

Distribution Future Energy Scenarios 2022

Local Authority:
Milton Keynes

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 Milton Keynes 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 Milton Keynes 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	1317	788	788	0	69687	33034	33034	0
Domestic	New dwellings	0	12481	13504	13504	15790	18331	17974	17974	17729
Electric vehicles	Electric vehicles	4471	28537	33935	62602	62003	191827	169152	175575	138874
EV Charge Point	EV charge points	2222	12249	16891	31707	34618	92890	85643	92708	92762
Heat pumps	Heat pump installations	584	8201	8748	22638	34845	55324	63308	107066	91561
Hydrogen electrolysis	MW (installed capacity)	0.0	0.0	0.5	0.0	0.0	1.5	6.8	3.4	5.9
Non domestic	Floorspace (metres squared) of new I&C developments	0	537006	1226326	589326	1299126	699866	1326066	689066	1336866
Other Distributed Generation	MW (installed capacity)	31.8	31.8	28.0	28.0	16.8	20.6	12.4	5.2	28.8
Resistive electric heating	Resistive electric heating units	11036	10517	9848	10358	10176	7745	3767	7238	7646
Solar Generation	MW (installed capacity)	22.7	34.5	49.7	71.8	70.0	83.6	161.9	249.6	248.7
Storage	MW (installed capacity)	0.3	0.8	2.9	5.9	7.7	8.4	20.6	50.0	64.0
Wind	MW (installed capacity)	0.7	0.8	1.0	3.0	2.5	3.1	8.1	25.4	20.6

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.

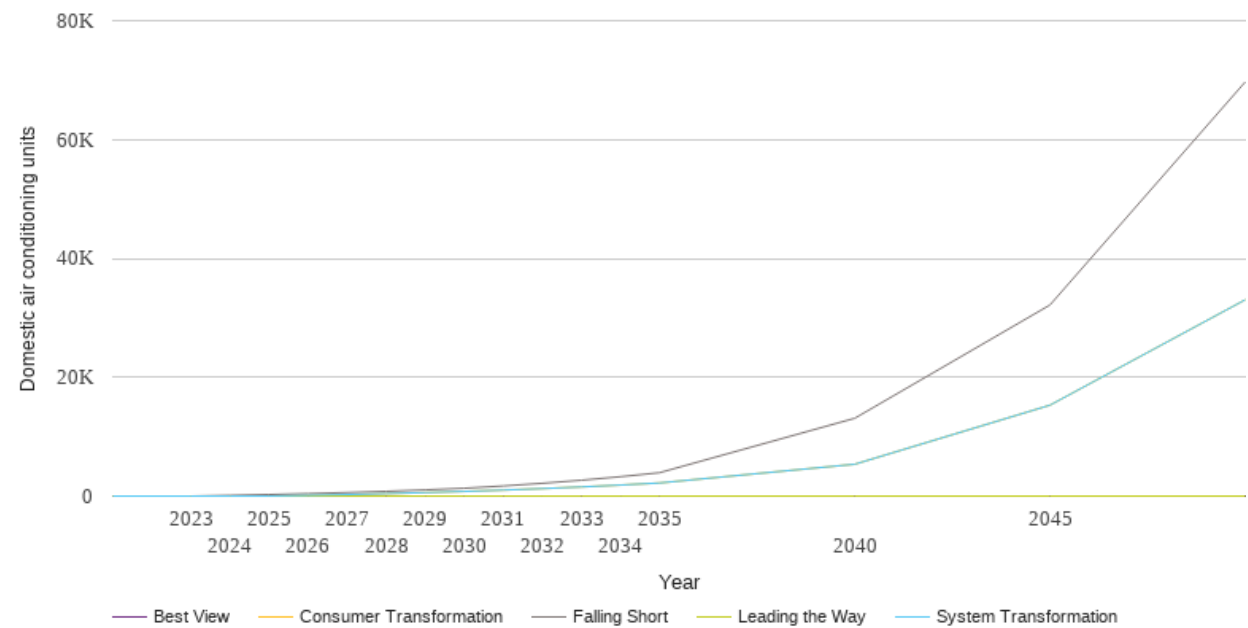
If you have any comments or queries regarding these reports, please contact

nged.energyplanning@nationalgrid.co.uk.

