

Renewable electricity in Scotland, Wales, Northern Ireland and the regions of England in 2018

Introduction

This article provides information and analysis on the amount of electricity from renewable sources, disaggregated below UK level. It includes information on capacity, generation and number of operational sites, as well as derived load factors, for the four UK countries, the nine English regions and, from 2014, UK Local Authorities^{1,2}. It updates that published in the September 2018 edition of *Energy Trends*.

These data are consistent with those published for the UK in Table 6.4 of the Digest of United Kingdom Energy Statistics 2019 (DUKES), and use similar categories³. These data cover renewable electricity schemes, including those accredited under the Renewables Obligation (RO), Feed in Tariff (FiT) and Contracts for Differences support mechanism. These data also include some schemes that not eligible for support, such as pre-April 2002 large-scale hydro and non-CHP energy from waste schemes and those schemes that are registered with the MCS (Microgeneration Certification Scheme) but are not accredited to FITs. However, scale schemes that are not supported by government subsidy schemes or have not registered with the MCS are not included in these figures. As a result, the solar PV capacity and generation figures are likely to be underestimated. We are looking at options for extending our data coverage.

Consistent time-series data for each year from 2003 for regional and Local Authority data from 2014, are available as Excel spreadsheets⁴. The spreadsheets include detailed data and additional charts for generation, capacity, number of sites, generation per GVA and load factors by country of the UK, region of England and by Local Authority.

Key points – 2018

Renewable generation in the UK grew by 11 per cent from 2017 to 2018. Within this:

- Generation in England was **up 14 per cent**
- Generation in Northern Ireland was **up 21 per cent**
- Generation in Scotland was **up 7.1 per cent**
- Generation in Wales was **down 2.2 per cent**

Generation in England, Scotland and Northern Ireland was boosted by new capacity coming online. The bulk of renewable generation in Wales comes from onshore wind, generation from onshore wind was down in Wales in 2018 as average wind speeds were lower.

Overall capacity increased by 10 per cent from 40.3 GW at the end of 2017 to 44.3 GW at the end of 2018. Within this:

- Capacity in England was **up 9.7 per cent**
- Capacity in Northern Ireland was **up 19 per cent**
- Capacity in Scotland was **up 10.4 per cent**
- Capacity in Wales was up **4.7 per cent**

¹ Offshore wind is allocated to the region to which its output is connected. The exceptions are Robin Rigg, which comes ashore at Seaton, Cumbria but whose generation is associated with Scotland, and Burbo Bank, which comes ashore in Wales but whose generation is associated with the North West.

² Where disclosure of confidential generation data was likely at the site level, this has been addressed, where possible, by replacing this with data from publicly available sources. Where this is not possible, the data have been removed, and added to the unallocated row at the bottom of the Local Authority listings.

