

A Note on Installations of National Significance & the Setting of Local Renewable Energy 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 and 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 0.2 MW and the Feed-in Tariff (FIT) Installation Report which records capacities from 5 MW down to the lowest. Only capacities 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 July 2020, for the larger installations and Feed-in Tariff Load Factors, Energy Trends, published BEIS, 22 December 2020, for the smaller (FIT) installations.

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.

6. Data are presented in two sets of tables, one for operational installations, representing current generation and the other for operational plus in-pipeline installations, representing future generation.

7. Tables 1 & 2 provide data for 30 June 2011 that confirm the Government's expectation, at that time, of a 50/50 National/Local split. 60.3 TWh of electricity estimated to have been generated in the previous 12 months was split 48.3% National, 51.7% Local (Table 1). Taking into account potential generation in the pipeline, future generation (towards 2020) was estimated to be 70.4 TWh, split 51.1% National, 48.9% Local (Table 2).

8. Tables 3 & 4 provide data for 31 December 2020. These provide an estimate of 113.9 TWh for the generation of renewable electricity in the UK in 2020, split 54.1 National, 45.9 Local (Table 3). Taking into account potential generation in the pipeline, future generation (towards 2050) was estimated to be 226.5 TWh, split 65.8% National, 34.2% Local (Table 4).

9. It can be noted⁴ that Dorset Council's Low Carbon Team has stated that Dorset needs to generate 100% of its estimated 4 TWh future annual electricity demand from its own solar, wind and biomass resources. The possibility that this target could be reduced by two thirds through a contribution from installations of National Significance appears not to have been considered.

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, July 2011.
3. Overarching National Policy Statement for Energy (EN-1), published DECC, July 2011.
4. Renewable Energy: Detailed Technical Paper, Low Carbon Team, Dorset Council.

Table 1 UK OPERATIONAL INSTALLATIONS at 30 Jun 2011						
Installation Significance	Installations		Installed Capacity		Annual Energy Generation	
	Number	%	MW	%	GWh	%
NATIONAL (REPD)	66	0.1	9,814.4	47.5	29,074.3	48.3
LOCAL (REPD)	1,090	1.7	10,668.2	51.6	30,965.7	51.4
LOCAL (FIT)	64,120	98.2	200.8	1.0	216.7	0.4
LOCAL (REPD & FIT)	65,210	99.9	10,869.0	52.5	31,182.4	51.7
ALL	65,276	100.0	20,683.4	100.0	60,256.7	100.0

Table 2 UK OPERATIONAL INSTALLATIONS & THOSE IN THE PLANNING PIPELINE at 30 Jun 2011						
Installation Significance	Installations		Capacity		Annual Energy Generation	
	Number	%	MW	%	GWh	%
NATIONAL (REPD)	79	0.1	11,463.2	49.5	35,971.9	51.1
LOCAL (REPD)	1,141	1.7	11,490.8	49.6	34,175.7	48.6
LOCAL (FIT)	64,120	98.1	200.8	0.9	216.7	0.3
LOCAL (REPD & FIT)	65,261	99.9	11,691.6	50.5	34,392.3	48.9
ALL	65,340	100.0	23,154.8	100.0	70,364.2	100.0

Table 3 UK OPERATIONAL INSTALLATIONS at 31 Dec 2020						
Installation Significance	Installations		Installed Capacity		Annual Energy Generation	
	Number	%	MW	%	GWh	%
NATIONAL (REPD)	90	0.01	17,512.5	40.8	61,645.2	54.1
LOCAL (REPD)	2,537	0.3	21,497.6	50.1	48,415.7	42.5
LOCAL (FIT)	866,715	99.7	3,889.3	9.1	3,814.5	3.3
LOCAL (REPD & FIT)	869,252	100.0	25,386.9	59.2	52,230.2	45.9
ALL	869,342	100.0	42,899.4	100.0	113,875.4	100.0

Table 4 UK OPERATIONAL INSTALLATIONS & THOSE IN THE PLANNING PIPELINE at 31 Dec 2020						
Installation Significance	Installations		Capacity		Annual Energy Generation	
	Number	%	MW	%	GWh	%
NATIONAL (REPD)	182	0.02	45,827.0	55.5	149,021.5	65.8
LOCAL (REPD)	3,401	0.4	32,786.2	39.7	73,710.9	32.5
LOCAL (FIT)	866,715	99.6	3,889.3	4.7	3,814.5	1.7
LOCAL (REPD & FIT)	870,116	100.0	36,675.5	44.5	77,525.4	34.2
ALL	870,298	100.0	82,502.5	100.0	226,546.9	100.0

