

Distribution Future Energy Scenarios 2022

Local Authority:
Nottingham

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 Nottingham covered by the NGED licence areas.



Scenario Summary

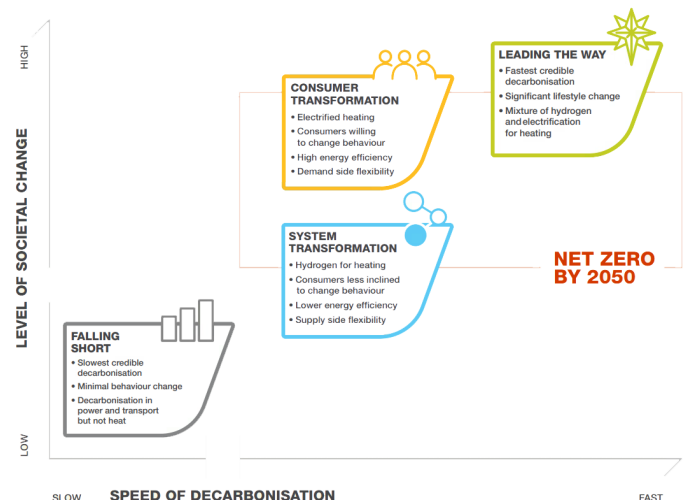
This DFES scenario framework includes three scenarios that are compliant with UK government targets of Net Zero greenhouse gas emissions by 2050. A summary of each scenario is below:

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 Nottingham 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	4994	13215	11643	11643	5030	118692	75509	75508	5084
Domestic	New dwellings	0	9836	10505	10505	11825	13563	13196	13196	12937
Electric vehicles	Electric vehicles	4678	29463	37683	68925	69118	227861	225890	229499	173108
EV Charge Point	EV charge points	1977	11178	16802	31751	34327	99823	101388	106540	105798
Heat pumps	Heat pump installations	488	9581	9063	26260	38718	83308	91731	143406	125881
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.0	0.0	0.4	0.3	1.3	0.4	3.3
Non domestic	Floorspace (metres squared) of new I&C developments	0	271499	323502	323502	341834	550912	550060	550060	550912
Other Distributed Generation	MW (installed capacity)	6.8	10.0	7.0	7.0	0.9	10.0	0.8	0.8	10.0
Resistive electric heating	Resistive electric heating units	16799	15004	14328	15016	14605	10244	5008	10313	10777
Solar Generation	MW (installed capacity)	25.8	32.2	43.9	64.9	66.0	56.6	113.4	205.3	214.6
Storage	MW (installed capacity)	2.2	2.6	4.0	6.6	7.7	9.3	20.8	49.6	62.6
Wind	MW (installed capacity)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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.

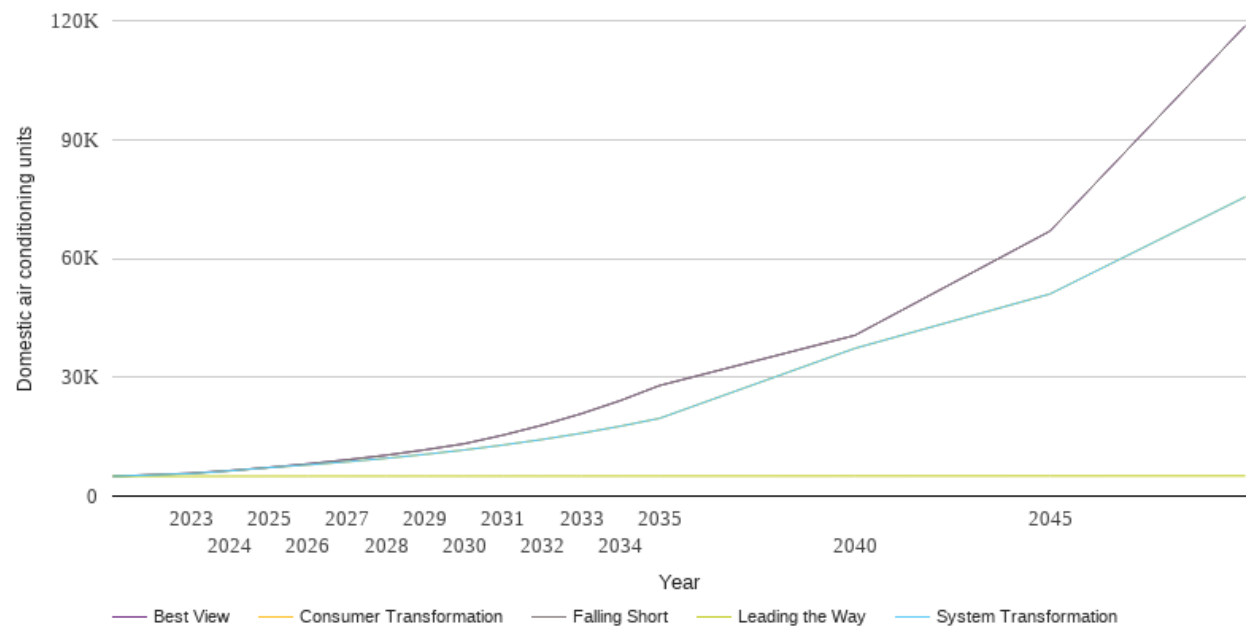
If you have any comments or queries regarding these reports, please contact

nged.energyplanning@nationalgrid.co.uk.

