

Distribution Future Energy Scenarios 2022

Local Authority:
Pembrokeshire

What are Distribution Future Energy Scenarios?

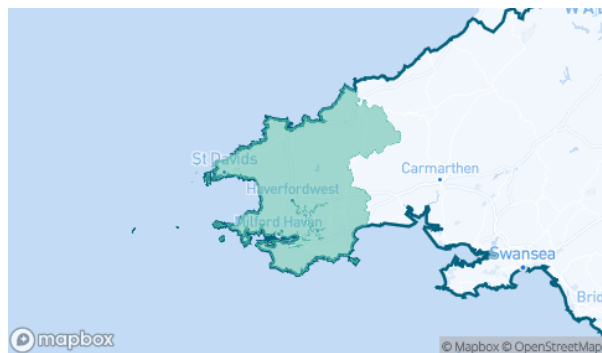
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Pembrokeshire covered by the NGED licence areas.



Scenario Summary

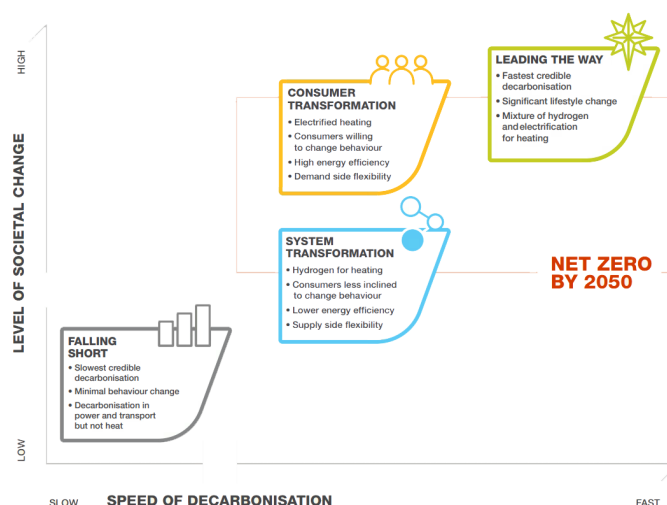
This DFES scenario framework includes three scenarios that are compliant with UK government targets of Net Zero greenhouse gas emissions by 2050. A summary of each scenario is below:

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 Pembrokeshire 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	103	60	60	0	10758	4710	4710	0
Domestic	New dwellings	0	1614	1710	1710	1928	2068	2006	2006	1962
Electric vehicles	Electric vehicles	667	10453	13425	25159	25106	77390	65946	64976	57312
EV Charge Point	EV charge points	434	4797	7150	13394	14682	43623	43789	43253	44863
Heat pumps	Heat pump installations	656	7920	9152	13146	18917	39443	42653	58245	51549
Hydrogen electrolysis	MW (installed capacity)	0.0	4.6	10.6	5.6	1.5	44.1	35.2	31.1	20.8
Non domestic	Floorspace (metres squared) of new I&C developments	0	583325	692366	692366	733242	1134910	1134516	1134516	1134910
Other Distributed Generation	MW (installed capacity)	0.5	0.5	4.7	17.8	17.8	0.4	16.5	41.8	41.9
Resistive electric heating	Resistive electric heating units	10568	8628	8419	8891	8519	4959	2112	5485	5713
Solar Generation	MW (installed capacity)	37.6	44.1	54.9	67.2	69.4	101.9	180.7	231.4	226.7
Storage	MW (installed capacity)	0.0	0.4	1.5	3.1	4.7	5.1	12.6	29.3	36.7
Wind	MW (installed capacity)	15.3	15.8	24.9	49.6	45.6	31.7	65.7	170.2	143.7

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.

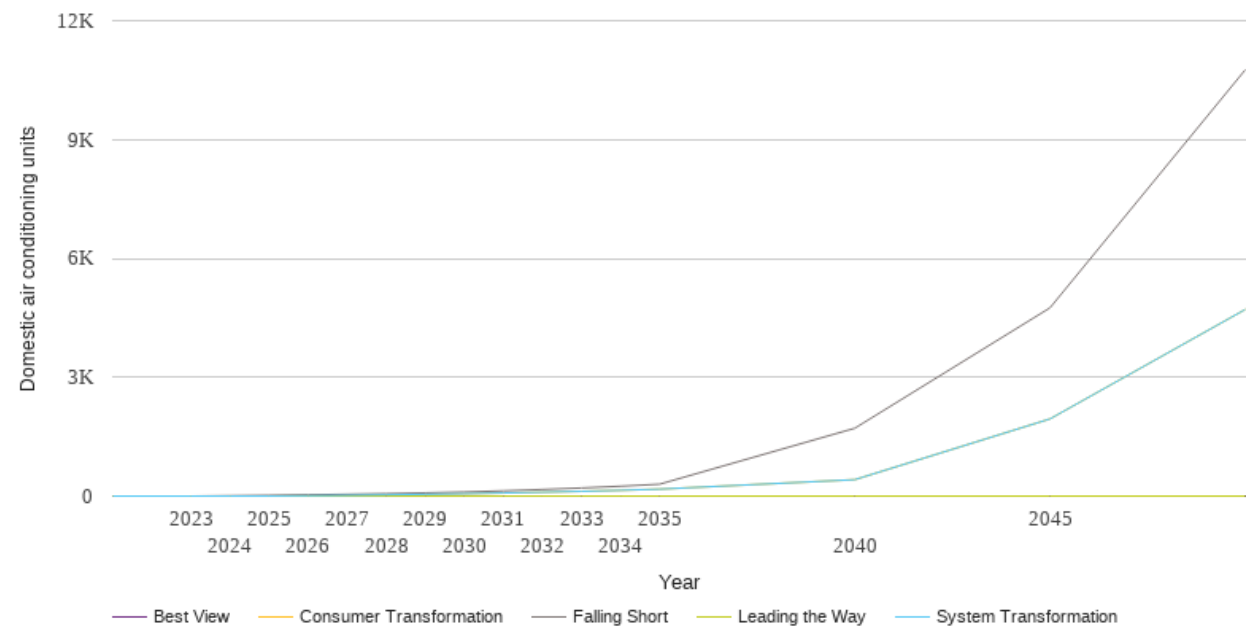
If you have any comments or queries regarding these reports, please contact

nged.energyplanning@nationalgrid.co.uk.

