

# Distribution Future Energy Scenarios 2022

Local Authority:  
Derby

## 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 Derby covered by the NGED licence areas.



## Scenario Summary

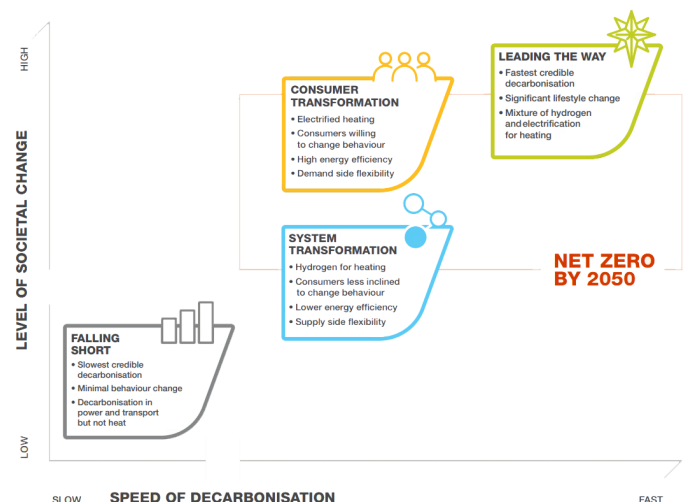
This DFES scenario framework includes three scenarios that are compliant with UK government targets of Net Zero greenhouse gas emissions by 2050. A summary of each scenario is below:

**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 Derby 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	2862	7552	6661	6661	2874	88318	51786	51785	2896
Domestic	New dwellings	0	3920	4393	4393	5113	5918	5919	5919	5914
Electric vehicles	Electric vehicles	3943	25074	31236	57260	57145	176848	160191	160122	129216
EV Charge Point	EV charge points	1843	10690	15824	29788	32645	92291	91065	96692	95862
Heat pumps	Heat pump installations	351	5489	3998	16680	27052	57747	65175	110013	96530
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.2	0.0	0.2	0.2	1.2	0.3	2.2
Non domestic	Floorspace (metres squared) of new I&C developments	0	111724	140059	140059	147593	263027	263027	263027	263027
Other Distributed Generation	MW (installed capacity)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Resistive electric heating	Resistive electric heating units	14824	12201	11832	12504	11992	7807	3460	8176	8481
Solar Generation	MW (installed capacity)	16.4	23.6	34.0	53.1	53.9	45.5	96.1	179.6	188.6
Storage	MW (installed capacity)	0.0	0.3	1.7	4.2	5.3	6.2	15.8	43.4	56.0
Wind	MW (installed capacity)	5.3	5.3	5.3	5.3	5.3	6.5	6.6	8.0	8.0

## 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.

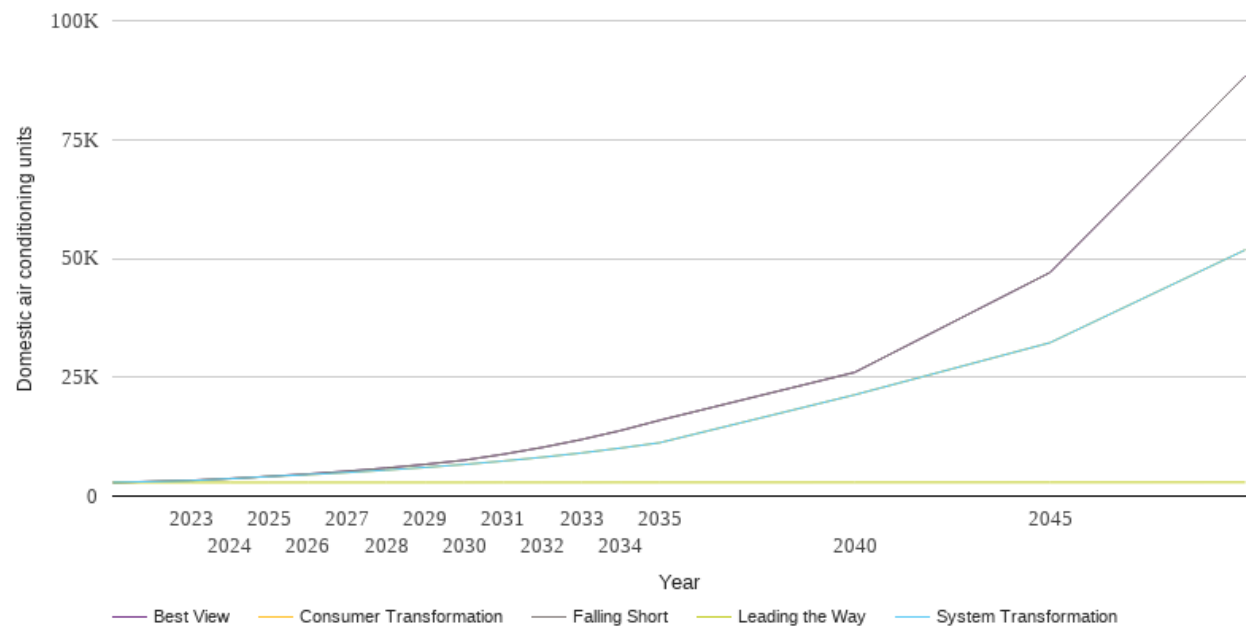
If you have any comments or queries regarding these reports, please contact

[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.