Technology Summary: Air conditioning

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

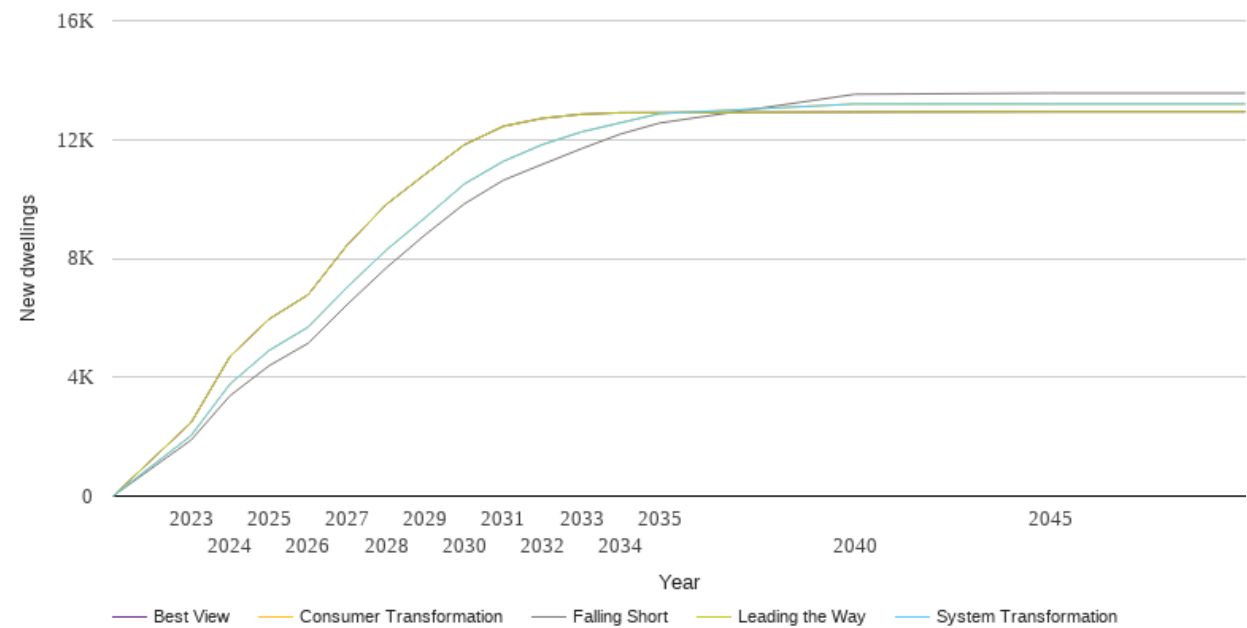
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	4994	4994	4994	4994	4994
2023	5759	5667	5667	5000	5759
2024	6437	6367	6367	5006	6437
2025	7228	7182	7182	5012	7228
2026	8129	7877	7877	5018	8129
2027	9162	8657	8657	5018	9162
2028	10324	9544	9544	5024	10324
2029	11683	10541	10541	5030	11683
2030	13215	11643	11643	5030	13215
2031	15406	12895	12895	5036	15406
2032	17922	14296	14296	5041	17922
2033	20808	15868	15868	5041	20808
2034	24117	17651	17651	5046	24117
2035	27900	19623	19623	5046	27900
2040	40560	37276	37275	5062	40560
2045	66887	51018	51017	5072	66887
2050	118692	75509	75508	5084	118692



