

# Distribution Future Energy Scenarios 2022

Local Authority:  
South Kesteven

## 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 South Kesteven 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 South Kesteven 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	432	258	258	0	27732	12877	12877	0
Domestic	New dwellings	0	4700	5217	5217	6296	9830	9761	9761	9703
Electric vehicles	Electric vehicles	2399	15192	18732	34483	34338	107019	90392	92206	78882
EV Charge Point	EV charge points	1181	6662	9680	18148	20036	55950	53901	57508	57136
Heat pumps	Heat pump installations	904	5603	6105	12602	19108	35462	40824	66147	58264
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	2.8	0.0	0.2	5.4	24.4	12.5	18.7
Non domestic	Floorspace (metres squared) of new I&C developments	0	159856	230778	230778	231375	587188	587188	587188	587188
Other Distributed Generation	MW (installed capacity)	3.5	3.6	4.5	5.9	5.6	3.2	3.5	5.5	6.1
Resistive electric heating	Resistive electric heating units	7532	6374	6112	6514	6257	4500	1945	4373	4590
Solar Generation	MW (installed capacity)	29.0	38.3	52.7	65.3	56.7	125.3	240.5	293.2	270.4
Storage	MW (installed capacity)	0.0	0.3	1.9	3.6	5.2	6.4	16.1	36.4	47.2
Wind	MW (installed capacity)	1.0	1.2	1.8	8.2	6.8	9.9	27.5	86.3	69.2

## 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.

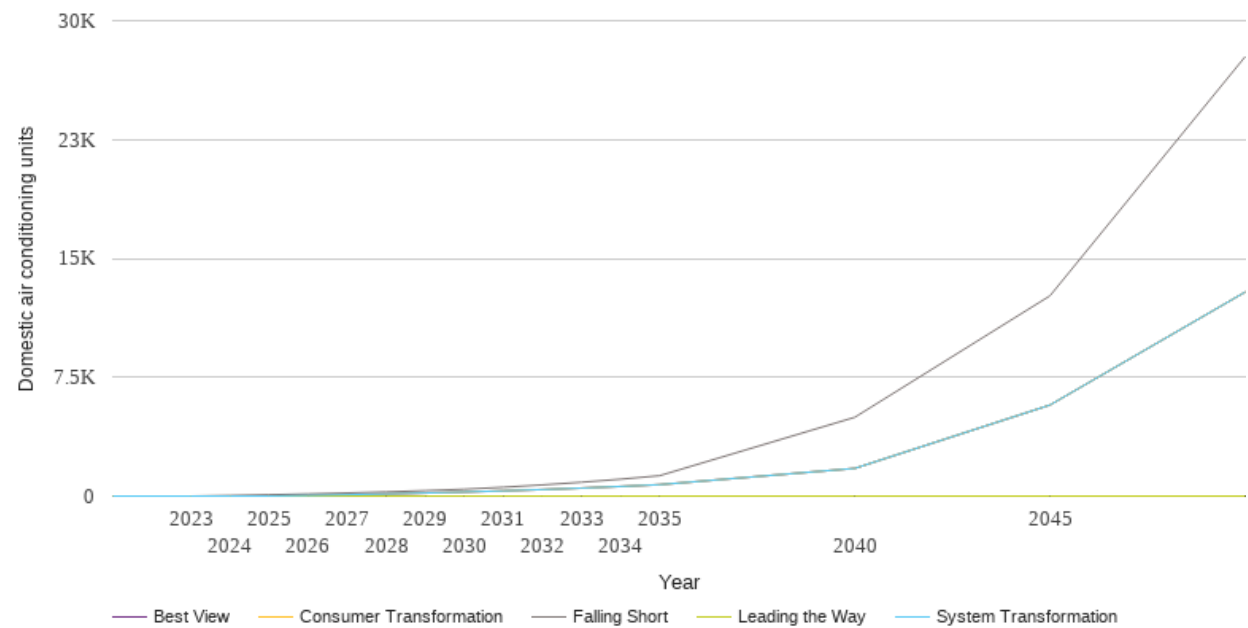
If you have any comments or queries regarding these reports, please contact

[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.

