

Distribution Future Energy Scenarios 2022

Local Authority:
South Gloucestershire

What are Distribution Future Energy Scenarios?

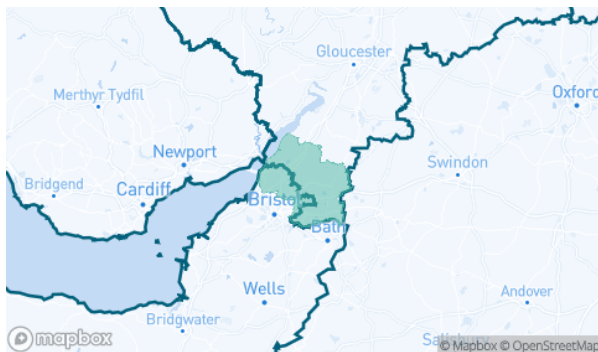
National Grid run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network.

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 Gloucestershire 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 Gloucestershire 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	464	1935	1500	1500	464	63480	31264	31264	464
Domestic	New dwellings	0	7079	7672	7672	8992	12117	11923	11923	11793
Electric vehicles	Electric vehicles	3287	27783	33346	61738	61366	188401	164400	167361	135175
EV Charge Point	EV charge points	1926	13454	18905	35652	39079	109549	101968	105991	109347
Heat pumps	Heat pump installations	1081	8098	8164	20890	32194	63367	73194	127682	114493
Hydrogen electrolysis	MW (installed capacity)	0.0	0.2	7.9	1.7	11.4	3.2	23.7	15.1	35.0
Non domestic	Floorspace (metres squared) of new I&C developments	0	484620	583579	583579	620163	1158781	1157957	1157957	1158781
Other Distributed Generation	MW (installed capacity)	28.4	21.4	10.9	10.9	10.0	3.3	6.9	6.9	9.7
Resistive electric heating	Resistive electric heating units	15971	13866	13278	13910	13511	10589	5135	10168	10708
Solar Generation	MW (installed capacity)	29.9	42.8	60.3	85.8	96.4	111.5	209.1	310.6	325.7
Storage	MW (installed capacity)	0.1	0.7	3.0	6.7	9.5	9.3	23.2	59.5	76.9
Wind	MW (installed capacity)	1.5	1.6	1.7	3.1	2.7	2.9	6.7	18.3	15.2

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.

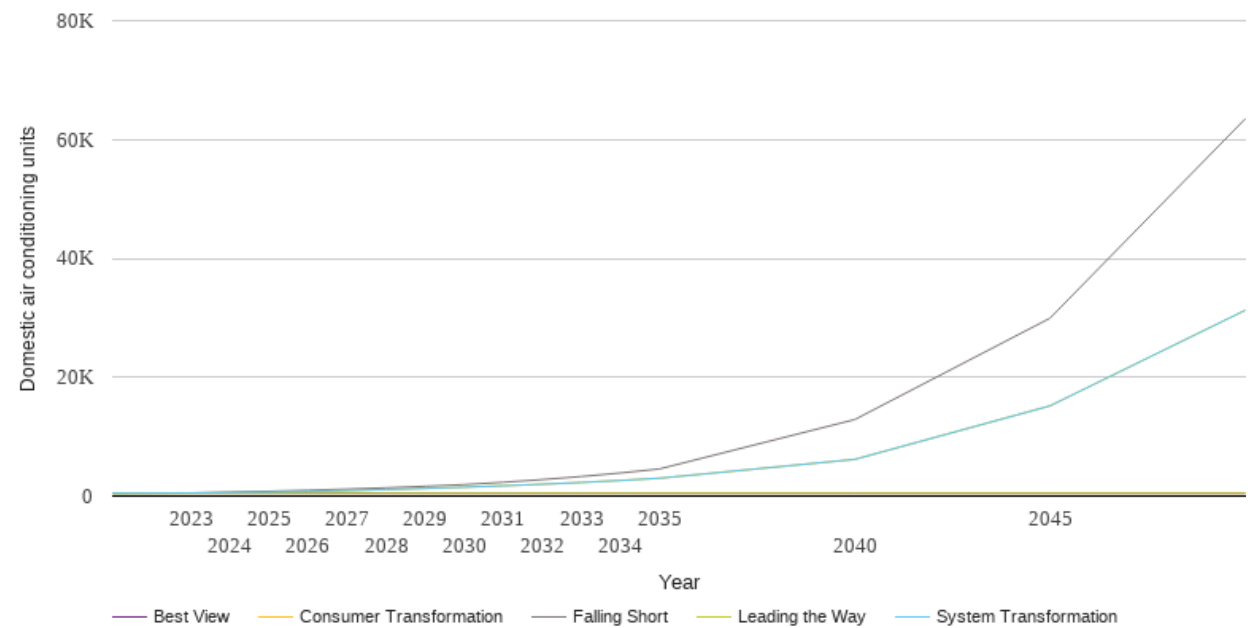
If you have any comments or queries regarding these reports, please contact

nged.energyplanning@nationalgrid.co.uk.

