

# Renewable electricity in Scotland, Wales, Northern and the regions of England in 2020

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## Key headlines

Renewable generation in the UK grew by 13 per cent from 119.5 TWh in 2019 to 134.6 TWh in 2020. Within this:

- Generation in England was **up 15 per cent**
- Generation in Northern Ireland was **up 8.0 per cent**
- Generation in Scotland was **up 5.9 per cent**
- Generation in Wales was **up 16 per cent**

Generation in all countries was boosted by new capacity coming online, together with increased rainfall, wind and sunshine hours. Overall capacity increased by 2.1 per cent from 46.8 GW at the end of 2019 to 47.8 GW at the end of 2020. Within this:

- Capacity in England was **up 2.4 per cent**
- Capacity in Northern Ireland was **up 0.7 per cent**
- Capacity in Scotland was **up 0.5 per cent**
- Capacity in Wales was **up 2.2 per cent**

## 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, the number of operational sites and load factors for the four UK countries, the nine English regions and the UK Local Authorities<sup>1 2</sup>. It updates the published figures in the September 2020 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 2021 (DUKES), and use similar categories<sup>3</sup>. The UK totals published here are consistent with the figures published in *Energy Trends*. However, there are small differences between the totals published for England, Northern Ireland, Scotland and Wales published here and those published in ET 6.1. Some sites cannot be allocated to local authorities where it would disclose the generation of individual schemes.

Time-series data for each year for regional (2003 – 2020) and Local Authority data (2014 – 2020) are available as Excel spreadsheets at: <https://www.gov.uk/government/statistics/regional-renewable-statistics>. 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.

## Capacity

The total capacity and number of sites that cannot be allocated to a region or an individual local authority has grown in 2019 and 2020. This is because the Feed in Tariff scheme (FITs) closed to new entrants and the end of March 2019. Small scale installations that have come online since April 2019 are recorded through the MCS (Microgeneration Certification Scheme) however, the geographic information of the MCS data incomplete. For the first time this year, an attempt has been made to allocate some of the new MCS installations to individual local authorities. This remains an area for further improvement.

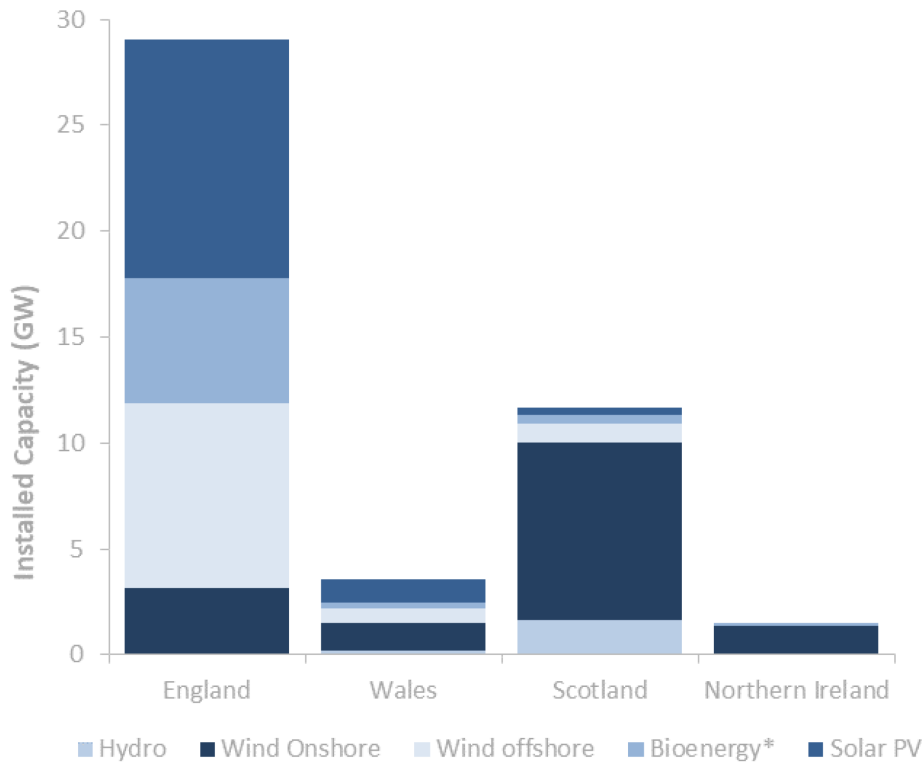
<sup>1</sup> Offshore wind is allocated to the region to which its output is connected. The exceptions are Robin Rigg, which comes ashore at Seaton, Cumbria but whose generation is associated with Scotland, Burbo Bank, which comes ashore in Wales but whose generation is associated with the North West and Hornsea Project One which lands in the East Midlands but with grid connection in Yorkshire and the Humber.

