

Distribution Future Energy Scenarios 2022

Local Authority:
Swansea

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 Swansea covered by the NGED licence areas.



Scenario Summary

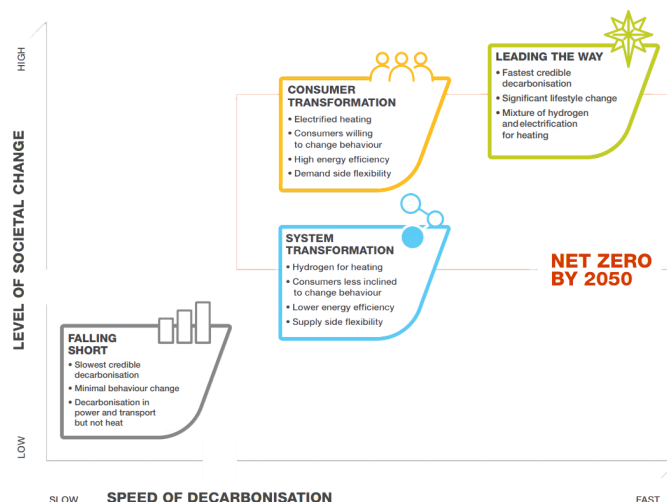
This DFES scenario framework includes three scenarios that are compliant with UK government targets of Net Zero greenhouse gas emissions by 2050. A summary of each scenario is below:

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 Swansea 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	657	1992	1674	1674	657	35363	18570	18567	657
Domestic	New dwellings	0	5359	5534	5534	5938	6377	6121	6121	5938
Electric vehicles	Electric vehicles	1369	2143 2	2652 0	4951 5	4936 9	15292 2	13738 2	13698 0	11023 7
EV Charge Point	EV charge points	959	9906	1440 3	2728 8	2990 0	86237	83816	84751	88260
Heat pumps	Heat pump installations	645	6030	5964	1762 5	2905 3	60351	69948	11651 2	10029 2
Hydrogen electrolysis	MW (installed capacity)	0.0	0.5	9.8	1.3	13.5	20.7	15.7	5.5	20.5
Non domestic	Floorspace (metres squared) of new I&C developments	0	5895 8	7623 4	7623 4	7654 8	14237 8	14237 8	14237 8	14237 8
Other Distributed Generation	MW (installed capacity)	6.6	3.8	3.8	3.8	3.7	0.7	0.0	2.9	0.0
Resistive electric heating	Resistive electric heating units	10665	9419	9062	9518	9255	6525	3179	6562	6877
Solar Generation	MW (installed capacity)	16.8	26.2	38.9	59.2	56.8	70.5	135.2	217.8	214.4
Storage	MW (installed capacity)	0.2	0.8	2.4	5.2	7.1	7.1	17.1	43.9	55.2
Wind	MW (installed capacity)	1.1	1.2	1.5	4.3	3.6	4.5	11.4	35.5	28.5

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

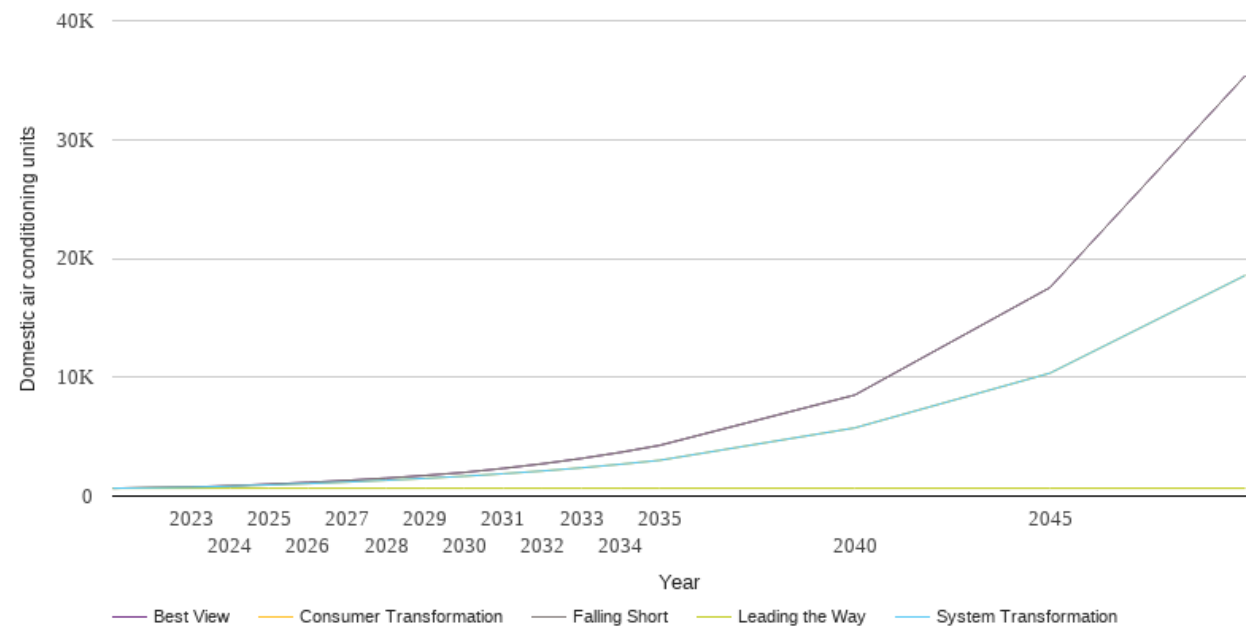
NGED is committed to continually improving the DFES process. To ensure the DFES projections fully capture local ambition, in 2022 we have appointed two DSO Strategic Engagement Officers to engage with local authorities. Any feedback will be incorporated into future Distribution Future Energy Scenarios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

