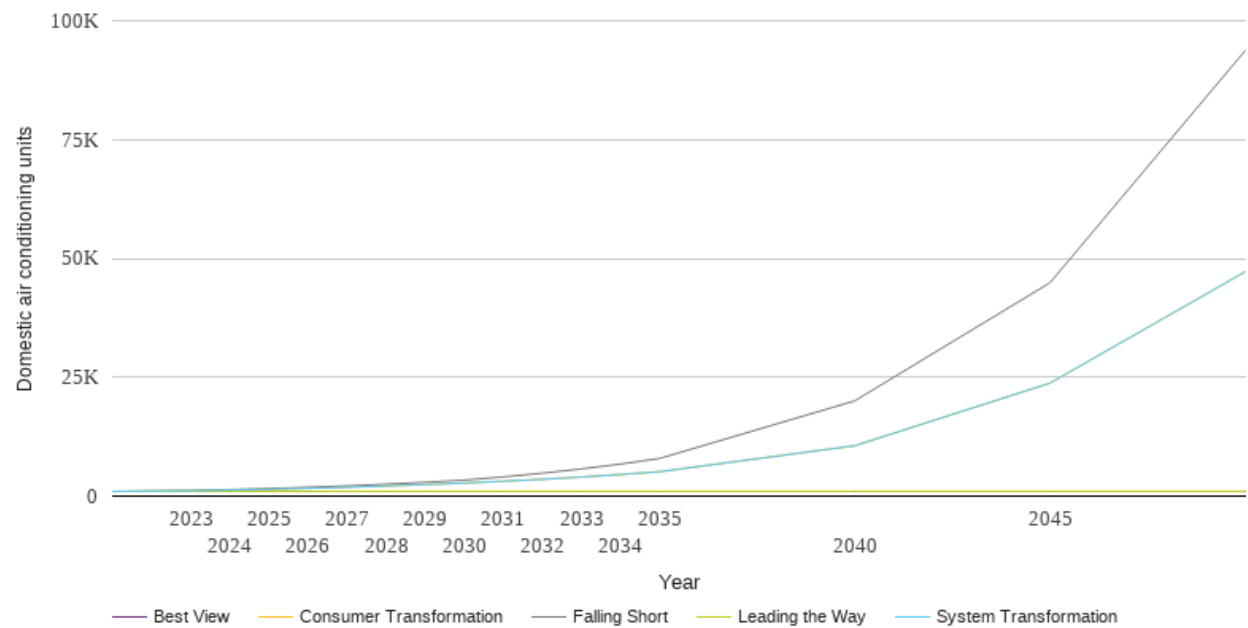
If you have any comments or queries regarding these reports, please contact

nged.energyplanning@nationalgrid.co.uk.

Technology Summary: Air conditioning

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

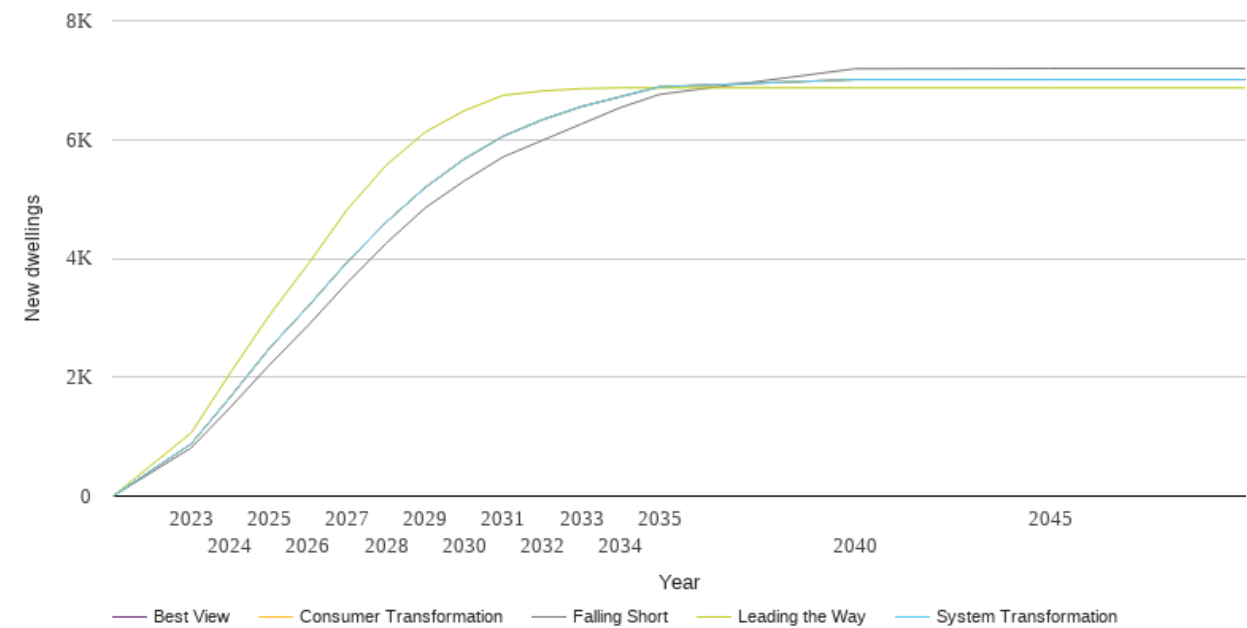
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	996	996	996	996	996
2023	1149	1131	1131	996	996
2024	1350	1270	1270	996	996
2025	1584	1432	1432	996	996
2026	1850	1635	1635	996	996
2027	2156	1866	1866	996	996
2028	2502	2129	2129	996	996
2029	2904	2424	2424	996	996
2030	3359	2751	2751	996	996
2031	4039	3123	3123	996	996
2032	4819	3540	3540	996	996
2033	5714	4007	4007	996	996
2034	6741	4538	4537	996	996
2035	7914	5125	5124	996	996
2040	20035	10601	10600	996	996
2045	44867	23757	23756	996	996
2050	93713	47188	47187	996	996