Technology Summary: Air conditioning

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

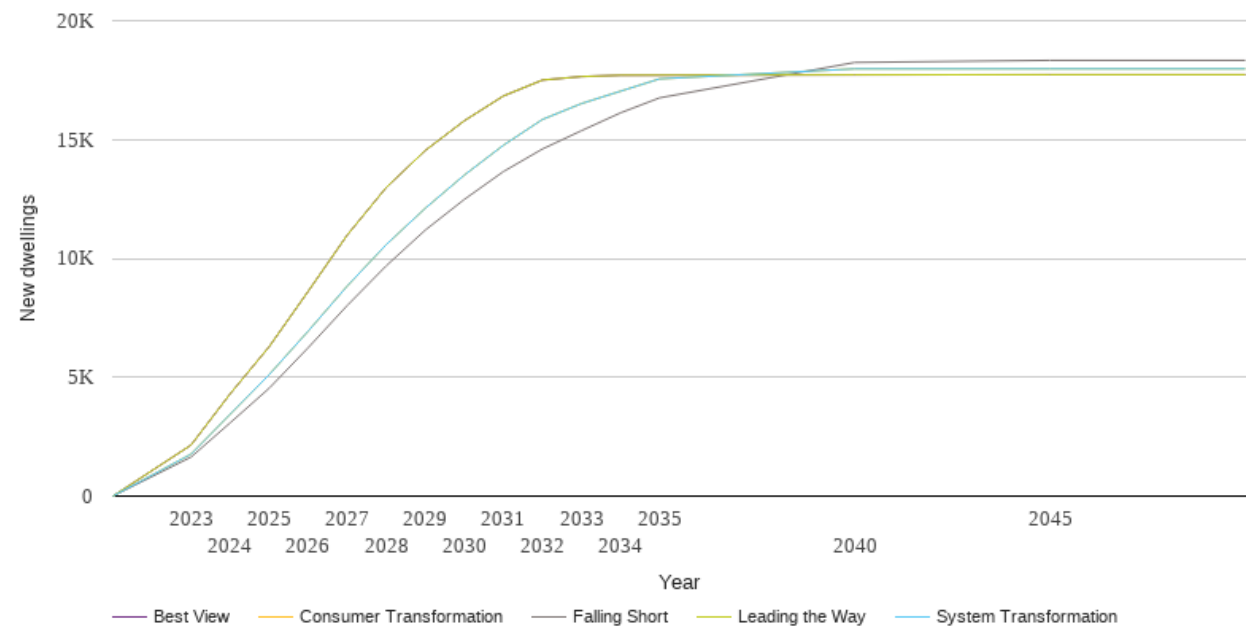
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	0	0	0	0	0
2024	118	0	0	0	0
2025	256	0	0	0	0
2026	414	122	122	0	0
2027	596	259	259	0	0
2028	802	416	416	0	0
2029	1044	591	591	0	0
2030	1317	788	788	0	0
2031	1709	1010	1010	0	0
2032	2156	1260	1260	0	0
2033	2671	1540	1540	0	0
2034	3262	1857	1857	0	0
2035	3938	2210	2210	0	0
2040	13096	5359	5359	0	0
2045	32161	15301	15301	0	0
2050	69687	33034	33034	0	0



Technology Summary: Domestic

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

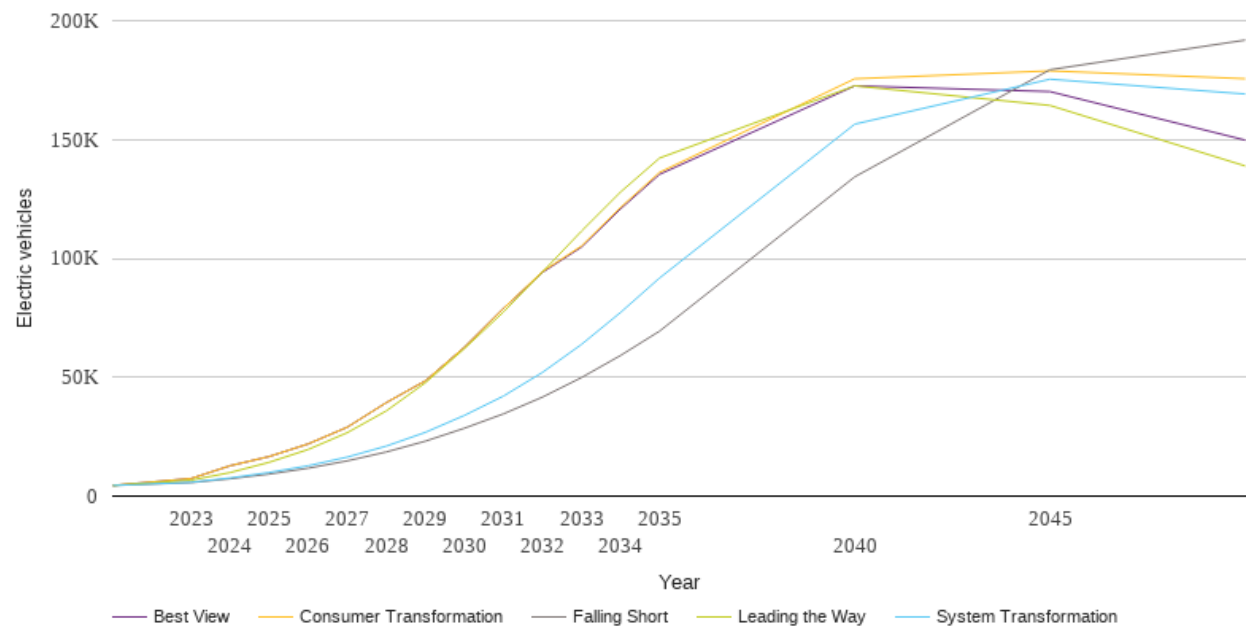
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	1641	1765	1765	2146	2146
2024	3079	3439	3439	4297	4297
2025	4534	5107	5107	6283	6283
2026	6241	6938	6938	8614	8614
2027	8017	8835	8835	10980	10980
2028	9688	10581	10581	12982	12982
2029	11191	12109	12109	14540	14540
2030	12481	13504	13504	15790	15790
2031	13651	14759	14759	16832	16832
2032	14601	15844	15844	17502	17502
2033	15373	16513	16513	17649	17649
2034	16122	17033	17033	17705	17705
2035	16753	17553	17553	17708	17708
2040	18243	17974	17974	17721	17721
2045	18331	17974	17974	17729	17729
2050	18331	17974	17974	17729	17729



