

Distribution Future Energy Scenarios 2022

Local Authority:
Rhondda Cynon Taf

What are Distribution Future Energy Scenarios?

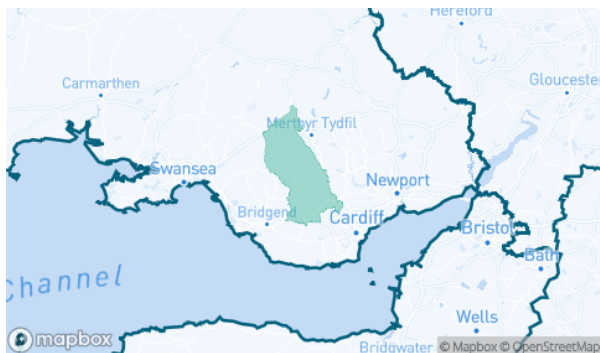
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Rhondda Cynon Taf covered by the NGED licence areas.



Scenario Summary

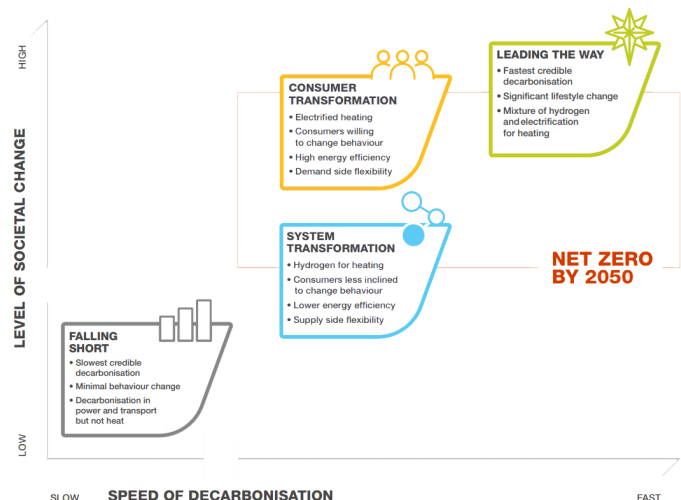
This DFES scenario framework includes three scenarios that are compliant with UK government targets of Net Zero greenhouse gas emissions by 2050. A summary of each scenario is below:

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 Rhondda Cynon Taf 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	508	1559	1310	1310	508	31688	16237	16237	508
Domestic	New dwellings	0	4796	5288	5288	6200	8623	8555	8555	8457
Electric vehicles	Electric vehicles	1254	19311	24980	46533	46570	148279	137673	137414	111443
EV Charge Point	EV charge points	727	8749	13285	25140	27472	81781	82422	82164	85427
Heat pumps	Heat pump installations	289	3403	3290	13398	24553	54725	64577	115134	94925
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.9	0.0	3.4	1.4	3.6	2.0	6.9
Non domestic	Floorspace (metres squared) of new I&C developments	0	283247	330366	330366	347869	650397	649937	649937	650397
Other Distributed Generation	MW (installed capacity)	29.2	31.2	31.2	31.2	31.1	26.8	24.0	24.0	35.4
Resistive electric heating	Resistive electric heating units	3643	3570	3324	3464	3437	3369	1742	2887	3067
Solar Generation	MW (installed capacity)	22.3	57.5	61.3	80.8	86.1	116.2	180.7	261.9	264.3
Storage	MW (installed capacity)	0.0	1.5	3.2	6.2	11.0	8.8	20.5	49.3	63.1
Wind	MW (installed capacity)	3.5	14.8	16.0	36.1	30.9	33.9	47.0	113.5	92.1

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.

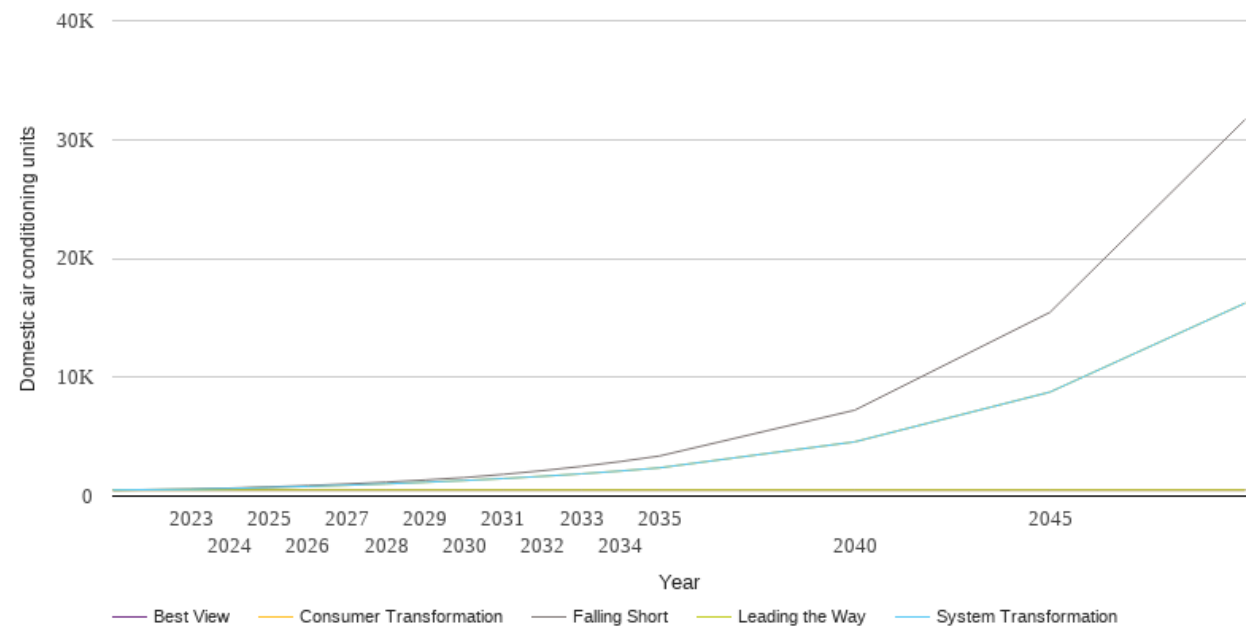
If you have any comments or queries regarding these reports, please contact

nged.energyplanning@nationalgrid.co.uk.

