

# Distribution Future Energy Scenarios 2022

Local Authority:  
Newcastle-under-Lyme

## What are Distribution Future Energy Scenarios?

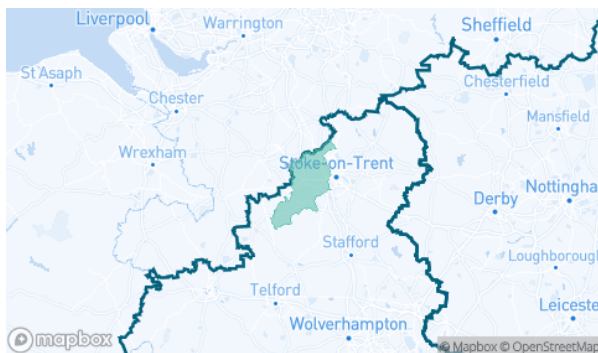
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Newcastle-under-Lyme covered by the NGED licence areas.



## Scenario Summary

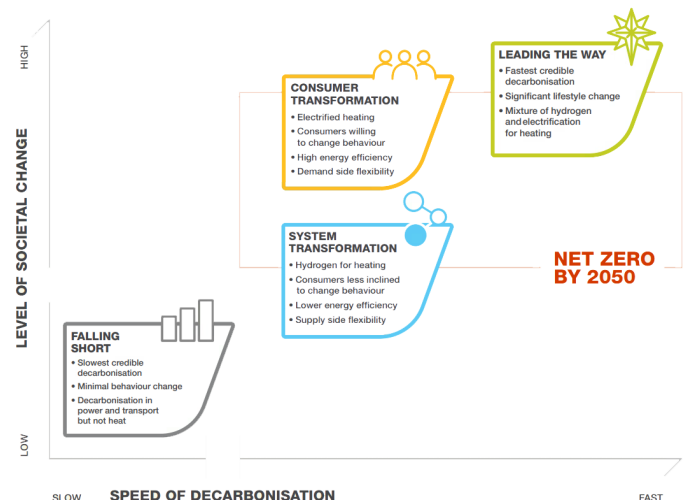
This DFES scenario framework includes three scenarios that are compliant with UK government targets of Net Zero greenhouse gas emissions by 2050. A summary of each scenario is below:

**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 Newcastle-under-Lyme 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	308	863	746	746	308	29601	14352	14352	308
Domestic	New dwellings	0	2082	2204	2204	2341	2439	2381	2381	2341
Electric vehicles	Electric vehicles	1405	11572	14414	26669	26610	81919	74296	73735	59267
EV Charge Point	EV charge points	751	5354	7926	15045	16513	47337	46343	48349	49007
Heat pumps	Heat pump installations	586	3687	3361	9025	14520	28860	32695	54700	47883
Hydrogen electrolysis	MW (installed capacity)	0.5	1.0	4.1	1.3	4.4	3.4	15.9	10.5	16.5
Non domestic	Floorspace (metres squared) of new I&C developments	0	138689	165531	165531	177769	299329	298542	298542	299329
Other Distributed Generation	MW (installed capacity)	11.9	19.8	10.5	11.5	11.1	17.4	17.5	18.7	27.6
Resistive electric heating	Resistive electric heating units	6246	5167	5013	5341	5115	3410	1489	3496	3671
Solar Generation	MW (installed capacity)	13.4	17.5	24.2	34.4	32.7	41.7	83.8	126.1	123.3
Storage	MW (installed capacity)	1.0	1.3	2.1	3.4	4.5	4.5	9.9	23.7	30.3
Wind	MW (installed capacity)	2.2	2.2	2.3	2.7	2.6	2.7	4.9	9.7	8.6

## 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.

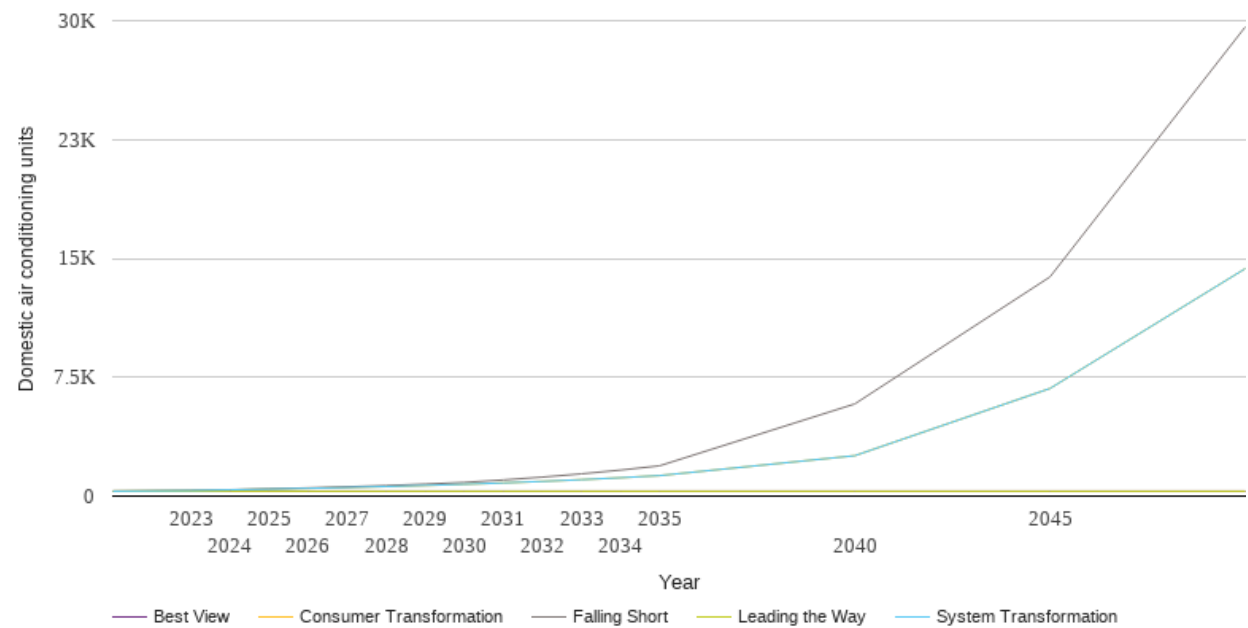
If you have any comments or queries regarding these reports, please contact

[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.

