WESTERN POWER DISTRIBUTION

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Distribution Future Energy Scenarios

Local Authority: Coventry District (B)

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What are Distribution Future Energy Scenarios?

Western Power Distribution 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 WPD 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 Coventry District (B) covered by the WPD East Midlands licence area.

Scenario Summary

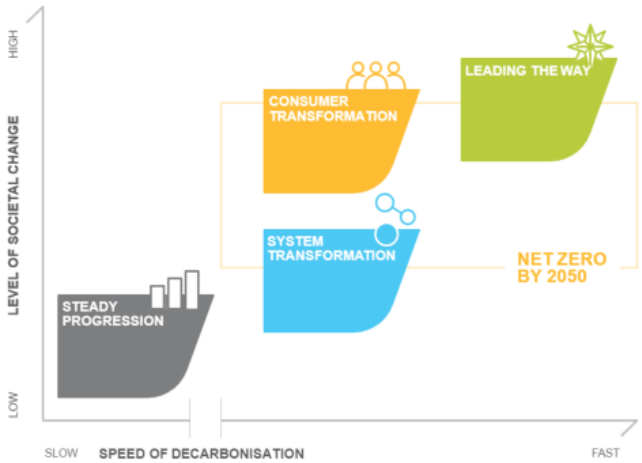
This DFES scenario framework includes three scenarios that are compliant with UK government targets of Net Zero greenhouse gas emissions by 2050. A summary of each scenario is below:

Steady Progression (SP) 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 Coventry District (B) for two specific years in the DFES analysis.

WPD also create a 5th 'Best View' scenario for the purposes of regulatory reporting. This is a hybrid scenario built on local stakeholder engagement, which maps which of the four DFES scenarios aligns most closely with regional ambition and delivery capabilities. The WPD Best View informs the likely amount of investment on the network across a licence area, and is supplemented by uncertainty mechanisms which can flex to accommodate changes in regional growth projections.

For the DFES 2020 analysis, Coventry District (B) has been assigned the Consumer Transformation scenario for the WPD Best View.

Technology	Units	Baseline Total	2030				2050			
			SP	ST	CT	LW	SP	ST	CT	LW
Air conditioning	Number of domestic air conditioning units	1328	5545	4641	4641	1499	96638	54526	54526	1781
Direct electric heating	Number of customers with direct electric heating	14767	15825	15725	15615	15864	17918	15672	14966	16085
Domestic	Number of new dwellings	0	9773	12881	12881	16159	26148	34276	34276	44748
Electric vehicles	Number of electric vehicles	1786	26255	32467	57339	64194	181784	160240	145663	120992
EV Charge Point	Number of EV charge points	953	10300	13655	31421	33779	83161	86962	89430	89261
Heat pumps	Number of heat pumps	90	1854	6552	25522	31854	21452	43705	124216	118844
Non domestic	Floorspace (metres squared) of new I&C developments	0.0	153497.0	200801.0	200801.0	263509.0	457059.0	560114.0	560114.0	556455.0
Other Distributed Generation	MW (installed capacity)	55.6	60.8	50.1	56.2	50.3	63.6	27.9	28.4	2.2
Solar Generation	MW (installed capacity)	11.8	16.6	27.7	45.1	70.0	39.8	115.6	192.0	139.9
Storage	MW (installed capacity)	0.0	0.4	0.2	1.6	4.9	14.0	2.7	48.5	68.6
Wind	MW (installed capacity)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	2.3

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 Network Development Plan due to be published in 2022.

Incorporating your feedback

WPD is committed to continually improving the DFES process. Future work in 2021 will deliver projected energy consumption figures for each Local Authority alongside the volume projections. To validate the DFES process, we would like to sense check our scenario projections against the ambitions of the relevant Local Authorities in our area. WPD Distribution Managers will be engaging with local stakeholders throughout 2021 and any feedback will be incorporated in the 2021 Distribution Future Energy Scenarios analysis.

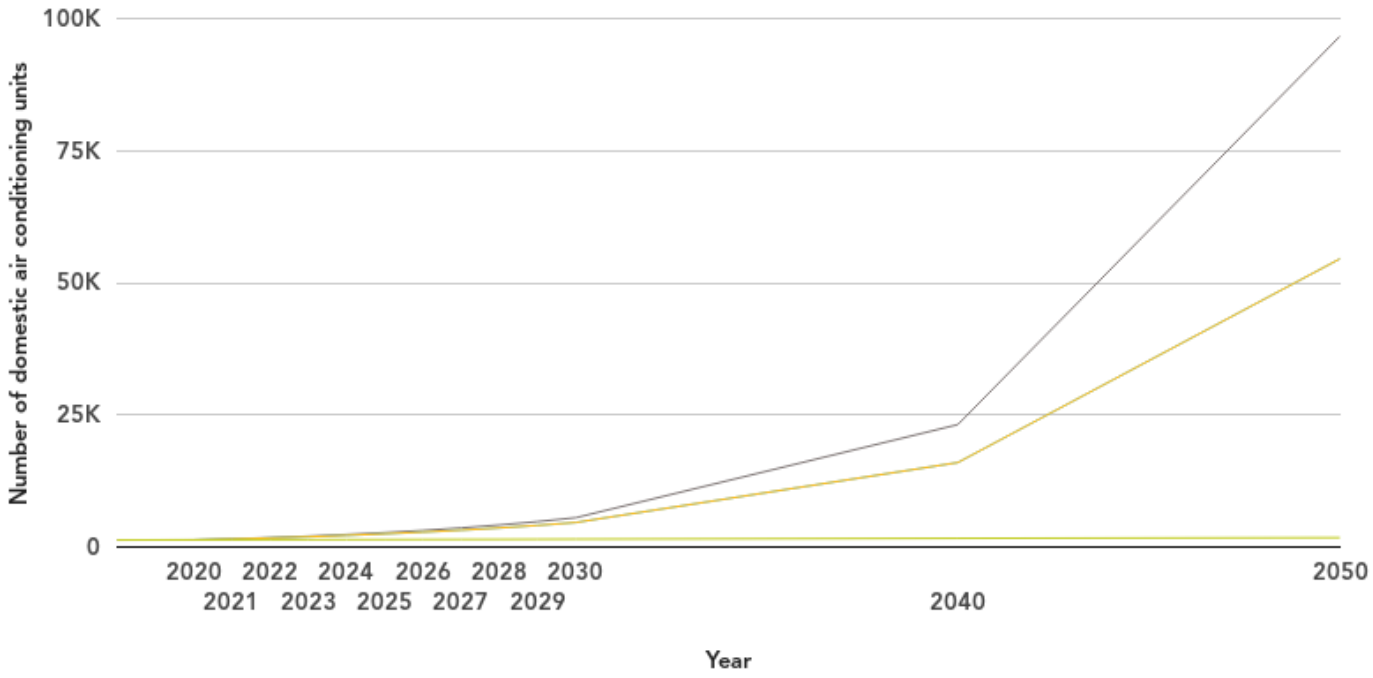
If you have any comments or queries regarding these reports, please contact wpdnetworkstrategy@westernpower.co.uk.