Technology Summary: Air conditioning

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

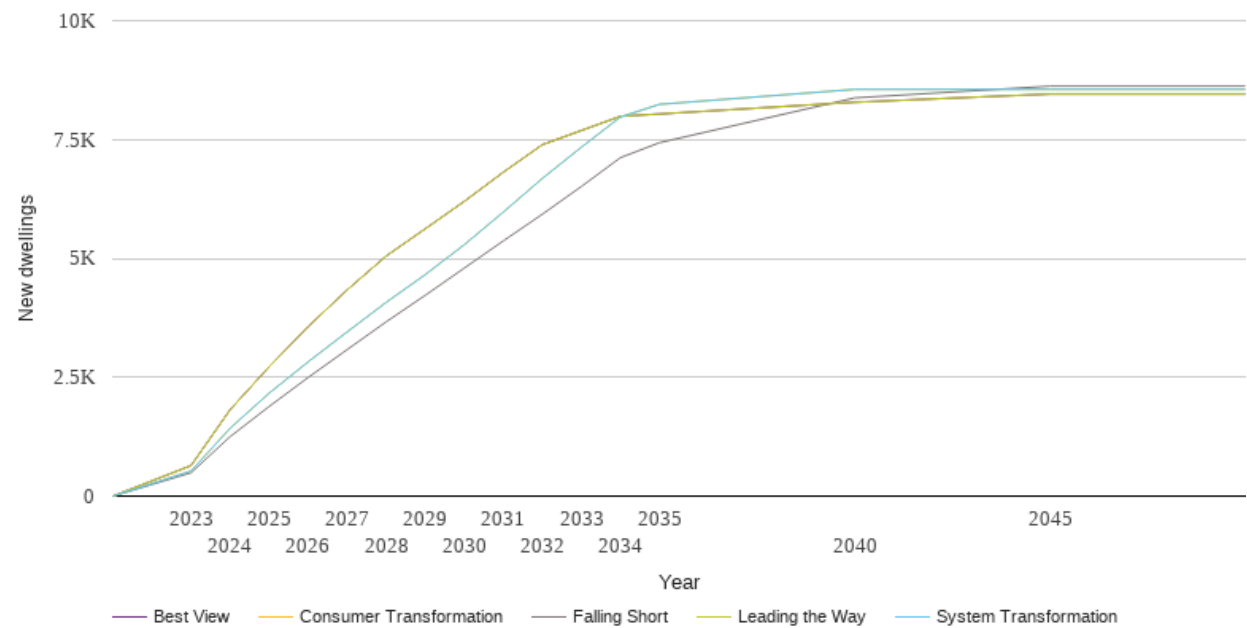
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	508	508	508	508	508
2023	583	575	575	508	508
2024	669	643	643	508	508
2025	771	724	724	508	508
2026	889	814	814	508	508
2027	1022	915	915	508	508
2028	1175	1033	1033	508	508
2029	1355	1164	1164	508	508
2030	1559	1310	1310	508	508
2031	1829	1476	1476	508	508
2032	2140	1664	1664	508	508
2033	2497	1873	1873	508	508
2034	2906	2112	2112	508	508
2035	3375	2377	2377	508	508
2040	7230	4565	4565	508	508
2045	15463	8753	8753	508	508
2050	31688	16237	16237	508	508