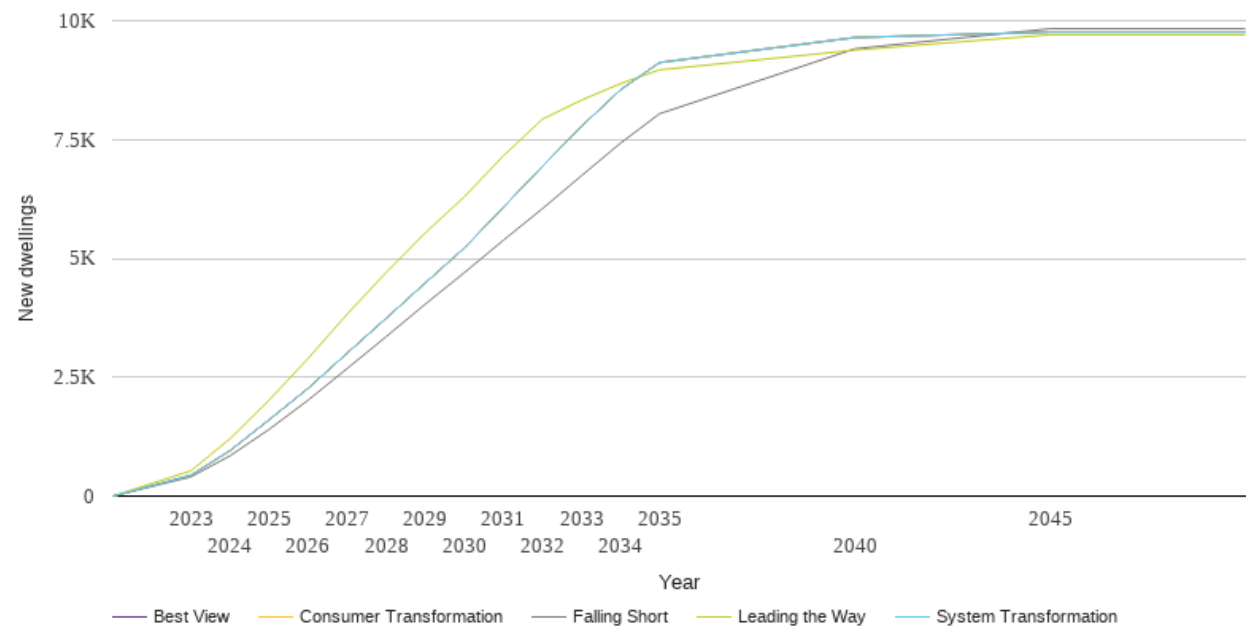
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	39	0	0	0	0
2025	84	0	0	0	0
2026	136	40	40	0	40
2027	196	85	85	0	85
2028	264	136	136	0	136
2029	343	194	194	0	194
2030	432	258	258	0	258
2031	559	331	331	0	331
2032	706	412	412	0	412
2033	874	504	504	0	504
2034	1066	607	607	0	607
2035	1286	722	722	0	722
2040	4972	1748	1748	0	1748
2045	12639	5747	5747	0	5747
2050	27732	12877	12877	0	12877



# Technology Summary: Domestic

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

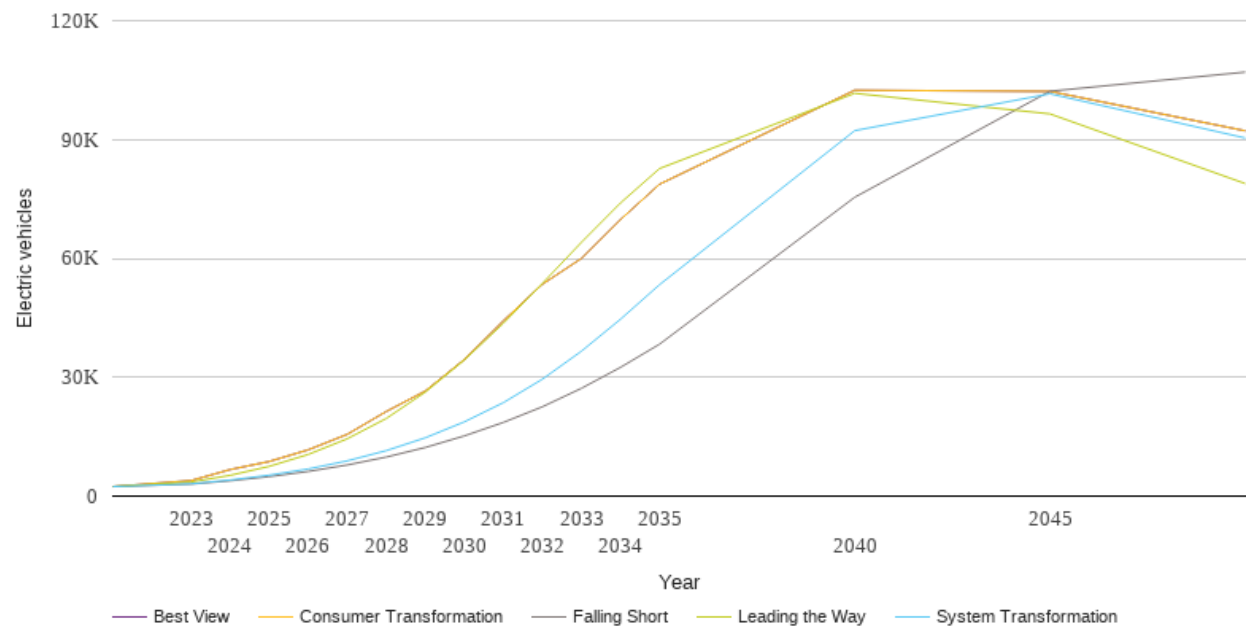
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	407	440	440	535	440
2024	848	957	957	1206	957
2025	1404	1605	1605	2019	1605
2026	2018	2267	2267	2896	2267
2027	2684	3008	3008	3828	3008
2028	3354	3741	3741	4706	3741
2029	4038	4484	4484	5536	4484
2030	4700	5217	5217	6296	5217
2031	5381	6075	6075	7157	6075
2032	6046	6936	6936	7929	6936
2033	6739	7778	7778	8328	7778
2034	7424	8545	8545	8676	8545
2035	8042	9119	9119	8965	9119
2040	9408	9646	9646	9381	9646
2045	9830	9761	9761	9703	9761
2050	9830	9761	9761	9703	9761