Technology Summary: Air conditioning

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

WPD Best View scenario: aligned to Consumer Transformation

Year	Scenario			
	Steady Progression	System Transformation	Consumer Transformation	Leading the Way
Baseline	1328	1328	1328	1328
2020	1343	1344	1344	1350
2021	1548	1518	1518	1360
2022	1775	1721	1721	1371
2023	2049	1946	1946	1385
2024	2370	2204	2204	1402
2025	2729	2495	2495	1416
2026	3138	2817	2817	1429
2027	3614	3191	3191	1443
2028	4173	3614	3614	1457
2029	4810	4090	4090	1477
2030	5545	4641	4641	1499
2040	23161	15984	15984	1652
2050	96638	54526	54526	1781

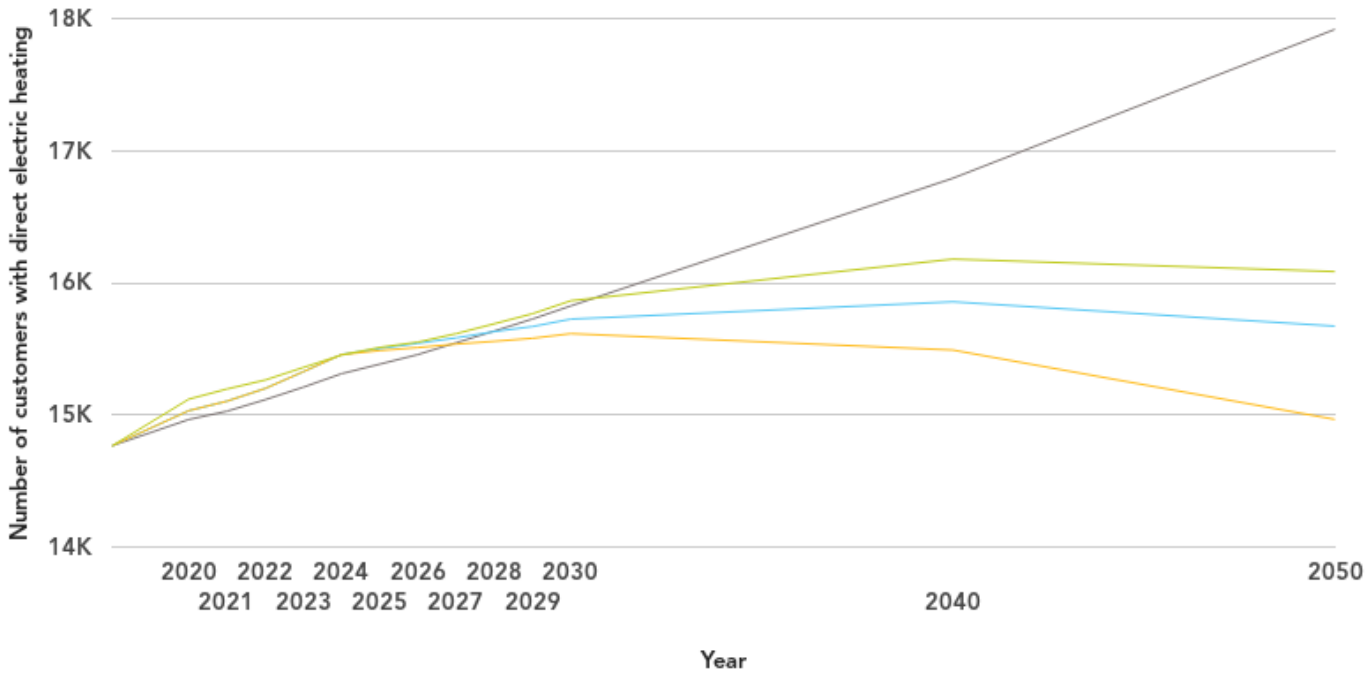


Technology Summary: Direct electric heating

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

WPD Best View scenario: aligned to Consumer Transformation

Year	Scenario			
	Steady Progression	System Transformation	Consumer Transformation	Leading the Way
Baseline	14767	14767	14767	14767
2020	14965	15032	15032	15119
2021	15028	15104	15104	15196
2022	15115	15200	15200	15264
2023	15210	15327	15327	15359
2024	15312	15457	15457	15453
2025	15384	15502	15487	15511
2026	15457	15542	15510	15551
2027	15546	15583	15536	15615
2028	15635	15631	15557	15690
2029	15726	15669	15580	15766
2030	15825	15725	15615	15864
2040	16791	15856	15491	16179
2050	17918	15672	14966	16085