Technology Summary: Electric vehicles

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

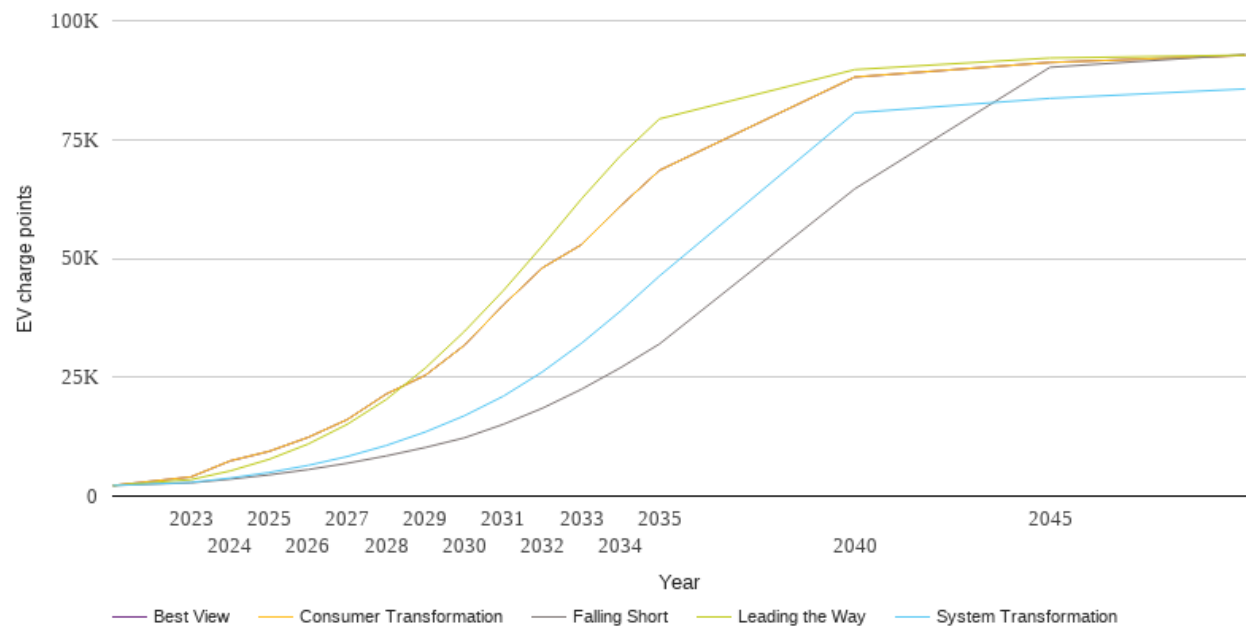
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	4471	4471	4471	4471	4471
2023	5693	5802	7380	6683	7380
2024	7276	7615	12759	9897	12759
2025	9260	9929	16634	14207	16636
2026	11731	12754	21939	19598	21943
2027	14810	16404	28963	26667	28967
2028	18557	21024	39294	35820	39298
2029	23095	26804	48473	47654	48477
2030	28537	33935	62602	62003	62608
2031	34578	42057	78934	77414	78940
2032	41635	52023	94442	94236	94099
2033	49856	63799	105184	111455	104750
2034	59138	77229	121400	127894	120798
2035	69391	91734	136178	142194	135356
2040	134306	156475	175562	172592	172587
2045	179359	175380	178890	164348	170164
2050	191827	169152	175575	138874	149756



Technology Summary: EV Charge Point

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

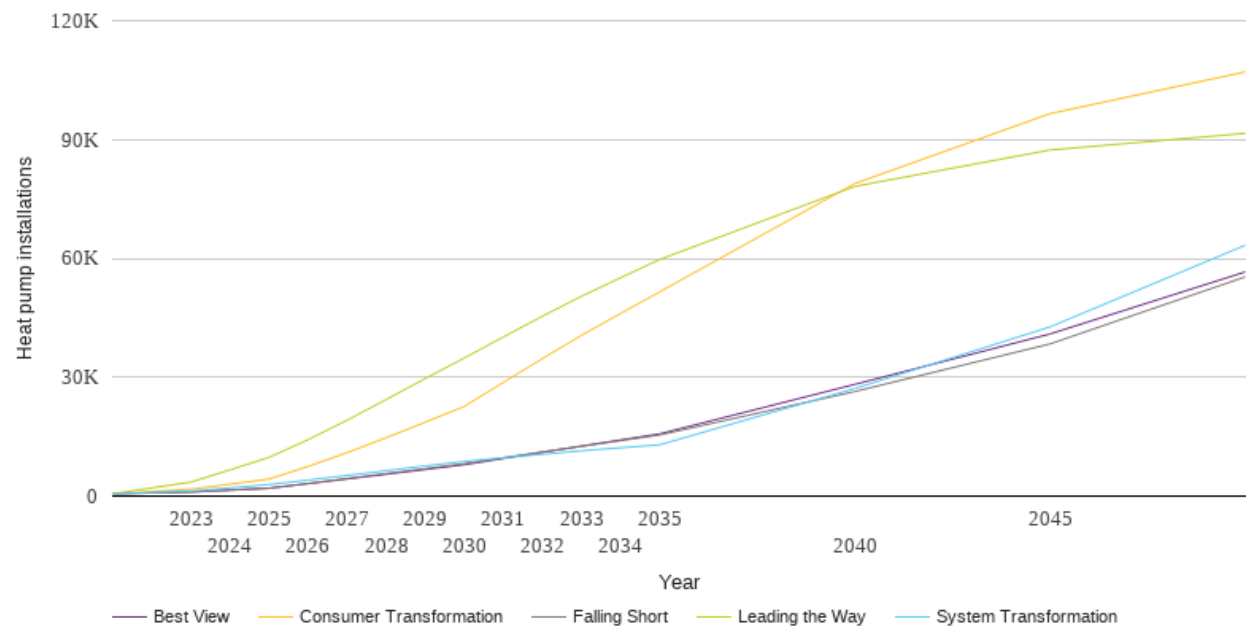
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	2222	2222	2222	2222	2222
2023	2800	2876	4041	3462	4032
2024	3546	3786	7405	5288	7385
2025	4465	4965	9426	7732	9411
2026	5579	6454	12364	10952	12357
2027	6902	8324	16089	15096	16095
2028	8447	10642	21466	20318	21471
2029	10223	13484	25396	26914	25405
2030	12249	16891	31707	34618	31711
2031	15102	21015	40202	43232	40206
2032	18482	26124	48001	52654	48009
2033	22468	32140	52872	62514	52893
2034	26998	38917	61021	71608	61033
2035	32012	46306	68519	79353	68526
2040	64620	80615	88154	89704	88125
2045	90193	83654	91208	92148	91223
2050	92890	85643	92708	92762	92715



