

Distribution Future Energy Scenarios Summary

Local Authority: Charnwood District (B)

What are Distribution Future Energy Scenarios?

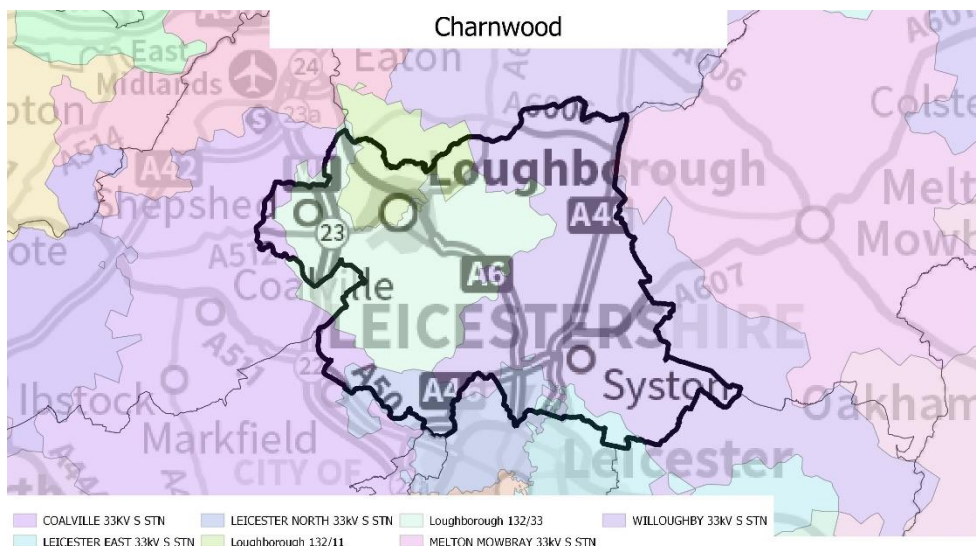
Western Power Distribution run Distribution Future Energy Scenarios (DFES) on an annual cycle for all licence areas, and represent a range of credible future scenarios of what could connect to the distribution network. The scenarios follow the same framework as used in National Grid's Future Energy Scenarios and account for differing uptakes of Electric Vehicles, Heat Pumps, new domestic and I&C developments and distributed generation connections.

WPD's network is split into the geographic areas supplied by each Primary substation or Bulk Supply Point, the growth projections of each technology are spatially allocated using local stakeholder knowledge and land resource assessments. The WPD Best View picks a particular scenario used for each technology which forms the basis of RIIO-ED2 strategic planning.

DFES scenario projections for Electricity Supply Areas and Local Authorities are available with further information on the website [here](#):

Charnwood District (B) Area

This report covers the area of Charnwood District (B) supplied from the WPD East Midlands licence area which is shown as the black highlighted area in the map below. The legend on this map shows the geographic areas fed from Primary/BSPs on the WPD network.



SCENARIO SUMMARY

This DFES study follows the 2018 Future Energy Scenarios framework, aligned to 2018 UK government decarbonisation targets of an 80% reduction in greenhouse gas emissions from 1990 levels. A summary of each scenario is below:

Two Degrees explores how the decarbonisation target can be achieved with a focus on larger and more centralised technologies. This scenario features changes to the energy landscape such as hydrogen heating networks and large-scale transmission connected generation technologies such as nuclear and offshore wind.

Community Renewables explores how the 2050 decarbonisation target can be achieved through a more decentralised energy landscape with high levels of smaller scale, local and domestic activity.

Consumer Evolution is a decentralised scenario which makes progress towards the decarbonisation target but fails to achieve the 80% reduction by 2050. Deployment is focused on smaller scale, local and domestic projects.

Steady Progression is a centralised scenario that makes progress towards, but does not meet, the 2050 decarbonisation target. In the timescale of this study, the scenario sees very low deployment of renewable technologies with gas generation continuing to play a significant role.

Scenario Projections Summary

Technology	Units	Baseline Total	Local Authority projections in 2030				
			Community Renewables	Consumer Evolution	Steady Progression	Two Degrees	WPD Best View
Air conditioning	Number of units	688	1949	3420	3420	1029	3420
Battery storage	Installed capacity (MW)	0.0	18.7	8.1	4.9	12.5	8.1
Electric vehicles	Number of units	413	28820	7265	7426	44884	28820
Heat pumps	Number of units	137	9137	2295	1115	5061	5061
Large scale PV	Installed capacity (MW)	40.8	72.2	71.0	40.8	77.1	71.0
New I&C developments	Floorspace (m2)	0.0	540630.0	346114.0	346114.0	441410.0	346114.0
New domestic developments	Number of houses	0	6826	5653	5653	5653	5653
Other generation	Installed capacity (MW)	11.2	78.9	70.3	32.5	36.6	32.7
Small scale PV	Installed capacity (MW)	9.3	31.1	15.2	12.4	19.6	15.2
Wind	Installed capacity (MW)	3.5	6.7	4.3	3.7	5.1	4.3

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. This work is undertaken in the Shaping Subtransmission studies, an extensive network review to identify what network constraints might occur under each scenario and detail potential strategic investment options to unlock future capacity.

