

# Distribution Future Energy Scenarios 2022

Local Authority:  
Monmouthshire

## What are Distribution Future Energy Scenarios?

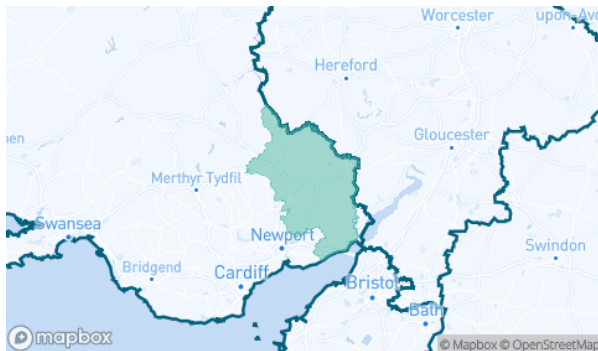
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Monmouthshire covered by the NGED licence areas.



## Scenario Summary

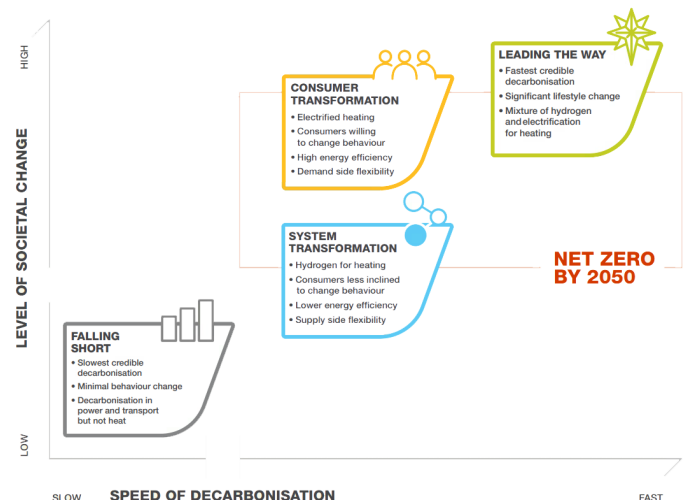
This DFES scenario framework includes three scenarios that are compliant with UK government targets of Net Zero greenhouse gas emissions by 2050. A summary of each scenario is below:

**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 Monmouthshire 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	0	126	73	73	0	9885	4422	4422	0
Domestic	New dwellings	0	1101	1163	1163	1296	1365	1328	1328	1302
Electric vehicles	Electric vehicles	616	9818	11572	21624	21541	66184	54070	55663	46847
EV Charge Point	EV charge points	594	4768	6398	11924	13099	36215	32848	33709	35154
Heat pumps	Heat pump installations	990	5207	5775	9463	14418	25145	27744	41156	35504
Hydrogen electrolysis	MW (installed capacity)	1.0	1.5	2.8	1.5	3.5	5.0	11.7	8.1	12.3
Non domestic	Floorspace (metres squared) of new I&C developments	0	26527 9	32120 1	32120 1	34347 0	52682 2	52536 4	52536 4	52682 2
Other Distributed Generation	MW (installed capacity)	15.2	6.8	7.9	8.5	9.4	6.5	10.0	11.4	16.6
Resistive electric heating	Resistive electric heating units	3867	3240	3141	3321	3191	1995	880	2116	2202
Solar Generation	MW (installed capacity)	21.9	27.2	35.3	43.7	38.1	76.5	134.8	169.3	156.1
Storage	MW (installed capacity)	0.0	0.3	1.2	2.4	3.4	4.0	9.7	22.1	28.1
Wind	MW (installed capacity)	3.8	4.0	4.6	11.1	9.4	11.6	27.8	83.7	67.8

## 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

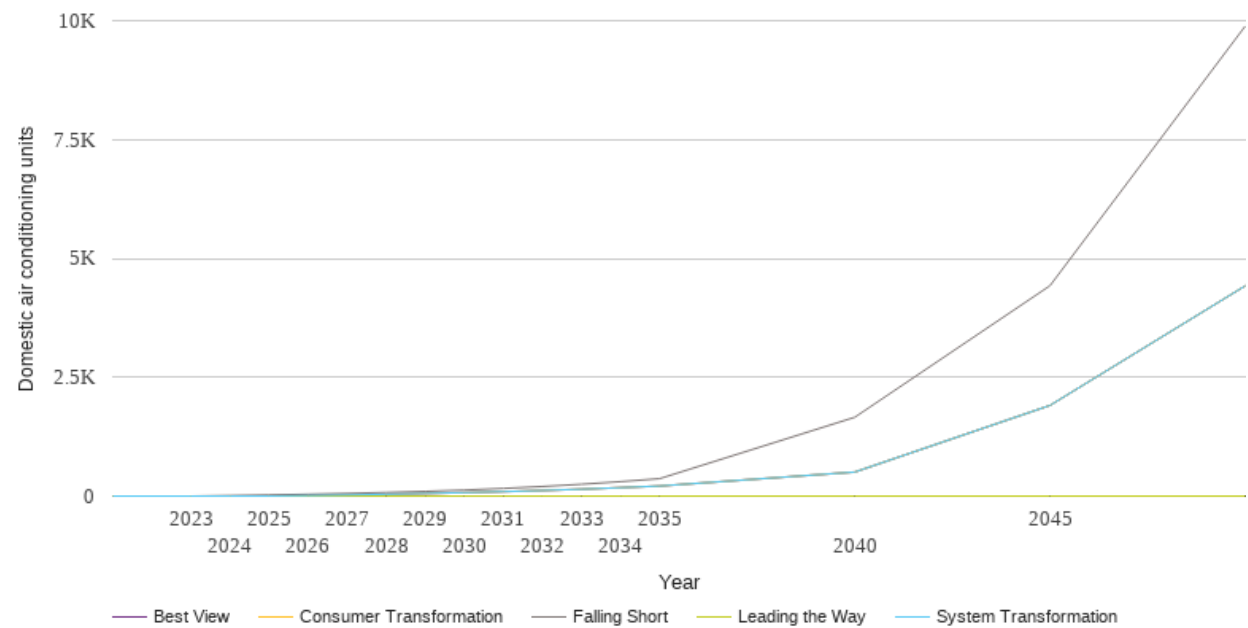
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

If you have any comments or queries regarding these reports, please contact [nged.energyplanning@nationalgrid.co.uk](mailto:nged.energyplanning@nationalgrid.co.uk).