Technology Summary: Heat pumps

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

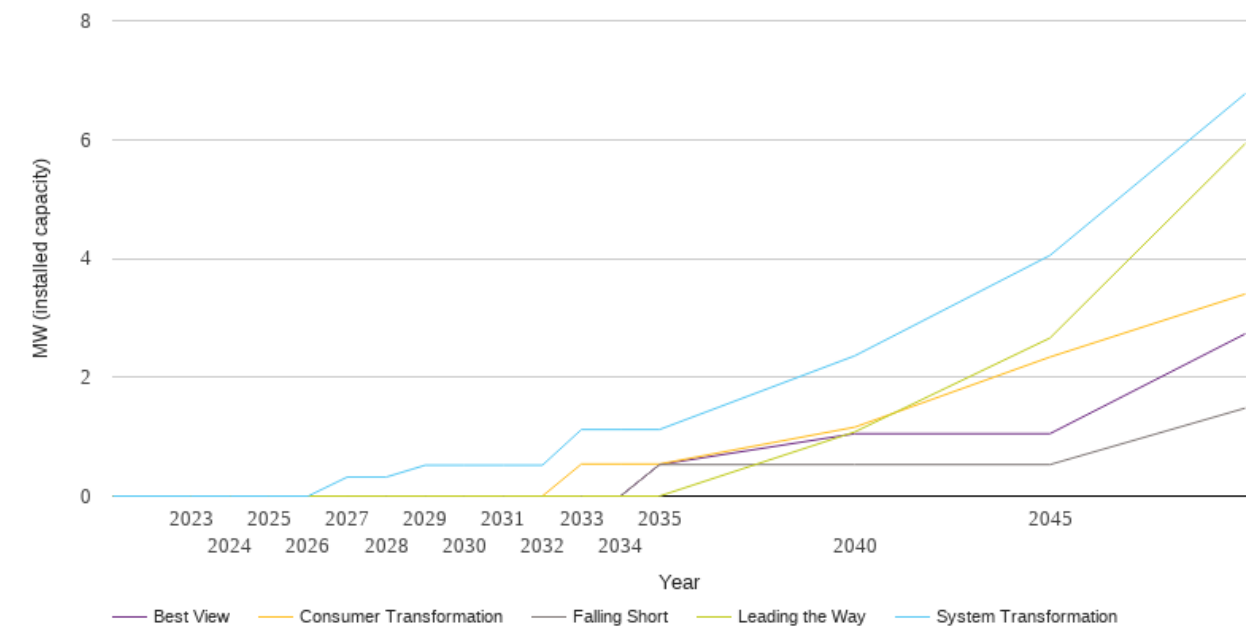
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	584	584	584	584	584
2023	1042	1281	1741	3539	1042
2024	1517	2074	3002	6628	1517
2025	1988	2910	4305	9792	1988
2026	3201	4042	7488	14258	3145
2027	4451	5213	10973	19160	4335
2028	5691	6414	14741	24398	5518
2029	6944	7607	18671	29682	6716
2030	8201	8748	22638	34845	7916
2031	9671	9658	28694	40164	9496
2032	11126	10567	34701	45398	11063
2033	12567	11435	40582	50433	12616
2034	13996	12191	46078	55090	14163
2035	15417	12935	51520	59706	15697
2040	26393	27155	78890	78170	28199
2045	38406	42690	96529	87354	40916
2050	55324	63308	107066	91561	56581