Technology Summary: Air conditioning

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

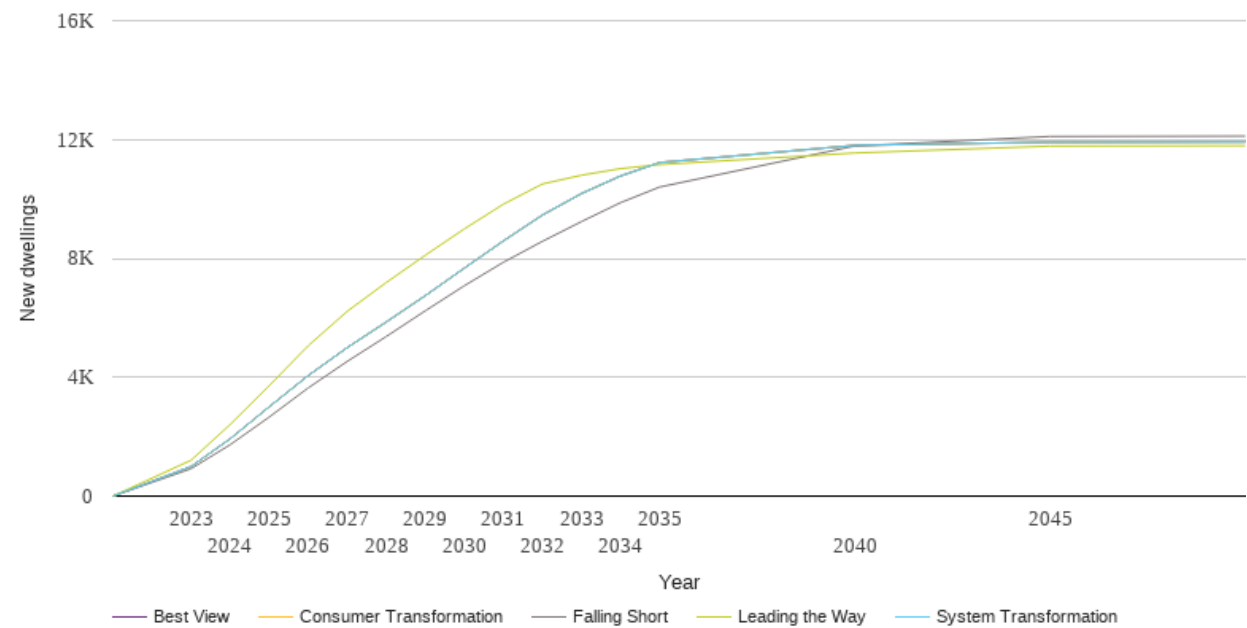
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	464	464	464	464	464
2023	534	526	526	464	464
2024	660	590	590	464	464
2025	808	664	664	464	464
2026	977	793	793	464	464
2027	1172	940	940	464	464
2028	1391	1107	1107	464	464
2029	1646	1293	1293	464	464
2030	1935	1500	1500	464	464
2031	2328	1734	1734	464	464
2032	2779	1998	1998	464	464
2033	3298	2295	2295	464	464
2034	3892	2633	2633	464	464
2035	4573	3004	3004	464	464
2040	12877	6177	6177	464	464
2045	29929	15186	15186	464	464
2050	63480	31264	31264	464	464



Technology Summary: Domestic

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

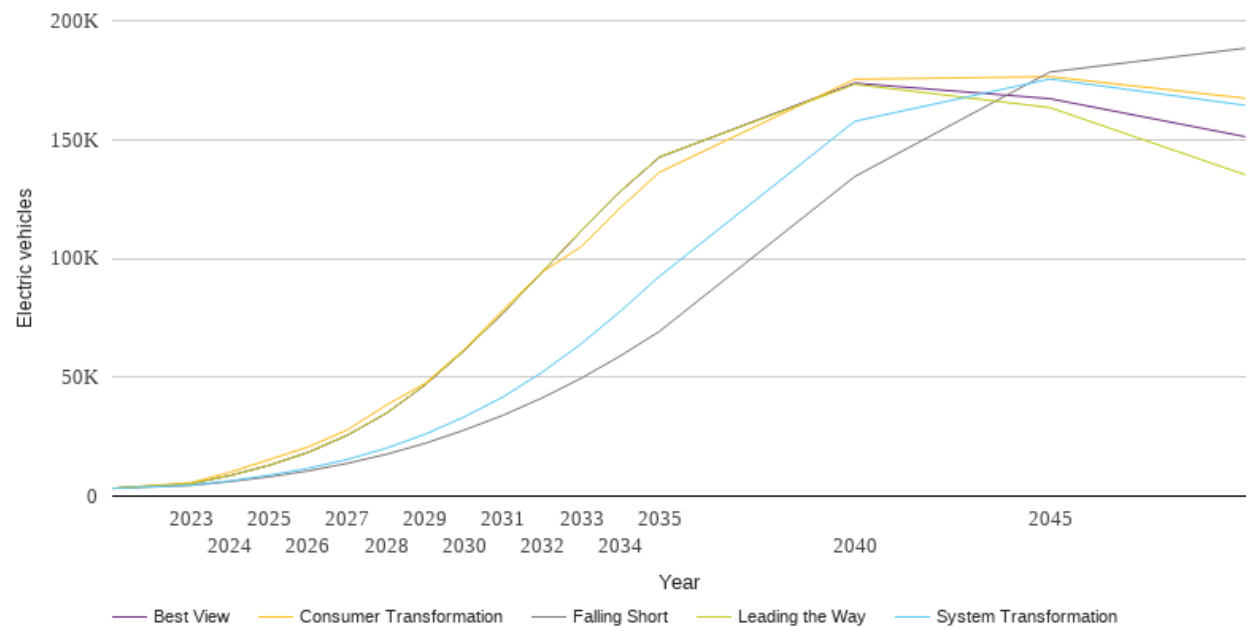
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	923	994	994	1207	994
2024	1727	1927	1927	2407	1927
2025	2658	3003	3003	3713	3003
2026	3638	4055	4055	5057	4055
2027	4532	4996	4996	6218	4996
2028	5370	5858	5858	7187	5858
2029	6235	6745	6745	8106	6745
2030	7079	7672	7672	8992	7672
2031	7868	8587	8587	9824	8587
2032	8574	9459	9459	10505	9459
2033	9239	10182	10182	10799	10182
2034	9875	10773	10773	11021	10773
2035	10400	11225	11225	11157	11225
2040	11783	11804	11804	11547	11804
2045	12104	11910	11910	11780	11910
2050	12117	11923	11923	11793	11923