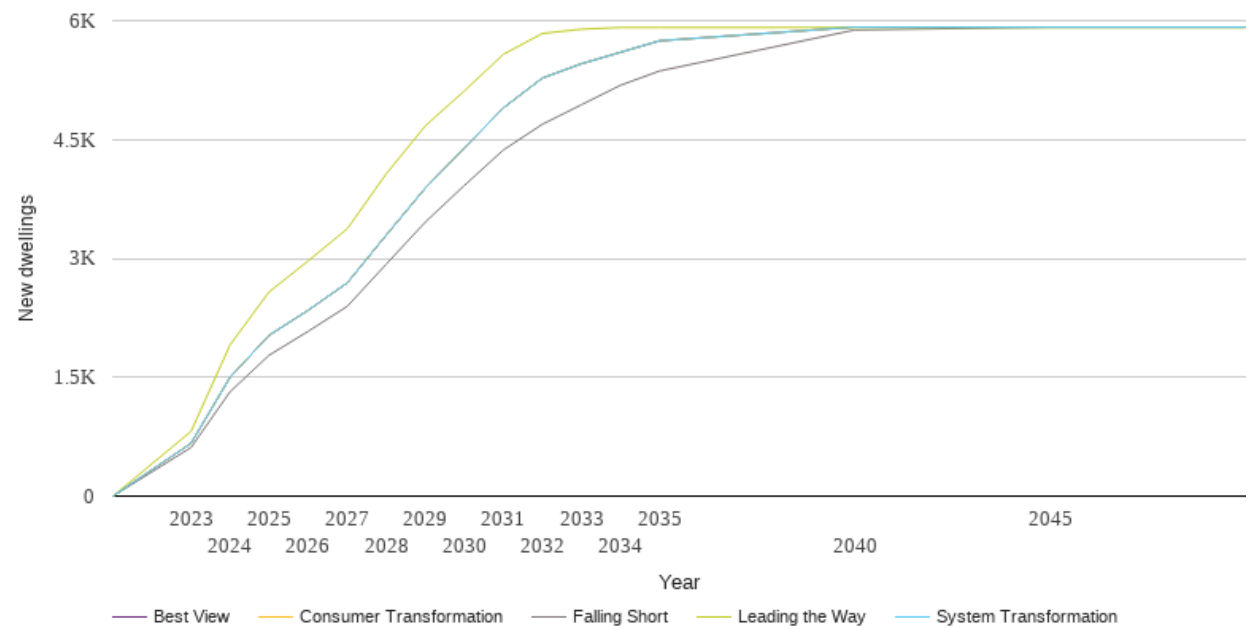
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	2862	2862	2862	2862	2862
2023	3299	3247	3247	2864	3299
2024	3685	3647	3647	2866	3685
2025	4136	4113	4113	2868	4136
2026	4650	4509	4509	2870	4650
2027	5239	4955	4955	2870	5239
2028	5902	5462	5462	2872	5902
2029	6678	6031	6031	2874	6678
2030	7552	6661	6661	2874	7552
2031	8805	7376	7376	2876	8805
2032	10241	8175	8175	2878	10241
2033	11889	9071	9071	2878	11889
2034	13779	10091	10091	2880	13779
2035	15941	11218	11218	2880	15941
2040	26039	21302	21302	2886	26039
2045	47026	32259	32259	2890	47026
2050	88318	51786	51785	2896	88318



# Technology Summary: Domestic

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

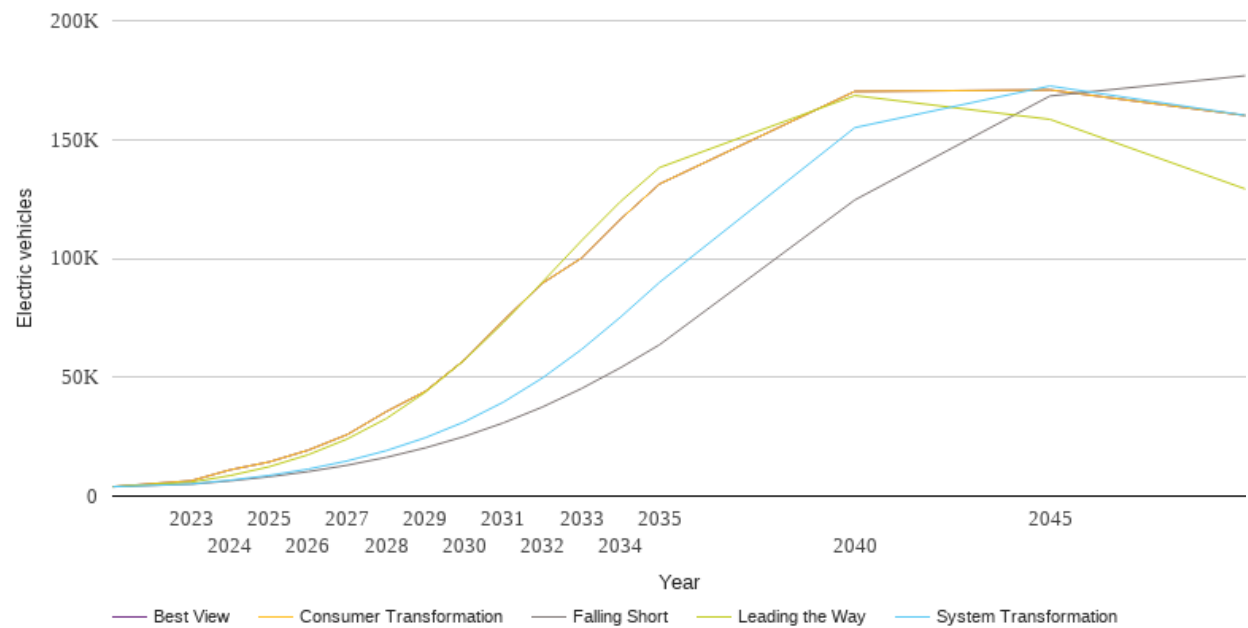
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	613	666	666	817	666
2024	1317	1500	1500	1909	1500
2025	1778	2029	2029	2577	2029
2026	2079	2345	2345	2968	2345
2027	2394	2690	2690	3373	2690
2028	2927	3294	3294	4068	3294
2029	3458	3888	3888	4672	3888
2030	3920	4393	4393	5113	4393
2031	4368	4899	4899	5575	4899
2032	4693	5276	5276	5839	5276
2033	4939	5456	5456	5892	5456
2034	5185	5601	5601	5914	5601
2035	5365	5746	5746	5914	5746
2040	5883	5919	5919	5914	5919
2045	5918	5919	5919	5914	5919
2050	5918	5919	5919	5914	5919