Table 5 SUMMARY of Tables 1 - 4					
Date of Assessment	Development Status	Installation Significance	Number of Installations	Annual Energy Generation	
				GWh	%
30 Jun 2011	Operational	NATIONAL	66	29,074.3	48.3
		LOCAL	65,210	31,182.4	51.7
		ALL	65,276	60,256.7	100.0
	Operational & in the Planning Pipeline	NATIONAL	79	35,971.9	51.1
		LOCAL	65,261	34,392.3	48.9
		ALL	65,340	70,364.2	100.0
31 Dec 2020	Operational	NATIONAL	90	61,645.2	54.1
		LOCAL	869,252	52,230.2	45.9
		ALL	869,342	113,875.4	100.0
	Operational & in the Planning Pipeline	NATIONAL	182	149,021.5	65.8
		LOCAL	870,116	77,525.4	34.2
		ALL	870,298	226,546.9	100.0

Technology	Number	%	Installed Capacity		Load Factor	Annual Energy Generation	
			MW	%		GWh	%
Wind Offshore	42	0.005	10,406.7	24.3	0.3889	35,449.5	31.1
Wind Onshore	7,324	0.8	13,474.7	31.4	0.2663	31,429.2	27.6
Plant Biomass	606	0.1	3,460.9	8.1	0.7549	22,885.9	20.1
Solar Photovoltaics	859,772	98.9	12,193.2	28.4	0.1072	11,453.8	10.1
Waste Incineration	55	0.01	1,350.1	3.1	0.3570	4,222.4	3.7
Landfill Gas	268	0.03	747.7	1.7	0.4600	3,013.2	2.6
Anaerobic digestion	209	0.02	338.2	0.8	0.6051	1,792.7	1.6
Hydro Large	23	0.003	470.6	1.1	0.3514	1,448.7	1.3
Advanced Conversion	17	0.002	186.3	0.4	0.8200	1,338.2	1.2
Hydro Small	1,008	0.1	186.4	0.4	0.3831	625.5	0.5
Sewage Digestion	12	0.001	50.2	0.1	0.4660	204.9	0.2
Shoreline Wave	2	0.0002	24.0	0.1	0.0371	7.8	0.007
Tidal	4	0.0005	10.5	0.02	0.0371	3.4	0.003
ALL TECHNOLOGIES	869,342	100.0	42,899.4	100.0	0.3030	113,875.4	100.0

Technology	Number	%	Installed Capacity		Load Factor	Annual Energy Generation	
			MW	%		GWh	%
Wind Offshore	63	0.007	29,277.6	35.5	0.3889	99,731.6	44.0
Wind Onshore	7,677	0.9	24,933.4	30.2	0.2662	58,147.0	25.7
Plant biomass	624	0.07	4,281.9	5.2	0.7549	28,315.7	12.5
Solar Photovoltaics	860,142	98.8	17,098.0	20.7	0.1080	16,175.4	7.1
Waste Incineration	114	0.01	2,931.4	3.6	0.3570	9,167.8	4.0
Advanced Conversion	66	0.01	955.6	1.2	0.8200	6,864.3	3.0
Landfill Gas	271	0.03	770.7	0.9	0.4600	3,105.9	1.4
Anaerobic Digestion	242	0.03	417.4	0.5	0.6045	2,210.1	1.0
Hydro Large	23	0.003	470.6	0.6	0.3514	1,448.7	0.6
Hydro Small	1,043	0.12	222.0	0.3	0.3826	743.9	0.3
Tidal	15	0.002	1,032.9	1.3	0.0371	335.4	0.1
Sewage Digestion	12	0.001	50.2	0.1	0.4660	204.9	0.1
Hot Dry Rocks	2	0.0002	10.0	0.01	0.9100	79.7	0.04
	4	0.0005	51.0	0.1	0.0371	16.6	0.01
ALL TECHNOLOGIES	870,298	100.0	82,502.5	100.0	0.3135	226,546.9	100.0