Technology Summary: Electric vehicles

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

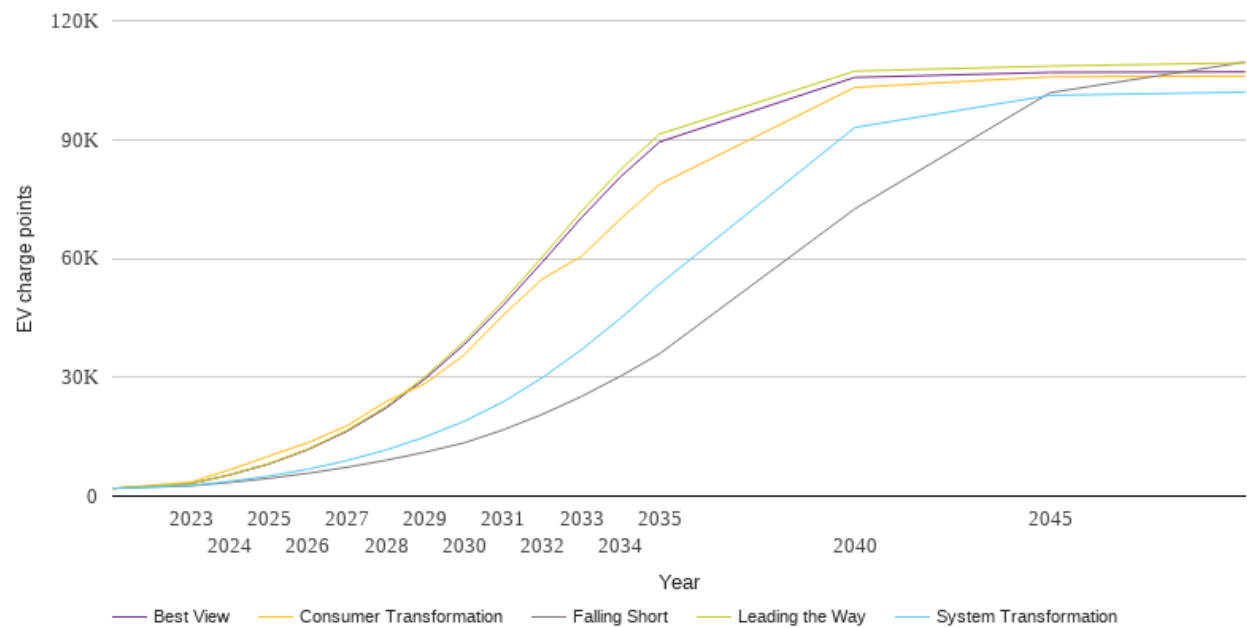
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	3287	3287	3287	3287	3287
2023	4511	4618	5621	5262	5262
2024	6100	6424	10045	8648	8648
2025	8103	8759	15333	12953	12953
2026	10604	11645	20681	18402	18397
2027	13757	15411	27812	25622	25584
2028	17579	20136	38235	34882	34831
2029	22221	26055	47489	46852	46779
2030	27783	33346	61738	61366	61267
2031	34052	41803	78520	77229	77097
2032	41356	52148	94293	94461	94319
2033	49642	64156	104995	111841	111693
2034	58999	77808	121382	128365	128224
2035	69317	92486	136248	142707	142589
2040	134436	157679	175362	173224	173732
2045	178395	175434	176434	163425	167183
2050	188401	164400	167361	135175	151212



