

INSTALLATIONS OF NATIONAL SIGNIFICANCE AND THE SETTING OF LOCAL RENEWABLE ELECTRICITY TARGETS

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The Campaign to Protect Rural England exists to promote the beauty, tranquillity and diversity of rural England by encouraging the sustainable use of land and other natural resources in town and country.

Summary

1. This report concludes that it would be appropriate for Dorset Council to reintroduce the 2011 policy whereby each UK local authority was able to reduce its 2020 renewable energy target by 50% from 15% (the UK target) to 7.5%. This policy was proposed and implemented when it was realised that if the 15% target were to be realised, the damage that would be done to Dorset's rural assets, particularly its landscapes, would be unacceptable.

2. The means by which reduction was to be carried out was for a local authority not to claim the output from an installation of National Significance for its area but to allow the aggregate output from all such installations to be distributed, virtually, to every local administration as 50% of its 2020 target. It can be noted that the 2020 target required 15% of total energy consumption to be generated by renewable sources. In contrast, the current 2050 target requires 100% of total electricity consumption to be generated from renewable sources.

3. At the time the decision was made, 23 Installations of National Significance were responsible for 31% of UK renewable electricity output. By 31 December 2020 these figures had risen to 90 and 54%, respectively. This evidence and an analysis of future trends, importantly the Government focus on offshore wind and nuclear, suggest that a figure of 70% is possible in the medium to long term.

4. The significance of a 70% reduction in the 2050 target is summarised in Tables A & B on page 4 for three authorities: England, Dorset Council UA and Bournemouth, Christchurch & Poole UA.

5. As an example, Dorset Council's target of 3.84 TWh is reduced to 1.15 TWh. Allowing for current generation of 0.50 TWh, the remaining 0.65 TWh could be provided by installation of roof-mounted solar photovoltaic panels on 50.3% of currently unutilised domestic, commercial and public buildings. The methodology employed to allow these conclusions is the subject of a sister report "Solar Photovoltaics in 2050 Renewable Electricity Technology Mixes and the Role of Roof-Mounted Installations.

Installations of National Significance & the Setting of Local Renewable Electricity Targets

1. In its Final Draft for Endorsement of the Bournemouth, Dorset & Poole Renewable Energy Strategy to 2020, published March 2012, the Dorset Energy Partnership (DEP) announced its expectation that approximately half its 2020 renewable energy target would be delivered via resources considered by Government to be of national significance^{1,2,3}. This expectation was deduced from the UK Renewable Energy Roadmap, para. 2.7, p.14, published BEIS, 12 July 2011.

2. There are two criteria that have to be satisfied for an installation to be of National Significance: location and installed capacity. If its location is offshore its installed capacity has to be greater than 100 MW. If its location is onshore its installed capacity has to be greater than 50 MW. All other installations are defined as being of Local Significance.

3. The installed capacities to produce this report have been taken from two Government publications: the Renewable Energy Planning Database (REPD) Extract, which records capacities from the highest down to 0.1 MW and the Feed-in Tariff (FIT) Installation Report which records capacities from 5 MW down to the lowest, 0.02 kW. Only capacities of 0.2 MW and above in the REPD Extract and below 0.2 MW in the FIT report have been utilised. This allows full coverage of the data available and avoids duplication.

4. Although the distinction between national and local is based on installed capacity, an installation's performance is based on energy generation. The load factors required to calculate energy generation have also been taken from two Government sources: The Digest of UK Energy Statistics (DUKES), Table 6.5, published, BEIS 30 Jul 2020, for the larger installations (Table 11a) and Feed-in Tariff Load Factors, Energy Trends, published BEIS, 22 Dec 2020, for the smaller (FIT) installations (Table 11b). Three technologies are not covered in these reports. Load factors for these have been obtained elsewhere.

5. The installations recorded in this report are either operational or in the planning pipeline. Installations in the pipeline are those that have been submitted for planning consent, those that have been permitted and are awaiting construction and those that are under construction. The attrition that occurs as installations pass through the pipeline has not been taken into account and the aggregate annual energy generation for these installations represents a theoretical maximum for eventual deployment. Although the magnitude of future generation is uncertain, the split of annual energy generation between National and Local installations expressed as percentages is not significantly affected unless their attrition rates are significantly different. Whether or not there is a significant difference in rates has not been determined for the data published in this report.

6. Tables 2 to 9 of this report provide detailed estimates of the contribution of installations of National and Local Significance to UK renewable energy generation from 30 Jun 2011 to 31 Dec 2021. Tables 1 (a) & 1 (b) provide summaries of data for installations of National Significance and Local Significance, respectively.

6.1 Table 2 shows the annual contribution from operational installations of National Significance at 30 June 2011, close to the 12 July 2011 publication date of the BEIS Road Map, to be just 31%.