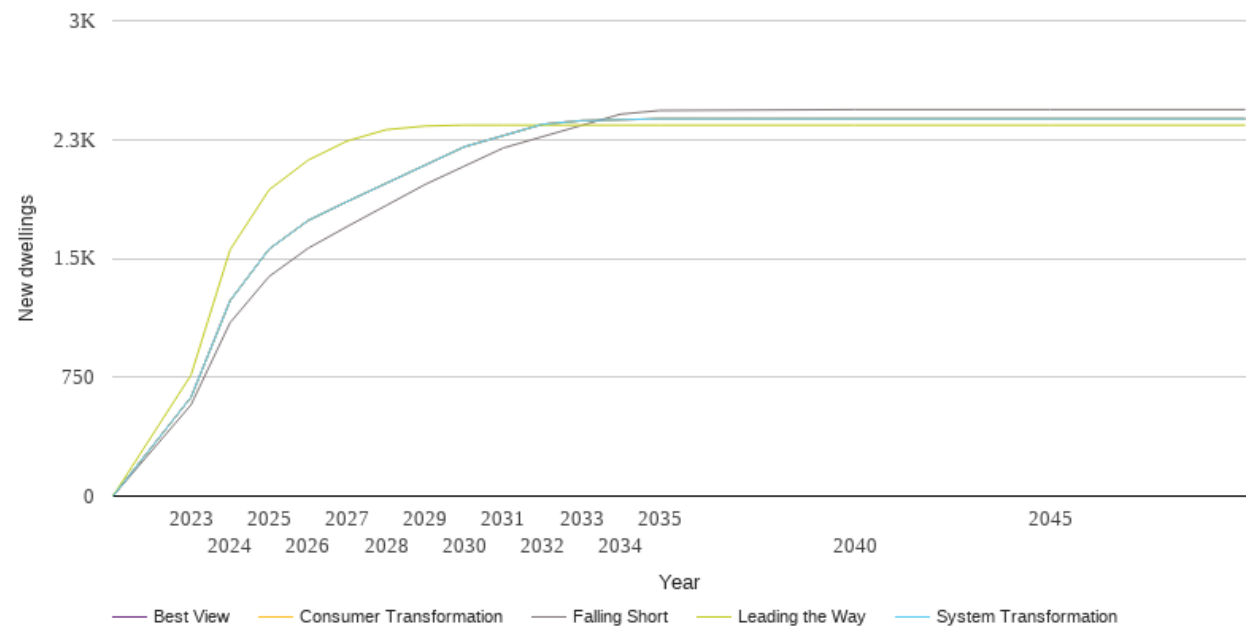
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	308	308	308	308	308
2023	355	349	349	308	308
2024	401	392	392	308	308
2025	455	442	442	308	308
2026	516	489	489	308	308
2027	586	542	542	308	308
2028	665	603	603	308	308
2029	758	671	671	308	308
2030	863	746	746	308	308
2031	1019	832	832	308	308
2032	1198	928	928	308	308
2033	1404	1035	1035	308	308
2034	1640	1157	1157	308	308
2035	1910	1292	1292	308	308
2040	5816	2549	2549	308	308
2045	13831	6791	6791	308	308
2050	29601	14352	14352	308	308



# Technology Summary: Domestic

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

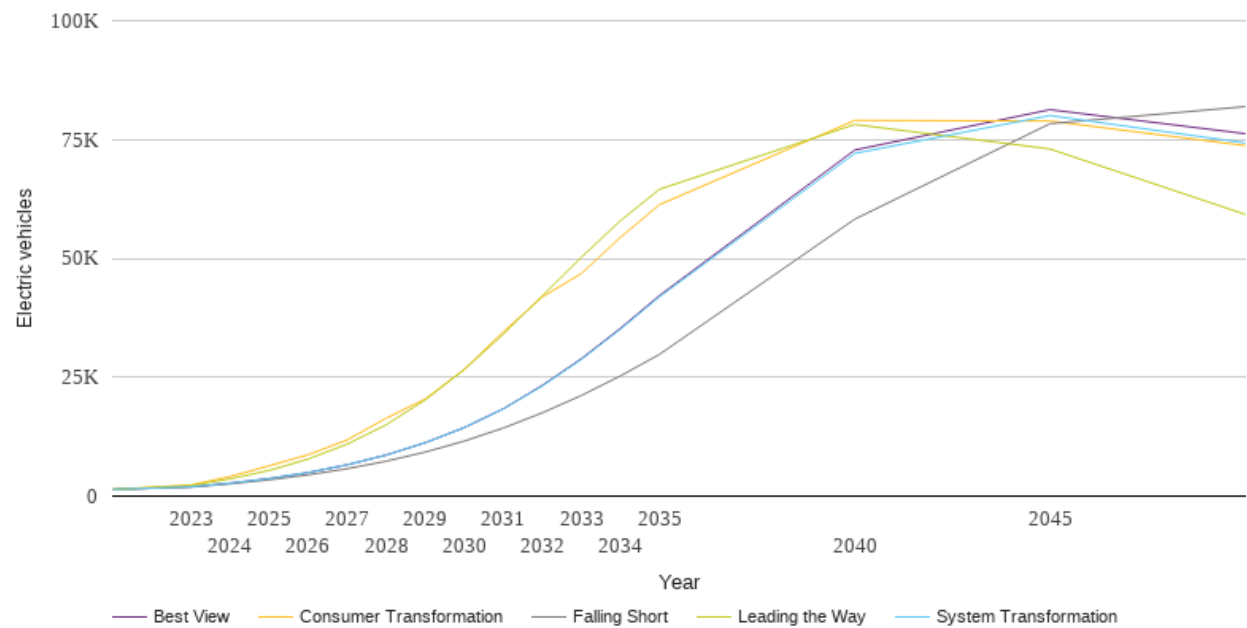
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	576	624	624	764	624
2024	1094	1233	1233	1554	1233
2025	1386	1559	1559	1933	1559
2026	1564	1739	1739	2120	1739
2027	1701	1859	1859	2241	1859
2028	1834	1974	1974	2312	1974
2029	1967	2089	2089	2335	2089
2030	2082	2204	2204	2341	2204
2031	2197	2275	2275	2341	2275
2032	2268	2346	2346	2341	2346
2033	2339	2369	2369	2341	2369
2034	2410	2375	2375	2341	2375
2035	2433	2381	2381	2341	2381
2040	2439	2381	2381	2341	2381
2045	2439	2381	2381	2341	2381
2050	2439	2381	2381	2341	2381