Technology Summary: Domestic

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

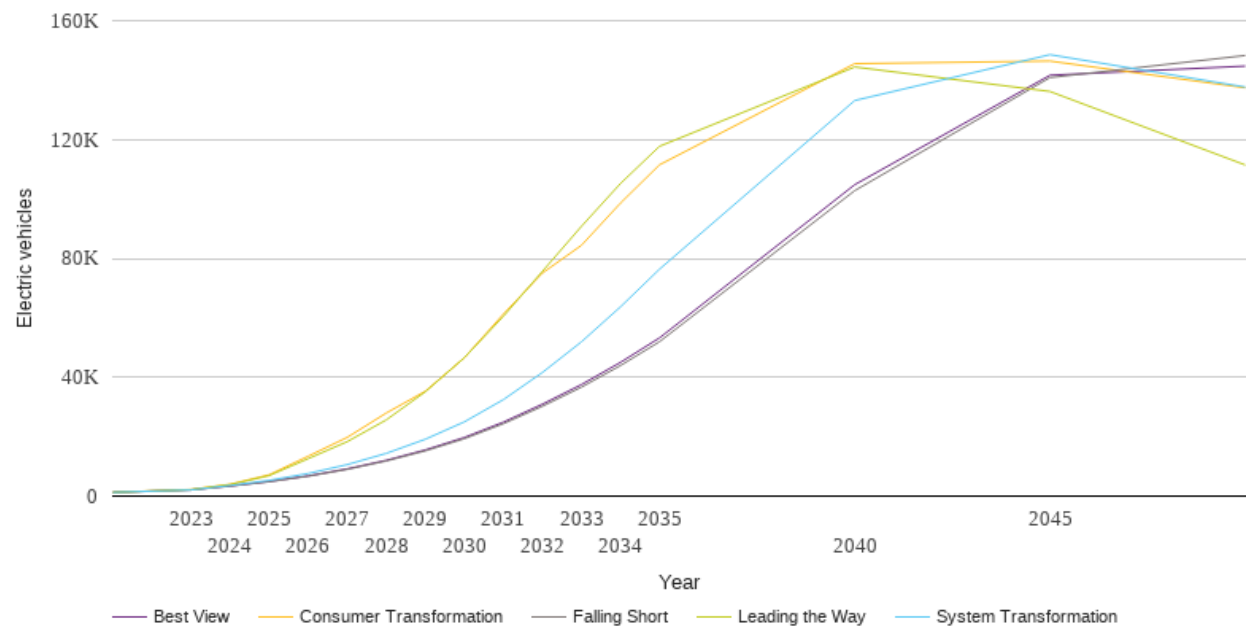
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	491	528	528	642	642
2024	1250	1427	1427	1816	1816
2025	1884	2164	2164	2720	2720
2026	2495	2823	2823	3565	3565
2027	3082	3454	3454	4338	4338
2028	3666	4076	4076	5051	5051
2029	4224	4659	4659	5623	5623
2030	4796	5288	5288	6200	6200
2031	5369	5975	5975	6814	6814
2032	5930	6683	6683	7392	7392
2033	6514	7341	7341	7691	7691
2034	7120	7974	7974	7989	7989
2035	7434	8241	8241	8038	8038
2040	8376	8555	8555	8285	8285
2045	8623	8555	8555	8457	8457
2050	8623	8555	8555	8457	8457



Technology Summary: Electric vehicles

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

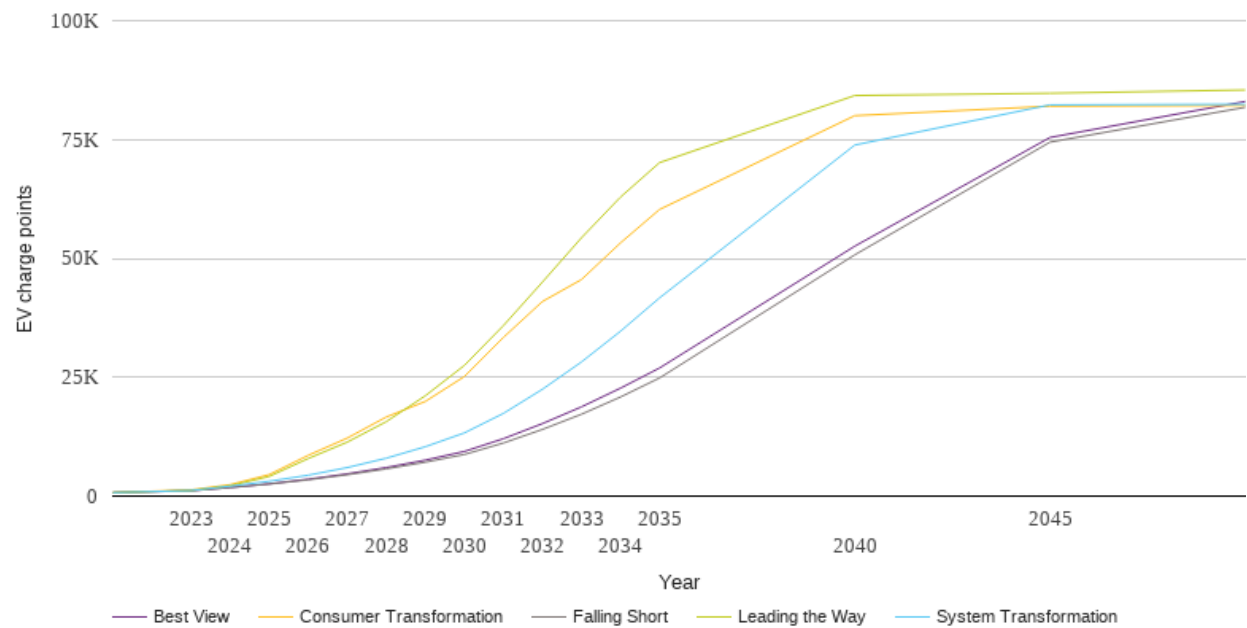
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1254	1254	1254	1254	1254
2023	2098	2083	2222	2161	2107
2024	3359	3571	3965	3869	3396
2025	4844	5290	7162	6885	4911
2026	6691	7607	13423	12596	6797
2027	9003	10597	19752	18314	9161
2028	11815	14381	27948	25637	12036
2029	15219	19125	35292	35099	15528
2030	19311	24980	46533	46570	19722
2031	24358	32466	61254	60504	24890
2032	30238	41597	75071	75637	30935
2033	36668	51931	84401	90787	37536
2034	43937	63688	98608	105202	45004
2035	51968	76383	111498	117733	53246
2040	102802	133133	145536	144421	104813
2045	140852	148563	146409	136173	141638
2050	148279	137673	137414	111443	144713



