

# Distribution Future Energy Scenarios 2022

Local Authority:  
Carmarthenshire

## 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 Carmarthenshire 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 Carmarthenshire 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	144	428	360	360	144	17152	7895	7895	144
Domestic	New dwellings	0	2789	3035	3035	3562	4937	4861	4861	4795
Electric vehicles	Electric vehicles	991	15572	19704	36914	36791	110775	94796	92151	80105
EV Charge Point	EV charge points	661	6871	10397	19718	21754	63717	63451	63352	65785
Heat pumps	Heat pump installations	984	9992	11878	17577	25866	53345	58199	80994	71486
Hydrogen electrolysis	MW (installed capacity)	0.0	0.5	1.8	0.7	1.0	19.2	53.6	36.4	45.3
Non domestic	Floorspace (metres squared) of new I&C developments	0	240122	297064	297064	311604	436667	436667	436667	436667
Other Distributed Generation	MW (installed capacity)	10.1	10.1	10.1	10.1	0.1	10.1	10.1	10.1	15.1
Resistive electric heating	Resistive electric heating units	9980	8296	8025	8461	8136	5176	2335	5498	5733
Solar Generation	MW (installed capacity)	23.9	36.0	54.5	70.7	56.3	156.2	306.9	375.0	332.1
Storage	MW (installed capacity)	0.0	0.4	2.4	4.7	6.8	7.4	18.2	43.1	56.0
Wind	MW (installed capacity)	11.1	17.3	19.7	45.7	38.0	56.0	103.3	292.4	233.4

## 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

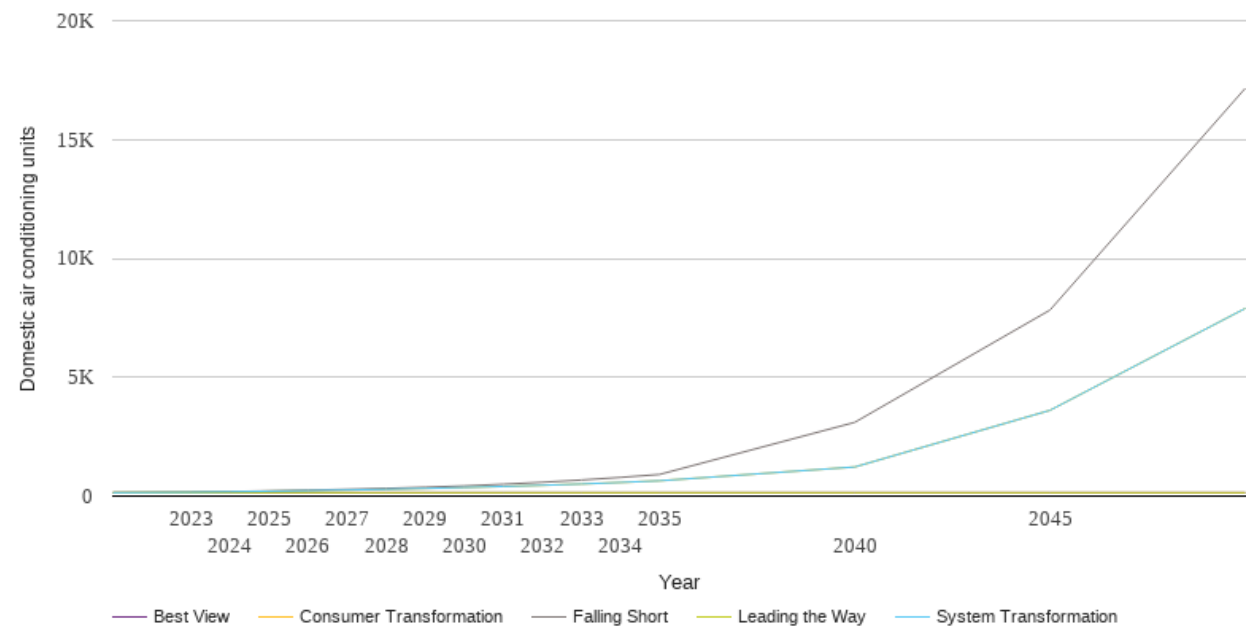
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