# Technology Summary: Electric vehicles

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

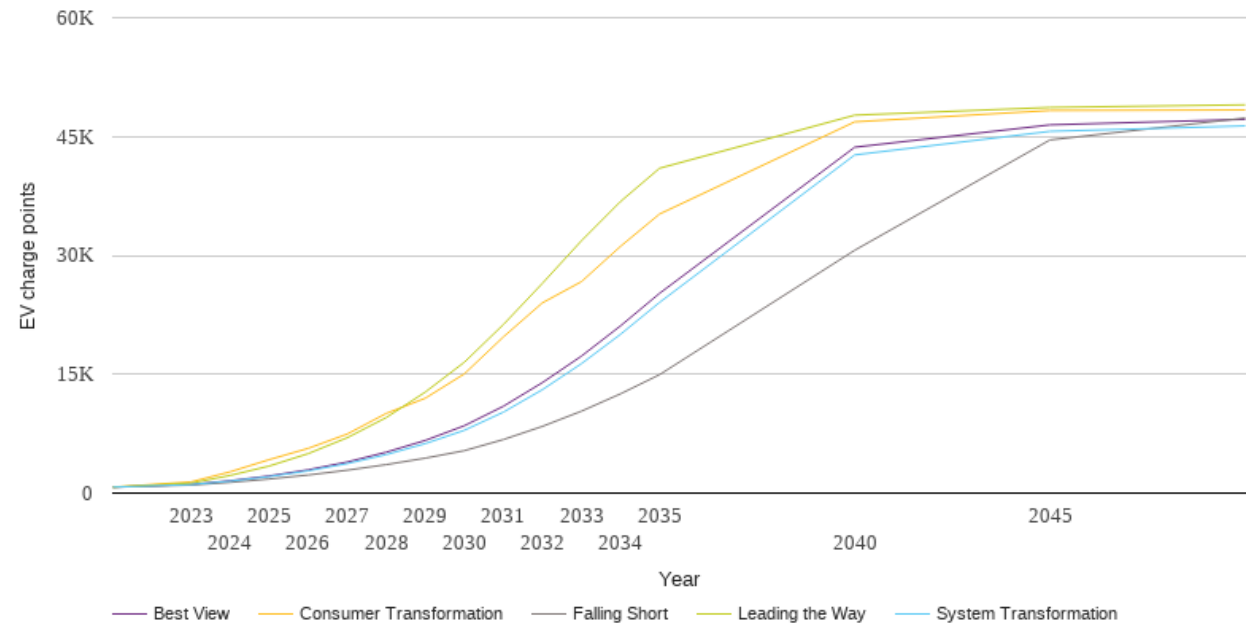
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1405	1405	1405	1405	1405
2023	1914	1960	2348	2203	1960
2024	2578	2710	4107	3629	2711
2025	3419	3677	6363	5396	3678
2026	4459	4943	8710	7798	4944
2027	5759	6576	11816	10942	6578
2028	7346	8641	16392	15004	8644
2029	9266	11226	20432	20252	11232
2030	11572	14414	26669	26610	14422
2031	14325	18360	34562	34066	18372
2032	17530	23171	41913	42129	23300
2033	21171	28762	46829	50255	28916
2034	25283	35106	54437	57929	35308
2035	29818	41927	61312	64550	42194
2040	58253	72085	79018	78172	72796
2045	78333	80050	78892	73015	81277
2050	81919	74296	73735	59267	76237