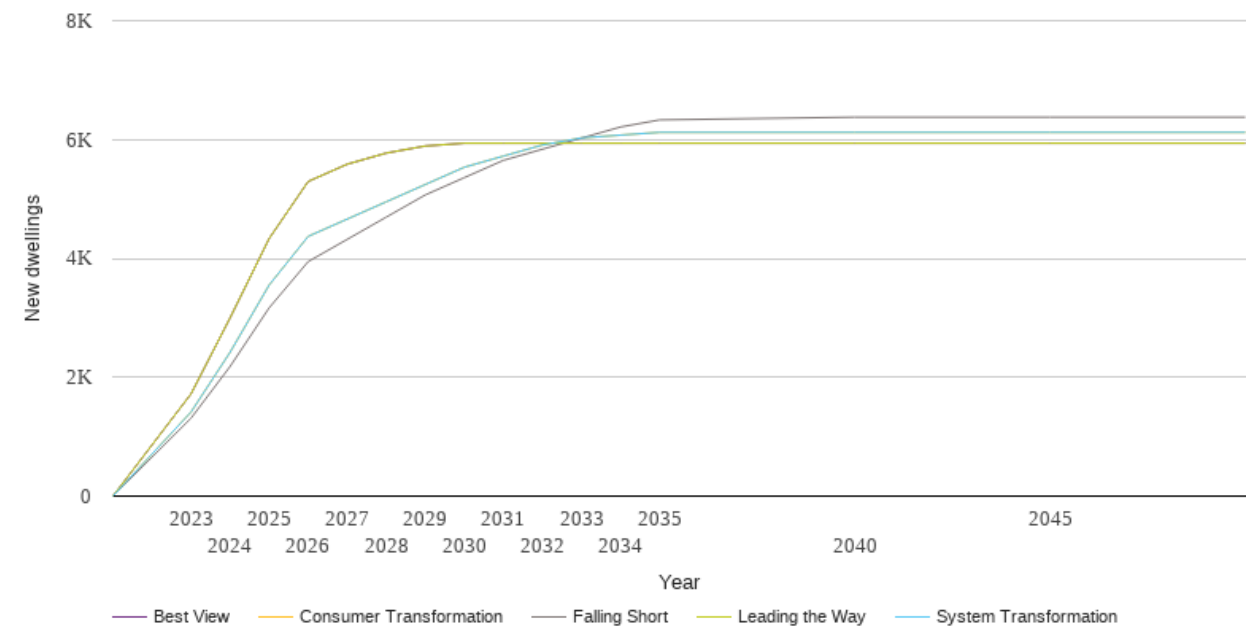
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	657	657	657	657	657
2023	755	744	744	657	755
2024	867	833	833	657	867
2025	997	938	938	657	997
2026	1146	1051	1051	657	1146
2027	1317	1180	1180	657	1317
2028	1509	1328	1328	657	1509
2029	1737	1491	1491	657	1737
2030	1992	1674	1674	657	1992
2031	2331	1882	1882	657	2331
2032	2719	2114	2114	657	2719
2033	3166	2378	2378	657	3166
2034	3679	2678	2678	657	3679
2035	4265	3010	3010	657	4265
2040	8502	5737	5737	657	8502
2045	17544	10344	10344	657	17544
2050	35363	18570	18567	657	35363



Technology Summary: Domestic

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

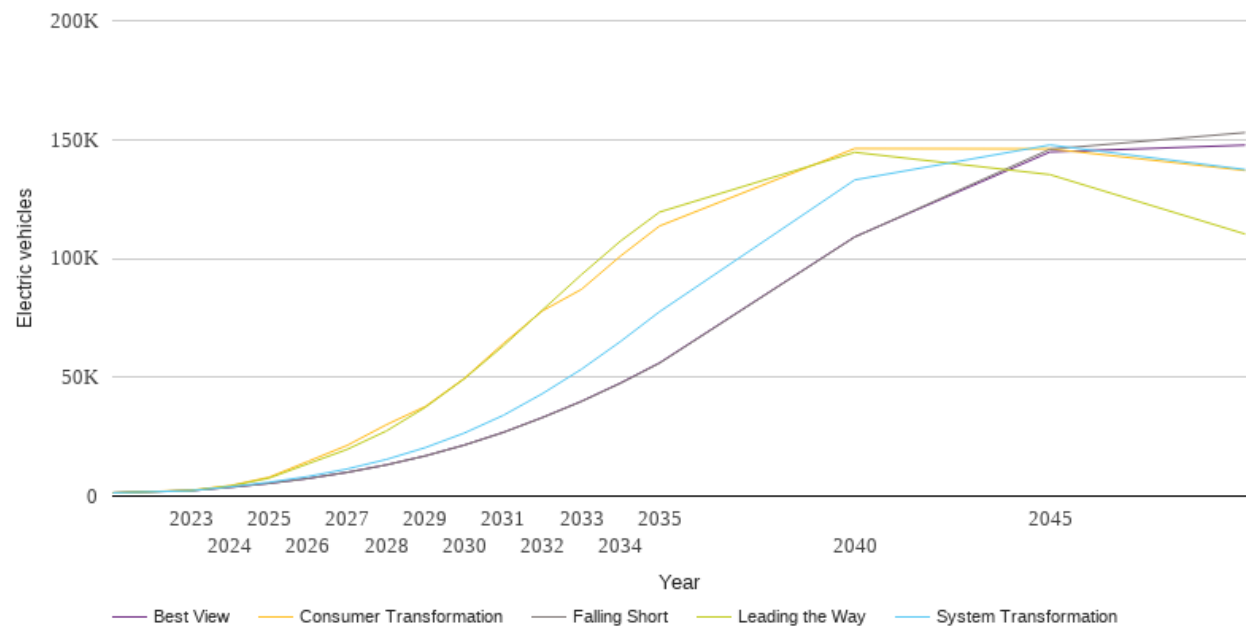
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	1311	1415	1415	1720	1720
2024	2181	2420	2420	2998	2998
2025	3167	3551	3551	4333	4333
2026	3946	4370	4370	5294	5294
2027	4320	4661	4661	5585	5585
2028	4694	4952	4952	5772	5772
2029	5068	5243	5243	5891	5891
2030	5359	5534	5534	5938	5938
2031	5650	5721	5721	5938	5938
2032	5837	5908	5908	5938	5938
2033	6024	6027	6027	5938	5938
2034	6211	6074	6074	5938	5938
2035	6330	6121	6121	5938	5938
2040	6377	6121	6121	5938	5938
2045	6377	6121	6121	5938	5938
2050	6377	6121	6121	5938	5938