Technology	Development Status	Number of Installations	Annual Energy Generation		
			GWh	%	% Cumul.
Wind Offshore	Operational only.	42	35,449.5	31.1	31.1
Wind Onshore		7,324	31,429.2	27.6	58.7
Plant Biomass		606	22,885.9	20.1	78.8
Solar Photovoltaics		859,772	11,453.8	10.1	88.9
9 Others		1,598	12,656.9	11.1	100.0
ALL TECHNOLOGIES		869,342	113,875.4	100.0	

Technology	Development Status	Number of Installations	Annual Energy Generation		
			GWh	%	% Cumul.
Wind Offshore	Operational, submitted for approval, permitted & awaiting construction and under construction.	63	99,731.6	44.0	44.0
Wind Onshore		7,677	58,147.0	25.7	69.7
Plant Biomass		624	28,315.7	12.5	82.2
Solar Photovoltaics		860,142	16,175.4	7.1	89.3
10 Others		1,792	24,177.2	10.7	100.0
ALL TECHNOLOGIES		870,298	226,546.9	100.0	

NOTE Offshore wind deployment is beginning to outstrip all others. Onshore wind is holding its position thanks to Scotland (not illustrated here). Solar PV appears to be on a relative decline.

Technology	Number	%	Installed Capacity		Load Factor	Annual Energy Generation	
			MW	%		GWh	%
Wind Offshore	23	25.6	9,188.2	52.5	0.3889	31,298.8	50.8
Plant Biomass	6	6.7	2,470.4	14.1	0.7550	16,338.4	26.5
Wind Onshore	52	57.8	5,203.1	29.7	0.2662	12,131.8	19.7
Waste Incineration	6	6.7	416.0	2.4	0.3570	1,301.0	2.1
Hydro Large	2	2.2	165.0	0.9	0.3514	507.9	0.8
Solar Photovoltaics	1	1.1	69.8	0.4	0.1099	67.2	0.1
ALL TECHNOLOGIES	90	100.0	17,512.5	100.0	0.4018	61,645.2	100.0

Technology	Number	%	Installed Capacity		Load Factor	Annual Energy Generation	
			MW	%		GWh	%
Wind Offshore	40	22.0	27,929.2	60.9	0.3889	95,138.4	63.8
Wind Onshore	113	62.1	12,484.1	27.2	0.2662	29,108.6	19.5
Plant biomass	8	4.4	3,068.4	6.7	0.7550	20,293.3	13.6
Waste Incineration	12	6.6	857.0	1.9	0.3570	2,680.3	1.8
Advanced Conversion	1	0.5	81.0	0.2	0.8200	581.8	0.4
Hydro Large	2	1.1	165.0	0.4	0.3514	507.9	0.3
Solar Photovoltaics	3	1.6	482.3	1.1	0.1099	464.3	0.3
Tidal	3	1.6	760.0	1.7	0.0371	246.8	0.2
ALL TECHNOLOGIES	182	100.0	45,827.0	100.0	0.3712	149,021.5	100.0

Technology	Number	%	Installed Capacity		Load Factor	Annual Energy Generation	
			MW	%		GWh	%
Wind Onshore	7,272	0.8	8,271.6	32.6	0.2663	19,297.4	36.9
Solar Photovoltaics	859,771	98.9	12,123.4	47.8	0.1072	11,386.7	21.8
Plant Biomass	600	0.1	990.5	3.9	0.7546	6,547.5	12.5
Wind Offshore	19	0.002	1,218.5	4.8	0.3889	4,150.7	7.9
Landfill Gas	268	0.03	747.7	2.9	0.4600	3,013.2	5.8
Waste Incineration	49	0.01	934.1	3.7	0.3570	2,921.4	5.6
Anaerobic digestion	209	0.02	338.2	1.3	0.6051	1,792.7	3.4
Advanced Conversion	17	0.002	186.3	0.7	0.8200	1,338.2	2.6
Hydro Large	21	0.002	305.6	1.2	0.3514	940.8	1.8
Hydro Small	1,008	0.1	186.4	0.7	0.3831	625.5	1.2
Sewage Digestion	12	0.001	50.2	0.2	0.4660	204.9	0.4
Shoreline Wave	2	0.0002	24.0	0.1	0.0371	7.8	0.01
Tidal	4	0.0005	10.5	0.04	0.0371	3.4	0.01
ALL TECHNOLOGIES	869,252	100.0	25,386.9	100.0	0.2349	52,230.2	100.0