Technology Summary: EV Charge Point

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

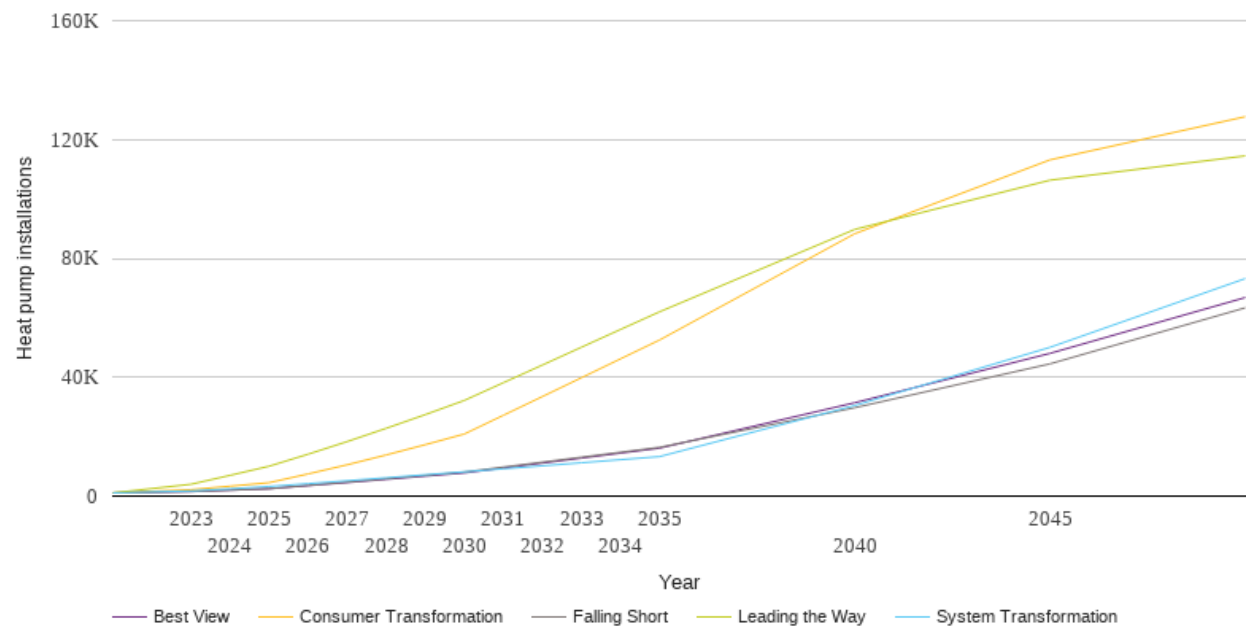
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1926	1926	1926	1926	1926
2023	2587	2684	3539	3155	3149
2024	3434	3730	6661	5402	5375
2025	4492	5071	10131	8200	8124
2026	5762	6792	13499	11893	11746
2027	7275	8975	17771	16644	16406
2028	9054	11665	23914	22633	22264
2029	11101	14946	28428	30207	29654
2030	13454	18905	35652	39079	38263
2031	16745	23822	45648	49275	48209
2032	20643	29899	54833	60401	59062
2033	25144	36942	60502	71882	70265
2034	30261	44867	69976	82425	80582
2035	35923	53484	78650	91360	89390
2040	72492	93027	103151	107259	105682
2045	101814	101151	105832	108549	106939
2050	109549	101968	105991	109347	107073



Technology Summary: Heat pumps

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

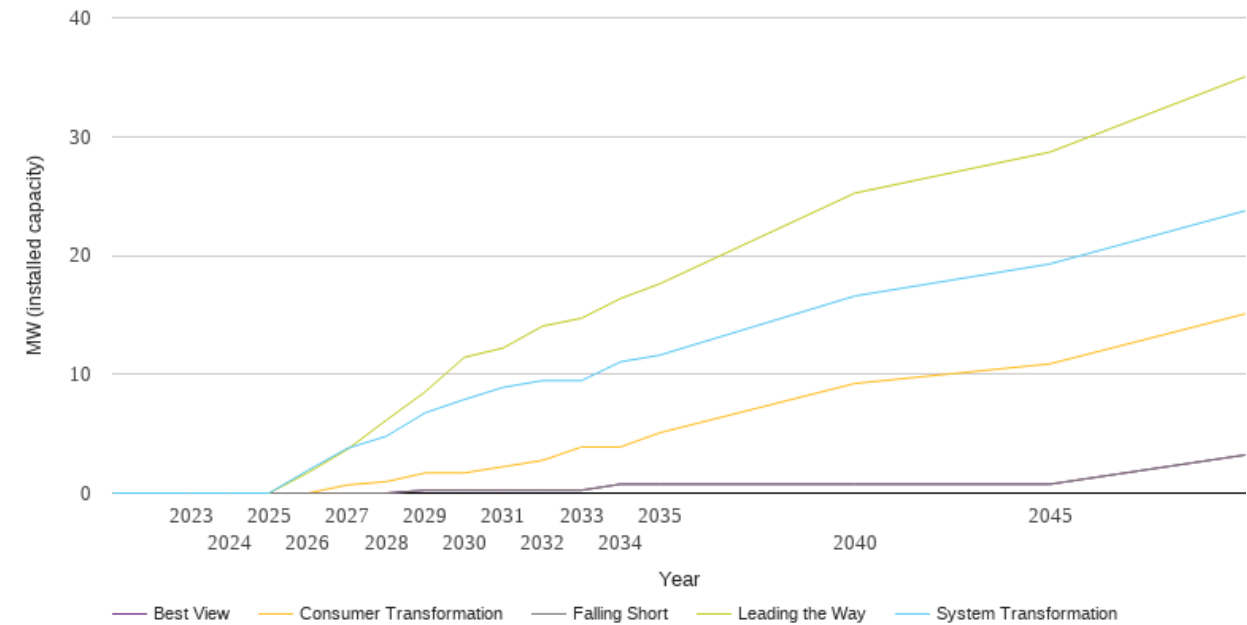
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	1081	1081	1081	1081	1081
2023	1535	1734	2165	3984	1535
2024	2009	2452	3321	6978	2009
2025	2490	3230	4520	10058	2490
2026	3596	4193	7465	14103	3529
2027	4711	5159	10537	18348	4580
2028	5837	6169	13852	22811	5647
2029	6972	7182	17305	27423	6725
2030	8098	8164	20890	32194	7800
2031	9764	9174	27193	38159	9455
2032	11423	10184	33503	44109	11116
2033	13085	11218	39840	50105	12788
2034	14751	12250	46190	56079	14466
2035	16407	13293	52526	62020	16135
2040	29744	30491	88311	89757	31428
2045	44504	50062	113160	106305	48031
2050	63367	73194	127682	114493	66815