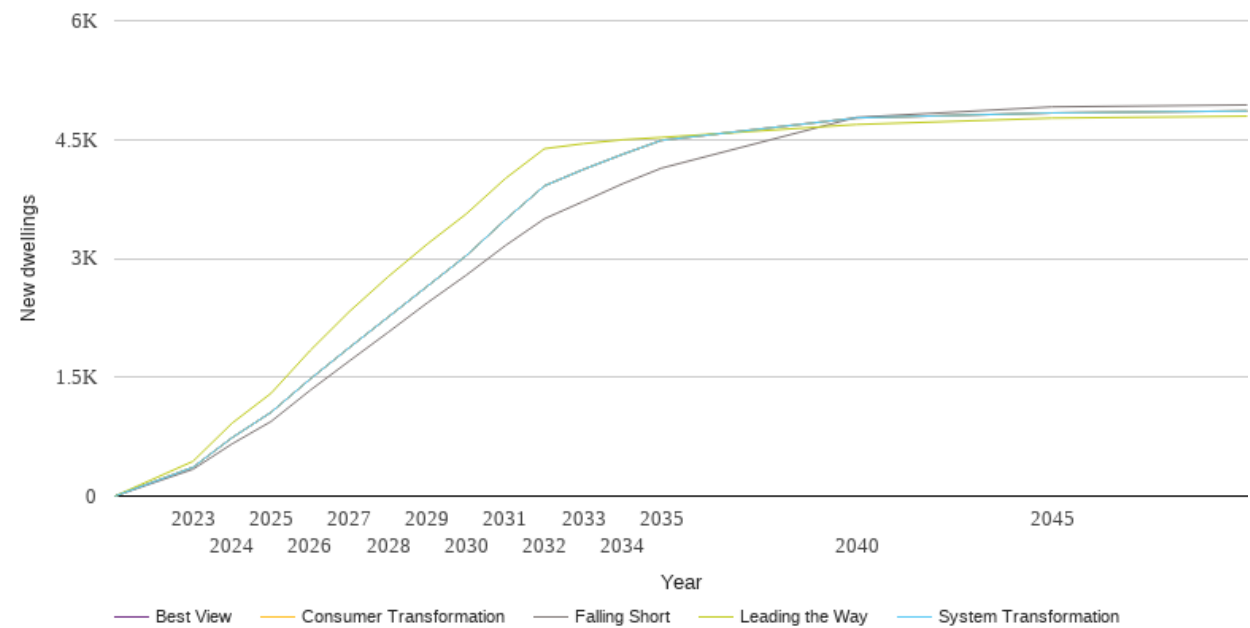
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	144	144	144	144	144
2023	166	163	163	144	144
2024	189	182	182	144	144
2025	217	205	205	144	144
2026	248	228	228	144	144
2027	285	255	255	144	144
2028	326	286	286	144	144
2029	373	322	322	144	144
2030	428	360	360	144	144
2031	500	405	405	144	144
2032	582	454	454	144	144
2033	677	510	510	144	144
2034	786	574	574	144	144
2035	911	644	644	144	144
2040	3103	1224	1224	144	144
2045	7826	3608	3608	144	144
2050	17152	7895	7895	144	144



# Technology Summary: Domestic

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

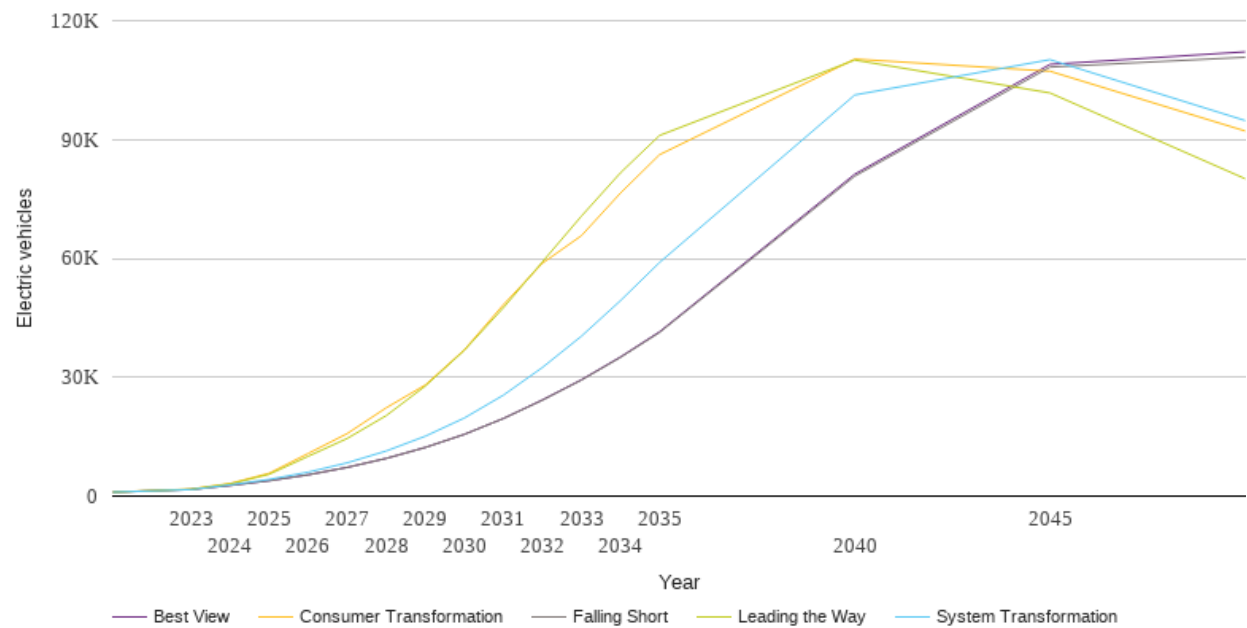
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	339	364	364	439	364
2024	659	737	737	920	737
2025	942	1058	1058	1298	1058
2026	1335	1477	1477	1837	1477
2027	1704	1873	1873	2327	1873
2028	2068	2260	2260	2770	2260
2029	2439	2648	2648	3181	2648
2030	2789	3035	3035	3562	3035
2031	3162	3488	3488	4008	3488
2032	3500	3915	3915	4384	3915
2033	3719	4123	4123	4448	4123
2034	3941	4313	4313	4497	4313
2035	4139	4490	4490	4527	4490
2040	4780	4773	4773	4690	4773
2045	4912	4836	4836	4770	4836
2050	4937	4861	4861	4795	4861