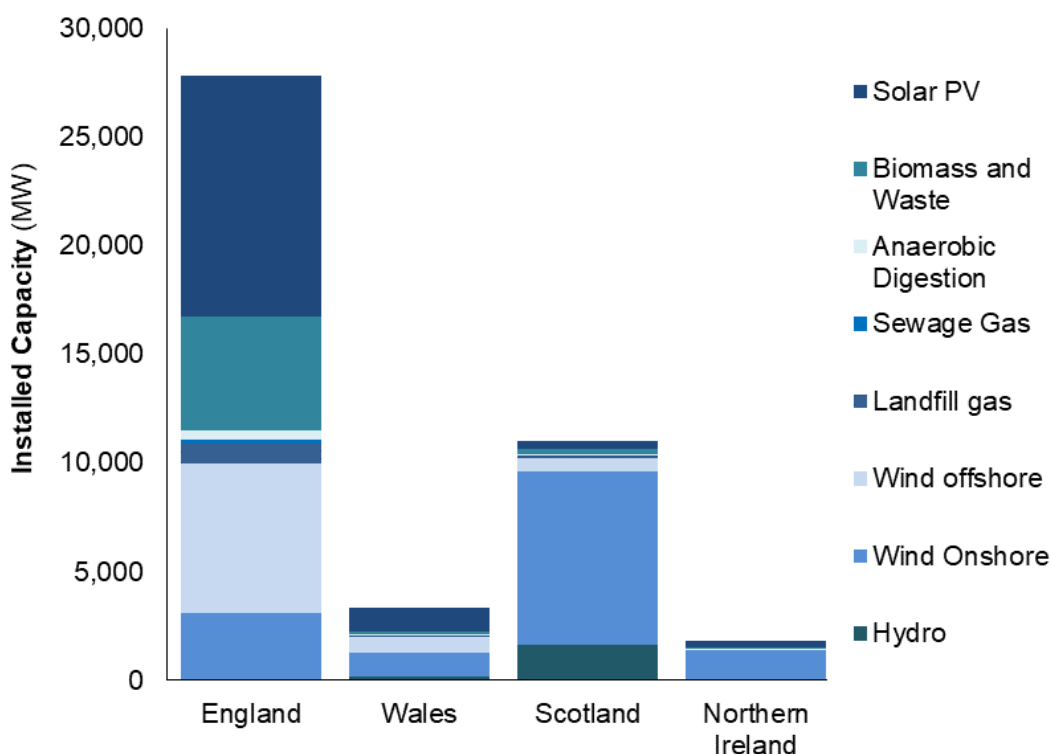
³ On occasion, it has been necessary to combine some renewable sources into categories so that information about individual sites provided in confidence are not disclosed.

⁴ Published at: www.gov.uk/government/statistics/regional-renewable-statistics

Capacity

- England had the most renewable capacity and generation, more than two and a half times that for Scotland; this is largely due to the fact that it has 90 per cent of the UK’s bioenergy capacity (mostly from four biomass units at Drax in Yorkshire and the Humber), 85 per cent of the PV capacity and 32 per cent of the offshore wind capacity. Chart 1 shows a breakdown of capacity at the end of 2018 by technology and country.
- The technology with highest growth in capacity was **biomass and waste** which grew by 35 per cent overall. Within this, capacity grew by 37 per cent in England. The additional capacity was primarily in Yorkshire and the Humber from the conversion of a unit from coal to biomass at Drax and in the North East, Lynemouth Power Station has also been converted to biomass. Both of these plants are supported by Contracts for Difference (CFD).

Chart 1 – Renewable capacity at the end of 2018 by technology and country



- The second highest growth in capacity was in **offshore wind** which grew by 18 per cent in the UK. The additional capacity was largely in Scotland where capacity more than doubled over the course of the year, this was driven by the Beatrice wind farm where the first 273 MW of capacity was online by the end of 2018.
- The next highest growth was for **onshore wind** which grew by 7.6 per cent in the UK – 8.4 per cent in Scotland, 17 per cent in Northern Ireland and 11 per cent in Wales but just 0.6 per cent in England.
- **Solar PV** capacity only grew by 2.6 per cent with Northern Ireland having the largest percentage increase at 27 per cent. This could be due to the Renewables Obligation closing to new Solar PV entrants in England, Scotland and Wales prior to 2018 but a grace period still being available in Northern Ireland until March 2018.

Special feature – Sub-national renewable electricity

The largest new schemes (including capacity increases) in 2018 were as follows:

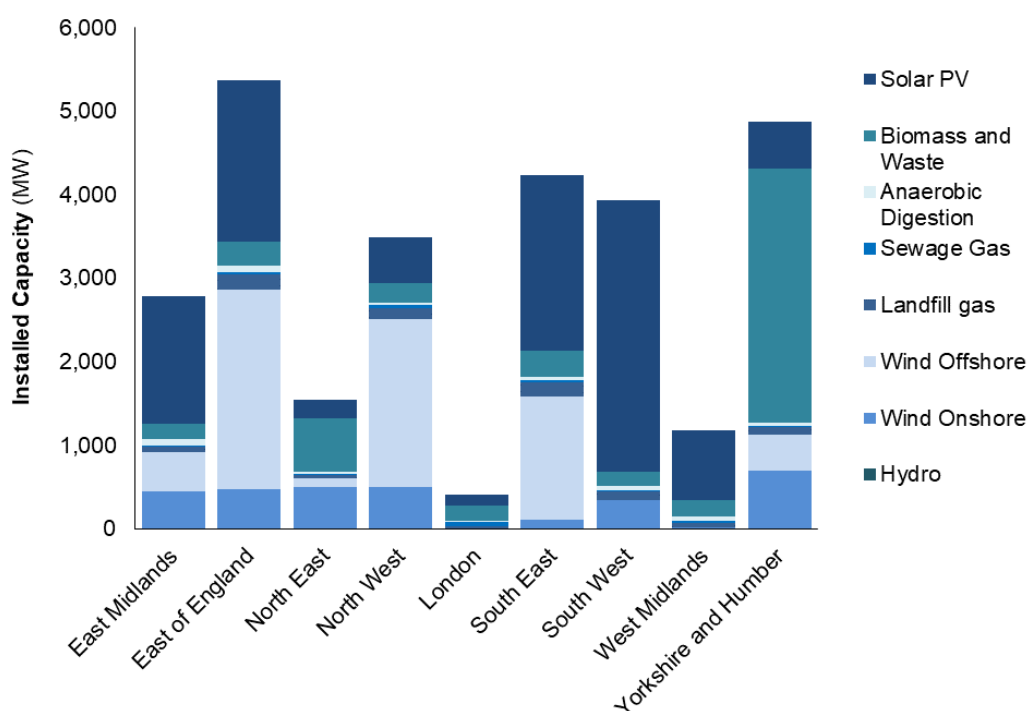
Onshore wind	Stronelairg Wind Farm	Scotland	228 MW
	Clyde Windfarm - North (capacity increase)	Scotland	80 MW
	Brechfa Forest West	Wales	57 MW
	Clyde Windfarm – Central (capacity increase)	Scotland	53 MW
	Blackcraig	Scotland	53 MW
Offshore wind	Walney (capacity increase)	North West	329 MW
	Galloper Wind Farm (capacity increase)	East of Eng	281 MW
	Beatrice Offshore windfarm	Scotland	273 MW
	Rampion	South East	217 MW
	Aberdeen Offshore Windfarm - Demonstration	Scotland	97 MW
Solar PV	Former Maghaberry Airfield	N Ireland	27 MW
	Fiskerton Airfield (Phase 2)	E Midlands	22 MW
Biomass and waste	Drax – new unit	Yorks & H	705 MW
	Lynemouth Power Station	North East	420 MW
	Tilbury Green Power	South East	41 MW
	Cramlington CHP	North East	28 MW
	Discovery Park	South East	27 MW
	Allerton Waste Recovery Park	Yorks & H	27 MW
	Energy Works (Hull)	Yorks & H	25 MW

The regions with the highest capacity in England (including PV) are:

- East of England - 5,378 GW (53 per cent from wind and 36 per cent from PV)
- Yorkshire and the Humber – 4,875 GW (63 per cent from biomass and waste - mostly from Drax – and 23 per cent from wind)
- South East (50 per cent from PV and 37 per cent from Wind).

Capacity by English region is shown in Chart 2:

Chart 2 – Renewable capacity at the end of 2018 by English region and technology



Special feature – Sub-national renewable electricity

Table 1 summarises capacity growth, the key technologies in each region as well as the major sites:

Table 1: Regional capacity growth		
Region	Key Technology	Growth (MW) Key Schemes
East Midlands	Biomass and Waste	41.5 Riverside Industrial Estate Gasification Plant, Sinfin Lane, JG Pears' animal rendering facility, WellandBioPower
	Solar PV	42.5 Colpmans Farm (Islip), Stow Solar Farm, Fiskerton Airfield (Phase 2), Belper (Knob Farm)
East of England	Biomass and Waste	54.6 Tilbury Green Power, Energy10 Huntingdon, Great Blakenham Energy from Waste, Hoddesdon Energy Ltd
	Offshore Wind	305.7 Galloper Wind Farm, Race Bank
North East	Biomass and Waste	491.0 Cramlington CHP, Hull Biomass Plant (Tansterne power station), Hartlepool Works, Lynemouth Power Station
	Solar PV	8.6 Hunger Hill Farm PV Generation
North West	Biomass and Waste	21.6 Ince Bio Power
	Solar PV	17.4 Siddick Solar Farm, Clay Cross
	Offshore Wind	329.0 Walney 4
	Onshore Wind	15.8 Hallburn Farm (resubmission)
London	Biomass and Waste	1.0 Bioliquid CHP 30054 Dagenham DC
	Solar PV	4.3 Mainly medium and small-scale projects (FIT)
South East	Biomass and Waste	23.2 Discovery Park
	Solar PV	28.9 Great Seabrook Farm, Hill Farm Extension Solar Farm, Netley Solar Farm, Former Westhampnett Landfill
	Onshore Wind	4.4 Mainly medium and small-scale projects (FIT)
	Offshore Wind	217.2 Rampion
South West	AD	3.1 Evercreech Renewable Energy (Farm AD)
	Biomass and Waste	3.8 Stanley's Biomass Ltd CHP, Eco Parley ORC Facility
	Solar PV	48.5 Lower Slade Farm, Springhill Solar Park (Northwick), Milborne Port Solar Farm, Great Houndbeare Farm, Land at Poles Hole Farm, Southwick PV Farm, Wick Road
West Midlands	Biomass and Waste	6.3 EnviRecover
Yorkshire and Humber	Biomass and Waste	769.8 Drax Units 1 + 2 + 3 + 4, Energy Works (Hull), King George Dock, Cross Green ERF, Allerton Waste Recovery Park (EfW)
	Solar PV	13.2 Sand Hutton Solar Farm
Northern Ireland	AD	11.9 AHS 500 (Farm AD), Airport Road West (Waste AD), ballyrenewables (Farm AD), Biogas51 Limited N. Ireland (Farm AD), Biogrid (Waste AD), BME (Farm AD), Cotwo AD (Farm AD), Devine AD (Farm AD), Gortahurk Road (Farm AD), Hewitts Meats - (Waste AD), Jambi (Farm AD), Kingspan (Farm AD), Newtownards (Farm AD), Pritchitts (Farm AD), RiverRidge (Farm AD),
	Biomass and Waste	10.0 Bombardier Aerospace (C Series), Encirc, Giants Park
	Landfill Gas	- 3.3 Drumme Dual Fuel Site, Glassmullagh Dual Fuel Site plus closures.
	Solar PV	68.8 Former Maghaberry Airfield, Gibson Farm, Laurelhill, Ballygarvey Road, Solar Farm DFD, South Antrim Solar Park - Phase 1
	Onshore Wind	206.3 Broughshane Wind Farm, Curraghmulkin (Dooish Wind Farm), Elginny Hill Resubmission, Pollnalaght Wind Farm, Teiges Mountain Wind Farm, Castle Craig
Scotland	Biomass and Waste	39.4 Levenseat EfW, Liberty Steel Dalzell, Acharn Forest Killin Biomass Plant
	Hydro	1.8 Allt Fionn Hydro Scheme, Upper Falloch Hydro
	Wave and tidal	2.0 Floating Energy Generation Platform - ATIR
	Offshore Wind	376.8 Aberdeen Offshore Windfarm - Demonstration, Beatrice Offshore windfarm
	Onshore Wind	611.9 Clyde Windfarm (Central), Clyde Windfarm (North), Tormywheel Wind Farm Limited, Blackcraig, Whiteside Hill, Tullymurdoch Wind Farm, Stronelairg Wind Farm, Afton Wind Farm, Keith Hill (resubmission), Auchadaduie Wind Farm, Bad a Cheo
Wales	Biomass and Waste	30.8 Liberty Steel Tredegar, Blazer Fuels, SIMEC Power 1 Limited
	Solar PV	10.0 Pant-Y-Moch CIC, Carmarthen
	Onshore Wind	110 Brechfa Forest West, Pen Bryn Oer Wind Farm, Brenig Wind Farm (Resubmission)

Special feature – Sub-national renewable electricity

Generation

- For similar reasons to capacity, generation from renewable sources in England was also more than two and a half times higher than Scotland, with the higher utilisation rates of bioenergy offset by the lower rates of the more intermittent solar PV which accounted for 15 per cent of English renewable generation.