Technology Summary: Hydrogen electrolysis

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

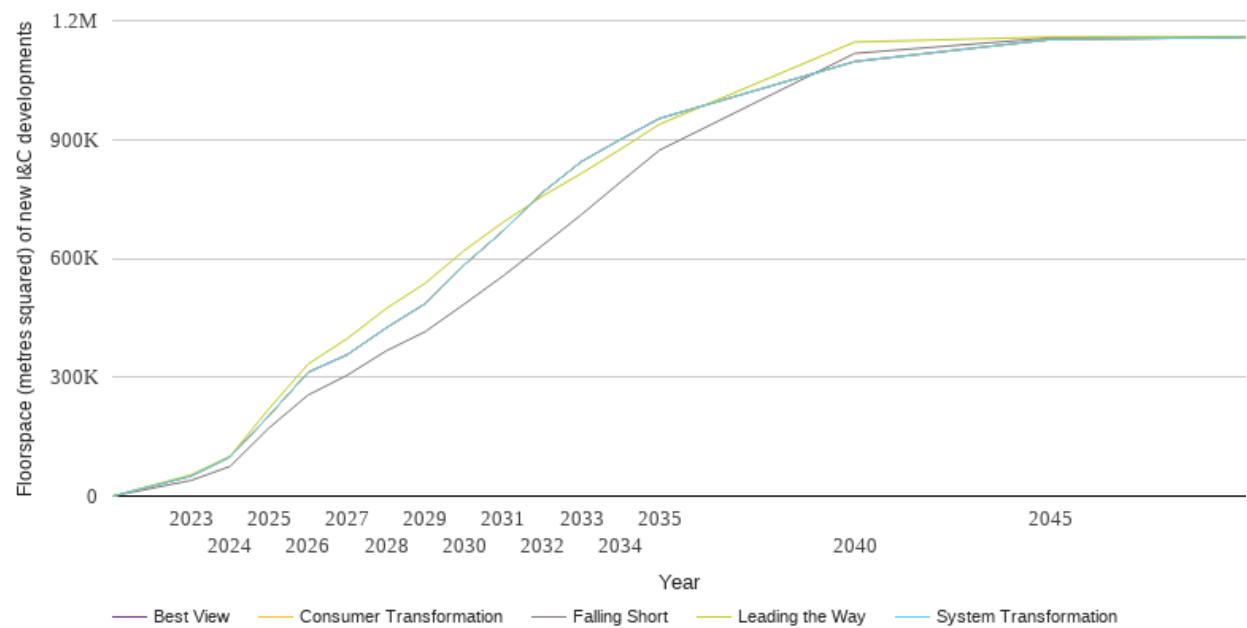
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	1.9	0.0	1.7	0.0
2027	0.0	3.8	0.7	3.7	0.0
2028	0.0	4.8	1.0	6.1	0.0
2029	0.2	6.8	1.7	8.5	0.2
2030	0.2	7.9	1.7	11.4	0.2
2031	0.2	8.9	2.2	12.2	0.2
2032	0.2	9.5	2.8	14.0	0.2
2033	0.2	9.5	3.9	14.7	0.2
2034	0.8	11.0	3.9	16.4	0.8
2035	0.8	11.6	5.1	17.6	0.8
2040	0.8	16.6	9.2	25.2	0.8
2045	0.8	19.3	10.9	28.7	0.8
2050	3.2	23.7	15.1	35.0	3.2



Technology Summary: Non domestic

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

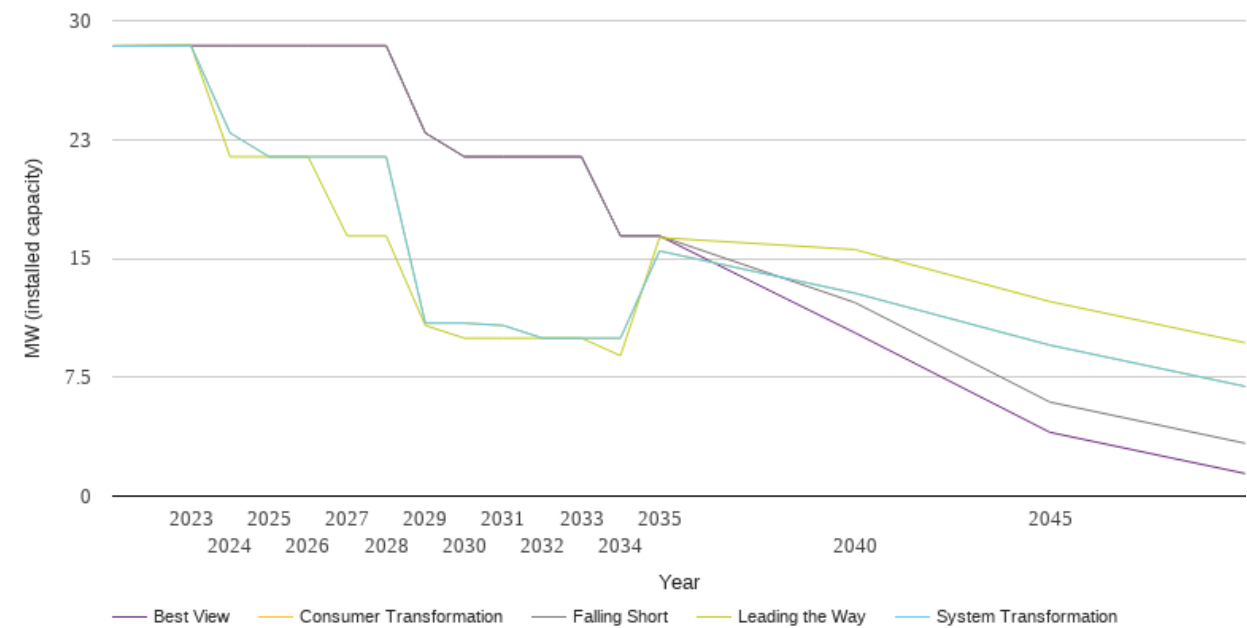
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	39622	50413	50413	53626	50413
2024	74887	98923	98923	100458	98923
2025	172225	203113	203113	220838	203113
2026	255115	312571	312571	333304	312571
2027	305063	356755	356755	397481	356755
2028	366452	424585	424585	473457	424585
2029	415167	485794	485794	537420	485794
2030	484620	583579	583579	620163	583579
2031	556217	669998	669998	691524	669998
2032	632679	766271	766271	756965	766271
2033	710576	844420	844420	814751	844420
2034	792767	900163	900163	875526	900163
2035	873221	953125	953125	938488	953125
2040	1117457	1096901	1096901	1146128	1096901
2045	1156377	1152306	1152306	1158781	1152306
2050	1158781	1157957	1157957	1158781	1157957