# Technology Summary: Electric vehicles

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

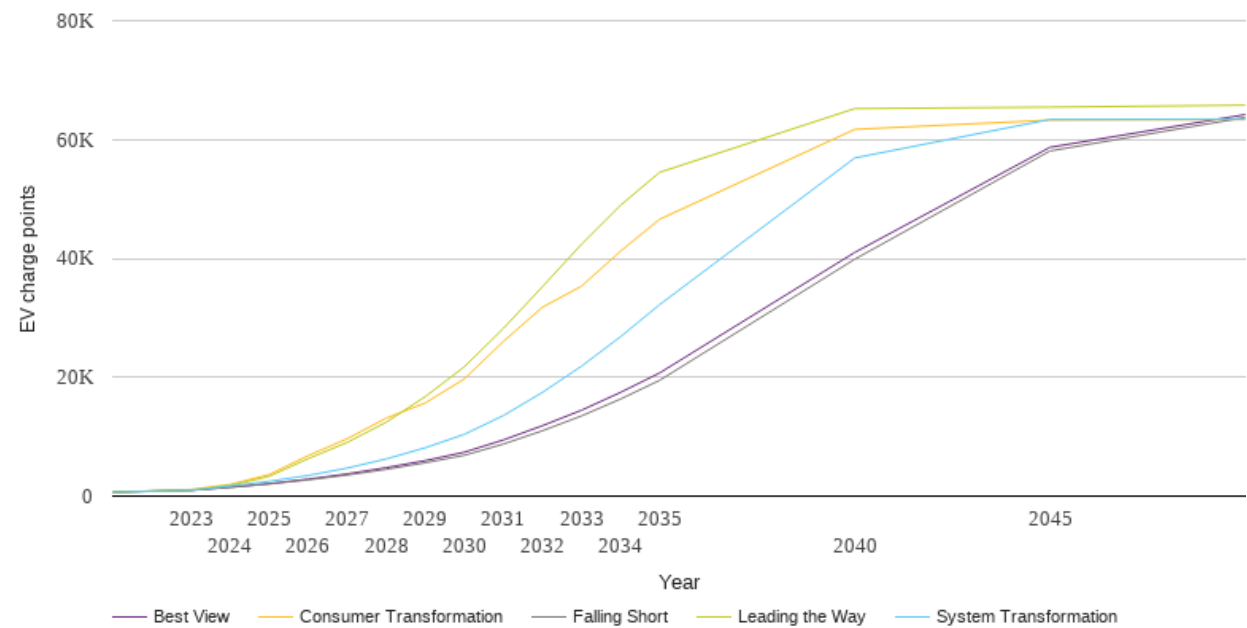
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	991	991	991	991	991
2023	1668	1645	1767	1723	1668
2024	2685	2837	3173	3077	2685
2025	3882	4211	5761	5498	3882
2026	5372	6041	10754	10040	5373
2027	7245	8402	15782	14551	7247
2028	9511	11382	22284	20317	9517
2029	12270	15115	28048	27768	12280
2030	15572	19704	36914	36791	15585
2031	19576	25477	48299	47540	19593
2032	24198	32464	58775	59116	24286
2033	29275	40366	65743	70678	29377
2034	34993	49340	76496	81605	35132
2035	41293	58969	86175	91024	41481
2040	80745	101244	110306	110072	81254
2045	108292	110163	107242	101763	108960
2050	110775	94796	92151	80105	112142



# 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	661	661	661	661	661
2023	977	995	1100	996	980
2024	1487	1711	1957	1778	1494
2025	2051	2486	3624	3325	2092
2026	2735	3467	6807	6302	2849
2027	3548	4711	9652	9034	3731
2028	4504	6254	13126	12437	4780
2029	5607	8134	15671	16741	5968
2030	6871	10397	19718	21754	7386
2031	8760	13550	26011	28199	9452
2032	10993	17447	31779	35226	11844
2033	13489	21853	35311	42375	14448
2034	16332	26809	41206	48933	17449
2035	19472	32206	46576	54477	20713
2040	39862	56902	61713	65203	41003
2045	58079	63375	63267	65449	58688
2050	63717	63451	63352	65785	64196