6.2 Table 3 shows that the contribution increases to 46% if installations with planning consent that are under construction or awaiting construction are included.

6.3 Table 4 indicates that the actual contribution from operational installations at 31 December 2020 (the last day of Target Year 2020), published 23 February 2021, was 54.1%.

6.4 Table 5 shows a minimal 0.1% increase to 54.2% in generation for installations of National Significance in 2021. Just one installation was commissioned during the year. This consisted of twenty-one 145 m high onshore wind turbines with a total capacity of 75.5 MW located in the Scottish Borders. Similarly, only 201 installations of Local Significance were commissioned during the year. This pause in deployment can be attributed to the negative impacts of Covid-19.

6.5 Table 6 indicates that the contribution increases to 64% if installations with planning consent that are under construction or awaiting construction are added to the operational installations in Table 5.

6.6 Table 7 indicates that of 400 installations awaiting planning approval at 31 Dec 2021, 38 (9.5%) are installations of National Significance and are responsible for 69% of total annual generation.

6.7 Table 8 indicates that if installations Awaiting Approval are added to the installations in Table 6 there is a modest increase to 65%.

7. The increase in annual generation for operational installations of National Significance from 31.4% at 30 June 2011 to 54.2% at 31 December 2021 (having been forecast to increase to about 50%), represents a mean annual increase of 2.17%. If this rate of increase were to be maintained, the the estimate in Table 8 could be reached in about 5 years.

8. Ambitions set out by Government in its recent British Energy Security Strategy, published 7 April 2022, suggest that 65% could be a conservative estimate of what might be achieved by 2030:

8.1 It is determined to deploy 50 GW of offshore wind by that date. 29.1 GW of this is either operational or already in the planning pipeline. Offshore wind's historical record (Table 8) indicates that 95.4% of the remaining 20.9 GW could generate an annual 73.23 TWh from installations of National Significance. This would increase their contribution from 153.70 TWh to 226.93 TWh.

8.2 It refers to the Scottish Government's 28 October 2021 Consultation Paper on Onshore Wind Policy. This states its ambition to have up to 20.4 GW of onshore wind installed by 2030. Scotland already has 18.86 GW that are either operational or in the planning pipeline. Scotland's onshore wind historical record (Table 14) indicates that 63.4% of the balance of 1.54 GW could generate an annual 2.26 TWh. This can be added to future generation of National Significance, raising it from 226.93 TWh to 229.19 TWh.

8.2.1 It can be noted (Table 14) that Scotland is responsible for 73.8% of the UK operational and potential generation from onshore wind. This contrasts with England's 11.7% contribution to the total. The 7 April 2022 strategy announcement is clear that the long-standing suppression of onshore wind deployment in England is likely to continue.

8.3 It sets out its ambition for the UK to have 24 GW of operational nuclear power by 2050. Assuming a load factor of 0.9, this would be sufficient to generate an annual 189.22 TWh or 28% of the BEIS Dynamic Dispatch Team's estimate of 676.76 TWh for high electricity demand in 2050.

8.3.1 All operational and planned UK nuclear power stations have an installed capacity well in excess of 100 MW and are considered to be of National Significance. They play an important role as a reliable "low-carbon" (rather than renewable) source of electricity when wind speeds and sunlight are at low levels. The term "low carbon" is used because although nuclear technology does not emit greenhouse gases, it relies upon uranium as a fuel, which is clearly not renewable.

8.3.2 When added to the previously unidentified contributions to generation of National Significance from offshore and onshore wind (8.1 & 8.2 above) the 189.22 TWh generation from nuclear raises the identified generation in Table 8 from 153.70 to 418.41 TWh, an increase of 172%. It can be noted that 418.41 TWh represents 83.435% of total generation but this would be reduced by increases in generation of Local Significance that have not been estimated for inclusion in this report.

9. In conclusion, the above analysis suggests that it would be safe to assume that by 2030 the sources of at least 70% of annual electricity generation would be a combination of renewable and low carbon (principally nuclear) energy installations of National Significance.

10. What remains is a decision to reintroduce the 2011 renewable energy policy stated in paragraph 1 so that it would be appropriate for a Local Authority to reduce its 2050 Target for 100% of electricity consumption to be from local renewable sources by the percentage that the UK is generating from installations of National Significance.

11. Tables A & B below provide information on the impact on three administrative areas of sharing generation from installations of National Significance: England, Dorset Council and the Unitary Authority BCP. In preparing the table the following assumptions have been made and information provided:

11.1 During 2050 the UK reaches its annual renewable electricity target of 677 TWh, the higher of the targets chosen by the Dynamic Dispatch Team at the Department for Business, Energy & Industrial Strategy for its model of 2050.

11.2 70% of the UK generation is from Installations of National Significance and 30% is from Installations of Local Significance situated in the 379 Local Authorities that constitute the UK.