Technology Summary: Other Distributed Generation

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

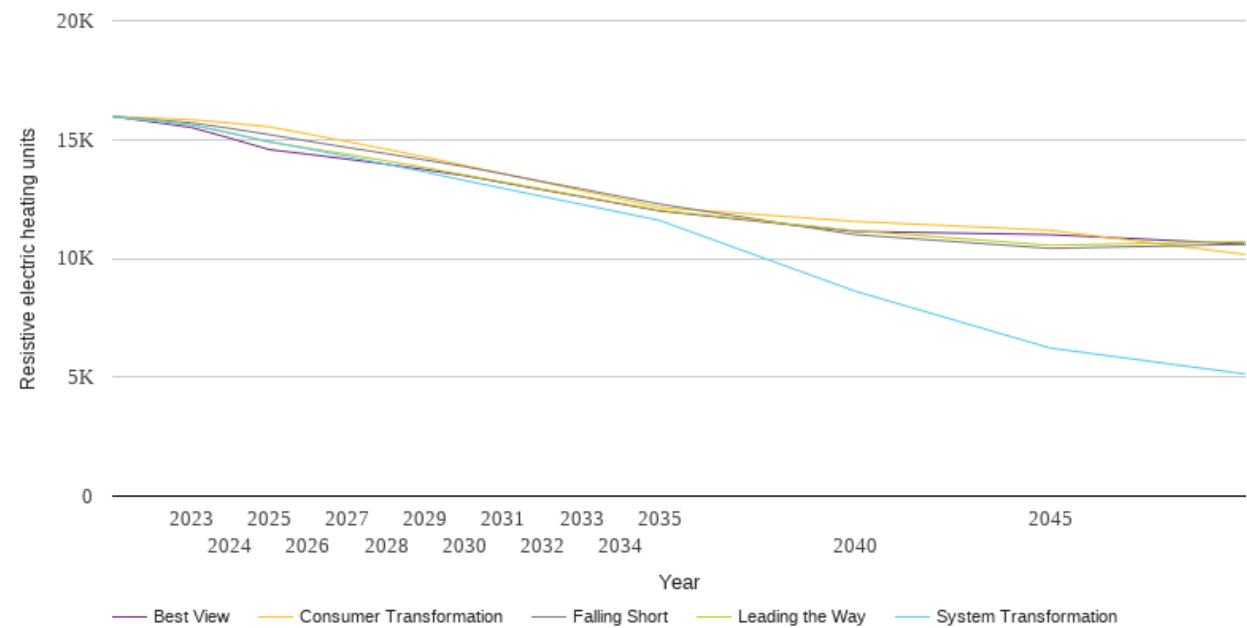
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	28.4	28.4	28.4	28.4	28.4
2023	28.4	28.4	28.4	28.4	28.4
2024	28.4	22.9	22.9	21.4	28.4
2025	28.4	21.4	21.4	21.4	28.4
2026	28.4	21.4	21.4	21.4	28.4
2027	28.4	21.4	21.4	16.4	28.4
2028	28.4	21.4	21.4	16.4	28.4
2029	22.9	10.9	10.9	10.8	22.9
2030	21.4	10.9	10.9	10.0	21.4
2031	21.4	10.8	10.8	10.0	21.4
2032	21.4	10.0	10.0	10.0	21.4
2033	21.4	10.0	10.0	10.0	21.4
2034	16.4	10.0	10.0	8.9	16.4
2035	16.4	15.5	15.5	16.3	16.4
2040	12.2	12.8	12.8	15.6	10.3
2045	5.9	9.5	9.5	12.3	4.0
2050	3.3	6.9	6.9	9.7	1.4