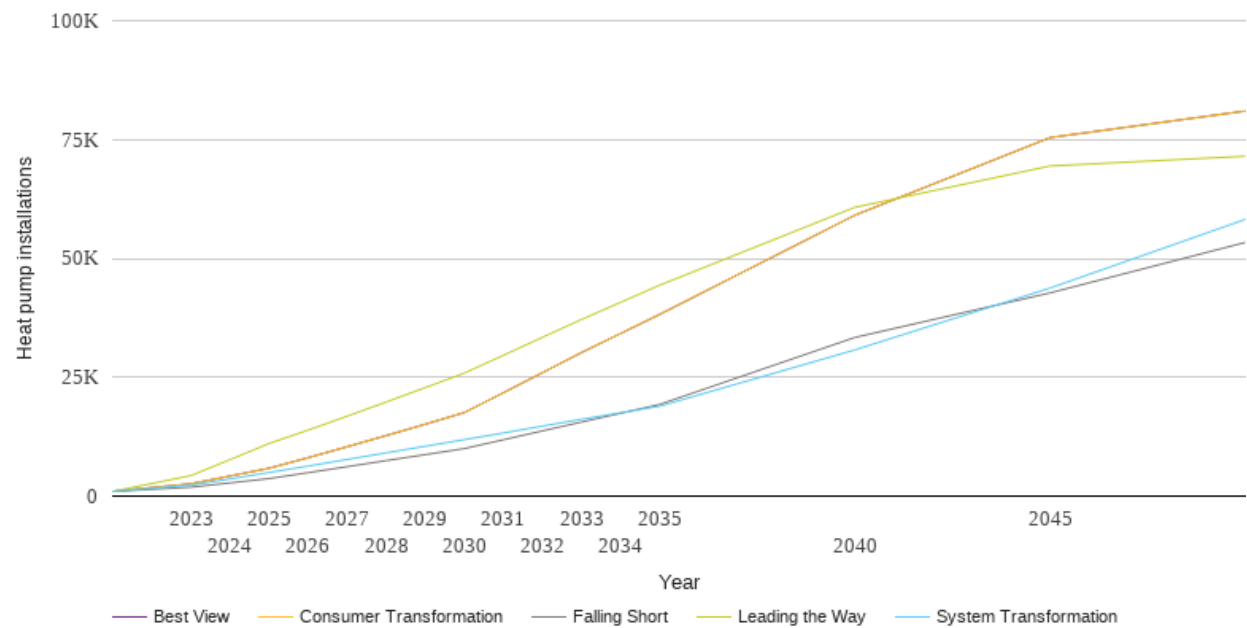




# Technology Summary: Heat pumps

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

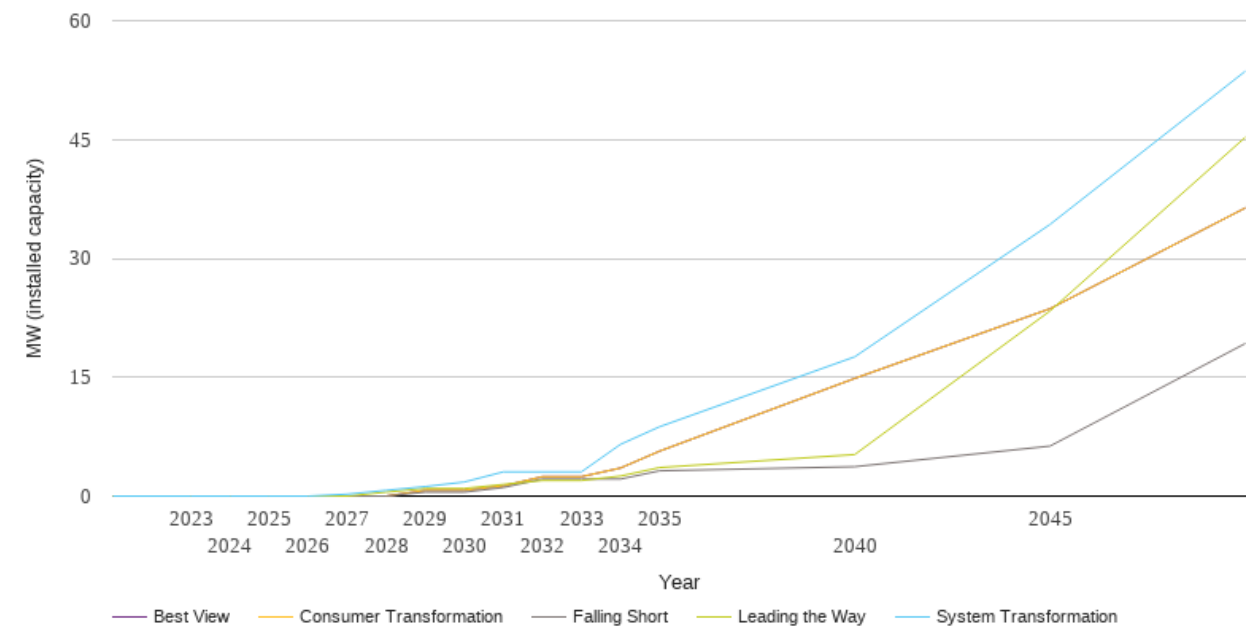
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	984	984	984	984	984
2023	1875	2287	2594	4317	2594
2024	2774	3610	4219	7673	4219
2025	3680	4961	5859	11063	5859
2026	4923	6317	8082	13882	8082
2027	6192	7707	10386	16816	10386
2028	7467	9094	12731	19799	12731
2029	8727	10483	15123	22819	15123
2030	9992	11878	17577	25866	17577
2031	11852	13278	21735	29603	21735
2032	13716	14726	25960	33397	25960
2033	15573	16149	30179	37141	30179
2034	17417	17522	34193	40750	34193
2035	19274	18901	38196	44348	38196
2040	33361	30740	59076	60737	59076
2045	42732	43750	75402	69430	75402
2050	53345	58199	80994	71486	80994