Number

- Excluding PV, England continues to have the largest number of renewable sites (5,706) followed by Scotland (4,428), Northern Ireland (1,493) and Wales (1,138); the position for the last two countries is reversed when PV is taken into consideration.
- Excluding PV, the regions with the highest number in England are the South West, East of England and Yorkshire and the Humber, respectively, a position that changes for the last two regions, when PV is taken into consideration, to the South East and the East of England.

Capacity and Generation per GVA

- Economic activity in each country or region is measured in terms of Gross Value Added (GVA)⁵. Scotland continues to show both the largest capacity from renewables per £ of GVA, followed by Wales, Northern Ireland and Yorkshire and the Humber.
- Scotland also shows the largest generation per £ of GVA, followed by Yorkshire and the Humber (due to Drax), Wales and Northern Ireland.

Load Factors

Load factors are the ratio of how much electricity was generated as a proportion of the total generating capacity. UCLFs or “load factor on an unchanged configuration basis” describes the amount of electricity generated from schemes that have been operating throughout the whole of the calendar year with the same installed capacity configuration⁶.

The UCLFs and load factors on a standard basis can be found in the load factor time-series spreadsheets⁷. A summary by country is given in table 2:

Table 2 - Load factors on an unchanged configuration basis by country of the UK and technology:

	Onshore Wind	Offshore Wind	Solar PV	Hydro	Biomass and waste
England	25.8%	38.7%	11.4%	34.1%	66.0%
Northern Ireland	26.0%	n/a	9.2%	30.9%	64.4%
Scotland	26.5%	39.2%	9.4%	34.1%	68.0%
Wales	23.7%	34.6%	10.8%	18.6%	76.6%
UK average	26.0%	38.3%	11.2%	32.6%	66.3%

- Scotland now has the highest **onshore wind** load factor (26.5 per cent) breaking a consecutive three year run by England. This implies again that there have been fewer significant outages and curtailments than were noted in previous years for some large Scottish wind farms. Chart 3 shows the load factors for offshore wind in the different countries:

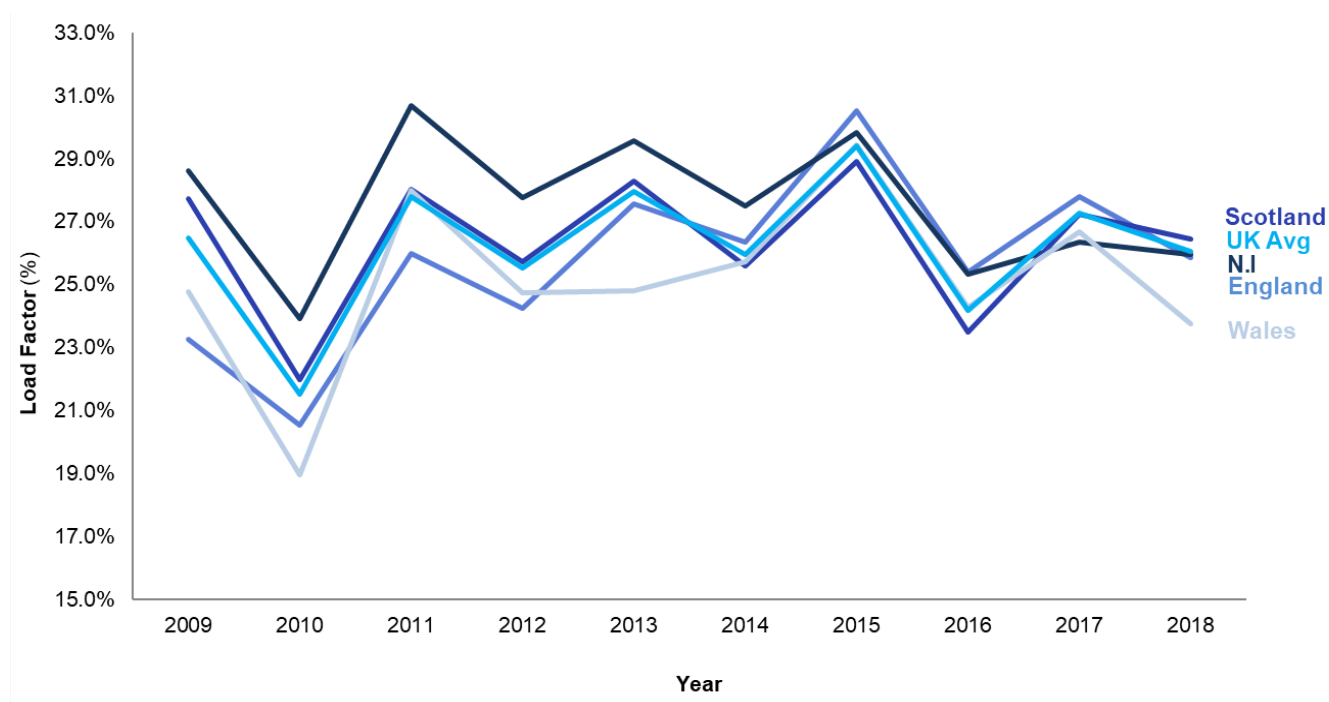
⁵ GVA is Gross Value Added as published as Total GVA in Regional Gross Value Added (Income Approach), December 2015 at: www.ons.gov.uk/economy/grossvalueaddedgva/bulletins/regionalgrossvalueaddedbalanceduk/1998to2016