# Technology Summary: Electric vehicles

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

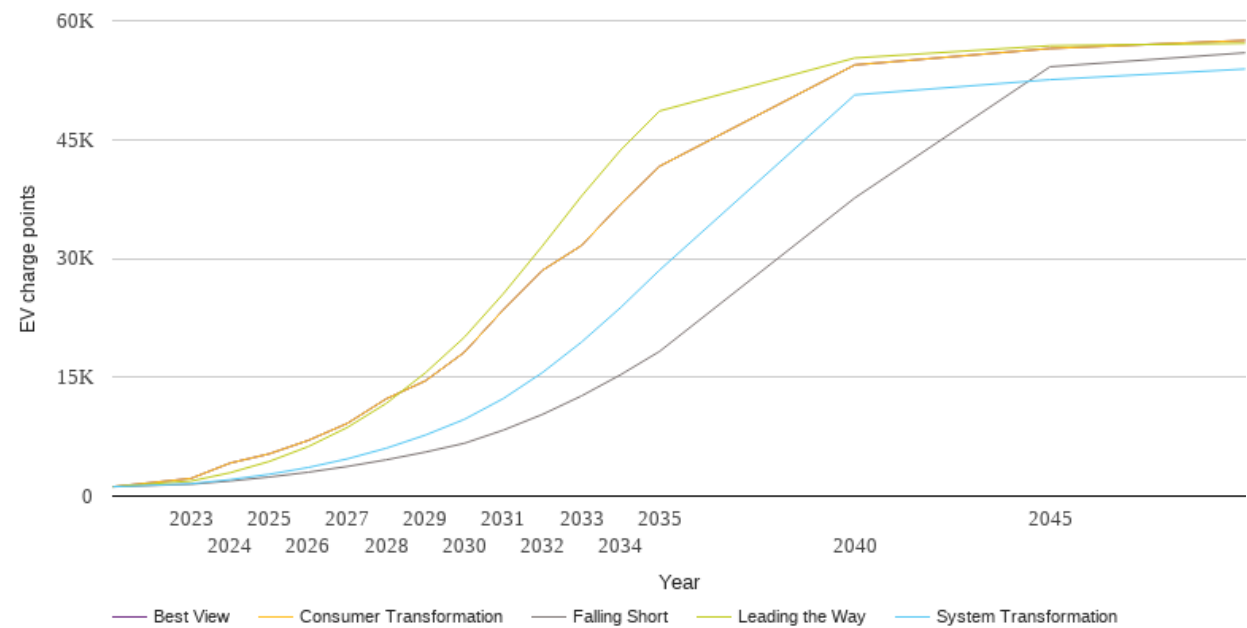
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	2399	2399	2399	2399	2399
2023	3038	3095	3909	3555	3909
2024	3867	4049	6690	5234	6690
2025	4907	5274	8729	7499	8729
2026	6219	6846	11671	10501	11671
2027	7855	8889	15589	14455	15589
2028	9849	11470	21350	19586	21350
2029	12272	14714	26523	26240	26523
2030	15192	18732	34483	34338	34483
2031	18595	23586	44265	43597	44265
2032	22549	29514	53474	53680	53474
2033	27208	36582	59998	64063	59998
2034	32493	44637	69796	73990	69796
2035	38343	53362	78721	82670	78721
2040	75437	92249	102444	101665	102444
2045	102192	101547	102156	96477	102156
2050	107019	90392	92206	78882	92206



# 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	1181	1181	1181	1181	1181
2023	1497	1560	2227	1894	2227
2024	1901	2078	4164	2947	4164
2025	2404	2750	5328	4365	5328
2026	3011	3606	7022	6240	7022
2027	3737	4691	9169	8654	9169
2028	4579	6040	12274	11697	12274
2029	5551	7695	14534	15547	14534
2030	6662	9680	18148	20036	18148
2031	8327	12314	23527	25544	23527
2032	10304	15584	28490	31569	28490
2033	12642	19428	31616	37850	31616
2034	15305	23778	36823	43650	36823
2035	18258	28517	41624	48598	41624
2040	37627	50637	54416	55288	54416
2045	54181	52555	56487	56845	56487
2050	55950	53901	57508	57136	57508