<sup>2</sup> Where disclosure of confidential generation data was likely at the site level the data have been removed and added to the unallocated row at the bottom of the Local Authority listings.

<sup>3</sup> On occasion, it has been necessary to combine some renewable sources into categories so that information about individual sites is not disclosed.

- 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 England has 88 per cent of the UK's bioenergy capacity (mostly from four biomass units at Drax and the Ferrybridge Multifuel Power Station in Yorkshire and the Humber as well as Lynemouth Power Station in the North East), 83 per cent of the solar PV capacity and 84 per cent of the offshore wind capacity. Chart 1 shows a breakdown of capacity at the end of 2020 by technology and country.

**Chart 1 – Renewable capacity at the end of 2020 by technology and country**



*Includes biomass, waste, anaerobic digestion, landfill gas and sewage gas*

- The technology with the highest growth in capacity was **offshore wind** (5.0 per cent) which accounted for half of the total UK growth and associated entirely with the East of England. This was driven by East Anglia 1 with the addition of around 500 MW capacity.
- **Onshore wind** grew by 0.8 per cent in the UK – 47 per cent of the new capacity was in Scotland, 39 per cent in Wales, 10 per cent in England and 5 per cent in Northern Ireland.
- **Solar PV** capacity grew by 1.8 per cent, with East of England having the largest percentage increase at 2.1 per cent.
- **Biomass and waste** grew by 2.2 per cent overall. Within this, capacity grew by 1.9 per cent in England and 8.7 per cent in Wales. The additional capacity was primarily in South East (37 per cent) with the K3 CHP Facility [Kemsley EfW] (50.4 MW), South West (25 per cent), from the Avonmouth Resource Recovery Centre (34.7 MW), and Wales (14 per cent) from Parc Adfer EfW (19 MW).

Table 1 shows the largest new schemes (including capacity increases) in 2020:

**Table 1 - Largest new schemes**

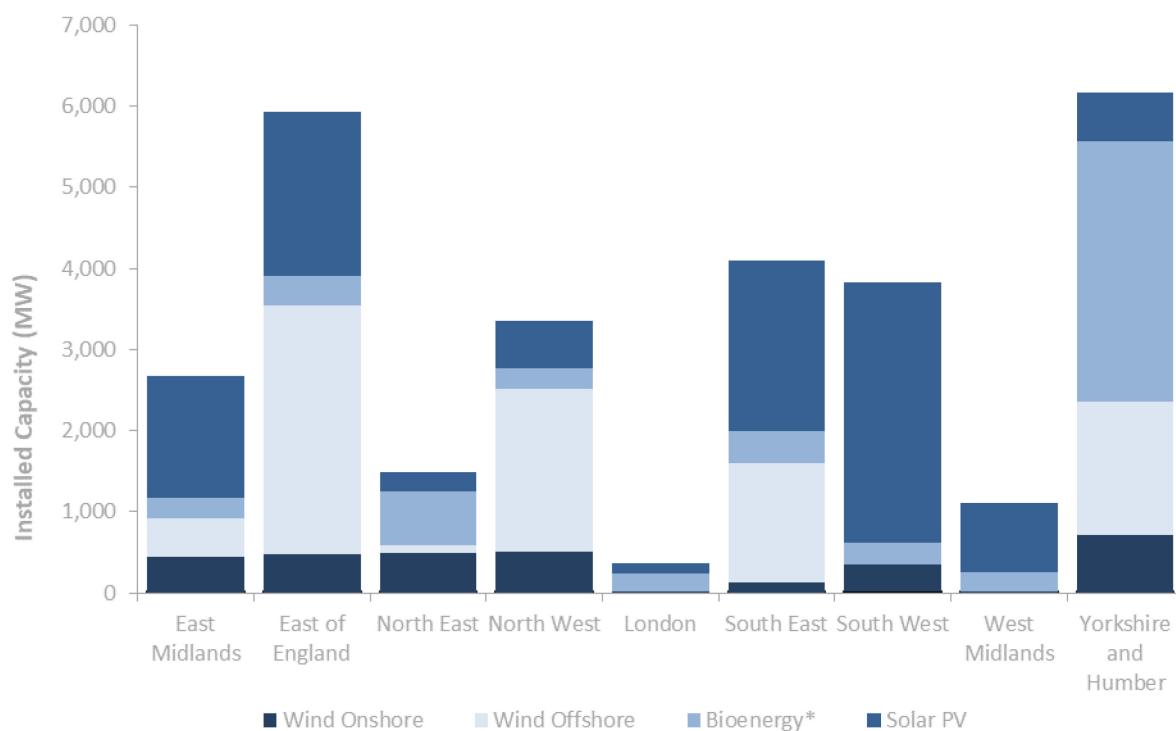
<b>Onshore wind</b>	Ransonmoor Wind Farm (capacity increase)	East of England	8 MW
	Binn Eco Park	Scotland	9 MW
	Burnfoot East	Scotland	11 MW
	Tralorg	Scotland	19 MW
	Inverclyde (Greenock Resubmission)	Scotland	24 MW
	Solwaybank (Resubmission)	Scotland	30 MW
	Llyn Brenig	Wales	38 MW
<b>Offshore wind</b>	East Anglia 1 (capacity increase)	East of England	501 MW
<b>Solar PV</b>	Creacombe Solar Farm	South West	7 MW
	Lamby Way Solar Farm	Wales	9 MW
	Bumpers Farm 2	South East	12 MW
	Goosehall	East of England	43 MW
<b>Biomass and waste</b>	NewLinks Development Ltd (Grimsby EfW plant) (capacity increase)	Yorkshire and Humber	11 MW
	Parc Adfer EfW	Wales	19 MW
	Avonmouth Resource Recovery Centre	South West	34 MW
	K3 CHP Facility (Kemsley EfW)	South East	50 MW

The regions with the highest capacity in England are:

- Yorkshire and the Humber – 6,265 GW (51 per cent from biomass and waste - mostly from Drax and Ferrybridge – and 37 per cent from wind – mostly from Hornsea Project One).
- East of England - 6,124 GW (58 per cent from wind and 33 per cent from solar PV).
- South East - 4,305 GW (49 per cent from solar PV and 37 per cent from Wind).

Capacity by English region is shown in Chart 2:

**Chart 2 – Renewable capacity at the end of 2020 by English region and technology**



\*Includes biomass, waste, anaerobic digestion, landfill gas and sewage gas

Table 2 summarises capacity growth, the key technologies in each region as well as the major sites:

<b>Table 2: Regional capacity growth</b>			
<b>Region</b>	<b>Key Technology</b>	<b>Growth (MW)</b>	<b>Key Schemes</b>
East Midlands	Biomass and Waste	- 2.3	Capacity correction
	Solar PV	0.2	Mainly medium and small-scale projects (includes FIT revisions)
	Onshore Wind	0.7	Featherstone House Farm (Clark Recovered)
East of England	AD	0.6	Greenyard Frozen UK Ltd (Waste AD)
	Biomass and Waste	0.8	Capacity revision
	Solar PV	41.1	Goosehall
	Offshore Wind	501.0	East Anglia 1
	Onshore Wind	11.5	Ransonmoor Wind Farm
North East	Biomass and Waste	8.7	Biopower Hartlepool
	Offshore Wind	- 4.3	Capacity correction
	Onshore Wind	- 2.0	Capacity correction
North West	Solar PV	5.5	Tesco Crab Tree Lane, Kingmoor Park
London	Biomass and Waste	5.0	Capacity revision
South East	AD	1.7	Charlton Lane Eco Park (Waste AD)
	Biomass and Waste	50.4	K3 CHP Facility (Kemsley EfW)
	Solar PV	12.2	Bumpers Farm 2, Tesco Superstore Shripney Road
South West	Biomass and Waste	34.7	Avonmouth Resource Recovery Centre (formerly Severn Road)
	Landfill gas	- 0.8	Closure
	Solar PV	16.5	Building F, Renishaw Factory, Renishaw PLC Factory, Creacombe Solar Farm, Queen Elizabeth The Queen Mothers Hospital
	Onshore Wind	2.2	Ventonteague
West Midlands	AD	0.4	Capacity growth to existing
	Biomass and Waste	1.6	Capacity revisions
	Solar PV	1.4	Salford Lodge, Ibstock
Yorkshire and Humber	Biomass and Waste	11.3	NewLinks Development Ltd (Grimsby EfW plant)
	Landfill gas	- 0.1	Closure
	Solar PV	0.6	Hewitts Avenue Tesco, Tesco Wombwell Lane
	Onshore Wind	- 1.9	Capacity correction
<b>Northern Ireland</b>	AD	2.3	Berry Energy (Farm AD), MillfordAD (Waste AD), Rewyas Energy (Waste AD), Victus Power Annesborough (Waste AD), Glenagri Bioelectric (Farm AD)
	Biomass and Waste	5.2	Glenagri Bioelectric CHP, Hyster, Victus Power Silverwood, Ryobi, Annesborough CHP,
	Solar PV	0.8	Dunore PV Farm, Finvoy Solar Farm
	Onshore Wind	5.1	Loughran - Dunamore Road, Railroad, Castleroddy Road, 16, Curragh Road, 70, Loughmallon Road, 136, Ballyveely Road, 99 (Replacement), GGE 3, McNally- Iveagh Road, Porter-Garvagh Rd-GP, Poyntzpasswindltd, Quarry Hill Wind, Rea - Boghill Road, Smyth - Garvagh, Watson-Crewmore Rd – GP, Cooks Wind Station
<b>Scotland</b>	AD	0.6	Angus Hotel CHP_Extension (Waste AD), TECA AD (Waste AD)
	Biomass and Waste	0.5	Capacity revision
	Hydro	2.0	Birkhall Estate
	Solar PV	5.9	Invergordon Academy, Lochaber High School (Resubmission), Parkhill Solar Farm, St Margarets Bay, Finmont Service Reservoir
	Onshore Wind	50.6	Binn Eco Park, Locheport Community Windfarm (Resubmission), Nether Fauldhouse Farm, Burnfoot East, Inverclyde (Greenock Resubmission), Solwaybank (Resubmission), Tralorg, Halsary, Aftonlea, Burnbrae Farm (Strathaven), Greenhill Croft Tubine 2
<b>Wales</b>	Biomass and Waste	19.0	Parc Adfer EfW
	Hydro	- 2.0	Closure
	Solar PV	19.0	Llancadle Farm, Lamby Way Solar Farm, Flint Landfill Site Castle Park
	Offshore Wind	- 2.0	Capacity correction
	Onshore Wind	41.6	Ffrwd Farm, East Williamston Community Turbine, Trefawr Farm, Llyn Brenig, Parc Stormy T2, Longlands Farm

## Generation

- For similar reasons to capacity, generation from renewable sources in England was almost three times higher than Scotland, with the higher utilisation rates of bioenergy and wind offset by the lower rates of the more intermittent solar PV, which accounted for 13 per cent of English renewable generation in 2020.

## Number

- Excluding PV, England continues to have the largest number of renewable sites (5,736) following by Scotland (4,504), Northern Ireland (1,592) and Wales (1,164); the position for the last two countries is reversed when PV is taken into consideration.
- Excluding PV, regions with the highest number in England are the South West, East of England and Yorkshire and the Humber. When PV is taken into consideration, the South West still has the highest number of sites but is followed by 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)<sup>4</sup>. Scotland continues to show both the largest capacity from renewables per £ of GVA (around four times higher than England) followed by Wales, Yorkshire and the Humber and Northern Ireland.
- In terms of electricity generated, Scotland also shows the largest generation per £ of GVA, (around four times higher than England) followed by Yorkshire and the Humber, Wales, North East 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<sup>5</sup>.

