



Department for
Business, Energy
& Industrial Strategy

Energy Trends

UK, July to September 2021

About this release

Information on energy production, trade, and consumption in the UK for total energy and by specific fuels.

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Data tables

Additional data are available online as part of the Energy Trends series:

[Total energy](#)

[Coal and derived gases](#)

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[Renewables](#)

This publication is based on a snapshot of survey data from energy suppliers. New data are incorporated in line with the [revisions policy](#).

Percentage change from July to September 2020

(mtoe basis)	Production	Imports	Exports	Demand
Total energy	-8.8%	+12%	-11%	+5.3%
Coal	-38%	+15%	-39%	+13%
Primary oil	-7.5%	+12%	-17%	+14%
Petroleum products	+14%	+23%	+26%	+13%
Gas	-11%	+3.6%	-42%	-0.8%
Electricity	-12%	+113%	-49%	-12%

Final energy consumption in the third quarter of 2021 was up 6.4 per cent from last year and returning to pre-pandemic levels for most sectors of the economy. Energy requirements for industrial use, demand from other final users (e.g. shops, restaurants, offices, and public buildings) and transport demand are all up on last year, and similar to the third quarter of 2019 once temperature is considered for all sectors except transport (see below).

Transport fuels demand remains the exception. Whilst up 18 per cent on last year, it is down 17 per cent compared to the same period in 2019. Whilst petrol and diesel sales have returned to near normal levels, **aviation demand, is down 61 per cent on the third quarter of 2019.**

Energy production is down 8.8 per cent on the same period last year, largely because of maintenance activities on the UK's Continental Shelf (UKCS), including work on the Forties Pipeline early in the quarter. UKCS production has since increased to regular levels following the completion of these activities. **Coal production reached another record low,** whilst output from wind, solar and hydro was also low due to prevailing weather conditions.

Unfavourable weather conditions meant that **renewable generation fell to 24.3 TWh,** the lowest value in four years and down 17 per cent on the same quarter last year. As a share of total generation, **renewable generation fell 4.0 percentage points to 35.9 per cent.** Wind generation was particularly affected, down 30 per cent on the same period last year as wind speeds dropped to their lowest level this century. The share of generation attributed to **fossil fuels increased to 44.8 per cent, 2.5 percentage points up** on the same quarter last year.

Quarter 3 2021 saw an increase in new renewable capacity, up 3.0 per cent from last year. This is notably larger than the increases seen in recent quarters.

Section 1: UK total energy

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Key headlines

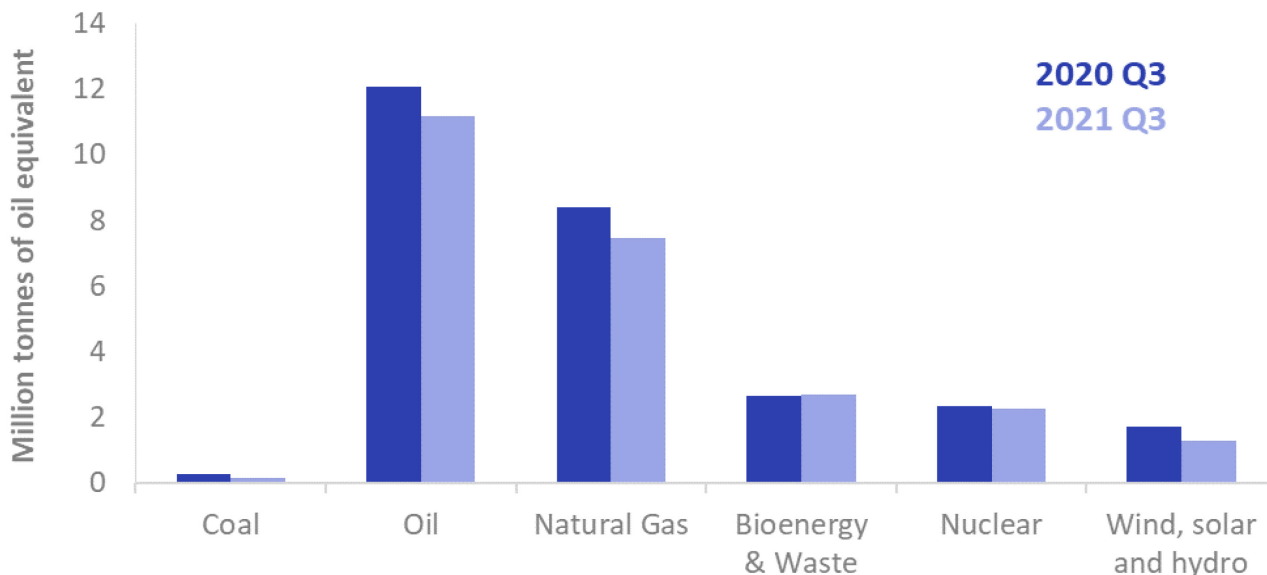
In the third quarter of 2021 **total production was 25.1 million tonnes of oil equivalent, 8.8 per cent lower** than in the third quarter of 2020. This is a result of significant maintenance on the North Sea (notably the Forties Pipeline System), coupled with lower wind speeds reducing renewable generation.

Total primary energy consumption for energy uses rose by 6.5 per cent, recovering from the low levels last year when Covid-19 restrictions reduced energy demand for all fuels but particularly petroleum. When adjusted to take account of weather differences, primary energy consumption rose by 6.6 per cent.

Total final energy consumption (excluding non-energy use) was 6.4 per cent higher compared to the third quarter of 2020 when the UK first started to ease lockdown restrictions arising from the Covid-19 pandemic. Transport consumption rose by 15 per cent as travel restrictions were eased, industrial consumption rose by 6.0 per cent and other final users (mainly from the service sector) consumption rose by 1.4 per cent. Domestic consumption fell by 10 per cent with average temperatures warmer than a year earlier, and a return to more office-based working. On a seasonally and temperature adjusted basis, final energy consumption rose by 6.7 per cent, with rises in all sectors except domestic which fell by 0.7 per cent.

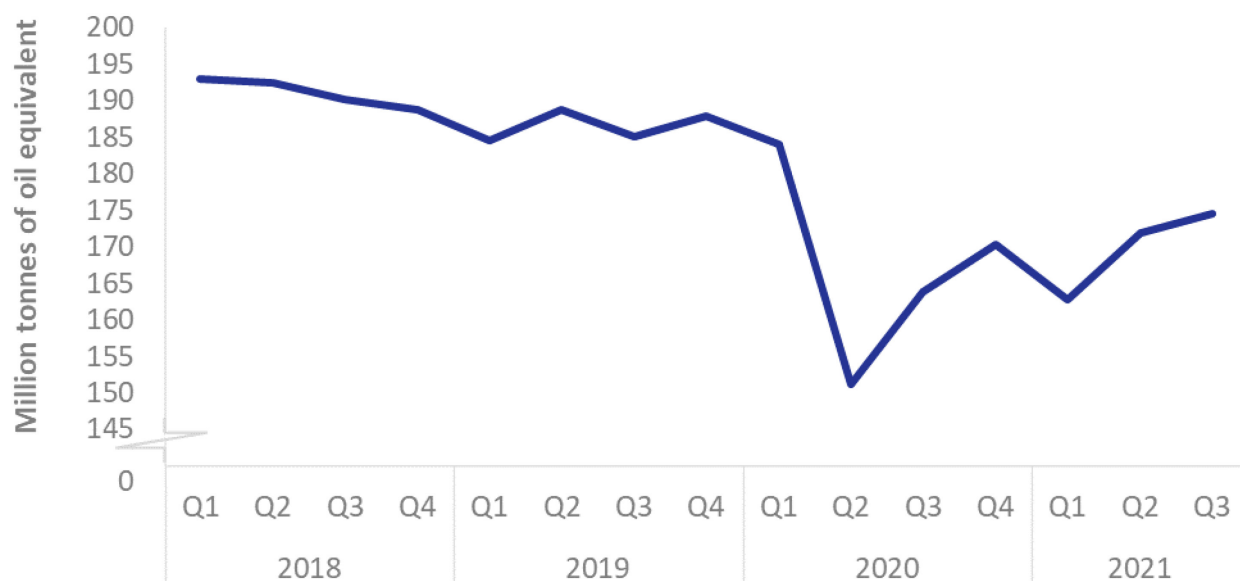
Consumption has continued to pick up in 2021 and has returned to close to pre-pandemic totals for most fuels and sectors. The notable exception is for oil for transport demand which remains relatively muted, mainly because of continuing low demand for aviation fuel.

Chart 1.1 UK production



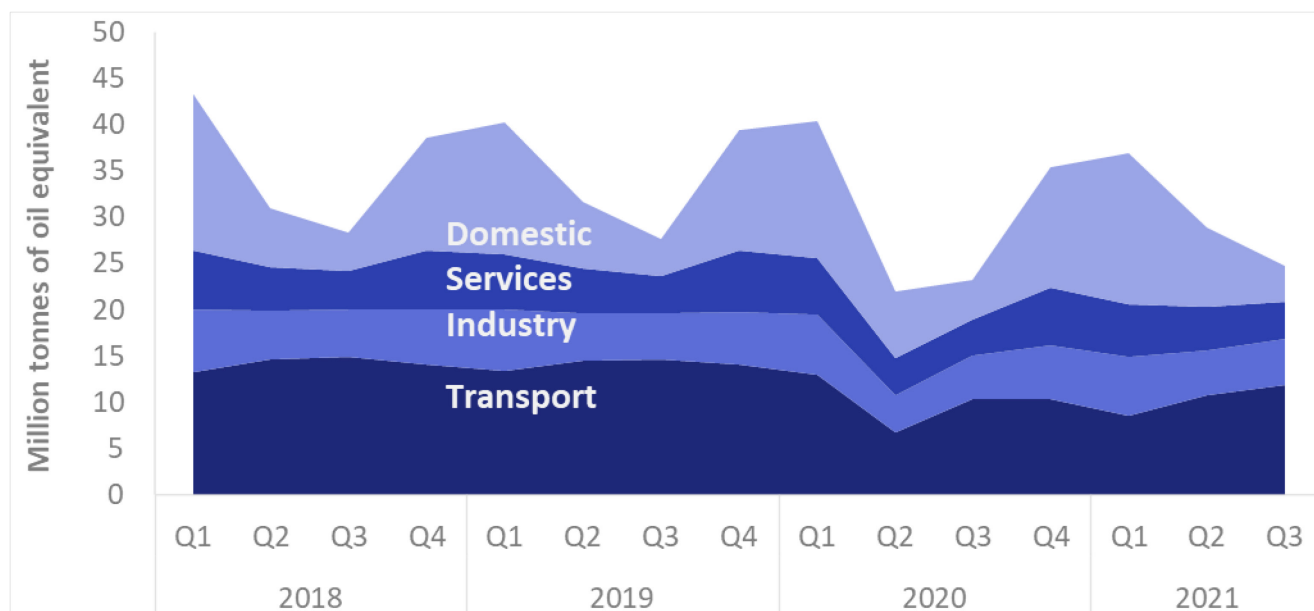
In the third quarter of 2021 **total production was 25.1 million tonnes of oil equivalent, 8.8 per cent lower** than in the third quarter of 2020. Production on the UKCS was impacted by the shutdown of the Forties Pipeline System (FPS) for planned maintenance, as well as reduced capacity at several major gas terminals also due to maintenance. Wind, solar and hydro output fell due to less favourable weather conditions for all renewable technologies, with wind speeds notably lower compared to 2020.

Chart 1.2 Total inland consumption (primary fuel input basis)



In the third quarter of 2021 **total inland consumption (which includes not only fuel use by consumers, but fuel used for electricity generation and other transformation)** was 174.5 million tonnes of oil equivalent, 6.6 per cent higher than in the third quarter of 2020, on a seasonally adjusted and annualised rate that removes the impact of temperature on demand. This increase represents the easing of Covid-19 restrictions in 2021 compared with 2020 and is driven by a 17 per cent increase in petroleum consumption.

Chart 1.3 Final energy consumption by user



In the third quarter of 2021 **total final energy consumption (excluding non-energy use)** was **6.4 per cent higher** than in the third quarter of 2020 when the UK first started to ease lockdown restrictions arising from the Covid-19 pandemic. Transport consumption rose by 15 per cent, as lockdown restrictions were lifted particularly for domestic travel. Industrial sector energy consumption rose by 6.0 per cent and service sector consumption rose by 1.4 per cent as access to shops, schools and workplaces was opened up. Domestic consumption fell by 10 per cent, as people returned to work in offices as well as average temperatures being warmer than a year earlier. Except for transport demand, which remains muted due to low demand for aviation fuel in particular, consumption levels are returning to close to the average levels before the pandemic.

Section 2: Coal and derived gases

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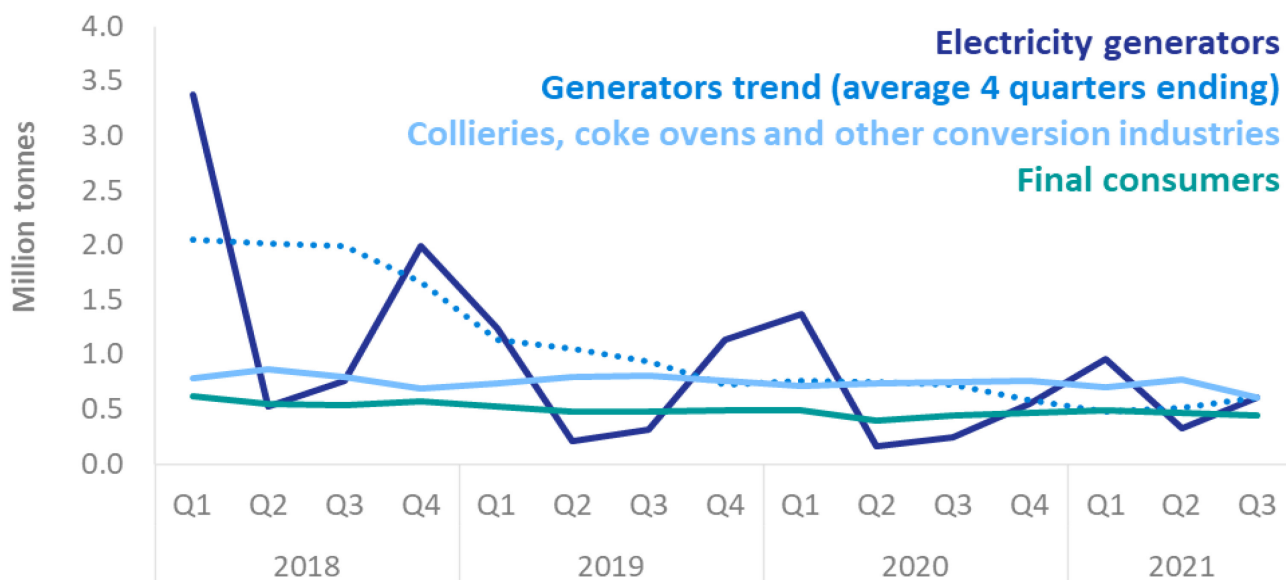
Key headlines

In the third quarter of 2021, demand for coal by electricity generators rose but from a low baseline following record periods without coal generation in Great Britain in 2020. Lower generation from low carbon sources also contributed to higher coal generation. With the Drax coal units mothballed at the end of March 2021, just three coal plants remain operational in the UK, with coal use for electricity generation expected to cease completely by October 2024. (Chart 2.1)

Overall coal production **for the third quarter of 2021 fell to a new record low of 246 thousand tonnes**, down 38 per cent on the third quarter of 2020. Demand for coal remains low due to declining demand from electricity generators, and UK production over the last year has been further affected by mine closures, and production restrictions due to Covid-19 and flooding

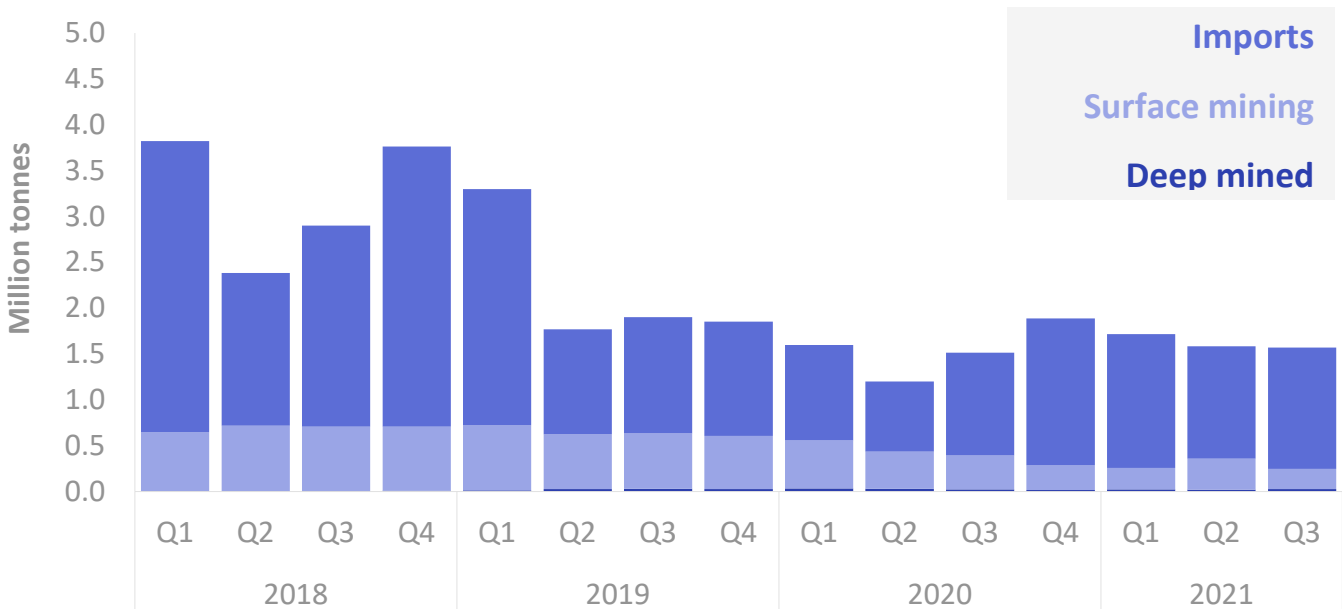
In Quarter 3 2021, **coal imports rose to 1.3 million tonnes**, 18 per cent up on Q3 2020. Net imports accounted for 66 per cent of supply in Q1 2021 (Chart 2.2). Russia (48 per cent), the USA (25 per cent) and Venezuela (10 per cent) accounted for 83 per cent of total coal imports. (Chart 2.3)

Chart 2.1 Coal Consumption



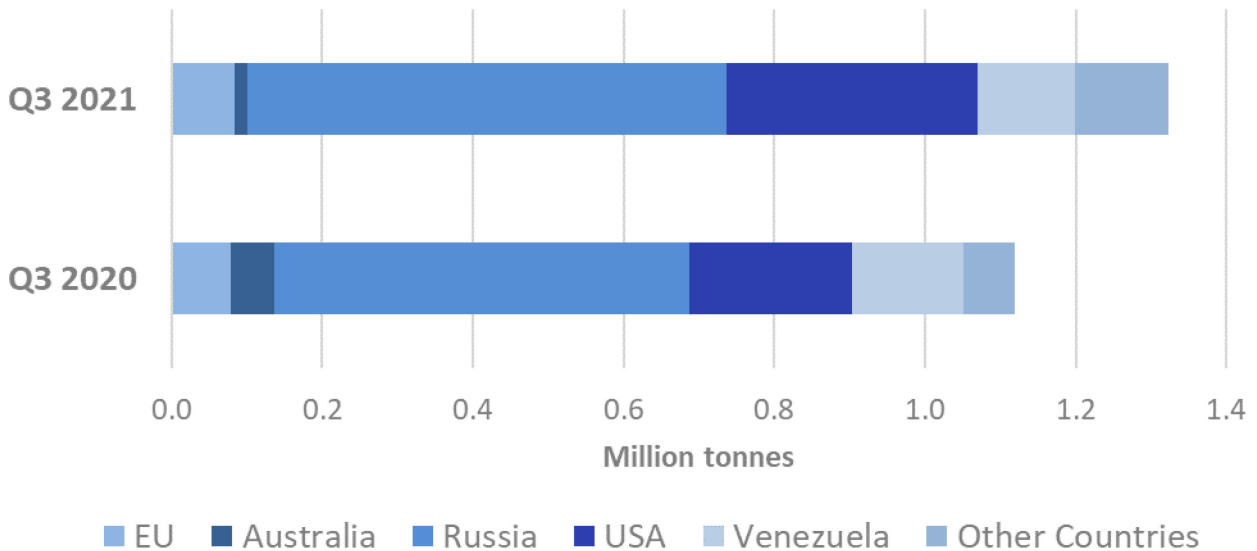
In the most recent quarter, coal demand for coal-fired electricity generation rose from 239 tonnes in Quarter 3 2020 to 611 thousand tonnes in Quarter 3 2021. The increase was from a low baseline following record periods without coal generation in Great Britain in 2020. Lower generation from low carbon sources also contributed to higher coal generation. Despite the fall in gas generation during the period, coal-fired generation continued to be less economically favourable due to relatively low gas prices and higher carbon pricing. The spike in spot prices for gas in mid-September did not immediately impact gas plants, which will contract supply over a longer term. Demand for coal-fired generation is seasonal, peaking in winter when conditions are cold and dark; these peaks have declined as coal-fired generation became less competitive economically and gas and renewable sources displaced it.