⁶ The formula for calculating UCLFs:

$$\frac{\text{Electricity generated during the year (MWh)}}{(\text{capacity of schemes operating throughout the year with an unchanged capacity (MW) x hours in year})}$$

⁷ Available at: www.gov.uk/government/collections/renewables-statistics. These data are only reported where the region contains three or more operational schemes.

Chart 3 – Onshore wind UC LFs since 2000 by UK country



- Scotland also has the highest load factors for **offshore wind**.
- England has the highest average load factor for **Solar PV**, followed by Wales as solar irradiance tends to be slightly higher in England and Wales than in Scotland or Northern Ireland.
- Load factors for other technologies and additional graphs are included in the related spreadsheets.

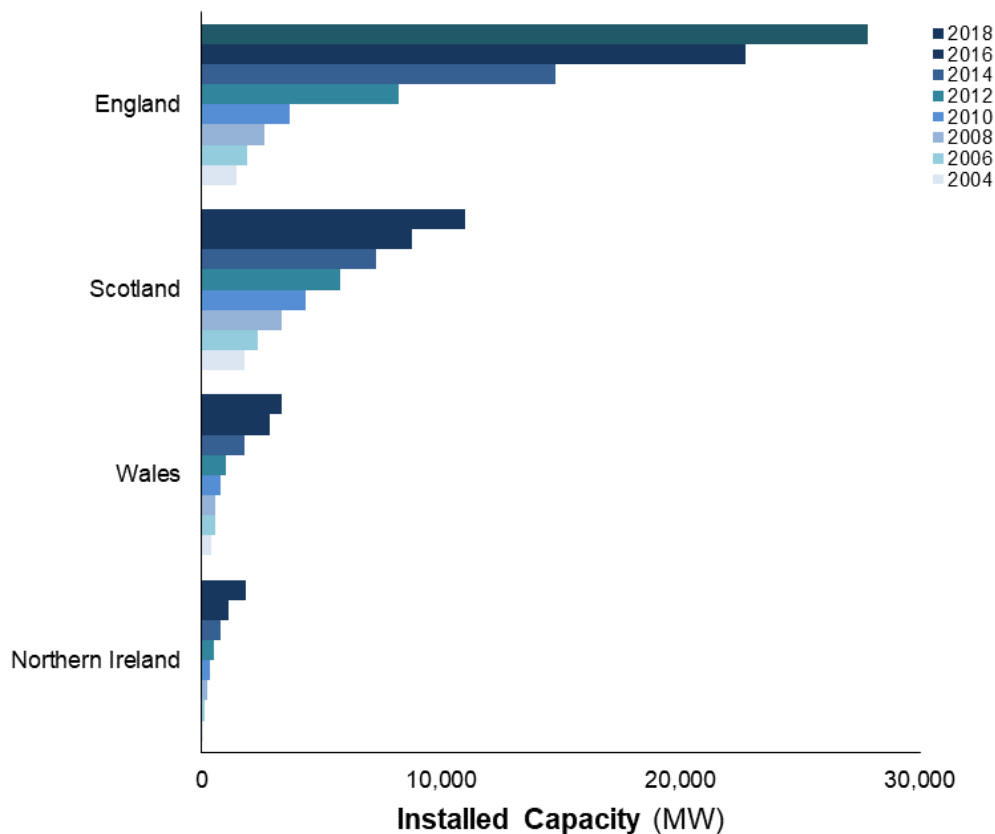
Time Series

- Capacity and generation have grown at different rates in different regions for each technology. In the case of the installed capacity for solar PV, following a period of rapid growth encouraged by the RO and FiT schemes, the initial fast rate of growth has slowed down, which is also reflected in the corresponding generation figures; this is probably due to a combination of effects including closure of the RO, a reduction in FiT financial support mechanisms and the rapid exploitation of prime development sites.
- In the case of landfill gas, the rate of exploitation of prime sites reached saturation several years ago but interestingly there is no similar plateauing of generation data which instead decreases with time. This is because biogas production rates reduce with time as the biodegradable resource gets exploited.

Special feature – Sub-national renewable electricity

Chart 4 shows how capacity has grown over time in each country.

Chart 4 – Total renewable capacity by country – 2004 – 2018



Local authority analysis

- Tables 3 to 5 rank the top five Local Authorities (LAs), per: number of installations, installed capacity, and generation for key technologies; these are also shown graphically in the Excel spreadsheets.
- **Number of sites:** Cornwall remains the top ranked (17,974), reflecting the large number of solar PV schemes installed in the South West; for other technologies, the top ranking LAs for number of installations for onshore wind, hydro, landfill gas, anaerobic digestion (AD) and plant biomass are the Orkney Islands, Highland, Thurrock, Shropshire and Mendip respectively.