11.3 The UK 2050 target has been suggested by the Government. The 2050 targets for England, Dorset and BCP are based on 2019 electricity consumption⁴. These are then expressed as a percentage of the UK consumption in 2019. These percentages are then applied to the UK 2050 Government target to obtain an unadjusted 2050 target that requires to be reduced by 70% to allow for its share of generation from Installations of National Significance.

11.4 Table 1b also provides information on current renewable energy generation from installations of Local Significance, the balance of generation required to meet the 2050 target and the % of unused buildings necessary to reach the target by installation of roof-mounted solar photovoltaics.

Administrative Authority	2019 Electricity Consumption (most recent available)		2050 Higher Demand ⁵		Contribution from Installations of National Significance		Balance Required to Meet Demand
	TWh	% of UK	TWh	% of UK	TWh	TWh	
UK (379 LAs)	280.0132	100.0	676.7506	70.0	473.7254	203.0252	
England (314 LAs)	230.1403	82.2	556.2152	70.0	389.3506	166.8646	
Dorset	1.5878	0.6	3.8374	70.0	2.6862	1.1512	
BCP	1.4729	0.5	3.5598	70.0	2.4918	1.0679	

Administrative Authority	Operational Installations of Local Significance at 31 Dec 2021*		Balance Required to Meet Demand	Solar PV Available from Unused Buildings	% of Unused Buildings Required	Average Capacity per Roof	Number of Buildings Required
	Number	TWh	TWh	TWh		kW	
UK (379 LAs)	869,450	52.7110	150.3142	unknown**	unknown**	unknown**	unknown**
England (314 LAs)	787,359	33.2654	133.5992	155.5948	85.8635	6.2995	21,596,855
Dorset	8,653	0.4987	0.6525	1.2968	50.3194	7.1928	92,384
BCP	6,443	0.0267	1.0412	1.0598	98.2438	6.1600	172,132

*Dorset and BCP have no installations of National Significance

**Building numbers for Scotland, Wales and Northern Ireland have not been assessed.

REFERENCES

1. Guidance on Nationally Significant Infrastructure, Planning Act 2008, published DCLG, March 2017.
2. National Policy Statement for Renewable Energy Infrastructure (EN-3), published DECC, Jul 2011.
3. Overarching National Policy Statement for Energy (EN-1), published DECC, July 2011.
4. Sub-national total final energy consumption 2019, published BEIS, 30 Sep 2021.
<https://www.gov.uk/government/statistics/total-final-energy-consumption-at-regional-and-local-authority-level-2005-to-2019>
5. Modelling 2050: Electricity System Analysis, published by the BEIS Dynamic Dispatch Team, 4 Dec 2020.
<https://www.gov.uk/government/publications/modelling-2050-electricity-system-analysis>

UK Renewable Electricity Installations					
Table 1 (a) SUMMARY OF ESTIMATES OF GENERATION BY INSTALLATIONS OF NATIONAL SIGNIFICANCE					
Date of Assessment	Table Number	Number of Installations	Development Status of installations	Annual Generation of National Significance	
				TWh	% of Total
30 Jun 2011	2	23	Operational only	6.63	31.4
	3	57	Operational, Under Construction and Awaiting Construction	25.92	46.4
31 Dec 2020	4	90	Operational only	61.65	54.1
31 Dec 2021	5	91	Operational only	62.43	54.2
	6	153	Operational, Under Construction and Awaiting Construction	134.33	64.2
	7	38	Submitted for Approval only	19.36	69.1
	8	191	Operational, Under Construction, Awaiting Construction and Submitted for Approval	153.70	64.8

UK Renewable Electricity Installations					
Table 1 (b) SUMMARY OF ESTIMATES OF GENERATION BY INSTALLATIONS OF LOCAL SIGNIFICANCE					
Date of Assessment	Table Number	Number of Installations	Development Status of installations	Annual Generation of National Significance	
				TWh	% of Total
30 Jun 2011	2	45,091	Operational only	14.46	68.6
	3	45,472	Operational, Under Construction and Awaiting Construction	29.97	53.6
31 Dec 2020	4	869,252	Operational only	52.23	45.9
31 Dec 2021	5	869,449	Operational only	52.68	45.8
	6	870,521	Operational, Under Construction and Awaiting Construction	74.92	35.8
	7	362	Submitted for Approval only	8.65	30.9
	8	870,883	Operational, Under Construction, Awaiting Construction and Submitted for Approval	83.58	35.2