# Technology Summary: Hydrogen electrolysis

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

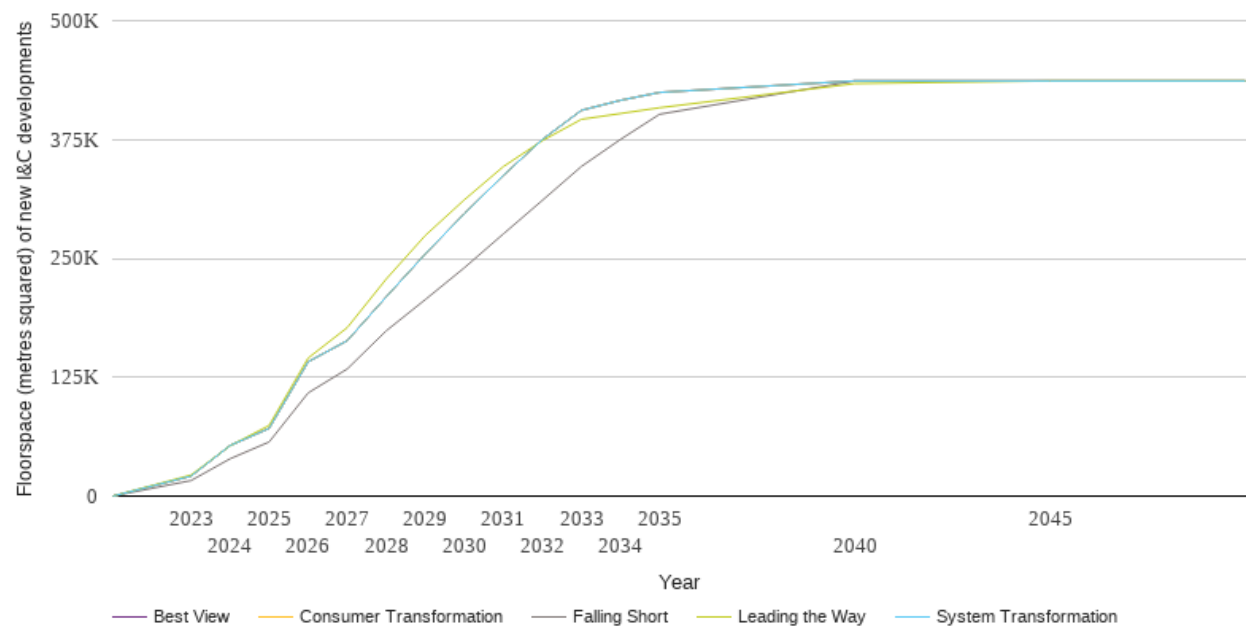
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.2	0.0	0.0	0.0
2028	0.0	0.7	0.0	0.5	0.0
2029	0.5	1.2	0.7	1.0	0.7
2030	0.5	1.8	0.7	1.0	0.7
2031	1.1	3.1	1.3	1.5	1.3
2032	2.2	3.1	2.5	2.0	2.5
2033	2.2	3.1	2.5	2.0	2.5
2034	2.2	6.5	3.5	2.5	3.5
2035	3.2	8.8	5.7	3.6	5.7
2040	3.7	17.6	14.8	5.2	14.8
2045	6.3	34.3	23.6	23.4	23.6
2050	19.2	53.6	36.4	45.3	36.4



# Technology Summary: Non domestic

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

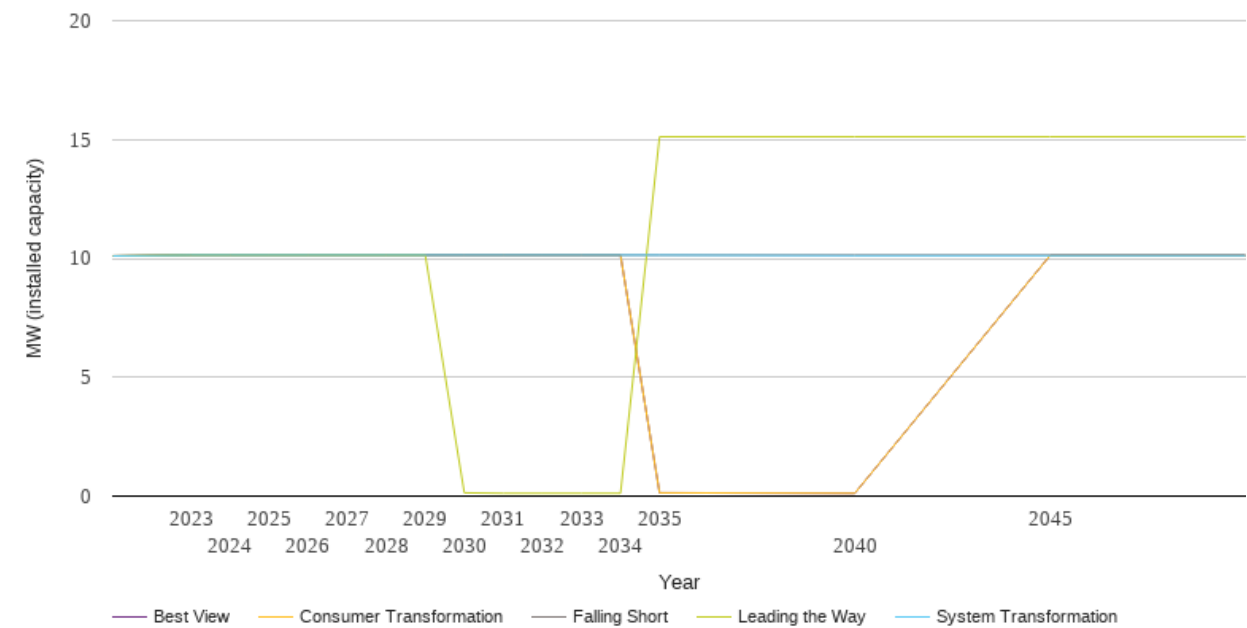
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	16333	21000	21000	22167	21000
2024	39239	53189	53189	52886	53189
2025	56926	71194	71194	74307	71194
2026	108528	141245	141245	145185	141245
2027	133696	163448	163448	177150	163448
2028	173836	209570	209570	228299	209570
2029	206665	254659	254659	274108	254659
2030	240122	297064	297064	311604	297064
2031	275748	337240	337240	346547	337240
2032	311067	375117	375117	373875	375117
2033	346711	405740	405740	396269	405740
2034	375128	416237	416237	402344	416237
2035	401591	424545	424545	408419	424545
2040	436667	436667	436667	433843	436667
2045	436667	436667	436667	436667	436667
2050	436667	436667	436667	436667	436667