# Technology Summary: Air conditioning

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

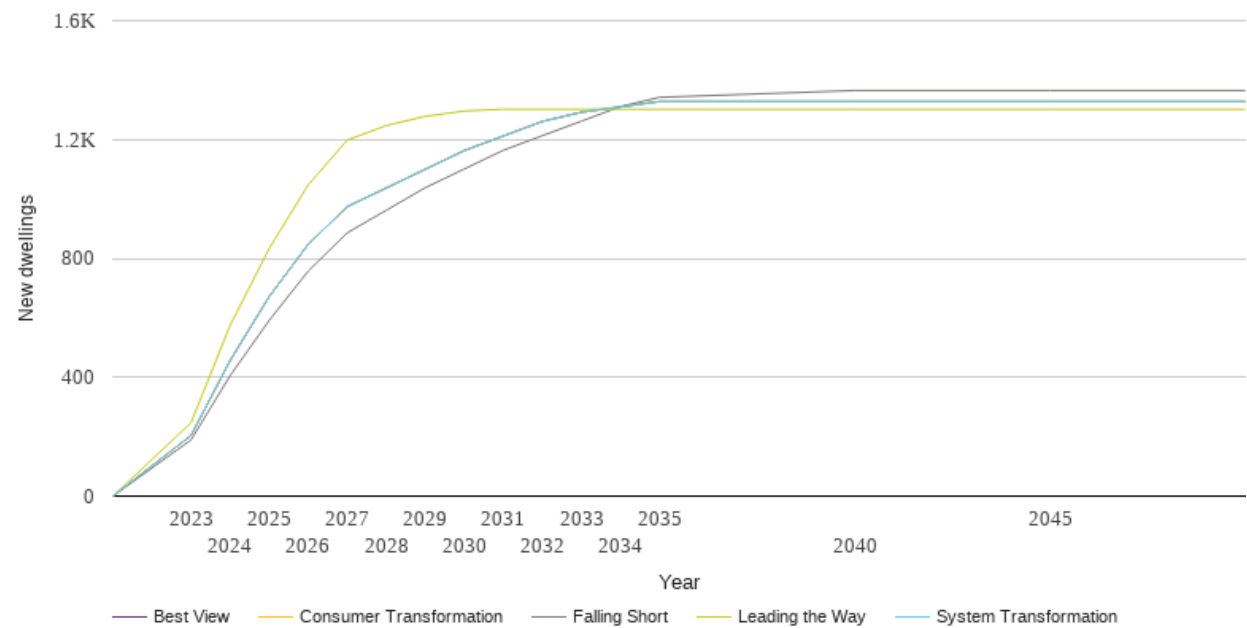
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	11	0	0	0	0
2025	24	0	0	0	0
2026	39	11	11	0	11
2027	56	23	23	0	23
2028	76	38	38	0	38
2029	99	55	55	0	55
2030	126	73	73	0	73
2031	161	94	94	0	94
2032	202	118	118	0	118
2033	249	145	145	0	145
2034	304	177	177	0	177
2035	366	212	212	0	212
2040	1658	505	505	0	505
2045	4425	1907	1907	0	1907
2050	9885	4422	4422	0	4422



# Technology Summary: Domestic

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

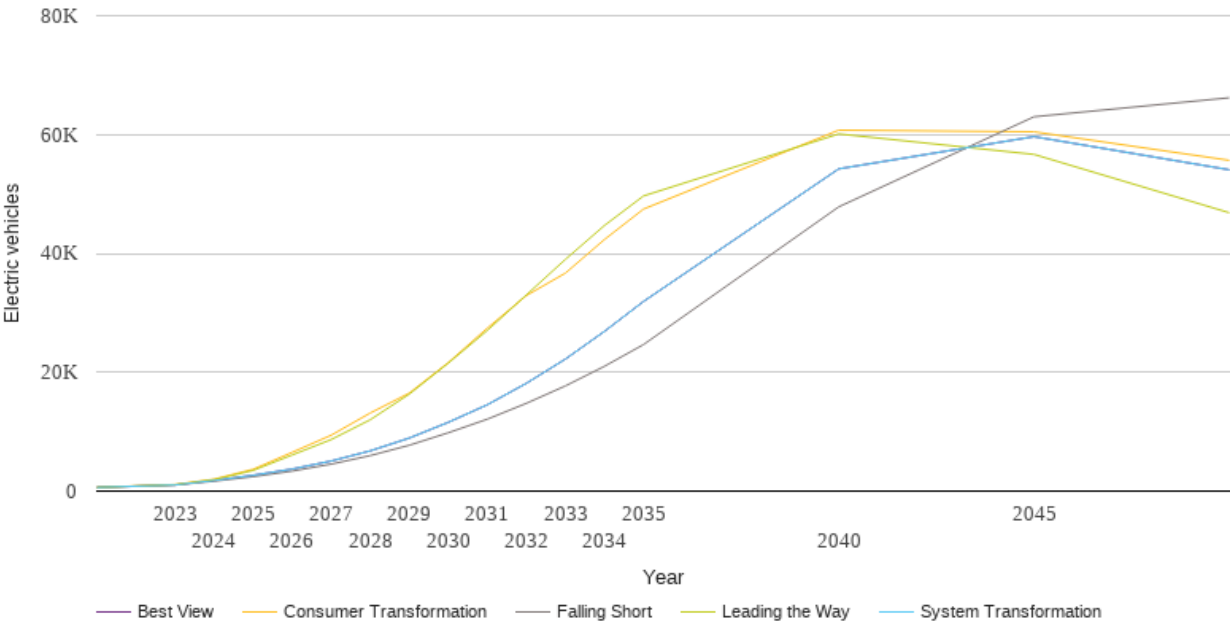
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	189	204	204	247	204
2024	405	456	456	574	456
2025	591	671	671	833	671
2026	757	847	847	1047	847
2027	886	974	974	1198	974
2028	962	1037	1037	1247	1037
2029	1038	1100	1100	1278	1100
2030	1101	1163	1163	1296	1163
2031	1164	1212	1212	1302	1212
2032	1213	1261	1261	1302	1261
2033	1262	1292	1292	1302	1292
2034	1311	1310	1310	1302	1310
2035	1342	1328	1328	1302	1328
2040	1365	1328	1328	1302	1328
2045	1365	1328	1328	1302	1328
2050	1365	1328	1328	1302	1328