The UCLFs and load factors on a standard basis can be found in the load factor time-series spreadsheets. A summary by country is given in Table 3:

**Table 3 - Load factors on an unchanged configuration basis by UK country and technology:**

	<b>Onshore Wind</b>	<b>Offshore Wind</b>	<b>Solar PV</b>	<b>Hydro</b>	<b>Biomass and Waste</b>
<b>England</b>	30.5%	45.8%	11.4%	39.9%	69.1%
<b>Northern Ireland</b>	27.5%	n/a	9.3%	40.0%	68.0%
<b>Scotland</b>	26.7%	44.3%	10.3%	43.0%	65.7%
<b>Wales</b>	32.2%	37.6%	10.9%	25.1%	71.9%
<b>UK average</b>	28.0%	45.1%	11.3%	41.3%	69.0%

<sup>4</sup> 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/grossdomesticproductgdp/bulletins/regionaleconomicactivitybygrossdomesticproductuk/1998to2018](http://www.ons.gov.uk/economy/grossdomesticproductgdp/bulletins/regionaleconomicactivitybygrossdomesticproductuk/1998to2018)  
[www.ons.gov.uk/economy/grossvalueaddedgva/datasets/nominalandrealregionalgrossvalueaddedbalancedbyindustry](http://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/nominalandrealregionalgrossvalueaddedbalancedbyindustry)

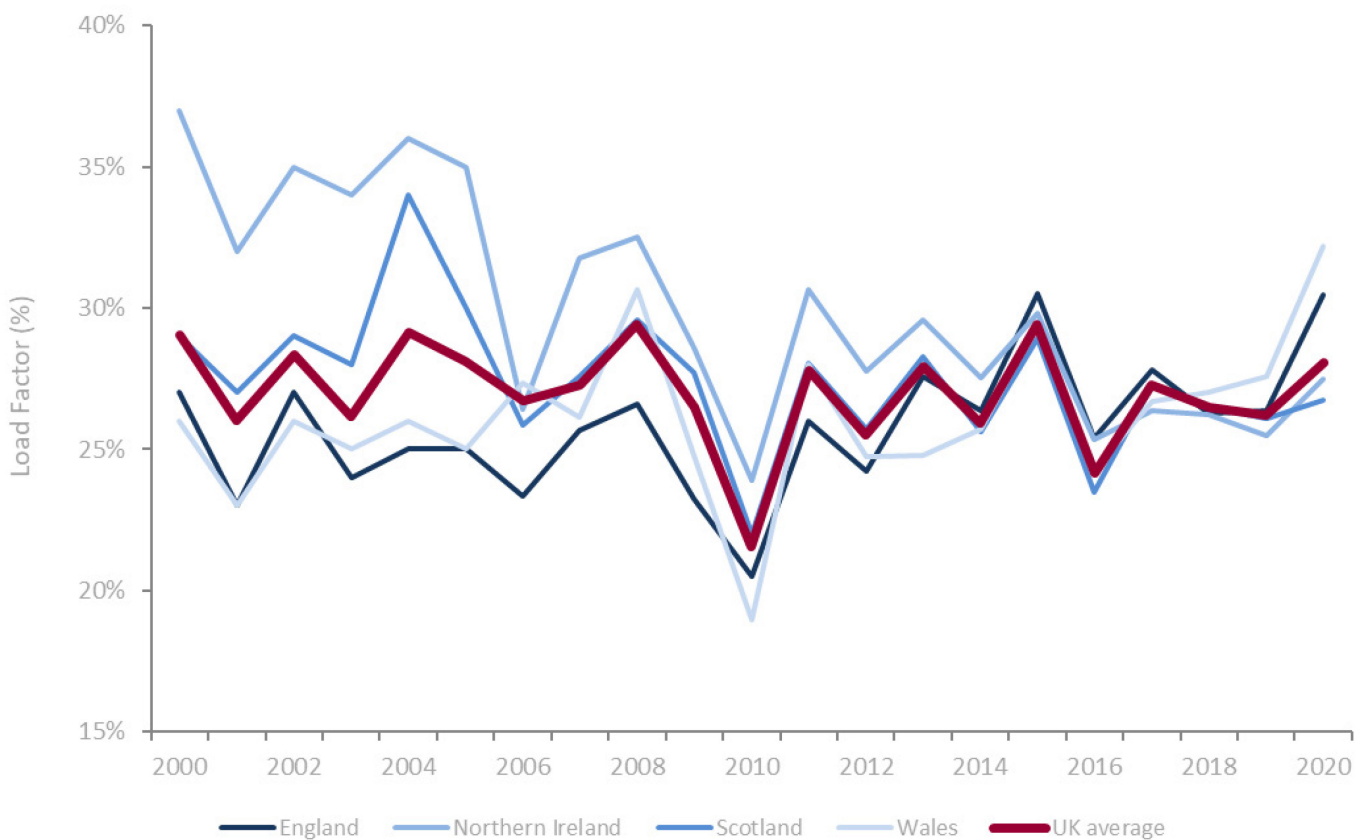
<sup>5</sup> The formula for calculating this is:

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

Installed capacity of schemes operating throughout the year with an unchanged capacity configuration (MW) x hours in year

- Wales continues to have the highest **onshore wind** load factor (32.2 per cent) followed by England (30.5 per cent), Northern Ireland (27.5 per cent) and Scotland (26.7 per cent). This implies that there have been some outages and curtailments for some large Scottish wind farms.
- England, however, has the highest load factor for **offshore wind** (45.8 per cent), followed closely by Scotland (44.3 per cent) and Wales (37.6 per cent). Again, these load factors can be affected by curtailment, where supply exceeds demand and wind farms are required to cut generation by the national grid.
- England also has the highest average load factor for **solar PV**, followed by Wales, Scotland and Northern Ireland which is in keeping with the relative solar irradiance in these countries.
- Load factors for other technologies and additional graphs are included in the related spreadsheets.

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

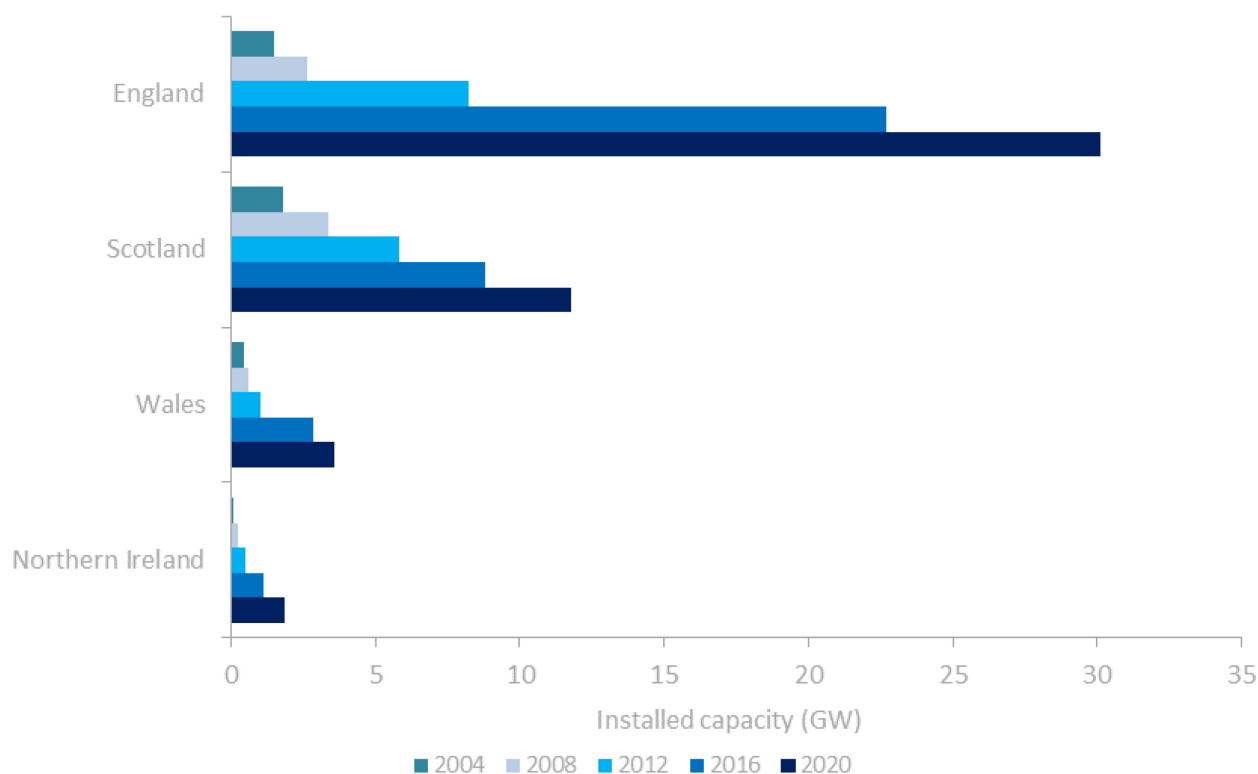


### Time series

- Capacity and generation have grown at different rates in different regions for each technology, which is partly dependent on the available resource and the support mechanism.
- In the case of the installed capacity for solar PV, following a period of rapid growth encouraged by the RO and FiT support mechanisms, the initial fast rate of growth has slowed down, 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 and the rapid exploitation of prime development sites. Similar patterns are seen for other technologies (onshore wind, landfill gas, sewage gas, and hydro).
- Offshore wind and other bioenergy continue to grow. In the case of other bioenergy, much of this is from biomass and waste.
- In the case of landfill gas, the rate of exploitation of prime sites reached saturation more than a decade ago but 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.

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

**Chart 4 – Total renewable capacity by country 2003 – 2020**



### Local authority analysis

- Tables 4 to 6 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. The Local Authority data used for this analysis has recently undergone some further data cleansing and revisions by Ofgem; as a result, there will be some minor differences when compared with the data published from the Annual Survey in DUKES.
- Last year several local authorities were amalgamated and now come under a new name or have undergone a name change<sup>6</sup>. This reporting year, an additional amalgamation has taken place<sup>7</sup> which has been amended in the time-series spreadsheets from 2018 onwards but the order listings, as per last year, remain unchanged so that time-series comparisons can still be made with pre-2018 datasets. Those LAs now amalgamated with others now have no data. A footnote has been included that explains this.