# Technology Summary: Other Distributed Generation

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

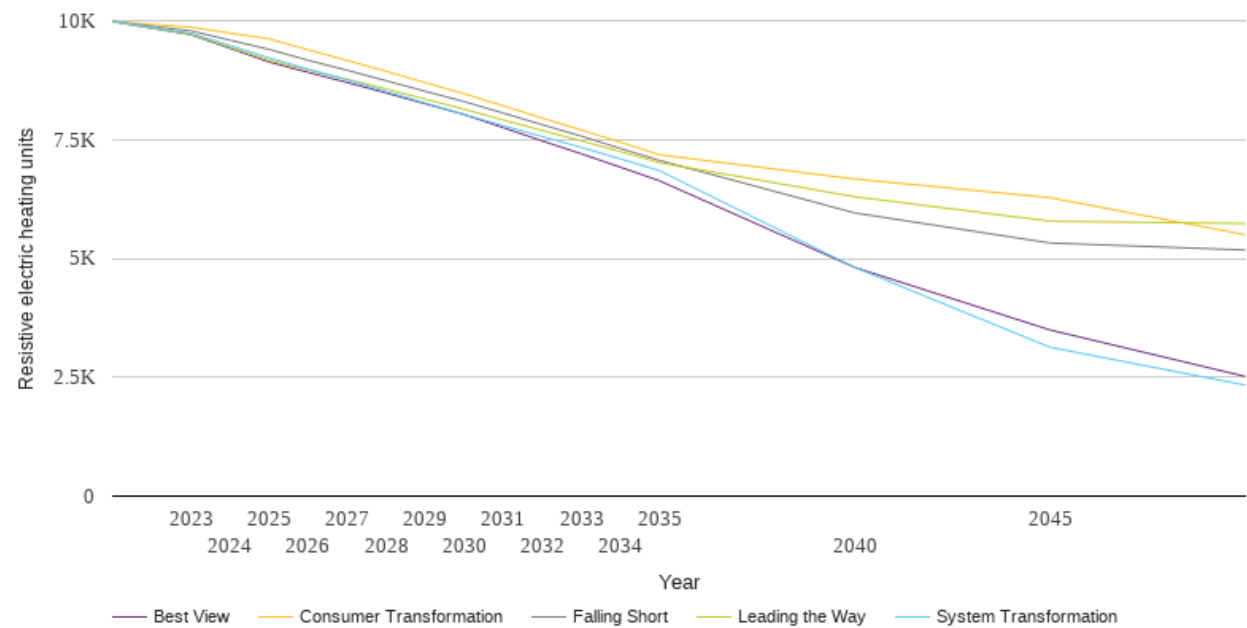
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	10.1	10.1	10.1	10.1	10.1
2023	10.1	10.1	10.1	10.1	10.1
2024	10.1	10.1	10.1	10.1	10.1
2025	10.1	10.1	10.1	10.1	10.1
2026	10.1	10.1	10.1	10.1	10.1
2027	10.1	10.1	10.1	10.1	10.1
2028	10.1	10.1	10.1	10.1	10.1
2029	10.1	10.1	10.1	10.1	10.1
2030	10.1	10.1	10.1	0.1	10.1
2031	10.1	10.1	10.1	0.1	10.1
2032	10.1	10.1	10.1	0.1	10.1
2033	10.1	10.1	10.1	0.1	10.1
2034	10.1	10.1	10.1	0.1	10.1
2035	10.1	10.1	0.1	15.1	0.1
2040	10.1	10.1	0.1	15.1	0.1
2045	10.1	10.1	10.1	15.1	10.1
2050	10.1	10.1	10.1	15.1	10.1