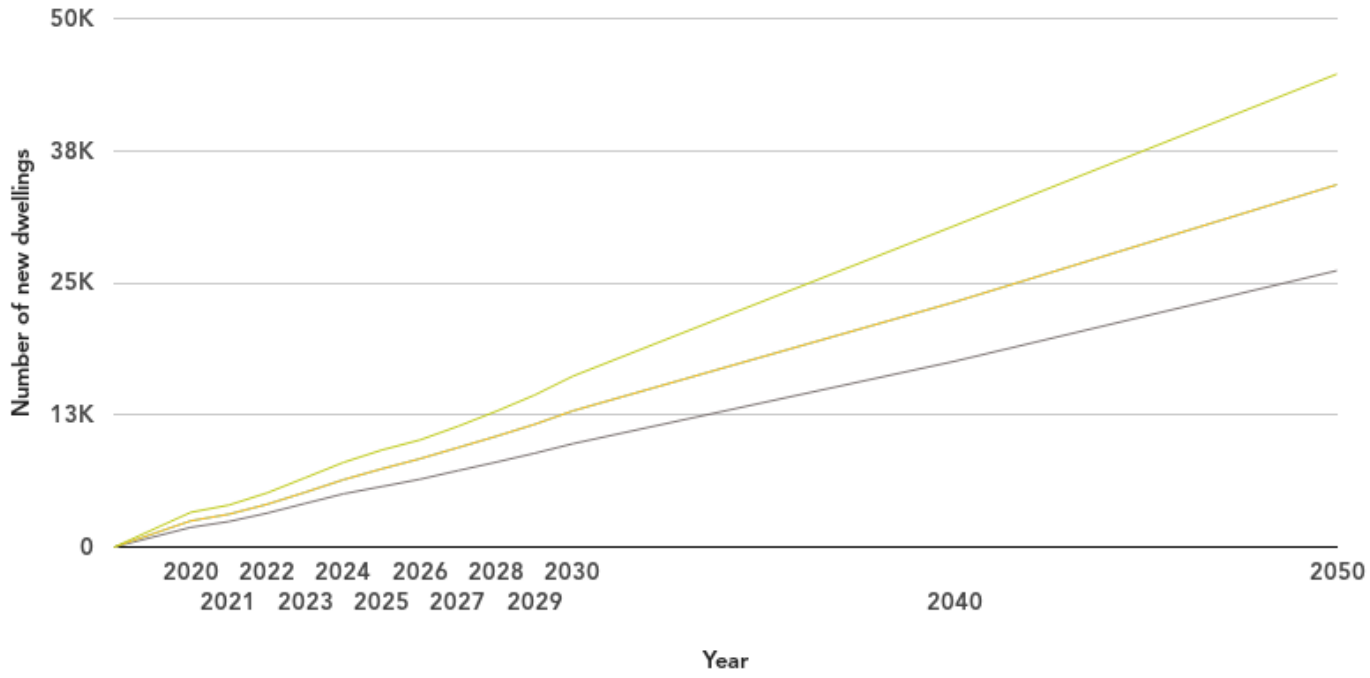


Technology Summary: Domestic

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

WPD Best View scenario: aligned to Consumer Transformation

Year	Scenario			
	Steady Progression	System Transformation	Consumer Transformation	Leading the Way
Baseline	0	0	0	0
2020	1858	2473	2473	3280
2021	2411	3106	3106	3969
2022	3206	4043	4043	5119
2023	4128	5179	5179	6556
2024	5035	6372	6372	8007
2025	5717	7393	7393	9176
2026	6410	8349	8349	10130
2027	7230	9410	9410	11426
2028	8034	10478	10478	12845
2029	8870	11606	11606	14374
2030	9773	12881	12881	16159
2040	17576	23185	23185	30401
2050	26148	34276	34276	44748