# Technology Summary: Electric vehicles

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

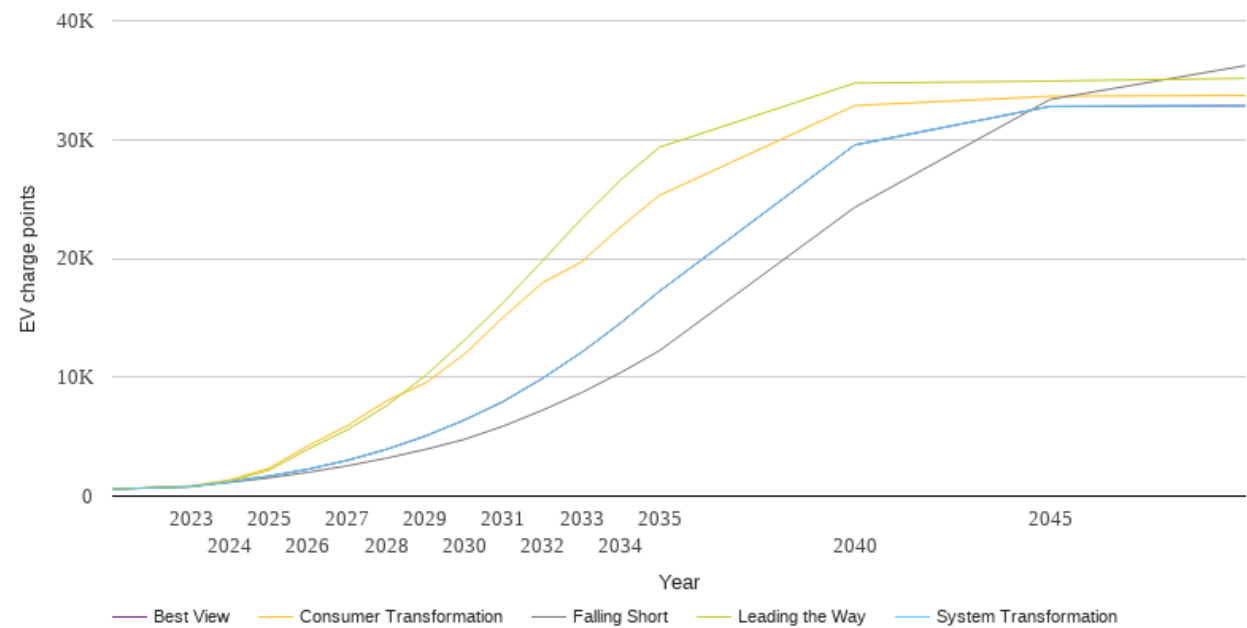
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	616	616	616	616	616
2023	1034	1030	1101	1062	1030
2024	1669	1788	1999	1926	1788
2025	2426	2660	3667	3480	2660
2026	3362	3706	6518	6076	3706
2027	4539	5061	9403	8673	5061
2028	5970	6771	13139	12006	6771
2029	7717	8925	16491	16320	8925
2030	9818	11572	21624	21541	11572
2031	12104	14535	27435	27048	14535
2032	14773	18141	32910	33018	18141
2033	17702	22224	36687	38998	22224
2034	21004	26884	42339	44701	26884
2035	24661	31915	47461	49669	31915
2040	47833	54223	60737	60103	54223
2045	62989	59648	60462	56657	59648
2050	66184	54070	55663	46847	54070