Technology Summary: Air conditioning

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

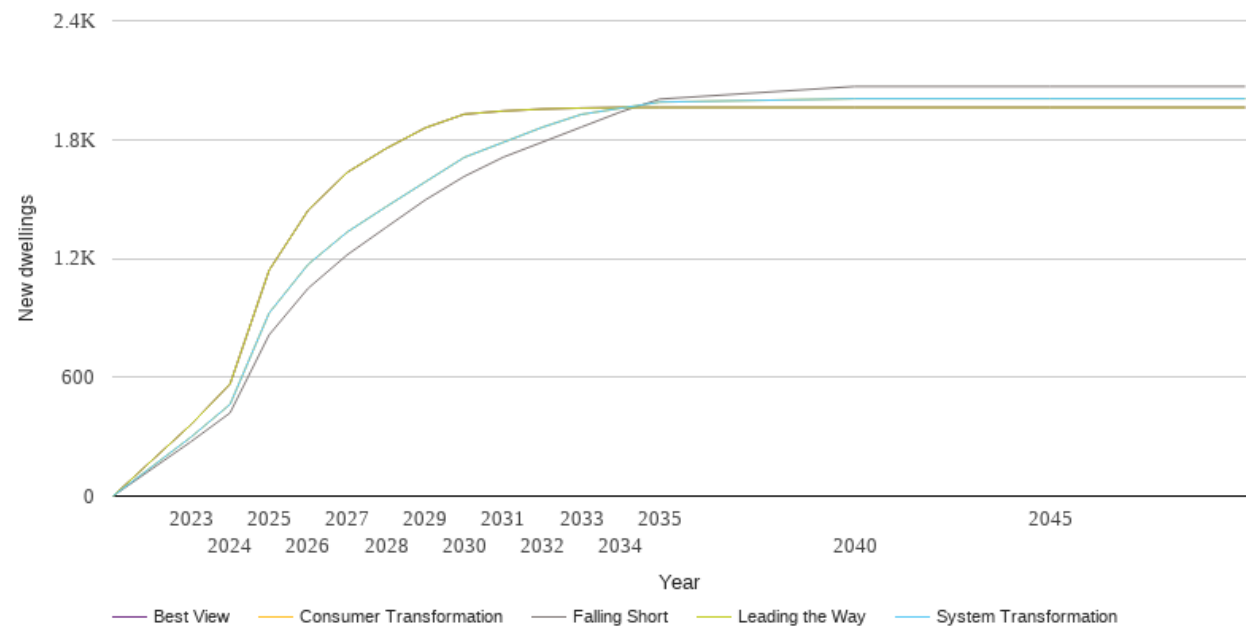
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	9	0	0	0	0
2025	19	0	0	0	0
2026	32	9	9	0	0
2027	46	19	19	0	0
2028	62	32	32	0	0
2029	81	45	45	0	0
2030	103	60	60	0	0
2031	132	78	78	0	0
2032	166	98	98	0	0
2033	205	120	120	0	0
2034	249	146	146	0	0
2035	300	175	175	0	0
2040	1712	414	414	0	0
2045	4751	1948	1948	0	0
2050	10758	4710	4710	0	0



Technology Summary: Domestic

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

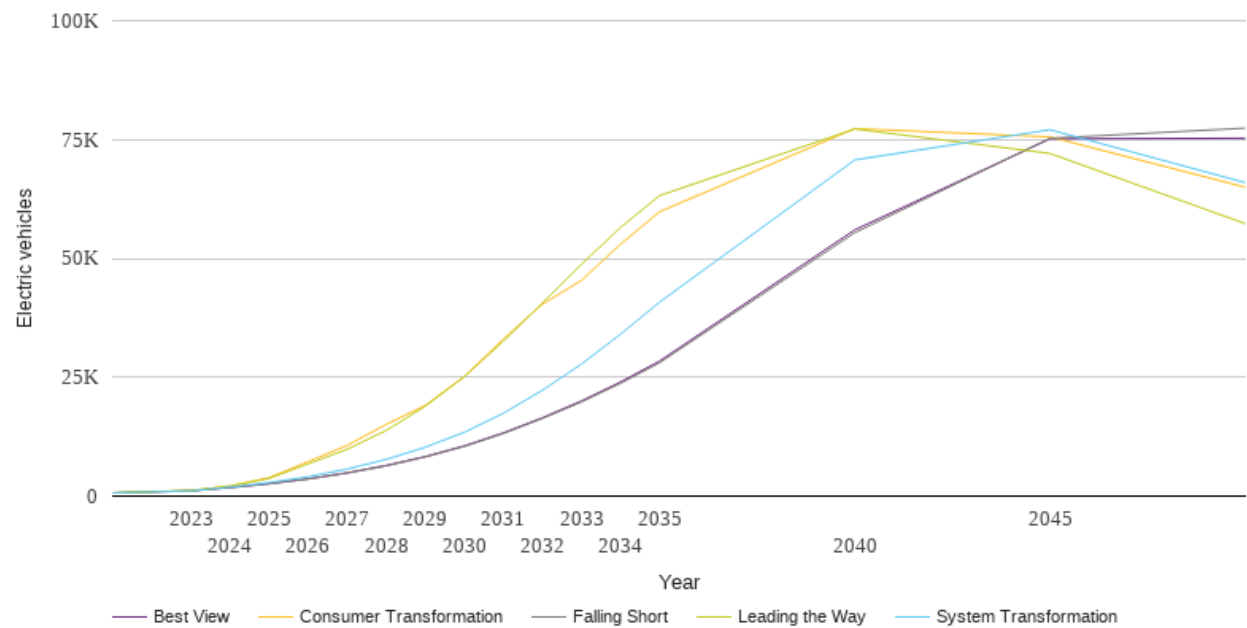
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	275	298	298	361	361
2024	420	463	463	566	566
2025	814	924	924	1140	1140
2026	1049	1170	1170	1443	1443
2027	1218	1333	1333	1634	1634
2028	1357	1461	1461	1755	1755
2029	1495	1586	1586	1859	1859
2030	1614	1710	1710	1928	1928
2031	1711	1786	1786	1944	1944
2032	1787	1862	1862	1954	1954
2033	1863	1927	1927	1959	1959
2034	1939	1958	1958	1962	1962
2035	2004	1989	1989	1962	1962
2040	2068	2006	2006	1962	1962
2045	2068	2006	2006	1962	1962
2050	2068	2006	2006	1962	1962