Technology Summary: Electric vehicles

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

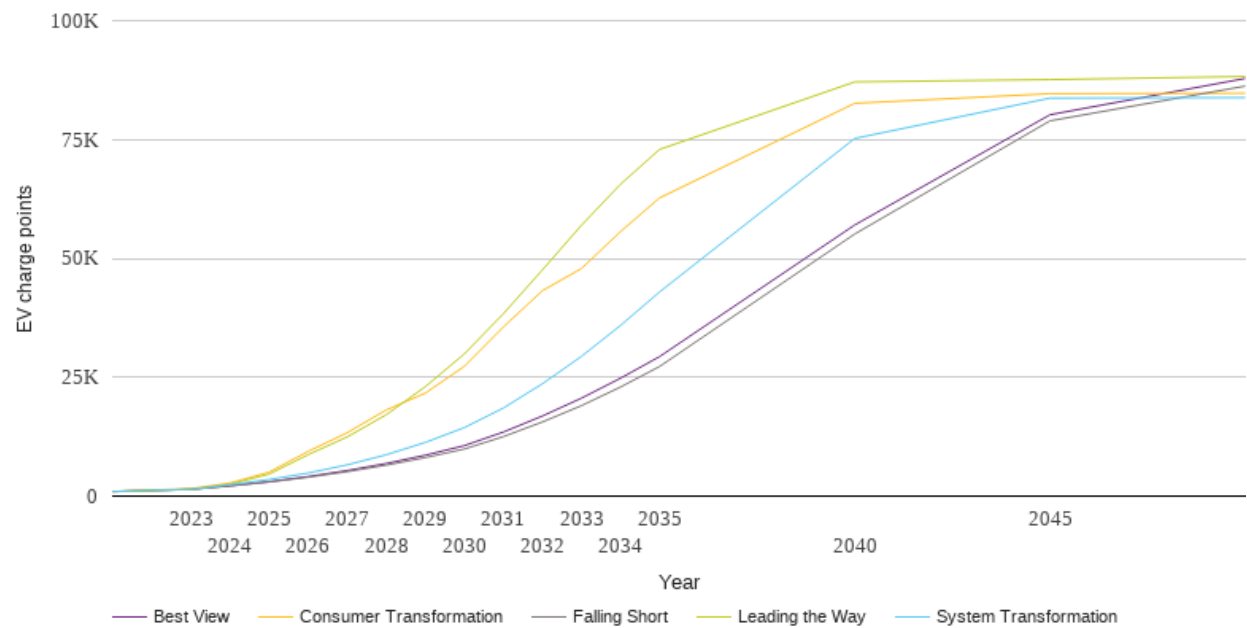
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1369	1369	1369	1369	1369
2023	2295	2273	2442	2358	2295
2024	3690	3922	4378	4225	3693
2025	5347	5821	7950	7567	5354
2026	7403	8265	14625	13627	7414
2027	9978	11423	21325	19664	9995
2028	13106	15401	30005	27372	13128
2029	16895	20392	37692	37323	16928
2030	21432	26520	49515	49369	21480
2031	26776	33988	64202	63235	26839
2032	32989	43098	77919	78247	33087
2033	39782	53373	86971	93174	39912
2034	47445	65030	100974	107286	47606
2035	55887	77570	113619	119477	56086
2040	108954	133006	146213	144623	109084
2045	145929	147715	146093	135234	144771
2050	152922	137382	136980	110237	147655