Technology Summary: Domestic

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

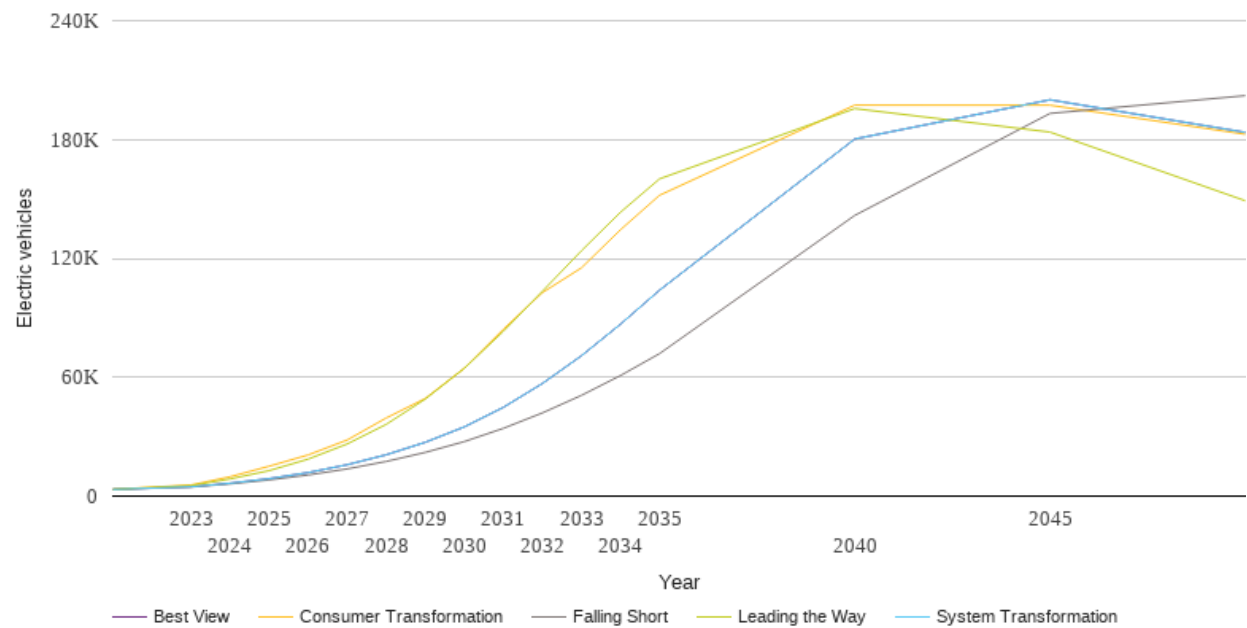
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	810	877	877	1061	877
2024	1488	1663	1663	2067	1663
2025	2201	2481	2481	3036	2481
2026	2871	3193	3193	3904	3193
2027	3589	3937	3937	4823	3937
2028	4256	4611	4611	5570	4611
2029	4852	5195	5195	6127	5195
2030	5305	5673	5673	6485	5673
2031	5710	6057	6057	6745	6057
2032	5986	6333	6333	6817	6333
2033	6262	6554	6554	6855	6554
2034	6538	6721	6721	6869	6721
2035	6759	6888	6888	6869	6888
2040	7190	7009	7009	6869	7009
2045	7197	7009	7009	6869	7009
2050	7197	7009	7009	6869	7009