- **Number of sites:** Cornwall remains the top ranked (19,033), 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 and plant biomass are the Orkney Islands, Highland, Buckinghamshire / Thurrock, Shropshire and Mendip. respectively.
- **Capacity:** Selby is the top ranked, primarily from Plant Biomass (Drax), followed closely by Highland, primarily from wind and hydro. For other technologies, the top ranking LAs are PV (Cornwall), landfill gas (Thurrock) and anaerobic digestion (Shropshire).

<sup>6</sup> "Bournemouth", "Christchurch" and "Poole" are now "Bournemouth, Christchurch and Poole"; "East Dorset", "North Dorset", "Purbeck", "West Dorset", "Weymouth and Portland" are now "Dorset"; "Forest Heath" and "St Edmundsbury" are now "West Suffolk"; "Suffolk Coastal" and "Waveney" are now "East Suffolk"; "Taunton Deane" and "West Somerset" are now "Somerset West and Taunton". "Shepway" is now called "Folkestone and Hythe".

<sup>7</sup> "Aylesbury Vale", "Chiltern", "South Bucks" and "Wycombe" are now "Buckinghamshire"

- **Generation:** Selby is top ranked, primarily from Plant Biomass: For other technologies, the top ranking LAs are onshore wind (Highland), PV (Cornwall), hydro (Highland), landfill gas (Buckinghamshire) and anaerobic digestion (Shropshire).
- Wiltshire and Cornwall continue to have large numbers of PV sites with correspondingly high capacity and generation which represents the installation of large solar farms. Interestingly, Sunderland and Peterborough between them have an unusually large number of PV sites, especially for a region like Sunderland with lower solar irradiance. However, they have much lower capacities and generation. This large number of small schemes probably represents the uptake of domestic installations.
- 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, some 3 times that of the Highland's, it has a much smaller capacity and generation, most likely because these are mainly small projects meeting local needs.
- Shropshire continues to show the highest number of AD facilities as well as capacity and generation, and probably reflects the availability of AD feedstock because of the high levels of livestock farming undertaken in this district.



Onshore Wind	Solar PV	Hydro	Landfill gas	Anaerobic Digestion	Plant Biomass	Total <sup>2</sup>							
Orkney Islands	785	Cornwall	18,573	Highland	301	Buckinghamshire	9	Shropshire	36	Mendip	30	Cornwall	19,033
Aberdeenshire	573	Wiltshire	9,966	Argyll & Bute	122	Thurrock	9	Strabane	21	Dumfries & Galloway	18	Wiltshire	9,995
Cornwall	427	Peterborough	9,256	Gwynedd	119	Doncaster	8	Herefordshire County of	20	Herefordshire County of	16	Peterborough	9,264
Dumfries & Galloway	297	Sunderland	8,921	Perth & Kinross	87	North Lanarkshire	8	Dumfries & Galloway	14	East Riding of Yorkshire	10	County Durham	8,936
Highland	256	Dorset	8,870	Dumfries & Galloway	83	Warrington	8	Dorset	12	Powys	10	Sunderland	8,931
						Wiltshire	8			Shropshire	10		
<b>UK Total</b>	<b>9,810</b>		<b>1,069,788</b>		<b>1,561</b>		<b>454</b>		<b>670</b>		<b>441</b>		<b>1,048,328</b>