Technology Summary: EV Charge Point

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

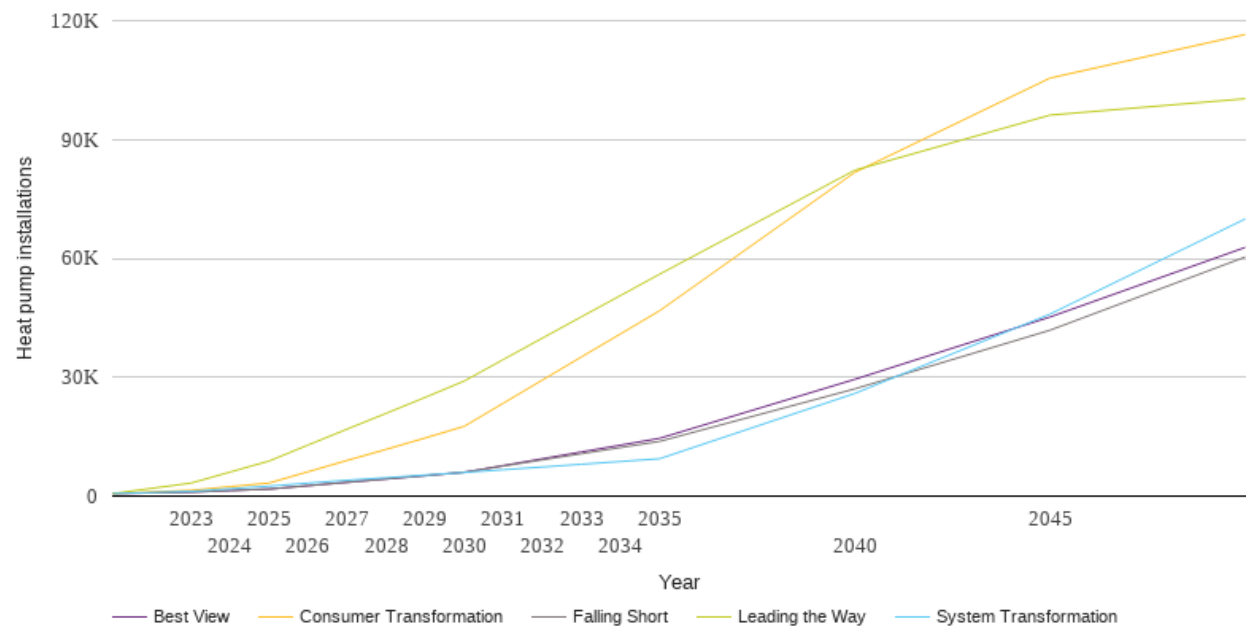
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	959	959	959	959	959
2023	1420	1426	1568	1427	1419
2024	2154	2415	2746	2512	2165
2025	2974	3486	5035	4625	3029
2026	3972	4848	9403	8714	4112
2027	5140	6569	13333	12451	5370
2028	6510	8691	18119	17111	6852
2029	8092	11290	21652	23011	8592
2030	9906	14403	27288	29900	10618
2031	12515	18527	35584	38354	13477
2032	15592	23630	43199	47577	16847
2033	19030	29387	47865	56975	20601
2034	22937	35884	55629	65606	24793
2035	27253	42935	62721	72918	29336
2040	55132	75231	82620	87122	57032
2045	78925	83710	84639	87606	80212
2050	86237	83816	84751	88260	87849



Technology Summary: Heat pumps

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

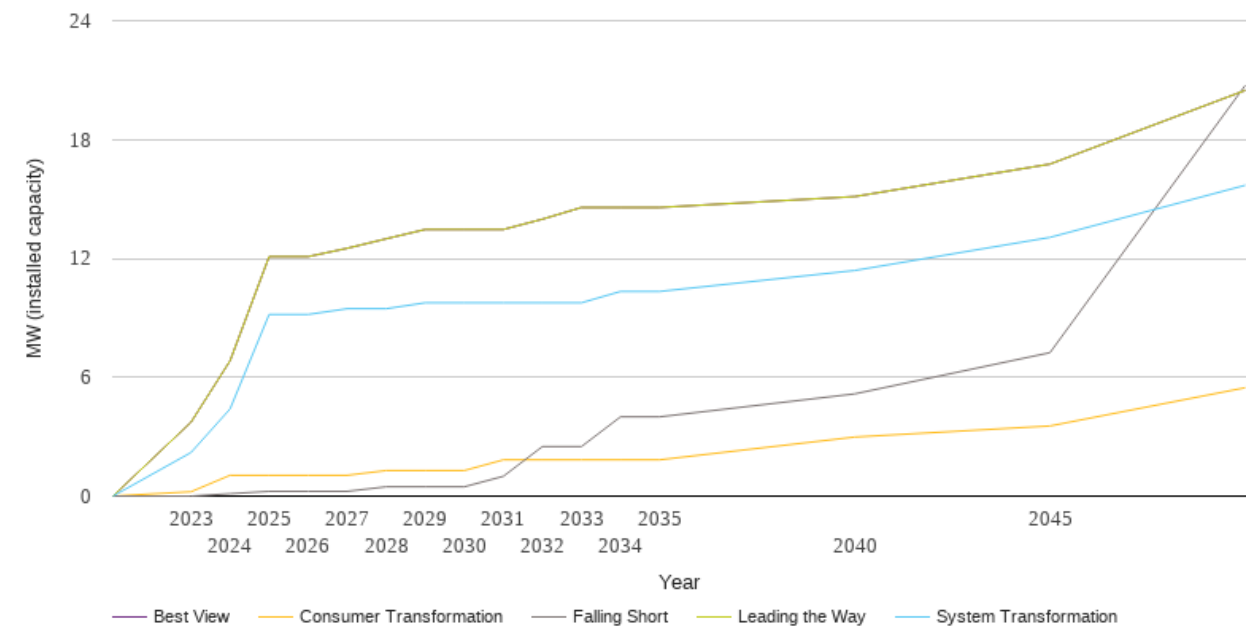
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	645	645	645	645	645
2023	1011	1188	1453	3284	1011
2024	1401	1857	2381	6067	1401
2025	1774	2500	3294	8855	1774
2026	2640	3285	6155	12894	2625
2027	3501	4003	9007	16922	3480
2028	4340	4653	11806	20895	4310
2029	5187	5309	14680	24933	5153
2030	6030	5964	17625	29053	6000
2031	7586	6654	23464	34475	7707
2032	9144	7343	29297	39876	9422
2033	10702	8037	35124	45264	11138
2034	12255	8732	40933	50622	12852
2035	13805	9430	46770	56002	14575
2040	27065	25908	81705	82251	29470
2045	41865	45931	105506	96162	45199
2050	60351	69948	116512	100292	62768