Technology Summary: Electric vehicles

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

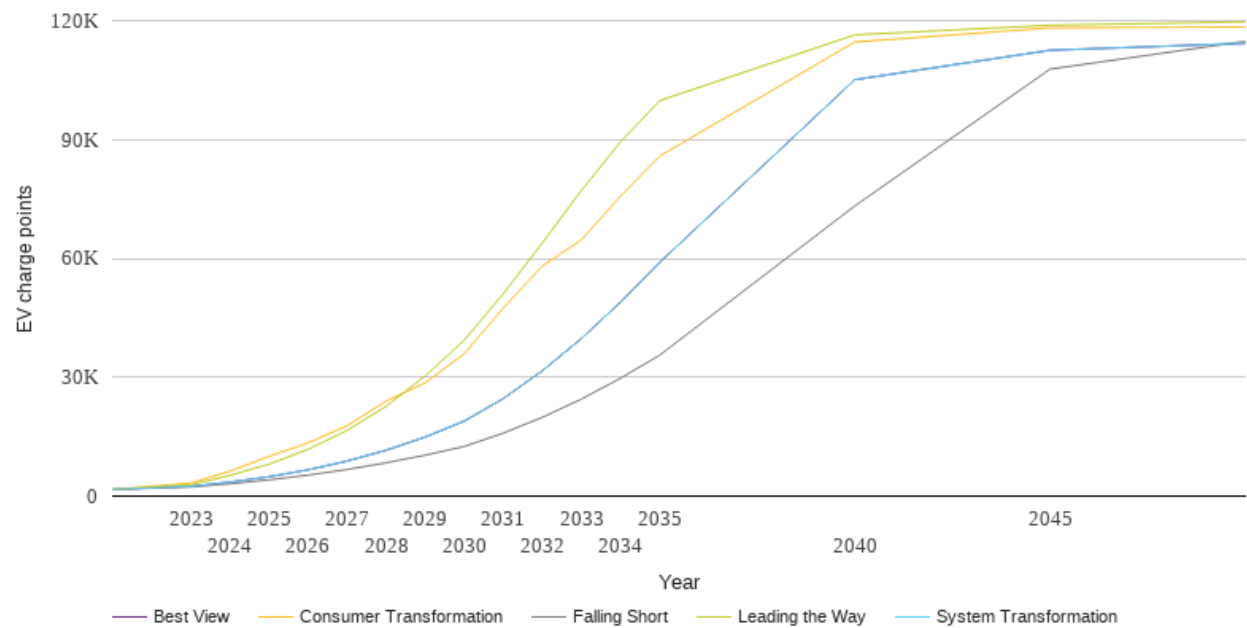
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	3380	3380	3380	3380	3380
2023	4597	4693	5606	5286	4693
2024	6171	6484	9751	8654	6484
2025	8161	8783	15077	12843	8783
2026	10639	11860	20771	18671	11860
2027	13725	15835	28323	26320	15835
2028	17485	20860	39435	36210	20860
2029	22050	27165	49312	48996	27165
2030	27515	34936	64529	64507	34936
2031	34211	44800	84279	83160	44800
2032	41993	56841	102722	103399	56841
2033	50854	70851	115232	123874	70851
2034	60861	86788	134449	143295	86788
2035	71916	103959	151866	160134	103959
2040	141697	180251	197369	195634	180251
2045	193170	200066	197327	183760	200066
2050	202146	183624	182669	149122	183624



Technology Summary: EV Charge Point

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

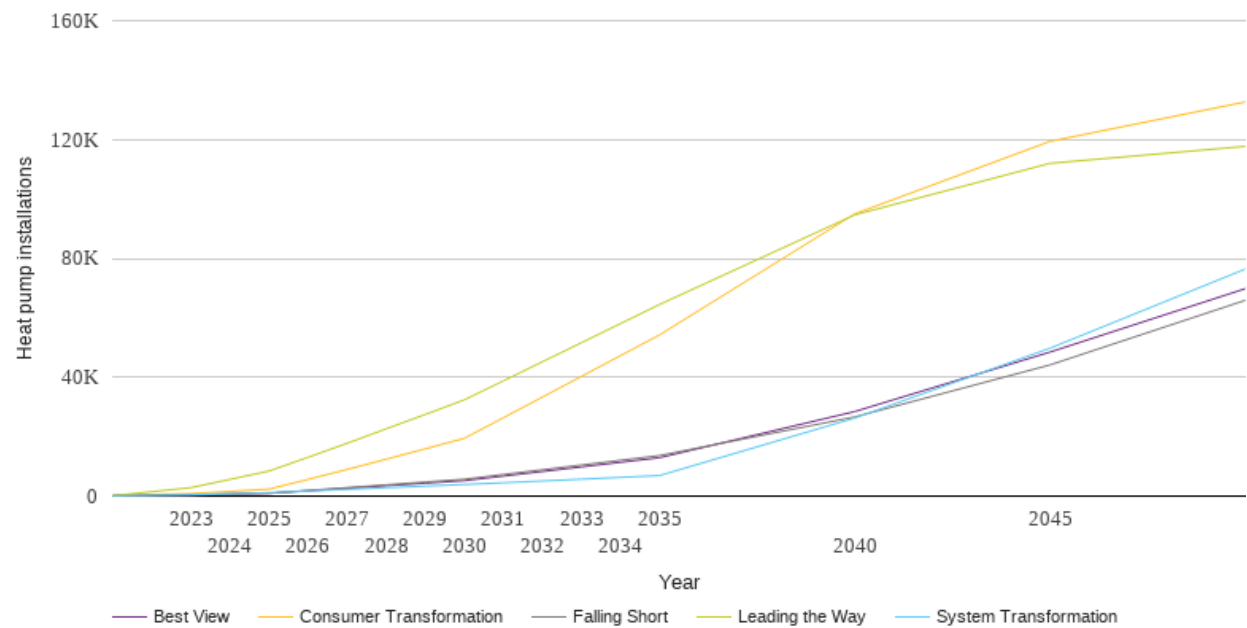
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1688	1688	1688	1688	1688
2023	2308	2466	3277	2897	2466
2024	3103	3524	6323	5234	3524
2025	4097	4885	10018	8062	4885
2026	5297	6637	13435	11804	6637
2027	6725	8844	17759	16605	8844
2028	8399	11575	24003	22677	11575
2029	10327	14923	28594	30362	14923
2030	12541	18954	35949	39357	18954
2031	15908	24632	47488	51095	24632
2032	19889	31645	58106	63925	31645
2033	24496	39787	64703	77183	39787
2034	29739	48969	75706	89401	48969
2035	35540	58957	85788	99792	58957
2040	73222	105096	114604	116416	105096
2045	107763	112537	118193	118845	112537
2050	114764	114287	118417	119710	114287