# Technology Summary: Electric vehicles

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

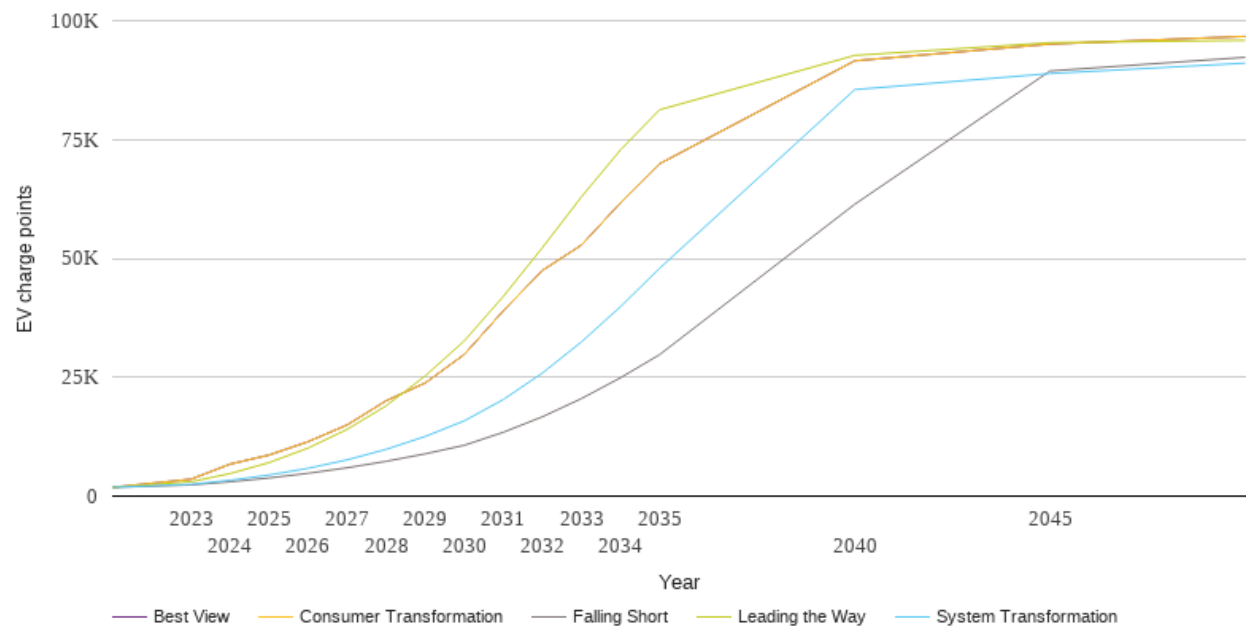
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	3943	3943	3943	3943	3943
2023	5007	5098	6438	5847	6438
2024	6387	6676	11032	8613	11032
2025	8122	8701	14367	12336	14367
2026	10286	11357	19313	17390	19313
2027	12991	14783	25871	24023	25871
2028	16286	19110	35527	32598	35527
2029	20281	24541	44069	43694	44069
2030	25074	31236	57260	57145	57260
2031	30797	39534	73951	72916	73951
2032	37460	49674	89548	90038	89548
2033	45226	61662	100122	107426	100122
2034	53997	75283	116479	123915	116479
2035	63674	89934	131298	138209	131298
2040	124571	154992	170249	168512	170249
2045	168324	172516	170879	158494	170879
2050	176848	160191	160122	129216	160122