Technology Summary: Electric vehicles

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

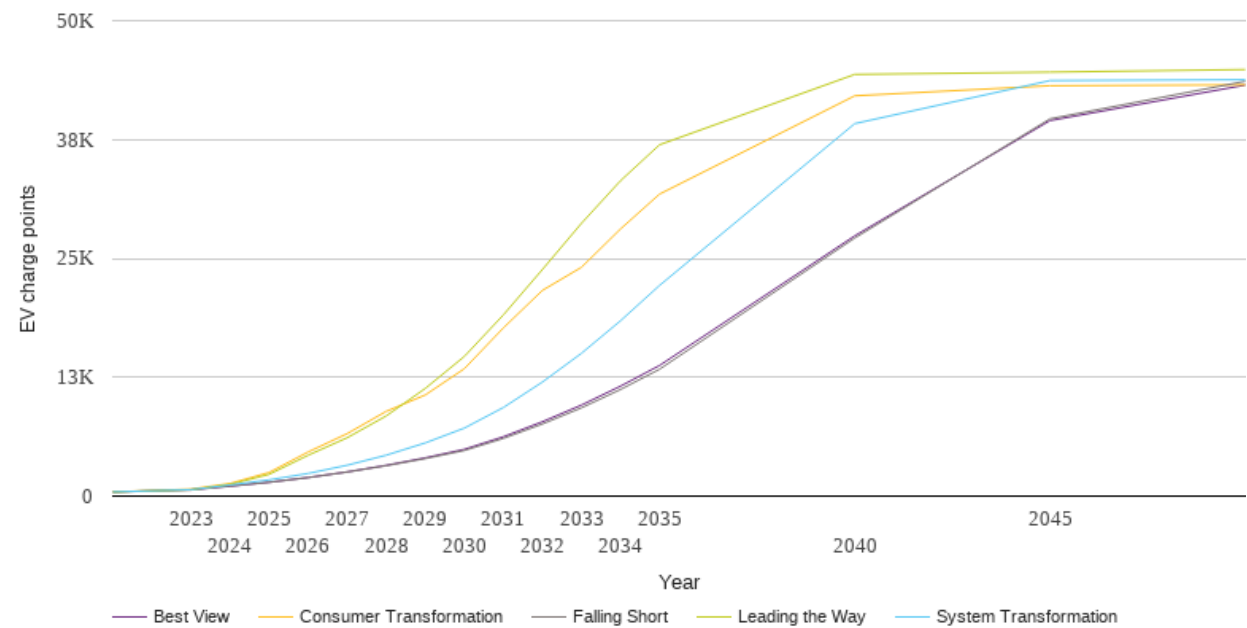
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	667	667	667	667	667
2023	1120	1108	1185	1161	1121
2024	1792	1909	2136	2083	1801
2025	2598	2839	3878	3717	2616
2026	3601	4080	7249	6784	3630
2027	4853	5695	10670	9867	4895
2028	6379	7723	15092	13805	6435
2029	8231	10280	19075	18913	8308
2030	10453	13425	25159	25106	10554
2031	13174	17418	33048	32560	13304
2032	16329	22252	40361	40626	16481
2033	19799	27762	45374	48761	20005
2034	23721	34032	52959	56500	23993
2035	28049	40778	59819	63214	28393
2040	55395	70713	77290	77222	55994
2045	75270	77060	75558	72078	75151
2050	77390	65946	64976	57312	75280