Technology Summary: Heat pumps

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

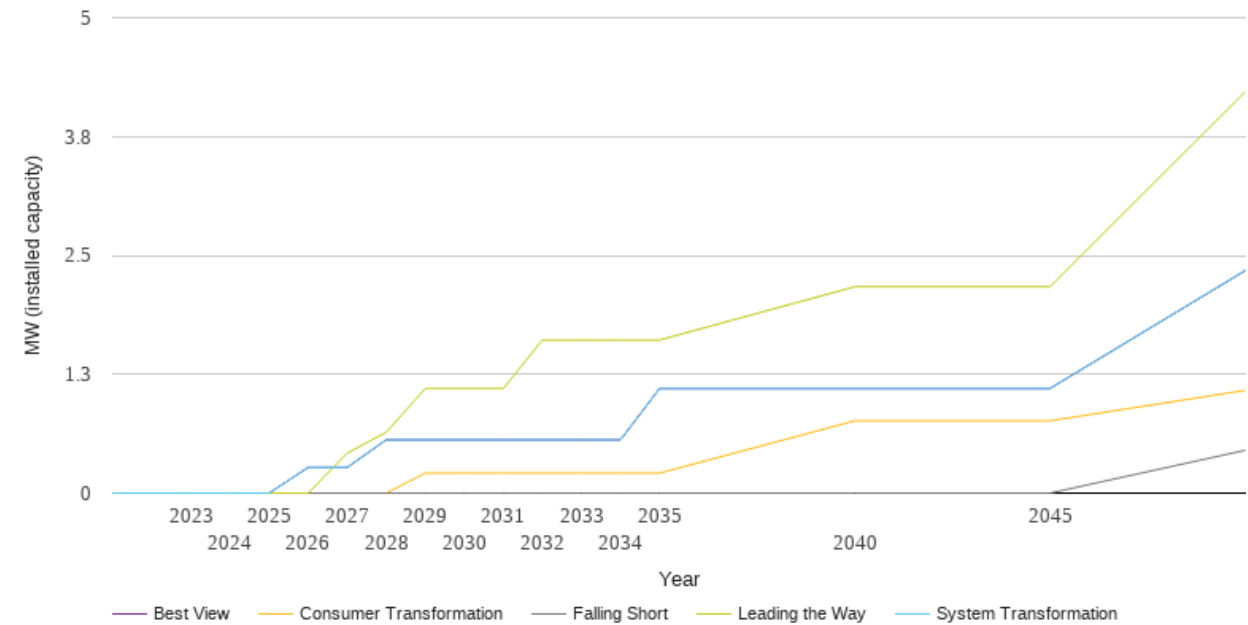
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	129	129	129	129	129
2023	396	430	833	2848	396
2024	669	783	1578	5630	669
2025	943	1161	2356	8450	943
2026	1883	1715	5629	13075	1787
2027	2828	2261	8973	17783	2638
2028	3777	2816	12422	22643	3495
2029	4727	3356	15926	27483	4350
2030	5673	3899	19444	32384	5202
2031	7266	4480	26371	38785	6741
2032	8860	5076	33318	45198	8287
2033	10450	5681	40285	51616	9828
2034	12053	6296	47261	58051	11382
2035	13645	6912	54240	64480	12923
2040	26646	26267	94975	94649	28447
2045	44140	49755	119389	111994	48461
2050	65876	76388	132636	117693	69797