Chart 2.2 Coal Supply



Domestic coal production has fallen steadily because of coal mine closures and a pattern of generally reduced demand over time, particularly for generation. Recent production was also affected by both restrictions from Covid-19 and localised flooding. With reduced production, imports filled the gap in demand, rising from 1.1 million tonnes in the third quarter of 2020 to 1.3 million tonnes in the third quarter of 2021. Set against historic imports however, current volumes are low: imports peaked at 13.3 million tonnes in the second quarter of 2013.

Chart 2.3 Coal Imports



In Quarter 3 2021 Russia (48 per cent), the USA (25 per cent) and Venezuela (10 per cent) accounted for 83 per cent of total coal imports.

Section 3: Oil and oil products

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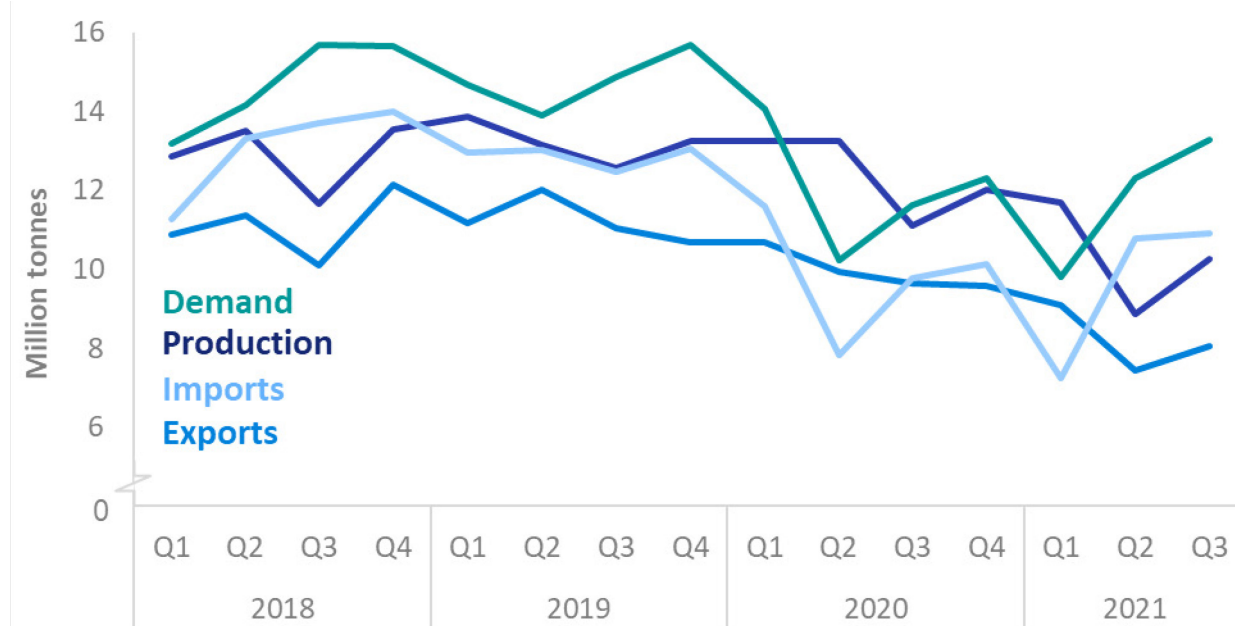
Key headlines

Production of crude oil and NGLs was down 7.4 per cent in quarter 3 2021 compared to the same period in the previous year. Production has increased following substantial planned maintenance over the summer but remains relatively low compared to pre-pandemic levels.

Demand for petroleum products increased by 13 per cent, driven by increased demand in the transport sector as well as an increase in domestic demand following historic lows in 2020. Whilst demand continues to recover it remains down compared to 2019 prior to the Covid-19 pandemic.

Following changes in the rules governing UK oil stocking, oil stocks decreased to a record low of 9.9 million tonnes in September 2021 following changes to the UK oil stocking protocol in January 2021 and the end of the EU-exit transition period. Oil stocks remain substantially above obligated levels as mandated by the International Energy Agency (IEA).

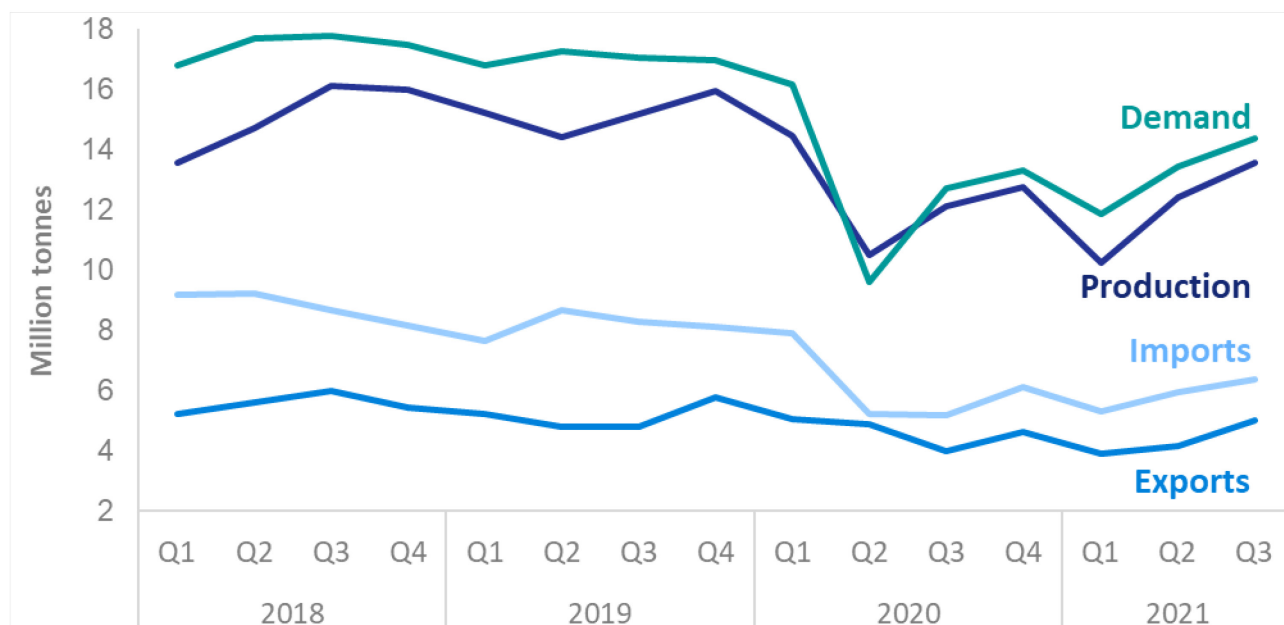
Chart 3.1 Production and trade of crude oil and NGLs



Production of primary oils was down 7.4 per cent in the third quarter of 2021 compared to the same period in the previous year. Production has increased compared to earlier this summer when substantial planned maintenance was undertaken but remains low compared to pre-pandemic levels.

Demand for primary oils increased by 14 per cent compared to last year. This increased demand was met with a substantial increase in net imports, up to 2.8 million tonnes from only 115 thousand tonnes last year. Whilst this is a substantial increase, last year was atypically low and net imports have in the past exceeded 8 million tonnes.

Chart 3.2 Production and trade of petroleum products



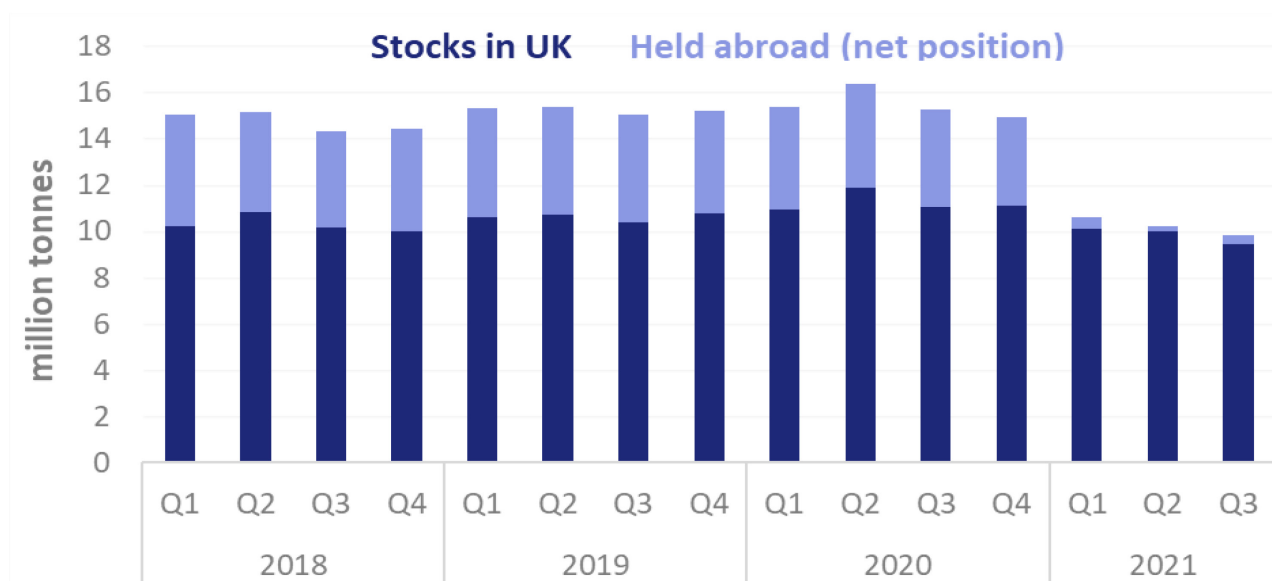
Demand for petroleum products increased by 13 per cent in quarter 3 2021 compared to the same period in the previous year, largely the result of increased demand in the transport sector. However, demand remains muted compared to pre pandemic levels with the three months to October down 16 per cent compared to the same period in 2019.

Demand for products from the transport sector increased by 17 per cent compared to the same period in the previous year. This is the result of fewer restrictions on travel due to the Covid-19 pandemic in 2021 compared to 2020. The rate of recovery has varied across the three transport fuels with demand for petrol and diesel stable when comparing to quarter 3 2019. Conversely, despite an uptick in the most recent quarter demand for aviation fuel remains less than half that seen before the pandemic.

Domestic demand increased by almost 80 per cent compared to the same period in the previous year. Most of which was due to cheaper burning oil prices early in 2020 that led to suppressed demand in Quarter 3.

Increased demand was largely met through increased production and imports up 12 and 23 per cent respectively. The UK remained a net importer of products by 1.3 million tonnes in quarter 3 2021. In general imports remain lower than pre pandemic levels in line with lower demand. Conversely, exports have reached more typical levels increasing by a quarter compared to quarter 3 2020 and stable on 2019.

Chart 3.3 Stocks of oil held for the UK, 2018 to 2021



Total stocks fell to a new record low as the UK settles into the lower stock holding obligation set by the International Energy Agency (IEA) (Table 3.6 and 3.11 for further details). This initial drop off was seen in Quarter 1 2021 following the end of the EU-Exit transition period. Companies have taken advantage of their new lower obligation to reduce stocks held abroad which have reached a new record low at 0.4 million tonnes. Domestic stocks also dropped, though to a markedly smaller degree, down 15 per cent on the third quarter of 2020.

Total stocks held for the UK, were 9.9 million tonnes in quarter 3 2021. Using the IEA methodology for calculating stock, this is equivalent to 865 days of net imports, more than sufficient to meet the IEA obligation of 90 days net imports.

Section 4: Gas

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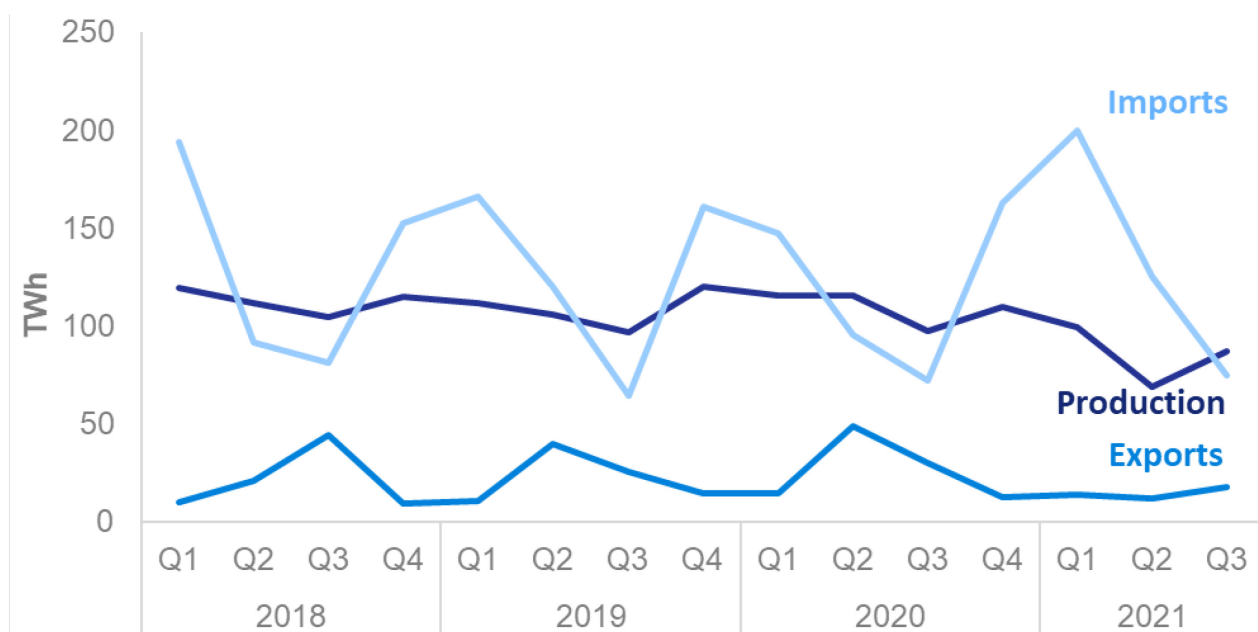
Key headlines

Production was down 11 per cent in July to September 2021 compared to the same period in 2020. Production levels started to return to normal levels in August as several large terminals completed maintenance.

Exports fell by over 40 per cent whilst imports were largely stable. As a result, net imports increased by over a third in July to September 2021 compared to the same period last year. Norway remained the principal source of UK imports, with volumes up 45 per cent compared to the same period last year. Imports of Liquefied Natural Gas fell notably compared to relatively high quarter 3 2020.

Demand for gas was broadly stable. This was due to the counteracting effects of a large reduction in domestic demand and increases in demand for industrial gas use and use for electricity generation. **Demand in the domestic sector was down by almost a quarter** due to high average temperatures reducing demand for heating. **Industrial demand was up by 8 per cent** as industrial production continued to recover from last year.

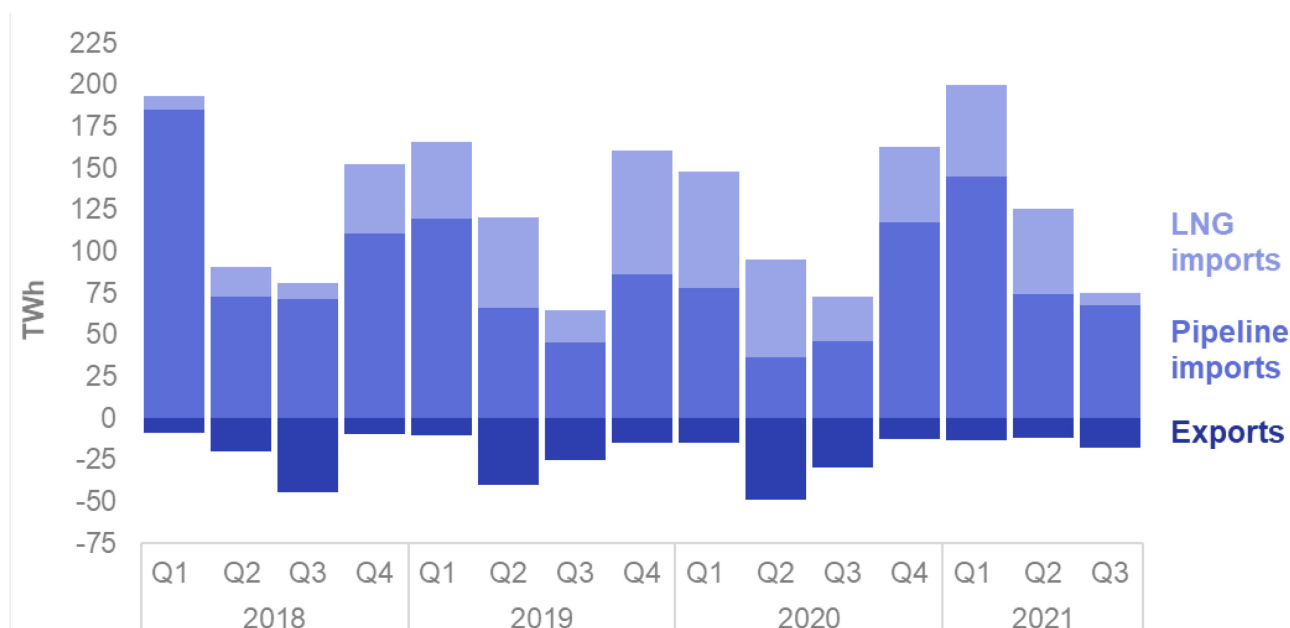
Chart 4.1 Production and trade of natural gas



Gross gas production was down by 11 per cent in July to September 2021 compared to the same period in 2020. Production returned to normal levels in August 2021 as gas terminals recovered from shutdowns that finished in June and July 2021. This is a key piece of UK offshore infrastructure, which is critical for approximately 40 per cent of UK oil and gas production. The work took three weeks, with many connected fields taking the opportunity to complete their own programmes of maintenance. The system came back online towards the end of June and connected fields have since been resuming operations.

Net imports increased by 35 per cent to meet demand in the face of low production, with exports down by over forty per cent on last year. The UK's principal source of imports during the period remained Norway, and Norwegian imports accounted for nearly 90 per cent of total imports.