# Technology Summary: Resistive electric heating

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

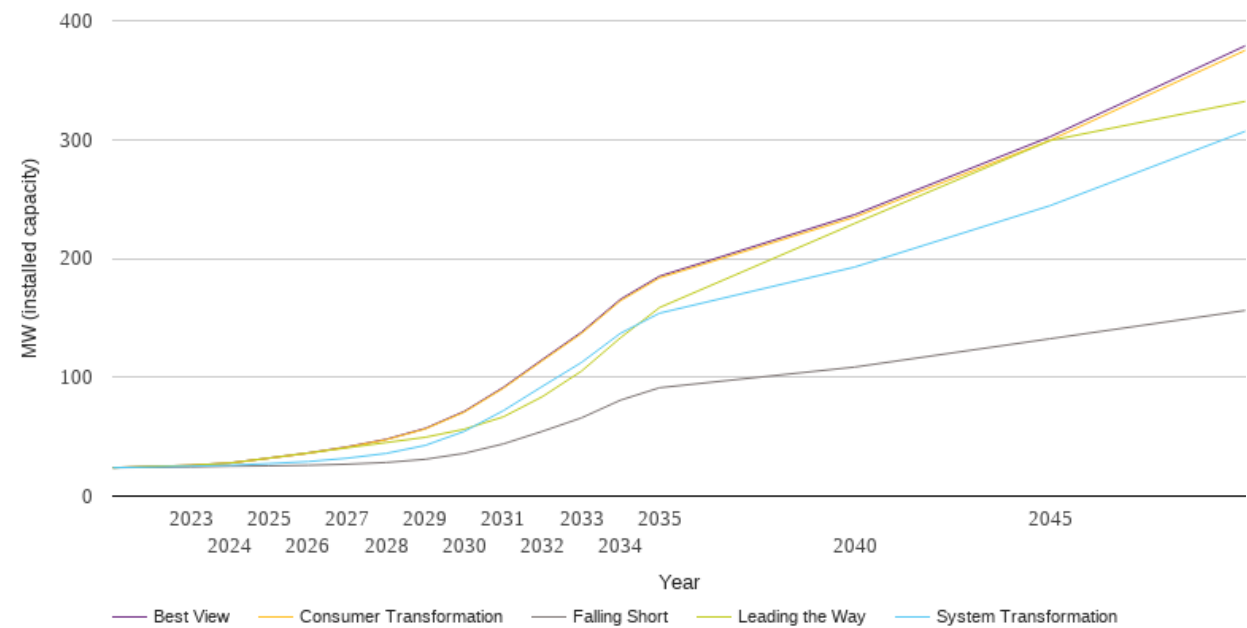
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	9980	9980	9980	9980	9980
2023	9785	9734	9863	9712	9705
2024	9589	9477	9740	9442	9419
2025	9396	9216	9617	9167	9130
2026	9167	8982	9386	8961	8912
2027	8956	8753	9162	8767	8700
2028	8735	8512	8935	8563	8479
2029	8515	8269	8696	8350	8252
2030	8296	8025	8461	8136	8025
2031	8055	7792	8209	7910	7749
2032	7811	7562	7950	7691	7470
2033	7571	7333	7700	7471	7199
2034	7311	7094	7442	7248	6918
2035	7060	6846	7180	7012	6632
2040	5956	4810	6670	6297	4810
2045	5324	3130	6278	5783	3494
2050	5176	2335	5498	5733	2517



# Technology Summary: Solar Generation

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

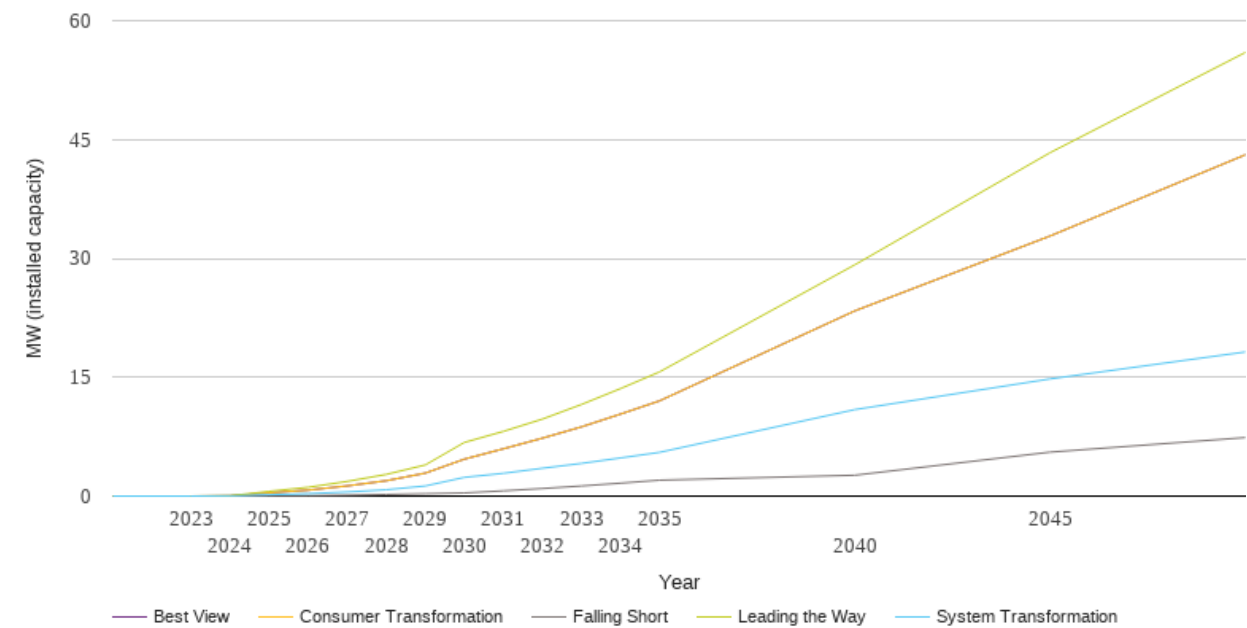
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	23.9	23.9	23.9	23.9	23.9
2023	24.6	25.2	25.8	25.9	25.9
2024	25.1	26.0	27.8	27.8	27.8
2025	25.4	27.3	31.9	32.0	32.0
2026	25.9	29.0	36.1	36.3	36.3
2027	26.8	31.9	41.1	40.6	41.4
2028	28.3	35.9	47.4	45.1	47.8
2029	31.0	42.7	56.5	49.5	57.0
2030	36.0	54.5	70.7	56.3	71.3
2031	43.9	71.9	90.7	66.7	91.5
2032	54.5	92.3	113.9	83.7	114.9
2033	65.8	112.4	136.8	105.1	137.9
2034	80.7	137.0	164.4	133.2	165.6
2035	91.2	153.9	183.6	158.6	185.0
2040	108.6	192.7	234.7	229.4	236.8
2045	132.4	244.3	299.3	299.1	302.3
2050	156.2	306.9	375.0	332.1	378.8