Technology Summary: Hydrogen electrolysis

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

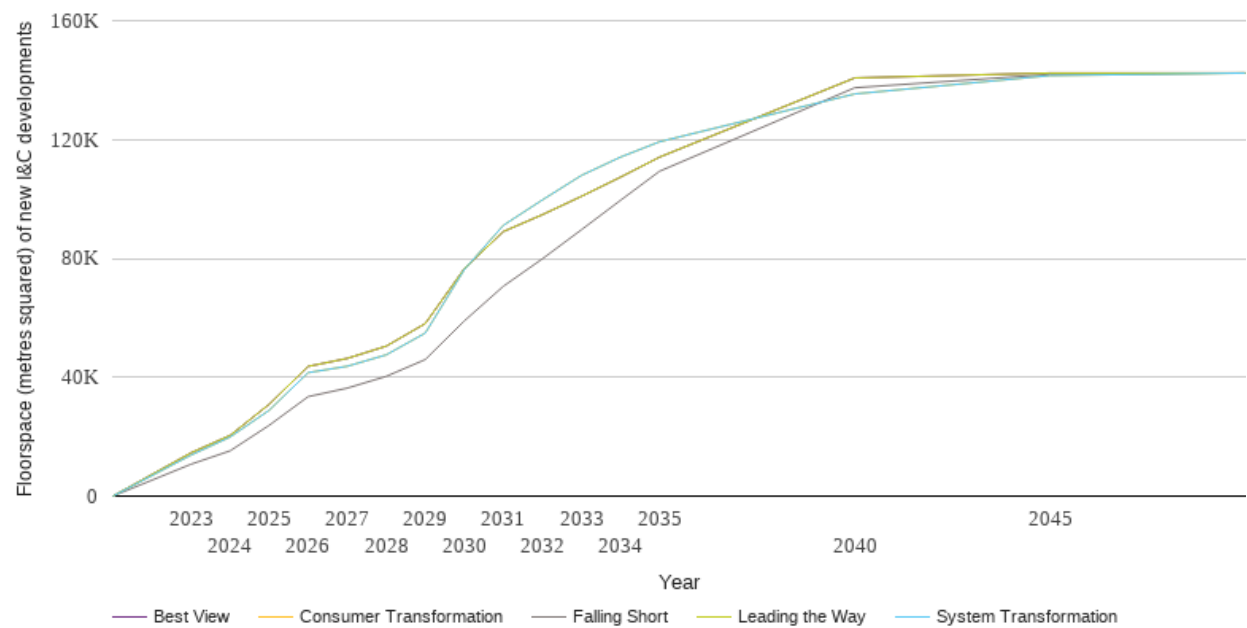
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	2.2	0.2	3.7	3.7
2024	0.1	4.4	1.0	6.8	6.8
2025	0.2	9.2	1.0	12.1	12.1
2026	0.2	9.2	1.0	12.1	12.1
2027	0.2	9.5	1.0	12.5	12.5
2028	0.5	9.5	1.3	13.0	13.0
2029	0.5	9.8	1.3	13.5	13.5
2030	0.5	9.8	1.3	13.5	13.5
2031	1.0	9.8	1.8	13.5	13.5
2032	2.5	9.8	1.8	14.0	14.0
2033	2.5	9.8	1.8	14.6	14.6
2034	4.0	10.3	1.8	14.6	14.6
2035	4.0	10.3	1.8	14.6	14.6
2040	5.2	11.4	3.0	15.1	15.1
2045	7.2	13.1	3.5	16.8	16.8
2050	20.7	15.7	5.5	20.5	20.5



Technology Summary: Non domestic

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

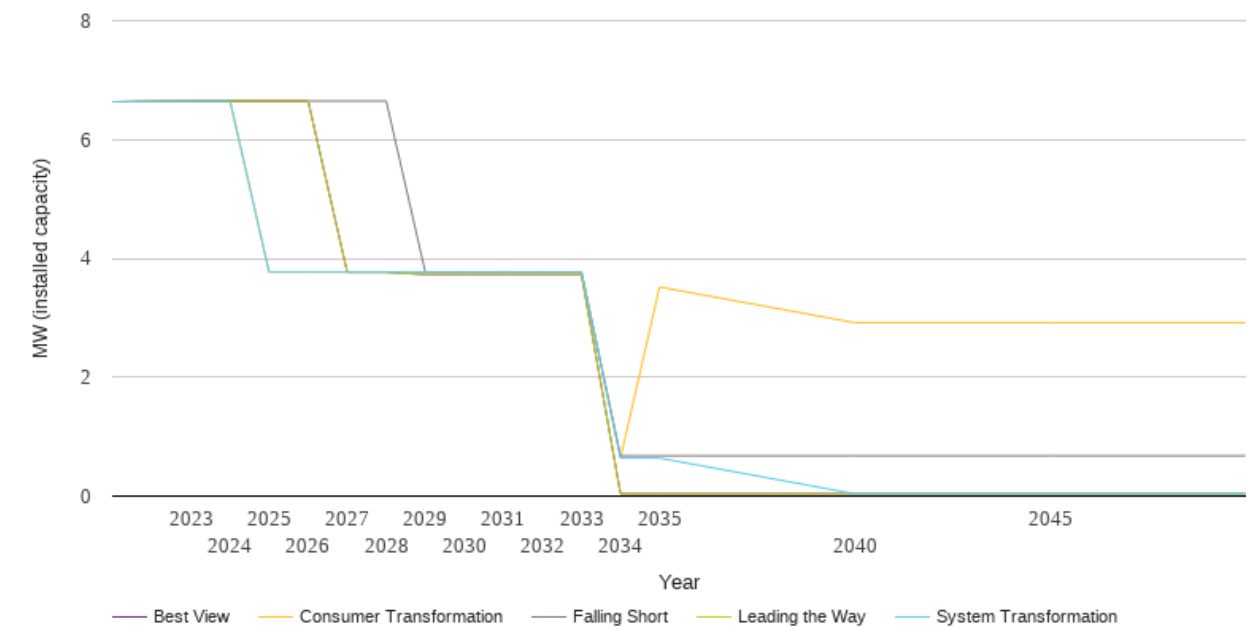
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	10733	13800	13800	14567	14567
2024	15222	19862	19862	20418	20418
2025	23805	28864	28864	30883	30883
2026	33468	41544	41544	43648	43648
2027	36331	43690	43690	46335	46335
2028	40294	47536	47536	50463	50463
2029	45957	54870	54870	58066	58066
2030	58958	76234	76234	76548	76548
2031	70624	91134	91134	89029	89029
2032	79853	99675	99675	94711	94711
2033	89644	107934	107934	100884	100884
2034	99538	114084	114084	107339	107339
2035	109324	119251	119251	114075	114075
2040	137428	135346	135346	140728	140728
2045	141928	141534	141534	142378	142378
2050	142378	142378	142378	142378	142378