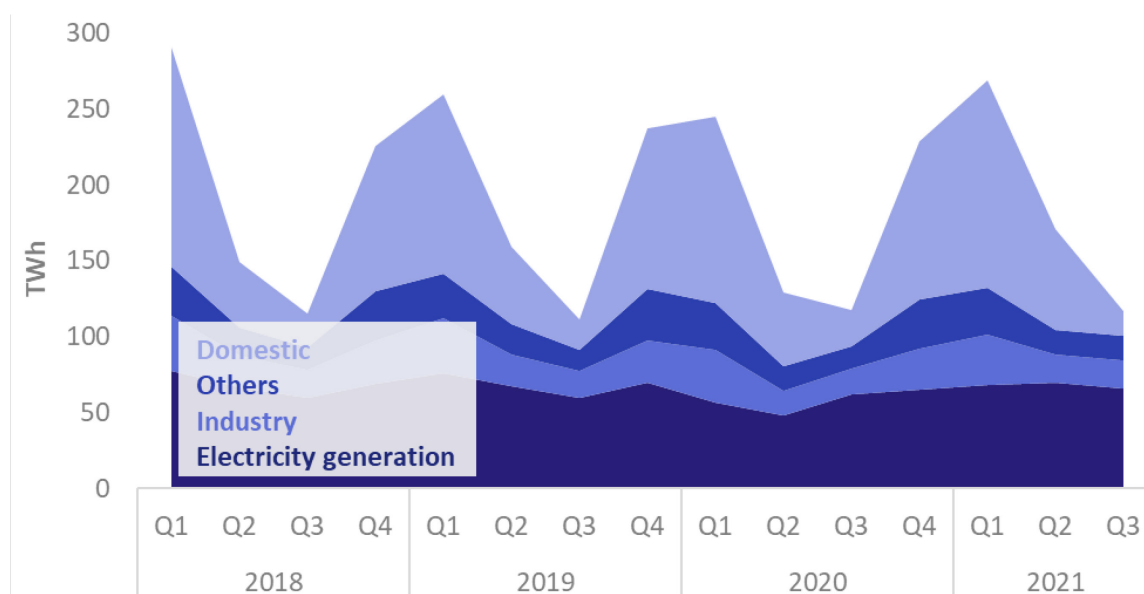
Chart 4.2 Trade in natural gas



Exports fell by 42 per cent in July to September 2021 compared to last year as trade was used to balance demand in the face of lower production. Flows to the Netherlands were down by 65 per cent, while exports to Belgium were at their lowest level for a third quarter since 1998 and down by 54 per cent on last year. In addition, exports to the Isle of Man were less than a quarter of the levels seen in the previous year.

Imports increased by 3.6 per cent on last year. Pipeline imports increased by 45 per cent to 67 TWh, which consisted entirely of Norwegian imports. In contrast, **Liquefied Natural Gas (LNG) imports were down 71 per cent on the same period in 2020 to 7.7 TWh**, which is the lowest level for a third quarter since 2008 and reflects global competition for LNG. Qatar accounted for over 60 per cent of LNG imports, followed by Algeria, the US and Nigeria.

Chart 4.3 Demand for natural gas



Demand for natural gas was broadly stable in July to September 2021 in comparison with last year. This was due to the counteracting effects of the large reduction in domestic demand and increases in demand for industrial gas use and use for electricity generation. **Domestic demand was down by 23 per cent to 17.9 TWh** due to higher average temperatures than those in July to September 2020. However, **industrial demand was up 8 per cent** in comparison with the same period in 2020 as industrial production continued to increase. **Demand for electricity generation increased by 7 per cent** on the previous year, due to lower renewable and low carbon generation.

Section 5: Electricity

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Key headlines

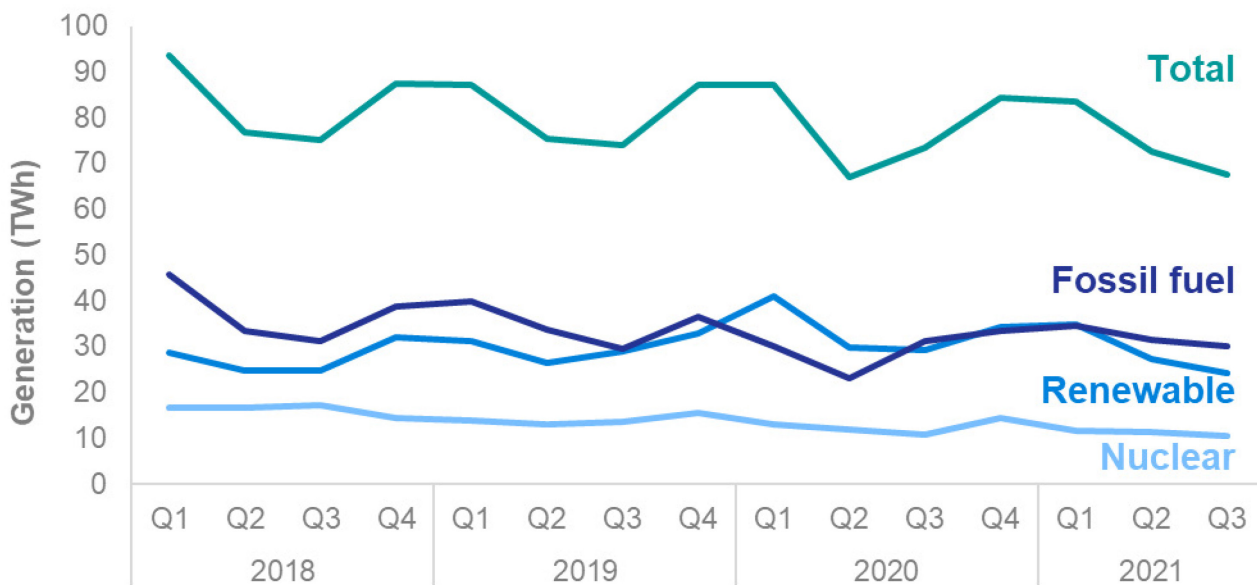
Supply and demand in Quarter 3 of 2021 was broadly in line with the same period last year, but **total generation decreased substantially and record net imports were needed to meet demand**. Total electricity generation was 67.7 TWh, a decrease of 7.7 per cent compared to Quarter 3 2020, while **net imports more than doubled to a record 7.6 TWh**.

Low carbon sources generated 51.5 per cent of the total in Quarter 3 2021, down 3.2 percentage points on the previous year. Renewable electricity generation was 17 per cent lower than the same period in 2020 at 24.3 TWh, equivalent to 35.9 percent of generation, a drop of 4.0 percentage points on last year when weather conditions – particularly wind speeds - were far more favourable to renewables generation. Nuclear generation fell by 3.0 per cent to 10.6 TWh but marginally increased the share of generation to 15.7 per cent.

Fossil fuels generated 30.3 TWh in Quarter 3 2021, higher than renewable sources. Although a drop in actual generation, the share of generation from fossil fuels increased 2.5 percentage points to 44.8 per cent.

Domestic demand decreased in Quarter 3 while non-domestic demand increased. Covid-19 restrictions were lifted in July but warmer temperatures in September reduced demand for heating. Domestic electricity consumption decreased by 4.2 per cent. Electricity consumed by the industrial sector was up 2.8 per cent while consumption by other final users (including commercial users) increased by 1.1 per cent.

Chart 5.1 Electricity generated, by fuel type



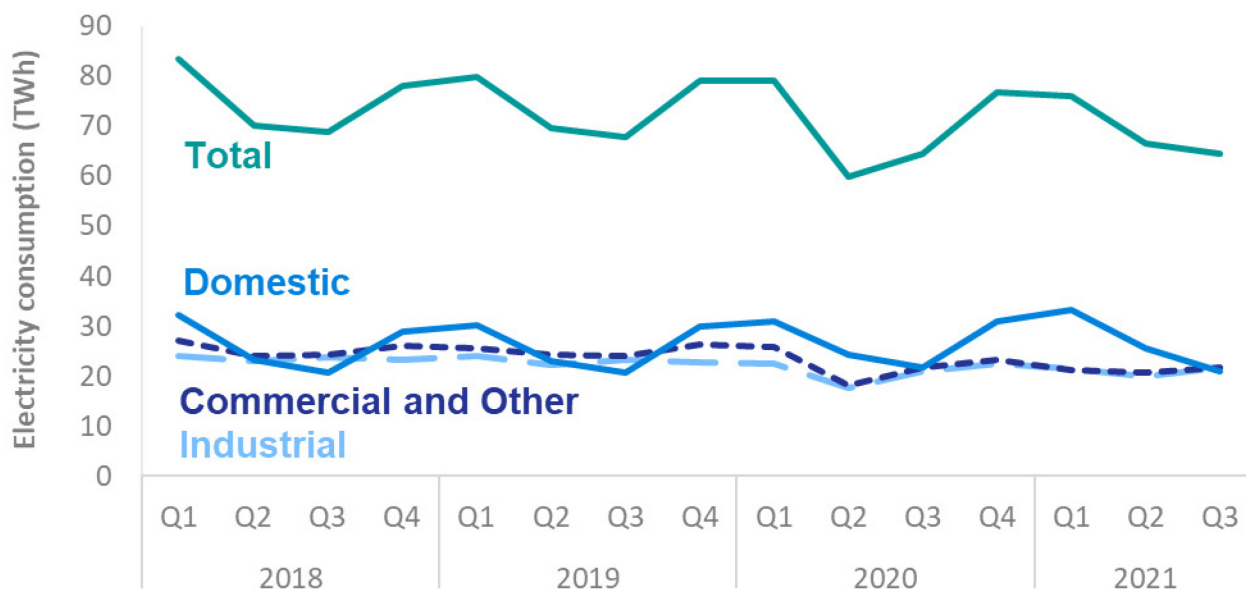
Quarter 3 of 2021 saw total electricity generation of 67.7 TWh, which was a 7.7 per cent decrease compared to Quarter 3 2020. This was in sharp contrast to the 0.9 per cent decrease in total demand over the same period. The difference was met by net imports which more than doubled to a record 7.6 TWh.

Renewable electricity generation was 24.6 TWh in Quarter 3 2021, 17 per cent lower than the same period in 2020. This fall was primarily driven by a 30 per cent reduction in wind generation because of lower average wind speeds, which were below the averages for the same months in 2020 and substantially below the 10-year averages. Solar and hydro generation also decreased due to less favourable weather conditions.

Low carbon sources generated 51.5 per cent of the total in Quarter 3 2021, down 3.2 percentage points on the previous year, due to lower renewable (see above) and nuclear generation. Nuclear generation fell by 3.0 per cent to 10.6 TWh in Quarter 3 2021, with outages at all but one of the UK's nuclear power stations, the lowest quarterly value on the published data series. The share of fossil fuel generation increased 2.5 percentage points to 44.8 per cent, whilst the renewable generation share fell to 35.9 per cent.

Fossil fuels generated 30.3 TWh in Quarter 3 2021, substantially higher than renewable sources. This was a 2.3 per cent decrease compared to Quarter 3 2020. Gas remained the fuel with the highest generation at 28.5 TWh, 5.9 per cent lower than in Quarter 3 2020 and equivalent to 42.1 per cent of generation. Coal generation was 1.5 TWh, more than double the coal generation for the same period in the previous year, but from a low baseline. Coal's share of generation was 2.2 per cent in the quarter.

Chart 5.2 Electricity consumption by sector



Total consumption of electricity was 64.4 TWh in Quarter 3 2021. This was a 0.3 per cent decrease compared to Quarter 3 of 2021. Quarter 3 saw an end to formal Covid-19 restrictions at the end of July, but milder temperatures in September reduced the demand for electricity for heating. Consumption also continued to show the effect of changes in consumer behaviour such as increased home working.

Domestic consumption decreased 4.2 per cent compared to Quarter 3 2021. This primarily reflects milder temperatures in September, which reduced the electricity demand for heating. Quarter 3 domestic consumption was similar to pre-pandemic levels, up 1.0 per cent compared to Quarter 3 2019 as restrictions eased.

Both industrial and commercial sectors saw increased consumption levels in Quarter 3 2021 compared to the same period in 2020. This increase reflects the easing of Covid-19 restrictions, which formally ended at the end of July. **Electricity consumed by the industrial sector increased by 2.8 per cent compared to Quarter 3 2020,** though remained 6.7 per cent below the value for the same period in 2019. This broadly mirrors the trends shown in the manufacturing [Index of Production](#).

Consumption by other final users (including the commercial sector) increased by 1.1 per cent in Quarter 3 2021 compared to the same period in 2020. This reflects the end to formal restrictions and the reopening of shops, offices and leisure venues, offset by reduced electricity demand for heating in September. Despite the increase, consumption in this sector was 8.6 per cent lower than the same period in 2019.

Section 6: Renewables

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Key headlines

In Quarter 3 2021, renewable electricity generation was 24.3 TWh, 17 per cent less than the same quarter in 2020 and the lowest since quarter 3 2017 as poorer conditions for generation, particularly low windspeed, reduced output.

The quarter saw new capacity at 609 MW delivered, the highest increase in capacity since Quarter 3 2019. The bulk of the increase was in wind (both onshore and offshore) and Solar PV.

Renewables share of electricity generation was 35.9 per cent in Quarter 3 2021, falling under fossil fuels' generation share. This was largely due to much less favourable weather conditions for renewable generation with lower wind speeds, less rainfall and fewer sun hours.

Chart 6.1 Change in renewable generation and capacity between Q3 2020 and Q3 2021

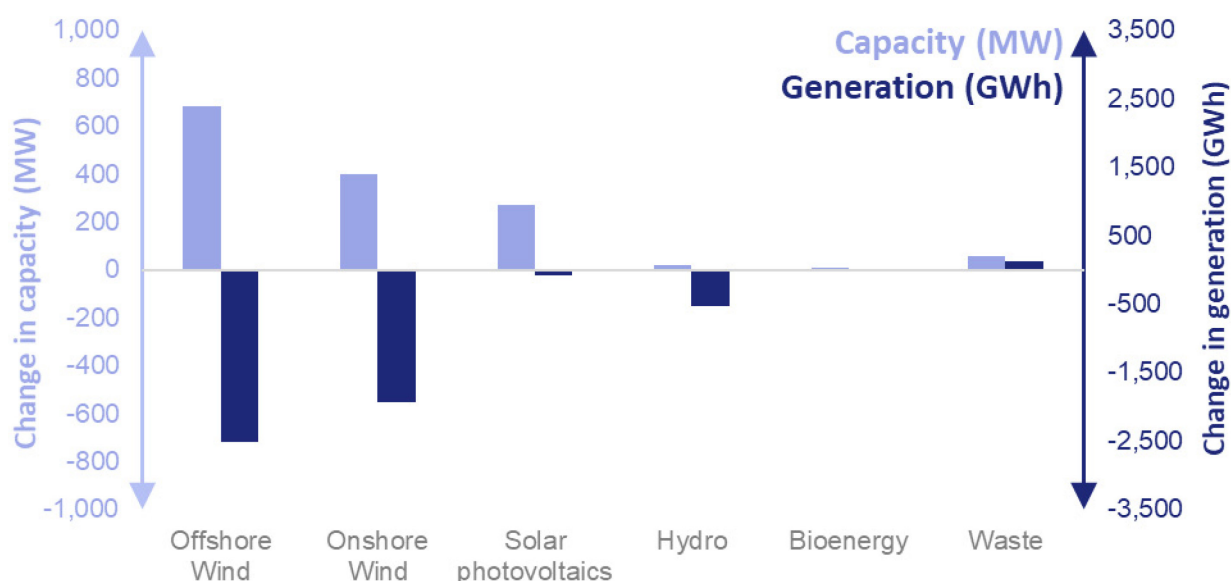


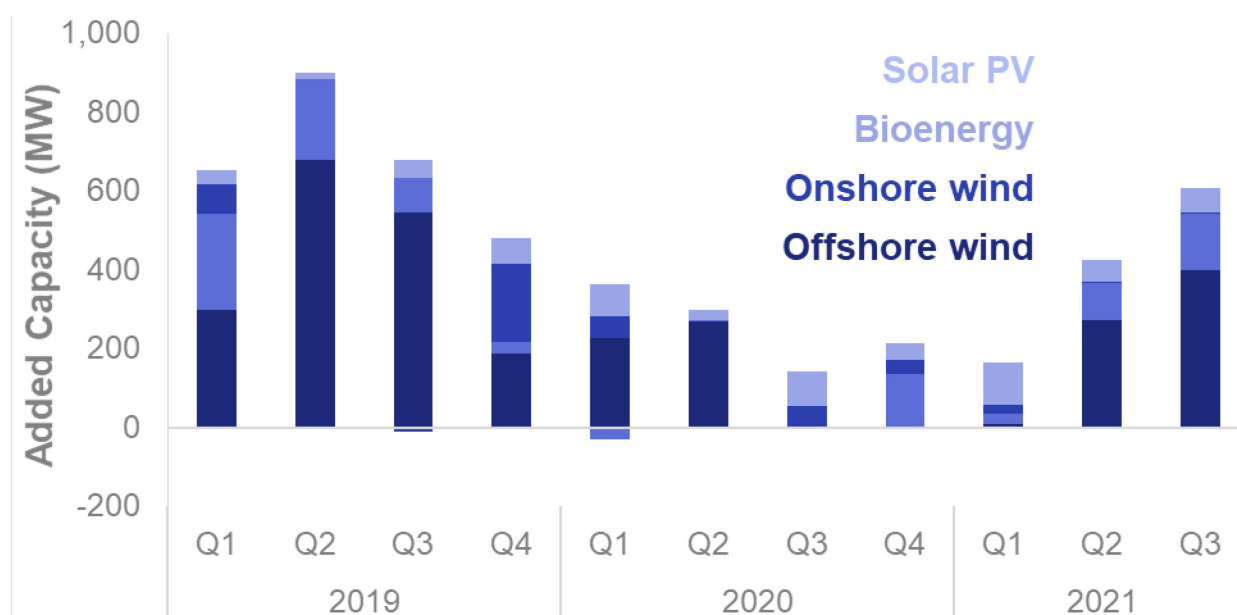
Chart 6.1 compares changes in capacity and generation by technology for Quarter 3 in 2020 and 2021. Where capacity and generation trends conflict, it tends to indicate the dominance of weather effects. This is most striking for wind generation for this quarter. Although there was new wind capacity, up 4.4 per cent on last year, generation fell by 38 per cent for onshore and 24 per cent for offshore due to a combination of lower wind speeds and planned maintenance and outages at several major plants. Solar PV generation fell by 1.8 per cent, with fewer sunlight hours more than offsetting the 2.0 per cent increase in capacity¹. Hydro generation fell by 45 per cent, in line with a 42 per cent decrease in average rainfall².

¹ The Feed in Tariff (FiT) scheme² closed March 2019. BEIS continues to monitor small scale generation using the Central FiTs Register, and Micro Generation Certification Scheme (MCS) registrations and the Renewable Energy Planning Database (REPD). Currently excluded are unsubsidised installations below 1MW not MCS registered. We are reviewing data sources to improve coverage.

² See technical information page for links to weather data.

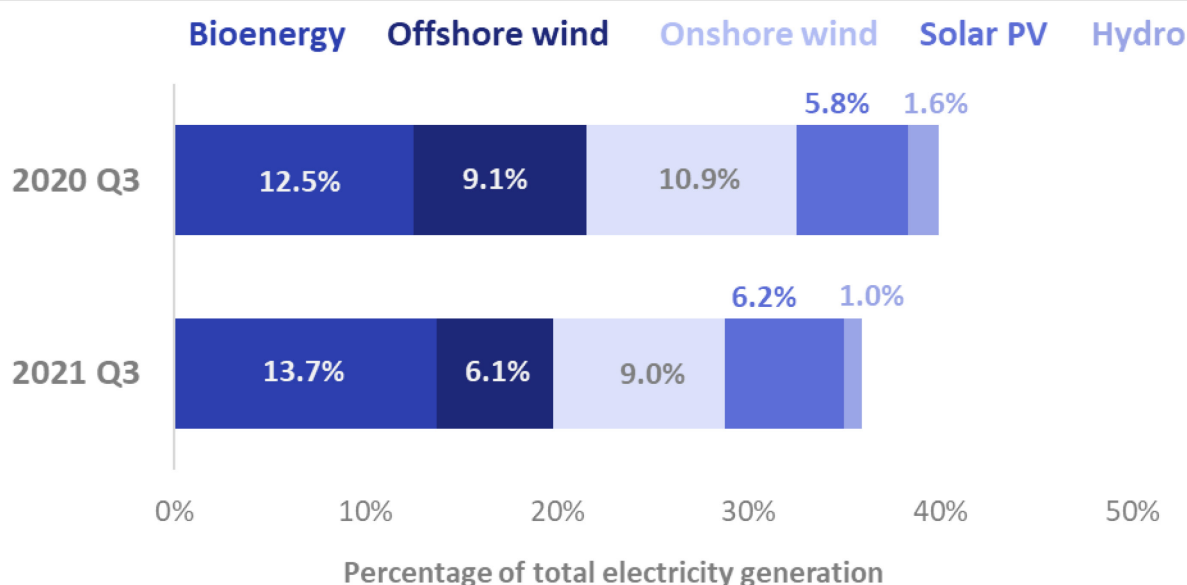
Total renewable capacity grew by 609 MW in Quarter 3 2021, building on the 426 MW increase seen in Quarter 2. This may reflect progress in some projects previously delayed due to Covid-19 restrictions.