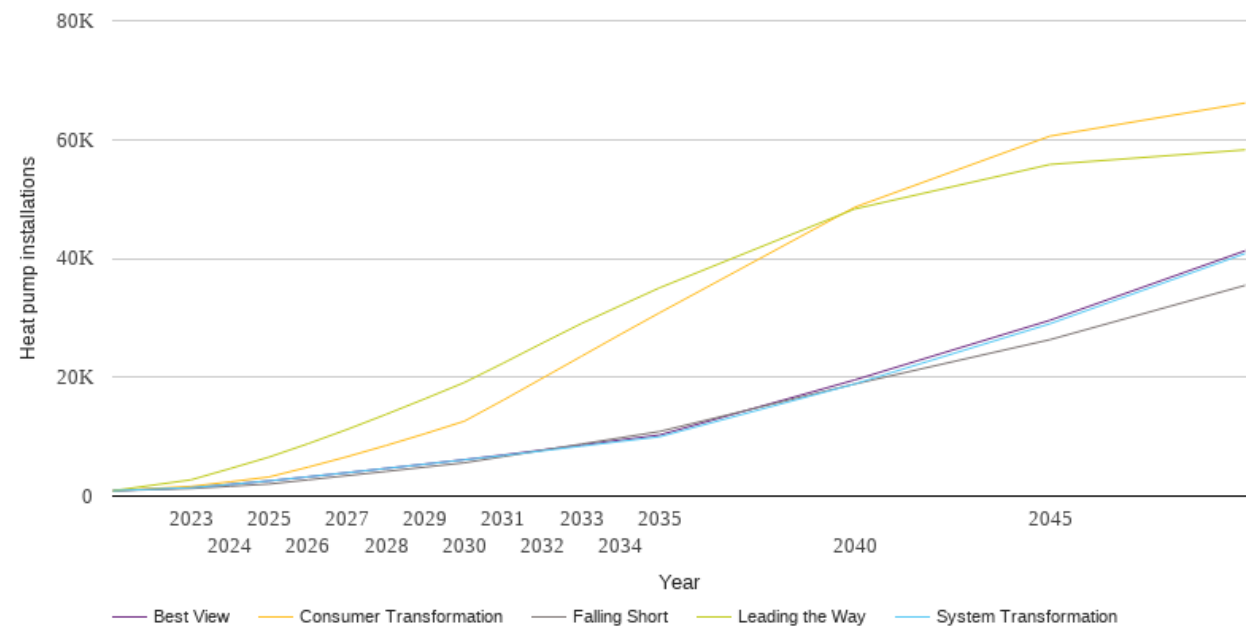




# Technology Summary: Heat pumps

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

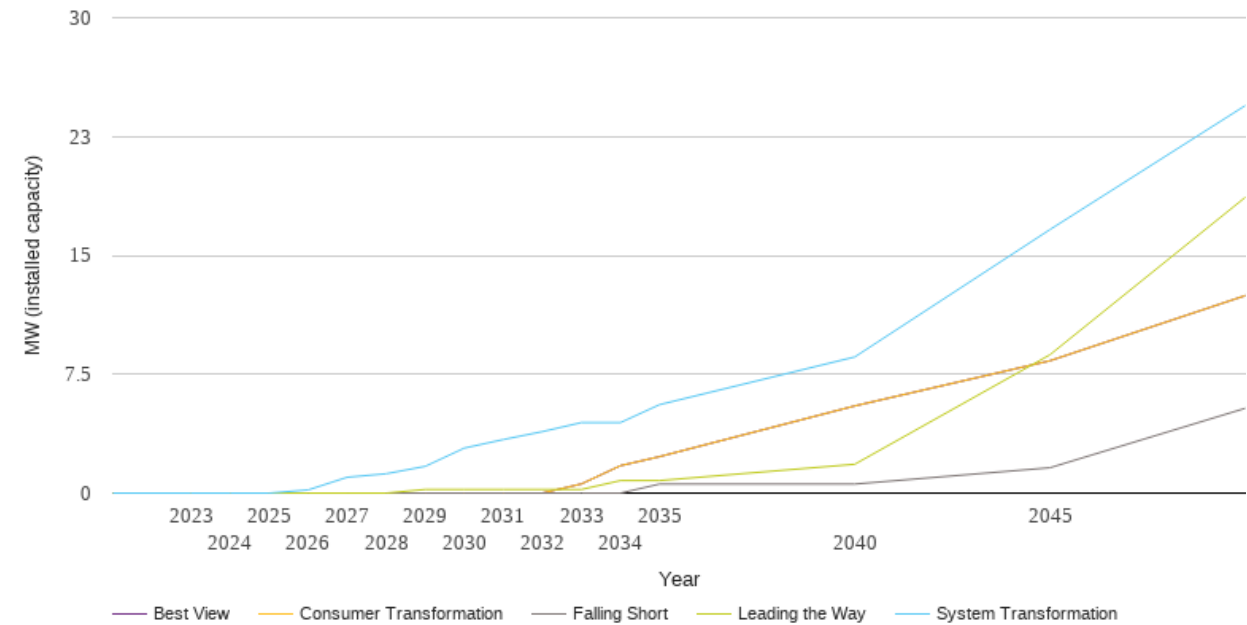
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	904	904	904	904	904
2023	1273	1416	1633	2738	1416
2024	1646	1968	2403	4622	1968
2025	2032	2558	3223	6566	2558
2026	2735	3241	4874	8818	3241
2027	3446	3936	6632	11218	3944
2028	4155	4654	8524	13761	4666
2029	4883	5368	10513	16397	5391
2030	5603	6105	12602	19108	6132
2031	6651	6838	16161	22383	6922
2032	7708	7617	19840	25747	7755
2033	8758	8406	23529	29044	8601
2034	9812	9203	27218	32053	9452
2035	10869	9982	30843	35045	10284
2040	18867	18872	48612	48317	19548
2045	26322	29004	60574	55806	29584
2050	35462	40824	66147	58264	41289