Technology Summary: EV Charge Point

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

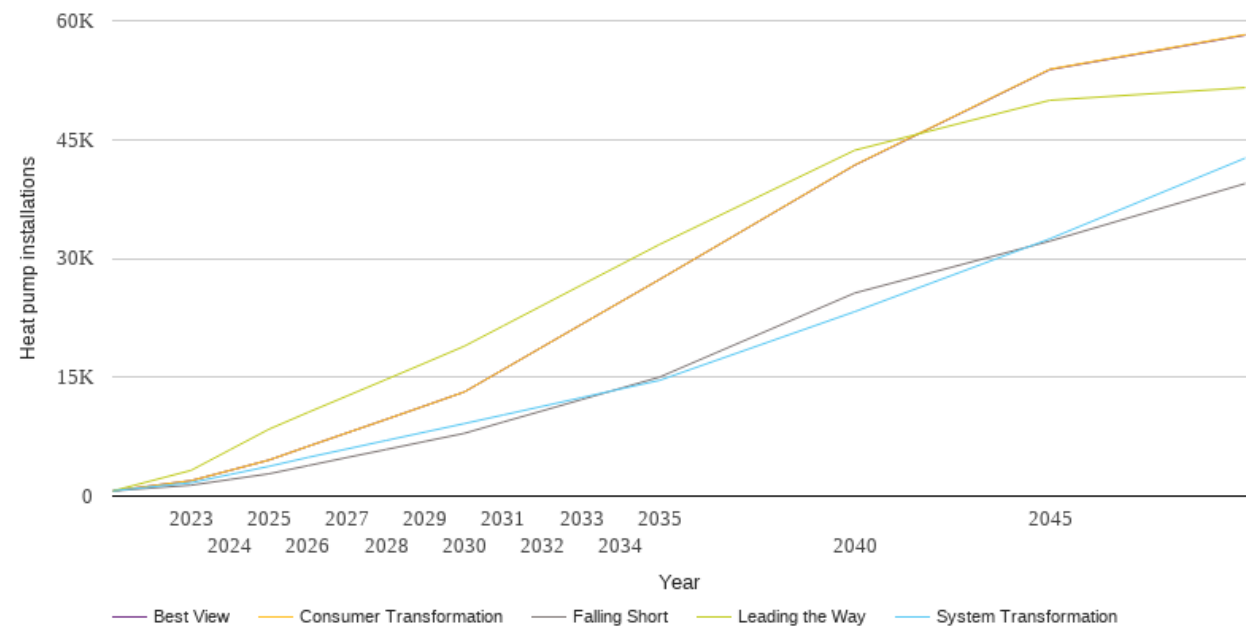
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	434	434	434	434	434
2023	678	675	730	661	650
2024	1057	1178	1325	1229	1039
2025	1453	1706	2485	2287	1454
2026	1942	2382	4643	4297	1952
2027	2530	3246	6569	6139	2543
2028	3198	4303	8914	8430	3237
2029	3946	5592	10635	11323	4022
2030	4797	7150	13394	14682	4915
2031	6069	9315	17688	19057	6242
2032	7585	11995	21634	23831	7818
2033	9281	15018	24064	28688	9572
2034	11211	18436	28093	33163	11560
2035	13343	22157	31760	36949	13736
2040	27142	39174	42100	44350	27373
2045	39673	43699	43158	44588	39492
2050	43623	43789	43253	44863	43228



Technology Summary: Heat pumps

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

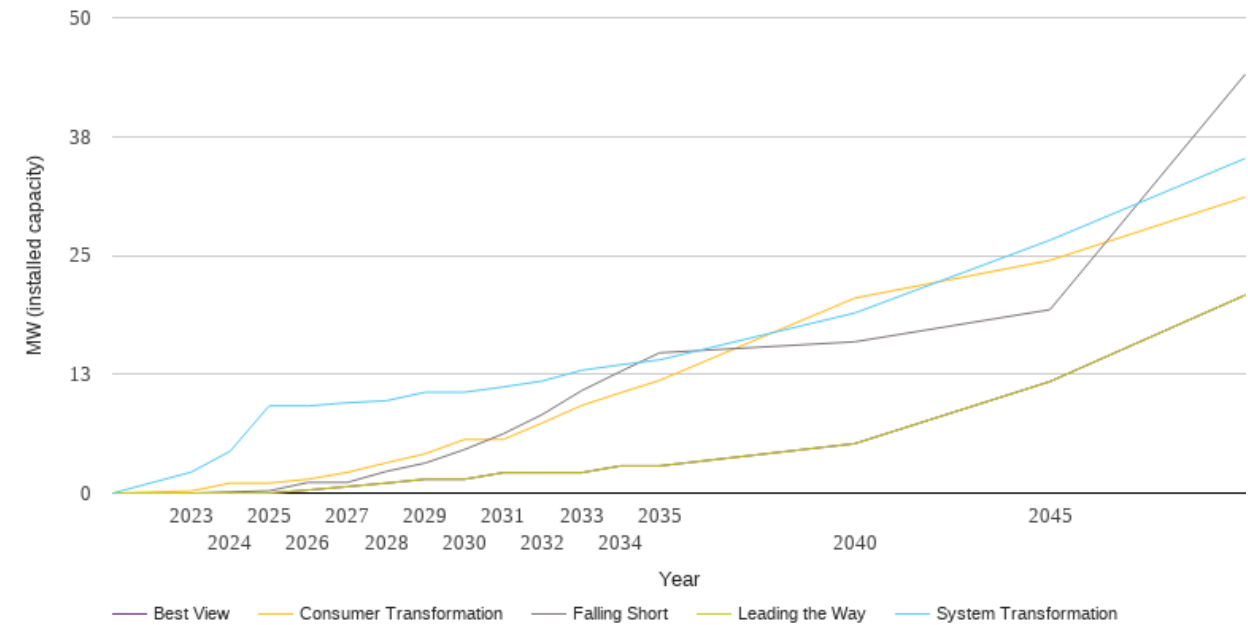
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	656	656	656	656	656
2023	1373	1685	1945	3244	1945
2024	2097	2725	3244	5850	3244
2025	2816	3757	4553	8448	4553
2026	3846	4887	6286	10572	6286
2027	4873	5952	7987	12643	7989
2028	5882	7022	9687	14721	9688
2029	6905	8087	11407	16811	11411
2030	7920	9152	13146	18917	13146
2031	9350	10243	15981	21492	15984
2032	10760	11327	18826	24063	18828
2033	12175	12427	21670	26637	21670
2034	13598	13514	24503	29196	24505
2035	15013	14609	27335	31757	27335
2040	25627	23275	41794	43647	41760
2045	32183	32481	53881	49955	53832
2050	39443	42653	58245	51549	58179