UK Renewable Electricity Installations					
Table 2 OPERATIONAL at 30 June 2011					
Technology	Number of Installations	Capacity MW	Load Factor	Generation	
				Annual TWh	Split %
Hydro Large	2	165.0	0.3552	0.51	
Waste Incineration	2	106.0	0.3602	0.33	
Plant Biomass	1	50.4	0.7479	0.33	
NATIONAL SIGNIFICANCE	23	2,372.4	0.3188	6.63	31.4
Wind Onshore	1,750	2,920.7	0.2644	6.76	
Landfill Gas	264	741.1	0.4304	2.79	
Plant Biomass	174	246.6	0.7475	1.61	
Waste Incineration	22	338.1	0.3602	1.07	
Hydro Large	21	305.6	0.3552	0.95	
Wind Offshore	4	194.8	0.3992	0.68	
Hydro Small	241	82.3	0.3814	0.28	
Anaerobic Digestion	21	32.7	0.6165	0.18	
Solar Photovoltaics	42,591	121.2	0.1012	0.11	
Sewage Sludge Digestion	1	5.5	0.4684	0.02	
Shoreline Wave	2	24.0	0.0371	0.01	
LOCAL SIGNIFICANCE	45,091	5,012.6	0.3293	14.46	68.6
NATIONAL + LOCAL	45,114	7,385	0.3260	21.09	100.0

UK Renewable Electricity Installations					
Table 3 OPERATIONAL, UNDER CONSTRUCTION & AWAITING					
CONSTRUCTION at 30 June 2011					
Technology	Number of Installations	Capacity MW	Load Factor	Generation	
				Annual TWh	Split %
Wind Offshore	12	3,830.2	0.3992	13.40	
Wind Onshore	35	3,384.2	0.2643	7.84	
Plant Biomass	3	414.4	0.7479	2.71	
Waste Incineration	4	278.0	0.3602	0.88	
Advanced Conversion	1	81.0	0.8200	0.58	
Hydro Large	2	165.0	0.3552	0.51	
NATIONAL SIGNIFICANCE	57	8,152.8	0.3629	25.92	46.4
Wind Onshore	1,930	5,464.3	0.2694	12.89	
Plant Biomass	195	710.7	0.7477	4.65	
Wind Offshore	13	985.3	0.3992	3.45	
Landfill Gas	266	746.2	0.4304	2.81	
Waste Incineration	38	740.8	0.3602	2.34	
Advanced Conversion	16	175.0	0.8200	1.26	
Hydro Large	21	305.6	0.3552	0.95	
Anaerobic Digestion	59	124.0	0.6149	0.67	
Solar Photovoltaics	42,673	458.2	0.1078	0.43	
Hydro Small	252	106.5	0.3814	0.36	
Hot Dry Rocks	2	10.0	0.9100	0.08	
Sewage Sludge Digestion	3	15.5	0.4684	0.06	
Shoreline Wave	2	24.0	0.0371	0.008	
Tidal	2	12.0	0.0371	0.004	
LOCAL SIGNIFICANCE	45,472	9,878.1	0.3463	29.97	53.6
NATIONAL + LOCAL	45,529	18,031	0.3538	55.89	100.0

UK Renewable Electricity Installations					
Table 4 OPERATIONAL at 31 December 2020					
Technology	Number of Installations	Capacity MW	Load Factor	Generation	
				Annual TWh	Split %
Wind Offshore	23	9,188.2	0.3889	31.30	
Plant Biomass	6	2,470.4	0.7550	16.34	
Wind Onshore	52	5,203.1	0.2662	12.13	
Waste Incineration	6	416.0	0.3570	1.30	
Hydro Large	2	165.0	0.3514	0.51	
Solar Photovoltaics	1	69.8	0.1099	0.07	
NATIONAL SIGNIFICANCE	90	17,512.5	0.4018	61.65	54.1
Wind Onshore	7,272	8,271.6	0.2663	19.30	
Solar Photovoltaics	859,771	12,123.4	0.1072	11.39	
Plant Biomass	600	990.5	0.7546	6.55	
Wind Offshore	19	1,218.50	0.3889	4.15	
Landfill Gas	268	747.70	0.4600	3.01	
Waste Incineration	49	934.10	0.3570	2.92	
Anaerobic Digestion	209	338.2	0.6051	1.79	
Advanced Conversion	17	186.30	0.8200	1.34	
Hydro Large	21	305.60	0.3514	0.94	
Hydro Small	1,008	186.4	0.3831	0.63	
Sewage Digestion	12	50.20	0.4660	0.20	
Shoreline Wave	2	24.00	0.0371	0.01	
Tidal	4	10.50	0.0371	0.003	
LOCAL SIGNIFICANCE	869,252	25,386.9	0.2349	52.23	45.9
NATIONAL + LOCAL	869,342	42,899.4	0.3030	113.88	100.0