# Technology Summary: Hydrogen electrolysis

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

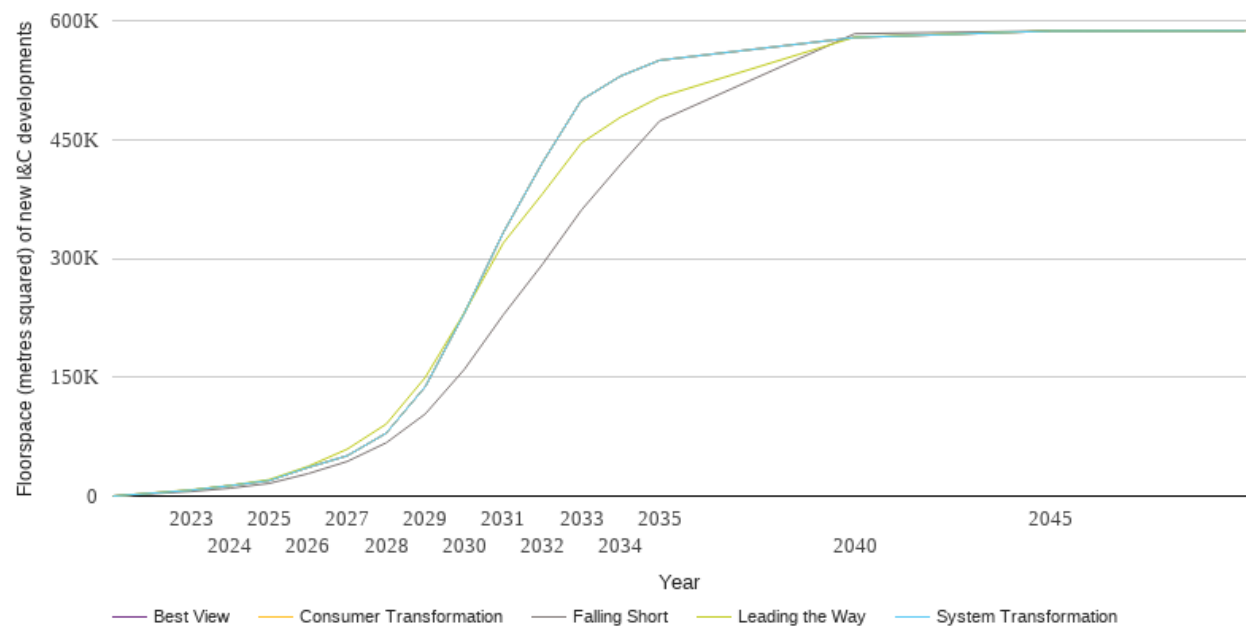
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.2	0.0	0.0	0.0
2027	0.0	1.0	0.0	0.0	0.0
2028	0.0	1.2	0.0	0.0	0.0
2029	0.0	1.7	0.0	0.2	0.0
2030	0.0	2.8	0.0	0.2	0.0
2031	0.0	3.4	0.0	0.2	0.0
2032	0.0	3.9	0.0	0.2	0.0
2033	0.0	4.4	0.6	0.2	0.6
2034	0.0	4.4	1.7	0.8	1.7
2035	0.6	5.6	2.3	0.8	2.3
2040	0.6	8.6	5.5	1.8	5.5
2045	1.6	16.6	8.4	8.7	8.4
2050	5.4	24.4	12.5	18.7	12.5



# Technology Summary: Non domestic

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

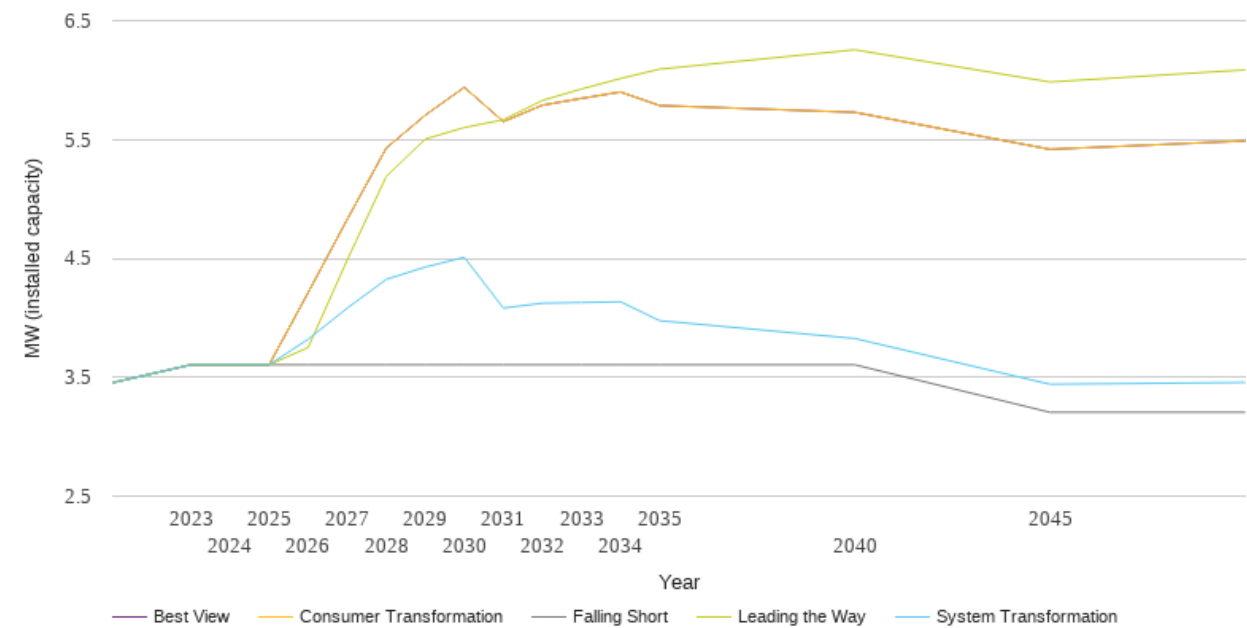
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	5769	7417	7417	7829	7417
2024	9924	13165	13165	13339	13165
2025	15992	19513	19513	20751	19513
2026	28306	36179	36179	37568	36179
2027	43698	50872	50872	59225	50872
2028	67265	79444	79444	90917	79444
2029	103667	138111	138111	149826	138111
2030	159856	230778	230778	231375	230778
2031	228856	332688	332688	319509	332688
2032	292452	420728	420728	381308	420728
2033	361015	499882	499882	445639	499882
2034	418412	530013	530013	478180	530013
2035	473306	549992	549992	503384	549992
2040	583530	578722	578722	579208	578722
2045	587188	586941	586941	587188	586941
2050	587188	587188	587188	587188	587188