These reports are published on our website [here](#):

How could we use your feedback?

To improve the DFES process, we would like to sense check our scenario projections against the ambitions of the relevant Local Authorities in our area. Attached is a feedback form, please send this back to wpdnetworkstrategy@westernpower.co.uk

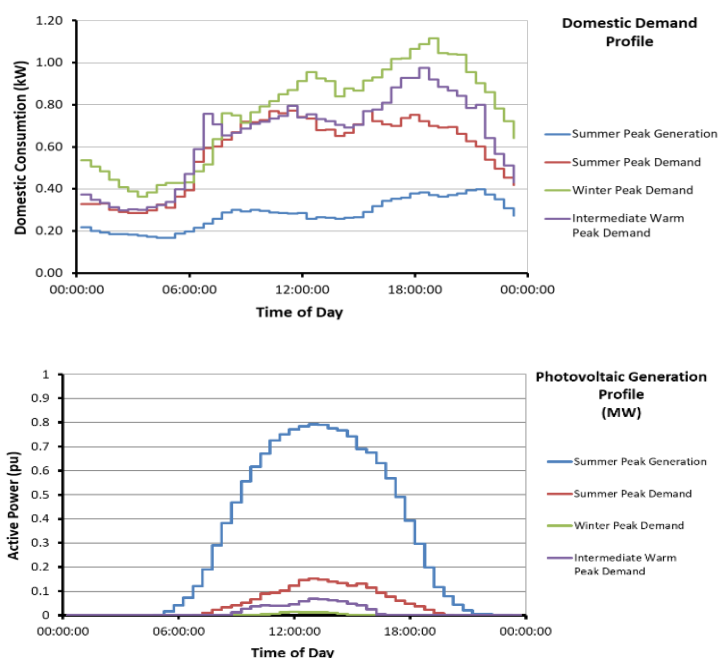


Figure 1: Example of the half hourly electrical profile used for new domestic developments and Solar PV generation

Technology: Air conditioning

The table and graph below show the scenario projections for each of the DFES scenarios, WPD Best View and years.

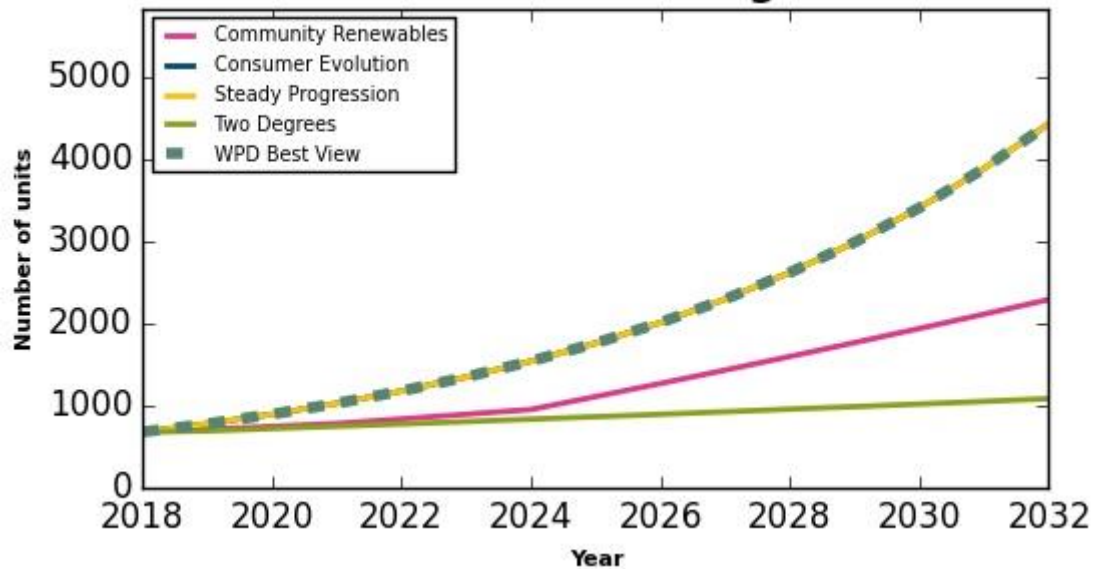
Units: Number of units

Charnwood District (B)