Technology Summary: EV Charge Point

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

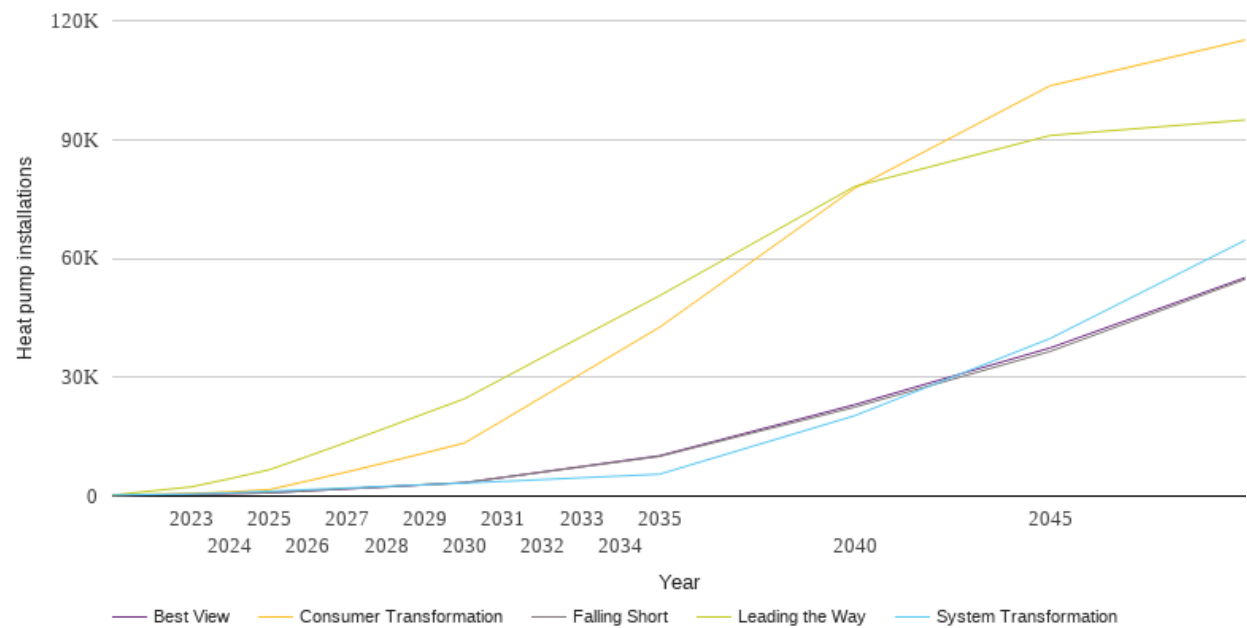
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	727	727	727	727	727
2023	1136	1167	1297	1169	1137
2024	1799	2102	2394	2173	1801
2025	2531	3108	4515	4127	2573
2026	3427	4387	8568	7900	3544
2027	4490	5996	12194	11348	4674
2028	5724	7968	16637	15652	6004
2029	7135	10382	19905	21100	7560
2030	8749	13285	25140	27472	9387
2031	11164	17388	33375	35857	12071
2032	14025	22467	40925	45012	15246
2033	17218	28210	45544	54332	18770
2034	20843	34675	53256	62896	22704
2035	24845	41693	60291	70143	26940
2040	50743	73836	80018	84258	52561
2045	74447	82291	82014	84740	75430
2050	81781	82422	82164	85427	83004



Technology Summary: Heat pumps

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

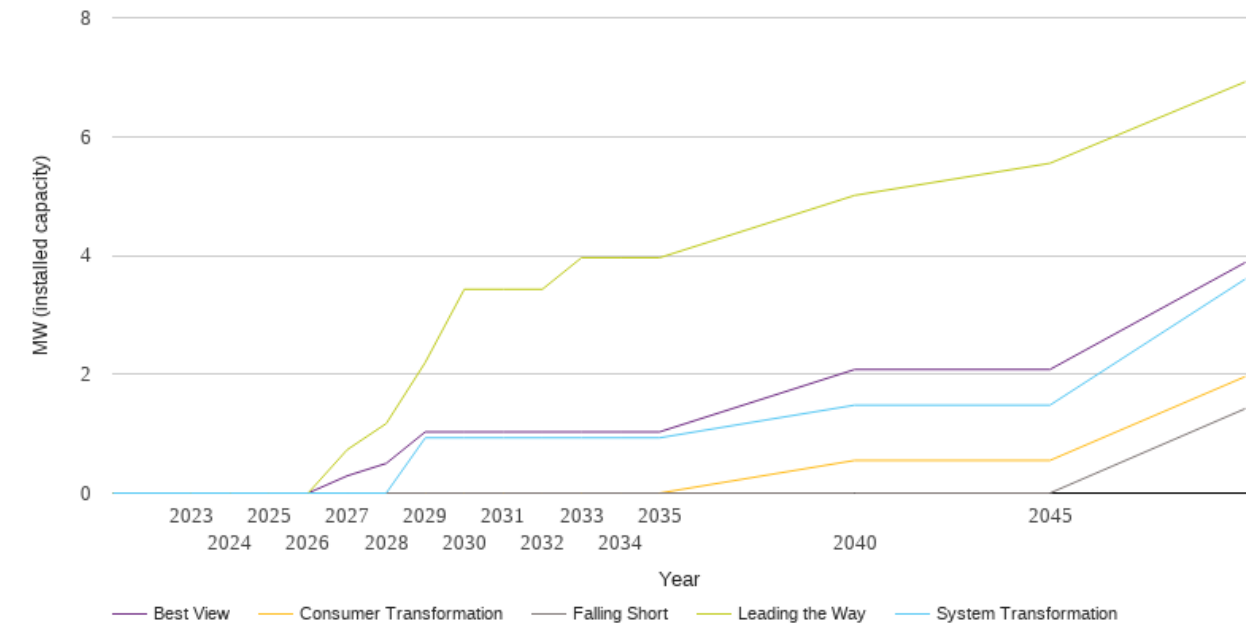
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	289	289	289	289	289
2023	450	528	667	2318	450
2024	624	827	1086	4400	624
2025	827	1220	1618	6635	827
2026	1338	1644	3839	10078	1330
2027	1850	2054	6125	13626	1834
2028	2362	2461	8479	17241	2339
2029	2886	2880	10917	20907	2849
2030	3403	3290	13398	24553	3362
2031	4723	3713	19189	29757	4722
2032	6053	4161	25051	35013	6094
2033	7368	4622	30926	40204	7450
2034	8695	5067	36776	45387	8818
2035	10019	5530	42602	50573	10183
2040	22453	20296	77715	78173	23074
2045	36509	39760	103552	91014	37375
2050	54725	64577	115134	94925	55130