Technology Summary: Hydrogen electrolysis

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

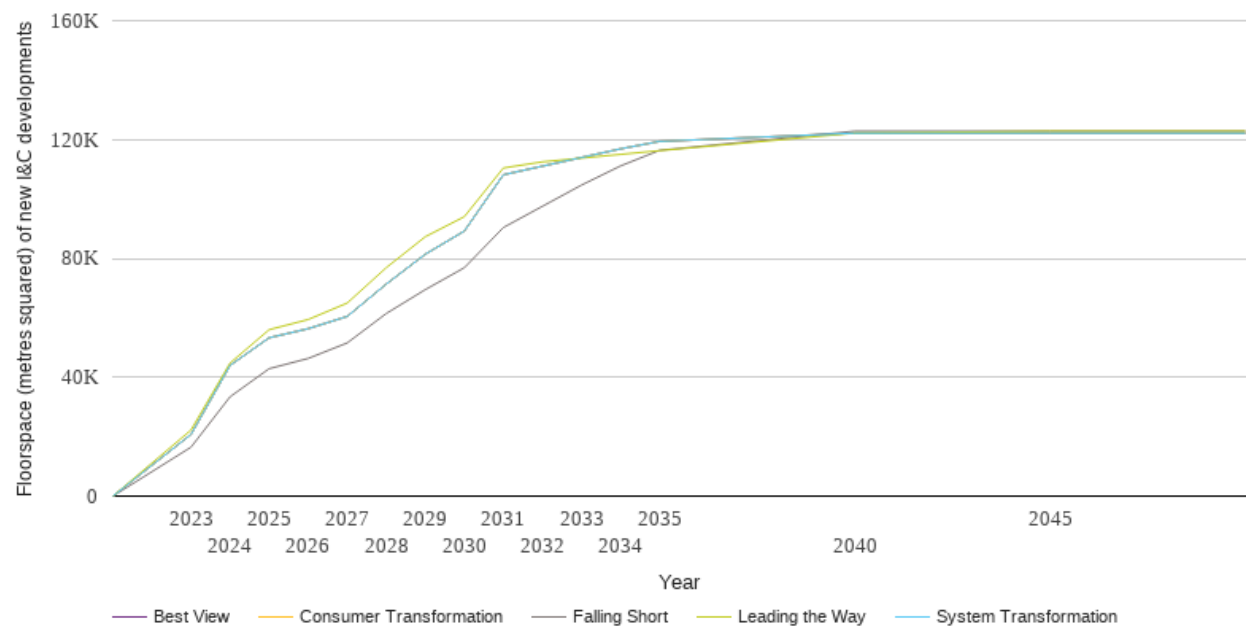
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.3	0.0	0.0	0.3
2027	0.0	0.3	0.0	0.4	0.3
2028	0.0	0.6	0.0	0.6	0.6
2029	0.0	0.6	0.2	1.1	0.6
2030	0.0	0.6	0.2	1.1	0.6
2031	0.0	0.6	0.2	1.1	0.6
2032	0.0	0.6	0.2	1.6	0.6
2033	0.0	0.6	0.2	1.6	0.6
2034	0.0	0.6	0.2	1.6	0.6
2035	0.0	1.1	0.2	1.6	1.1
2040	0.0	1.1	0.8	2.2	1.1
2045	0.0	1.1	0.8	2.2	1.1
2050	0.5	2.3	1.1	4.2	2.3



Technology Summary: Non domestic

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

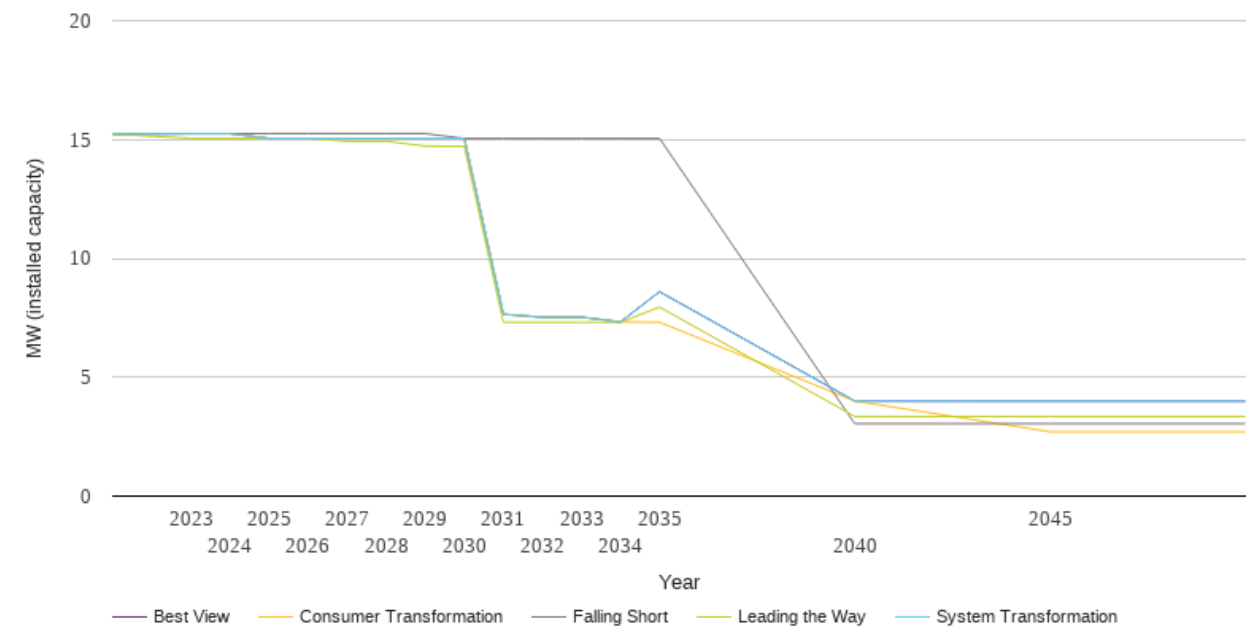
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	16469	20755	20755	22235	20755
2024	33425	43983	43983	44766	43983
2025	42871	53272	53272	56001	53272
2026	46329	56332	56332	59421	56332
2027	51547	60461	60461	64961	60461
2028	61440	71350	71350	76869	71350
2029	69489	81401	81401	87289	81401
2030	76856	89193	89193	94031	89193
2031	90389	108137	108137	110424	108137
2032	97527	111045	111045	112486	111045
2033	104665	113952	113952	113744	113952
2034	111111	116860	116860	115003	116860
2035	116370	119374	119374	116261	119374
2040	122810	122157	122157	122171	122157
2045	122810	122157	122157	122810	122157
2050	122810	122157	122157	122810	122157