Technology Summary: Domestic

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

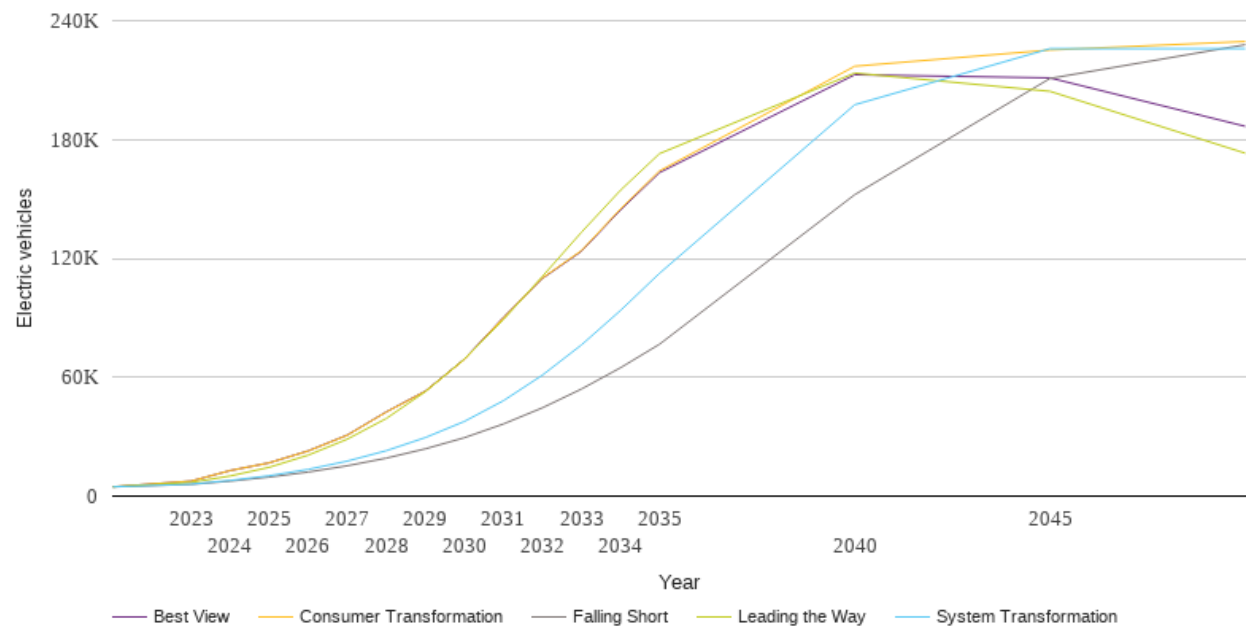
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	1886	2037	2037	2472	2472
2024	3381	3774	3774	4700	4700
2025	4387	4902	4902	5956	5956
2026	5144	5688	5688	6777	6777
2027	6448	7033	7033	8450	8450
2028	7681	8279	8279	9815	9815
2029	8799	9374	9374	10835	10835
2030	9836	10505	10505	11825	11825
2031	10632	11268	11268	12447	12447
2032	11166	11831	11831	12714	12714
2033	11692	12256	12256	12851	12851
2034	12185	12564	12564	12902	12902
2035	12555	12872	12872	12906	12906
2040	13523	13196	13196	12925	12925
2045	13563	13196	13196	12937	12937
2050	13563	13196	13196	12937	12937



Technology Summary: Electric vehicles

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

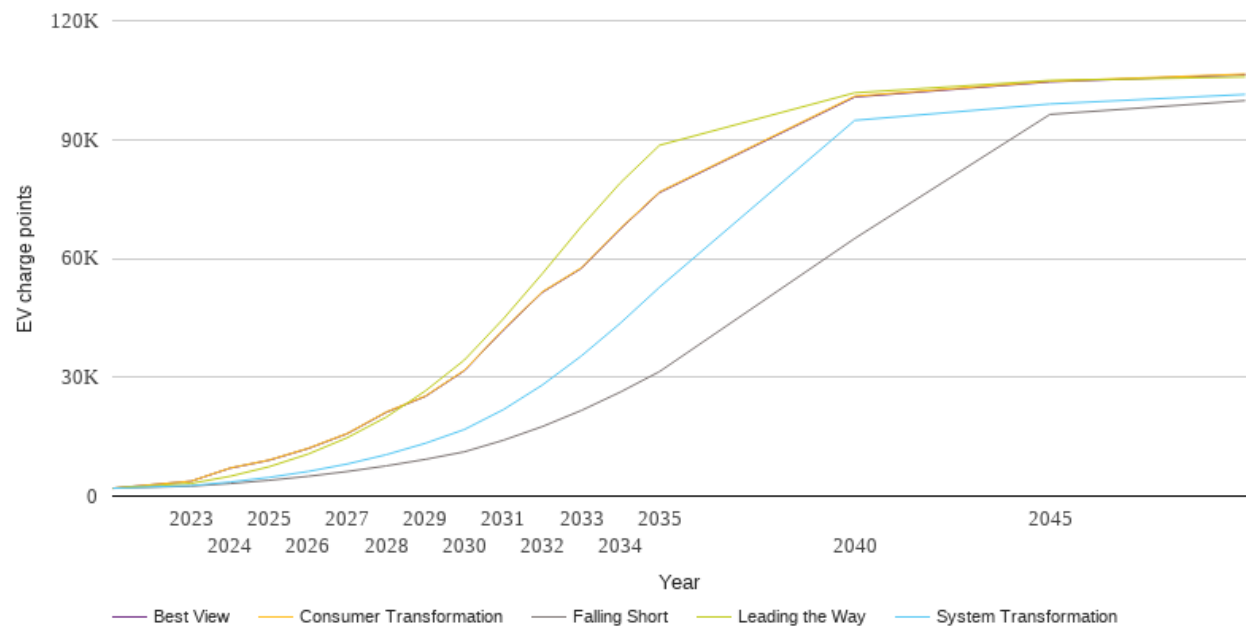
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	4678	4678	4678	4678	4678
2023	5937	6030	7562	6901	7562
2024	7556	7888	12869	10142	12869
2025	9586	10268	16773	14517	16793
2026	12129	13488	22761	20659	22816
2027	15298	17647	30711	28726	30791
2028	19161	22912	42398	39167	42508
2029	23844	29524	52854	52691	53001
2030	29463	37683	68925	69118	69113
2031	36399	48144	89971	89076	90208
2032	44562	61066	110088	110919	109856
2033	54053	76318	123919	133182	123594
2034	64784	93710	144967	154401	144419
2035	76669	112496	164175	172900	163316
2040	152182	197567	216996	213564	212721
2045	210834	225881	225197	204338	211117
2050	227861	225890	229499	173108	186673