# Technology Summary: EV Charge Point

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

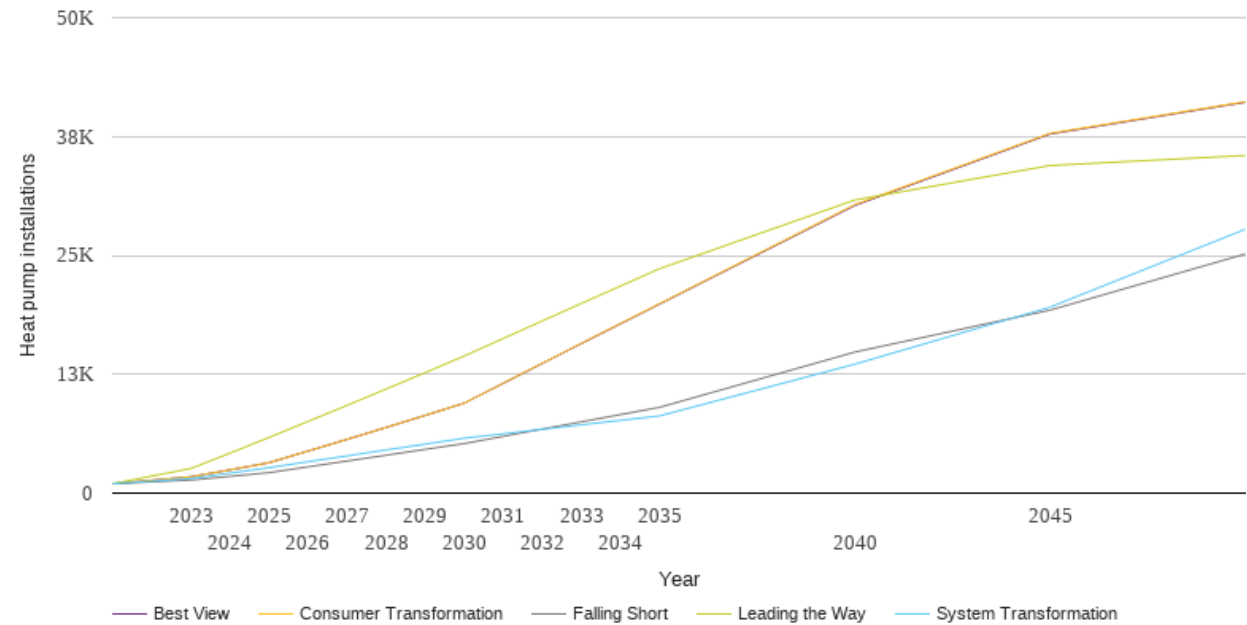
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	594	594	594	594	594
2023	809	792	857	798	792
2024	1155	1219	1365	1267	1219
2025	1538	1679	2350	2186	1679
2026	2003	2264	4237	3957	2264
2027	2547	3007	5926	5577	3007
2028	3186	3924	7992	7586	3924
2029	3925	5047	9506	10134	5047
2030	4768	6398	11924	13099	6398
2031	5891	7965	15061	16290	7965
2032	7221	9899	17937	19778	9899
2033	8699	12087	19704	23332	12087
2034	10380	14551	22635	26596	14551
2035	12238	17238	25315	29356	17238
2040	24297	29544	32859	34744	29544
2045	33368	32783	33636	34918	32783
2050	36215	32848	33709	35154	32848



# Technology Summary: Heat pumps

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

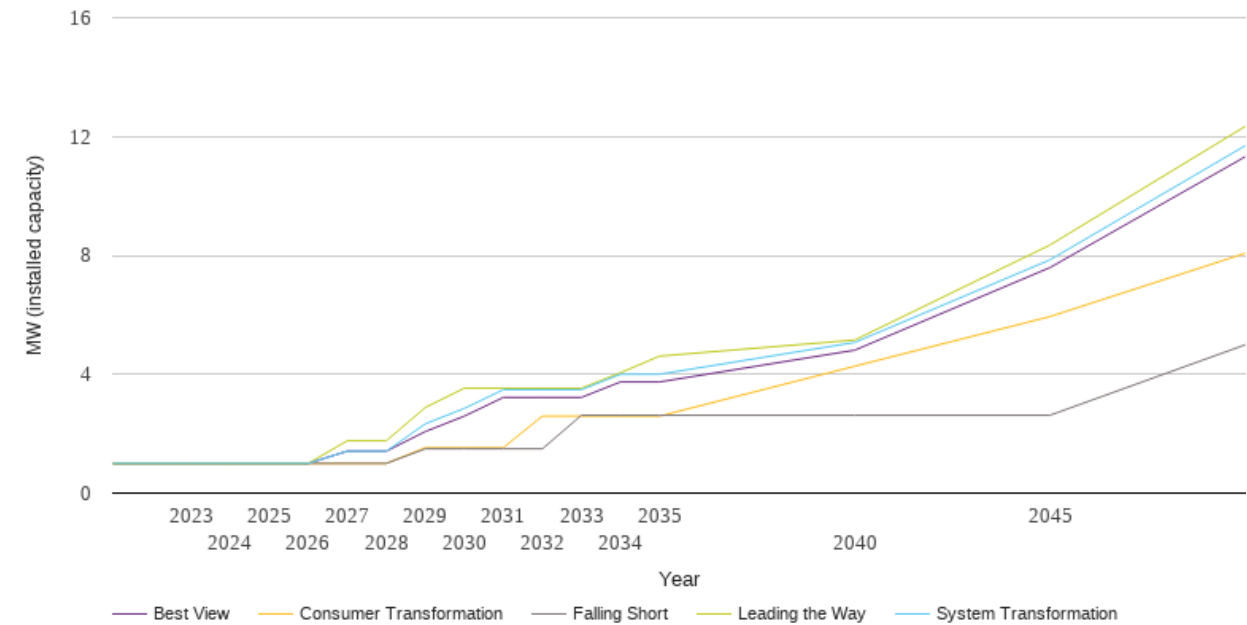
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	990	990	990	990	990
2023	1372	1530	1713	2593	1713
2024	1756	2099	2441	4208	2441
2025	2151	2669	3201	5858	3201
2026	2761	3303	4424	7538	4424
2027	3376	3919	5656	9230	5655
2028	3983	4540	6909	10946	6908
2029	4599	5150	8176	12670	8175
2030	5207	5775	9463	14418	9463
2031	5972	6238	11563	16265	11552
2032	6735	6712	13659	18110	13641
2033	7496	7180	15754	19947	15728
2034	8261	7650	17837	21776	17803
2035	9019	8113	19921	23596	19878
2040	14828	13553	30338	30825	30251
2045	19236	19550	37832	34450	37764
2050	25145	27744	41156	35504	41107