East Midlands

Year	Scenario				
	Community Renewables	Consumer Evolution	Steady Progression	Two Degrees	WPD Best View
2018	688	688	688	688	688
2019	720	788	788	701	788
2020	756	904	904	730	904
2021	791	1037	1037	758	1037
2022	847	1187	1187	786	1187
2023	904	1358	1358	815	1358
2024	962	1551	1551	845	1551
2025	1119	1770	1770	874	1770
2026	1279	2021	2021	904	2021
2027	1442	2306	2306	935	2306
2028	1608	2630	2630	967	2630
2029	1777	3000	3000	997	3000
2030	1949	3420	3420	1029	3420
2031	2124	3900	3900	1061	3900
2032	2302	4444	4444	1095	4444

Air conditioning



Technology: Battery storage

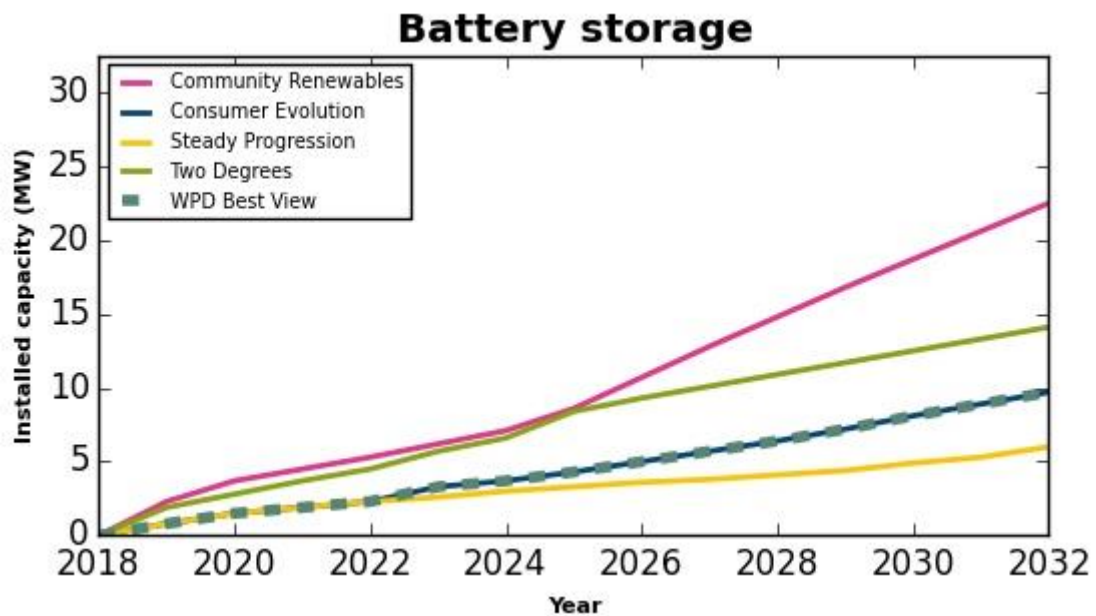
The table and graph below show the scenario projections for each of the DFES scenarios, WPD Best View and years.

Units: Installed capacity (MW)

Charnwood District (B)

East Midlands

Year	Scenario				
	Community Renewables	Consumer Evolution	Steady Progression	Two Degrees	WPD Best View
2018	0.0	0.0	0.0	0.0	0.0
2019	2.3	0.8	0.8	1.9	0.8
2020	3.7	1.5	1.5	2.8	1.5
2021	4.5	1.9	1.9	3.7	1.9
2022	5.3	2.3	2.3	4.5	2.3
2023	6.2	3.3	2.6	5.7	3.3
2024	7.1	3.7	3.0	6.6	3.7
2025	8.6	4.3	3.3	8.4	4.3
2026	10.7	5.0	3.6	9.3	5.0
2027	12.8	5.7	3.8	10.1	5.7
2028	14.8	6.4	4.1	10.9	6.4
2029	16.8	7.2	4.4	11.7	7.2
2030	18.7	8.1	4.9	12.5	8.1
2031	20.6	8.9	5.3	13.3	8.9
2032	22.5	9.7	6.0	14.1	9.7



Technology: Electric vehicles

The table and graph below show the scenario projections for each of the DFES scenarios, WPD Best View and years.