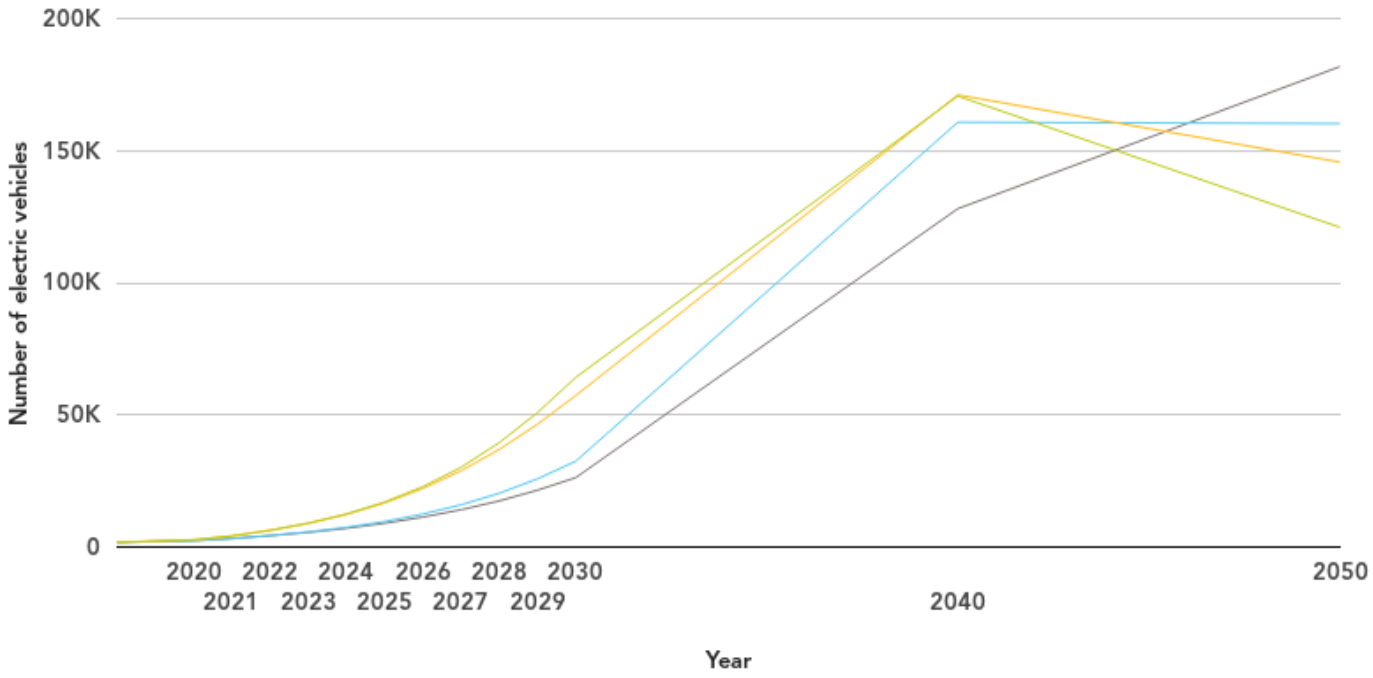


Technology Summary: Electric vehicles

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

WPD Best View scenario: aligned to Consumer Transformation

Year	Scenario			
	Steady Progression	System Transformation	Consumer Transformation	Leading the Way
Baseline	1786	1786	1786	1786
2020	2386	2383	2715	2728
2021	3221	3211	4225	4188
2022	4299	4327	6397	6255
2023	5532	5721	8929	9055
2024	7095	7459	12321	12517
2025	9006	9663	16696	17043
2026	11334	12475	22180	22866
2027	14114	15973	28877	30182
2028	17474	20369	36951	39517
2029	21517	25825	46504	50900
2030	26255	32467	57339	64194
2040	128035	160758	171098	170654
2050	181784	160240	145663	120992

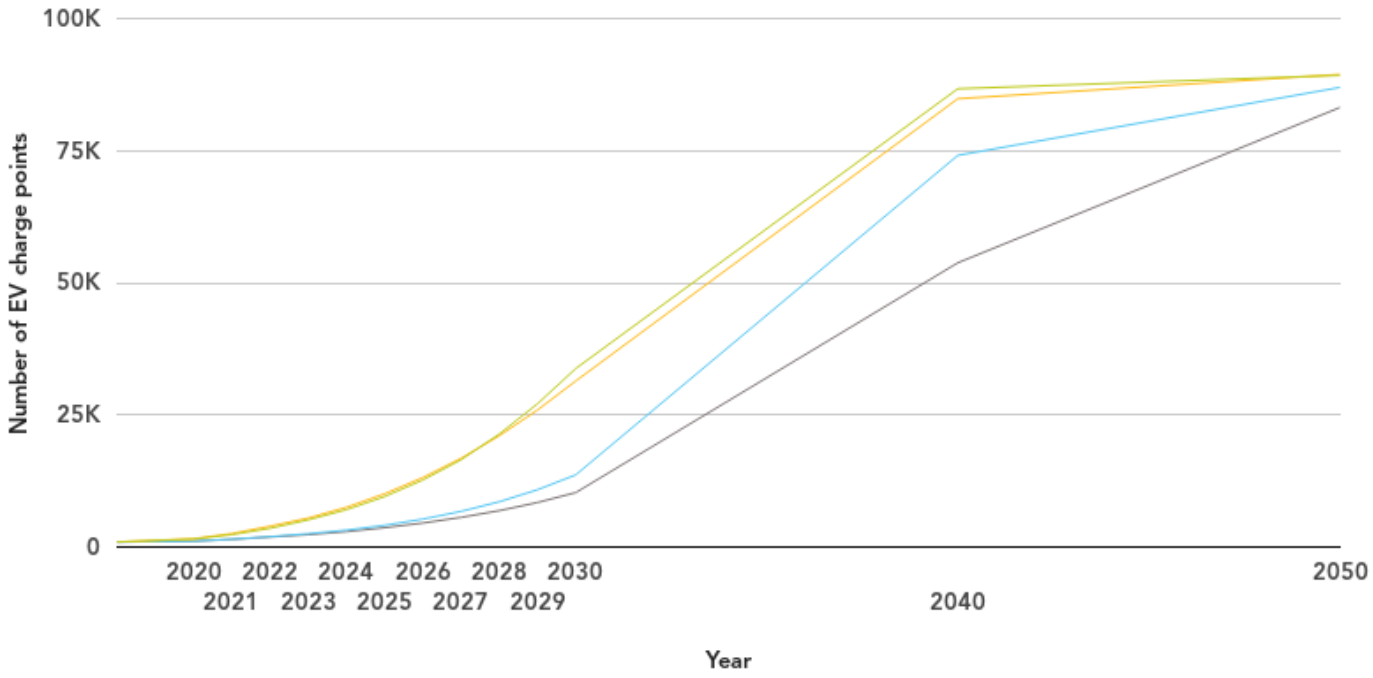


Technology Summary: EV Charge Point

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

WPD Best View scenario: aligned to Consumer Transformation

Year	Scenario			
	Steady Progression	System Transformation	Consumer Transformation	Leading the Way
Baseline	953	953	953	953
2020	1118	1119	1570	1509
2021	1449	1478	2547	2348
2022	1904	1957	3945	3549
2023	2345	2517	5479	5153
2024	2921	3198	7524	7079
2025	3662	4106	10077	9567
2026	4543	5284	13157	12696
2027	5608	6747	16805	16530
2028	6885	8575	21061	21381
2029	8424	10845	25937	27121
2030	10300	13655	31421	33779
2040	53779	74110	84827	86713
2050	83161	86962	89430	89261