Technology Summary: EV Charge Point

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

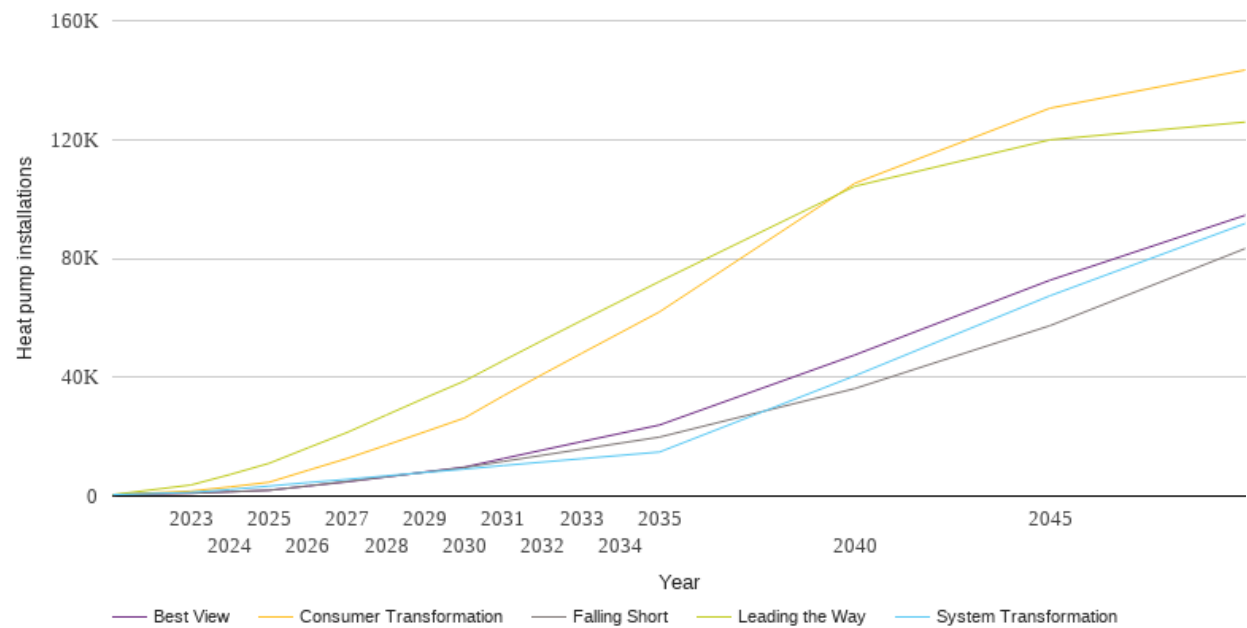
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1977	1977	1977	1977	1977
2023	2500	2635	3774	3199	3754
2024	3162	3544	7091	4996	7036
2025	3983	4721	9109	7409	9053
2026	4993	6217	12062	10610	11997
2027	6204	8102	15813	14731	15742
2028	7621	10450	21231	19937	21137
2029	9264	13323	25247	26535	25153
2030	11178	16802	31751	34327	31631
2031	14095	21824	42071	44747	41924
2032	17553	28048	51592	56164	51436
2033	21628	35389	57626	68078	57498
2034	26281	43680	67618	79113	67458
2035	31434	52720	76792	88558	76614
2040	65034	94840	100955	101797	100736
2045	96349	98970	104727	104918	104562
2050	99823	101388	106540	105798	106375