Chart 6.2 Added capacity per quarter for key renewable technologies



Notable increases in capacity since Quarter 3 2020 were seen in offshore wind, with 683 MW added (mostly during the two most recent quarters), onshore wind (397 MW added), and Solar PV (269 MW added).

Chart 6.3 Renewables' share of electricity generation – Q3 2020 and Q3 2021



In Quarter 3 2021, renewables' share of generation was 35.9 per cent, 4.0 percentage points down on Quarter 3 2020 and lower than fossil fuels' share for the second consecutive quarter (see chart 5.1). Whilst total electricity generated decreased, unfavourable weather conditions, outages and maintenance at several wind farms impacted renewable generation. As a result, wind generation's share fell, by 3.0 percentage points for offshore, and 1.9 for onshore. Hydro's share also fell with lower rainfall and generation. Bioenergy's share, unaffected by weather conditions, increased by 1.2 percentage points. Solar PV's share also increased but only slightly, by 0.4 percentage points, despite a fall in generation.

Data tables and special articles

Data in this release

Data are collected by BEIS through surveys of energy suppliers. This publication highlights key stories in energy in the UK for the specified period. Additional data are available in the quarterly and monthly statistical tables for each fuel and total energy. The tables are generally in commodity balance format, showing the flow from the sources of supply through to final use.

Special articles

Special articles that explore current topics of interest are available alongside this summary report. Included in this publication are:

Electricity generation and supply in Scotland, Wales, Northern Ireland and England, 2016 to 2020

Diversity and security of gas supply in Europe, 2020

Feed-in Tariff load factor analysis

Energy Company Obligation (ECO) flexible eligibility

Statistical tables*

Data tables available as part of the Energy Trends series:

[Total energy](#)

[Solid fuels and derived gases](#)

[Oil and oil products](#)

[Gas](#)

[Electricity](#)

[Renewables](#)

The full range of special articles is available here:

<https://www.gov.uk/government/collections/energy-trends-articles>

Additional sources of information

Index of Production, published by the Office for National Statistics:

<https://www.ons.gov.uk/economy/economicoutputandproductivity/output/bulletins/indexofproduction/previousReleases>

Index of Services, published by the Office for National Statistics:

<https://www.ons.gov.uk/economy/economicoutputandproductivity/output/bulletins/indexofservices/previousReleases>

Detailed annual Digest of UK Energy Statistics:

<https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes>

Tables showing foreign trade flows of energy:

<https://www.gov.uk/government/statistics/dukes-foreign-trade-statistics>

Weather tables produced by BEIS using Met Office data:

<https://www.gov.uk/government/collections/weather-statistics>

Information on Energy Prices:

<https://www.gov.uk/government/collections/quarterly-energy-prices>

*Hyperlinks will open the most recently published table. If you require a previously published version of a table published by BEIS, please contact Kevin Harris:

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Technical information

Methodology and revisions

More detailed notes on the methodology used to compile the figures and data sources are available on the collection pages for each fuel. The figures have not been adjusted for temperature or seasonal factors except where noted.

Percentage changes relate to the corresponding period a year ago. They are calculated from unrounded figures. They are shown as (+) or (-) when the percentage change is very large. Quarterly figures relate to calendar quarters. All figures relate to the United Kingdom unless otherwise indicated. Further information on Oil and Gas is available from the Oil & Gas Authority at www.ogauthority.co.uk/

Table of conversion factors

To	ktoe	TJ	GWh	million therms	To	toe	GJ	kWh	therms
From	Multiply by				From	Multiply by			
ktoe	1	41.868	11.63	.39683	toe	1	41.868	11.63	396.83
TJ	.023885	1	.27778	.0094778	GJ	.023855	1	277.78	9.4778
GWh	.085985	3.6	1	.034121	kWh	.000085985	.003600	1	.034121
million therms	2.52	105.51	29.307	1	therms	.00252	.105510	29.307	1

toe = tonne of oil equivalent

ktoe = thousand tonne of oil equivalent

Sector breakdowns

Categories for final users are defined by Standard Industrial Classification 2007:

Fuel producers	05-07, 09, 19, 24.46, 35
Final consumers	
Iron and steel	24 (excluding 24.4, 24.53 and 24.54)
Other industry	08, 10-18, 20-23, 24.4 (excluding 24.46), 24.53, 24.54, 25-33, 36-39, 41-43
Transport	49-51
Other final users	
Agriculture	01-03
Commercial	45-47, 52-53, 55-56, 58-66, 68-75, 77-82
Public administration	84-88
Other services	90-99
Domestic	Not covered

Revisions policy

Figures for the latest periods are provisional and are liable to subsequent revision. [The BEIS statistical revisions policy](#) sets out the revisions policy for these statistics, which has been developed in accordance with the UK Statistics Authority [Code of Practice for Statistics](#).

Related publications

Recent publications of interest

Smart Meters

Statistics on the roll-out of Smart Meters in Great Britain, covering meters operating and meters installed: www.gov.uk/government/collections/smart-meters-statistics

Household Energy Efficiency

Statistics on the Energy Company Obligation (ECO), Green Deal and homes insulated. Monthly updates of ECO measures and quarterly updates of in-depth ECO statistics, carbon savings and the Green Deal schemes: www.gov.uk/government/collections/household-energy-efficiency-national-statistics

Renewable Heat Incentive

Statistics on deployment data for the domestic and non-domestic Renewable Heat Incentive (RHI) to support the uptake of renewable heat: www.gov.uk/government/collections/renewable-heat-incentive-statistics

Energy Consumption in the United Kingdom (ECUK)

Detailed data on end use estimates of energy in the UK: www.gov.uk/government/collections/energy-consumption-in-the-uk

Sub-national total final energy consumption

Findings of the sub-national energy consumption analysis in the UK for all fuels, for the period covering 1 January to 31 December, with gas consumption covering the annual period from mid-May: www.gov.uk/government/collections/total-final-energy-consumption-at-sub-national-level

Sub-national electricity consumption

Electricity consumption by consuming sector for Great Britain and devolved administration areas. Data are based on the aggregation of Meter Point Administration Number readings as part of BEIS's annual meter point electricity data exercise: www.gov.uk/government/collections/sub-national-electricity-consumption-data.

Sub-national gas consumption

Gas consumption by consuming sector for Great Britain, and devolved administration areas. Data are based on the aggregation of Meter Point Reference Number readings throughout Great Britain as part of BEIS's annual meter point gas data exercise. Data are subject to a weather correction factor to enable comparison of gas use over time: www.gov.uk/government/collections/sub-national-gas-consumption-data.

Sub-national road transport consumption

Road transport fuels consumption in the UK at regional and local authority level. Data is modelled and provided to BEIS by Ricardo Energy & Environment, with estimates based on where the fuel is consumed, rather than where it is purchased. www.gov.uk/government/collections/road-transport-consumption-at-regional-and-local-level

Sub-national consumption of residual fuels

Non-gas, non-electricity and non-road transport fuels consumption in the UK. Includes coal, petroleum, solid fuels, and bioenergy not for generation or road use: www.gov.uk/government/collections/sub-national-consumption-of-other-fuels

Further information

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Electricity generation and supply in Scotland, Wales, Northern Ireland and England, 2016 to 2020

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Introduction

This article examines the variation of electricity generation and consumption in the four nations of the United Kingdom. It updates and extends [the previous version](#), published in December 2020. The UK data in this article are taken from chapters 5 and 6 of the [Digest of United Kingdom Energy Statistics \(DUKES\) 2021](#) and the definitions match those in DUKES. The text covers the latest five years of data and the corresponding timeseries (including latest revisions) for 2004 to 2020 can be found in the accompanying Excel spreadsheet.

Key headlines

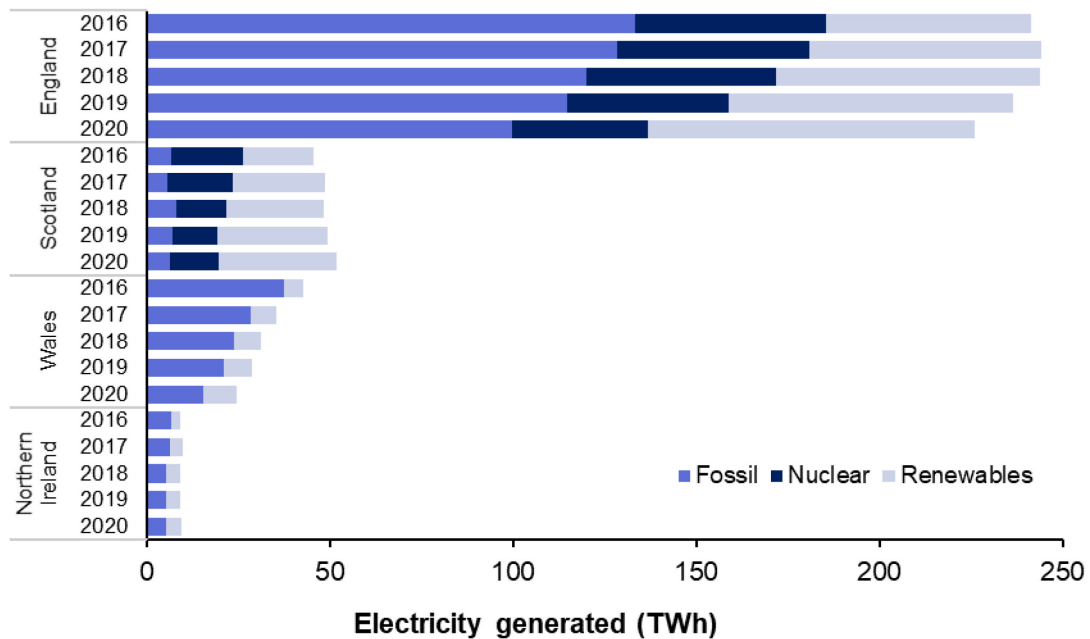
- UK total electricity generation in 2020 was 312 TWh, the lowest value on the published time series and a decrease of 3.6 per cent compared to 2019. Though electricity generation has been declining year on year since 2015, the larger reduction in 2020 reflected lower demand as a result of the response to the Covid-19 pandemic.
- Shares of generation and demand by country remained similar to 2019, with England having the largest share. England's share of demand is larger than its generation share so it continues to transfer electricity from Scotland and Wales as well as import electricity from continental Europe.
- UK fossil fuel generation fell by 16 per cent between 2019 and 2020. Wales had the largest fall in fossil fuel generation, down by 27 per cent, with England having a 15 per cent reduction. This showed the effect of plant closures, including Aberthaw B in Wales, and Fiddler's Ferry in England.
- Renewable generation rose to record levels in all four nations of the UK. This was driven by favourable weather conditions across the year, with UK wide renewable generation increasing by 13 per cent to 135 TWh. This was 43.1 per cent of the total UK generation.
- UK-wide nuclear generation fell by 11 per cent between 2019 and 2020 with the aging nuclear plants needing more frequent maintenance outages. This accounted for 16.1 per cent of the UK's total electricity. Nuclear generation fell by 16.0 per cent in England but rose by 9.2 per cent in Scotland where fewer outages took place.
- The high renewable generation meant that 2020 saw low carbon shares of generation rise to their highest values on the time series for all UK nations, rising to 55.9 per cent in England, 87.6 per cent in Scotland, 36.1 per cent in Wales and 45.6 per cent in Northern Ireland.

Generation, consumption, and trade

During 2020 the UK generated 312 TWh of electricity, a decrease of 3.6 per cent on 2019 and the lowest value on the published timeseries. This came at a time when demand fell by 4.6 per cent, as a result of the response to the Covid-19 pandemic. The sharp fall in generation in 2020 followed a period from 2014 to 2017 wherein generation remained broadly stable at around 338 TWh, before dropping by 1.6 per cent (to 333 TWh) in 2018 and then falling by a further 2.7 per cent (to 324 TWh) in 2019. In contrast to the UK trend, Scotland and Northern Ireland both saw year on year increases in total generation between 2019 and 2020, driven by

increased renewable generation. Chart 1 shows total electricity generation by UK country, between 2016 and 2020, with generation divided by fossil fuel, nuclear and renewable technologies.

Chart 1: Total electricity generation by country (all generating companies), 2016 to 2020.



Shares of electricity generated by nation remained broadly stable compared to the previous year, with England accounting for the largest share of electricity generation at 72.4 per cent, falling by 0.5 percentage points relative to 2019. Scotland held a 16.6 per cent share of generation, up 1.3 percentage points on the previous year, while the Welsh generation share fell by 1.0 percentage points to 7.8 per cent of the total. Northern Ireland remained the nation with the lowest generation share (3.1 per cent), which is approximately level compared to 2019. The increase to Scotland’s generation share came during a record-breaking year for renewables due to favourable weather conditions. Scotland benefitted more than the other UK nations due to its greater share of generation from renewables (61.8 per cent) compared to the rest of the UK (39.4 per cent).

UK fossil fuel generation fell by 16 per cent between 2019 and 2020. Wales had the largest fall in fossil fuel generation, down by 27 per cent, followed by England with a 15 per cent reduction. The sharp falls in Welsh and English fossil fuel generation came at a time of several power plant closures, with the closure of Aberthaw B in Wales, and Fiddler’s Ferry in England. The closure of Aberthaw B marked the end of over 125 years of coal-fired electricity generation in Wales and contributed to Wales’s reduced generation share during 2020. As part of the UK’s net zero targets, the remaining coal-fired power stations are due to close by October 2024.

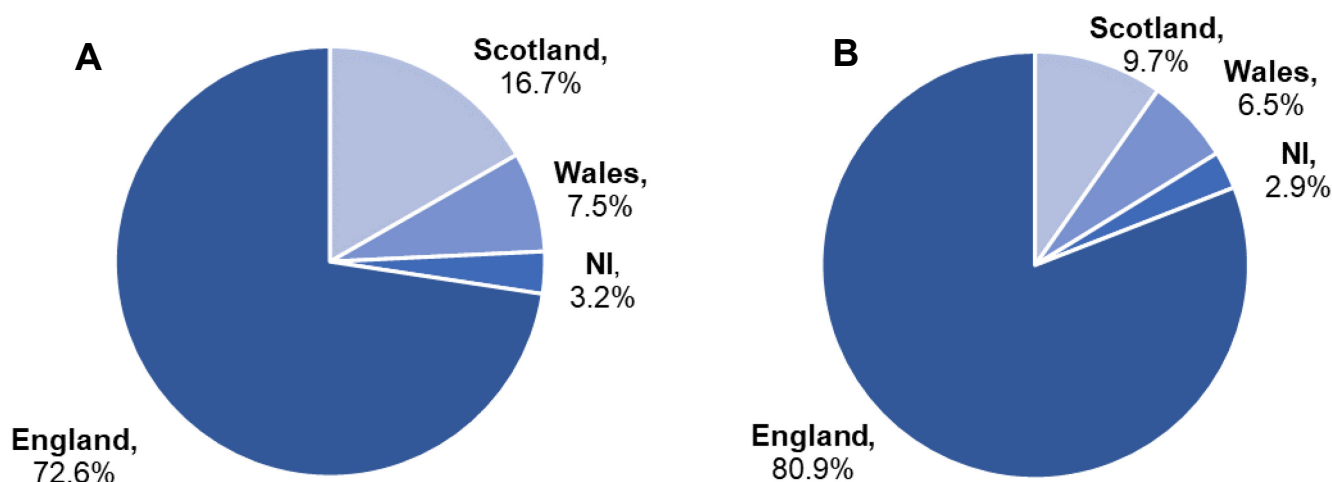
As the UK’s nuclear power plants continued to age, UK-wide nuclear generation fell by 11 per cent between 2019 and 2020. This accounted for 16.1 per cent of the UK’s total electricity generation, down 1.2 percentage points on the previous year. Since the closure of Wylfa in Wales during 2015, there has been no nuclear generation within Wales or Northern Ireland.

While fossil fuel and nuclear generation fell during 2020, renewable generation rose to record levels in all four nations of the UK. This was driven by favourable weather conditions across the year, with UK wide renewable generation increasing by 12.6 per cent to 135 TWh. This was 43.1 per cent of the total UK generation, a rise of 6.2 percentage points on a year ago. Notably, Scotland almost met its target of 100 per cent renewable electricity generation as a proportion of gross electricity consumption (defined as generation plus transfers into Scotland less transfers out of Scotland). In 2020, Scotland reached a record 98.6 per cent of the renewable target, up 8.8 percentage points on 2019 and up 22.6 percentage points compared to 2018.

Despite the pandemic, shares of annual electricity consumption of the respective UK nations did not significantly differ from 2019, with the majority of demand coming from England (80.9 per cent), 9.7 per cent from Scotland, 6.5 per cent from Wales and 2.9 per cent from Northern Ireland. This was similar to the 2016-

19 period where average consumption shares were 81.2 per cent, 9.9 per cent, 6.2 per cent and 2.7 per cent respectively. Chart 2 shows shares of electricity supply and demand in the UK by country in 2020.

Chart 2: Shares of electricity supply (A) and demand (B) in the UK by country in 2020.



To offset the difference between England’s electricity generation and demand, net positive transfers from Scotland and Wales, as well as net imports from continental Europe (via the France, Netherlands and Belgium interconnectors) were required. During 2020, these sources provided 17.1 per cent of England’s total electricity consumption, down 0.3 percentage points on 2019. In 2020, Scotland exported a record 37.3 per cent of its generation in net transfers to England and Northern Ireland. This was driven by Scotland’s increased renewable generation (due to favourable weather conditions), and a 4.5 per cent fall in Scottish electricity demand between 2019 and 2020, which resulted in Scotland having more electricity available to export to both England and Northern Ireland. Meanwhile, Wales exported 11.8 per cent of its total generation to England in 2020, the lowest proportion on the time series. Total generation in Wales has fallen 43.0 per cent since 2016, predominantly driven by the reduction of coal and gas-fired generation in the period. A flow chart illustrating electricity generation, consumption and trade in the UK nations is provided in Appendix A.

Electricity generation by fuel

In recent years, the closure of coal and gas fired power stations and an increase in the capacity of renewable generators has shifted the UK’s generation mix from fossil fuels towards renewables. As the fossil fuel share of generation fell from 51.9 per cent in 2016 to 37.9 per cent in 2020, the renewable share rose from 24.5 per cent in 2016 to a record 43.1 per cent in 2020. Notably in Wales, fossil fuel generation has decreased by 60 per cent since 2016, with Welsh coal generation ceasing during 2020 following the closure of Aberthaw B. Both England and Northern Ireland saw similar, but less dramatic falls in fossil fuel generation, dropping by 28 and 23 per cent respectively since 2016. While Scotland’s fossil fuel generation has remained consistent since 2016, a 65 per cent uplift in renewable generation led to Scotland having the lowest fossil fuel generation share of the UK nations.

The introduction of the Carbon Price Floor (CPF) in April 2013 contributed to the swift decline of coal generation, which accounted for 39.2 per cent of the UK generation mix in 2012, compared to a record-low share of just 1.8 per cent in 2020. Unfavourable economics, as well as the impact of the Large Combustion Plant Directive drove the closure of almost all the UK’s coal plants. 2020 saw the closure of both Aberthaw B in Wales and Fiddler’s Ferry in England, with the remainder of the UK’s coal plants planning to close by October 2024, as the UK works towards net zero emissions by 2050. The closure of Aberthaw B has ended over 125 years of coal generation in Wales, joining Scotland as the only two UK nations with no coal generation. In Northern Ireland, coal generation rose by 16 per cent compared to 2019, the only UK nation to have an increase in coal generation.