# Technology Summary: EV Charge Point

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

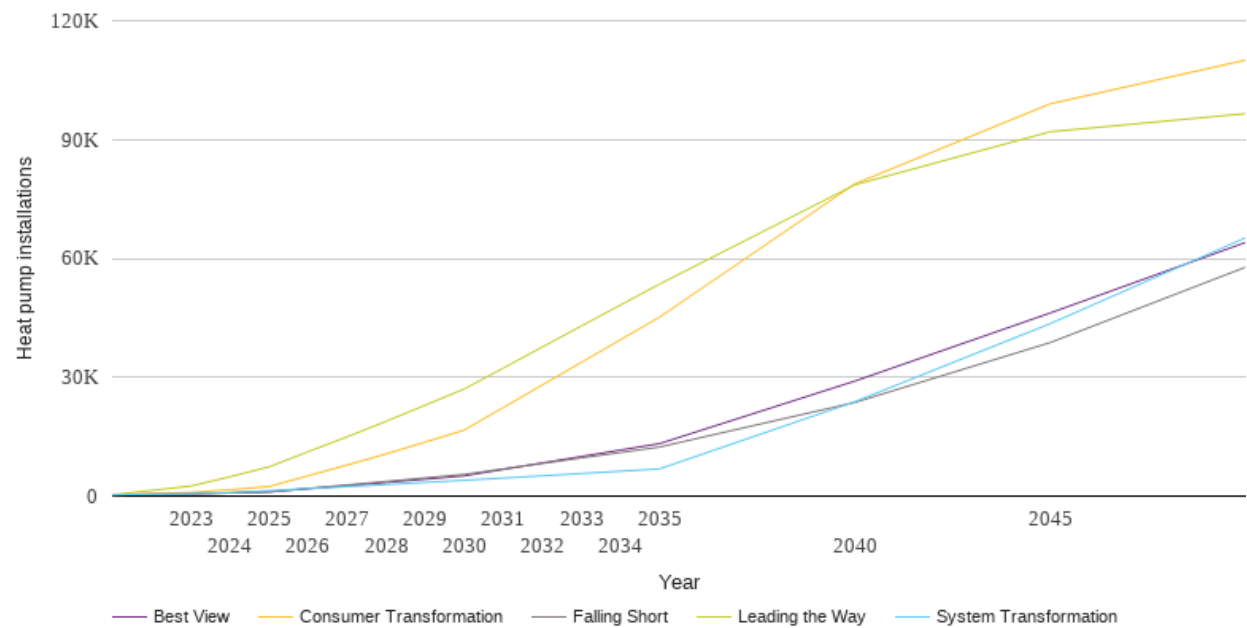
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1843	1843	1843	1843	1843
2023	2352	2472	3558	3018	3558
2024	3002	3327	6725	4737	6725
2025	3810	4434	8648	7051	8648
2026	4793	5844	11451	10107	11451
2027	5958	7628	14979	14045	14979
2028	7320	9844	20073	19009	20073
2029	8891	12557	23802	25294	23802
2030	10690	15824	29788	32645	29788
2031	13431	20318	38982	42008	38982
2032	16684	25880	47467	52260	47467
2033	20516	32436	52803	62946	52803
2034	24894	39841	61708	72825	61708
2035	29742	47902	69903	81252	69903
2040	61384	85503	91559	92696	91559
2045	89416	88876	95087	95371	95087
2050	92291	91065	96692	95862	96692



# Technology Summary: Heat pumps

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

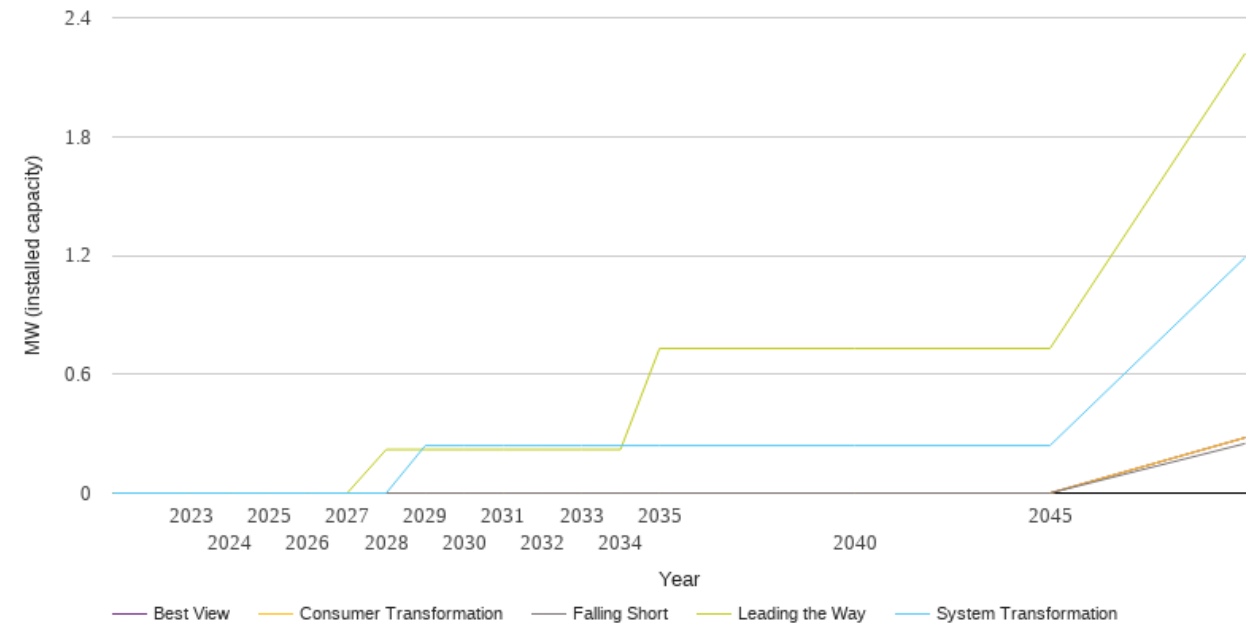
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	351	351	351	351	351
2023	559	574	923	2543	559
2024	803	907	1609	4890	803
2025	1056	1364	2417	7385	1056
2026	1940	1895	5141	11206	1850
2027	2811	2389	7840	14972	2633
2028	3697	2905	10665	18888	3439
2029	4592	3455	13639	22963	4275
2030	5489	3998	16680	27052	5116
2031	6864	4551	22355	32320	6741
2032	8248	5123	28063	37638	8371
2033	9630	5699	33766	42940	9996
2034	11004	6281	39467	48227	11621
2035	12384	6861	45156	53503	13243
2040	23630	23810	78794	78567	29020
2045	38729	43490	98989	91953	46187
2050	57747	65175	110013	96530	63994