Technology Summary: Heat pumps

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

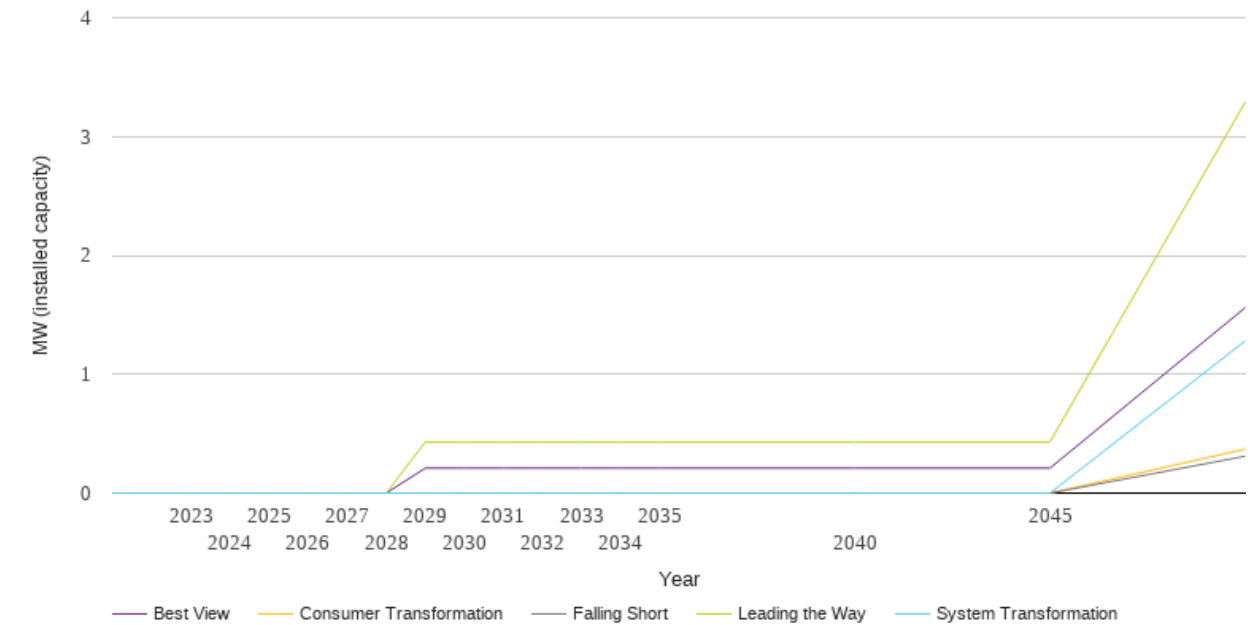
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	488	488	488	488	488
2023	955	1252	1682	3739	955
2024	1451	2221	3087	7256	1451
2025	1959	3368	4667	11032	1959
2026	3468	4557	8688	16257	3374
2027	4964	5628	12677	21425	4803
2028	6504	6824	17132	27259	6440
2029	8048	7966	21679	33071	8111
2030	9581	9063	26260	38718	9749
2031	11668	10286	33756	45599	12632
2032	13732	11444	40948	52374	15484
2033	15781	12583	48003	59043	18310
2034	17822	13701	55005	65622	21106
2035	19856	14837	62013	72216	23922
2040	36175	40482	105263	104264	47488
2045	57355	67418	130547	119900	72652
2050	83308	91731	143406	125881	94508



Technology Summary: Hydrogen electrolysis

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

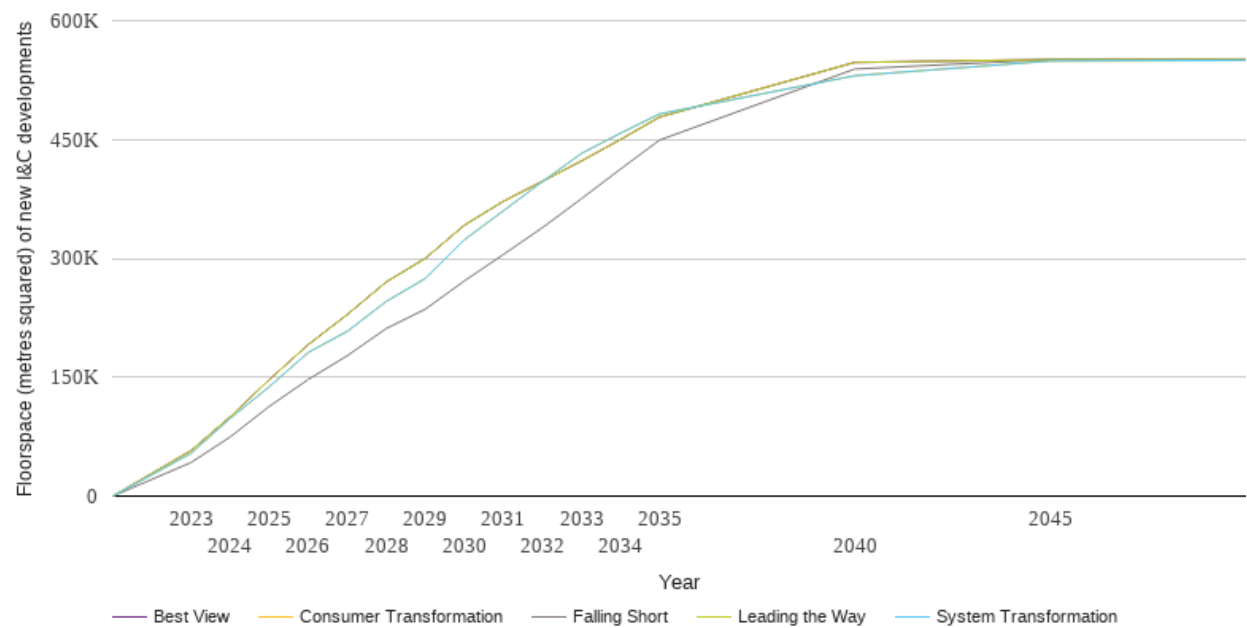
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0	0.4	0.2
2030	0.0	0.0	0.0	0.4	0.2
2031	0.0	0.0	0.0	0.4	0.2
2032	0.0	0.0	0.0	0.4	0.2
2033	0.0	0.0	0.0	0.4	0.2
2034	0.0	0.0	0.0	0.4	0.2
2035	0.0	0.0	0.0	0.4	0.2
2040	0.0	0.0	0.0	0.4	0.2
2045	0.0	0.0	0.0	0.4	0.2
2050	0.3	1.3	0.4	3.3	1.6