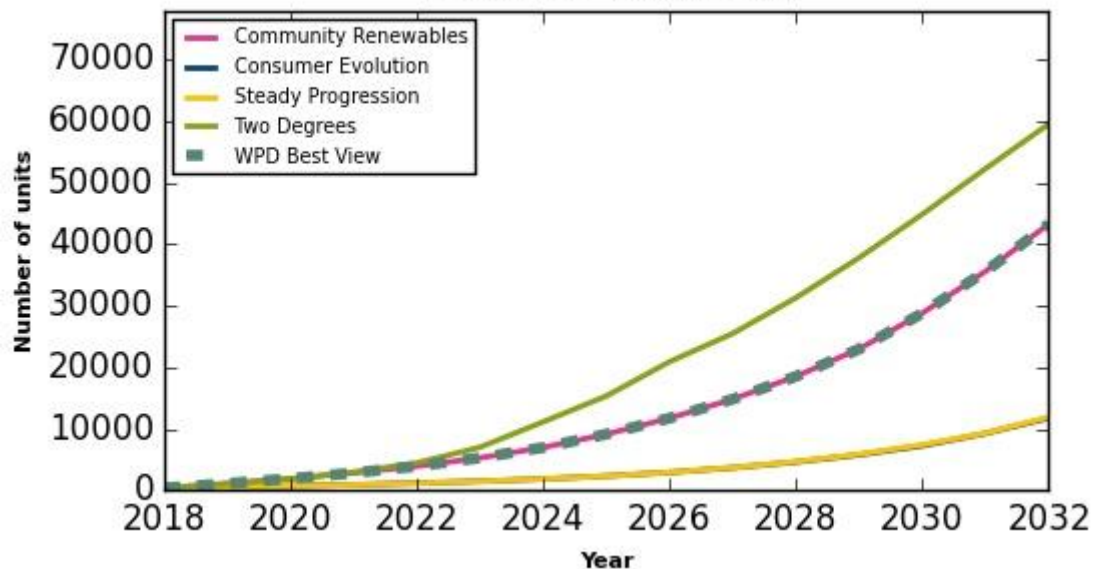
Units: Number of units

Charnwood District (B)

East Midlands

Year	Scenario				
	Community Renewables	Consumer Evolution	Steady Progression	Two Degrees	WPD Best View
2018	413	413	413	413	413
2019	1129	563	556	1030	1129
2020	1925	733	726	1860	1925
2021	2846	940	929	2986	2846
2022	3934	1191	1177	4463	3934
2023	5297	1497	1489	7006	5297
2024	6980	1873	1866	11136	6980
2025	9143	2348	2343	15338	9143
2026	11741	2940	2953	20909	11741
2027	14832	3689	3718	25497	14832
2028	18532	4621	4682	31300	18532
2029	22989	5795	5896	37810	22989
2030	28820	7265	7426	44884	28820
2031	35615	9275	9331	52290	35615
2032	43294	11763	11918	59545	43294

Electric vehicles



Technology: Heat pumps

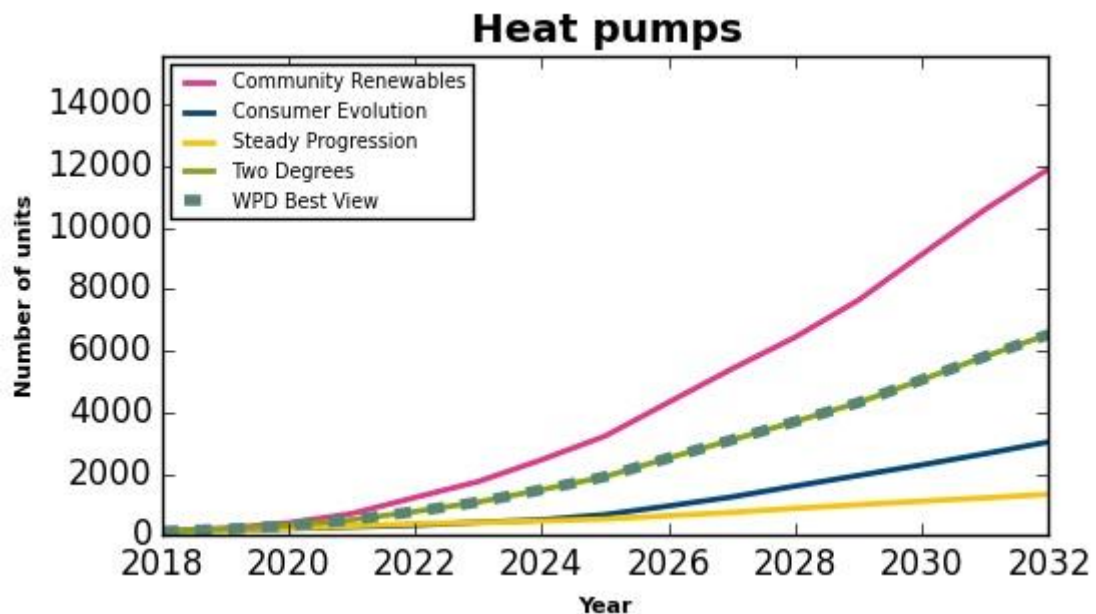
The table and graph below show the scenario projections for each of the DFES scenarios, WPD Best View and years.