Technology Summary: Hydrogen electrolysis

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

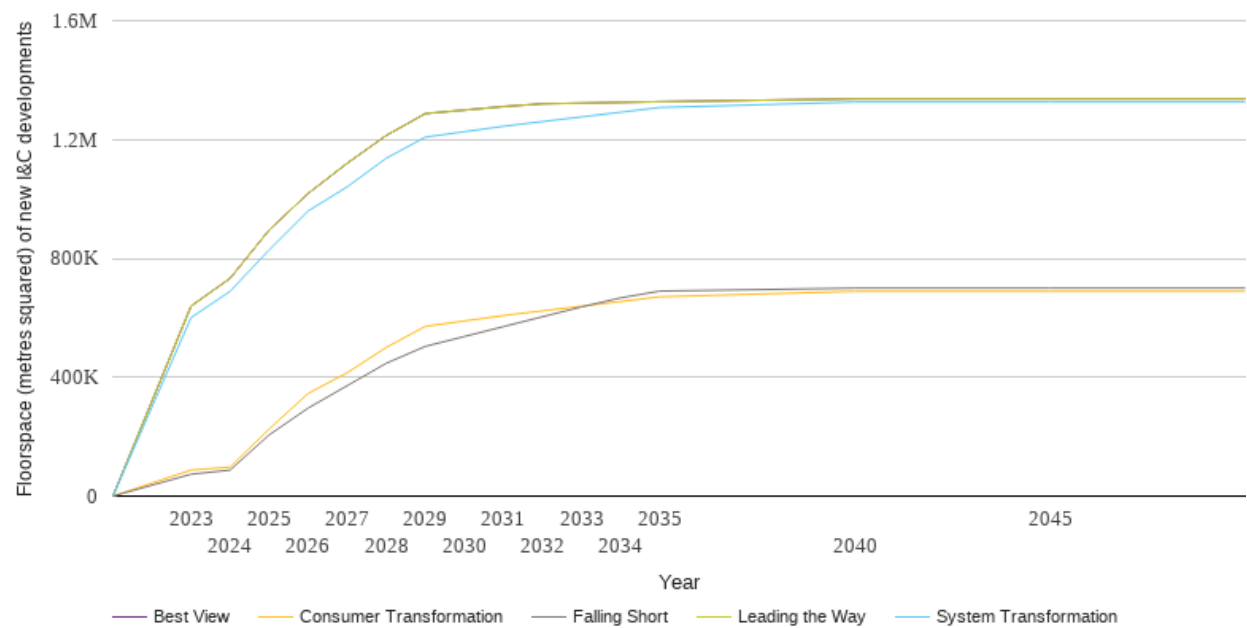
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0	0.0
2027	0.0	0.3	0.0	0.0	0.0
2028	0.0	0.3	0.0	0.0	0.0
2029	0.0	0.5	0.0	0.0	0.0
2030	0.0	0.5	0.0	0.0	0.0
2031	0.0	0.5	0.0	0.0	0.0
2032	0.0	0.5	0.0	0.0	0.0
2033	0.0	1.1	0.5	0.0	0.0
2034	0.0	1.1	0.5	0.0	0.0
2035	0.5	1.1	0.5	0.0	0.5
2040	0.5	2.4	1.2	1.1	1.0
2045	0.5	4.1	2.3	2.7	1.0
2050	1.5	6.8	3.4	5.9	2.7



Technology Summary: Non domestic

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

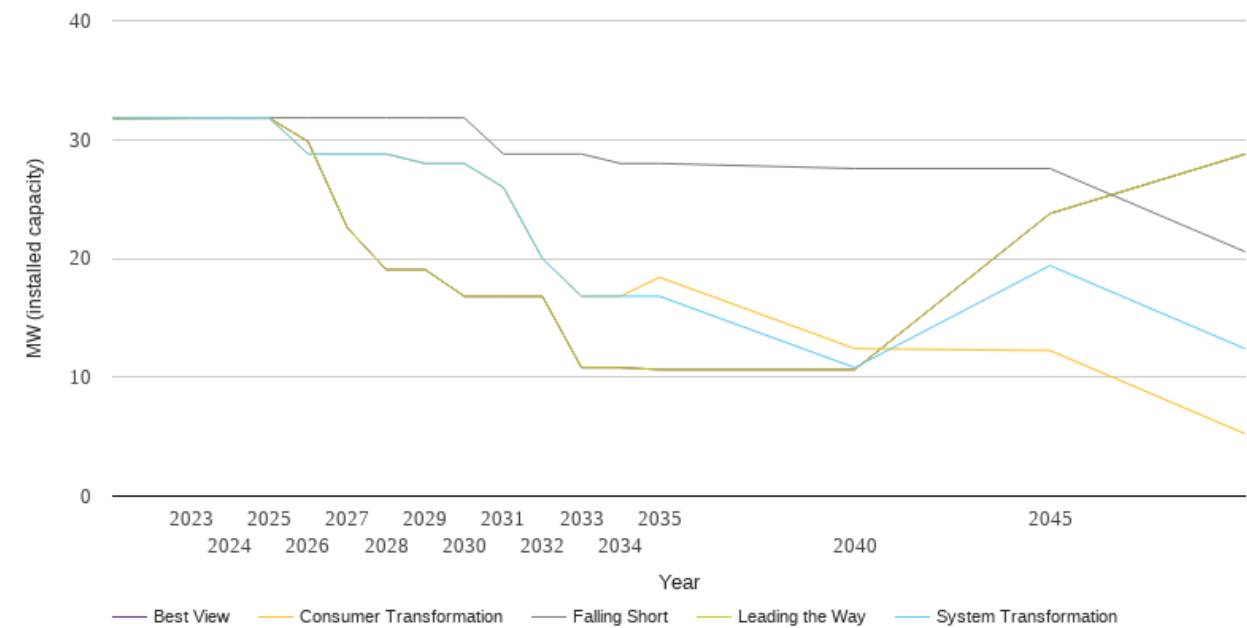
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0	0	0	0	0
2023	73579	600659	87659	639429	639429
2024	87501	689007	97607	732764	732764
2025	205863	828355	225555	895324	895324
2026	296225	959603	345403	1018699	1018699
2027	371587	1040851	415251	1120199	1120199
2028	446949	1137099	500099	1213699	1213699
2029	503778	1208066	571066	1287266	1287266
2030	537006	1226326	589326	1299126	1299126
2031	570235	1244586	607586	1310986	1310986
2032	603464	1260346	623346	1320346	1320346
2033	636692	1276106	639106	1322706	1322706
2034	666999	1291866	654866	1325066	1325066
2035	689866	1307626	670626	1327426	1327426
2040	699866	1326066	689066	1336866	1336866
2045	699866	1326066	689066	1336866	1336866
2050	699866	1326066	689066	1336866	1336866