# Technology Summary: EV Charge Point

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

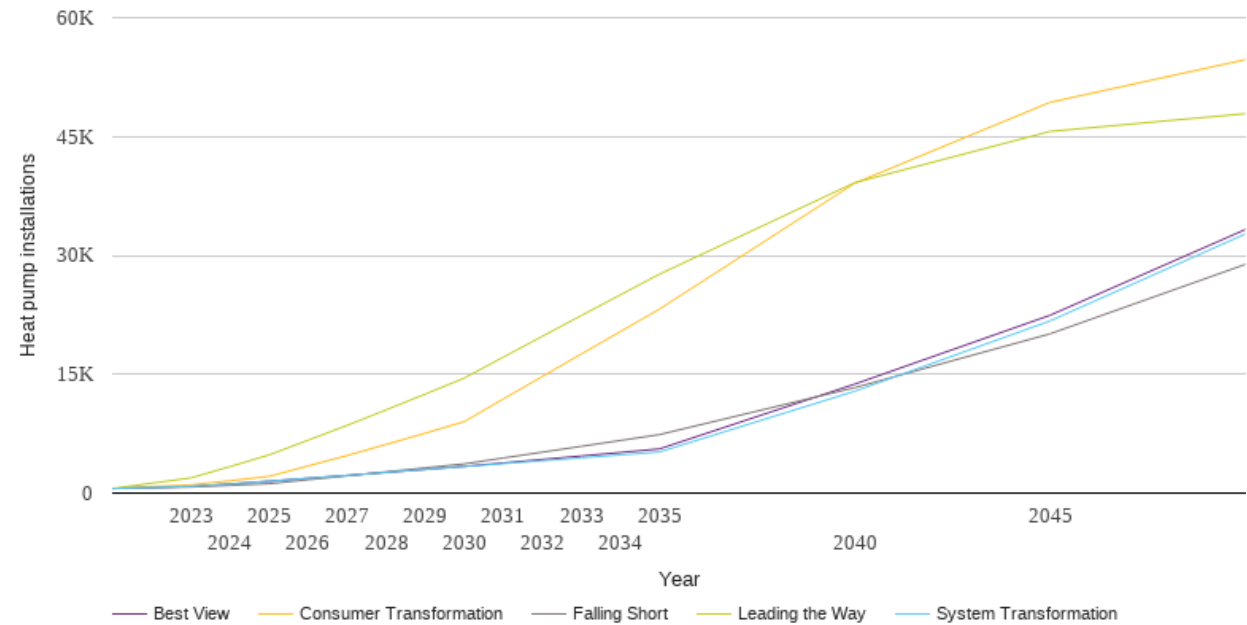
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	751	751	751	751	751
2023	1014	1073	1411	1252	1090
2024	1352	1513	2681	2224	1558
2025	1775	2079	4220	3409	2164
2026	2282	2808	5643	4976	2940
2027	2888	3723	7450	6986	3920
2028	3595	4858	10056	9531	5162
2029	4411	6247	11977	12751	6649
2030	5354	7926	15045	16513	8501
2031	6759	10216	19712	21268	10961
2032	8420	13053	24014	26471	13945
2033	10338	16336	26687	31849	17289
2034	12527	20037	31136	36795	21104
2035	14944	24062	35218	40996	25210
2040	30651	42680	46856	47699	43652
2045	44570	45653	48287	48672	46471
2050	47337	46343	48349	49007	47172



# Technology Summary: Heat pumps

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

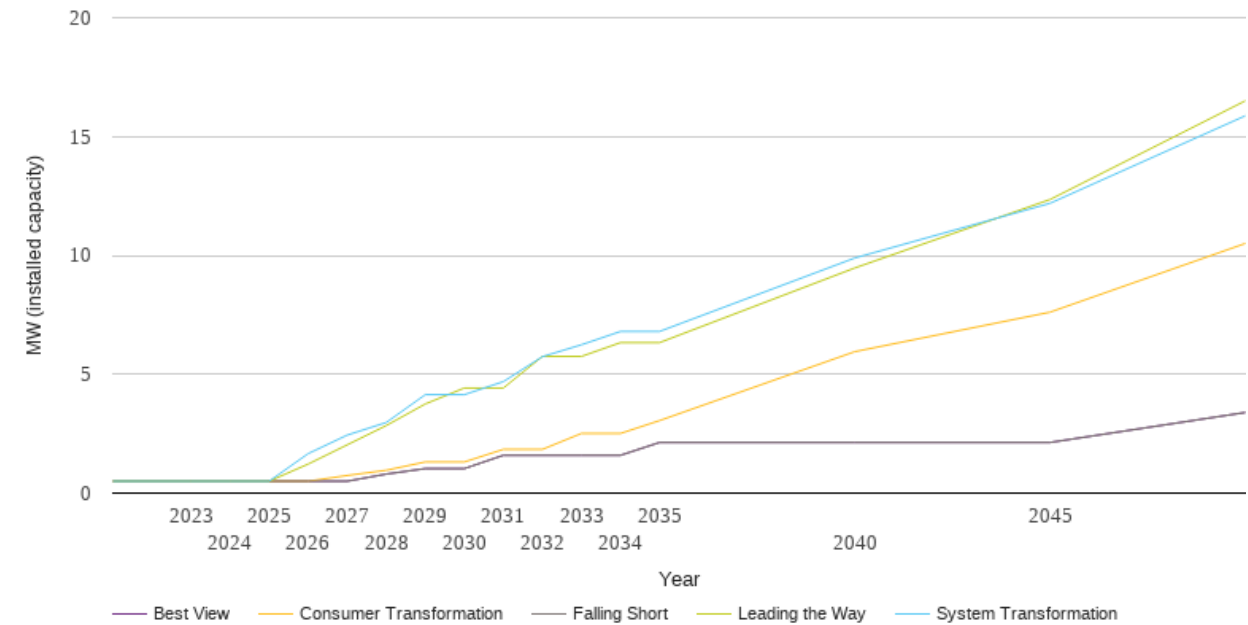
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	586	586	586	586	586
2023	771	832	1038	1919	832
2024	978	1150	1559	3347	1150
2025	1187	1501	2113	4818	1501
2026	1688	1873	3430	6681	1871
2027	2181	2232	4750	8552	2229
2028	2679	2615	6146	10511	2614
2029	3184	2985	7564	12494	2988
2030	3687	3361	9025	14520	3370
2031	4432	3724	11882	17158	3806
2032	5165	4088	14718	19794	4242
2033	5907	4455	17563	22417	4684
2034	6643	4818	20391	25026	5122
2035	7384	5194	23227	27638	5578
2040	13308	12857	39114	39175	13754
2045	20097	21724	49315	45643	22440
2050	28860	32695	54700	47883	33255