Units: Number of units

Charnwood District (B)

East Midlands

Year	Scenario				
	Community Renewables	Consumer Evolution	Steady Progression	Two Degrees	WPD Best View
2018	137	137	137	137	137
2019	232	170	166	206	206
2020	406	225	238	322	322
2021	711	280	308	507	507
2022	1236	337	380	779	779
2023	1754	428	423	1087	1087
2024	2464	509	473	1489	1489
2025	3232	678	535	1912	1912
2026	4327	960	643	2518	2518
2027	5415	1252	750	3106	3106
2028	6447	1607	882	3703	3703
2029	7652	1952	1001	4320	4320
2030	9137	2295	1115	5061	5061
2031	10603	2659	1224	5822	5822
2032	11915	3040	1339	6534	6534



Technology: Large scale PV

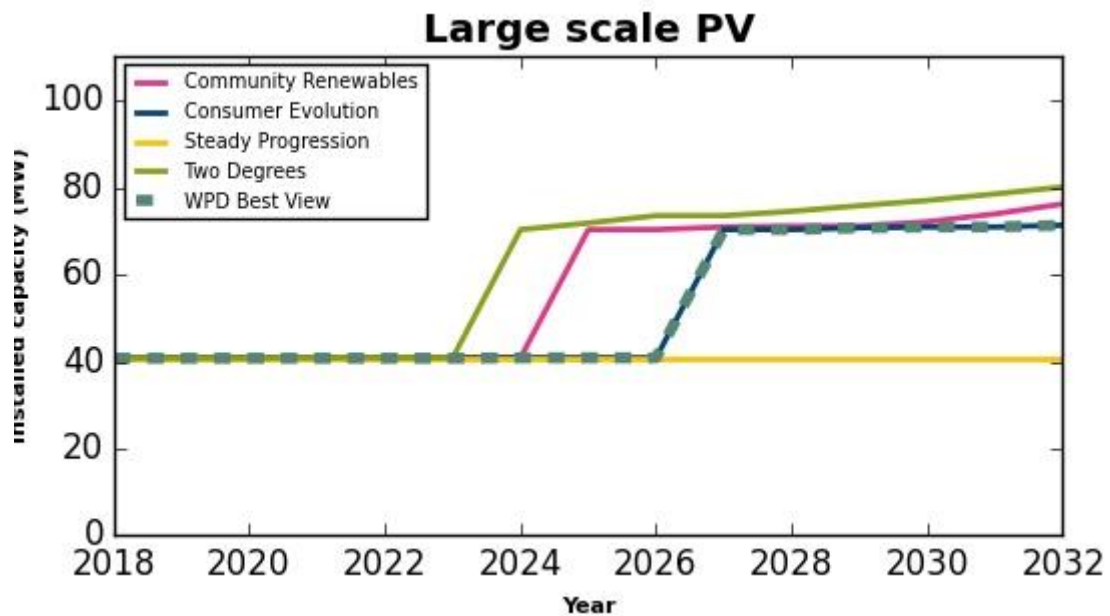
The table and graph below show the scenario projections for each of the DFES scenarios, WPD Best View and years.

Units: Installed capacity (MW)

Charnwood District (B)

East Midlands

Year	Scenario				
	Community Renewables	Consumer Evolution	Steady Progression	Two Degrees	WPD Best View
2018	40.8	40.8	40.8	40.8	40.8
2019	40.8	40.8	40.8	40.8	40.8
2020	40.8	40.8	40.8	40.8	40.8
2021	40.8	40.8	40.8	40.9	40.8
2022	40.9	40.8	40.8	40.9	40.8
2023	40.9	40.8	40.8	40.9	40.8
2024	40.9	40.9	40.8	70.4	40.9
2025	70.4	40.9	40.8	71.9	40.9
2026	70.4	40.9	40.8	73.6	40.9
2027	71.0	70.4	40.8	73.6	70.4
2028	71.2	70.4	40.8	74.6	70.4
2029	71.2	70.8	40.8	75.9	70.8
2030	72.2	71.0	40.8	77.1	71.0
2031	74.0	71.0	40.8	78.6	71.0
2032	76.3	71.4	40.8	80.2	71.4