Technology Summary: Other Distributed Generation

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

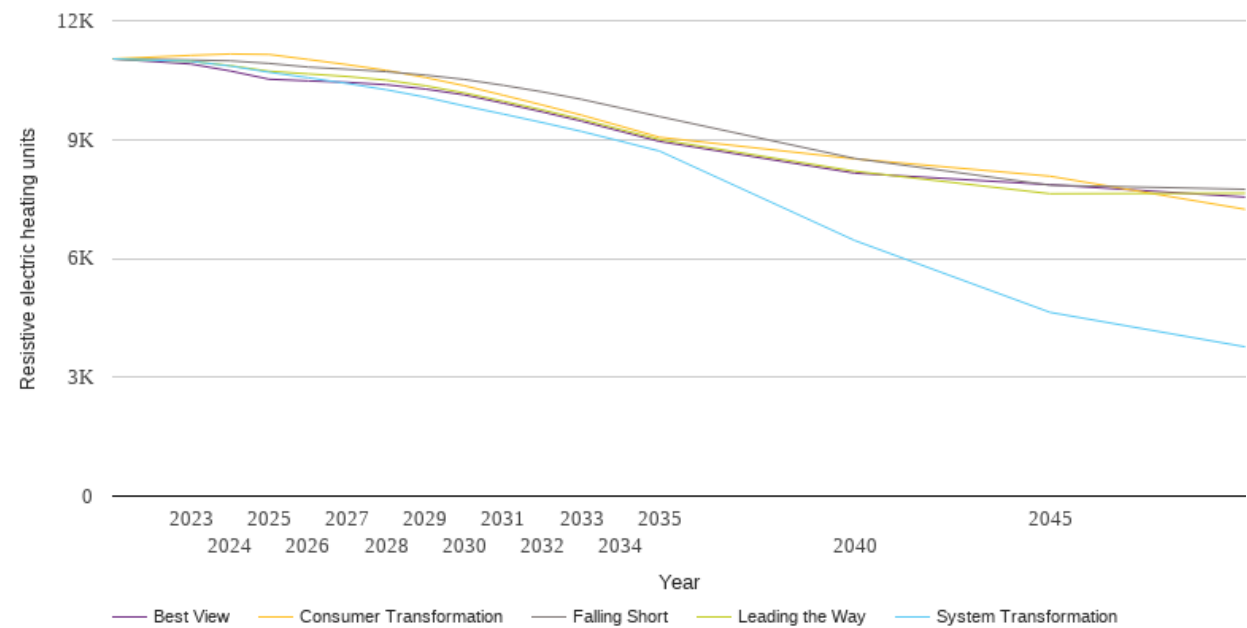
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	31.8	31.8	31.8	31.8	31.8
2023	31.8	31.8	31.8	31.8	31.8
2024	31.8	31.8	31.8	31.8	31.8
2025	31.8	31.8	31.8	31.8	31.8
2026	31.8	28.8	28.8	29.8	29.8
2027	31.8	28.8	28.8	22.6	22.6
2028	31.8	28.8	28.8	19.0	19.0
2029	31.8	28.0	28.0	19.0	19.0
2030	31.8	28.0	28.0	16.8	16.8
2031	28.8	26.0	26.0	16.8	16.8
2032	28.8	20.0	20.0	16.8	16.8
2033	28.8	16.8	16.8	10.8	10.8
2034	28.0	16.8	16.8	10.8	10.8
2035	28.0	16.8	18.4	10.6	10.6
2040	27.6	10.8	12.4	10.6	10.6
2045	27.6	19.4	12.2	23.8	23.8
2050	20.6	12.4	5.2	28.8	28.8