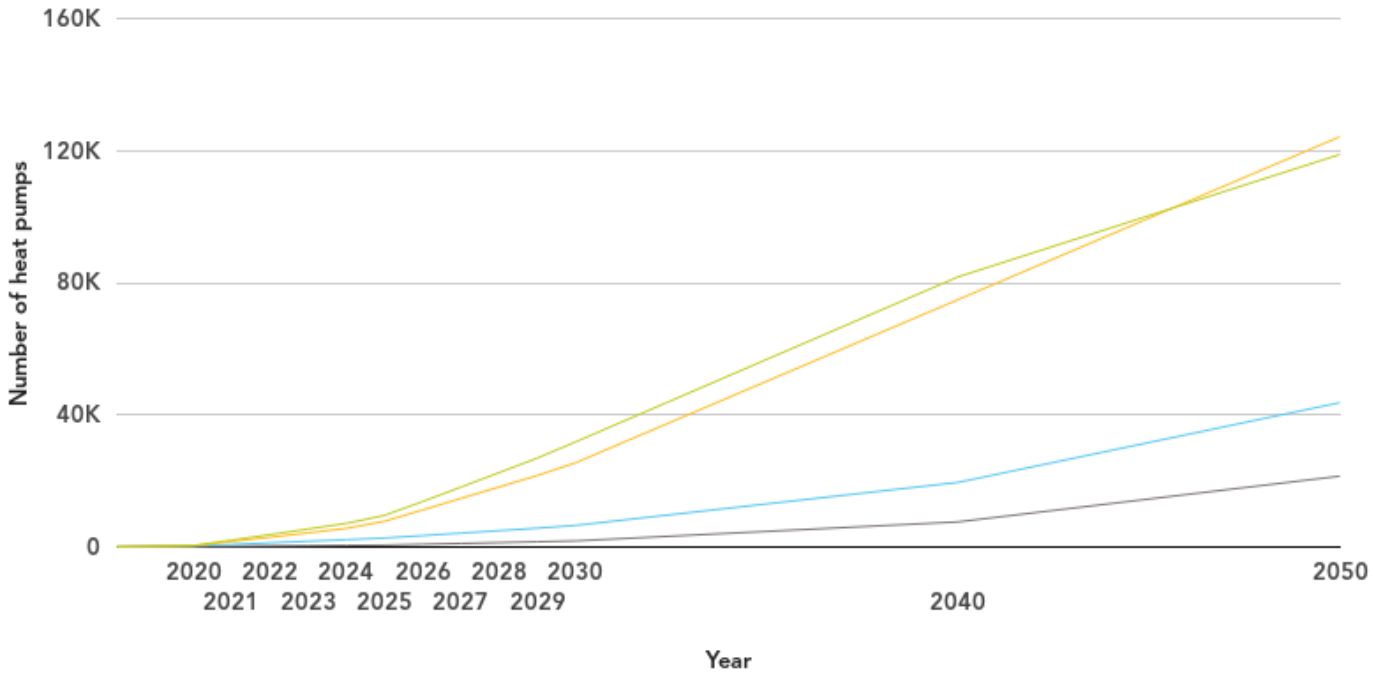


Technology Summary: Heat pumps

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

WPD Best View scenario: aligned to Consumer Transformation

Year	Scenario			
	Steady Progression	System Transformation	Consumer Transformation	Leading the Way
Baseline	90	90	90	90
2020	191	331	380	456
2021	258	789	1660	2091
2022	337	1260	2965	3760
2023	420	1741	4294	5455
2024	506	2220	5638	7168
2025	584	2734	7816	9598
2026	831	3466	11250	13806
2027	1079	4208	14733	18163
2028	1335	4952	18195	22553
2029	1587	5707	21674	26954
2030	1854	6552	25522	31854
2040	7605	19554	74864	81763
2050	21452	43705	124216	118844