# Technology Summary: Hydrogen electrolysis

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

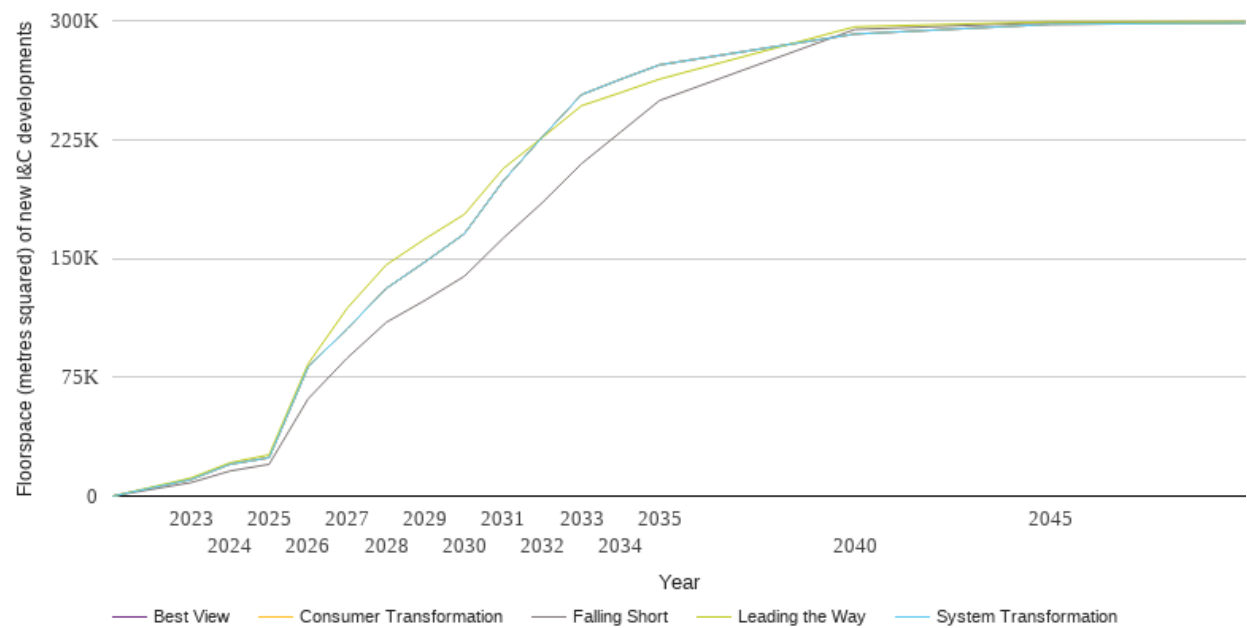
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.5	0.5	0.5	0.5	0.5
2023	0.5	0.5	0.5	0.5	0.5
2024	0.5	0.5	0.5	0.5	0.5
2025	0.5	0.5	0.5	0.5	0.5
2026	0.5	1.7	0.5	1.2	0.5
2027	0.5	2.4	0.7	2.0	0.5
2028	0.8	3.0	1.0	2.8	0.8
2029	1.0	4.1	1.3	3.8	1.0
2030	1.0	4.1	1.3	4.4	1.0
2031	1.6	4.7	1.8	4.4	1.6
2032	1.6	5.7	1.8	5.8	1.6
2033	1.6	6.2	2.5	5.8	1.6
2034	1.6	6.8	2.5	6.3	1.6
2035	2.1	6.8	3.1	6.3	2.1
2040	2.1	9.9	6.0	9.5	2.1
2045	2.1	12.2	7.6	12.4	2.1
2050	3.4	15.9	10.5	16.5	3.4



# Technology Summary: Non domestic

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

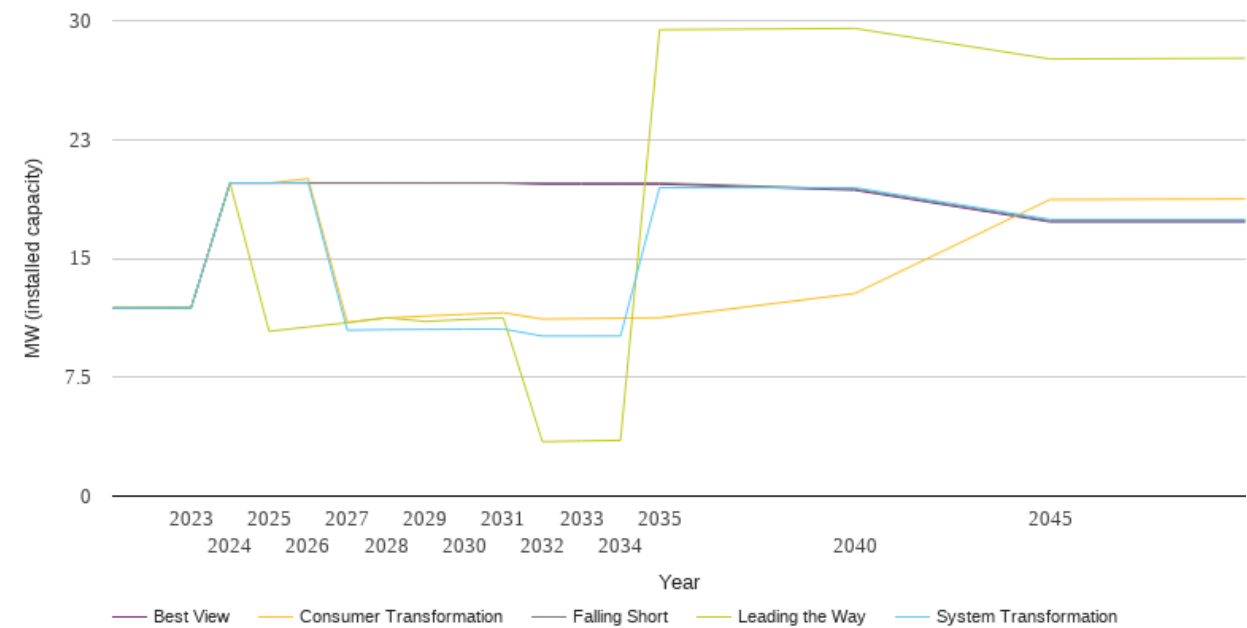
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	8544	10479	10479	11454	10479
2024	15849	20086	20086	21045	20086
2025	20067	24242	24242	26055	24242
2026	61377	81534	81534	83460	81534
2027	87142	105581	105581	118578	105581
2028	109606	131022	131022	145909	131022
2029	123645	147903	147903	162408	147903
2030	138689	165531	165531	177769	165531
2031	162850	198982	198982	206754	198982
2032	185214	226677	226677	226279	226677
2033	209742	253291	253291	246306	253291
2034	229659	262957	262957	254565	262957
2035	249628	272098	272098	263102	272098
2040	294424	291574	291574	296150	291574
2045	298883	297705	297705	299329	297705
2050	299329	298542	298542	299329	298542