Technology Summary: Other Distributed Generation

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

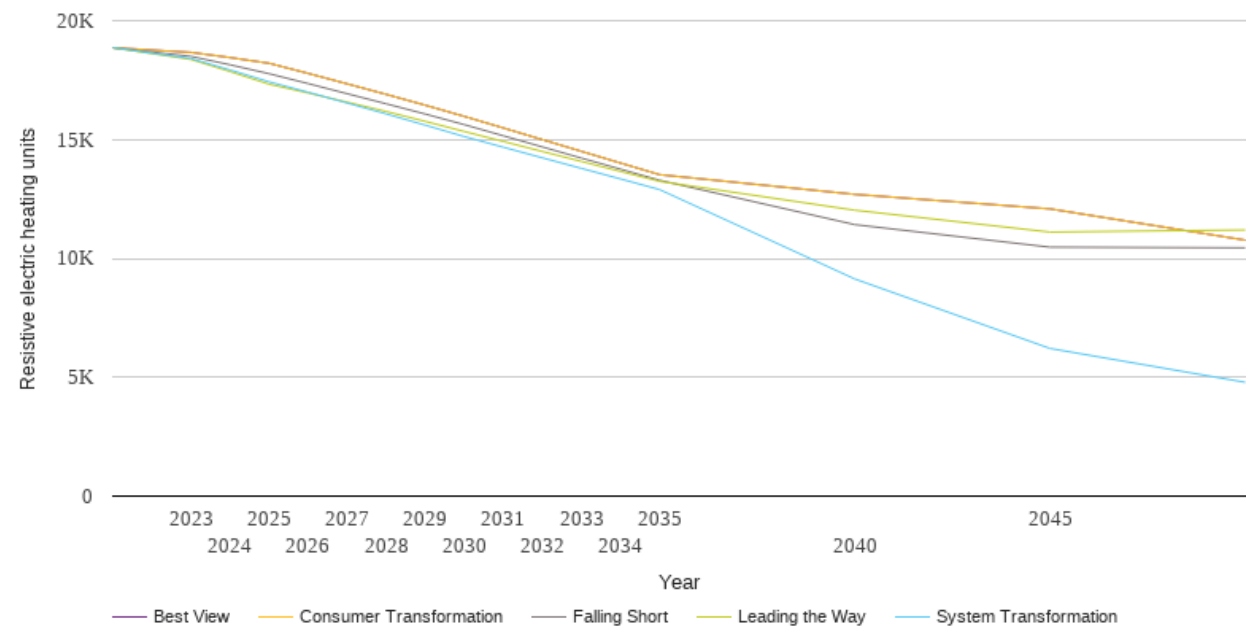
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	15.2	15.2	15.2	15.2	15.2
2023	15.2	15.2	15.2	15.0	15.2
2024	15.2	15.2	15.2	15.0	15.2
2025	15.2	15.0	15.0	15.0	15.0
2026	15.2	15.0	15.0	15.0	15.0
2027	15.2	15.0	15.0	14.9	15.0
2028	15.2	15.0	15.0	14.9	15.0
2029	15.2	15.0	15.0	14.7	15.0
2030	15.0	15.0	15.0	14.7	15.0
2031	15.0	7.6	7.6	7.3	7.6
2032	15.0	7.5	7.5	7.3	7.5
2033	15.0	7.5	7.5	7.3	7.5
2034	15.0	7.3	7.3	7.3	7.3
2035	15.0	8.6	7.3	7.9	8.6
2040	3.0	4.0	4.0	3.3	4.0
2045	3.0	4.0	2.7	3.3	4.0
2050	3.0	4.0	2.7	3.3	4.0