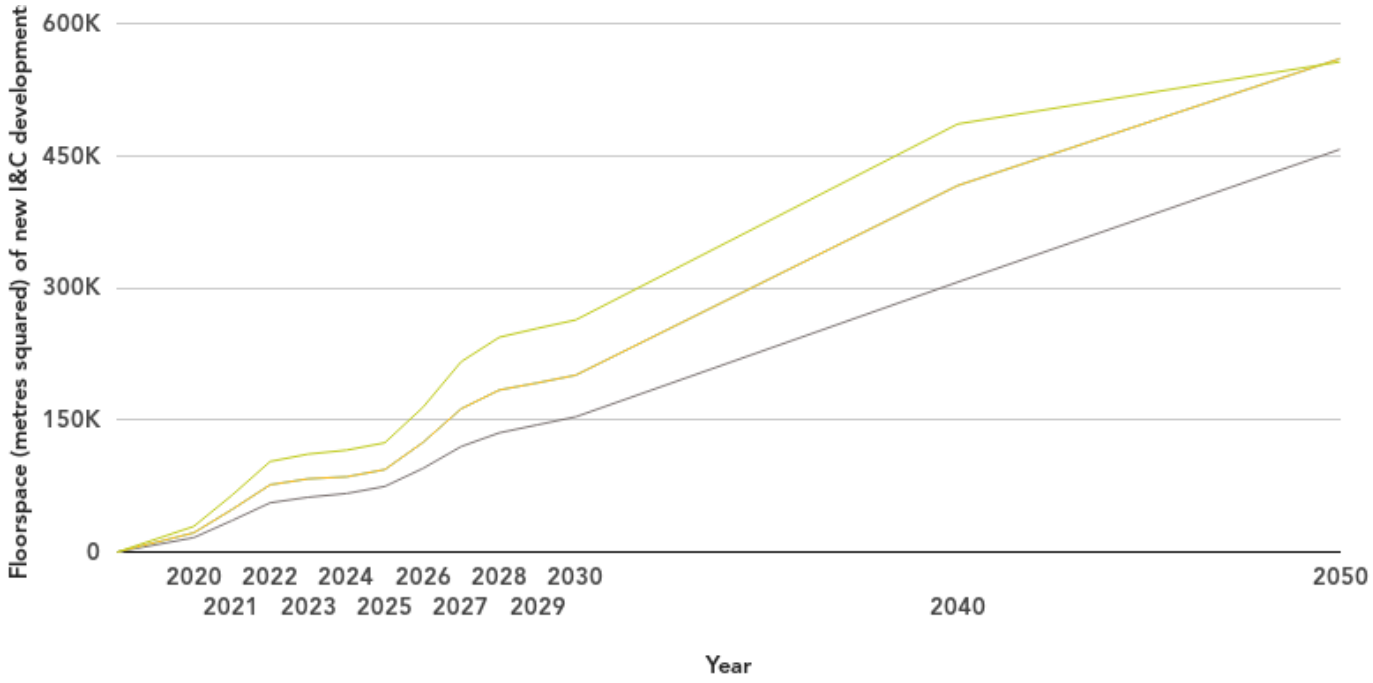


Technology Summary: Non domestic

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

WPD Best View scenario: aligned to Consumer Transformation

Year	Scenario			
	Steady Progression	System Transformation	Consumer Transformation	Leading the Way
Baseline	0.0	0.0	0.0	0.0
2020	16357.0	21809.0	21809.0	29078.0
2021	35697.0	48221.0	48221.0	64433.0
2022	55885.0	76358.0	76358.0	102803.0
2023	62242.0	83125.0	83125.0	111206.0
2024	66428.0	85386.0	85386.0	115646.0
2025	74453.0	93584.0	93584.0	124014.0
2026	94928.0	124403.0	124403.0	164288.0
2027	119796.0	162623.0	162623.0	216064.0
2028	135341.0	183968.0	183968.0	243866.0
2029	144424.0	192051.0	192051.0	253949.0
2030	153497.0	200801.0	200801.0	263509.0
2040	306479.0	416082.0	416082.0	485981.0
2050	457059.0	560114.0	560114.0	556455.0

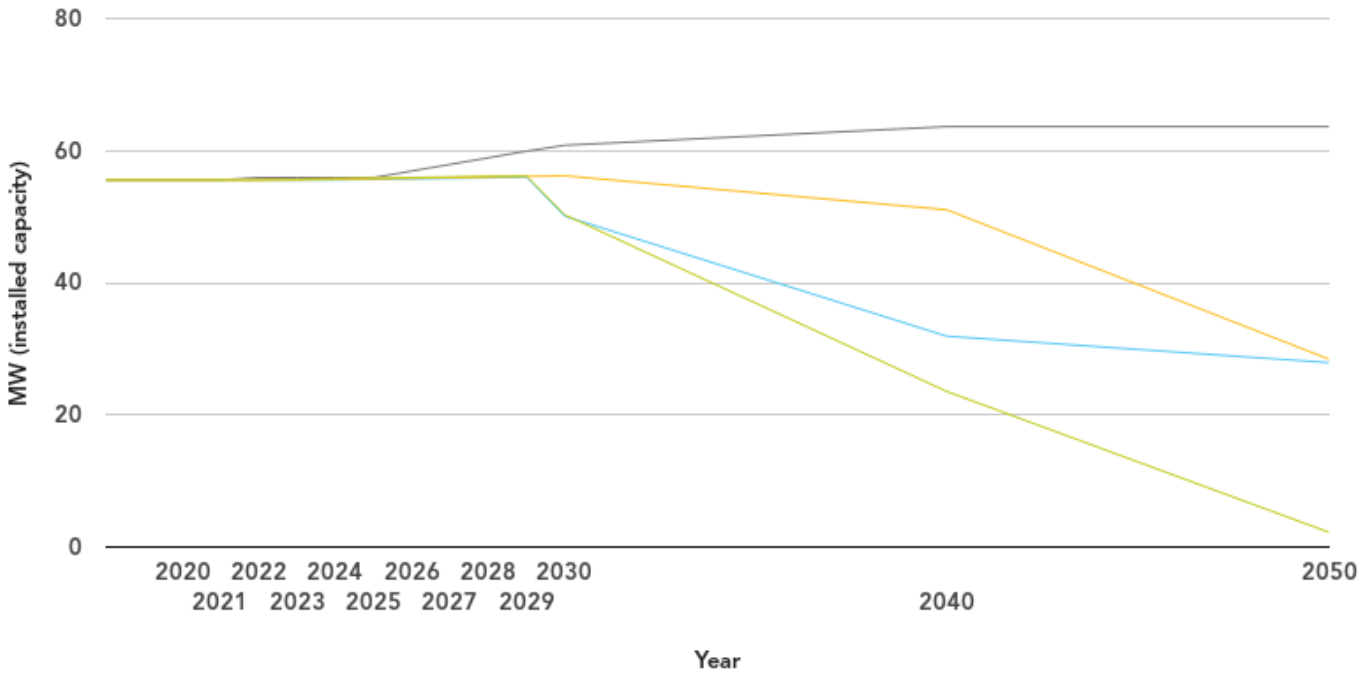


Technology Summary: Other Distributed Generation

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

WPD Best View scenario: aligned to Consumer Transformation

Year	Scenario			
	Steady Progression	System Transformation	Consumer Transformation	Leading the Way
Baseline	55.6	55.6	55.6	55.6
2020	55.6	55.6	55.6	55.6
2021	55.6	55.6	55.6	55.6
2022	55.9	55.6	55.6	55.6
2023	55.9	55.6	55.6	55.7
2024	55.9	55.6	55.7	55.7
2025	55.9	55.7	55.7	55.8
2026	56.9	55.7	55.8	55.9
2027	57.9	55.8	55.9	56.0
2028	58.9	55.9	56.0	56.1
2029	59.9	56.0	56.1	56.2
2030	60.8	50.1	56.2	50.3
2040	63.6	31.9	51.0	23.5
2050	63.6	27.9	28.4	2.2