Technology Summary: Hydrogen electrolysis

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

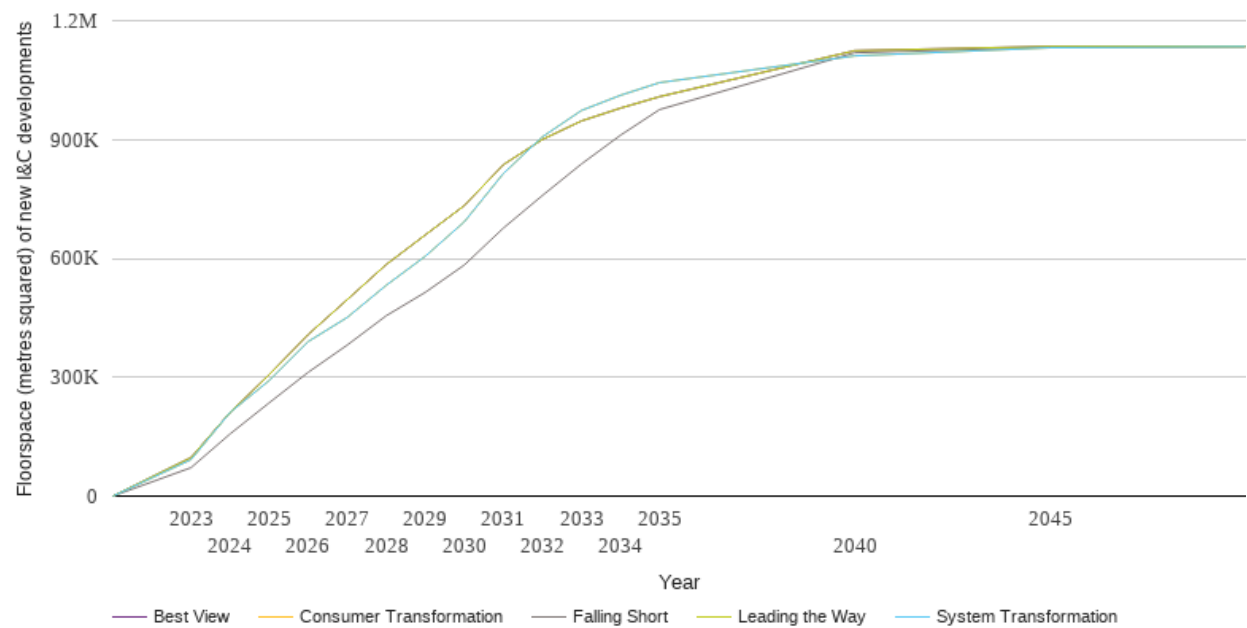
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	2.2	0.2	0.0	0.0
2024	0.1	4.4	1.0	0.0	0.0
2025	0.2	9.2	1.0	0.0	0.0
2026	1.1	9.2	1.5	0.3	0.3
2027	1.1	9.5	2.2	0.7	0.7
2028	2.3	9.7	3.2	1.0	1.0
2029	3.2	10.6	4.1	1.5	1.5
2030	4.6	10.6	5.6	1.5	1.5
2031	6.2	11.2	5.6	2.2	2.2
2032	8.3	11.8	7.4	2.2	2.2
2033	10.8	12.9	9.2	2.2	2.2
2034	12.8	13.5	10.6	2.9	2.9
2035	14.7	14.0	11.8	2.9	2.9
2040	15.9	18.9	20.5	5.2	5.2
2045	19.3	26.6	24.5	11.7	11.7
2050	44.1	35.2	31.1	20.8	20.8