Gas largely replaced coal in the generation mix in 2016, since then its share of generation has fluctuated around the 40 per cent mark. Overall, the share of UK gas generation dropped to 35.7 per cent in 2020, down

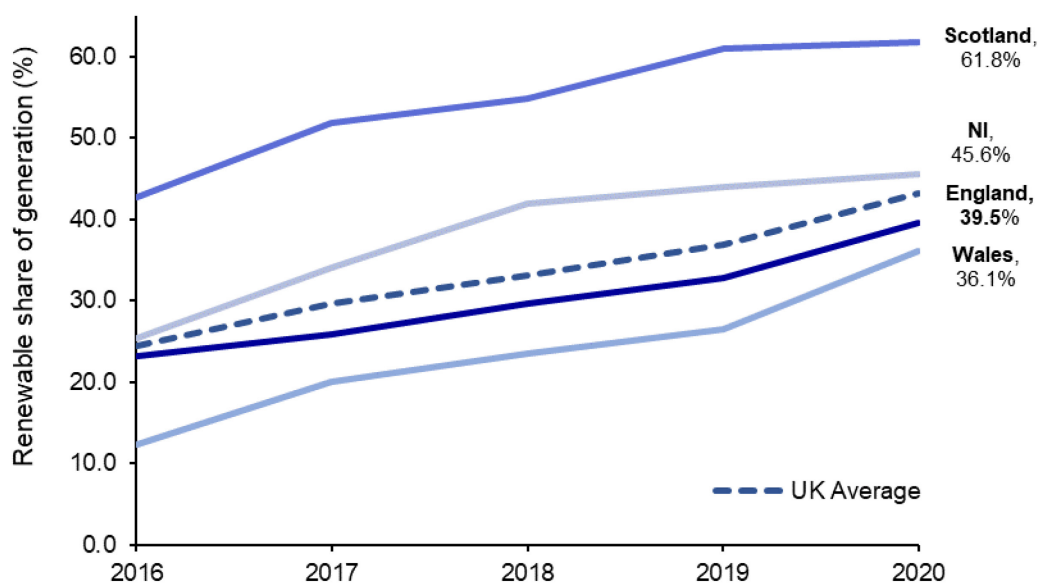
5.0 percentage points on 2019, the lowest value since 2015. The fall in gas generation share was linked to the high generation share from renewables, which rose by 6.2 percentage points to 43.1 per cent of the total generation. Wales remains the UK nation with the highest proportion of gas generation, with gas generation accounting for 55.7 per cent of the total, though down 7.2 percentage points on 2019 and the lowest value since 2015. England, Scotland and Northern Ireland also saw substantial falls in the share of generation from gas.

The UK's overall nuclear generation fell for the fourth consecutive year, decreasing by 11 per cent on 2019, with the aging nuclear plants leading to more frequent maintenance outages. Additionally, Sizewell B operated at half capacity from May to September at the request of National Grid because of the lower demand for electricity. Between 2019 and 2020, nuclear generation fell by 16.0 per cent in England but rose by 9.2 per cent in Scotland. The rise in Scotland reflects that there were fewer maintenance outages in 2020 than 2019, when both plants were on outage for much of the year. Since the closure of Wylfa in 2015, there has been no nuclear generation in Wales.

High renewable generation meant that 2020 saw shares of low carbon generation (nuclear plus renewables) rise to their highest values on the time series for all UK nations, rising to 55.9 per cent in England, 87.6 per cent in Scotland, 36.1 per cent in Wales and 45.6 per cent in Northern Ireland. The low carbon generation shares for both Wales and Northern Ireland are lower than those of England and Scotland due to a combination of these nations having no nuclear generation capacity, alongside lower proportions of renewable capacity.

Renewable generators saw record levels of generation in 2020, accounting for 43.1 per cent of the UK's total (up 6.2 percentage point on 2019) as the UK saw favourable weather conditions for renewables, alongside increases (albeit smaller than previous years) in both wind and bioenergy capacity. In Scotland, 61.8 per cent of electricity was generated by renewable fuels in 2020, accounting for just under a quarter of the UK's renewable electricity. While Scotland remains the UK leader for renewable generation, all four nations saw record shares, with renewable electricity accounting for 39.5 per cent, 36.1 per cent and 45.6 per cent of generation for England, Wales and Northern Ireland respectively. Chart 3 shows the renewable share of total electricity generation in each UK country from 2016 to 2020, compared to the UK average.

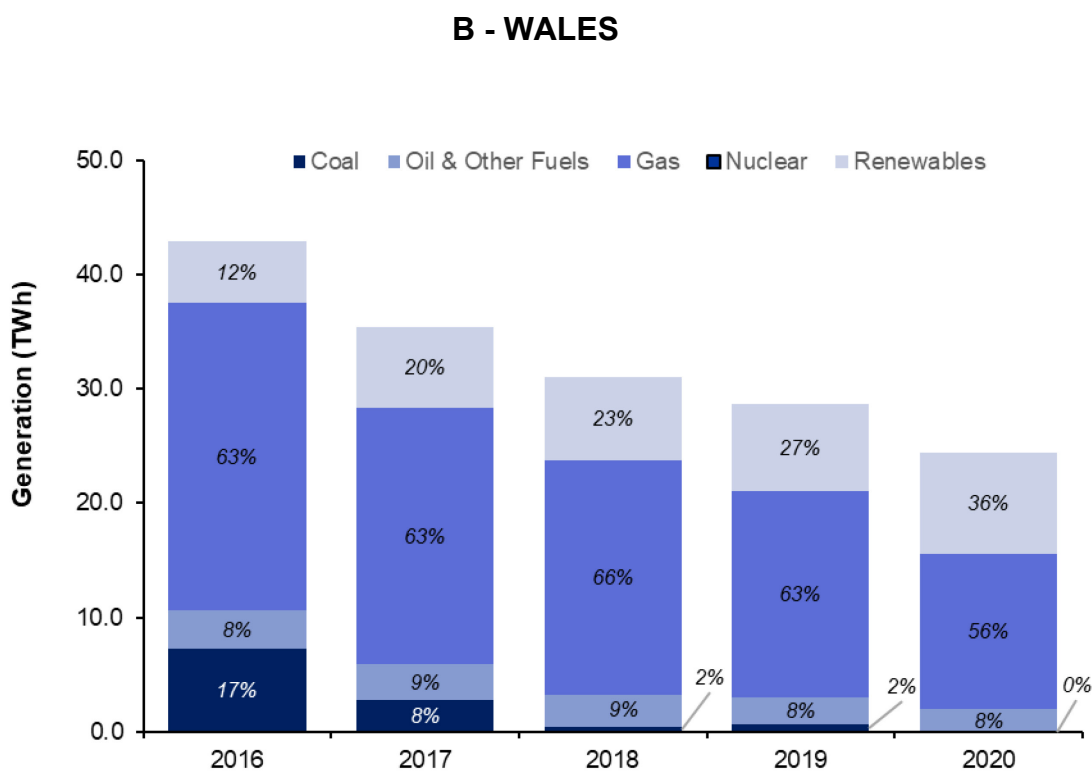
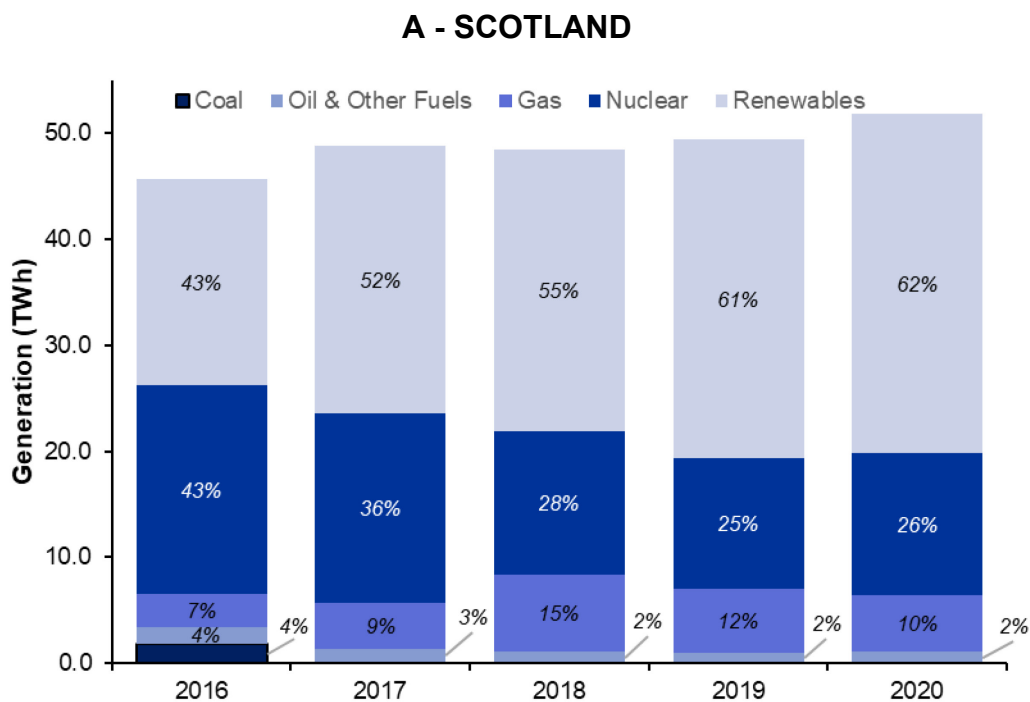
Chart 3: Renewable share of electricity generation by country, 2016 to 2020.



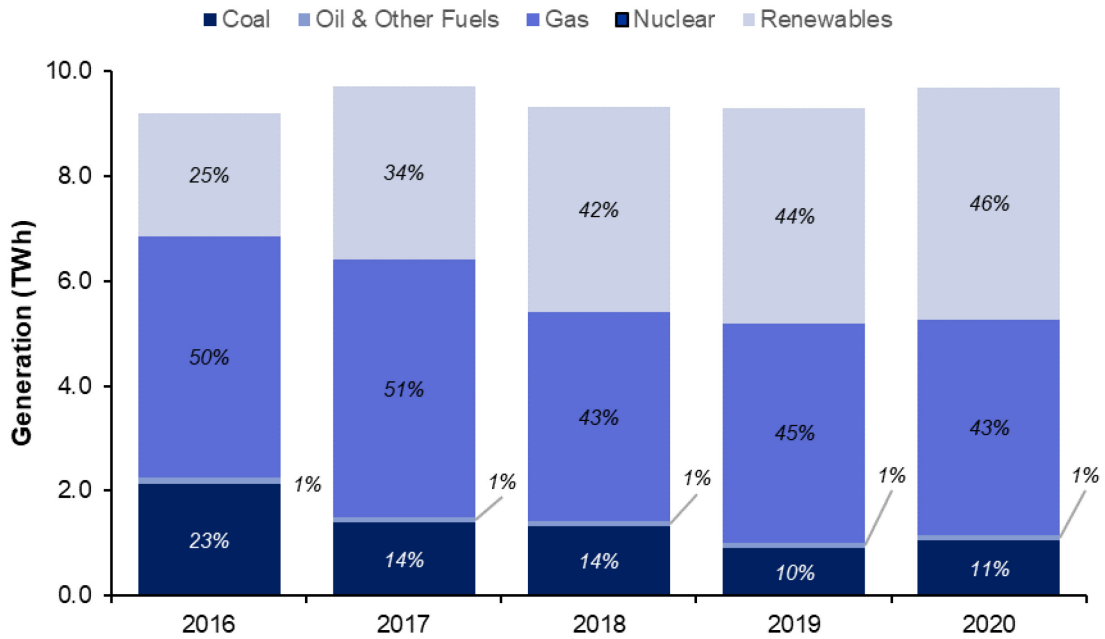
A map illustrating the distribution of Major Power Producers in Scotland, Wales, Northern Ireland and England is provided in Appendix B.

Chart 4 shows electricity generation by fuel (in all generating companies) in each UK country for the period 2016 to 2020. To illustrate the generation mix in each country, shares of electricity generated by fuel are shown as data labels.

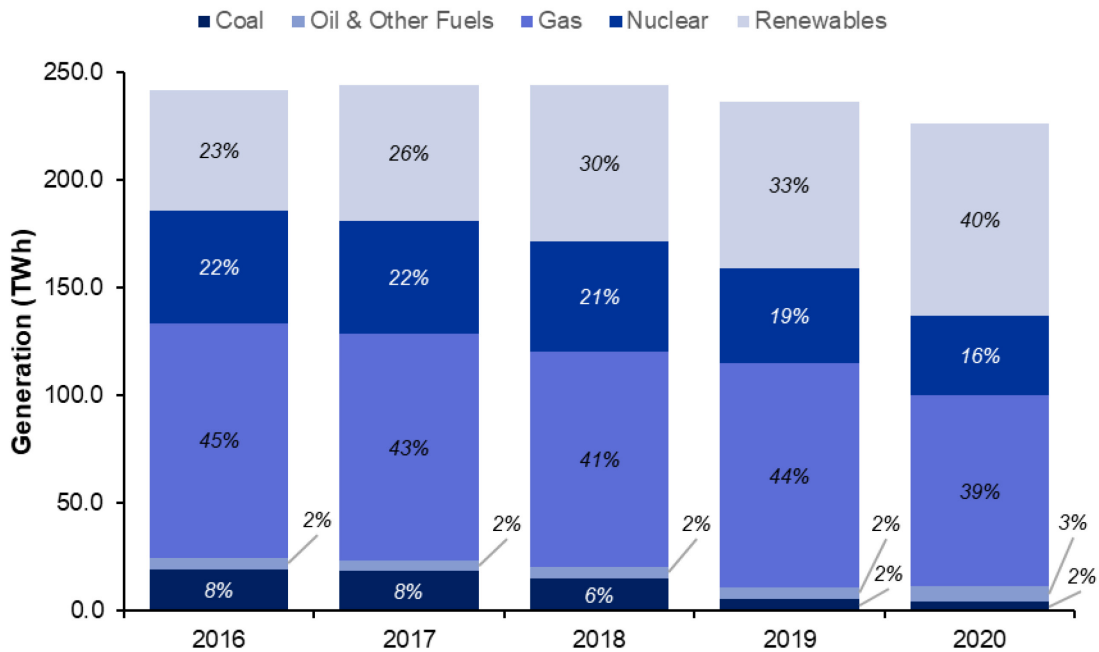
Chart 4: Electricity generation by fuel (with shares of electricity generated) in all generating companies, in Scotland (A), Wales (B), Northern Ireland (C) and England (D), 2016 to 2020.



C – Northern Ireland



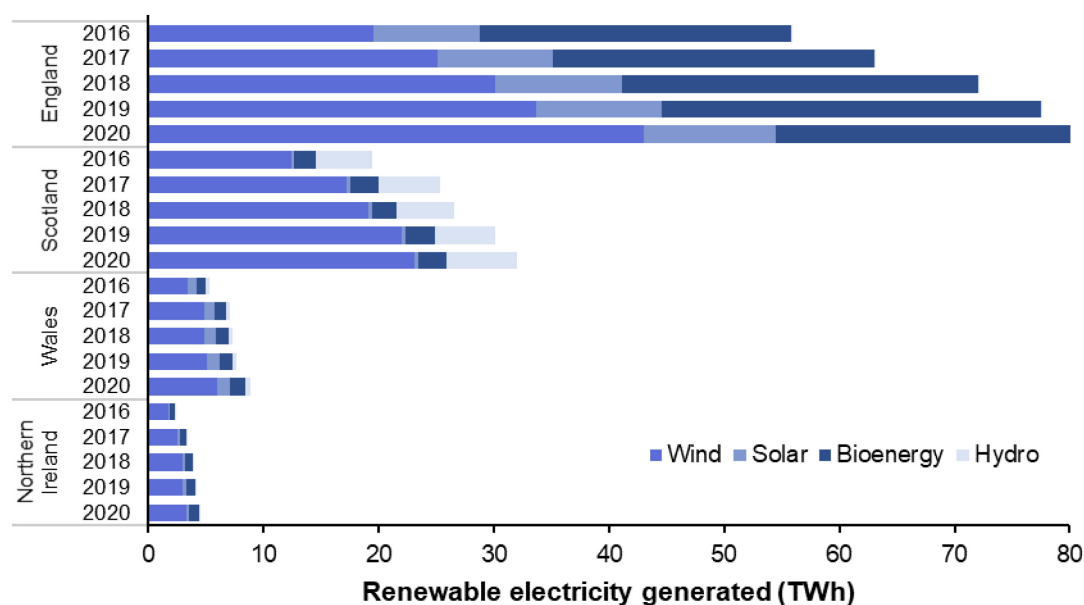
D – England



Low carbon and renewable electricity

Renewable electricity generation and capacity has increased dramatically in recent years as the UK works towards its goal to achieve net zero carbon emissions by 2050. In 2019, the UK became the [first global economy to enshrine this commitment in law](#). Chart 5 shows electricity generation by renewable technology in each UK nation between 2016 and 2020.

Chart 5: Renewable electricity generation by technology, in each UK nation between 2016 and 2020.



Since 2016, there has been an upsurge in renewable generation, increasing by 62 per cent between 2016 and 2020. This trend was continued between 2019 and 2020, with a 13 per cent increase in renewable generation. In previous years, the increase in renewable generation was attributed to increasing renewable capacity, but for 2020 it was primarily driven by favourable weather conditions. Compared to 2019, the UK's renewable capacity (derated for intermittency) increased by just 1.8 per cent. In comparison, between 2018/19, renewable generation increased by 8.7 per cent, with a corresponding increase in derated capacity of 6.5 per cent.

Wind generation has been particularly prominent, with UK wind generation more than doubling between 2016 and 2020. Wind power accounted for close to half of Scotland's total generation in 2020, more than double the average for the rest of the UK (20.1 per cent). Wind generation increased in all four countries, with a 28 per cent increase in England and substantial increases for Wales (18 per cent) and Northern Ireland (8.8 per cent), while Scotland had a smaller increase of 4.8 per cent. Notably, 2020 saw the opening of the East Anglia ONE offshore wind farm with a capacity of 714 MW. The UK plans to increase its installed capacity for offshore wind generation to 40 GW by 2030, increasing overall wind capacity to over 50 GW, in line with the commitment to achieve net zero carbon emissions by 2050.

Bioenergy had a 12.6 per cent generation share in 2020 with most bioenergy generation (88.2 per cent) occurring in England. Since the conversion of coal units at Lynemouth and Drax to biomass in 2018, the majority of biomass generation by major producers now takes place at these two sites, which are both in England. Biomass capacity continued to grow in 2020, and now represents over a tenth of UK generation capacity. Increases in bioenergy capacity fuelled a 23 per cent rise in Welsh bioenergy generation alongside with a 5.2 per cent rise for England and an 8.2 per cent increase in Northern Ireland.

Solar generation increased by 4.6 per cent between 2019 and 2020. The largest increase was seen in England (up 5.2 per cent), followed by smaller increases for Wales (up 1.3 per cent) and Scotland (up 0.3 per cent). These increases were driven by a 1.8 per cent increase in UK-wide derated solar capacity compared to 2019, alongside a marginal increase in UK-wide sun hours. Northern Ireland was the only UK nation that saw a decrease in solar generation, with a marginal 0.3 per cent fall. This was likely due to lower average sun hours as solar capacity in Northern Ireland remained level in this period.

The vast majority of the UK's hydro generation assets are in Scotland, where generation increased 16.2 per cent on the previous year, 15.5 per cent for the UK as a whole. This was in line with a 24.6 per cent increase in UK rainfall, weighted by location of UK hydro resource, as de-rated hydro capacity remained broadly level.

For further detailed renewable statistics on a sub-national and regional basis, please refer to the [special feature article](#) published in the September 2021 issue of Energy Trends. For weather data, weighted by location of renewable resources, refer to [Energy Trends section 7: weather](#).

Note that previous versions of this article included reference to renewable generation under the Renewables Obligation (RO). This is no longer included since the RO closed to new generating capacity in March 2017, with a grace period ending in 2018.