Technology Summary: Hydrogen electrolysis

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

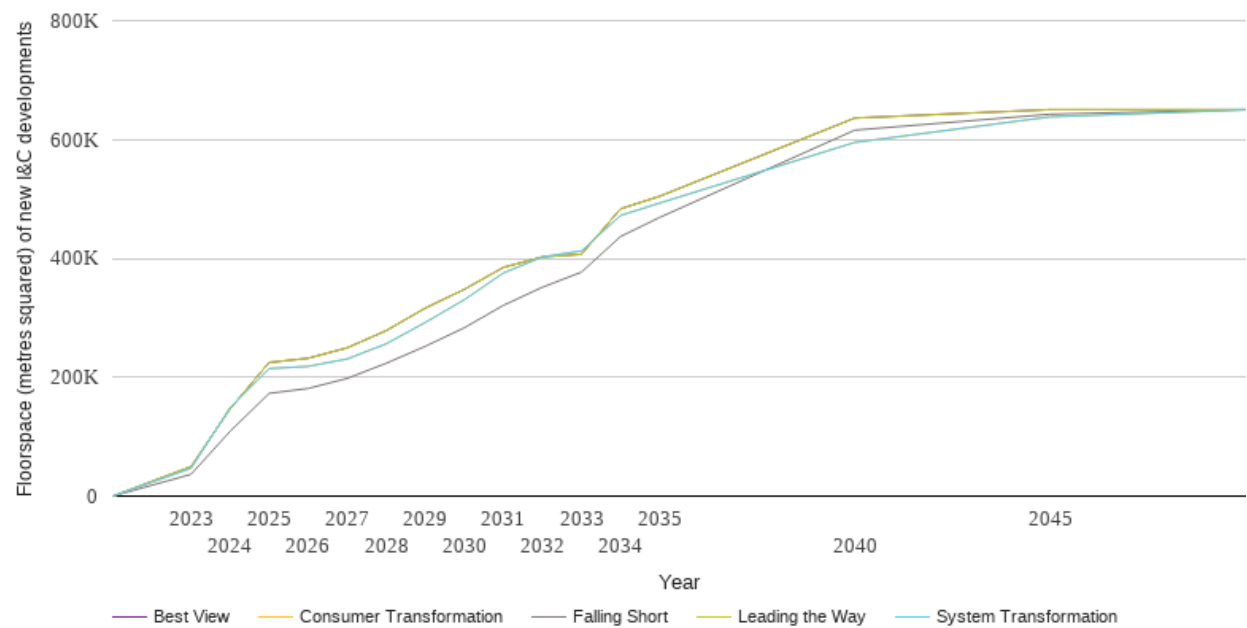
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.7	0.3
2028	0.0	0.0	0.0	1.2	0.5
2029	0.0	0.9	0.0	2.2	1.0
2030	0.0	0.9	0.0	3.4	1.0
2031	0.0	0.9	0.0	3.4	1.0
2032	0.0	0.9	0.0	3.4	1.0
2033	0.0	0.9	0.0	4.0	1.0
2034	0.0	0.9	0.0	4.0	1.0
2035	0.0	0.9	0.0	4.0	1.0
2040	0.0	1.5	0.6	5.0	2.1
2045	0.0	1.5	0.6	5.5	2.1
2050	1.4	3.6	2.0	6.9	3.9