UK Renewable Electricity Installations					
Table 5 OPERATIONAL at 31 December 2021					
Technology	Number of Installations	Capacity MW	Load Factor	Generation	
				Annual TWh	Split %
Wind Offshore	23	9,188.2	0.3992	32.13	
Plant Biomass	6	2,470.4	0.7479	16.18	
Wind Onshore	53	5,278.6	0.2643	12.22	
Waste Incineration	6	416.0	0.3602	1.31	
Hydro Large	2	165.0	0.3552	0.51	
Solar Photovoltaics	1	69.8	0.1102	0.07	
NATIONAL SIGNIFICANCE	91	17,588.0	0.4052	62.43	54.2
Wind Onshore	7,274	8,443.2	0.2644	19.56	
Solar Photovoltaics	860,468	12,181.1	0.1074	11.46	
Plant Biomass	71	993.8	0.7479	6.51	
Wind Offshore	19	1,218.5	0.3992	4.26	
Waste Incineration	49	934.1	0.3602	2.95	
Landfill Gas	269	748.7	0.4304	2.82	
Anaerobic Digestion	213	340.1	0.6167	1.84	
Advanced Conversion	18	206.3	0.8200	1.48	
Hydro Large	21	305.6	0.3552	0.95	
Hydro Small	1,033	190.9	0.3807	0.64	
Sewage Sludge Digestion	12	50.2	0.4684	0.21	
Hot Dry Rocks	1	3.0	0.9100	0.02	
Shoreline Wave	2	24.0	0.0371	0.01	
Tidal	4	10.5	0.0371	0.003	
LOCAL SIGNIFICANCE	869,454	25,650	0.2346	52.71	45.8
NATIONAL + LOCAL	869,545	43,238.1	0.3040	115.15	100.0

UK Renewable Electricity Installations					
Table 6 OPERATIONAL, UNDER CONSTRUCTION & AWAITING CONSTRUCTION					
CONSTRUCTION at 31 December 2021					
Technology	Number of Installations	Capacity MW	Load Factor	Generation	
				Annual TWh	Split %
Advanced Conversion	1	81.0	0.8200	0.58	
Hydro Large	2	165.0	0.3552	0.51	
Plant Biomass	8	3,068.4	0.7479	20.10	
Solar Photovoltaics	2	419.8	0.1102	0.41	
Tidal	1	320.0	0.0371	0.10	
Waste Incineration	11	782.0	0.3602	2.47	
Wind Offshore	38	25,614.2	0.3992	89.58	
Wind Onshore	90	8,887.1	0.2643	20.58	
NATIONAL SIGNIFICANCE	153	39,337.5	0.3898	134.33	64.2
Advanced Conversion	64	846.6	0.8200	6.08	
Anaerobic Digestion	244	425.3	0.6162	2.30	
Hot Dry Rocks	2	10.0	0.9100	0.08	
Hydro Large	21	305.6	0.3552	0.95	
Hydro Small	1,064	223.4	0.3808	0.75	
Landfill Gas	272	793.2	0.4304	2.99	
Plant Biomass	310	1,216.4	0.7477	7.97	
Sewage Sludge Digestion	12	50.2	0.4684	0.21	
Shoreline Wave	2	24.0	0.0371	0.01	
Solar Photovoltaics	860,899	16,755.3	0.1082	15.88	
Tidal	11	172.9	0.0371	0.06	
Waste Incineration	97	1,969.2	0.3602	6.21	
Wind Offshore	23	1,348.4	0.3992	4.72	
Wind Onshore	7,500	11,542.1	0.2644	26.73	
LOCAL SIGNIFICANCE	870,521	35,682.6	0.2397	74.92	35.8
NATIONAL + LOCAL	870,674	75,020.1	0.3184	209.26	100.0

UK Renewable Electricity Installations					
Table 7 AWAITING APPROVAL at 31 December 2021					
Technology	Number of Installations	Capacity MW	Load Factor	Generation	
				Annual TWh	Split %
Hydro Large	1	200.0	0.3552	0.62	
Plant Biomass	1	260.0	0.7479	1.70	
Solar Photovoltaics	1	62.0	0.1102	0.06	
Tidal	2	440.0	0.0371	0.14	
Waste Incineration	1	75.0	0.3602	0.24	
Wind Offshore	2	2,100.0	0.3992	7.34	
Wind Onshore	30	3,996.6	0.2643	9.25	
NATIONAL SIGNIFICANCE	38	7,133.6	0.3099	19.36	69.1
Advanced Conversion	1	28.0	0.8200	0.20	
Anaerobic Digestion	4	5.6	0.6143	0.030	
Hydro Large	1	10.0	0.3552	0.031	
Hydro Small	3	2.8	0.3817	0.0092	
Landfill Gas	4	16.3	0.4304	0.06	
Shoreline Wave	2	27.0	0.0371	0.0088	
Solar Photovoltaics	245	4,898.4	0.1102	4.73	
Tidal	1	100.0	0.0371	0.032	
Waste Incineration	10	205.8	0.3602	0.649	
Wind Onshore	91	1,253.6	0.2643	2.90	
LOCAL SIGNIFICANCE	362	6,547.4	0.1509	8.65	30.9
NATIONAL + LOCAL	400	13,681.0	0.2338	28.02	100.0