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Revisions

Previous versions of the data in this article remain available online for comparison at:

<https://www.gov.uk/government/collections/energy-trends-articles>

References

Digest of UK Energy Statistics 2021 (DUKES) – Electricity (Chapter 5):

<https://www.gov.uk/government/statistics/electricity-chapter-5-digest-of-united-kingdom-energy-statistics-dukes>

Electricity generation and supply article and accompanying data for Scotland, Wales, Northern Ireland and England, 2015 to 2019:

<https://www.gov.uk/government/publications/energy-trends-december-2020-special-feature-articles>

UK electricity generation and consumption (Energy Trends 5.1 to 5.6):

<https://www.gov.uk/government/statistics/electricity-section-5-energy-trends>

Renewable electricity generation and capacity (Energy Trends 6.1):

<https://www.gov.uk/government/statistics/energy-trends-section-6-renewables>

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

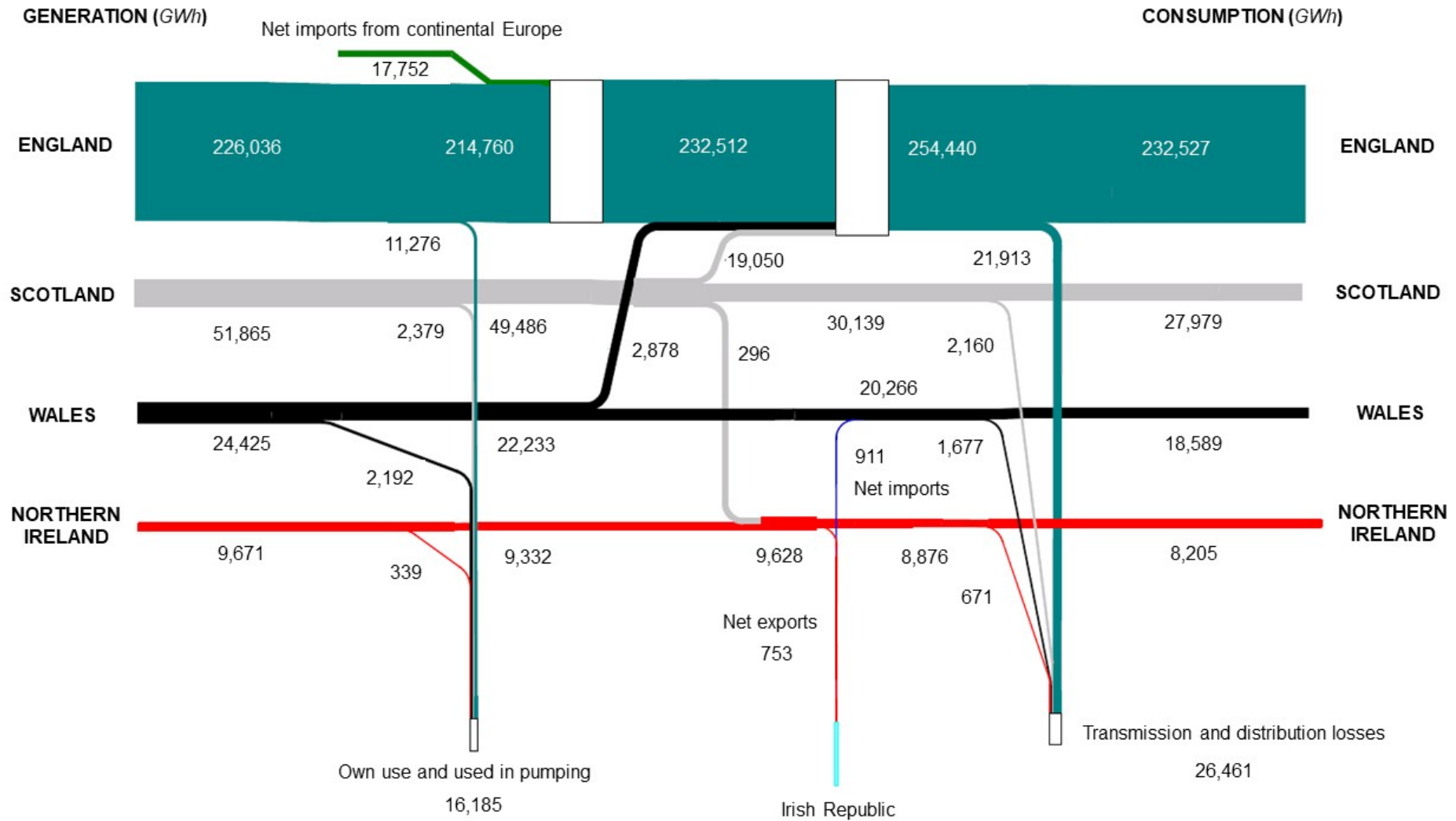
<https://www.gov.uk/government/publications/energy-trends-december-2020-special-feature-articles>

Energy Trends: weather

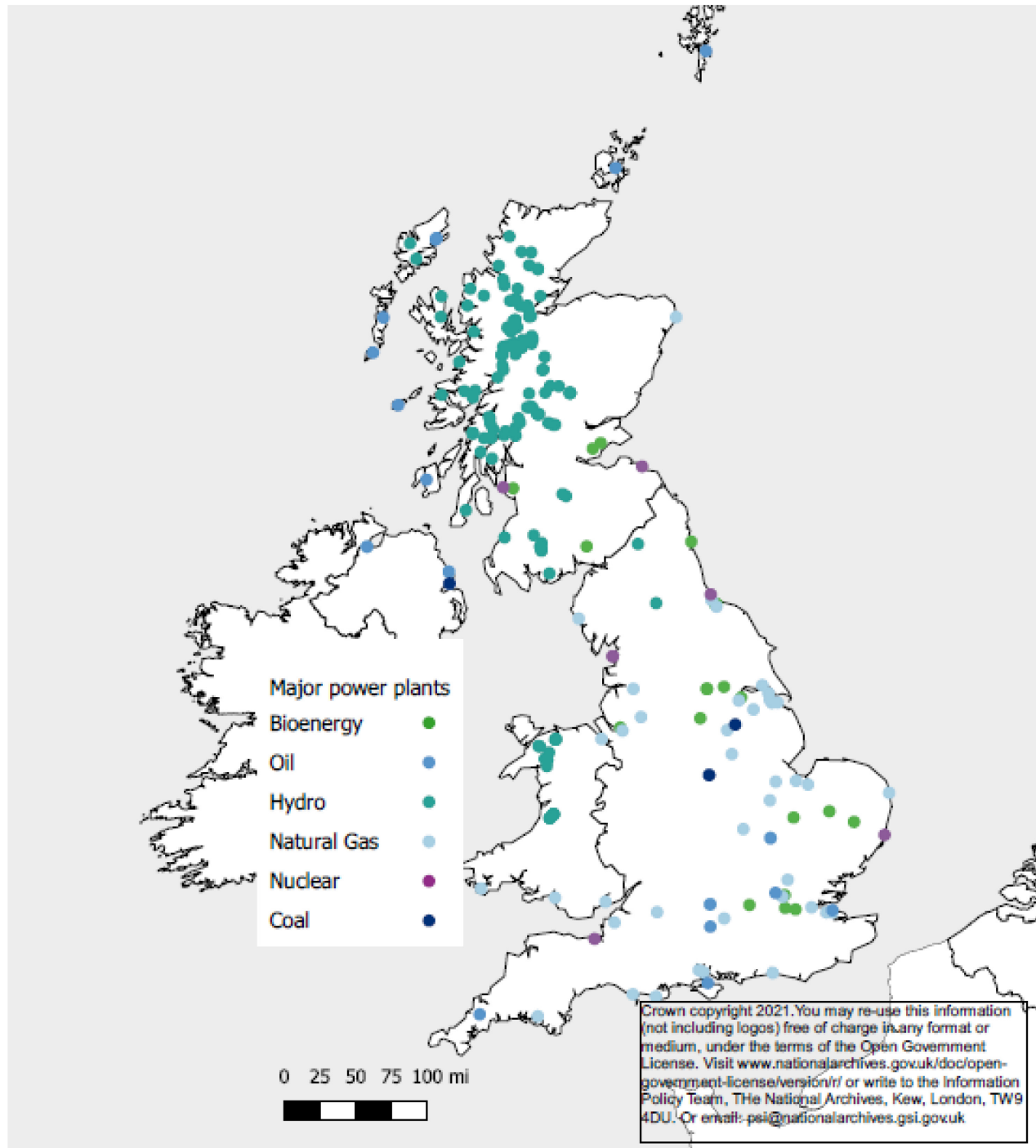
<https://www.gov.uk/government/statistics/energy-trends-section-7-weather>

Appendices

Appendix A: Electricity generation and consumption in Scotland, Wales, Northern Ireland and England



Appendix B: Distribution of Major Power Producers (MPPs) in the United Kingdom





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Diversity and security of gas supply in Europe, 2020

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Key headlines

Europe is a large consumer of natural gas, consuming 541 billion cubic metres (bcm) in 2020. European indigenous production could have met over two fifths of demand in 2020, largely due to substantial production by Norway, one of the largest gas-producing countries globally.

The UK continues to produce large amounts of natural gas; UK indigenous production could have met more than half of demand in 2020. Considering the supply index of European countries, the UK ranked as the third highest scoring country for diversity and security of supply, owing to substantial indigenous production and a diverse range of import sources.

An extensive pipeline network provides the infrastructure for much of the gas trade across Europe. However, in recent years Liquefied Natural Gas (LNG) has come to play an important role in balancing both UK and European gas markets. In 2020, imports met 51 and 58 per cent of European and UK demand respectively.

Introduction

Demand for natural gas is met through supply, which is calculated as indigenous production¹ plus imports. In 2020, indigenous production met 43 and 52 per cent of demand in Europe and the UK respectively. The remainder of supply consisted of natural gas imports, which arrive via pipelines or as shipments of Liquefied Natural Gas (LNG). In 2020, pipeline imports met just over a third of demand in both Europe and the UK, whereas LNG imports met almost a fifth of demand in Europe, and almost a quarter of demand in the UK.

This article assesses the diversity and security of gas supply in Europe and the UK. The data to complete this article was sourced from the International Energy Agency (IEA)², and countries included are those which supply the IEA with natural gas data³. This includes the majority of Europe. European countries without data in the IEA database include Andorra, Kosovo, Liechtenstein, Monaco, San Marino, and Vatican City. Cyprus, Iceland, and Montenegro were excluded from this analysis as they did not produce or consume natural gas in 2020. Given the contribution of Russian gas imports to European demand, Russia has not been included as part of Europe for this analysis. Previous versions of this article used data from the UK and EU member states, other than this the methods used remain the same.

Methods

This article uses three indicators to analyse diversity and security of natural gas supply.

Self-sufficiency: The country's ability to meet its natural gas demand through indigenous production alone. This is calculated by dividing the volume of indigenous production by demand. Countries with a self-sufficiency score of 0 did not produce natural gas. Countries with a score greater than 0 and less than 1 meet some demand through indigenous production and the remainder through imports, making them a net importer of gas. Countries with a score of exactly 1 produced as much gas as used. Countries with a score greater than 1 produced more gas than they used, making them a net exporter of gas. In general, high self-sufficiency means that natural gas supply is secure.

¹ Indigenous production refers to marketable production within national boundaries, including offshore production.

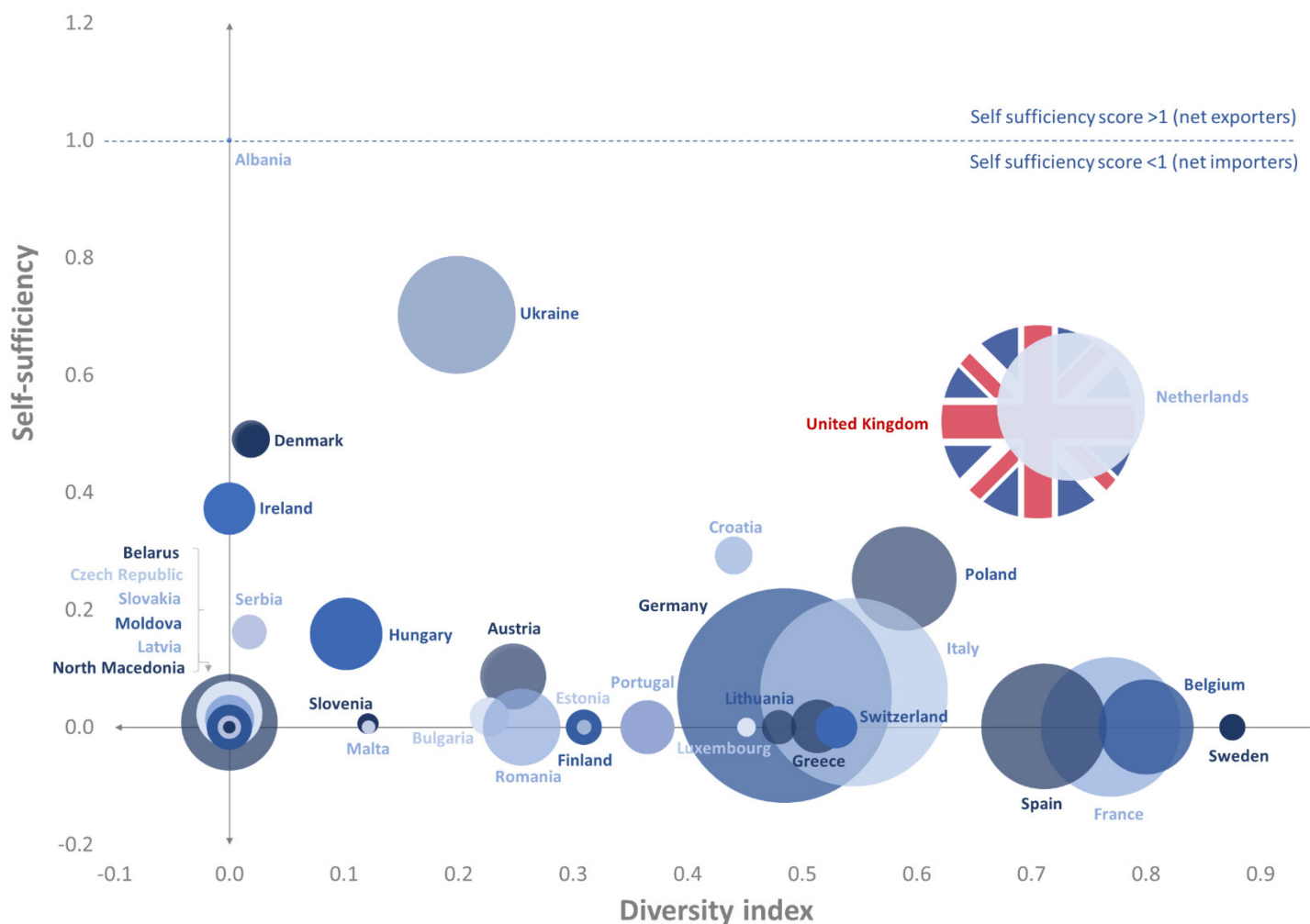
² Data sourced from <http://www.iea.org/data-and-statistics>

³ Requirements for inclusion in the IEA database can be found in the IEA Database Documentation: http://wds.iea.org/wds/pdf/WORLDBAL_Documentation.pdf

Diversity index: The number of import sources for a given country, weighted by each source country's political stability⁴. A country with many import sources of high political stability will have a high diversity index. Conversely, a country with few import sources of low political stability will have a low diversity index. In general, a diverse source of imports means gas supply is more secure. This is further improved if the source countries are politically stable.

Supply index: The sum of a country's self-sufficiency score and diversity index score. This is a simple indication of security of supply. A supply index of 0 indicates that a country has no indigenous production and only one import source.

Chart 1: Self-sufficiency and diversity index of European countries, 2020



Bubble size equates to demand for natural gas, Norway has been excluded from the graph, see Appendix 1 for underlying data.

Chart 1 shows the relationship between a country's self-sufficiency score and diversity index. The size of the bubble equates to each country's demand for natural gas.

In 2020, most countries had a supply index between 0 and 1.5. The only country outside of this range was Norway, which had a supply index of 23.5. This large supply index is a result of its high self-sufficiency score of 22.9, meaning it had high indigenous production relative to consumption. Norway is one of the largest producers of natural gas globally. Due to the difference in scores between Norway and the other European countries, Norway has been excluded from Charts 1 and 2.

⁴ Data sourced from World Bank governance indicators, see Appendix 1 for underlying data and Appendix 2 for method.

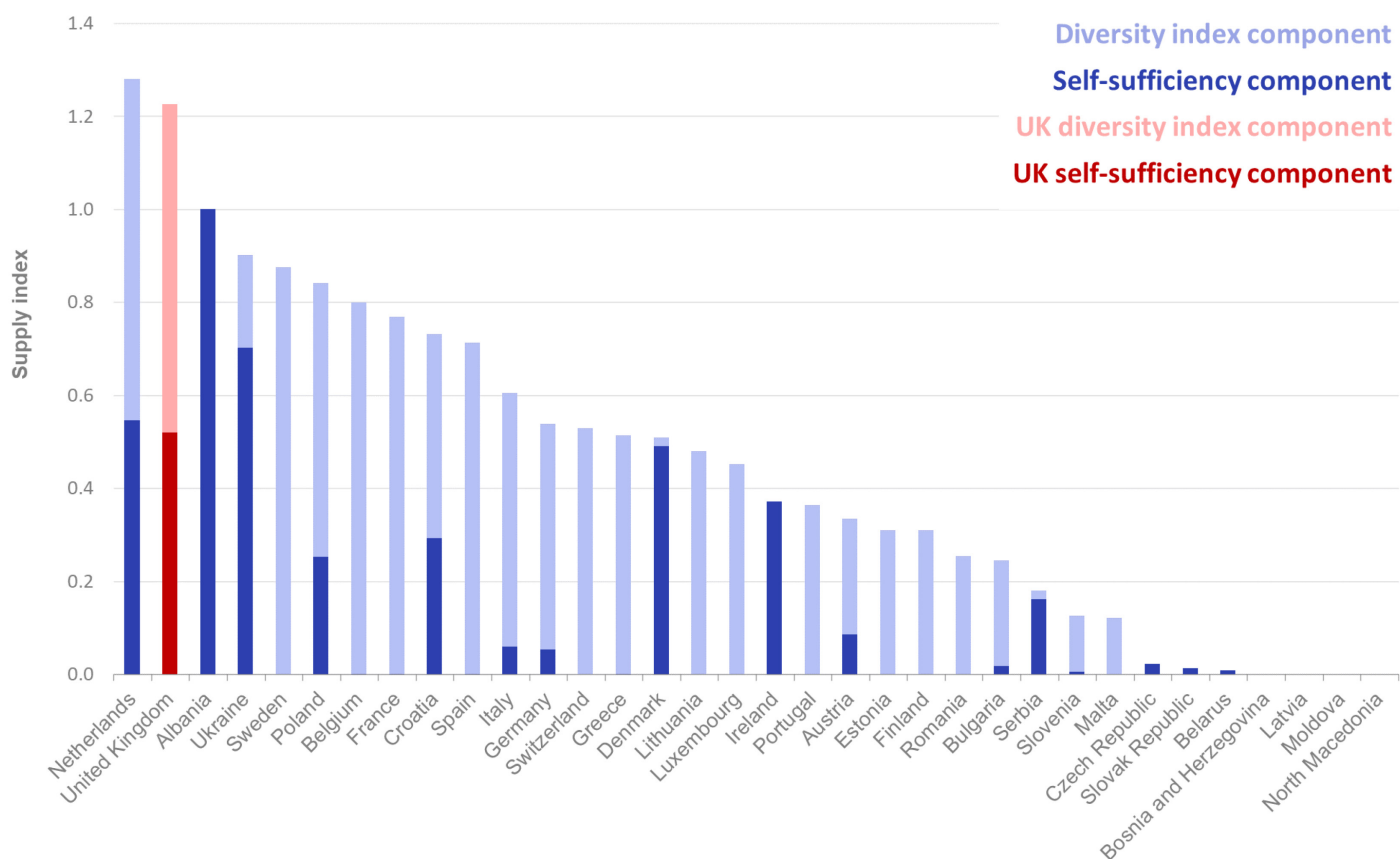
Self-sufficiency

On average, 43 per cent of Europe's demand was met through indigenous production. In 2020, only one European country, Norway, was a net exporter of natural gas. Previously, Denmark has been a net exporter of natural gas, however the temporary closure of Tyra, the country's largest natural gas field, in 2020 led to a large reduction in their indigenous production. In 2020, UK indigenous production could have met just over half of demand with the remainder being met by imports. This has decreased in the last decade, down from the 58 per cent in 2010. The UK has maintained a self-sufficiency score of around 0.5 since 2016.

Diversity index

Countries use imports to meet any shortfall in supply from indigenous production. The UK and other European countries import gas from many sources. In 2020, the UK had a diversity index of 0.71, this is higher than the European average which was 0.32. The UK's high score is due to the receipt of gas from many import sources, some of which are very politically stable. The UK's proportion of total demand from imports has fluctuated between 40 and 60 per cent since 2010.