# Technology Summary: Other Distributed Generation

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

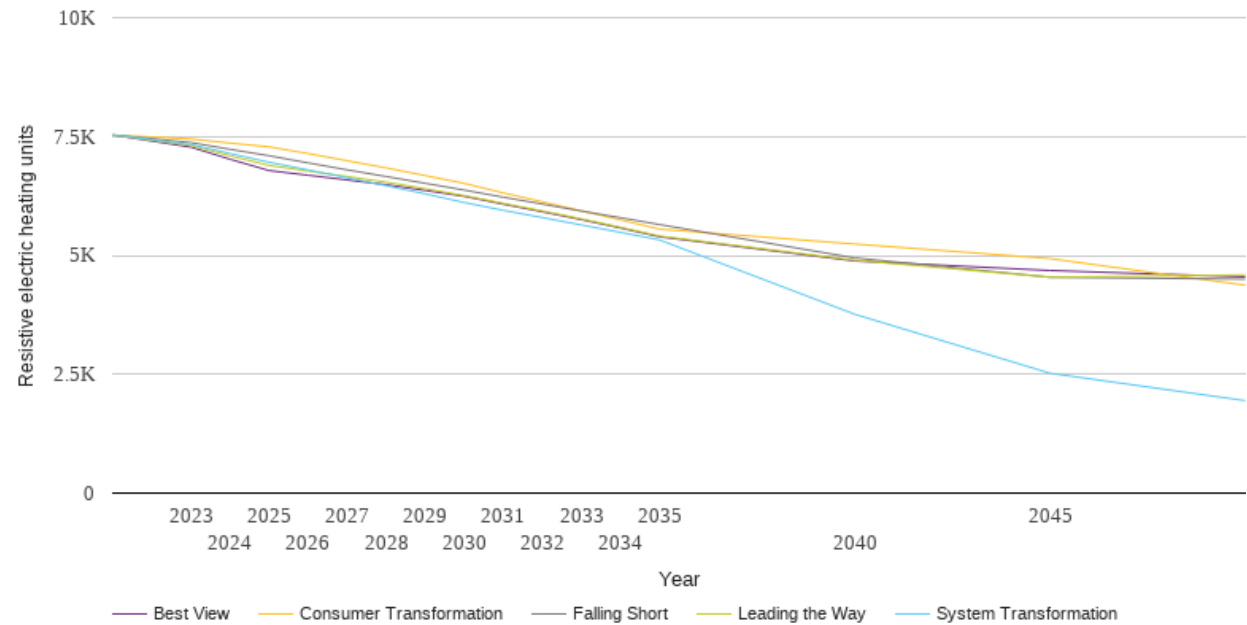
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	3.5	3.5	3.5	3.5	3.5
2023	3.6	3.6	3.6	3.6	3.6
2024	3.6	3.6	3.6	3.6	3.6
2025	3.6	3.6	3.6	3.6	3.6
2026	3.6	3.8	4.2	3.7	4.2
2027	3.6	4.1	4.8	4.5	4.8
2028	3.6	4.3	5.4	5.2	5.4
2029	3.6	4.4	5.7	5.5	5.7
2030	3.6	4.5	5.9	5.6	5.9
2031	3.6	4.1	5.7	5.7	5.7
2032	3.6	4.1	5.8	5.8	5.8
2033	3.6	4.1	5.8	5.9	5.8
2034	3.6	4.1	5.9	6.0	5.9
2035	3.6	4.0	5.8	6.1	5.8
2040	3.6	3.8	5.7	6.3	5.7
2045	3.2	3.4	5.4	6.0	5.4
2050	3.2	3.5	5.5	6.1	5.5