Technology Summary: Resistive electric heating

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

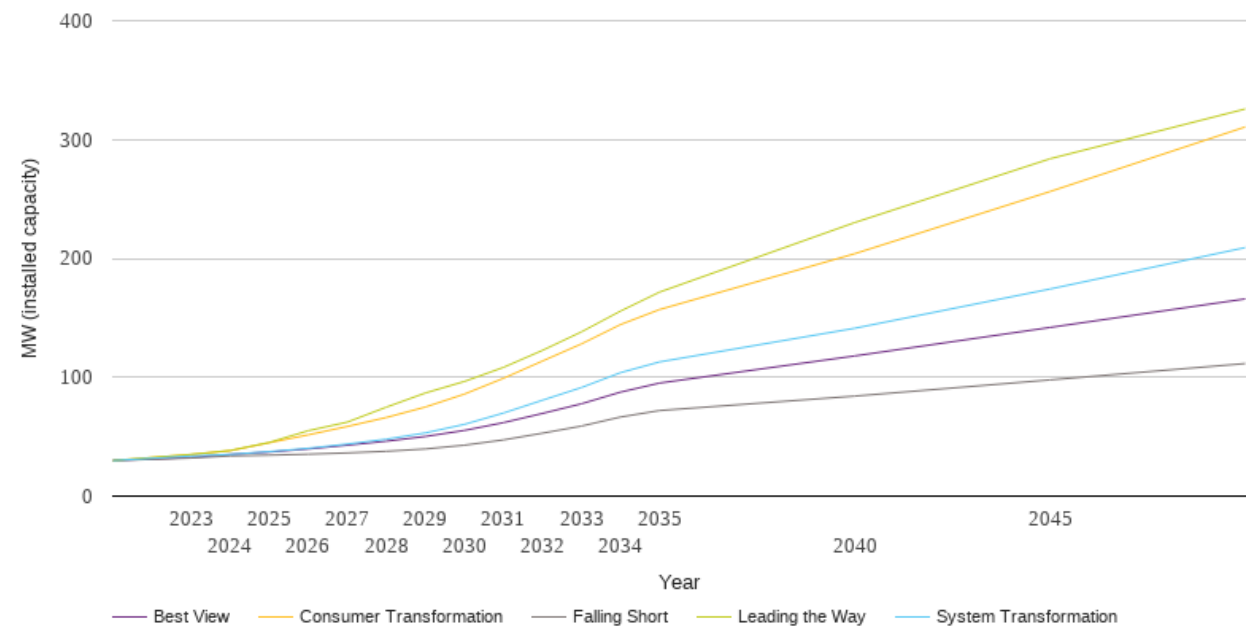
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	15971	15971	15971	15971	15971
2023	15706	15629	15838	15612	15511
2024	15468	15280	15697	15264	15056
2025	15207	14916	15533	14893	14578
2026	14933	14604	15232	14638	14381
2027	14665	14288	14913	14381	14176
2028	14408	13967	14595	14105	13961
2029	14139	13629	14261	13816	13729
2030	13866	13278	13910	13511	13485
2031	13553	12945	13561	13214	13184
2032	13232	12605	13207	12914	12888
2033	12922	12274	12852	12623	12597
2034	12601	11935	12499	12323	12298
2035	12284	11597	12142	12025	11999
2040	11001	8626	11555	11164	11137
2045	10423	6229	11184	10551	10999
2050	10589	5135	10168	10708	10603



Technology Summary: Solar Generation

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

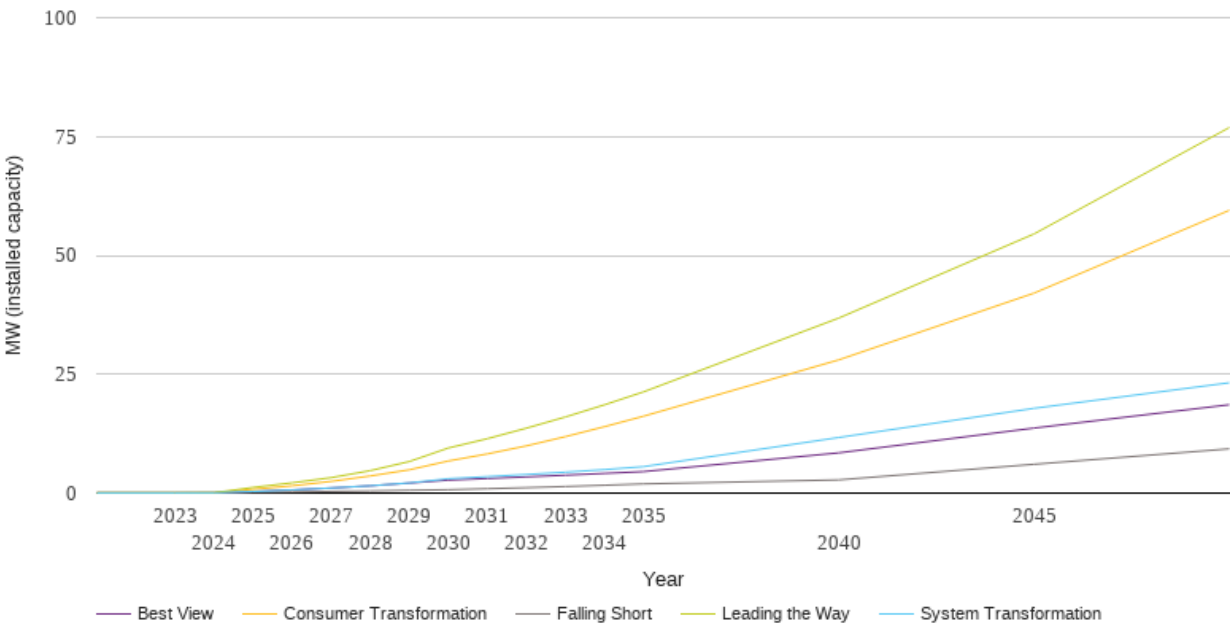
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	29.9	29.9	29.9	29.9	29.9
2023	32.0	33.7	34.9	35.0	32.5
2024	33.8	35.1	38.2	38.3	35.0
2025	34.4	37.4	44.8	45.1	37.1
2026	35.2	40.2	51.5	55.0	39.7
2027	36.3	43.8	58.6	62.2	42.8
2028	37.7	47.9	66.1	74.8	46.2
2029	39.7	53.1	74.9	86.7	50.2
2030	42.8	60.3	85.8	96.4	55.2
2031	47.3	69.9	99.1	108.3	61.8
2032	52.9	80.7	113.6	122.6	69.5
2033	58.9	91.3	128.1	138.2	77.7
2034	66.5	103.9	144.3	155.7	87.5
2035	72.0	112.9	156.9	171.6	95.1
2040	84.1	141.2	204.0	230.2	117.9
2045	97.8	174.2	256.2	283.8	141.9
2050	111.5	209.1	310.6	325.7	165.9