Technology Summary: Non domestic

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

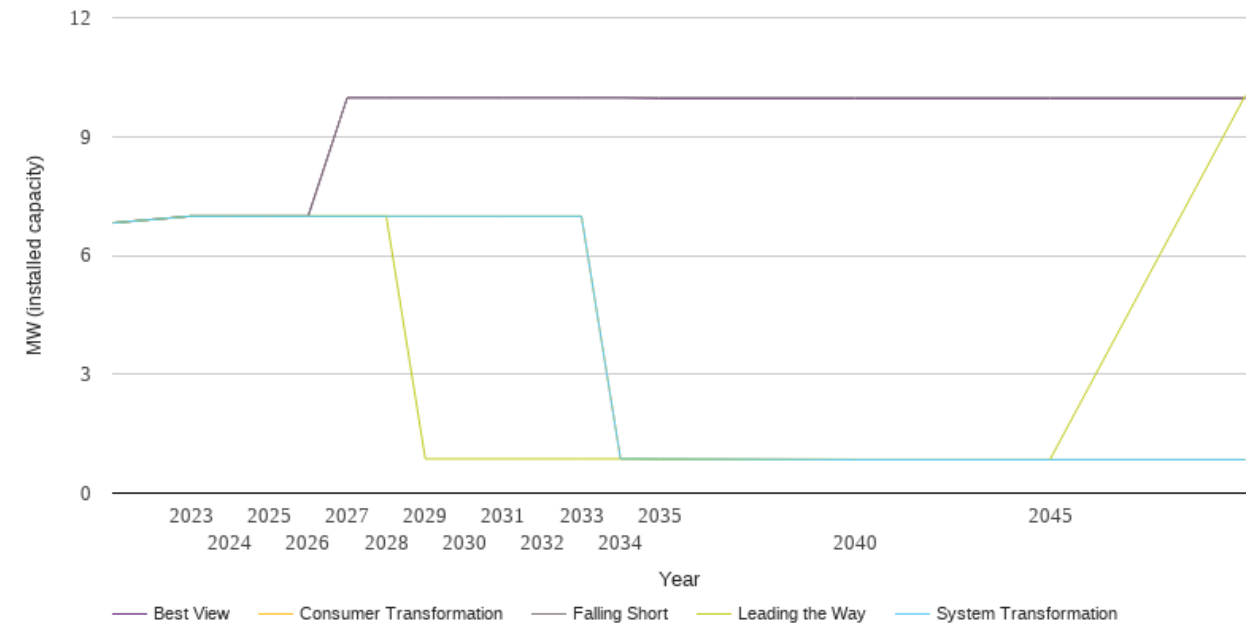
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	42426	54000	54000	57426	57426
2024	74576	97948	97948	99963	99963
2025	113019	137823	137823	146732	146732
2026	147111	181180	181180	191063	191063
2027	177103	207838	207838	229075	229075
2028	211396	245693	245693	270289	270289
2029	235863	274581	274581	300057	300057
2030	271499	323502	323502	341834	341834
2031	304895	360053	360053	372064	372064
2032	338778	396919	396919	397335	397335
2033	375322	432455	432455	423003	423003
2034	412727	458012	458012	450001	450001
2035	449300	482269	482269	478330	478330
2040	538980	530548	530548	547373	547373
2045	550912	549133	549133	550912	550912
2050	550912	550060	550060	550912	550912



Technology Summary: Other Distributed Generation

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

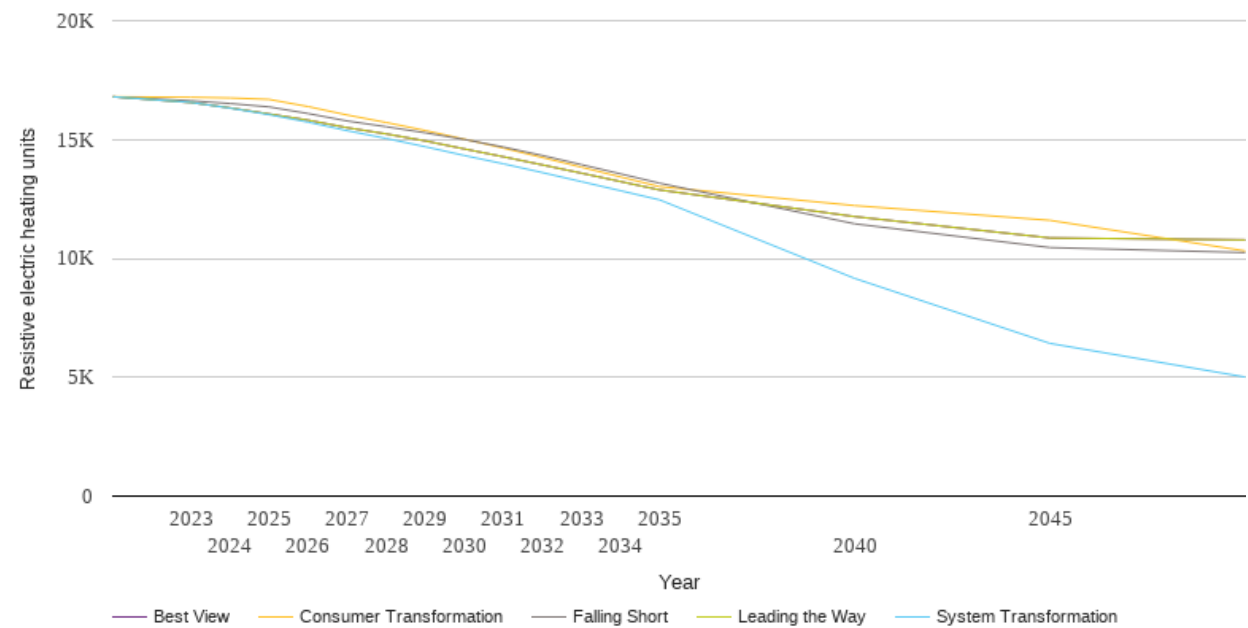
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	6.8	6.8	6.8	6.8	6.8
2023	7.0	7.0	7.0	7.0	7.0
2024	7.0	7.0	7.0	7.0	7.0
2025	7.0	7.0	7.0	7.0	7.0
2026	7.0	7.0	7.0	7.0	7.0
2027	10.0	7.0	7.0	7.0	10.0
2028	10.0	7.0	7.0	7.0	10.0
2029	10.0	7.0	7.0	0.9	10.0
2030	10.0	7.0	7.0	0.9	10.0
2031	10.0	7.0	7.0	0.9	10.0
2032	10.0	7.0	7.0	0.9	10.0
2033	10.0	7.0	7.0	0.9	10.0
2034	10.0	0.9	0.9	0.9	10.0
2035	10.0	0.9	0.9	0.8	10.0
2040	10.0	0.8	0.8	0.8	10.0
2045	10.0	0.8	0.8	0.8	10.0
2050	10.0	0.8	0.8	10.0	10.0