Technology Summary: Other Distributed Generation

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

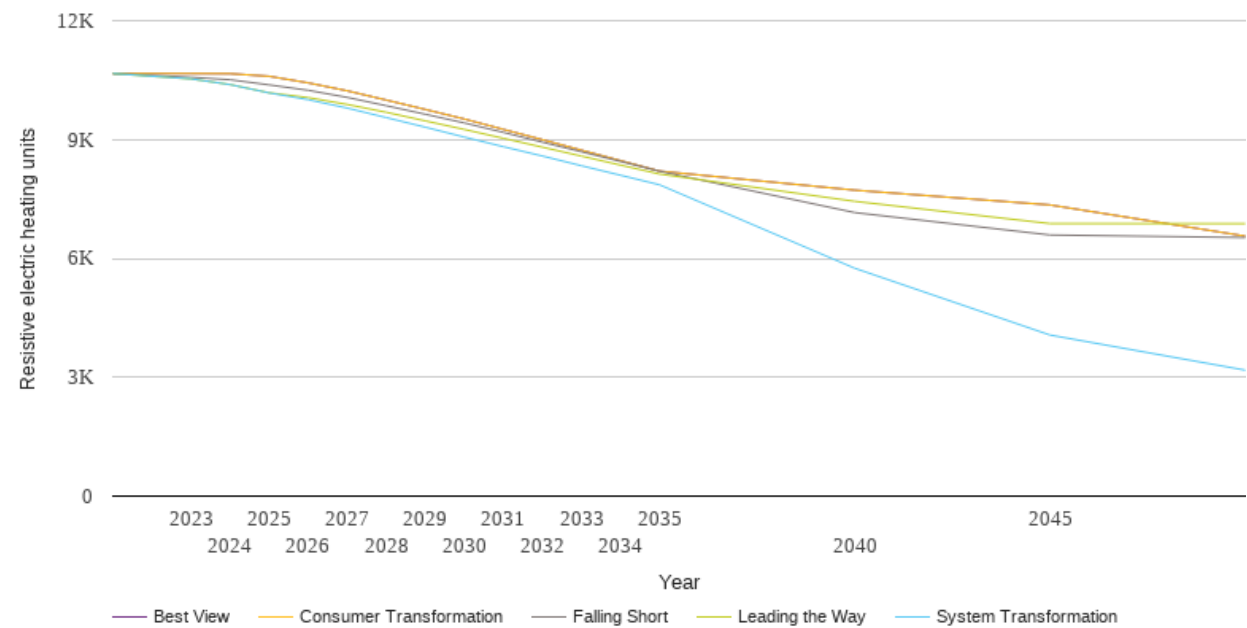
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	6.6	6.6	6.6	6.6	6.6
2023	6.6	6.6	6.6	6.6	6.6
2024	6.6	6.6	6.6	6.6	6.6
2025	6.6	3.8	3.8	6.6	6.6
2026	6.6	3.8	3.8	6.6	6.6
2027	6.6	3.8	3.8	3.8	3.8
2028	6.6	3.8	3.8	3.8	3.8
2029	3.8	3.8	3.8	3.7	3.7
2030	3.8	3.8	3.8	3.7	3.7
2031	3.8	3.8	3.8	3.7	3.7
2032	3.8	3.8	3.8	3.7	3.7
2033	3.8	3.8	3.8	3.7	3.7
2034	0.7	0.6	0.6	0.0	0.0
2035	0.7	0.6	3.5	0.0	0.0
2040	0.7	0.0	2.9	0.0	0.0
2045	0.7	0.0	2.9	0.0	0.0
2050	0.7	0.0	2.9	0.0	0.0