Chart 2: Supply index of European countries, 2020



Norway has been excluded from the graph, see Appendix 1 for underlying data

Chart 2 shows the supply index for European countries in 2020. The self-sufficiency score and diversity index have been stacked, indicating the relative contribution of these components to the security of supply ranking.

Supply index

Europe had an average supply index of 1.1. The supply index of European countries excluding Norway ranged between 0 and 1.28. The supply index of European countries excluding Norway ranged between 0 and 1.28. The UK ranked in third place with a score of 1.23, behind Norway and the Netherlands.

Bosnia and Herzegovina, Latvia, Moldova, and North Macedonia had no indigenous production and only one import source, so had a supply index of zero.

Import sources: Pipeline and Liquefied Natural Gas (LNG)

In 2020, Europe met 51 per cent of demand through imports. Most imports arrive via pipeline as the infrastructure is well-established, and it is an efficient method of gas transportation. Pipeline infrastructure means it is often convenient to import gas from neighbouring countries. Because of this, Western European countries tend to import gas from Norway whilst central and Eastern European countries import most of their gas from Russia. 28 European countries imported gas from Russia in 2020. It should be noted that Russia acts as a transit country for gas from Kazakhstan and Turkmenistan, so the origin of this gas is not necessarily entirely Russian. For Bosnia and Herzegovina, Latvia, Moldova, and North Macedonia, Russia was their only import source. For all countries excluding the UK, Russian imports are included as reported by the IEA. In the interest of transparency, the proportion of UK imports from Russia have been adjusted to include an estimate for Russian pipeline imports via the Netherlands.

In addition to pipeline imports, gas can be transferred by ship. LNG is natural gas that has been cooled to a liquefied state, making it easier to store and transport. It can then be regasified at import terminals or processing facilities, before being transferred to the pipeline system. The UK has three operational LNG import terminals: Dragon, the Isle of Grain and South Hook. Imports of LNG to the UK and Europe have been increasing since 2018. In 2020, LNG imports met 17 per cent of demand in Europe, and 24 per cent of demand in the UK.

Chart 3: Sources of gas supply for Europe, 2020

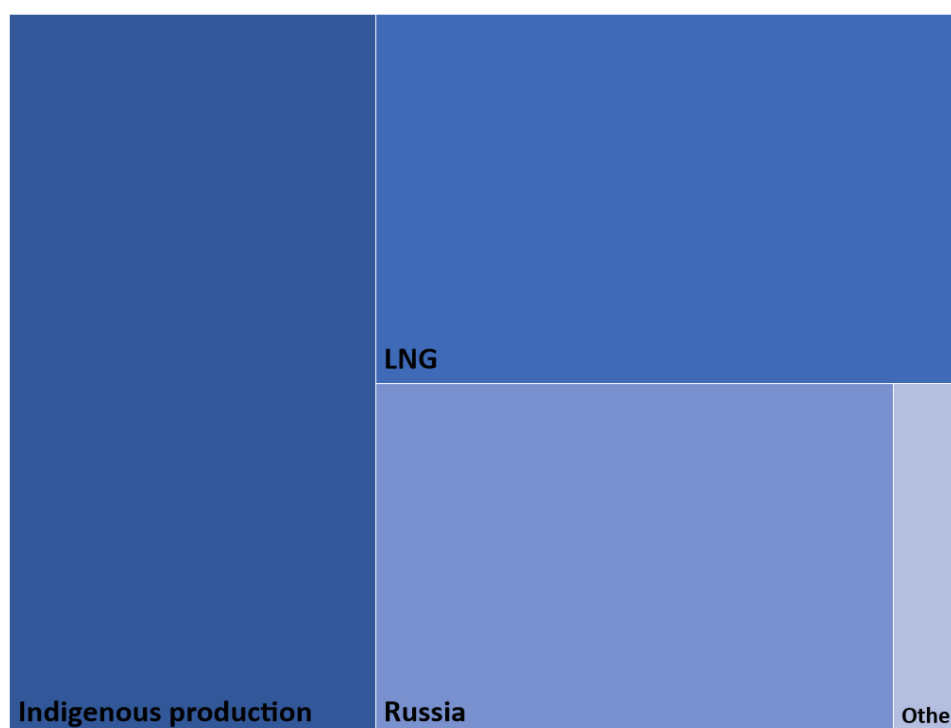


Chart 3 shows the main sources of natural gas for Europe, with sources of supply broken down by country of origin.

When considering European countries together, pipeline imports from Russia were the largest single import source, accounting for 29 per cent of total demand. Small quantities of gas imports have been grouped together as 'Other'; this includes Libya, Turkey, Azerbaijan as well as non-specified imports.

Chart 4: Sources of gas supply for the UK, 2020

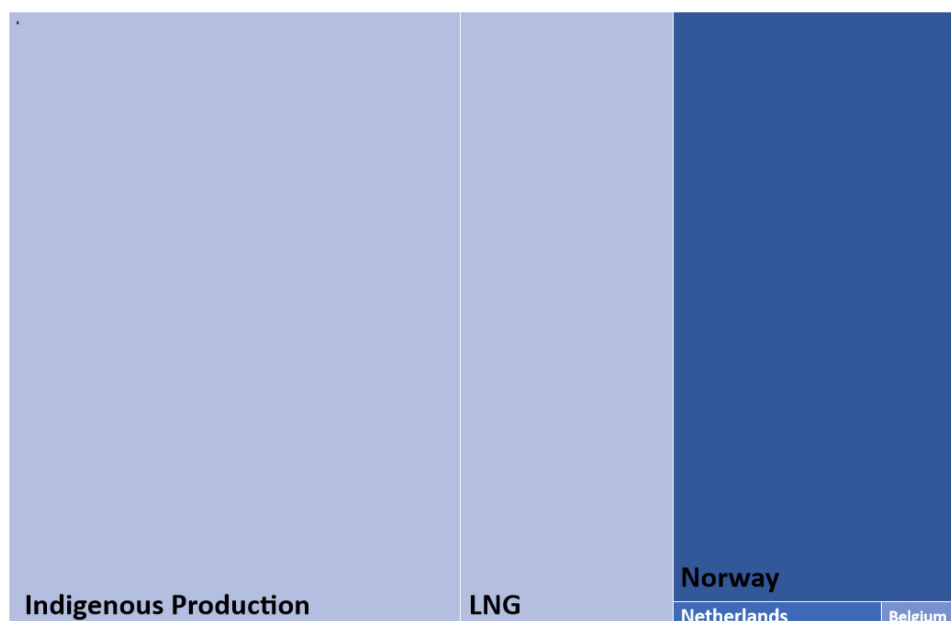


Chart 4 shows the equivalent chart for sources of supply of natural gas to the UK.

The UK receives direct imports via pipeline from Belgium, the Netherlands and Norway. The UK also receives imports as LNG, accounting for 24 per cent of demand in the UK in 2020. This maintains the high levels of LNG imports seen in 2019, and is consistent with trends seen across Europe. The LNG market is one of the fastest growing commodity markets globally. This growth is expected to continue as several prominent commentators are confident in sustained demand in the medium to long term despite the impacts of Covid-19. LNG is analysed in more detail in the special feature article [LNG Trends in Trade](#).

The UK has been historically reliant on pipeline imports due to its proximity to Norway and shared infrastructure in the North Sea. However, fast growth in the LNG market is supported by plans for large infrastructure projects across the world including in North America and Asia, as well as planned expansion in liquefaction capacity in Qatar and Russia.

Chart 5: Sources of European LNG imports, 2020

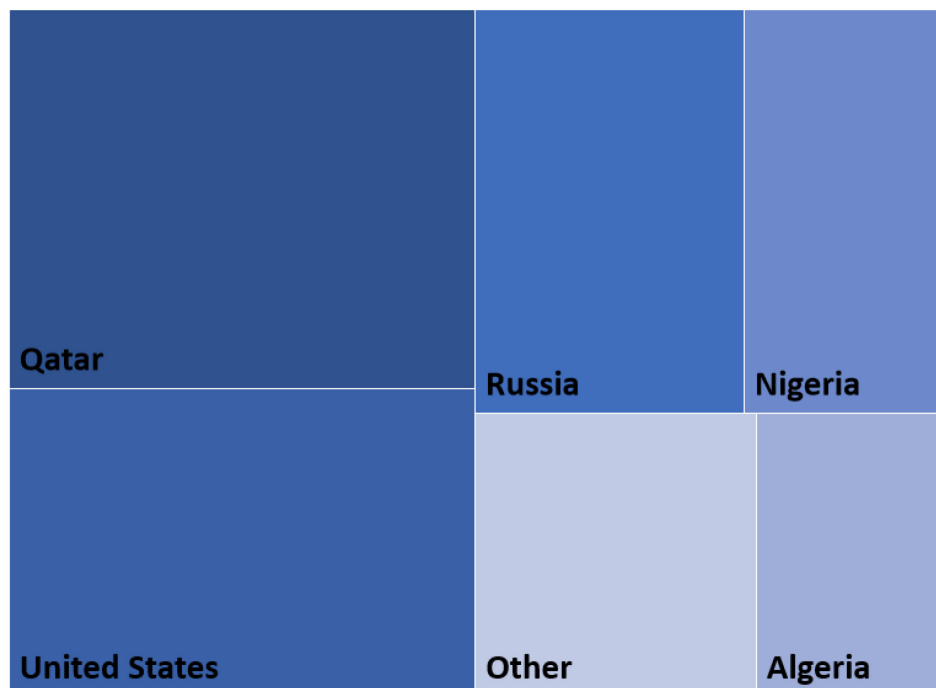


Chart 5 shows the main sources of LNG imports for Europe.

Historically, Qatar has been the largest source of LNG imports for Europe and the UK. In 2020, more than a quarter of LNG cargoes received originated from Qatar. Europe received LNG cargoes from 17 countries. The second largest LNG imports source was the United States. The 12 countries included in 'Other' accounted for 12 per cent of LNG imports (see Appendix 1 for a full list of countries included in 'Other').

Chart 6: Sources of UK LNG imports, 2020

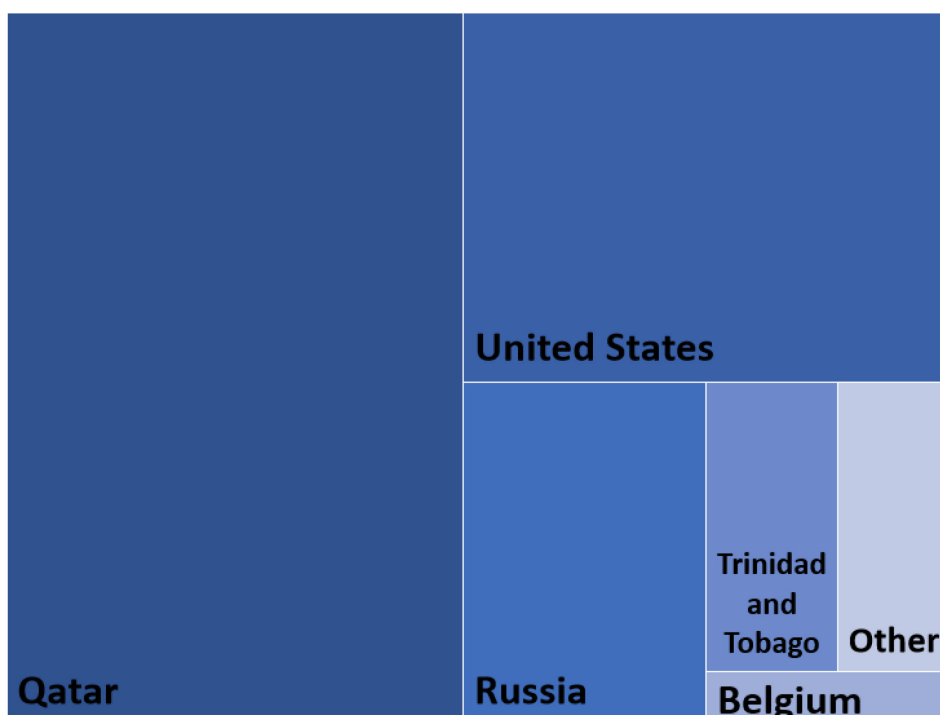


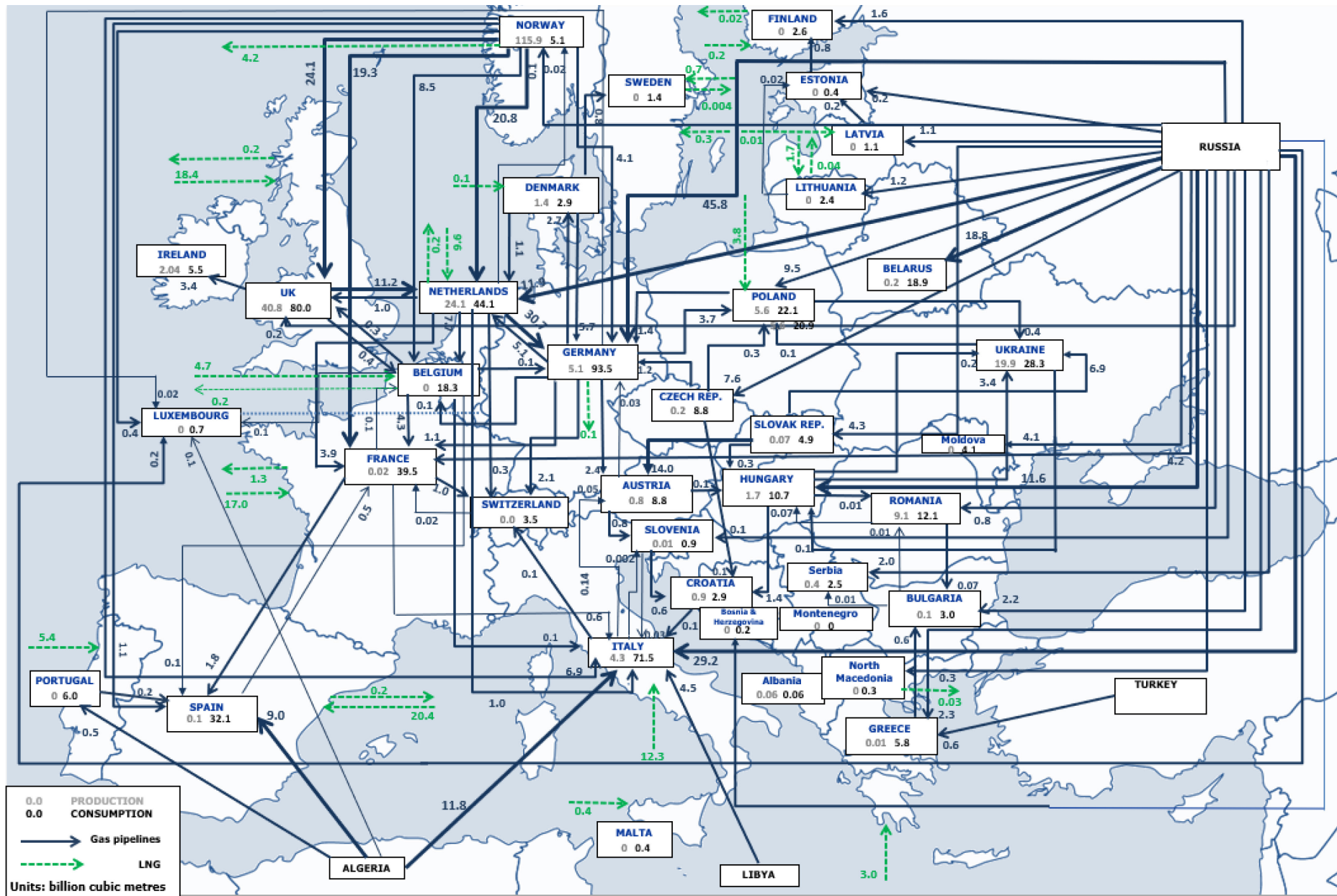
Chart 6 shows the equivalent chart for LNG imports of natural gas to the UK.

Imports of LNG to the UK peaked in 2011 at 25bcm, and 85 per cent of this was from Qatar. In 2020, the Qatari share of LNG imports fell to just under half. The UK received LNG cargoes from 10 countries. In 2020, 27 per cent of total UK LNG imports were from the United States (up from 16 per cent on 2019), and 12 per

cent from Russia. 'Other' included 5 countries and accounted for 5 per cent of LNG imports (see Appendix 1 for a full list of countries included in 'Other').

Map 1 illustrates the diversity of import supply, as well as the complexities of European gas trade. For readers wanting a greater level of detail, the IEA have made available an interactive gas map, based on entry and exit points throughout Europe. This map is available free of charge at: <http://www.iea.org/gtf/>.

Map 1: Physical gas flows in Europe, 2020



Summary

Europe consumed 541 bcm of natural gas in 2020, 43 per cent of this demand could have been met with indigenous production. Comparatively, the UK could have met just over half of demand through indigenous production. When considering the supply index, the UK had the third most secure supply. As well as a comparatively high self-sufficiency score, the UK also had a high number of import sources. Notably, Norway was the largest import source of natural gas in the UK, meeting 32 per cent of UK demand in 2020. Whilst well-established pipeline infrastructure provides a relatively stable supply story for Europe and the UK, LNG provides an increasingly important role in meeting natural gas demand.

Supply of LNG to the UK peaked in 2011 and had been in decline before the sharp growth seen in late 2018. Whereas Qatar has historically been the primary source of LNG supply to the UK and Europe, global liquification capacity is increasing, creating and expanding on new and existing import sources. Historic trends and the current supply mix of UK and European imports of LNG are explored in further detail in the special feature article [LNG Trends in Trade](#).

Appendix 1: Underlying data for charts

Table 1: Underlying data for Chart 1 and Chart 2

Country	Self sufficiency	Diversity index	Supply index	Demand (mcm)
Albania	1.00	0.00	1.00	57
Austria	0.09	0.25	0.33	8,807
Belarus	0.01	0.00	0.01	18,854
Belgium	0.00	0.80	0.80	18,281
Bosnia and Herzegovina	0.00	0.00	0.00	183
Bulgaria	0.02	0.23	0.24	3,020
Croatia	0.29	0.44	0.73	2,904
Czech Republic	0.02	0.00	0.02	8,823
Denmark	0.49	0.02	0.51	2,909
Estonia	0.00	0.31	0.31	436
Finland	0.00	0.31	0.31	2,561
France	0.00	0.77	0.77	39,538
Germany	0.05	0.48	0.54	93,488
Greece	0.00	0.51	0.51	5,834
Hungary	0.16	0.10	0.26	10,608
Ireland	0.37	0.00	0.37	5,477
Italy	0.06	0.55	0.60	71,507
Latvia	0.00	0.00	0.00	1,114
Lithuania	0.00	0.48	0.48	2,369
Luxembourg	0.00	0.45	0.45	709
Malta	0.00	0.12	0.12	378
Netherlands	0.55	0.73	1.28	44,122
Norway	22.90	0.58	23.47	5,062
Poland	0.25	0.59	0.84	22,106
Portugal	0.00	0.36	0.36	5,951
Moldova	0.00	0.00	0.00	4,098
North Macedonia	0.00	0.00	0.00	334
Romania	0.00	0.26	0.26	12,062
Serbia	0.16	0.02	0.18	2,481
Slovak Republic	0.01	0.00	0.01	4,877
Slovenia	0.01	0.12	0.13	903
Spain	0.00	0.71	0.71	32,091
Sweden	0.00	0.88	0.88	1,400
Switzerland	0.00	0.53	0.53	3,520
Ukraine	0.70	0.20	0.90	28,252
United Kingdom	0.52	0.71	1.23	75,568
Average	0.77	0.32	1.09	15019

Source: IEA (<http://data.iea.org/>)

Countries included in 'Other' in Chart 5: Trinidad and Tobago, Equatorial Guinea, Angola, Peru, Egypt, Argentina, Cameroon, Mexico, Gibraltar, South Africa, Ghana, and other sources in Africa.

Countries included in 'Other' in Chart 6: Nigeria, Norway, Egypt, France, and Algeria.

Appendix 2: Methodology

Self-sufficiency

Data for natural gas was extracted from the IEA database. Self-sufficiency was determined from data on indigenous production and demand (indigenous production (mcm) ÷ demand (mcm)).