- **Capacity:** Selby, is the top ranked, primarily from Plant Biomass (Drax Dedicated Biomass), followed closely by Highland, primarily from wind and hydro.
- **Generation:** Selby is top ranked, primarily from Plant Biomass; for other technologies, the top ranking LAs for onshore wind, PV, hydro, landfill gas and anaerobic digestion are Highland, Cornwall, Highland, Thurrock and Shropshire, respectively.
- Cornwall and Wiltshire continue to have large numbers of PV sites with correspondingly high capacity and generation which represents the installation of large solar farms. Sunderland and County Durham between them have an unusually large number of PV sites, especially for a region with low solar irradiance, however, they have much lower capacities and generation. This large number of small schemes represents the uptake of domestic installations.
- The Highland's overall capacity and generation is driven by the construction of large-scale wind farms. Whilst the Orkneys has the highest number of wind sites, more than 3 times that of the Highland's, it has a much smaller capacity and generation.
- Shropshire continues to show the highest number of AD facilities as well as capacity and generation, and probably reflects the availability of AD from the high levels of livestock farming undertaken in this District.

Table 3: Local Authority: Number of sites generating electricity from renewable sources, 2018¹												Number	
Onshore Wind	Solar PV		Hydro		Landfill gas		Anaerobic Digestion		Plant Biomass		Total²		
Orkney Islands	774	Cornwall	17,515	Highland	286	Thurrock	10	Shropshire	35	Mendip	30	Cornwall	17,974
Aberdeenshire	574	Wiltshire	9,409	Argyll & Bute	121	Doncaster	8	Herefordshire County of	20	Dumfries & Galloway	17	Wiltshire	9,436
Cornwall	426	Peterborough	9,157	Gwynedd	115	North Lanarkshire	8	Strabane	19	Herefordshire County of	17	Peterborough	9,165
Dumfries & Galloway	296	Sunderland	8,826	Perth & Kinross	88	Warrington	8	Dumfries & Galloway	14	East Riding of Yorkshire	10	Sunderland	8,836
Highland	251	County Durham	8,533	Dumfries & Galloway	84	Wiltshire	8	East Riding of Yorkshire	10	Powys	10	County Durham	8,653
								Shropshire	10				
UK Total	9,718		957,038		1,559		460		619		429		970,150