Technology Summary: Resistive electric heating

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

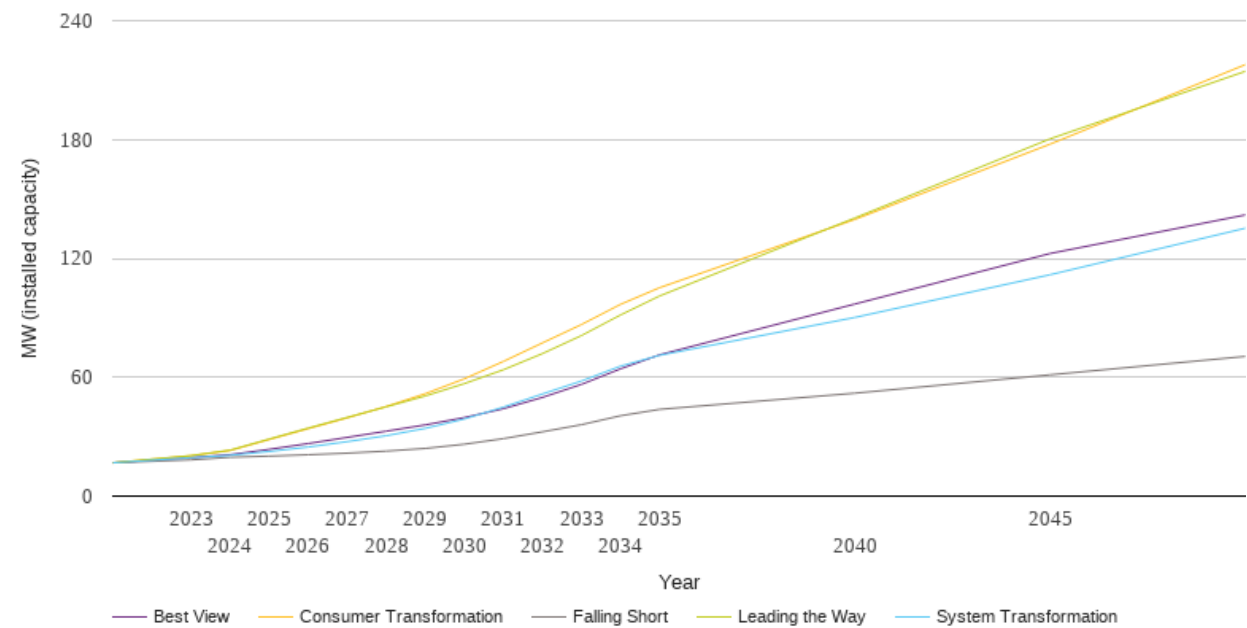
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	10665	10665	10665	10665	10665
2023	10571	10532	10666	10530	10666
2024	10510	10387	10663	10389	10663
2025	10380	10177	10597	10180	10597
2026	10243	10006	10431	10059	10431
2027	10064	9794	10230	9886	10230
2028	9854	9554	9997	9688	9997
2029	9639	9312	9760	9471	9760
2030	9419	9062	9518	9255	9518
2031	9180	8820	9256	9031	9256
2032	8933	8584	8996	8807	8996
2033	8691	8339	8731	8582	8731
2034	8447	8099	8468	8355	8468
2035	8199	7858	8203	8129	8203
2040	7156	5751	7722	7440	7722
2045	6591	4066	7349	6879	7349
2050	6525	3179	6562	6877	6562



Technology Summary: Solar Generation

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

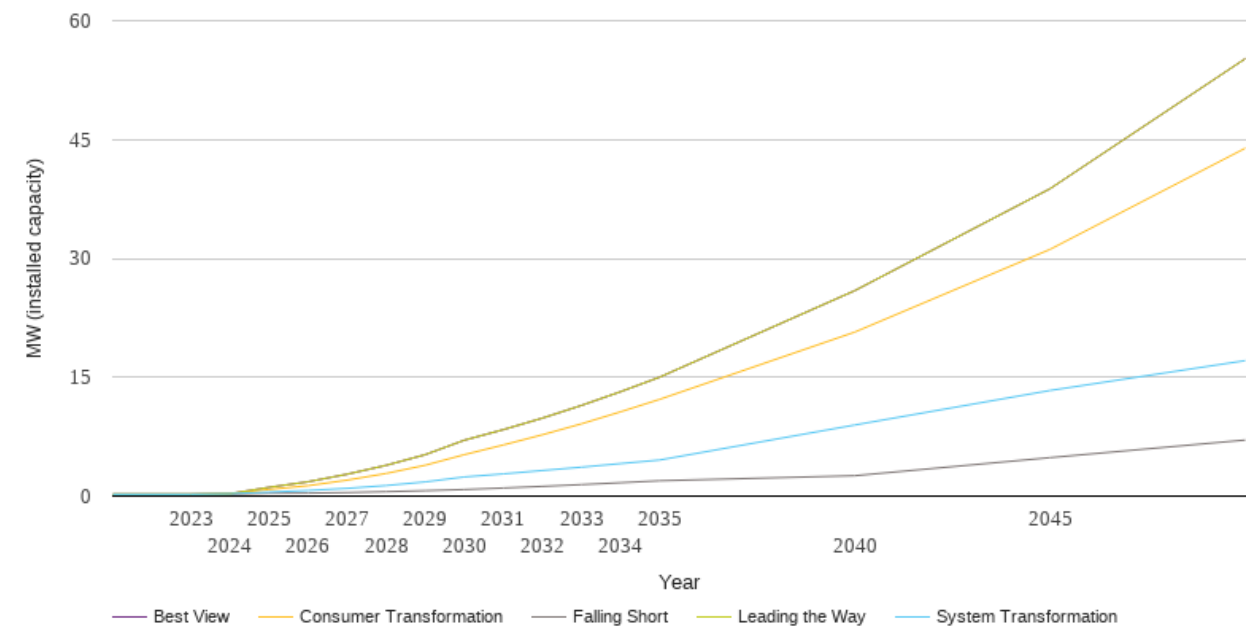
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	16.8	16.8	16.8	16.8	16.8
2023	18.3	19.4	20.3	20.4	19.5
2024	19.6	20.6	23.0	23.2	20.9
2025	20.2	22.5	28.5	28.8	23.6
2026	20.9	24.8	34.0	34.3	26.5
2027	21.7	27.5	39.5	39.7	29.6
2028	22.7	30.5	45.2	45.1	32.8
2029	24.1	34.2	51.7	50.5	35.9
2030	26.2	38.9	59.2	56.8	39.6
2031	29.0	44.9	68.0	63.8	44.1
2032	32.4	51.6	77.3	71.9	49.8
2033	36.1	58.1	86.6	81.0	56.4
2034	40.6	65.6	96.8	91.4	64.2
2035	43.8	71.1	105.2	101.0	71.3
2040	51.9	90.2	139.6	140.4	96.9
2045	61.2	111.7	177.6	180.3	122.4
2050	70.5	135.2	217.8	214.4	141.9