Technology: New I&C developments

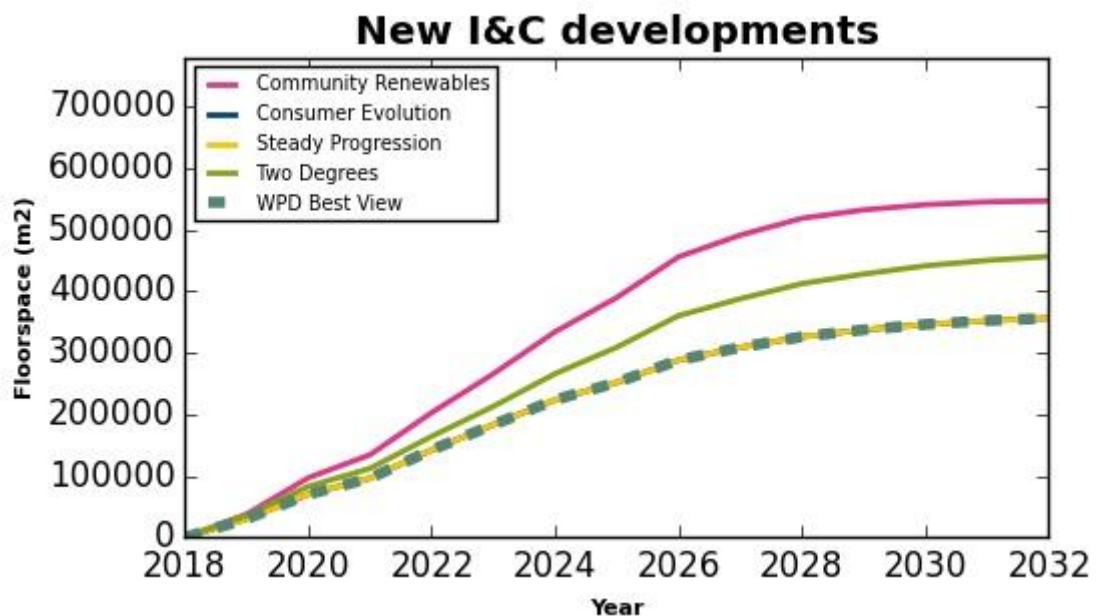
The table and graph below show the scenario projections for each of the DFES scenarios, WPD Best View and years.

Units: Floorspace (m2)

Charnwood District (B)

East Midlands

Year	Scenario				
	Community Renewables	Consumer Evolution	Steady Progression	Two Degrees	WPD Best View
2018	0.0	0.0	0.0	0.0	0.0
2019	37855.0	30242.0	30242.0	35810.0	30242.0
2020	96982.0	70145.0	70145.0	82871.0	70145.0
2021	134326.0	96338.0	96338.0	112249.0	96338.0
2022	202929.0	142356.0	142356.0	164298.0	142356.0
2023	265962.0	183232.0	183232.0	213011.0	183232.0
2024	334274.0	223686.0	223686.0	266075.0	223686.0
2025	389828.0	251778.0	251778.0	309164.0	251778.0
2026	455876.0	288220.0	288220.0	360259.0	288220.0
2027	491220.0	308687.0	308687.0	387816.0	308687.0
2028	518534.0	326111.0	326111.0	412407.0	326111.0
2029	532135.0	337356.0	337356.0	427924.0	337356.0
2030	540630.0	346114.0	346114.0	441410.0	346114.0
2031	545196.0	352292.0	352292.0	450143.0	352292.0
2032	546784.0	356146.0	356146.0	456430.0	356146.0



Technology: New domestic developments

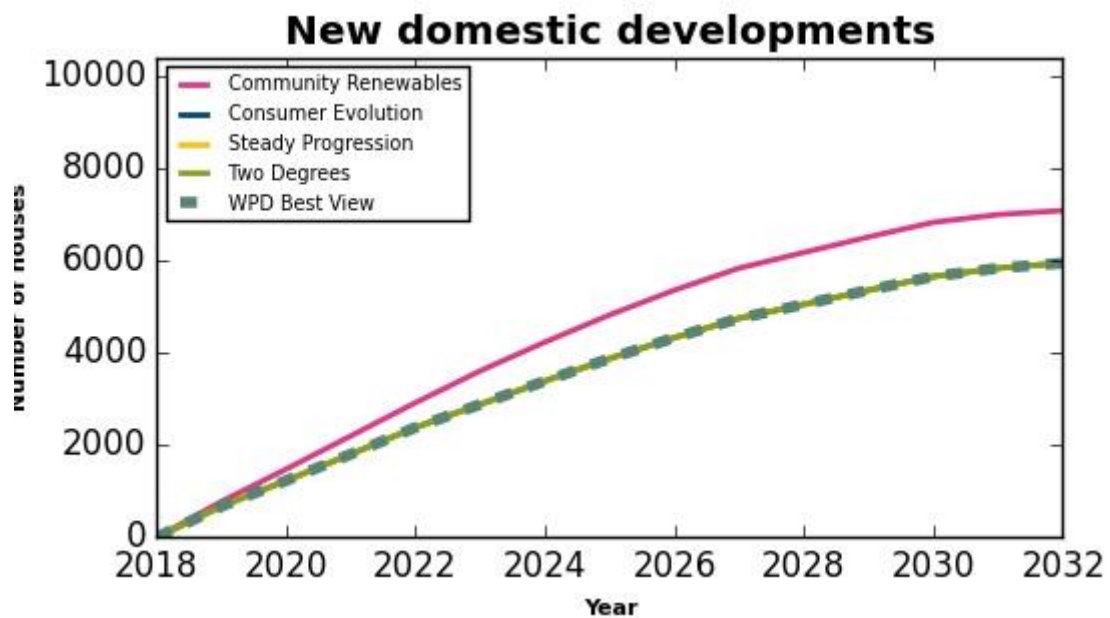
The table and graph below show the scenario projections for each of the DFES scenarios, WPD Best View and years.