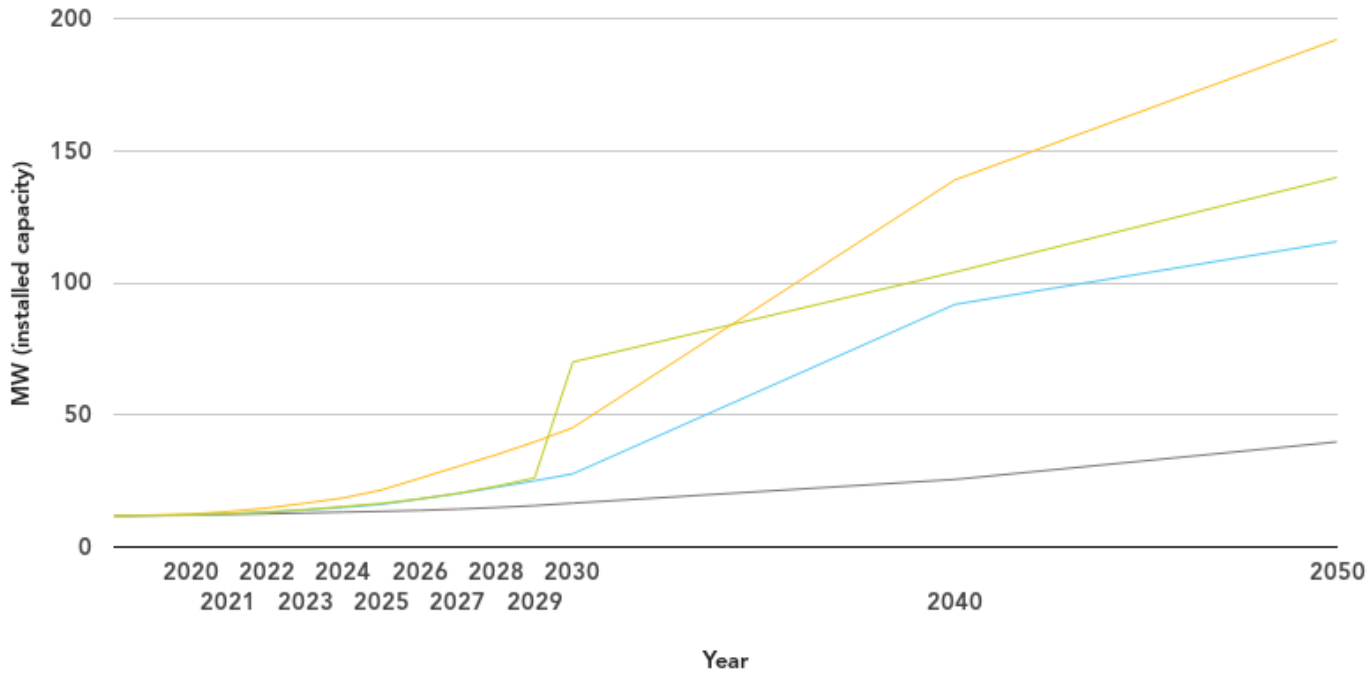


Technology Summary: Solar Generation

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

WPD Best View scenario: aligned to Consumer Transformation

Year	Scenario			
	Steady Progression	System Transformation	Consumer Transformation	Leading the Way
Baseline	11.8	11.8	11.8	11.8
2020	12.0	12.2	12.5	12.2
2021	12.3	12.6	13.4	12.6
2022	12.6	13.2	14.8	13.3
2023	12.9	14.0	16.6	14.2
2024	13.2	15.0	18.6	15.3
2025	13.5	16.1	21.6	16.5
2026	13.9	18.2	26.0	18.2
2027	14.4	20.2	30.5	20.3
2028	15.0	22.6	34.9	23.0
2029	15.7	25.1	39.8	26.1
2030	16.6	27.7	45.1	70.0
2040	25.6	91.8	138.9	104.0
2050	39.8	115.6	192.0	139.9