Table 4: Local Authority: Installed capacity of sites generating electricity from renewable sources, 2018¹												MW	
Onshore Wind	Solar PV		Hydro		Landfill gas		Anaerobic Digestion		Plant Biomass		Total²		
Highland	1,737	Wiltshire	594	Highland	803	Thurrock	44	Shropshire	19	Selby	2,663	Selby	2,720
South Lanarkshire	1,060	Cornwall	588	Argyll & Bute	296	Central Bedfordshire	33	East Cambridgeshire	18	Northumberland	448	Highland	2,601
Dumfries & Galloway	679	South Cambridgeshire	270	Perth & Kinross	278	Warrington	32	Redcar and Cleveland	10	Fife	77	Lancaster	1,379
South Ayrshire	653	Shropshire	213	Dumfries & Galloway	151	North Lanarkshire	26	Herefordshire County of	9	Slough	63	South Lanarkshire	1,116
Scottish Borders	638	Pembrokeshire	201	Stirling	85	Aylesbury Vale	21	Breckland	9	Sheffield	62	Dumfries & Galloway	1,085
UK Total	13,554		13,116		1,878		1,063		502		4,434		44,338

Table 5: Local Authority: Generation of electricity from renewable sources, 2018¹												GWh	
Onshore Wind	Solar PV		Hydro		Landfill gas		Anaerobic Digestion		Plant Biomass		Total²		
Highland	3,664	Cornwall	584	Highland	2,897	Thurrock	144	Shropshire	104	Selby	8,467	Selby	8,567
South Lanarkshire	2,631	Wiltshire	571	Perth & Kinross	755	Havering	120	East Cambridgeshire	98	Northumberland	530	Highland	6,756
Scottish Borders	1,483	South Cambridgeshire	269	Argyll & Bute	550	Aylesbury Vale	118	Redcar and Cleveland	54	Allerdale	370	Lancaster	3,703
South Ayrshire	1,388	Shropshire	200	Dumfries & Galloway	386	Central Bedfordshire	118	Strabane	49	Fife	341	Suffolk Coastal	2,964
Dumfries & Galloway	1,376	Pembrokeshire	197	Stirling	305	Warrington	114	Herefordshire County of	48	Sheffield	316	South Lanarkshire	2,816
UK Total	30,217		12,857		5,490		3,916		2,681		22,897		110,019

¹ Top five ranked Local Authorities (LAs). Where more than five schemes are listed, this indicates that more than one LA has the same ranking.

² Totals include offshore wind sites allocated to nearest Local Authority.

Special feature – Sub-national renewable electricity

Revisions

Historic revisions this year were only carried out to the 2016 and 2017 datasets. Whilst this has resulted in changes to both capacity and generation for all but three regions (including the minor changes to Northern Ireland), these are primarily due to the reassignment of unknown FiT data from the Other category. In addition new data is available from several sources and some duplicates have been identified. These revisions are summarised in table 6:

Year	2016		2017	
	MW	GWh	MW	GWh
England				
East Midlands	17	6	7	-5
East of England	0	0	0	0
North East	5	9	11	30
North West	1	1	-2	-8
London	1	1	4	0
South East	-17	-46	3	-41
South West	7	8	19	10
West Midlands	-3	4	0	-9
Yorkshire and the Humber	0	0	0	0
Northern Ireland	-1	0	0	-1
Scotland	-24	-56	-203	-266
Wales	4	-9	1	-41

Further information

For further details on the sub-national renewable analysis in this article please contact:

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www.gov.uk/government/statistics/regional-renewable-statistics