Units: Number of houses

Charnwood District (B)

East Midlands

Year	Scenario				
	Community Renewables	Consumer Evolution	Steady Progression	Two Degrees	WPD Best View
2018	0	0	0	0	0
2019	776	672	672	672	672
2020	1477	1229	1229	1229	1229
2021	2197	1802	1802	1802	1802
2022	2918	2381	2381	2381	2381
2023	3607	2883	2883	2883	2883
2024	4232	3388	3388	3388	3388
2025	4821	3876	3876	3876	3876
2026	5357	4327	4327	4327	4327
2027	5834	4747	4747	4747	4747
2028	6173	5049	5049	5049	5049
2029	6510	5357	5357	5357	5357
2030	6826	5653	5653	5653	5653
2031	6993	5833	5833	5833	5833
2032	7081	5944	5944	5944	5944



Technology: Other generation

The table and graph below show the scenario projections for each of the DFES scenarios, WPD Best View and years.

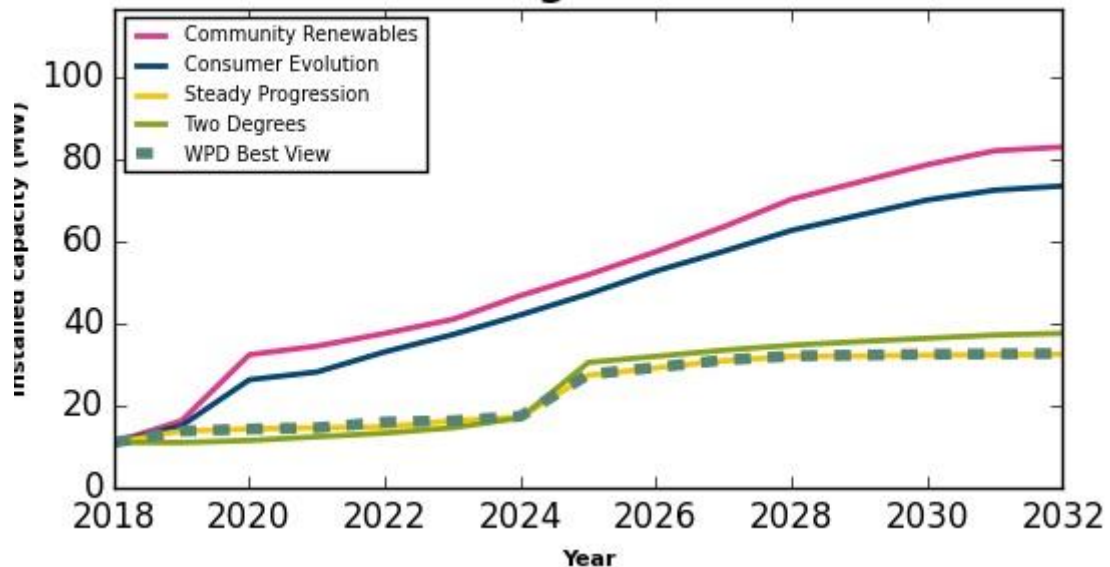
Units: Installed capacity (MW)

Charnwood District (B)

East Midlands

Year	Scenario				
	Community Renewables	Consumer Evolution	Steady Progression	Two Degrees	WPD Best View
2018	11.2	11.2	11.2	11.2	11.2
2019	16.5	15.3	14.0	11.2	14.0
2020	32.6	26.5	14.5	11.7	14.5
2021	34.7	28.4	14.8	12.6	14.8
2022	37.8	33.3	15.0	13.5	16.2
2023	41.2	37.5	16.5	14.8	16.5
2024	47.0	42.3	17.4	17.2	17.6
2025	52.1	47.4	27.6	30.7	27.8
2026	57.7	53.0	29.4	32.2	29.5
2027	63.8	57.8	31.1	33.7	31.3
2028	70.5	62.9	32.2	34.9	32.3
2029	74.7	66.6	32.3	35.8	32.5
2030	78.9	70.3	32.5	36.6	32.7
2031	82.3	72.7	32.6	37.4	32.8
2032	83.2	73.7	32.7	37.8	32.9