Technology Summary: Non domestic

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

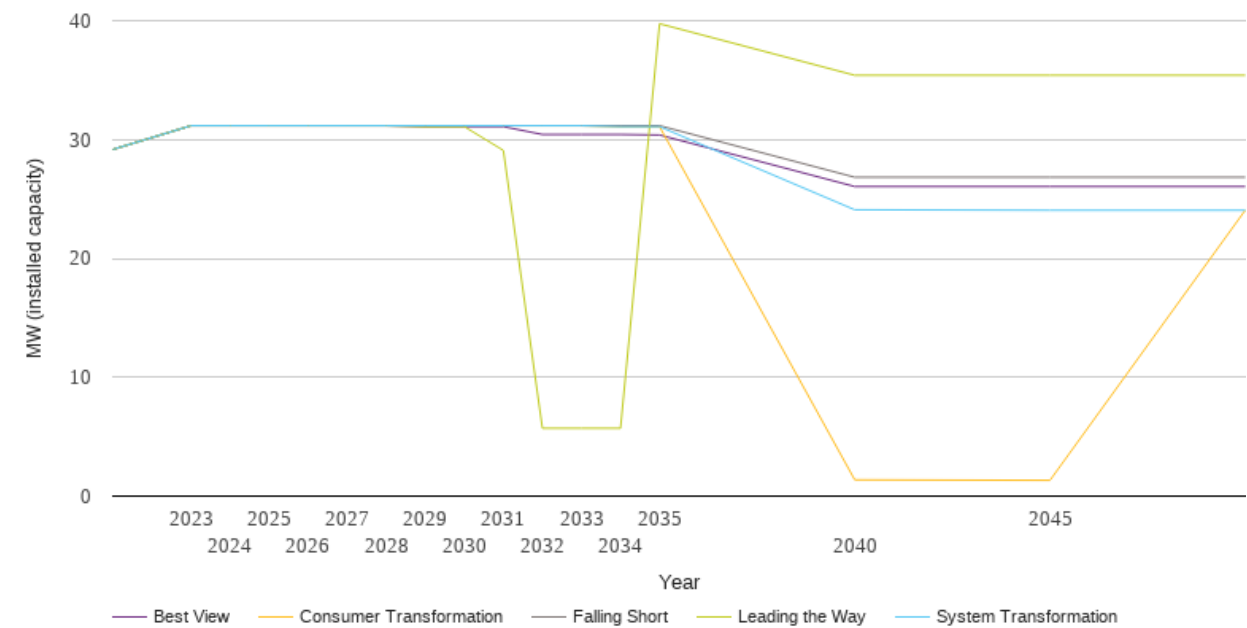
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	36630	46800	46800	49630	49630
2024	108980	148640	148640	146920	146920
2025	172828	214500	214500	224820	224820
2026	181116	218318	218318	231970	231970
2027	198006	230738	230738	249502	249502
2028	223510	256272	256272	278419	278419
2029	252015	292167	292167	316336	316336
2030	283247	330366	330366	347869	347869
2031	320922	375366	375366	384797	384797
2032	351437	402466	402466	402447	402447
2033	376852	412566	412566	406920	406920
2034	436707	472166	472166	483393	483393
2035	468873	493042	493042	504446	504446
2040	615787	595117	595117	636181	636181
2045	642597	638137	638137	650397	650397
2050	650397	649937	649937	650397	650397



Technology Summary: Other Distributed Generation

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

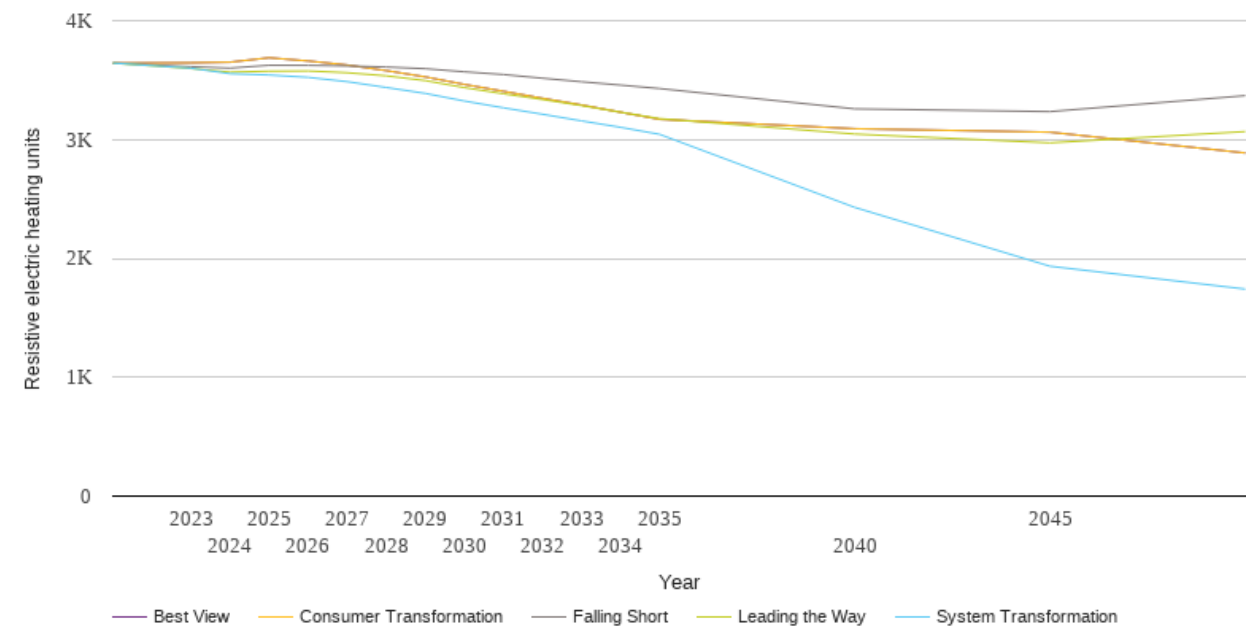
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	29.2	29.2	29.2	29.2	29.2
2023	31.2	31.2	31.2	31.2	31.2
2024	31.2	31.2	31.2	31.2	31.2
2025	31.2	31.2	31.2	31.2	31.2
2026	31.2	31.2	31.2	31.2	31.2
2027	31.2	31.2	31.2	31.2	31.2
2028	31.2	31.2	31.2	31.2	31.2
2029	31.2	31.2	31.2	31.1	31.1
2030	31.2	31.2	31.2	31.1	31.1
2031	31.2	31.2	31.2	29.1	31.1
2032	31.2	31.2	31.2	5.7	30.4
2033	31.2	31.2	31.2	5.7	30.4
2034	31.2	31.1	31.1	5.7	30.4
2035	31.2	31.1	31.1	39.7	30.4
2040	26.8	24.1	1.4	35.4	26.0
2045	26.8	24.0	1.3	35.4	26.0
2050	26.8	24.0	24.0	35.4	26.0