# Technology Summary: Storage

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

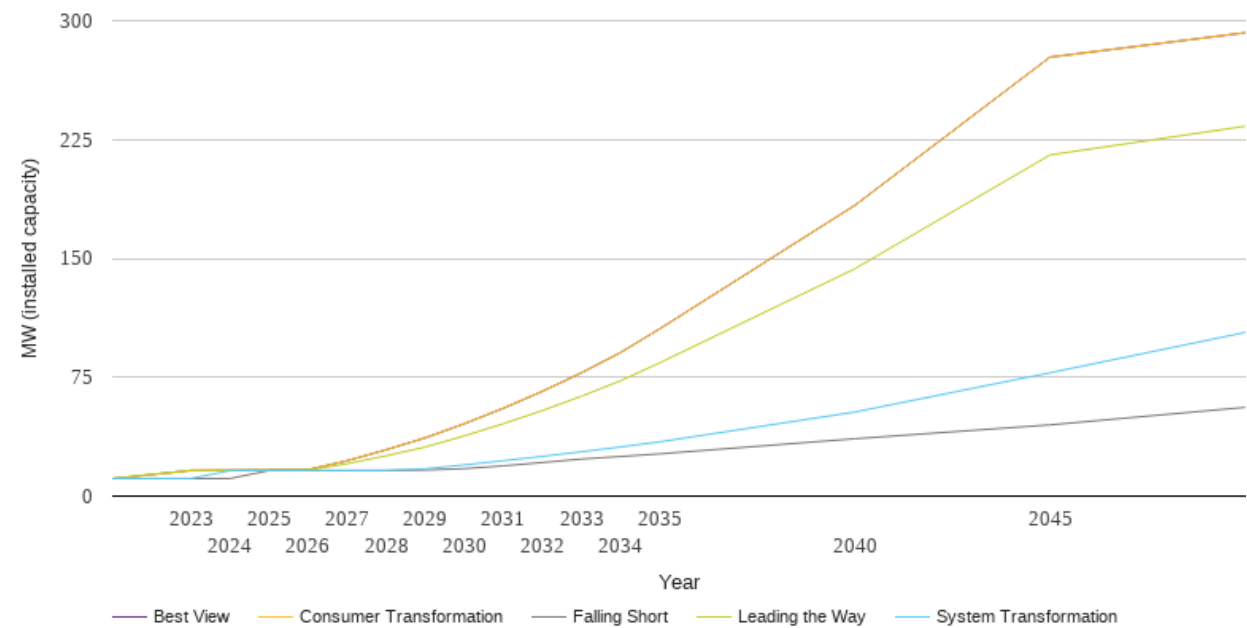
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.1	0.2	0.4	0.6	0.4
2026	0.1	0.3	0.8	1.1	0.8
2027	0.1	0.5	1.3	1.8	1.3
2028	0.2	0.8	1.9	2.7	1.9
2029	0.3	1.3	2.9	3.9	2.9
2030	0.4	2.4	4.7	6.8	4.7
2031	0.7	2.9	6.0	8.2	6.0
2032	1.0	3.5	7.3	9.7	7.3
2033	1.3	4.1	8.7	11.6	8.7
2034	1.6	4.8	10.3	13.6	10.3
2035	2.0	5.5	12.0	15.7	12.0
2040	2.6	10.9	23.4	29.2	23.4
2045	5.5	14.8	32.8	43.3	32.8
2050	7.4	18.2	43.1	56.0	43.1



# 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	11.1	11.1	11.1	11.1	11.1
2023	11.1	11.1	16.2	16.1	16.2
2024	11.1	16.1	16.3	16.2	16.3
2025	16.1	16.1	16.5	16.2	16.5
2026	16.1	16.1	16.7	16.3	16.7
2027	16.1	16.2	22.3	20.4	22.3
2028	16.1	16.2	29.2	25.5	29.2
2029	16.5	17.2	36.8	31.0	36.8
2030	17.3	19.7	45.7	38.0	45.7
2031	19.1	22.3	55.4	45.7	55.4
2032	21.2	25.1	66.1	54.0	66.1
2033	23.4	28.0	77.8	63.0	77.8
2034	25.0	31.0	90.6	72.8	90.6
2035	26.7	34.2	105.5	84.0	105.5
2040	36.2	53.0	183.5	143.4	183.5
2045	44.9	77.8	277.0	215.3	277.0
2050	56.0	103.3	292.4	233.4	292.4





National Grid Electricity Distribution PLC 09223384)  
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National Grid Electricity Distribution (West Midlands) Plc (company number 03600574))  
National Grid Electricity Distribution (South West) Plc (company number 02366894))  
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