Other generation



Technology: Small scale PV

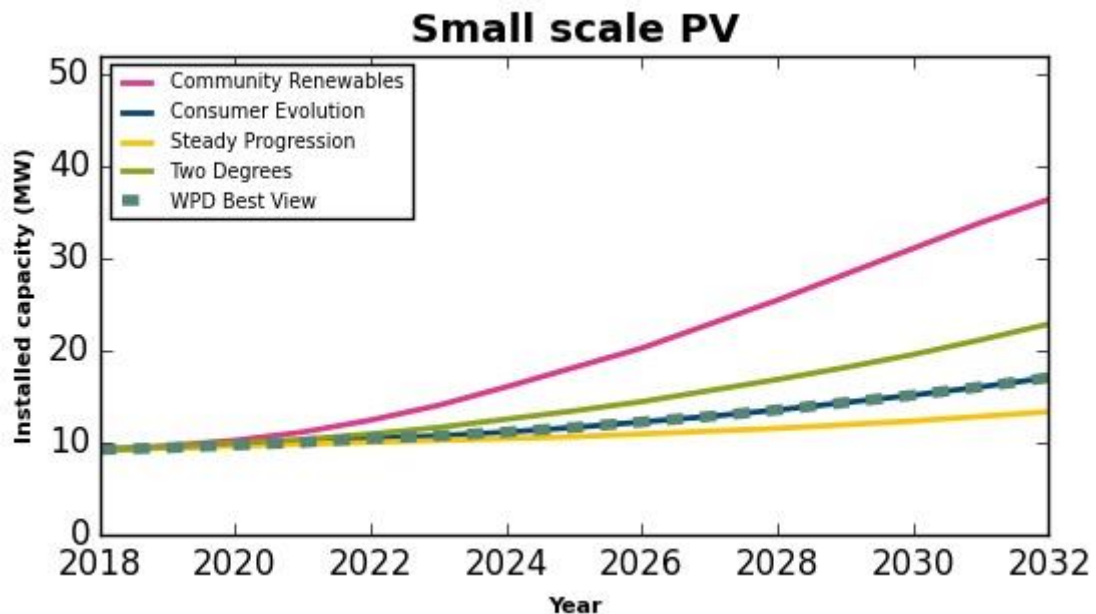
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Units: Installed capacity (MW)

Charnwood District (B)

East Midlands

Year	Scenario				
	Community Renewables	Consumer Evolution	Steady Progression	Two Degrees	WPD Best View
2018	9.3	9.3	9.3	9.3	9.3
2019	9.7	9.5	9.5	9.6	9.5
2020	10.3	9.8	9.7	10.0	9.8
2021	11.2	10.1	9.9	10.4	10.1
2022	12.5	10.5	10.1	11.0	10.5
2023	14.1	10.8	10.3	11.7	10.8
2024	16.1	11.2	10.5	12.6	11.2
2025	18.2	11.7	10.7	13.5	11.7
2026	20.3	12.3	11.0	14.5	12.3
2027	22.9	12.9	11.3	15.7	12.9
2028	25.5	13.6	11.6	16.9	13.6
2029	28.3	14.4	12.0	18.2	14.4
2030	31.1	15.2	12.4	19.6	15.2
2031	33.9	16.1	12.9	21.2	16.1
2032	36.4	17.1	13.4	22.9	17.1



Technology: Wind

The table and graph below show the scenario projections for each of the DFES scenarios, WPD Best View and years.

Units: Installed capacity (MW)

Charnwood District (B)

East Midlands

Year	Scenario				
	Community Renewables	Consumer Evolution	Steady Progression	Two Degrees	WPD Best View
2018	3.5	3.5	3.5	3.5	3.5
2019	3.5	3.5	3.5	3.5	3.5
2020	3.5	3.5	3.5	3.5	3.5
2021	3.5	3.5	3.5	3.5	3.5
2022	3.5	3.5	3.5	3.5	3.5
2023	3.5	3.5	3.5	3.5	3.5
2024	3.6	3.5	3.5	3.5	3.5
2025	3.9	3.6	3.5	3.5	3.6
2026	4.3	3.6	3.5	3.8	3.6
2027	4.7	3.7	3.6	3.8	3.7
2028	5.3	4.0	3.6	4.4	4.0
2029	6.0	4.0	3.7	5.1	4.0
2030	6.7	4.3	3.7	5.1	4.3
2031	7.4	4.5	3.9	5.8	4.5
2032	8.3	4.8	4.2	5.8	4.8

Wind