Onshore Wind	Solar PV	Hydro	Landfill gas	Anaerobic Digestion	Plant Biomass	Total <sup>2</sup>							
Highland	1,822	Cornwall	596	Highland	805	Thurrock	40	Shropshire	20	Selby	2,663	Selby	2,721
South Lanarkshire	1,194	Wiltshire	548	Argyll & Bute	297	Buckinghamshire	38	East Cambridgeshire	18	Northumberland	448	Highland	2,692
Dumfries & Galloway	676	Dorset	281	Perth & Kinross	277	Central Bedfordshire	33	Redcar and Cleveland	10	Fife	77	East Suffolk	1,705
South Ayrshire	652	South Cambridgeshire	279	Dumfries & Galloway	151	Warrington	32	East Riding of Yorkshire	10	Slough	63	North East Lincolnshire	1,492
Scottish Borders	641	Shropshire	218	Stirling	86	North Lanarkshire	26	Herefordshire County of	9	Sheffield	62	Lancaster	1,381
<b>UK Total</b>	<b>14,102</b>		<b>13,682</b>		<b>1,878</b>		<b>1,055</b>		<b>538</b>		<b>4,553</b>		<b>47,813</b>

Onshore Wind	Solar PV	Hydro	Landfill gas	Anaerobic Digestion	Plant Biomass	Total <sup>2</sup>							
Highland	4,036	Cornwall	584	Highland	3,439	Buckinghamshire	172	Shropshire	114	Selby	9,419	Selby	9,528
South Lanarkshire	3,014	Wiltshire	542	Perth & Kinross	1,014	Havering	113	East Cambridgeshire	99	Fife	397	Highland	7,722
Dumfries & Galloway	1,690	Dorset	295	Argyll & Bute	678	Central Bedfordshire	108	Strabane	58	Breckland	354	Lancaster	3,967
Scottish Borders	1,626	South Cambridgeshire	284	Dumfries & Galloway	497	Thurrock	99	Redcar and Cleveland	56	Allerdale	341	East Suffolk	3,742
South Ayrshire	1,295	Shropshire	209	Stirling	386	Warrington	98	East Riding of Yorkshire	54	Neath Port Talbot	335	South Lanarkshire	3,194
<b>UK Total</b>	<b>34,688</b>		<b>13,158</b>		<b>6,761</b>		<b>3,496</b>		<b>2,904</b>		<b>26,845</b>		<b>134,603</b>

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.

## Revisions

Historic revisions this year were only carried out to the 2018 and 2019 datasets which has resulted in changes to both capacity and generation for all but two regions. These are due to several reasons that include the reassignment of unknown FiT data from the Other category, capacity revisions to be consistent with the BEIS MPP (Major Power Producers), ROCs (Renewable Obligation Certificates) and the MSIW (Municipal Solid & Industrial Waste) Survey returns, the identification of some duplicates, closures and additional. These revisions are summarised in Table 7:

Year	2018		2019	
	MW	GWh	MW	GWh
<b>England</b>				
East Midlands	-14	52	-20	-42
East of England	0	0	0	0
North East	4	1	0	-7
North West	8	5	1	-18
London	5	0	2	-5
South East	-14	-20	-28	-65
South West	-46	-52	-59	-104
West Midlands	16	5	4	-21
Yorkshire and the Humber	0	0	0	0
<b>Northern Ireland</b>	<b>-52</b>	<b>-41</b>	<b>-51</b>	<b>-107</b>
<b>Scotland</b>	<b>-75</b>	<b>-268</b>	<b>-134</b>	<b>-459</b>
<b>Wales</b>	<b>2</b>	<b>280</b>	<b>-2</b>	<b>-23</b>



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