Technology Summary: Non domestic

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

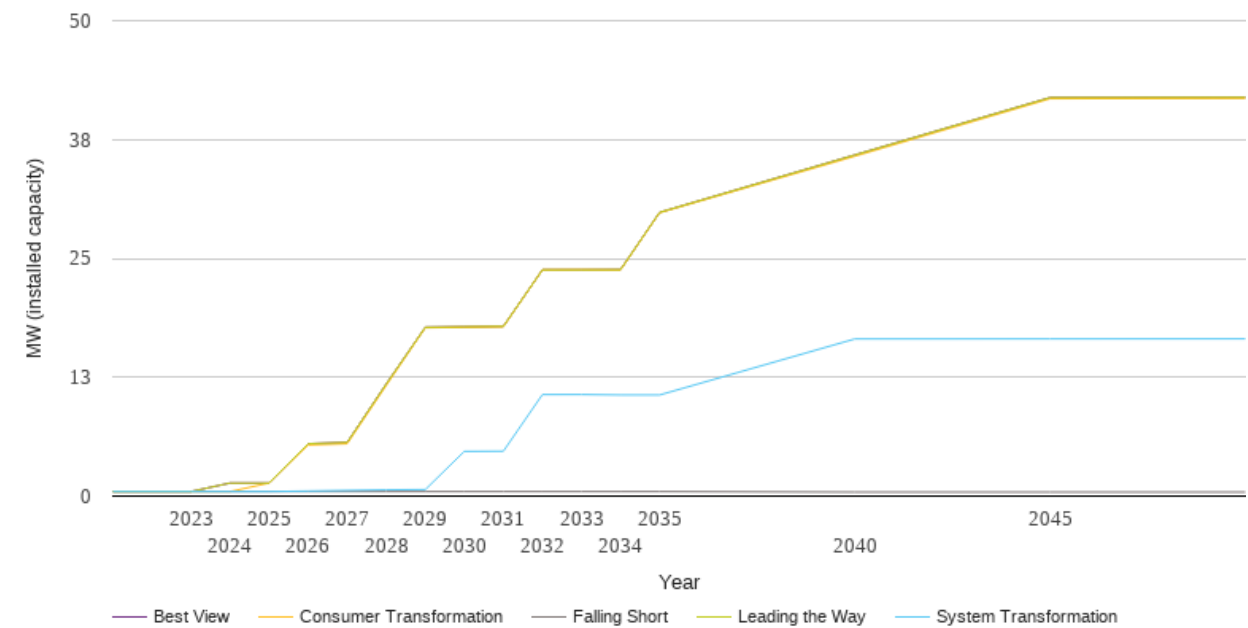
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	71800	92061	92061	97373	97373
2024	156872	210972	210972	211149	211149
2025	235287	291594	291594	306429	306429
2026	312410	389902	389902	407858	407858
2027	381164	450940	450940	495875	495875
2028	455212	532106	532106	584451	584451
2029	514310	605338	605338	659229	659229
2030	583325	692366	692366	733242	733242
2031	676502	814296	814296	836564	836564
2032	758736	906806	906806	900184	900184
2033	838298	973340	973340	946949	946949
2034	910886	1011684	1011684	979225	979225
2035	975596	1043649	1043649	1008193	1008193
2040	1119054	1111151	1111151	1124286	1124286
2045	1133469	1131813	1131813	1134910	1134910
2050	1134910	1134516	1134516	1134910	1134910



Technology Summary: Other Distributed Generation

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

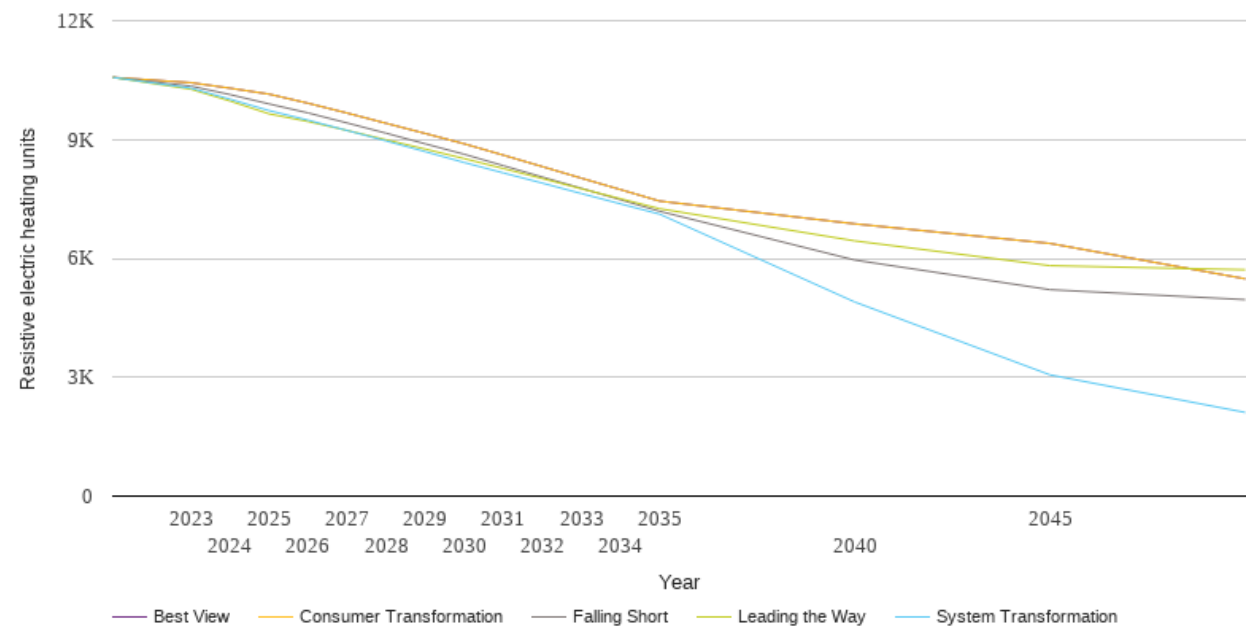
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.5	0.5	0.5	0.5	0.5
2023	0.5	0.5	0.5	0.5	0.5
2024	0.5	0.5	0.5	1.4	1.4
2025	0.5	0.5	1.4	1.4	1.4
2026	0.5	0.5	5.4	5.5	5.5
2027	0.5	0.6	5.5	5.7	5.7
2028	0.5	0.7	11.6	11.8	11.8
2029	0.5	0.7	17.7	17.8	17.8
2030	0.5	4.7	17.8	17.8	17.8
2031	0.5	4.7	17.8	17.9	17.9
2032	0.5	10.7	23.8	23.8	23.8
2033	0.5	10.7	23.8	23.8	23.8
2034	0.5	10.6	23.8	23.8	23.8
2035	0.5	10.6	29.8	29.8	29.8
2040	0.4	16.5	35.7	35.9	35.9
2045	0.4	16.5	41.8	41.9	41.9
2050	0.4	16.5	41.8	41.9	41.9