Technology Summary: Resistive electric heating

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

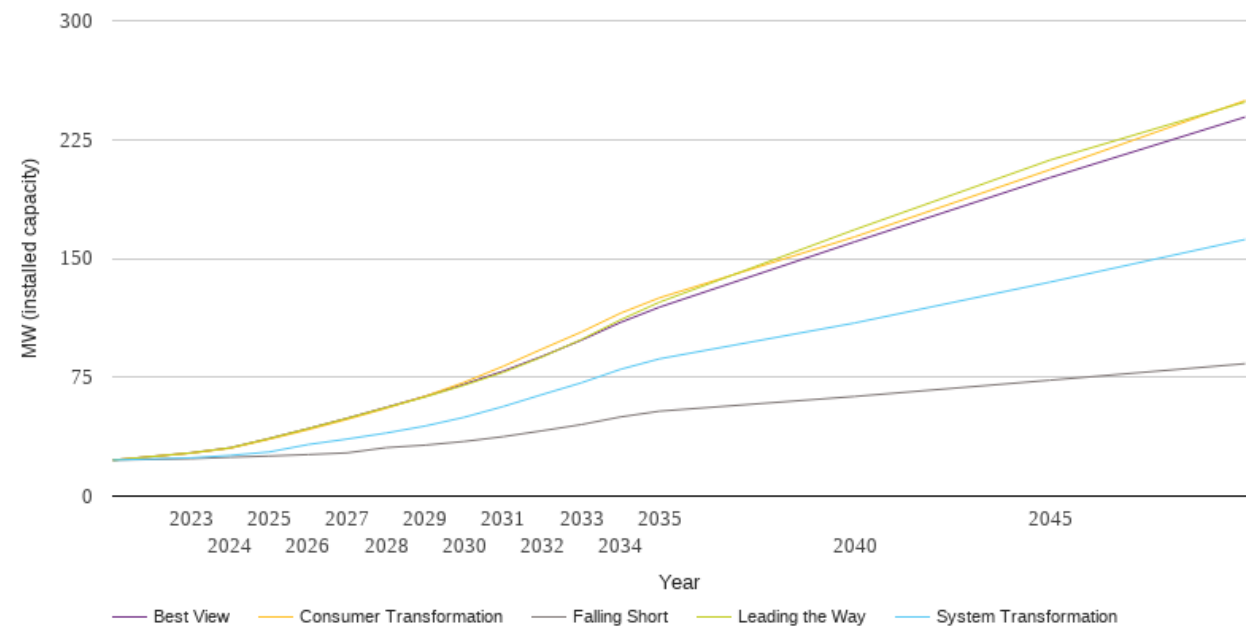
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	11036	11036	11036	11036	11036
2023	11008	10973	11124	10973	10906
2024	10986	10856	11160	10866	10732
2025	10921	10698	11147	10724	10522
2026	10829	10561	11021	10657	10480
2027	10773	10415	10890	10591	10443
2028	10713	10257	10746	10499	10384
2029	10627	10070	10567	10358	10275
2030	10517	9848	10358	10176	10127
2031	10368	9642	10117	9966	9917
2032	10204	9428	9871	9747	9697
2033	10015	9204	9617	9513	9465
2034	9798	8959	9339	9254	9208
2035	9580	8709	9057	9000	8952
2040	8522	6451	8512	8200	8152
2045	7848	4638	8075	7632	7860
2050	7745	3767	7238	7646	7548



Technology Summary: Solar Generation

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

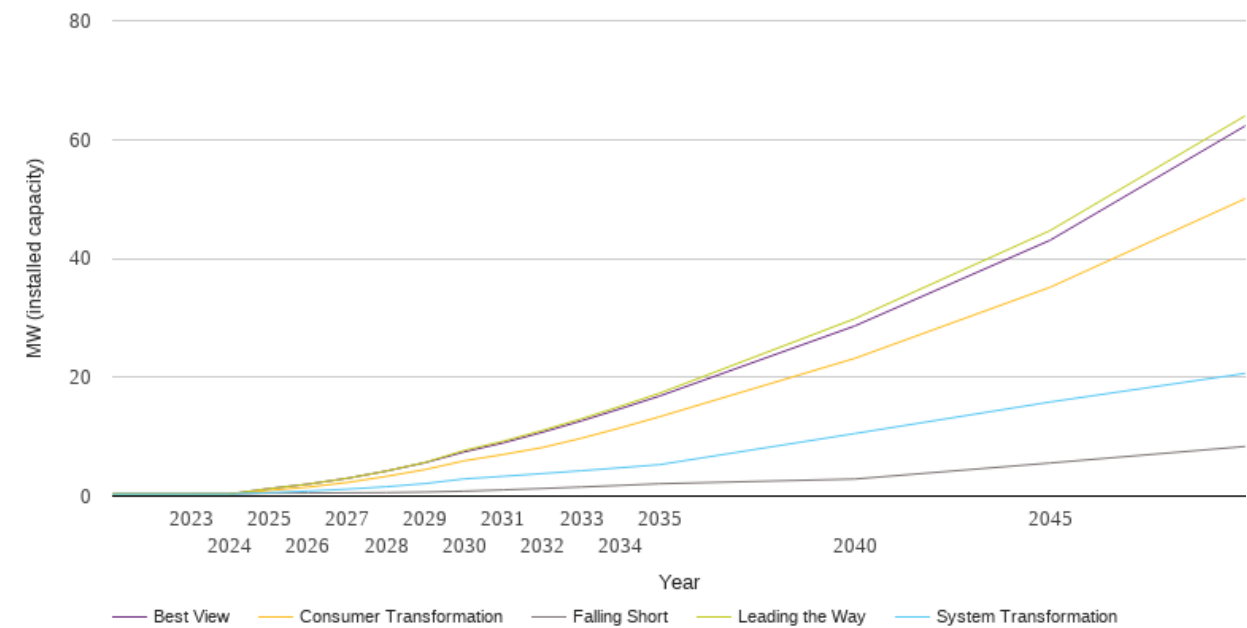
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	22.7	22.7	22.7	22.7	22.7
2023	23.6	24.2	27.1	27.3	27.3
2024	24.5	25.7	30.2	30.5	30.5
2025	25.3	27.8	35.9	36.3	36.3
2026	26.2	32.5	41.9	42.6	42.6
2027	27.3	36.0	48.4	49.1	49.1
2028	30.6	39.8	55.4	55.9	56.0
2029	32.2	44.2	63.0	62.6	63.0
2030	34.5	49.7	71.8	70.0	70.6
2031	37.5	56.6	82.0	78.1	78.9
2032	41.2	64.1	92.9	87.9	88.3
2033	45.1	71.5	103.6	98.8	98.4
2034	50.0	80.0	115.4	111.2	109.6
2035	53.6	86.6	125.1	122.4	119.3
2040	62.9	109.3	163.6	168.1	160.5
2045	73.1	135.0	206.0	212.0	200.9
2050	83.6	161.9	249.6	248.7	239.2