# Technology Summary: Other Distributed Generation

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

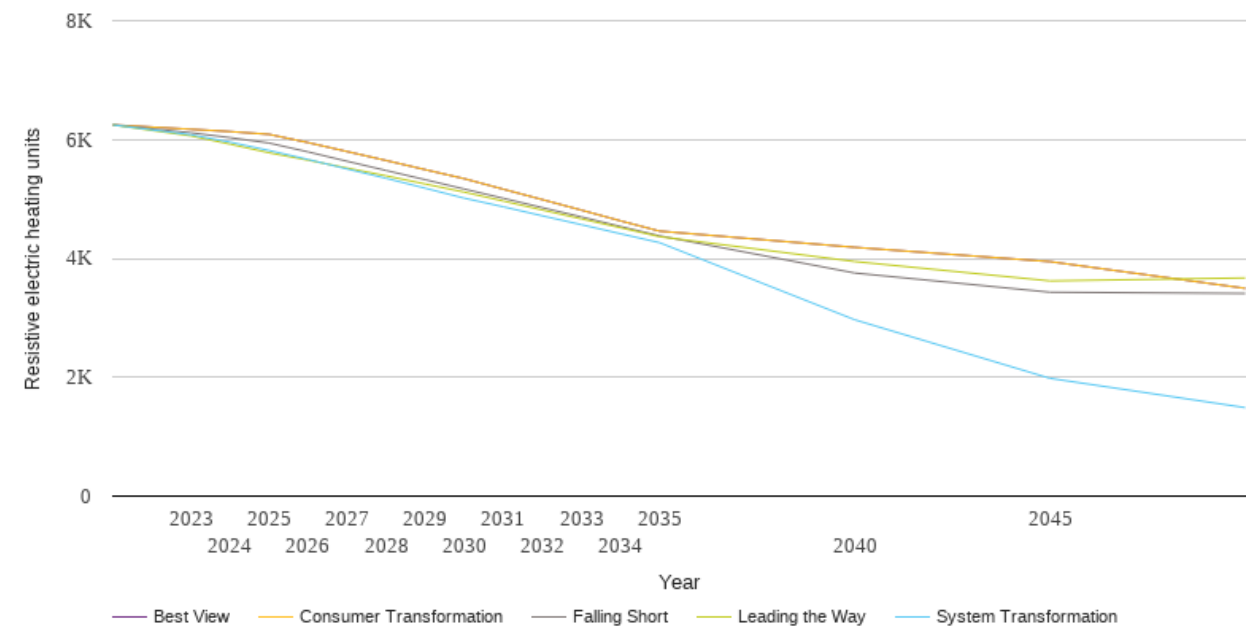
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	11.9	11.9	11.9	11.9	11.9
2023	11.9	11.9	11.9	11.9	11.9
2024	19.8	19.8	19.8	19.8	19.8
2025	19.8	19.8	19.8	10.4	19.8
2026	19.8	19.8	20.0	10.7	19.8
2027	19.8	10.5	11.0	10.9	19.8
2028	19.8	10.5	11.2	11.3	19.8
2029	19.8	10.5	11.4	11.0	19.8
2030	19.8	10.5	11.5	11.1	19.8
2031	19.8	10.5	11.6	11.2	19.8
2032	19.8	10.1	11.2	3.4	19.7
2033	19.8	10.1	11.2	3.5	19.7
2034	19.8	10.1	11.2	3.5	19.7
2035	19.8	19.5	11.3	29.4	19.7
2040	19.4	19.5	12.8	29.5	19.3
2045	17.4	17.5	18.7	27.6	17.3
2050	17.4	17.5	18.7	27.6	17.3