Technology Summary: Resistive electric heating

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

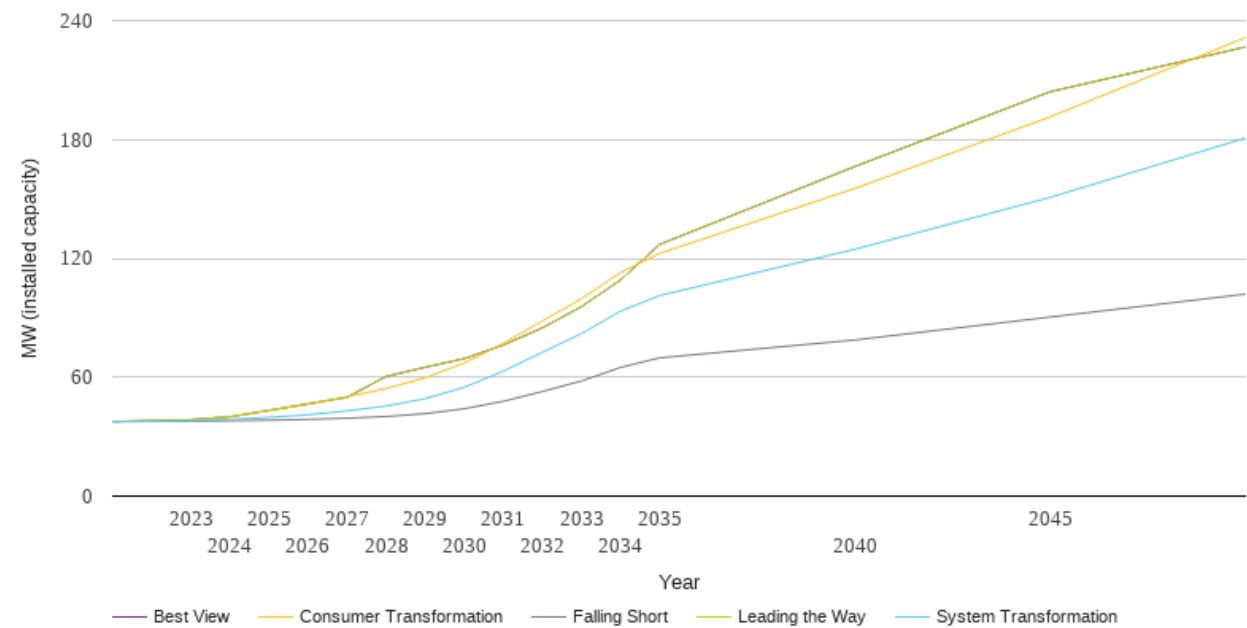
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	10568	10568	10568	10568	10568
2023	10348	10297	10435	10269	10435
2024	10135	10018	10296	9972	10296
2025	9899	9730	10146	9648	10146
2026	9671	9489	9916	9455	9916
2027	9418	9228	9668	9229	9668
2028	9159	8964	9409	8993	9409
2029	8891	8694	9153	8759	9153
2030	8628	8419	8891	8519	8891
2031	8340	8157	8606	8268	8606
2032	8053	7900	8316	8016	8316
2033	7769	7636	8024	7757	8024
2034	7480	7377	7737	7506	7737
2035	7190	7117	7447	7255	7447
2040	5958	4899	6872	6442	6872
2045	5210	3060	6378	5816	6378
2050	4959	2112	5485	5713	5485



Technology Summary: Solar Generation

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

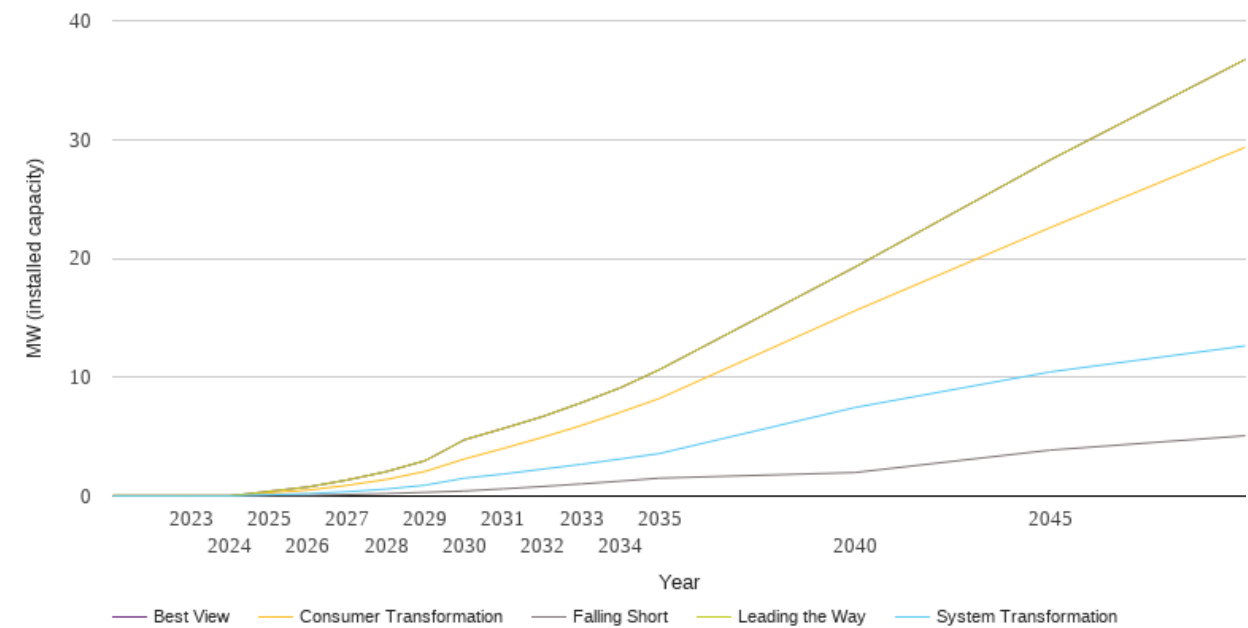
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	37.6	37.6	37.6	37.6	37.6
2023	37.8	38.1	38.5	38.6	38.6
2024	38.1	38.7	40.0	40.0	40.0
2025	38.3	39.7	43.2	43.3	43.3
2026	38.7	41.1	46.4	46.6	46.6
2027	39.3	43.0	50.1	49.9	49.9
2028	40.2	45.5	54.3	60.4	60.4
2029	41.6	49.2	59.8	65.0	65.0
2030	44.1	54.9	67.2	69.4	69.4
2031	47.9	63.1	77.1	76.3	76.3
2032	52.8	72.6	88.4	84.9	84.9
2033	58.1	82.0	99.6	95.6	95.6
2034	64.9	93.3	112.8	109.1	109.1
2035	69.8	101.2	122.5	127.0	127.0
2040	78.8	124.6	155.3	166.4	166.4
2045	90.4	150.8	191.4	204.1	204.1
2050	101.9	180.7	231.4	226.7	226.7