Technology Summary: Resistive electric heating

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

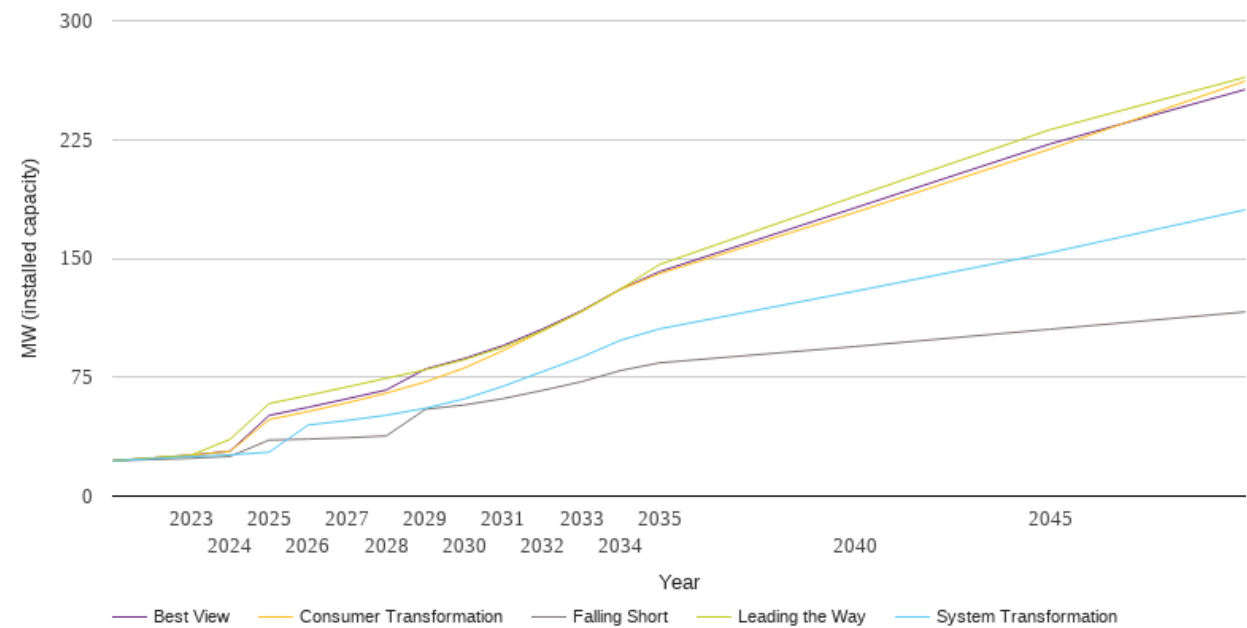
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	3643	3643	3643	3643	3643
2023	3613	3600	3646	3598	3646
2024	3601	3554	3651	3567	3651
2025	3625	3543	3688	3575	3688
2026	3624	3523	3661	3577	3661
2027	3619	3487	3627	3562	3627
2028	3610	3438	3580	3536	3580
2029	3596	3388	3527	3496	3527
2030	3570	3324	3464	3437	3464
2031	3547	3267	3406	3385	3406
2032	3516	3213	3347	3337	3347
2033	3486	3157	3291	3286	3291
2034	3458	3103	3230	3230	3230
2035	3429	3044	3170	3176	3170
2040	3258	2429	3091	3046	3091
2045	3235	1934	3062	2972	3062
2050	3369	1742	2887	3067	2887



Technology Summary: Solar Generation

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

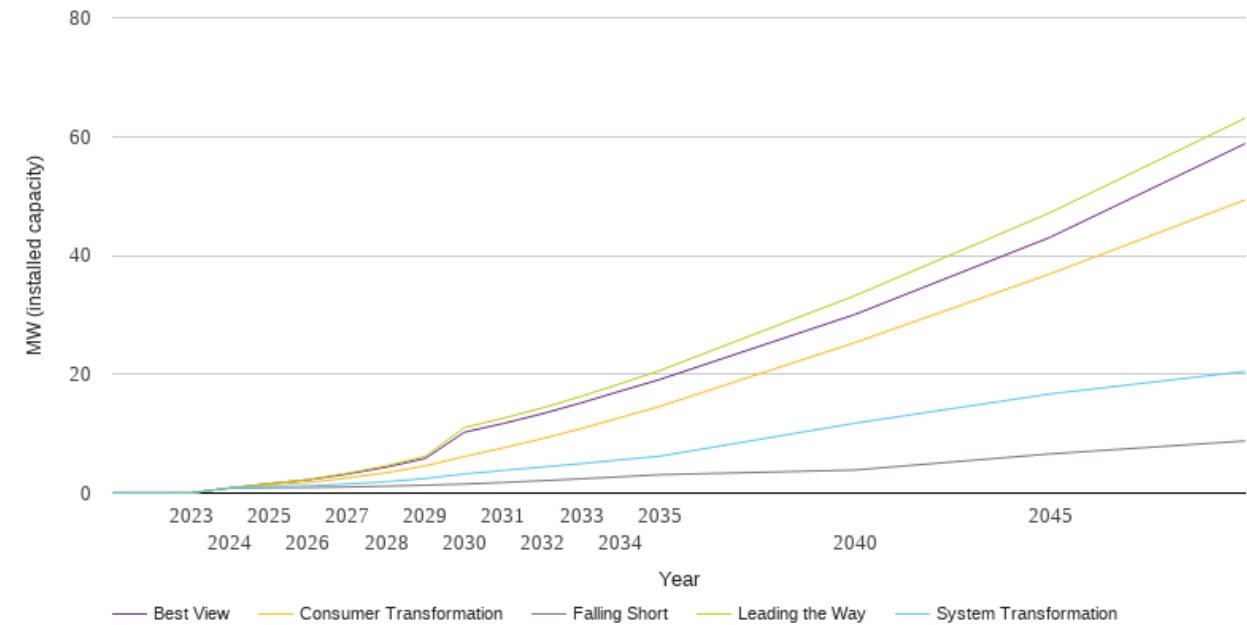
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	22.3	22.3	22.3	22.3	22.3
2023	23.9	25.0	25.8	25.8	25.8
2024	25.0	26.0	28.2	35.8	28.3
2025	35.4	27.7	48.3	58.4	50.9
2026	36.0	44.9	53.4	63.5	56.0
2027	36.8	47.7	58.9	68.9	61.4
2028	38.0	51.0	64.9	74.3	67.0
2029	54.7	55.4	72.1	79.7	80.1
2030	57.5	61.3	80.8	86.1	86.8
2031	61.5	69.4	91.9	94.0	95.1
2032	66.7	78.5	104.1	104.3	105.4
2033	72.2	87.6	116.4	116.3	116.9
2034	79.2	98.3	130.4	130.6	130.6
2035	84.1	105.5	140.4	146.1	141.6
2040	94.4	129.2	178.9	189.1	181.8
2045	105.3	153.6	219.0	231.2	222.2
2050	116.2	180.7	261.9	264.3	256.6