Technology Summary: Resistive electric heating

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

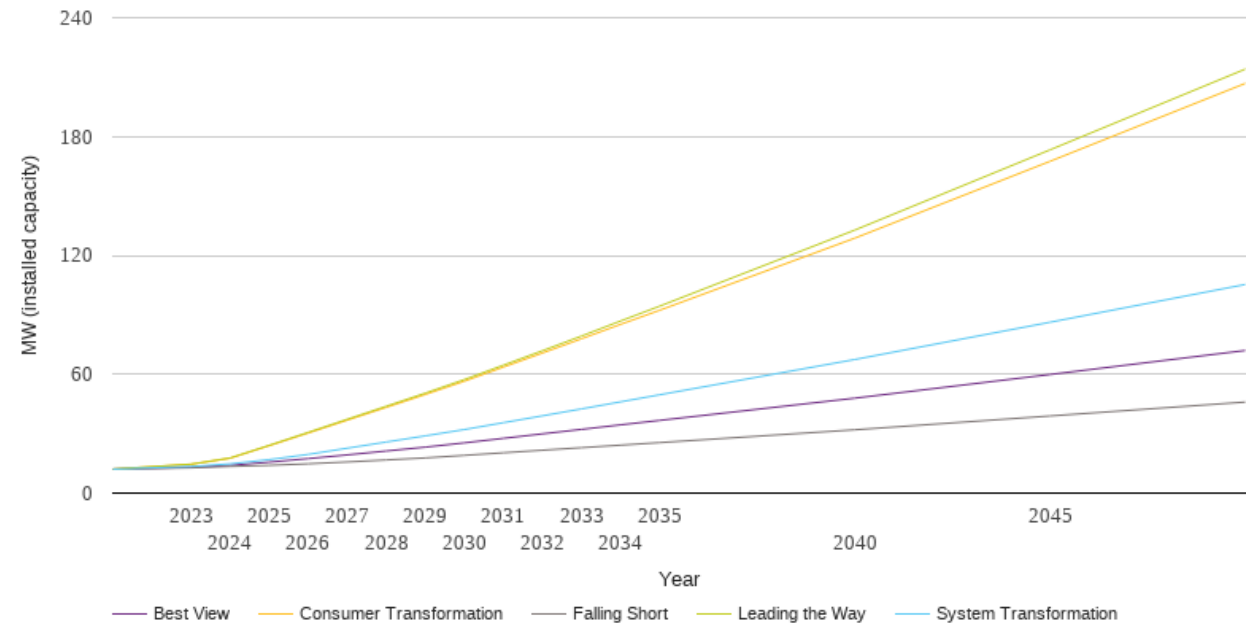
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	18860	18860	18860	18860	18860
2023	18499	18408	18666	18368	18666
2024	18144	17928	18448	17859	18448
2025	17769	17427	18208	17328	18208
2026	17354	16991	17783	16958	17783
2027	16928	16536	17343	16571	17343
2028	16503	16078	16900	16179	16900
2029	16073	15605	16444	15764	16444
2030	15627	15124	15974	15339	15974
2031	15157	14677	15486	14918	15486
2032	14689	14230	14994	14498	14994
2033	14219	13786	14503	14079	14503
2034	13754	13343	14012	13659	14012
2035	13286	12896	13523	13241	13523
2040	11421	9135	12694	12027	12694
2045	10472	6212	12084	11107	12084
2050	10446	4787	10768	11197	10768



Technology Summary: Solar Generation

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

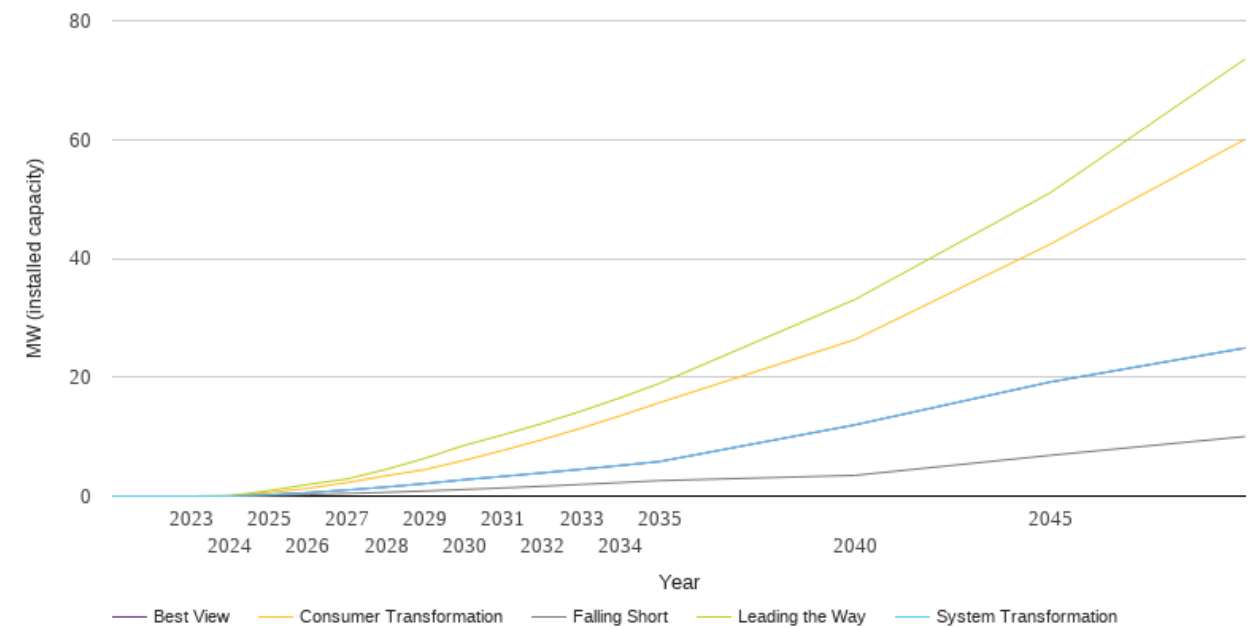
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	12.1	12.1	12.1	12.1	12.1
2023	12.8	13.4	14.5	14.6	13.0
2024	13.5	14.8	17.6	17.7	14.0
2025	14.0	16.9	23.9	24.1	15.6
2026	14.8	19.5	30.3	30.6	17.4
2027	15.7	22.7	36.8	37.3	19.3
2028	16.7	25.8	43.3	43.8	21.2
2029	17.8	28.9	49.8	50.5	23.2
2030	19.0	32.1	56.5	57.3	25.4
2031	20.3	35.5	63.6	64.6	27.6
2032	21.6	39.0	70.7	71.9	29.9
2033	22.9	42.5	77.9	79.3	32.2
2034	24.2	46.1	85.2	86.9	34.4
2035	25.5	49.6	92.3	94.3	36.7
2040	32.0	67.4	128.7	132.8	47.9
2045	38.9	86.2	167.5	173.3	59.9
2050	45.9	105.3	206.8	214.0	72.0