# Technology Summary: Hydrogen electrolysis

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

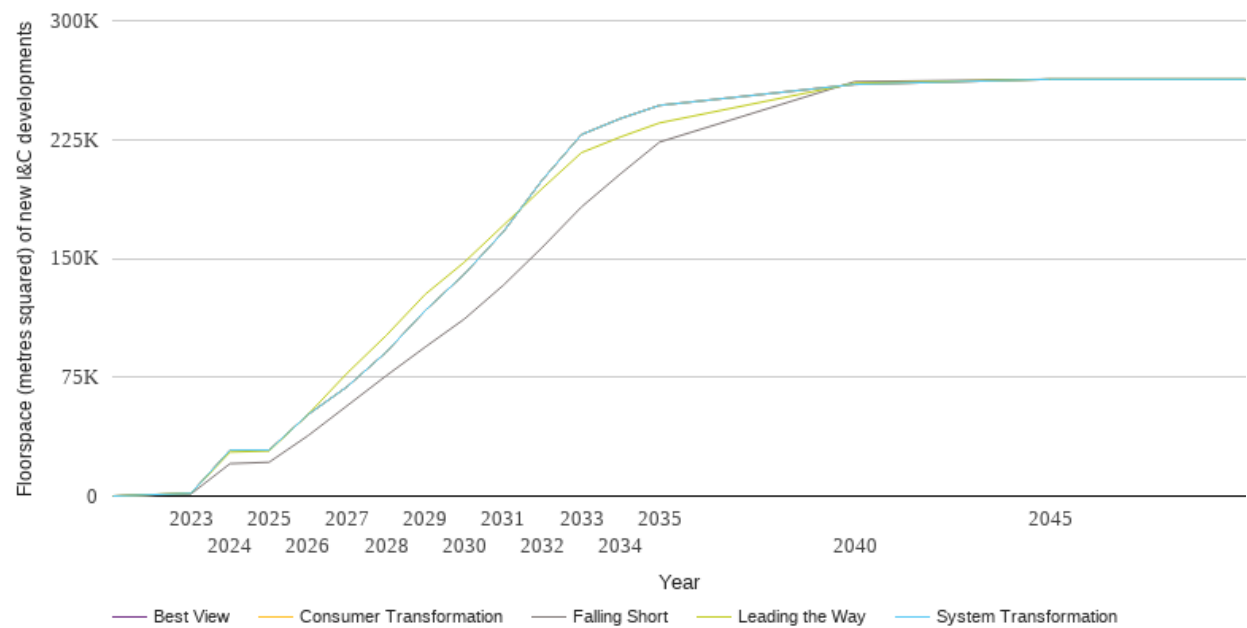
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0	0.0
2029	0.0	0.2	0.0	0.2	0.0
2030	0.0	0.2	0.0	0.2	0.0
2031	0.0	0.2	0.0	0.2	0.0
2032	0.0	0.2	0.0	0.2	0.0
2033	0.0	0.2	0.0	0.2	0.0
2034	0.0	0.2	0.0	0.2	0.0
2035	0.0	0.2	0.0	0.7	0.0
2040	0.0	0.2	0.0	0.7	0.0
2045	0.0	0.2	0.0	0.7	0.0
2050	0.2	1.2	0.3	2.2	0.3



# Technology Summary: Non domestic

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

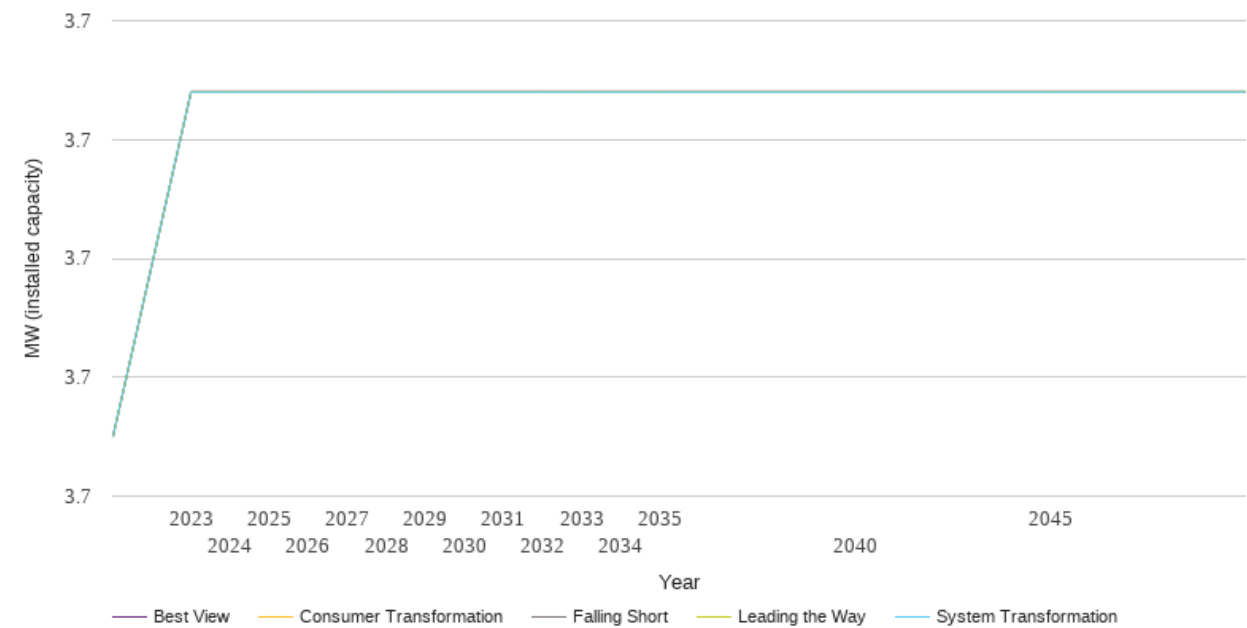
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	1400	1800	1800	1900	1800
2024	20486	29020	29020	27771	29020
2025	21361	29060	29060	28500	29060
2026	38175	51513	51513	51593	51513
2027	57061	69066	69066	77613	69066
2028	75947	90872	90872	101365	90872
2029	94092	117154	117154	127363	117154
2030	111724	140059	140059	147593	140059
2031	133080	166826	166826	170874	166826
2032	157028	199574	199574	194241	199574
2033	182467	228126	228126	216721	228126
2034	203349	238239	238239	226620	238239
2035	223400	246548	246548	235483	246548
2040	261533	259783	259783	260594	259783
2045	263027	263027	263027	263027	263027
2050	263027	263027	263027	263027	263027