UK Renewable Electricity Installations					
Table 8 OPERATIONAL, UNDER CONSTRUCTION, AWAITING CONSTRUCTION & AWAITING APPROVAL at 31 December 2021					
Technology	Number of Installations	Capacity MW	Load Factor	Generation	
				Annual TWh	Split %
Advanced Conversion	1	81.0	0.8200	0.58	
Hydro Large	3	365.0	0.3552	1.14	
Plant Biomass	9	3,328.4	0.7479	21.81	
Solar Photovoltaics	3	481.8	0.1102	0.47	
Tidal	3	760.0	0.0371	0.25	
Waste Incineration	12	857.0	0.3602	2.70	
Wind Offshore	40	27,714.2	0.3992	96.93	
Wind Onshore	120	12,883.7	0.2643	29.83	
NATIONAL SIGNIFICANCE	191	46,471.1	0.1840	153.70	64.8
Advanced Conversion	65	875	0.8200	6.28	
Anaerobic Digestion	248	430.9	0.6162	2.33	
Hot Dry Rocks	2	10.0	0.9100	0.08	
Hydro Large	22	315.6	0.3552	0.98	
Hydro Small	1,067	226.1	0.7545	0.75	
Landfill Gas	276	809.5	0.4304	3.05	
Plant Biomass	310	1,216.4	0.7477	7.97	
Sewage Sludge Digestion	12	50.2	0.4684	0.21	
Shoreline Wave	4	51.0	0.0371	0.02	
Solar Photovoltaics	861,144	21,653.7	0.1086	20.61	
Tidal	12	272.9	0.0371	0.09	
Waste Incineration	107	2,175.0	0.3602	6.86	
Wind Offshore	23	1,348.4	0.3992	4.72	
Wind Onshore	7,591	12,795.6	0.2644	29.63	
LOCAL SIGNIFICANCE	870,883	42,229.9	0.2259	83.57	35.2
NATIONAL + LOCAL	871,074	88,701.0	0.3054	237.27	100.0

UK Renewable Electricity Installations					
Table 9 AS Table 8 WITH DATA FOR NATIONAL AND LOCAL INSTALLATIONS COMBINED					
Technology	Number of Installations	Capacity MW	Load Factor	Generation	
				Annual TWh	% of Total
Wind Offshore	63	29,062.6	0.3992	101.64	42.8
Wind Onshore	7,711	25,679.5	0.2643	59.47	25.1
Plant Biomass	319	4,544.8	0.7478	29.77	12.5
Solar Photovoltaics	861,147	22,136.0	0.1087	21.07	8.9
Waste Incineration	119	3,032.0	0.3602	9.57	4.0
Advanced Conversion	66	955.6	0.8200	6.86	2.9
Landfill Gas	276	809.5	0.4304	3.05	1.3
Anaerobic Digestion	248	430.3	0.6160	2.32	1.0
Hydro Large	25	680.6	0.3552	2.12	0.9
Hydro Small	1,067	226.1	0.3809	0.75	0.3
Tidal	15	1,032.9	0.0371	0.34	0.1
Sewage Sludge Digestion	12	50.2	0.4684	0.21	0.1
Hot Dry Rocks	2	10.0	0.9100	0.08	0.0
Shoreline Wave	4	51.0	0.0371	0.02	0.0
TOTAL	871,074	88,701.0	0.3054	237.27	100.0

NOTE

1. Wind Offshore, Wind Onshore and Plant Biomass are responsible for 80.4% of all renewable electricity generation.
2. Solar Photovoltaics's contribution is limited to 8.9%.

UK Renewable Electricity Installations					
Table 10 DEVELOPMENT STATUS OF ALL INSTALLATIONS in Tables 8 & 9					
at 31 December 2021					
Technology	Number of Installations	Capacity MW	Load Factor	Generation	
				Annual TWh	% of Total
Operational	869,734	43,233.16	0.3040	115.14	48.7
Under Construction	131	10,079.89	0.3925	34.65	14.6
Awaiting Construction	809	21,707.00	0.3127	59.46	25.1
Awaiting Approval	390	13,475.23	0.2318	27.37	11.6
TOTAL	871,064	88,495.28	0.3052	236.62	100.0

Table11a LOAD FACTORS FOR INSTALLATIONS WITH A CAPACITY OF 0.2 MW or ABOVE	
Advanced Conversion*	0.8200
Anaerobic Digestion	0.6143
Waste Incineration	0.3602
Hot Dry Rocks**	0.9100
Hydro Large	0.3552
Hydro Small	0.3817
Landfill gas	0.4304
Plant Biomass	0.7479
Sewage Sludge Digestion	0.4684
Solar Photovoltaics	0.1102
Tidal and Wave**	0.0371
Wind Offshore	0.3992
Wind Onshore	0.2643

Table11b LOAD FACTORS FOR INSTALLATIONS WITH A CAPACITY BELOW 0.2 MW	
Anaerobic Digestion	0.7198
Hydro Small	0.3772
Plant Biomass*	0.1316
Solar Photovoltaics	0.1011
Onshore Wind	0.2694

*Micro CHP

SOURCE

Mean load factors for the 5-years 2016/17 to 2020/21, Research & analysis, Annual Feed-in Tariff Load Factors, published BEIS, 23 December 2021.