Technology Summary: Storage

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

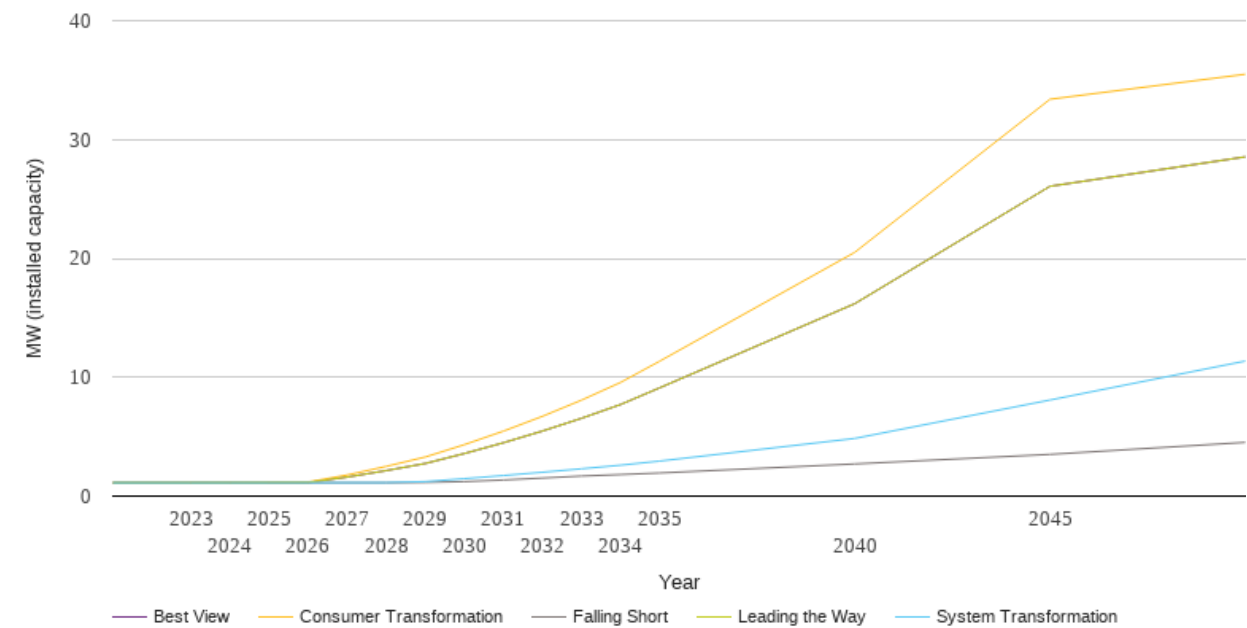
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.2	0.2	0.2	0.2	0.2
2023	0.2	0.2	0.2	0.2	0.2
2024	0.2	0.3	0.3	0.3	0.3
2025	0.4	0.5	0.8	1.1	1.1
2026	0.4	0.7	1.3	1.8	1.8
2027	0.4	1.0	2.0	2.8	2.8
2028	0.6	1.3	2.9	3.9	3.9
2029	0.7	1.8	3.9	5.2	5.2
2030	0.8	2.4	5.2	7.1	7.1
2031	1.0	2.8	6.5	8.4	8.4
2032	1.2	3.2	7.7	9.8	9.8
2033	1.4	3.6	9.1	11.4	11.4
2034	1.7	4.1	10.6	13.2	13.2
2035	1.9	4.6	12.2	15.0	15.0
2040	2.6	9.0	20.7	25.9	25.9
2045	4.9	13.3	31.1	38.8	38.8
2050	7.1	17.1	43.9	55.2	55.2



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	1.1	1.1	1.1	1.1	1.1
2023	1.1	1.1	1.1	1.1	1.1
2024	1.1	1.1	1.1	1.1	1.1
2025	1.1	1.1	1.2	1.1	1.1
2026	1.1	1.1	1.2	1.1	1.1
2027	1.1	1.1	1.8	1.6	1.6
2028	1.1	1.1	2.5	2.1	2.1
2029	1.2	1.2	3.3	2.7	2.7
2030	1.2	1.5	4.3	3.6	3.6
2031	1.4	1.7	5.5	4.5	4.5
2032	1.5	2.0	6.7	5.5	5.5
2033	1.7	2.3	8.1	6.5	6.5
2034	1.8	2.6	9.6	7.7	7.7
2035	1.9	2.9	11.3	9.1	9.1
2040	2.7	4.9	20.5	16.2	16.2
2045	3.5	8.1	33.4	26.1	26.1
2050	4.5	11.4	35.5	28.5	28.5



National Grid Electricity Distribution PLC 09223384)
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