Technology Summary: Storage

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

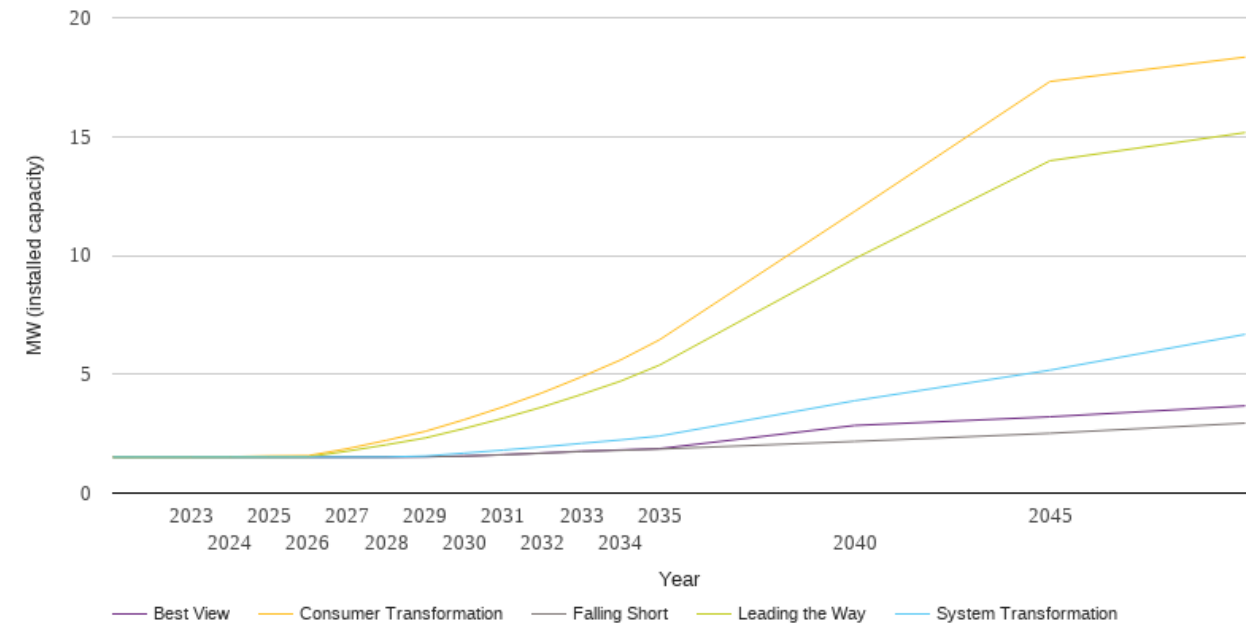
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.1	0.1	0.1	0.1	0.1
2023	0.1	0.1	0.1	0.1	0.1
2024	0.1	0.1	0.1	0.1	0.1
2025	0.2	0.3	0.8	1.2	0.3
2026	0.3	0.7	1.5	2.2	0.7
2027	0.3	1.1	2.5	3.2	1.1
2028	0.4	1.5	3.6	4.7	1.5
2029	0.6	2.1	4.9	6.6	2.1
2030	0.7	3.0	6.7	9.5	2.7
2031	0.9	3.5	8.2	11.4	3.1
2032	1.1	3.9	9.9	13.7	3.4
2033	1.4	4.4	11.9	16.0	3.8
2034	1.7	4.9	14.0	18.6	4.1
2035	1.9	5.6	16.2	21.3	4.5
2040	2.8	11.7	28.0	36.8	8.5
2045	6.1	17.8	42.1	54.5	13.7
2050	9.3	23.2	59.5	76.9	18.6



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	1.5	1.5	1.5	1.5	1.5
2023	1.5	1.5	1.5	1.5	1.5
2024	1.5	1.5	1.5	1.5	1.5
2025	1.5	1.5	1.6	1.5	1.5
2026	1.5	1.5	1.6	1.5	1.5
2027	1.5	1.5	1.9	1.8	1.5
2028	1.5	1.5	2.2	2.0	1.5
2029	1.5	1.6	2.6	2.3	1.5
2030	1.6	1.7	3.1	2.7	1.6
2031	1.6	1.8	3.6	3.2	1.6
2032	1.7	1.9	4.2	3.6	1.7
2033	1.7	2.1	4.9	4.2	1.8
2034	1.8	2.2	5.6	4.7	1.8
2035	1.9	2.4	6.4	5.4	1.9
2040	2.2	3.9	11.9	9.9	2.8
2045	2.5	5.2	17.3	14.0	3.2
2050	2.9	6.7	18.3	15.2	3.7



National Grid Electricity Distribution PLC 09223384)
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