SOURCES

*Mark Harradine, Technical Director, Syngas Products, Poole.

**Estimate from literature.

Remainder: Mean load factors for the 5-years 2016 to 2020, for schemes operating on an unchanged configuration basis, Digest of UK Energy Statistics (DUKES), Table 6.5, published BEIS 29 July 2021.

Table 12 UK RENEWABLE ELECTRICITY INSTALLATIONS of ALL DEVELOPMENTS at 31 December 2021						
Technology	Number of Installations	Capacity MW	Load Factor	Generation		Country
				Annual TWh	% of Total	
Advanced Conversion	52	817.00	0.8200	5.87	85.5	England
	9	91.60	0.8200	0.66	9.6	Scotland
	3	38.00	0.8200	0.27	4.0	Wales
	2	9.00	0.8200	0.06	0.9	Northern Ireland
Anaerobic Digestion	146	355.10	0.6143	1.91	83.9	England
	18	38.50	0.6143	0.21	9.1	Scotland
	11	20.10	0.6143	0.11	4.8	Northern Ireland
	6	9.40	0.6143	0.05	2.2	Wales
Plant Biomass	67	3,593.10	0.7479	23.54	79.1	England
	18	498.21	0.7479	3.26	11.0	Scotland
	11	433.60	0.7479	2.84	9.5	Wales
	3	19.60	0.7479	0.13	0.4	Northern Ireland
Waste Incineration	99	2,700.25	0.3602	8.52	89.1	England
	14	229.00	0.3602	0.72	7.6	Scotland
	4	73.80	0.3602	0.23	2.4	Wales
	2	28.90	0.3602	0.09	1.0	Northern Ireland
Hot Dry Rocks	2	10.00	0.9100	0.08	100.0	England
Landfill Gas	229	659.74	0.4304	2.49	81.5	England
	31	107.50	0.4304	0.41	13.3	Scotland
	14	38.10	0.4304	0.14	4.7	Wales
	2	4.20	0.4304	0.02	0.5	Northern Ireland
Hydro Large	20	422.60	0.3552	1.31	62.1	Scotland
	3	216.10	0.3552	0.67	31.8	England
	2	41.90	0.3552	0.13	6.2	Wales
Sewage Sludge Digestion	11	44.70	0.4684	0.18	89.0	England
	1	5.50	0.4684	0.02	11.0	Wales
Wave	1	23.00	0.0371	0.01	45.1	England
	2	21.00	0.0371	0.01	41.2	Scotland
	1	7.00	0.0371	0.00	13.7	Wales
Hydro Small	87	161.35	0.3817	0.54	87.6	Scotland
	6	14.90	0.3817	0.05	8.1	Wales
	12	7.90	0.3817	0.03	4.3	England
Solar Photovoltaics	1,650	16,338.89	0.1102	15.77	88.6	England
	79	508.21	0.1102	0.49	2.8	Scotland
	32	366.85	0.1102	0.35	2.0	Northern Ireland
	162	1,222.59	0.1102	1.18	6.6	Wales
Tidal	2	560.00	0.0371	0.18	54.2	Wales
	10	340.90	0.0371	0.11	33.0	Scotland
	1	100.00	0.0371	0.03	9.7	Northern Ireland
	2	32.00	0.0371	0.01	3.1	England
Offshore Wind	42	23,475.50	0.3992	82.10	80.8	England
	17	4,561.10	0.3992	15.95	15.7	Scotland
	4	1,026.00	0.3992	3.59	3.5	Wales
Onshore Wind	533	18,856.40	0.2643	43.66	73.8	Scotland
	296	3,000.00	0.2643	6.95	11.7	England
	95	1,870.50	0.2643	4.33	7.3	Wales
	205	1,807.15	0.2643	4.19	7.1	Northern Ireland

NOTES FOR TABLES 12-15

1. Only installations with an installed capacity of 0.2 MW or above are included in this analysis.
2. For each technology, countries are listed in order of decreasing contribution of annual generation of renewable electricity.
3. The major contributor for each technology is highlighted in yellow. England leads in all except for Onshore Wind and Hydro (Scotland) and Tidal (Wales).