# Technology Summary: Resistive electric heating

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

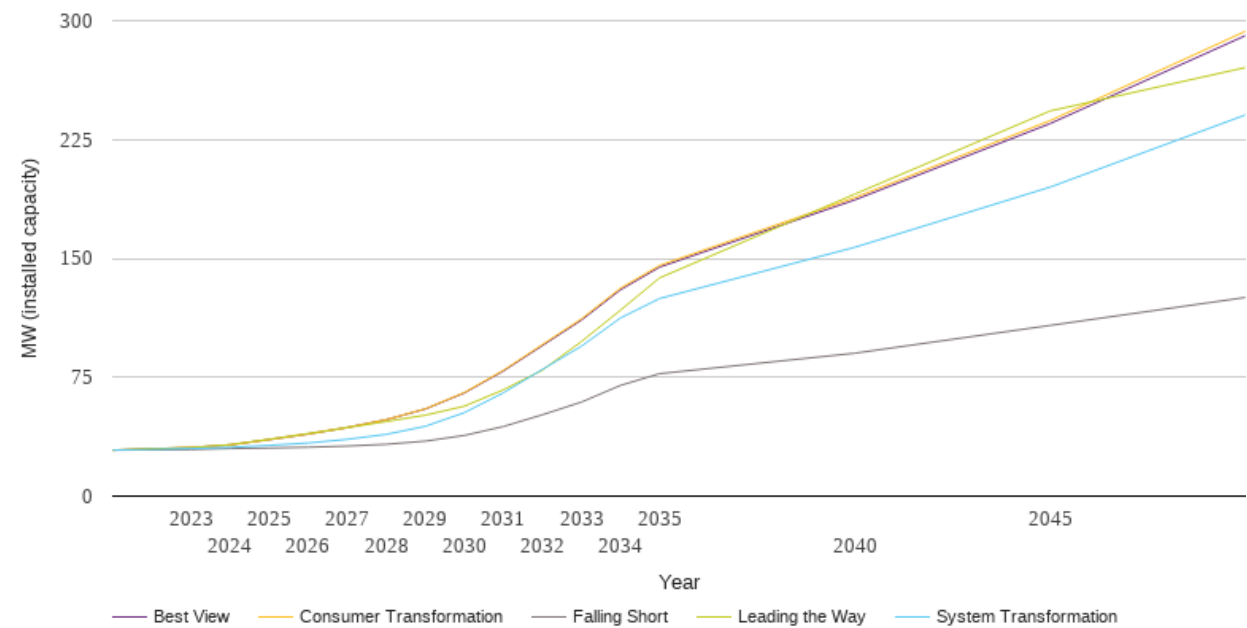
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	7532	7532	7532	7532	7532
2023	7374	7333	7447	7310	7276
2024	7231	7143	7362	7096	7022
2025	7096	6959	7283	6891	6784
2026	6946	6797	7142	6774	6686
2027	6799	6633	6990	6658	6587
2028	6659	6466	6840	6540	6487
2029	6516	6294	6678	6402	6367
2030	6374	6112	6514	6257	6243
2031	6224	5947	6314	6094	6078
2032	6080	5795	6126	5934	5918
2033	5932	5640	5936	5768	5752
2034	5792	5484	5747	5591	5577
2035	5648	5326	5552	5407	5391
2040	4946	3761	5239	4899	4883
2045	4541	2521	4933	4540	4682
2050	4500	1945	4373	4590	4547



# Technology Summary: Solar Generation

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

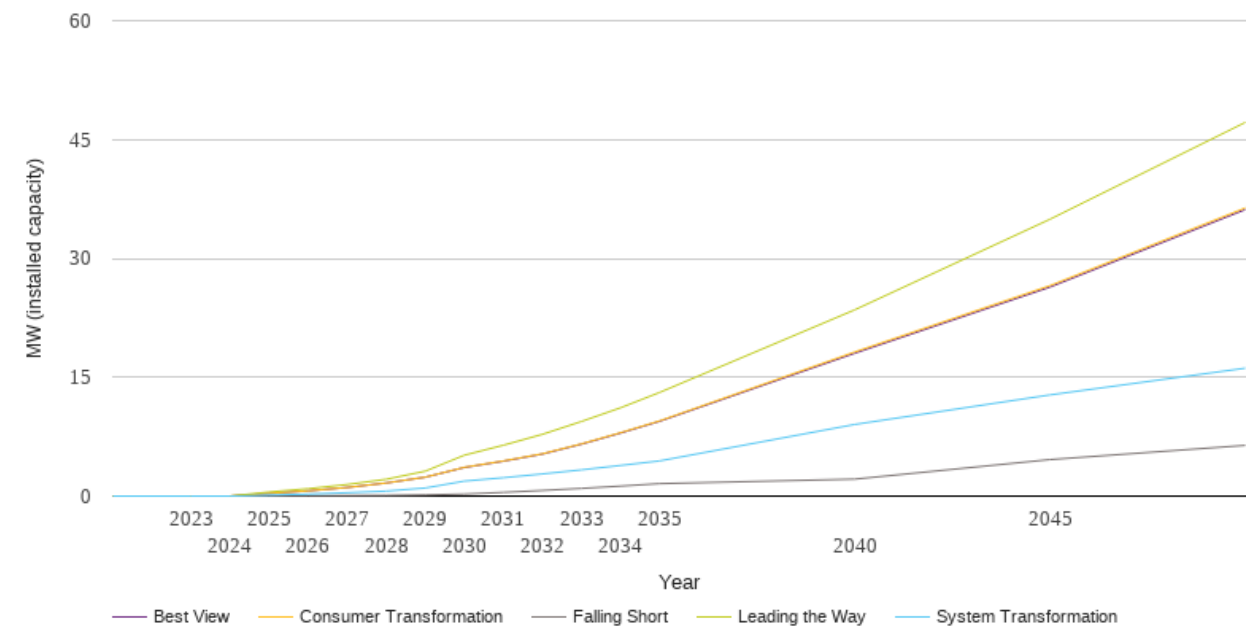
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	29.0	29.0	29.0	29.0	29.0
2023	29.3	30.0	30.6	30.6	30.6
2024	30.0	30.8	32.3	32.4	32.3
2025	30.4	32.0	35.7	35.8	35.7
2026	30.8	33.5	39.2	39.5	39.2
2027	31.6	35.8	43.3	43.2	43.3
2028	32.7	39.0	48.2	47.1	48.2
2029	34.7	44.0	55.0	51.1	54.9
2030	38.3	52.7	65.3	56.7	65.1
2031	43.9	65.2	79.4	67.1	78.9
2032	51.3	79.9	95.6	79.5	95.0
2033	59.3	94.6	111.9	97.5	111.1
2034	69.9	112.4	131.2	117.3	130.2
2035	77.2	124.7	145.5	137.7	144.5
2040	90.2	157.0	188.3	190.5	186.9
2045	107.7	195.0	236.9	243.0	235.0
2050	125.3	240.5	293.2	270.4	290.5