# Technology Summary: Resistive electric heating

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

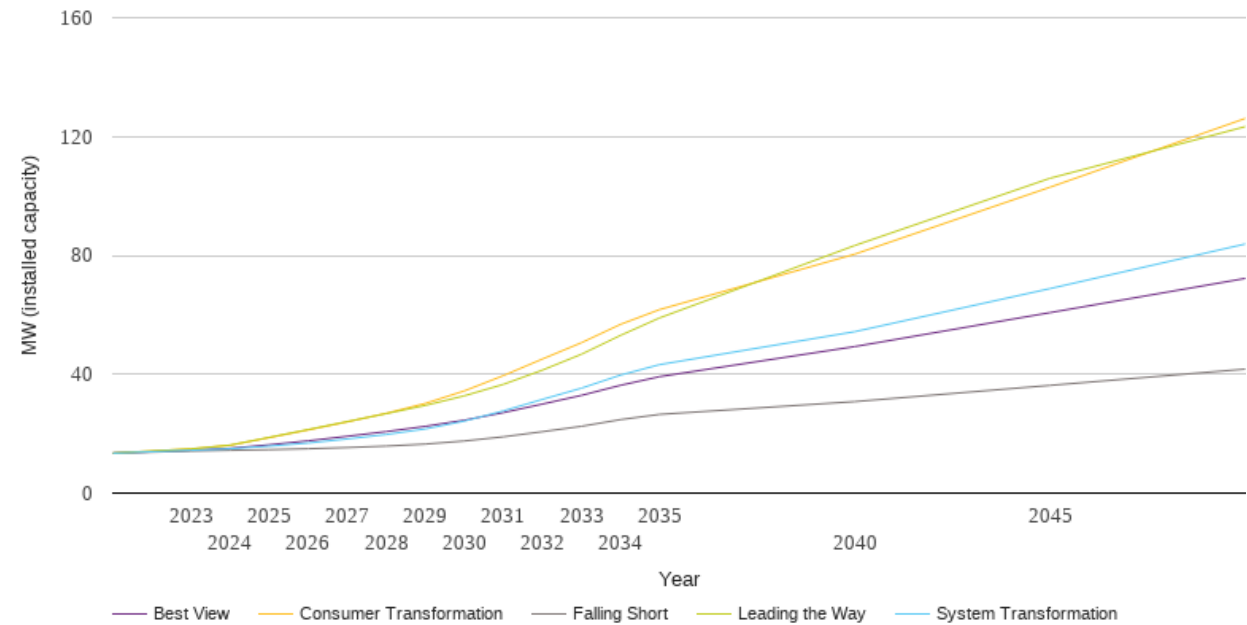
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	6246	6246	6246	6246	6246
2023	6114	6080	6173	6061	6173
2024	6032	5956	6134	5923	6134
2025	5941	5816	6087	5777	6087
2026	5792	5665	5948	5653	5948
2027	5634	5504	5798	5520	5798
2028	5479	5347	5647	5389	5647
2029	5324	5181	5493	5252	5493
2030	5167	5013	5341	5115	5341
2031	5011	4868	5164	4965	5164
2032	4854	4716	4989	4814	4989
2033	4698	4567	4812	4665	4812
2034	4537	4415	4632	4516	4632
2035	4380	4265	4459	4365	4459
2040	3754	2967	4186	3947	4186
2045	3431	1982	3946	3621	3946
2050	3410	1489	3496	3671	3496



# Technology Summary: Solar Generation

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

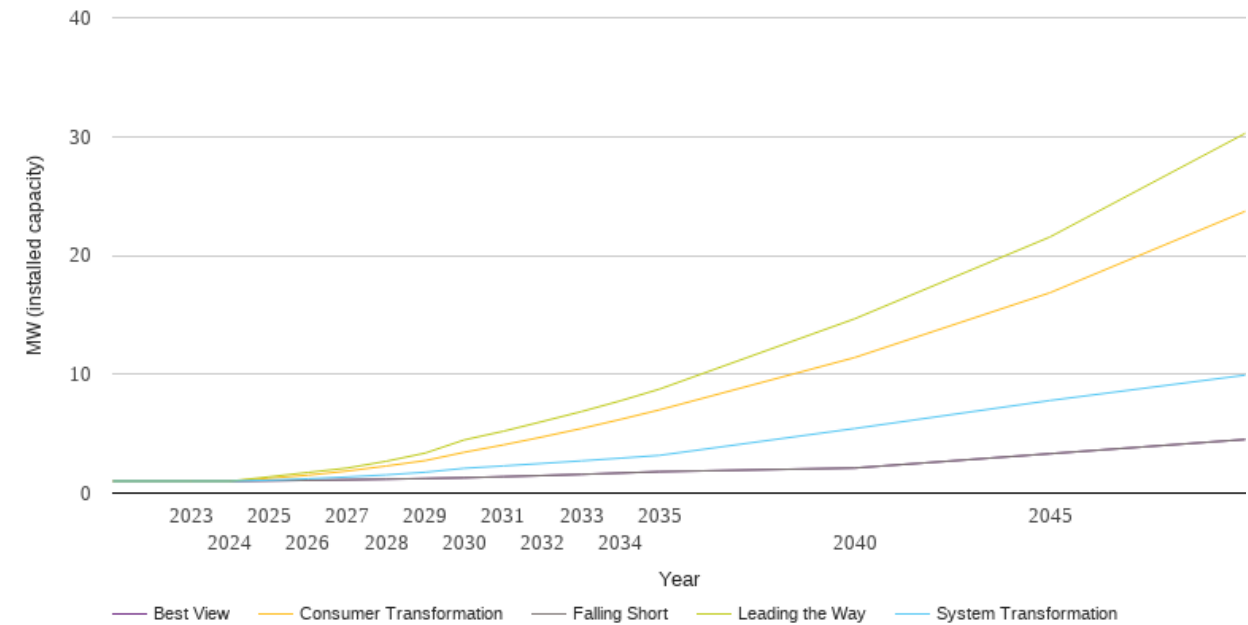
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	13.4	13.4	13.4	13.4	13.4
2023	14.2	14.4	14.8	14.9	14.4
2024	14.4	14.9	16.1	16.1	15.1
2025	14.6	15.8	18.6	18.7	16.2
2026	14.9	16.9	21.2	21.4	17.6
2027	15.3	18.2	24.0	24.1	19.1
2028	15.8	19.7	26.9	26.7	20.7
2029	16.5	21.6	30.2	29.5	22.5
2030	17.5	24.2	34.4	32.7	24.5
2031	18.9	27.7	39.5	36.6	27.1
2032	20.7	31.5	45.1	41.4	30.0
2033	22.5	35.3	50.6	46.7	32.9
2034	24.7	39.7	56.8	53.1	36.3
2035	26.5	43.2	61.8	59.0	39.2
2040	30.8	54.3	80.4	83.3	49.3
2045	36.2	68.8	102.9	106.0	60.7
2050	41.7	83.8	126.1	123.3	72.2