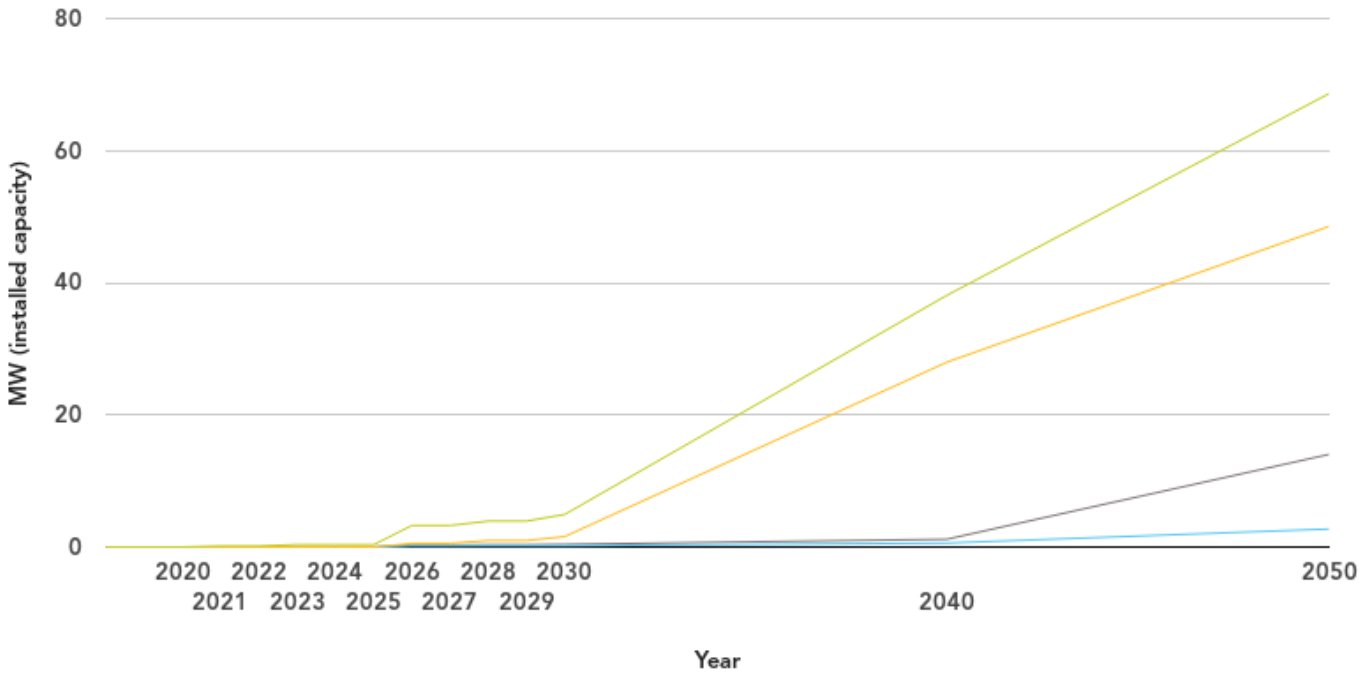


Technology Summary: Storage

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

WPD Best View scenario: aligned to Consumer Transformation

Year	Scenario			
	Steady Progression	System Transformation	Consumer Transformation	Leading the Way
Baseline	0.0	0.0	0.0	0.0
2020	0.0	0.0	0.0	0.0
2021	0.0	0.0	0.0	0.2
2022	0.0	0.0	0.0	0.2
2023	0.0	0.0	0.0	0.4
2024	0.0	0.0	0.0	0.4
2025	0.0	0.0	0.0	0.4
2026	0.3	0.2	0.5	3.3
2027	0.3	0.2	0.5	3.3
2028	0.4	0.2	1.0	3.9
2029	0.4	0.2	1.0	3.9
2030	0.4	0.2	1.6	4.9
2040	1.2	0.6	28.0	38.1
2050	14.0	2.7	48.5	68.6

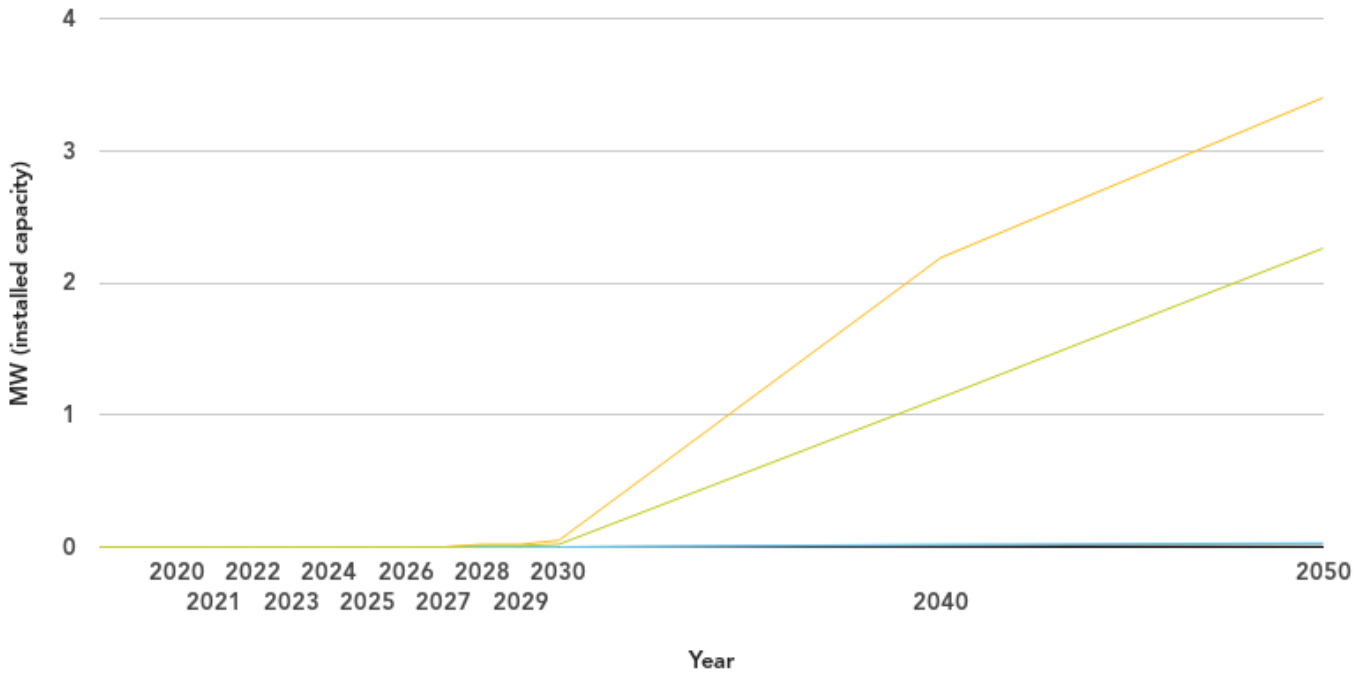


Technology Summary: Wind

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

WPD Best View scenario: aligned to Consumer Transformation

Year	Scenario			
	Steady Progression	System Transformation	Consumer Transformation	Leading the Way
Baseline	0.0	0.0	0.0	0.0
2020	0.0	0.0	0.0	0.0
2021	0.0	0.0	0.0	0.0
2022	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0
2025	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0	0.0
2030	0.0	0.0	0.0	0.0
2040	0.0	0.0	2.2	1.1
2050	0.0	0.0	3.4	2.3



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