# Technology Summary: Other Distributed Generation

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

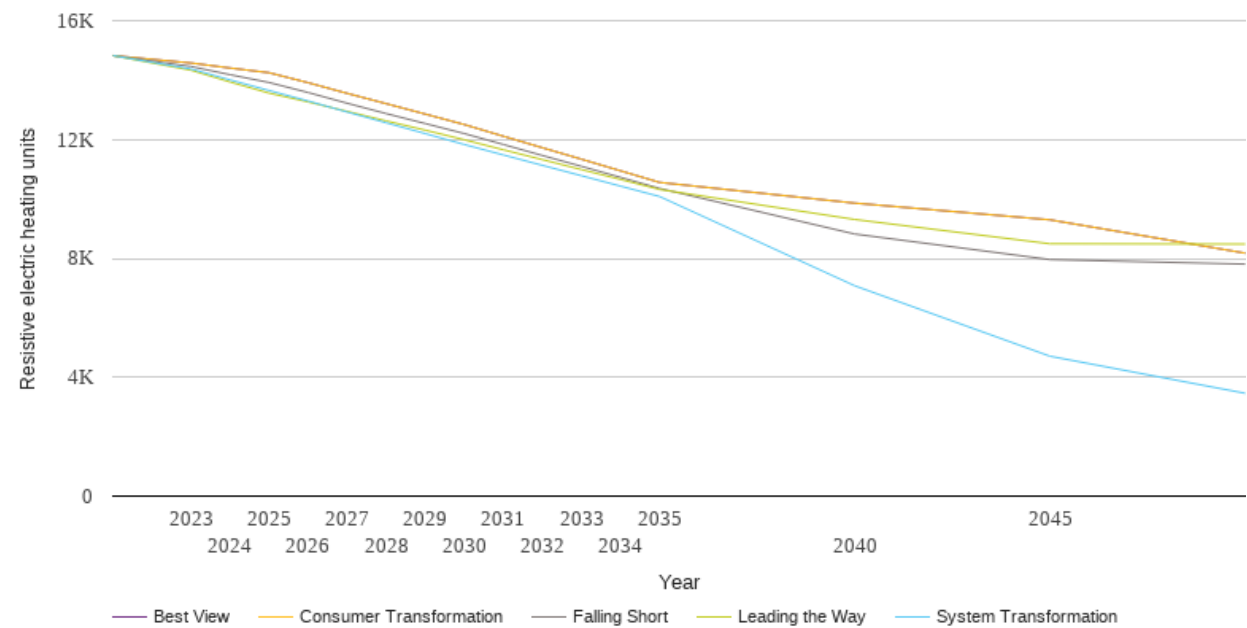
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	3.7	3.7	3.7	3.7	3.7
2023	3.7	3.7	3.7	3.7	3.7
2024	3.7	3.7	3.7	3.7	3.7
2025	3.7	3.7	3.7	3.7	3.7
2026	3.7	3.7	3.7	3.7	3.7
2027	3.7	3.7	3.7	3.7	3.7
2028	3.7	3.7	3.7	3.7	3.7
2029	3.7	3.7	3.7	3.7	3.7
2030	3.7	3.7	3.7	3.7	3.7
2031	3.7	3.7	3.7	3.7	3.7
2032	3.7	3.7	3.7	3.7	3.7
2033	3.7	3.7	3.7	3.7	3.7
2034	3.7	3.7	3.7	3.7	3.7
2035	3.7	3.7	3.7	3.7	3.7
2040	3.7	3.7	3.7	3.7	3.7
2045	3.7	3.7	3.7	3.7	3.7
2050	3.7	3.7	3.7	3.7	3.7