# Technology Summary: Hydrogen electrolysis

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

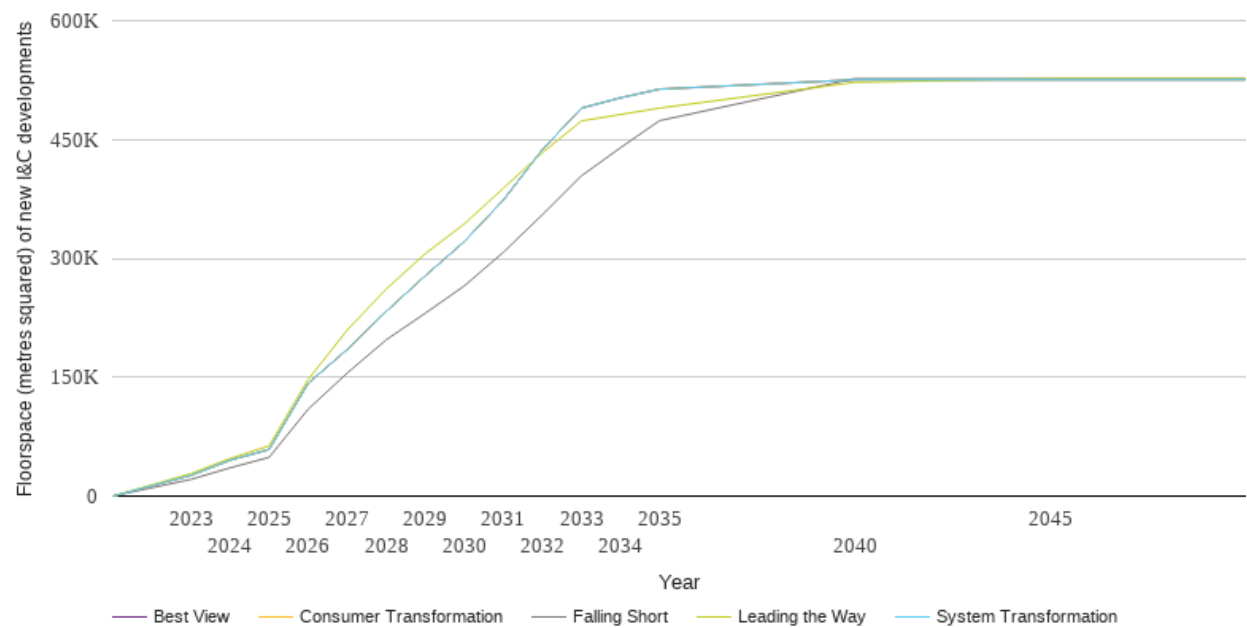
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1.0	1.0	1.0	1.0	1.0
2023	1.0	1.0	1.0	1.0	1.0
2024	1.0	1.0	1.0	1.0	1.0
2025	1.0	1.0	1.0	1.0	1.0
2026	1.0	1.0	1.0	1.0	1.0
2027	1.0	1.4	1.0	1.8	1.4
2028	1.0	1.4	1.0	1.8	1.4
2029	1.5	2.3	1.5	2.9	2.1
2030	1.5	2.8	1.5	3.5	2.6
2031	1.5	3.5	1.5	3.5	3.2
2032	1.5	3.5	2.6	3.5	3.2
2033	2.6	3.5	2.6	3.5	3.2
2034	2.6	4.0	2.6	4.1	3.7
2035	2.6	4.0	2.6	4.6	3.7
2040	2.6	5.1	4.3	5.2	4.8
2045	2.6	7.9	5.9	8.4	7.6
2050	5.0	11.7	8.1	12.3	11.3