Technology Summary: Resistive electric heating

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

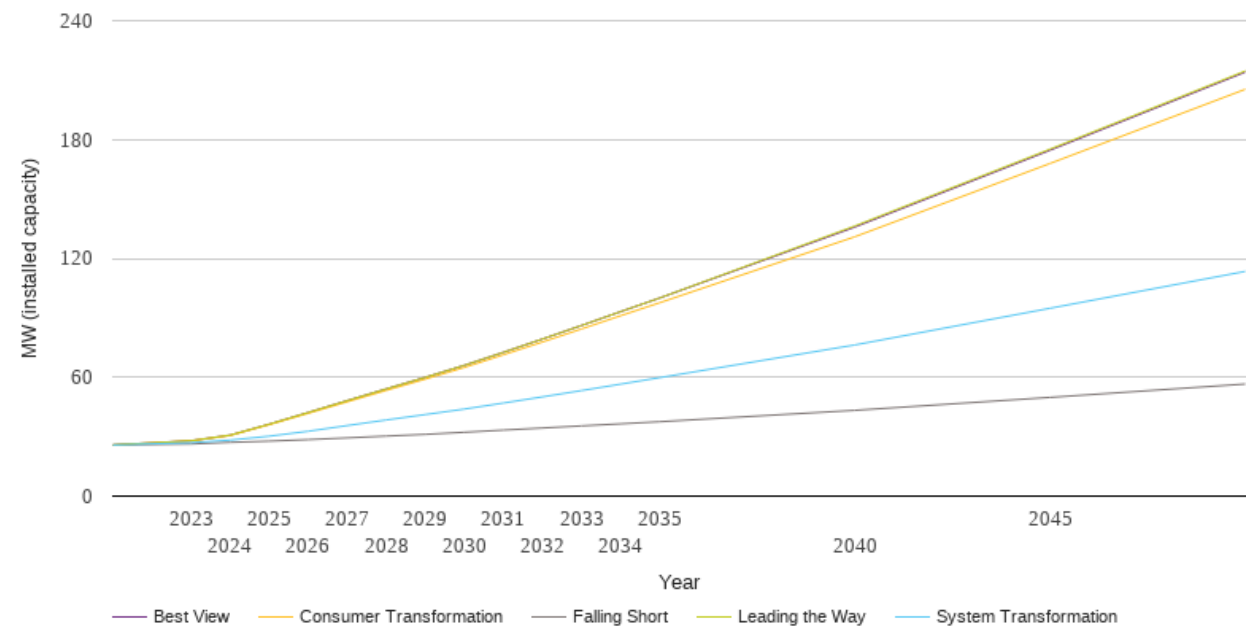
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	16799	16799	16799	16799	16799
2023	16629	16562	16778	16557	16557
2024	16515	16321	16750	16331	16331
2025	16373	16046	16687	16076	16076
2026	16093	15731	16386	15814	15814
2027	15781	15373	16032	15498	15498
2028	15539	15045	15716	15237	15237
2029	15284	14697	15379	14942	14942
2030	15004	14328	15016	14605	14605
2031	14685	13979	14639	14275	14275
2032	14329	13609	14243	13933	13933
2033	13944	13229	13836	13585	13585
2034	13557	12848	13427	13233	13233
2035	13165	12463	13019	12881	12881
2040	11454	9157	12221	11758	11758
2045	10455	6424	11601	10860	10860
2050	10244	5008	10313	10777	10777