# Technology Summary: Resistive electric heating

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

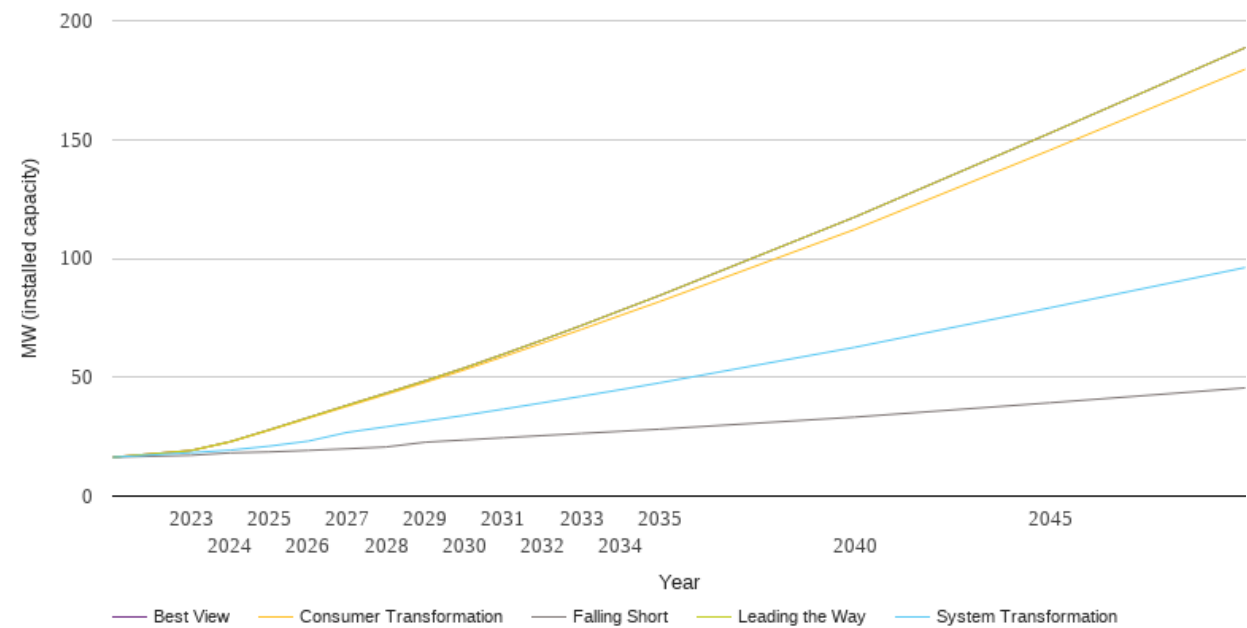
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	14824	14824	14824	14824	14824
2023	14458	14375	14576	14332	14576
2024	14183	14007	14407	13937	14407
2025	13919	13649	14248	13562	14248
2026	13582	13297	13913	13266	13913
2027	13221	12925	13554	12947	13554
2028	12873	12563	13207	12627	13207
2029	12538	12199	12857	12316	12857
2030	12201	11832	12504	11992	12504
2031	11833	11481	12111	11655	12111
2032	11463	11131	11724	11324	11724
2033	11098	10782	11338	10989	11338
2034	10727	10433	10948	10658	10948
2035	10356	10083	10557	10320	10557
2040	8820	7078	9860	9310	9860
2045	7960	4708	9298	8492	9298
2050	7807	3460	8176	8481	8176



# Technology Summary: Solar Generation

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

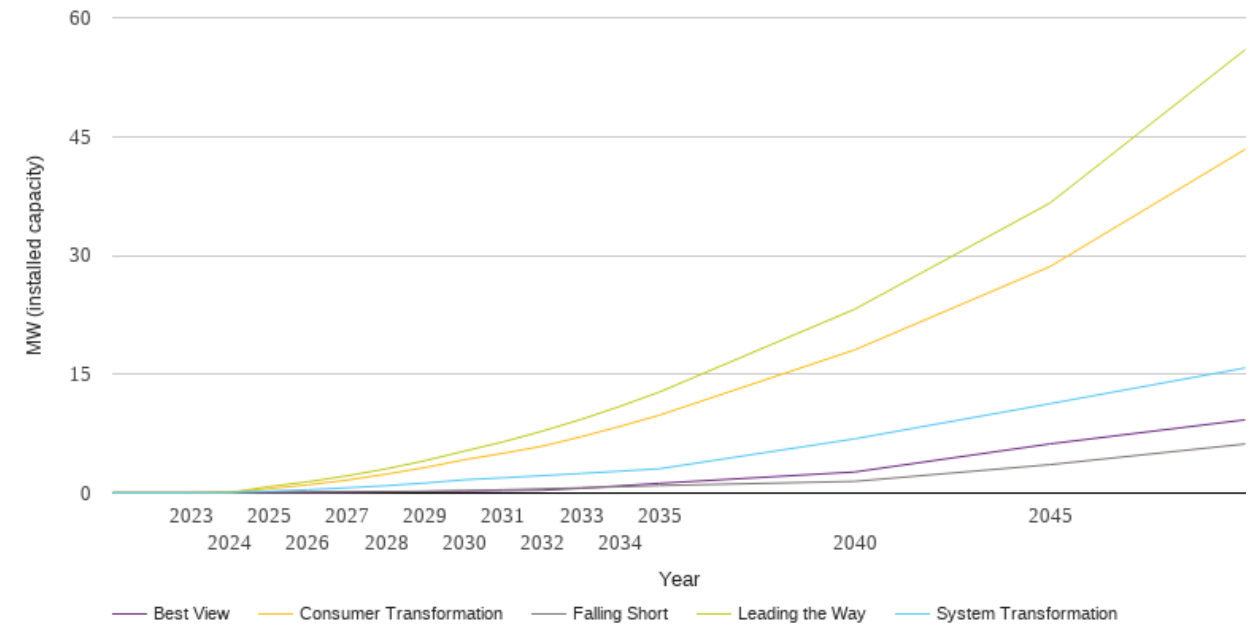
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	16.4	16.4	16.4	16.4	16.4
2023	17.2	18.3	19.1	19.2	19.2
2024	18.2	19.3	22.8	22.9	22.9
2025	18.6	21.0	27.7	27.9	27.9
2026	19.2	23.1	32.7	33.0	33.0
2027	19.9	26.8	37.8	38.2	38.2
2028	20.7	29.2	42.8	43.3	43.3
2029	22.7	31.6	47.8	48.5	48.5
2030	23.6	34.0	53.1	53.9	53.9
2031	24.5	36.6	58.7	59.7	59.7
2032	25.5	39.2	64.3	65.7	65.7
2033	26.4	42.0	70.1	71.8	71.8
2034	27.2	44.8	76.0	78.1	78.1
2035	28.2	47.6	81.8	84.4	84.4
2040	33.2	62.6	112.2	117.4	117.4
2045	39.3	79.2	145.5	152.7	152.7
2050	45.5	96.1	179.6	188.6	188.6