# Technology Summary: Storage

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

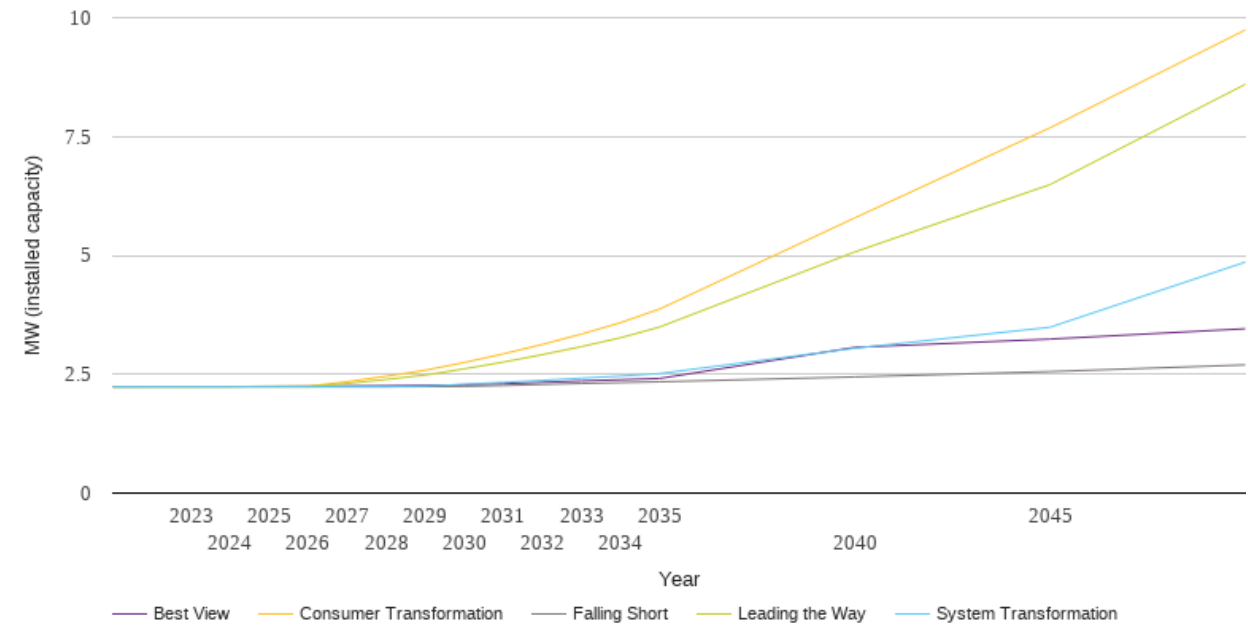
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1.0	1.0	1.0	1.0	1.0
2023	1.0	1.0	1.0	1.0	1.0
2024	1.0	1.0	1.0	1.0	1.0
2025	1.0	1.1	1.2	1.4	1.0
2026	1.1	1.2	1.5	1.7	1.1
2027	1.1	1.4	1.9	2.1	1.1
2028	1.2	1.5	2.3	2.7	1.2
2029	1.2	1.8	2.7	3.4	1.2
2030	1.3	2.1	3.4	4.5	1.3
2031	1.4	2.3	4.1	5.2	1.4
2032	1.5	2.5	4.7	6.0	1.5
2033	1.6	2.7	5.4	6.9	1.6
2034	1.7	2.9	6.2	7.8	1.7
2035	1.8	3.2	7.0	8.7	1.8
2040	2.1	5.4	11.4	14.7	2.1
2045	3.3	7.8	16.9	21.5	3.3
2050	4.5	9.9	23.7	30.3	4.5



# 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	2.2	2.2	2.2	2.2	2.2
2023	2.2	2.2	2.2	2.2	2.2
2024	2.2	2.2	2.2	2.2	2.2
2025	2.2	2.2	2.2	2.2	2.2
2026	2.2	2.2	2.2	2.2	2.2
2027	2.2	2.2	2.3	2.3	2.3
2028	2.2	2.2	2.5	2.4	2.3
2029	2.2	2.3	2.6	2.5	2.3
2030	2.2	2.3	2.7	2.6	2.3
2031	2.3	2.3	2.9	2.8	2.3
2032	2.3	2.4	3.1	2.9	2.3
2033	2.3	2.4	3.3	3.1	2.4
2034	2.3	2.5	3.6	3.3	2.4
2035	2.3	2.5	3.9	3.5	2.4
2040	2.4	3.0	5.8	5.1	3.1
2045	2.6	3.5	7.7	6.5	3.2
2050	2.7	4.9	9.7	8.6	3.5



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”)

[nged.networkstrategy@nationalgrid.co.uk](mailto:nged.networkstrategy@nationalgrid.co.uk)