Technology Summary: Solar Generation

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

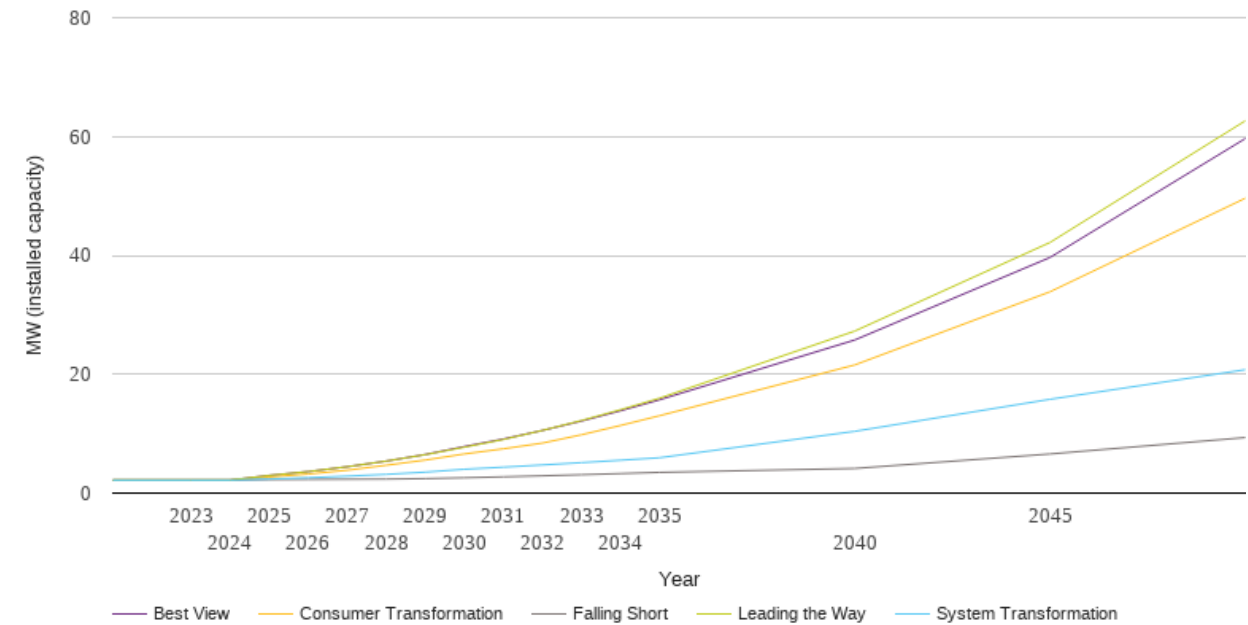
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	25.8	25.8	25.8	25.8	25.8
2023	26.3	27.0	27.9	27.9	27.9
2024	27.1	28.2	30.6	30.7	30.7
2025	27.7	30.2	36.0	36.3	36.3
2026	28.5	32.7	41.8	42.2	42.2
2027	29.4	35.6	47.6	48.2	48.2
2028	30.3	38.4	53.4	54.1	54.1
2029	31.2	41.2	59.1	59.9	59.9
2030	32.2	43.9	64.9	66.0	66.0
2031	33.3	47.0	71.3	72.6	72.6
2032	34.4	50.1	77.8	79.3	79.3
2033	35.4	53.3	84.4	86.1	86.1
2034	36.5	56.5	91.0	93.1	93.1
2035	37.5	59.8	97.6	100.0	100.0
2040	43.3	76.3	130.9	136.4	135.8
2045	49.8	94.8	167.9	175.1	174.6
2050	56.6	113.4	205.3	214.6	214.1



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	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	2.3	2.4	2.7	3.0	3.0
2026	2.3	2.6	3.2	3.6	3.6
2027	2.3	2.8	3.8	4.4	4.4
2028	2.4	3.1	4.7	5.4	5.4
2029	2.4	3.5	5.6	6.5	6.5
2030	2.6	4.0	6.6	7.7	7.8
2031	2.7	4.4	7.5	9.0	9.1
2032	2.9	4.7	8.4	10.5	10.5
2033	3.1	5.1	9.8	12.2	12.1
2034	3.3	5.5	11.4	14.0	13.9
2035	3.5	5.9	13.0	16.0	15.7
2040	4.1	10.4	21.6	27.3	25.8
2045	6.6	15.8	33.9	42.2	39.6
2050	9.3	20.8	49.6	62.6	59.7



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	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	0.0	0.0	0.0	0.0
2030	0.0	0.0	0.0	0.0	0.0
2031	0.0	0.0	0.0	0.0	0.0
2032	0.0	0.0	0.0	0.0	0.0
2033	0.0	0.0	0.0	0.0	0.0
2034	0.0	0.0	0.0	0.0	0.0
2035	0.0	0.0	0.0	0.0	0.0
2040	0.0	0.0	0.0	0.0	0.0
2045	0.0	0.0	0.0	0.0	0.0
2050	0.0	0.0	0.0	0.0	0.0



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))
National Grid Electricity Distribution (South Wales) Plc (company number 02366985))
(collectively, “NGED”)

nged.networkstrategy@nationalgrid.co.uk