# Technology Summary: Storage

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

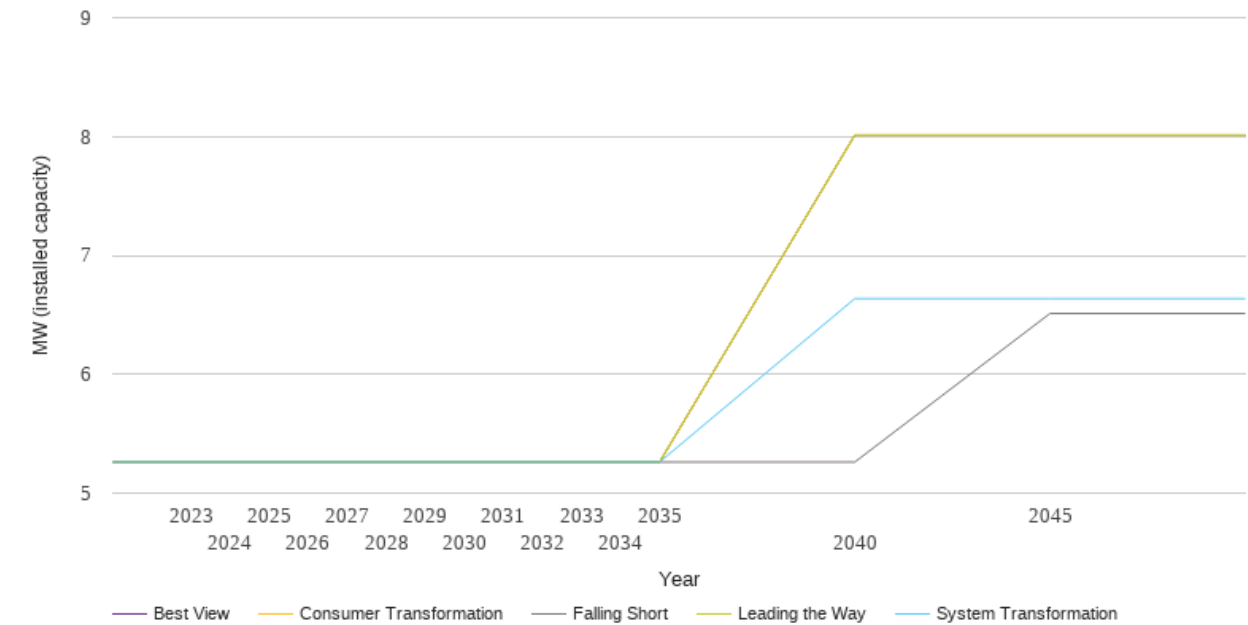
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.1	0.1	0.1	0.0
2025	0.1	0.2	0.6	0.8	0.1
2026	0.1	0.4	1.0	1.4	0.1
2027	0.1	0.7	1.6	2.2	0.1
2028	0.2	0.9	2.4	3.1	0.2
2029	0.2	1.3	3.2	4.1	0.2
2030	0.3	1.7	4.2	5.3	0.3
2031	0.4	1.9	5.0	6.5	0.3
2032	0.5	2.2	5.9	7.8	0.4
2033	0.7	2.5	7.1	9.3	0.6
2034	0.8	2.8	8.4	11.0	0.9
2035	0.9	3.1	9.8	12.8	1.2
2040	1.5	6.8	18.1	23.2	2.7
2045	3.6	11.3	28.6	36.6	6.2
2050	6.2	15.8	43.4	56.0	9.2



# 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	5.3	5.3	5.3	5.3	5.3
2023	5.3	5.3	5.3	5.3	5.3
2024	5.3	5.3	5.3	5.3	5.3
2025	5.3	5.3	5.3	5.3	5.3
2026	5.3	5.3	5.3	5.3	5.3
2027	5.3	5.3	5.3	5.3	5.3
2028	5.3	5.3	5.3	5.3	5.3
2029	5.3	5.3	5.3	5.3	5.3
2030	5.3	5.3	5.3	5.3	5.3
2031	5.3	5.3	5.3	5.3	5.3
2032	5.3	5.3	5.3	5.3	5.3
2033	5.3	5.3	5.3	5.3	5.3
2034	5.3	5.3	5.3	5.3	5.3
2035	5.3	5.3	5.3	5.3	5.3
2040	5.3	6.6	8.0	8.0	8.0
2045	6.5	6.6	8.0	8.0	8.0
2050	6.5	6.6	8.0	8.0	8.0



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))  
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