# Technology Summary: Non domestic

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

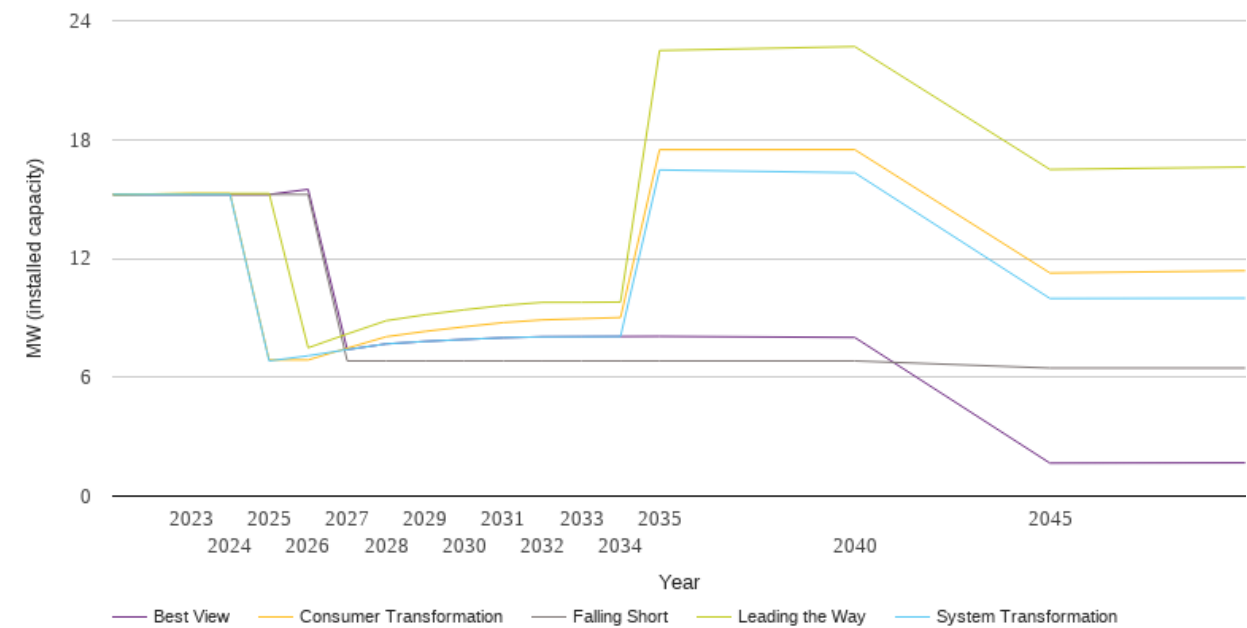
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	21109	26204	26204	28388	26204
2024	35650	45269	45269	47404	45269
2025	48907	58790	58790	63380	58790
2026	109624	142262	142262	147102	142262
2027	155261	185038	185038	209571	185038
2028	197231	233101	233101	261399	233101
2029	230792	278101	278101	305972	278101
2030	265279	321201	321201	343470	321201
2031	307652	373698	373698	388607	373698
2032	355184	437264	437264	433462	437264
2033	404239	489614	489614	473440	489614
2034	439670	502651	502651	481543	502651
2035	473808	513563	513563	489646	513563
2040	526822	525364	525364	522179	525364
2045	526822	525364	525364	526822	525364
2050	526822	525364	525364	526822	525364



# Technology Summary: Other Distributed Generation

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

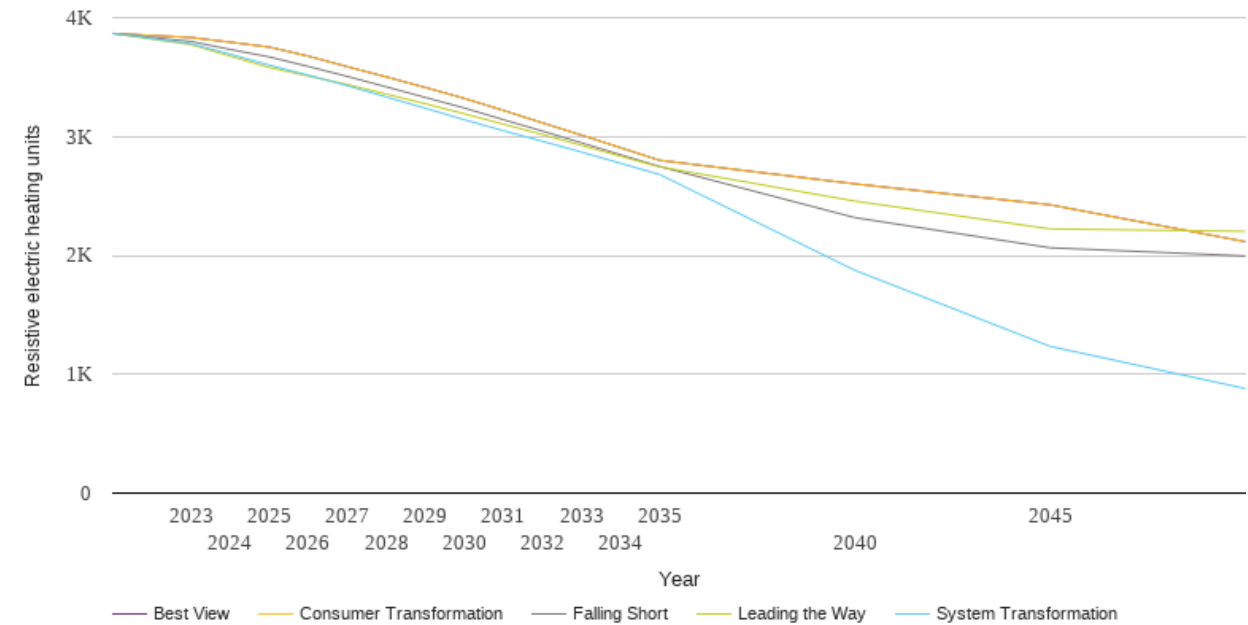
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	15.2	15.2	15.2	15.2	15.2
2023	15.2	15.2	15.3	15.3	15.2
2024	15.2	15.2	15.3	15.3	15.2
2025	15.2	6.8	6.9	15.3	15.2
2026	15.2	7.1	6.9	7.5	15.5
2027	6.8	7.4	7.5	8.2	7.4
2028	6.8	7.7	8.0	8.9	7.7
2029	6.8	7.8	8.3	9.2	7.8
2030	6.8	7.9	8.5	9.4	7.9
2031	6.8	8.0	8.8	9.6	8.0
2032	6.8	8.0	8.9	9.8	8.0
2033	6.8	8.1	9.0	9.8	8.1
2034	6.8	8.1	9.0	9.8	8.1
2035	6.8	16.5	17.5	22.5	8.1
2040	6.8	16.3	17.5	22.7	8.0
2045	6.5	10.0	11.3	16.5	1.7
2050	6.5	10.0	11.4	16.6	1.7