Technology Summary: Storage

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

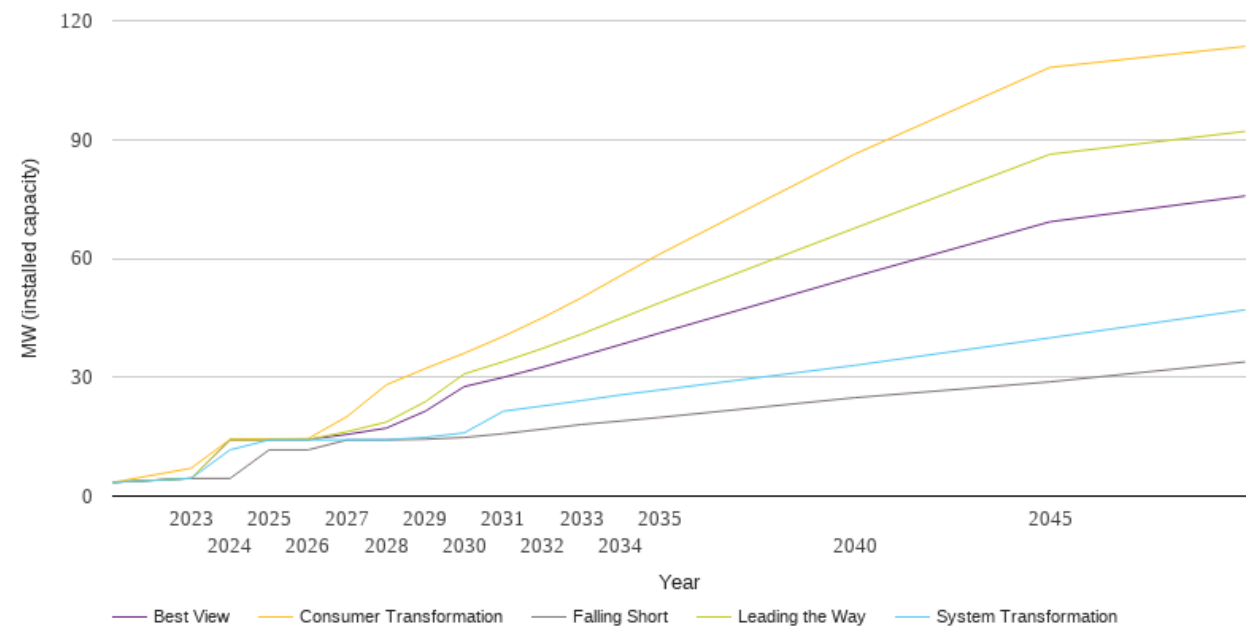
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.8	0.9	0.9	0.9	0.9
2025	0.9	1.0	1.3	1.6	1.6
2026	0.9	1.2	1.8	2.3	2.2
2027	1.0	1.5	2.5	3.3	3.2
2028	1.2	1.9	3.4	4.6	4.4
2029	1.3	2.4	4.6	6.2	5.8
2030	1.5	3.2	6.2	11.0	10.2
2031	1.8	3.8	7.6	12.6	11.7
2032	2.1	4.4	9.2	14.3	13.4
2033	2.4	5.0	10.9	16.3	15.2
2034	2.7	5.6	12.7	18.4	17.2
2035	3.1	6.2	14.6	20.6	19.1
2040	3.9	11.8	25.3	33.2	30.0
2045	6.6	16.7	36.9	47.2	43.0
2050	8.8	20.5	49.3	63.1	58.8



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	3.5	3.5	3.5	3.5	3.5
2023	4.5	4.5	7.0	4.5	4.5
2024	4.5	11.7	14.3	14.2	14.2
2025	11.7	14.2	14.4	14.2	14.2
2026	11.7	14.2	14.5	14.3	14.3
2027	14.2	14.2	20.1	16.3	15.6
2028	14.2	14.2	28.1	18.7	17.1
2029	14.3	14.8	32.2	23.8	21.4
2030	14.8	16.0	36.1	30.9	27.6
2031	15.7	21.4	40.3	33.9	30.0
2032	16.9	22.7	45.0	37.3	32.6
2033	18.1	24.1	50.1	40.9	35.3
2034	18.9	25.5	55.6	44.8	38.2
2035	19.9	26.8	61.1	48.8	41.1
2040	24.8	33.0	86.3	67.6	55.4
2045	28.8	39.9	108.2	86.3	69.2
2050	33.9	47.0	113.5	92.1	75.7



National Grid Electricity Distribution PLC 09223384)
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