Technology	Number	%	Installed Capacity		Load Factor	Annual Energy Generation	
			MW	%		GWh	%
Wind Onshore	7,564	0.9	12,449.3	33.9	0.2663	29,038.3	37.5
Solar Photovoltaics	860,139	98.9	16,615.7	45.3	0.1079	15,711.1	20.3
Plant biomass	616	0.07	1,213.5	3.3	0.7547	8,022.4	10.3
Waste Incineration	102	0.01	2,074.4	5.7	0.3570	6,487.5	8.4
Advanced Conversion	65	0.01	874.6	2.4	0.8200	6,282.4	8.1
Wind Offshore	23	0.003	1,348.4	3.7	0.3889	4,593.2	5.9
Landfill Gas	271	0.03	770.7	2.1	0.4600	3,105.9	4.0
Anaerobic Digestion	242	0.03	417.4	1.1	0.6045	2,210.1	2.9
Hydro Large	21	0.00	305.6	0.8	0.3514	940.8	1.2
Hydro Small	1,043	0.12	222.0	0.6	0.3826	743.9	1.0
Sewage Digestion	12	0.00	50.2	0.1	0.4660	204.9	0.3
Tidal	12	0.001	272.9	0.7	0.0371	88.6	0.1
Hot Dry Rocks	2	0.0002	10.0	0.03	0.9100	79.7	0.1
Shoreline Wave	4	0.00	51.0	0.1	0.0371	16.6	0.0
ALL TECHNOLOGIES	870,116	100.0	36,675.5	100.0	0.2413	77,525.4	100.0

Technology	Number of Installations	Installed Capacity MW	Load Factor	Annual Energy Generation	
				GWh	%
Solar Photovoltaic	61,829	178.96	0.101126	158.54	73.2
Wind Onshore	1,860	17.59	0.274723	42.33	19.5
Hydro Small	220	3.63	0.395166	12.56	5.8
Anaerobic Digestion	3	0.45	0.759943	2.98	1.4
Micro CHP (Plant Biomass)	208	0.21	0.131521	0.24	0.1
ALL TECHNOLOGIES	64,120	200.84	0.123144	216.65	100.0

Technology	Number of Installations	Installed Capacity MW	Load Factor	Annual Energy Generation	
				GWh	%
Solar Photovoltaic	858,593	3,695.56	0.101126	3,273.76	85.8
Wind Onshore	6,586	145.09	0.274723	349.17	9.2
Hydro Small	940	40.38	0.395166	139.77	3.7
Anaerobic Digestion	65	7.68	0.759943	51.12	1.3
Micro CHP (Plant Biomass)	531	0.58	0.131521	0.67	0.02
ALL TECHNOLOGIES	866,715	3,889.29	0.111960	3,814.48	100.0

Technology	Year					Average
	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	
Anaerobic Digestion	0.815376	0.713767	0.758475	0.759239	0.752859	0.759943
Hydro Small	0.447869	0.364932	0.389811	0.363748	0.409469	0.395166
Micro CHP (Plant Biomass)	0.120798	0.125747	0.135276	0.175149	0.100633	0.131521
Solar Photovoltaic	0.102567	0.099268	0.097054	0.104946	0.101793	0.101126
Wind Onshore	0.286853	0.246154	0.283539	0.260008	0.297059	0.274723

DATA SOURCE Feed-in tariff load factors, Energy Trends, published BEIS 22 December 2020.

NOTE All Feed-in Tariff (FIT) installations are operational and of local significance only. With a maximum capacity of < 200 kW essentially all solar photovoltaic installations reported are roof-mounted.

Technology	Load Factor
Hot dry rocks ¹	0.910000
Advanced Conversion ²	0.820000
Plant Biomass	0.754983
Anaerobic Digestion	0.601548
Sludge digestion	0.465954
Landfill Gas	0.460037
Wind Offshore	0.388860
Hydro Small	0.379793
Waste Incineration	0.357019
Hydro Large	0.351422
Wind Onshore	0.266171
Solar Photovoltaics	0.109890
Wave and Tidal	0.037072

DATA SOURCES

1. Hot Dry Rocks: Estimate from literature.
2. Advanced Conversion: Mark Harradine, Technical Director, Syngas Products, Poole.
3. Remainder: Digest of UK Energy Statistics (DUKES), Table 6.5, published BEIS 30 July 2020.