# Technology Summary: Resistive electric heating

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

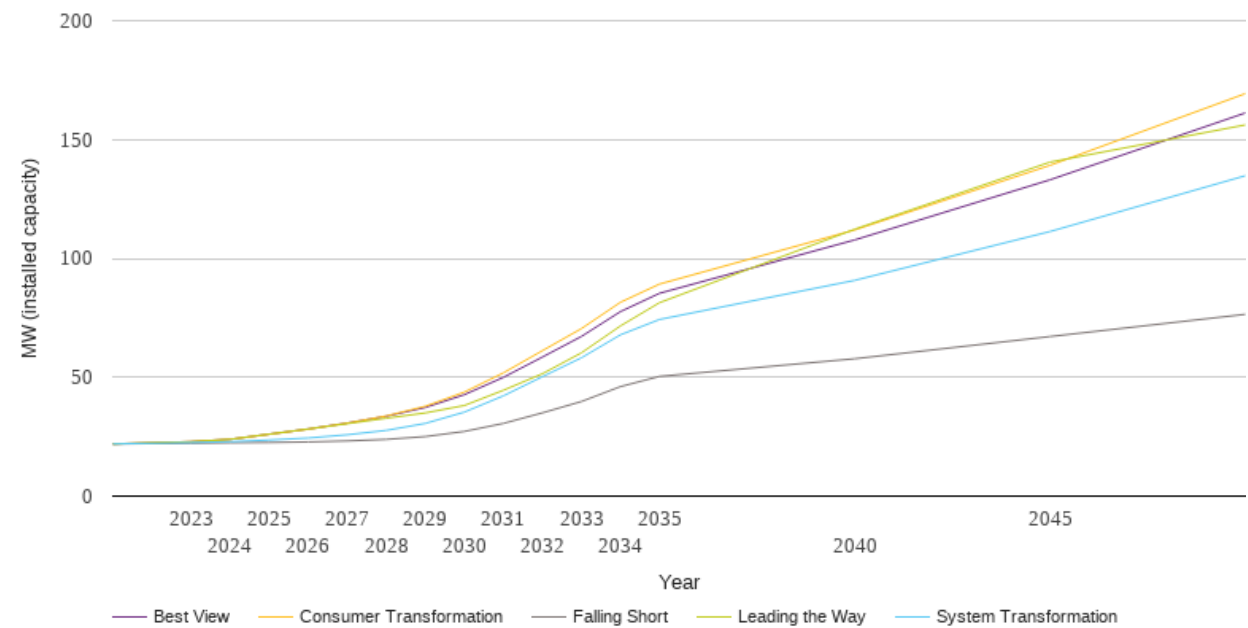
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	3867	3867	3867	3867	3867
2023	3800	3781	3833	3773	3833
2024	3733	3693	3794	3677	3794
2025	3670	3601	3753	3581	3753
2026	3590	3516	3677	3510	3677
2027	3506	3428	3588	3438	3588
2028	3418	3333	3502	3357	3502
2029	3329	3238	3413	3276	3413
2030	3240	3141	3321	3191	3321
2031	3142	3049	3220	3104	3220
2032	3046	2960	3115	3017	3115
2033	2947	2869	3012	2926	3012
2034	2847	2775	2906	2834	2906
2035	2748	2681	2800	2745	2800
2040	2318	1875	2602	2457	2602
2045	2064	1235	2426	2223	2426
2050	1995	880	2116	2202	2116



# Technology Summary: Solar Generation

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

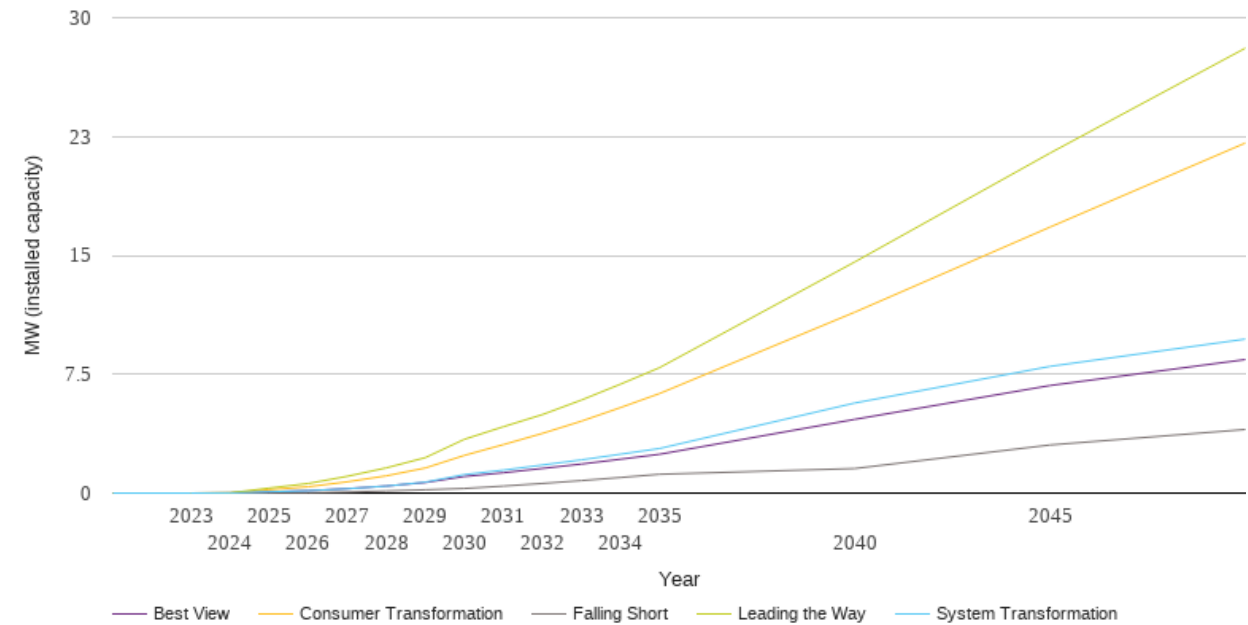
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	21.9	21.9	21.9	21.9	21.9
2023	22.3	22.5	22.9	22.9	22.9
2024	22.4	22.9	23.9	23.9	23.9
2025	22.5	23.6	26.0	26.0	26.0
2026	22.8	24.4	28.2	28.2	28.2
2027	23.2	25.8	30.7	30.5	30.7
2028	23.9	27.6	33.7	32.8	33.6
2029	25.0	30.6	37.8	35.0	37.3
2030	27.2	35.3	43.7	38.1	42.7
2031	30.6	42.2	51.8	44.5	50.0
2032	35.0	50.2	61.2	51.5	58.5
2033	39.8	58.2	70.5	60.3	67.2
2034	46.1	67.9	81.5	71.6	77.6
2035	50.4	74.3	89.2	81.4	85.3
2040	57.8	90.8	112.0	112.3	107.8
2045	67.1	111.3	139.1	140.5	133.1
2050	76.5	134.8	169.3	156.1	161.2