UK Renewable Electricity Installations of All Development Statuses							
Table 13 LOCATION OF OFFSHORE WIND at 31 December 2021							
Technology	Significance	Country	Number of Installations	Capacity MW	Load Factor	Generation	
						Annual TWh	% of Total
Wind Offshore	NATIONAL	England	30	22,681.20	0.3992	79.32	78.0
		Scotland	8	4,157.00	0.3992	14.54	14.3
		Wales	2	876.00	0.3992	3.06	3.0
		UK	40	27,714.20	0.3992	96.93	95.4
	LOCAL	England	12	794.30	0.3992	2.78	2.7
		Scotland	9	404.10	0.3992	1.41	1.4
		Wales	2	150.00	0.3992	0.52	0.5
		UK	23	1,348.40	0.3992	4.72	4.6
	NATIONAL & LOCAL	England	42	23,475.50	0.3992	82.10	80.8
		Scotland	17	4,561.10	0.3992	15.95	15.7
		Wales	4	1,026.00	0.3992	3.59	3.5
		UK	63	29,062.60	0.3992	101.64	100.0

UK Renewable Electricity Installations of All Development Statuses								
Table 14 LOCATION OF ONSHORE WIND at 31 December 2021								
Technology	Significance	Country	Number of Installations	Capacity MW	Load Factor	Generation		
						Annual TWh	% of Total	% Split NS/LS
Wind Onshore	NATIONAL	England	8	471.60	0.2643	1.09	1.8	
		Scotland	111	11,947.20	0.2643	27.66	46.8	63.4
		Wales	7	760.90	0.2643	1.76	3.0	
		NI	1	54.00	0.2643	0.13	0.2	
		UK	127	13,233.70	0.2643	30.64	51.8	
	LOCAL	England	288	2,528.40	0.2643	5.85	9.9	
		Scotland	422	6,909.20	0.2643	16.00	27.1	36.6
		Wales	88	1,109.60	0.2643	2.57	4.3	
		NI	204	1,753.15	0.2643	4.06	6.9	
		UK	714	12,300.35	0.2643	28.48	48.2	
	NATIONAL & LOCAL	England	296	3,000.00	0.2643	6.95	11.7	
		Scotland	533	18,856.40	0.2643	43.66	73.8	
		Wales	95	1,870.50	0.2643	4.33	7.3	
		NI	205	1,807.15	0.2643	4.18	7.1	
		UK	1,129	25,534.05	0.2643	59.12	100.0	

UK Renewable Electricity Installations of All Development Statuses							
Table 15 LOCATION OF SOLAR PHOTOVOLTAICS at 31 December 2021							
Technology	Significance	Country	Number of Installations	Capacity MW	Load Factor	Generation	
						Annual TWh	% of Total
Solar Photovoltaics	NATIONAL	England	2	419.80	0.1102	0.41	2.3
		Wales	1	62.00	0.1102	0.06	0.3
		UK	3	481.80	0.1102	0.47	2.6
	LOCAL	England	1,648	15,919.09	0.1102	15.37	86.3
		Scotland	79	508.21	0.1102	0.49	2.8
		Wales	161	1,160.59	0.1102	1.12	6.3
		NI	32	366.85	0.1102	0.35	2.0
		UK	1,920	17,954.74	0.1102	17.33	97.4
	NATIONAL & LOCAL	England	1,650	16,338.89	0.1102	15.77	88.6
		Scotland	79	508.21	0.1102	0.49	2.8
		Wales	162	1,222.59	0.1102	1.18	6.6
		NI	32	366.85	0.1102	0.35	2.0
	UK	1,923	18,436.54	0.1102	17.80	100.0	

Table 16 DORSET OPERATIONAL RENEWABLE ELECTRICITY					
INSTALLATIONS at 31 December 2021					
Technology	Number of Installations	Capacity MW	Load Factor	Generation	
				Annual TWh	% of Total
Anaerobic Digestion	14	7.00	0.6143	0.0377	7.6
Plant Biomass	1	3.20	0.7479	0.0210	4.2
Hydro Small	11	0.14	0.3817	0.0005	0.1
Landfill Gas	2	9.00	0.4304	0.0339	6.8
Photovoltaic	8,601	384.10	0.1200	0.4038	81.0
Onshore Wind	24	0.83	0.2643	0.0019	0.4
TOTAL	8,653	404.26	0.1408	0.4987	100.0

Table 17 BCP OPERATIONAL RENEWABLE ELECTRICITY					
INSTALLATIONS at 31 December 2021					
Technology	Number of Installations	Capacity MW	Load Factor	Generation	
				Annual TWh	% of Total
Solar Photovoltaics	6,443	25.39	0.1200	0.0267	100.0
TOTAL	6,443	25.39	0.1200	0.0267	100.0

NOTE

1. All installations shown for Dorset were commissioned in the County.
2. The Load Factor shown for Solar Photovoltaics is appropriate for Dorset and BCP*, all others are shown in Table 11a.

*Bournemouth, Christchurch & Poole Unitary Authority.