# Technology Summary: Storage

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

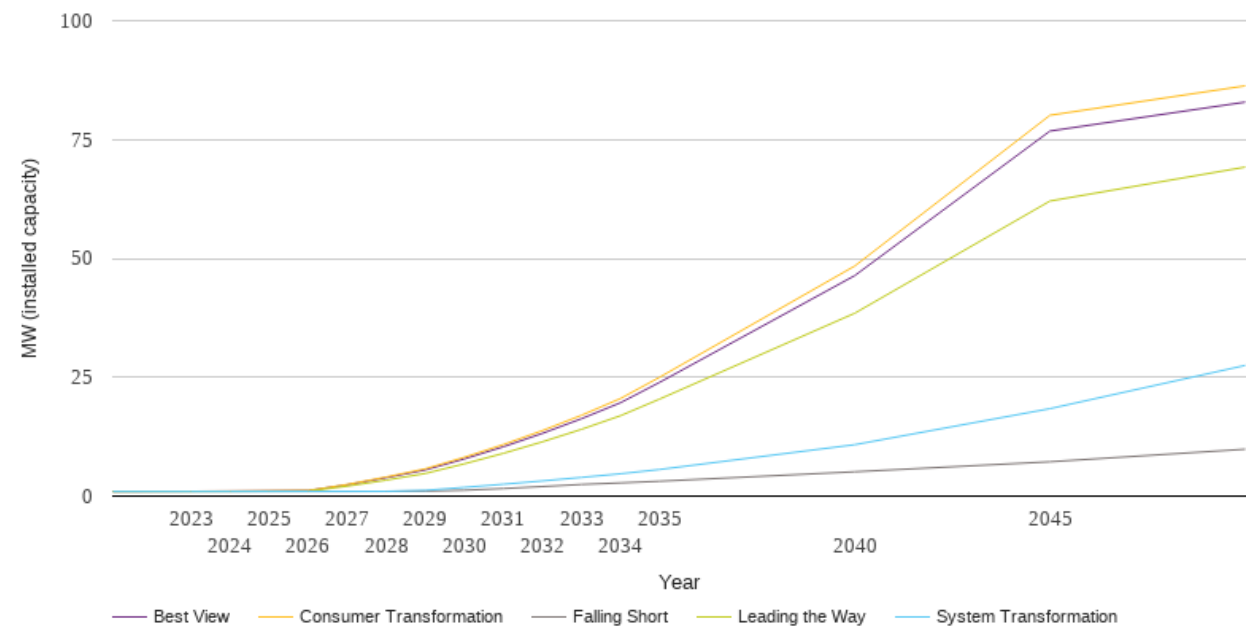
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.1	0.1	0.3	0.5	0.3
2026	0.1	0.3	0.7	0.9	0.7
2027	0.1	0.4	1.1	1.5	1.1
2028	0.1	0.6	1.7	2.1	1.7
2029	0.2	1.0	2.4	3.1	2.4
2030	0.3	1.9	3.6	5.2	3.6
2031	0.5	2.3	4.4	6.4	4.4
2032	0.7	2.8	5.3	7.8	5.3
2033	1.0	3.3	6.6	9.4	6.6
2034	1.3	3.9	8.0	11.1	8.0
2035	1.6	4.4	9.5	13.1	9.4
2040	2.1	9.0	18.2	23.5	18.0
2045	4.6	12.8	26.6	34.9	26.4
2050	6.4	16.1	36.4	47.2	36.2



# 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	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	1.0	1.1	1.0	1.1
2026	1.0	1.0	1.2	1.0	1.2
2027	1.0	1.0	2.4	2.1	2.4
2028	1.0	1.0	4.0	3.4	3.9
2029	1.1	1.2	5.7	4.8	5.5
2030	1.2	1.8	8.2	6.8	7.8
2031	1.6	2.5	10.8	9.0	10.4
2032	2.0	3.2	13.8	11.4	13.2
2033	2.4	3.9	17.0	14.0	16.3
2034	2.8	4.7	20.5	16.9	19.6
2035	3.1	5.6	25.0	20.4	23.9
2040	5.1	10.8	48.4	38.5	46.4
2045	7.2	18.4	80.1	62.1	76.8
2050	9.9	27.5	86.3	69.2	82.9





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