# Technology Summary: Storage

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

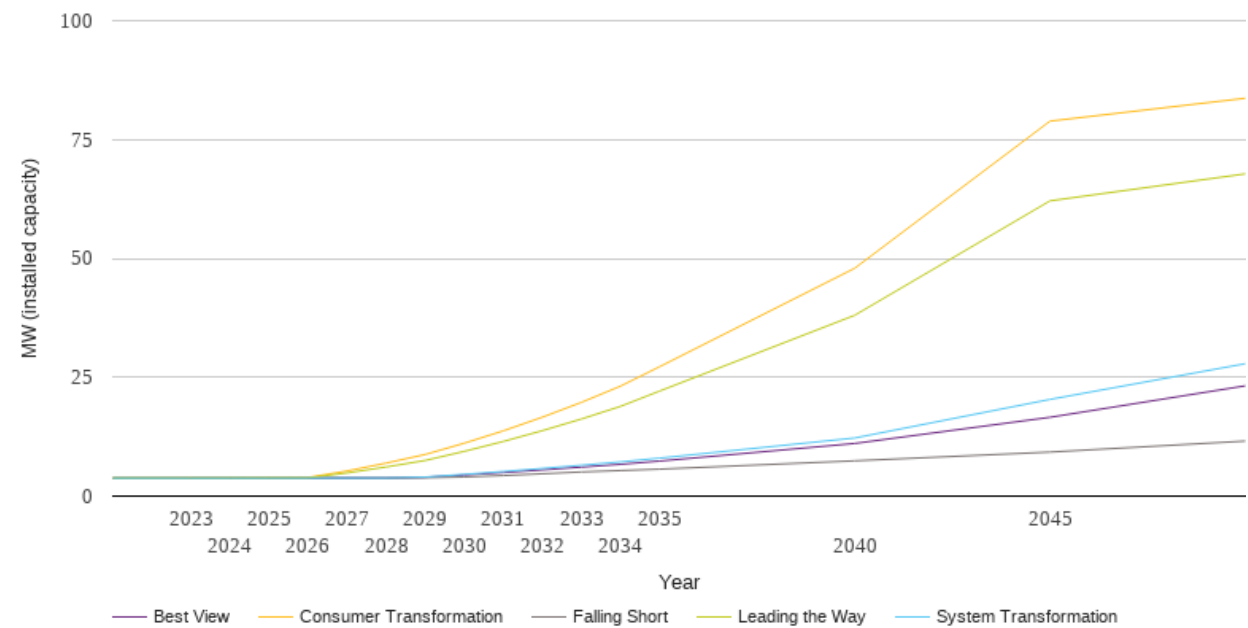
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.1	0.2	0.3	0.1
2026	0.0	0.2	0.4	0.6	0.2
2027	0.1	0.3	0.7	1.1	0.3
2028	0.1	0.4	1.1	1.6	0.4
2029	0.2	0.7	1.6	2.2	0.7
2030	0.3	1.2	2.4	3.4	1.0
2031	0.4	1.4	3.1	4.2	1.3
2032	0.6	1.8	3.8	5.0	1.6
2033	0.8	2.1	4.5	5.9	1.8
2034	1.0	2.5	5.4	6.9	2.1
2035	1.2	2.8	6.3	7.9	2.4
2040	1.5	5.7	11.4	14.6	4.7
2045	3.0	8.0	16.8	21.5	6.8
2050	4.0	9.7	22.1	28.1	8.4



# 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	3.8	3.8	3.8	3.8	3.8
2023	3.8	3.8	3.8	3.8	3.8
2024	3.8	3.8	3.8	3.8	3.8
2025	3.8	3.8	3.9	3.8	3.8
2026	3.8	3.8	3.9	3.8	3.8
2027	3.8	3.8	5.3	4.9	3.8
2028	3.8	3.8	6.9	6.1	3.8
2029	3.9	4.0	8.8	7.5	4.0
2030	4.0	4.6	11.1	9.4	4.4
2031	4.3	5.2	13.7	11.5	5.0
2032	4.7	5.8	16.6	13.8	5.5
2033	5.1	6.5	19.7	16.2	6.1
2034	5.4	7.2	23.1	18.9	6.7
2035	5.7	8.0	27.2	22.1	7.4
2040	7.4	12.2	47.9	38.0	11.1
2045	9.3	20.3	78.9	62.1	16.6
2050	11.6	27.8	83.7	67.8	23.2



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”)

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