Technology Summary: Storage

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

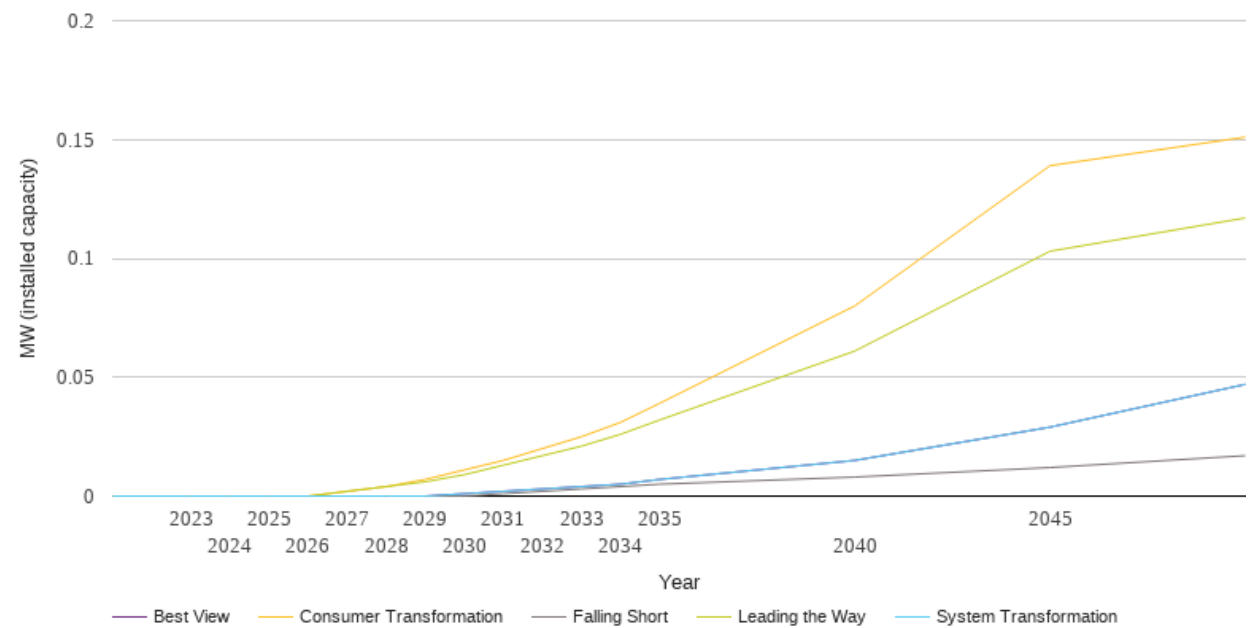
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.1	0.2	0.6	0.9	0.2
2026	0.2	0.6	1.3	2.0	0.6
2027	0.4	1.0	2.3	2.9	1.0
2028	0.6	1.5	3.4	4.5	1.5
2029	0.9	2.1	4.5	6.4	2.1
2030	1.1	2.8	6.0	8.5	2.8
2031	1.4	3.3	7.7	10.3	3.3
2032	1.7	3.9	9.5	12.2	3.9
2033	2.0	4.5	11.4	14.3	4.5
2034	2.3	5.2	13.5	16.6	5.1
2035	2.6	5.8	15.7	19.0	5.8
2040	3.5	12.0	26.3	33.1	12.0
2045	6.9	19.2	42.4	51.0	19.2
2050	10.0	25.0	60.1	73.5	24.9



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	0.1	0.1	0.0
2045	0.0	0.0	0.1	0.1	0.0
2050	0.0	0.0	0.2	0.1	0.0



National Grid Electricity Distribution PLC 09223384)
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National Grid Electricity Distribution (West Midlands) Plc (company number 03600574))
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