Technology Summary: Storage

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

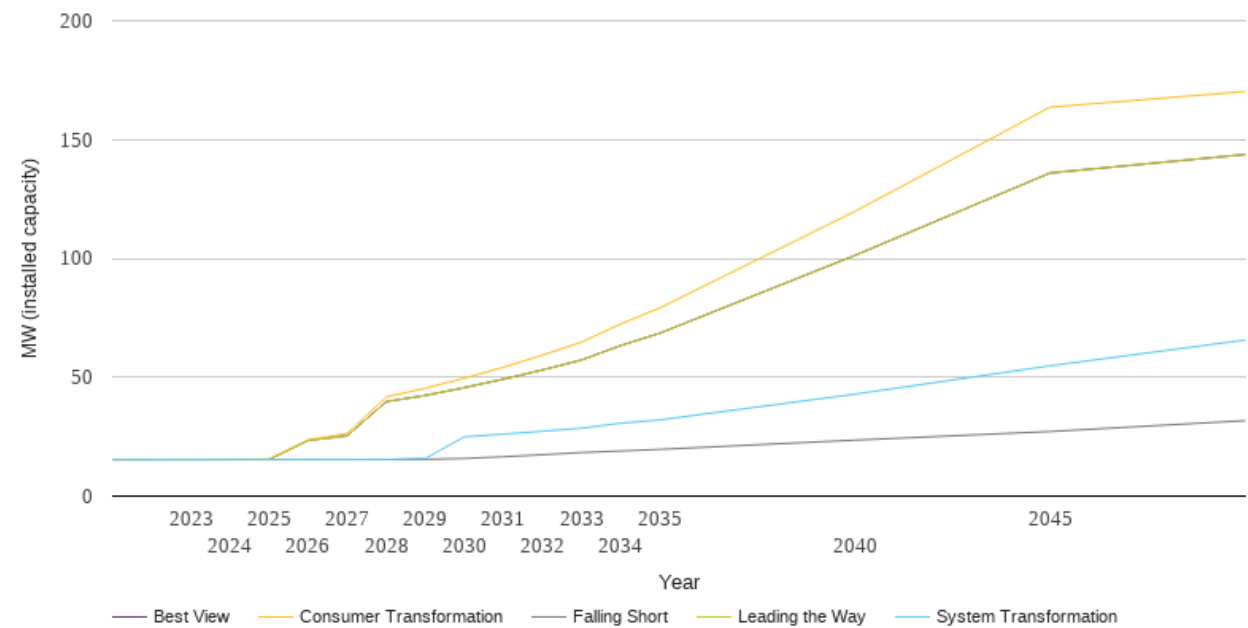
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.1	0.1	0.3	0.4	0.4
2026	0.1	0.2	0.5	0.8	0.8
2027	0.1	0.4	0.9	1.4	1.4
2028	0.2	0.6	1.4	2.1	2.1
2029	0.3	0.9	2.1	3.0	3.0
2030	0.4	1.5	3.1	4.7	4.7
2031	0.6	1.9	4.0	5.7	5.7
2032	0.8	2.3	4.9	6.7	6.7
2033	1.0	2.7	5.9	7.9	7.9
2034	1.3	3.1	7.1	9.1	9.1
2035	1.5	3.6	8.2	10.6	10.6
2040	2.0	7.4	15.6	19.3	19.3
2045	3.9	10.4	22.6	28.3	28.3
2050	5.1	12.6	29.3	36.7	36.7



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	15.3	15.3	15.3	15.3	15.3
2023	15.3	15.3	15.4	15.4	15.4
2024	15.3	15.3	15.5	15.4	15.4
2025	15.3	15.4	15.5	15.4	15.4
2026	15.4	15.4	23.6	23.4	23.4
2027	15.4	15.4	26.4	25.4	25.4
2028	15.4	15.4	41.7	39.8	39.8
2029	15.5	15.8	45.4	42.3	42.3
2030	15.8	24.9	49.6	45.6	45.6
2031	16.6	26.1	54.2	49.2	49.2
2032	17.4	27.3	59.3	53.1	53.1
2033	18.3	28.6	64.8	57.3	57.3
2034	19.0	30.7	72.3	63.3	63.3
2035	19.6	32.0	79.1	68.5	68.5
2040	23.5	42.9	119.7	101.2	101.2
2045	27.2	54.8	163.6	135.9	135.9
2050	31.7	65.7	170.2	143.7	143.7



National Grid Electricity Distribution PLC 09223384)
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