Technology Summary: Storage

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

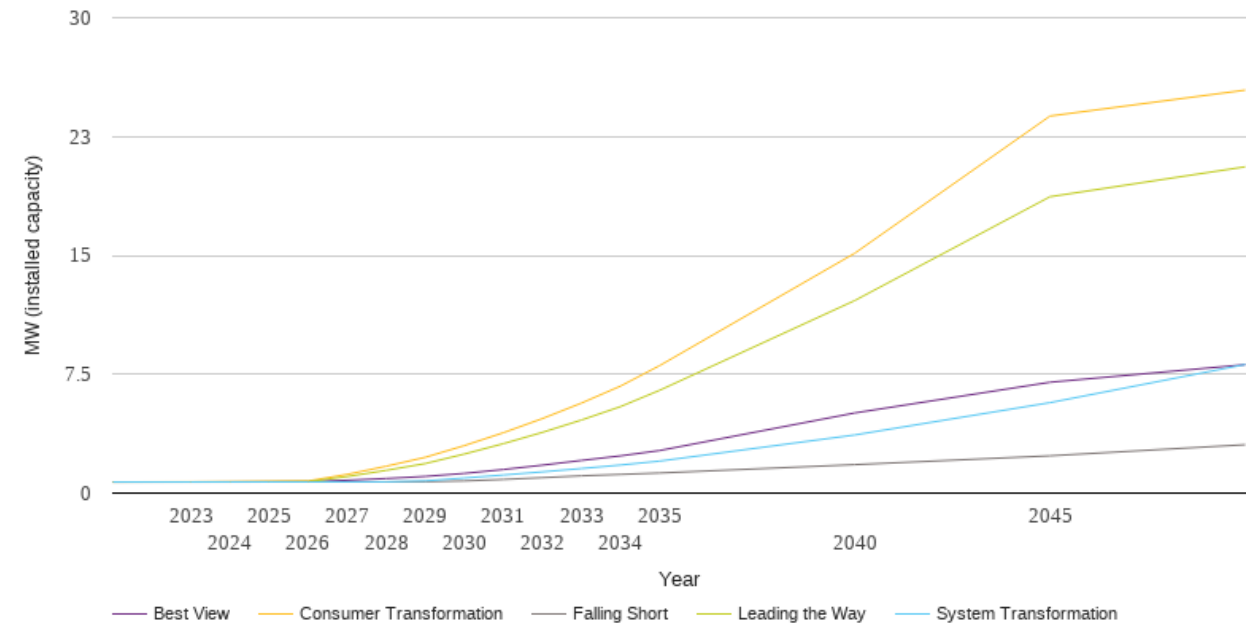
Year	Scenario				
	Falling Short	System Transformation	Consumer Transformation	Leading the Way	Best View
Baseline	0.3	0.3	0.3	0.3	0.3
2023	0.3	0.3	0.3	0.3	0.3
2024	0.3	0.4	0.4	0.4	0.4
2025	0.5	0.6	0.9	1.3	1.3
2026	0.5	0.8	1.5	2.0	2.0
2027	0.5	1.2	2.3	3.0	3.0
2028	0.6	1.6	3.3	4.2	4.2
2029	0.7	2.1	4.5	5.7	5.6
2030	0.8	2.9	5.9	7.7	7.4
2031	1.0	3.3	7.0	9.2	9.0
2032	1.3	3.8	8.2	11.0	10.7
2033	1.5	4.3	9.7	13.0	12.7
2034	1.8	4.8	11.5	15.1	14.7
2035	2.1	5.3	13.4	17.3	16.8
2040	2.9	10.5	23.2	29.8	28.6
2045	5.6	15.8	35.1	44.7	43.0
2050	8.4	20.6	50.0	64.0	62.3



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	0.7	0.7	0.7	0.7	0.7
2023	0.7	0.7	0.7	0.7	0.7
2024	0.7	0.7	0.7	0.7	0.7
2025	0.7	0.7	0.7	0.7	0.7
2026	0.7	0.7	0.8	0.7	0.7
2027	0.7	0.7	1.2	1.0	0.8
2028	0.7	0.7	1.7	1.4	0.9
2029	0.7	0.8	2.3	1.9	1.1
2030	0.8	1.0	3.0	2.5	1.2
2031	0.9	1.1	3.8	3.1	1.5
2032	1.0	1.3	4.7	3.8	1.8
2033	1.1	1.6	5.7	4.6	2.1
2034	1.2	1.8	6.8	5.5	2.3
2035	1.3	2.0	8.0	6.5	2.7
2040	1.8	3.7	15.1	12.2	5.1
2045	2.4	5.7	23.8	18.7	7.0
2050	3.1	8.1	25.4	20.6	8.1



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