Diversity index

The diversity index used here is a product of a standard diversity index and an index for political stability. As a basic index for measuring diversity, we used the Shannon-Wiener diversity index:

$$\sum_{i=1}^n -x_i \ln(x_i)$$

Where x is the proportion of total natural gas supply represented by the i^{th} source country and n represents the final source country. A value below 1 signifies a country that is dependent on a small range of import sources, a value above 1 represents a country with a wider range of import sources. The minimum value of zero denotes a country that has one imported fuel source or relies entirely on indigenous production (or a country with no imports). The Shannon-Wiener was chosen here because it places weight on the diversity of contributions from smaller countries and reduces the impact of larger nations.

Political stability was determined using data from the World Bank worldwide governance indicators. Specifically, the index reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism. These data were standardised between 0 and 1.

Source: World Bank <http://info.worldbank.org/governance/wqi/index.aspx#home>

Shannon-Wiener and political stability indices were multiplied and summed:

$$\sum_{i=1}^n -x_i \ln(x_i) b_i$$

Where b is an index of political stability of producing country. This is called the SWNI (Shannon-Weiner-Neumann index), in line with previous work. Each SWNI index was normalised between 0 and 1, in order to have a standardised index. This was done by working out a maximum diversity score, by assuming maximum diversity was equivalent to importing products in line with proportional contributions of exporting countries (e.g., if a single country were responsible for exporting 50 per cent of all natural gas, and five other countries were responsible for 10 per cent each, we assumed maximum import diversity at a ratio of 5:1:1:1:1:1). This maximum diversity score then acted as our upper score of 1, with all other scores divided by this maximum to standardise the data.

Other sources of gas

Sometimes, due to a variety of reasons, countries may report an import of natural gas from a “Non-Specified/ Other” source country. In 2020, for Austria, France, Germany, Hungary, Luxembourg and Ukraine at least 5 per cent of imports were reported as Non-Specified/ Other. For Austria and Ukraine, all imports were reported in this way. To reallocate the imports of a non-specified origin we used Border Point Data, which is available at www.iea.org/gtf/. This data is collected by the IEA and shows monthly gas flows in Europe.

Calculation of Russian pipeline flows to the UK

In addition to LNG, the UK imports gas from Russia indirectly through the Netherlands via pipeline. For transparency, the volume of these indirect imports is estimated. In 2020, the UK sourced 2 per cent of its natural gas imports through pipeline from the Netherlands. In turn Russian imports comprised 14 per cent of total supply to the Netherlands. The proportion of Netherlands’ supply from Russia has been applied to UK pipeline imports from the Netherlands.



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Feed-in Tariff load factor analysis

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Key headlines

This article updates the load factors – an indication of efficiency of electricity generation – for Feed-in Tariff installations. Feed-in Tariff load factors vary mainly due to weather conditions and do not shift substantially between years. Key findings are:

- **Median load factors were up for solar PV** from 10.3% to 10.4% as average sunlight hours increased.
- **Median wind load factors remained unchanged** at 19.1% but mean wind load factors went down from 29.7 per cent to 26.0 per cent. The load factors and average wind speeds were similar to 2018/19 levels.
- **South West England had the highest median load factor for solar PV**, at 11.3%. Scotland had the lowest median load factor (9.4 per cent), with London the second lowest (9.8 per cent).
- **Scotland had the highest median load factor for wind** at 24.7 per cent followed by South West (22.8 per cent) and Wales (22.5 per cent). Different trends were seen across the various region of England.

Introduction

This article updates the Feed-in Tariff (FIT) load factor analysis presented in the December 2021 edition of Energy Trends with data for FIT year eleven (financial year 2020/21). We also present regional analysis of solar PV for the ten years that data has been published (FIT years two to eleven) and wind for years five to eleven. All the data in this article, including quarterly load factors for solar PV, is available in Excel format at the [following link \(opens in a new window\)](#)¹.

Background

Load factors are a measure of the efficiency of electricity generation. A load factor is defined as the ratio of how much electricity was generated over a certain time period as a proportion of the total generating capacity.

The Feed-in Tariff scheme was launched in April 2010. It is a financial support scheme for eligible low-carbon electricity technologies, aimed at small-scale installations. The following technologies are supported:

- Solar photovoltaic (PV; Up to 5 MW capacity)
- Anaerobic digestion (AD; Up to 5 MW capacity)
- Hydro (Up to 5 MW capacity)
- Wind (Up to 5 MW capacity)
- Micro combined heat and power (MicroCHP; Up to 2 kW capacity)

Installers receive support through generation and export tariffs, paid directly from electricity suppliers. The generation tariff is based on the number of kilowatt hours (kWh) generated whereas the export tariff is based on electricity that is generated on site, not used and exported back to the grid. The FIT scheme closed to new entrants at the end of March 2019.

¹ The article published in December 2020 can be found at the following [link \(opens in a new window\)](#)

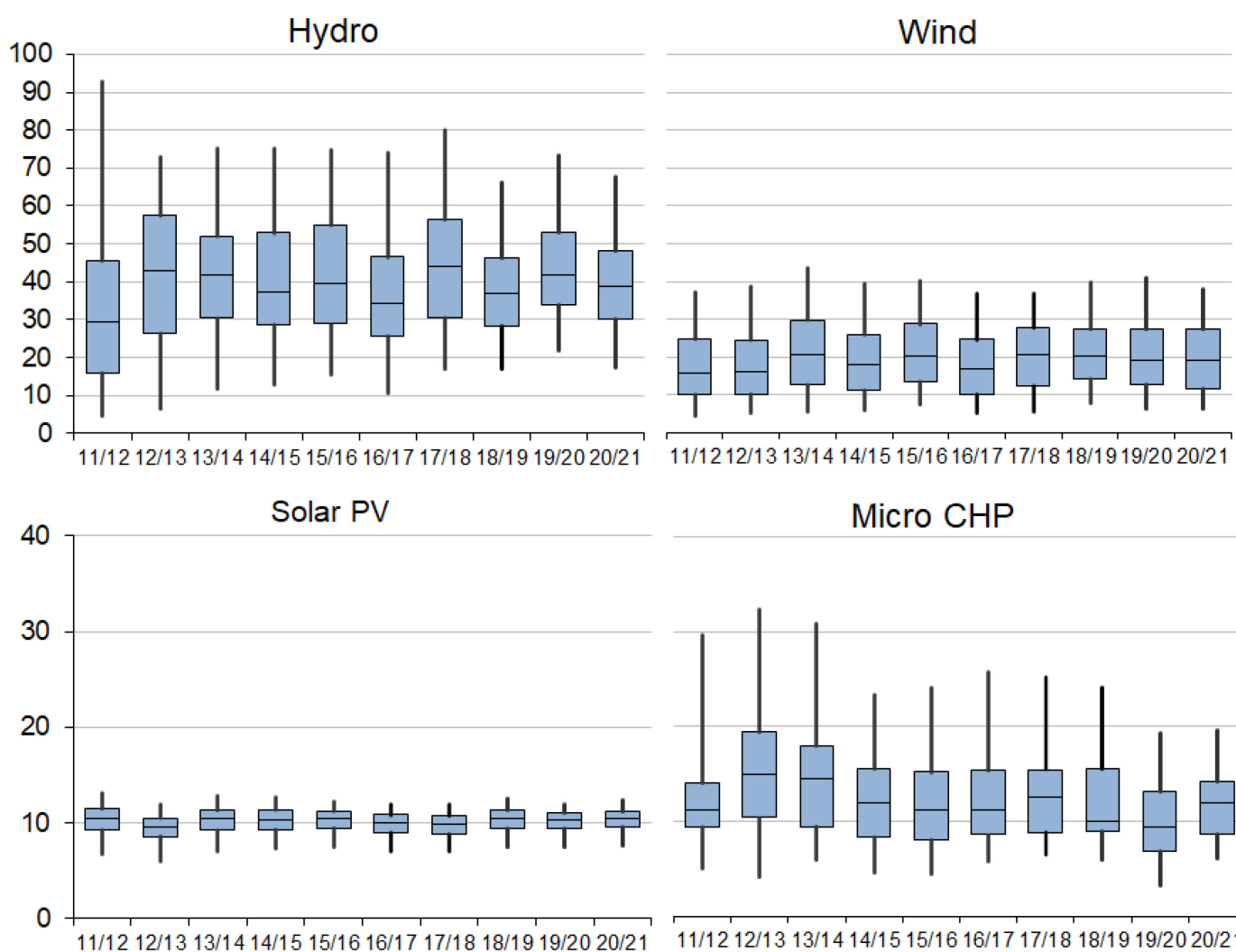
Results

Table 1 gives the weighted mean and median load factors as well as associated percentiles for each technology. Chart 1 presents this data across all available years (FITs years two to eleven), highlighting the large range present for Hydro compared to other technologies, whilst solar installations have the smallest range of load factors.

Table 1: FIT Year 11 (2020/2021) load factors by technology

Technology	Count	Weighted mean	Percentile				
			5 th	25 th	50 th (median)	75 th	95 th
Anaerobic digestion	155	61.4	25.0	61.8	85.3	94.6	98.2
Hydro	245	35.8	17.3	30.2	38.7	48.2	67.3
Micro CHP	14	12.1	6.1	8.7	11.9	14.2	19.6
Photovoltaic	177,826	10.3	7.7	9.5	10.4	11.2	12.4
Wind	1,876	26.0	6.4	11.6	19.1	27.5	37.8

Chart 1: FiT Load factors by technology and FiT year.



The median load factor for solar PV in 2020/21 was higher than 2019/20 by 0.1 percentage points, which can be explained by the longer average daily sun hours reported for 2020/21. The median load factor is in a similar range to the load factor reported in the years 2013/14 and 2014/15, when average daily sunlight hours were also similar. See Table 2:

Table 2: Solar PV load factors and average sun index

Year	Median load factor	Average daily sun hours
2011/12	10.5	4.5
2012/13	9.6	3.7
2013/14	10.4	4.5
2014/15	10.4	4.5
2015/16	10.4	4.3
2016/17	10.1	4.2
2017/18	9.8	4.1
2018/19	10.5	4.9
2019/20	10.3	4.4
2020/21	10.4	4.5

As can be seen from Table 3 (below), there is a relationship between wind speed and wind load factors, but it is weaker than the relationship between solar PV and sun hours. In addition, load factors for wind vary much more than those for solar PV: Chart 1 (above) shows that there is a much wider spread between the lower and upper quartiles for wind, but these ranges overlap from year to year. This may be because the wind farms that are on FITs are on average much smaller than wind farms owned by the major power producers and they may not be located in the most advantageous positions for wind generation. Furthermore, wind speeds are measured at ground level which may vary from the wind speed at the level of the wind turbine. The average wind speed quoted here is for the whole of the UK, however, wind speed varies by location.

Table 3: Wind load factors and average wind speed

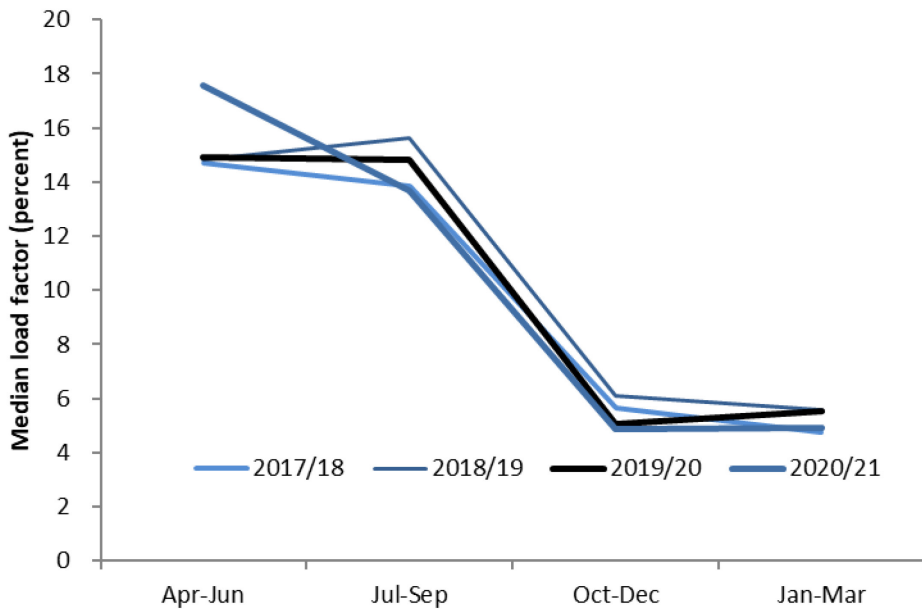
Year	Median load factor	Weighted mean load factor	Average wind speed (knots)
2011/12	15.9	18.3	9.2
2012/13	16.3	22.3	8.0
2013/14	20.5	27.2	9.3
2014/15	18.1	25.3	8.6
2015/16	20.3	28.7	9.2
2016/17	17.0	24.6	8.2
2017/18	20.5	28.4	8.8
2018/19	20.4	26.0	8.5
2019/20	19.1	29.7	8.8
2020/21	19.1	26.0	8.5

Quarterly Solar PV load factors

Quarterly load factors for solar PV installations are available in the accompanying Excel workbook and the last four years are presented graphically in Chart 2. These show an expected association between load factor and daily hours of sunshine, where the quarters mainly covering Autumn and Winter have the lowest load factors.

Load factors were exceptionally high during the spring quarter (Apr-Jun), mirroring the unusually long average daily hours of sun in that period, and reached a median value of 17.6%, the highest recorded since the start of the series.

Chart 2: Quarterly Solar PV load factors by FIT year



Regional Solar PV load factors

Solar PV load factors for each region have been updated with data from FIT year eleven and are available in the Excel workbook along with load factors for FIT years two to ten.

Chart 3: annual Solar PV load factor, by region and FIT Year

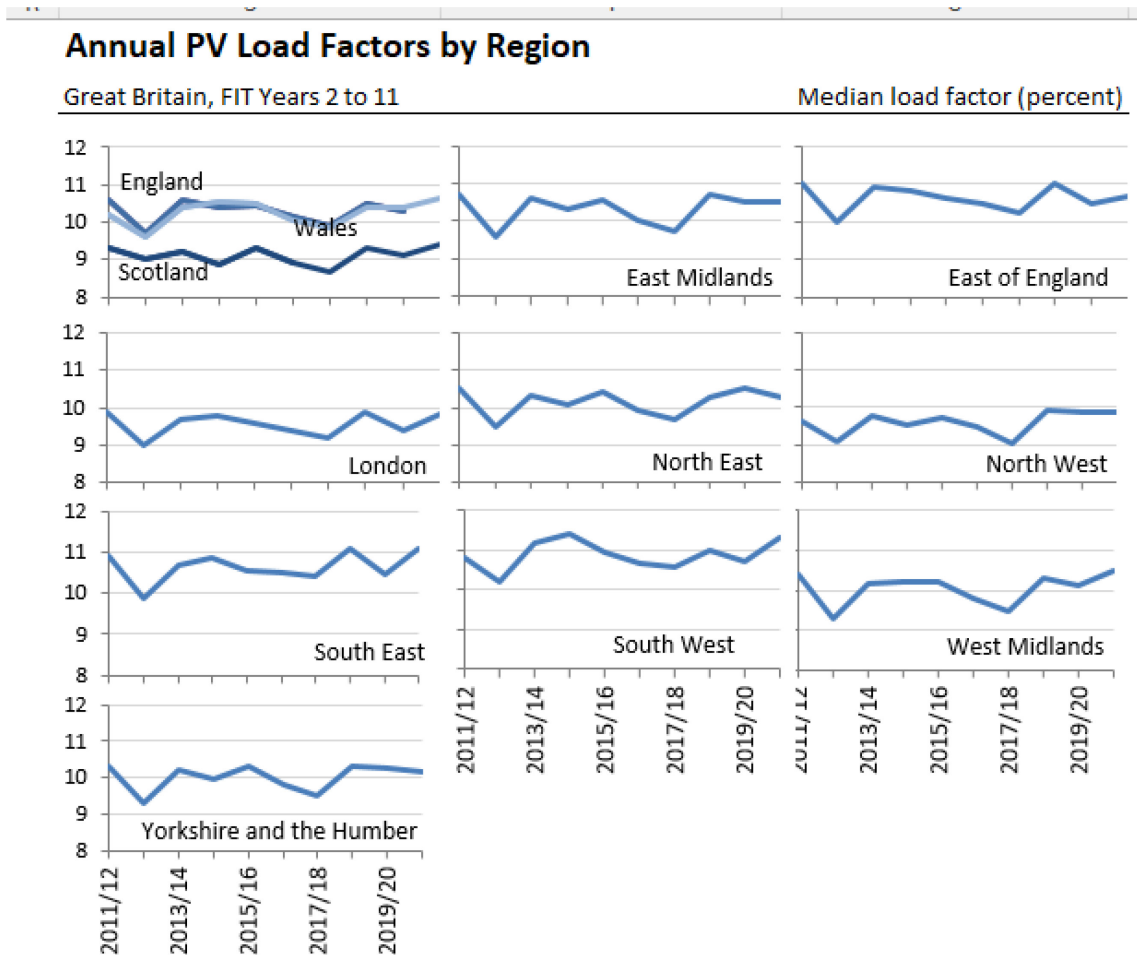
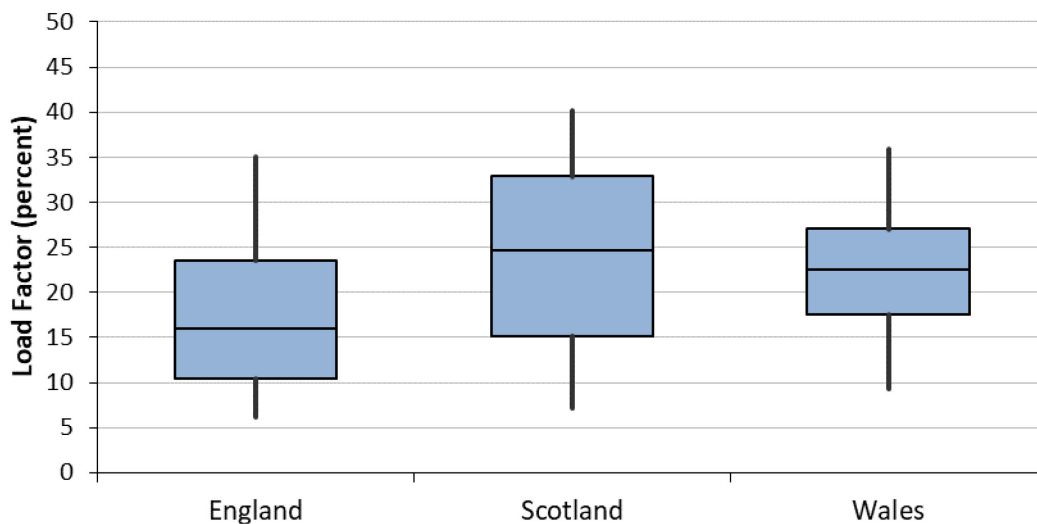


Chart 3 shows that once again Scotland records the lowest load factors, while the highest are seen in the South West. In year eleven (2020/21), the median load factor increased in every region except North East England and 'Yorkshire and the Humber', with the highest absolute increase seen in both South East and South West England (both up by 0.6 percentage points). This reflects average sunlight hours growing on FIT year ten but there are regional variations. Although the median load factor increased by 0.5 percentage points this year, London had a lower load factor than the South East and the lowest outside of Scotland. This may be due to pollution, particles settling on the panels or because panels are shaded by tall buildings nearby. London typically has one of the lowest regional load factors.

Regional Wind load factors

Regional load factors for wind schemes for FIT years five to eleven are also available in the accompanying Excel workbook. Data from London and the South East are aggregated as there were a low number of installations with a valid load factor within these regions. In the latest year, the highest wind load factors are found in Scotland, followed by South West England then Wales. Load factors have generally decreased in Scotland, Wales and the South of England compared to last year, however, the Midlands and the North of England saw an increase. Chart 4 summarises these data for England, Scotland and Wales.

Chart 4: Wind regional load factors for FITs year 11 by country



Lines indicate range from 5th to 95th percentile. Boxes indicate range from lower to upper quartile (25th to 75th percentile) with the line indicating the median.

Annex: Methodology and coverage

Introduction

From 2013, BEIS obtained meter readings for registered installations from Energy Suppliers and used this to produce quarterly and annual load factors for FIT years two to eleven (data from year one is not available as the number of installations running for the full year was very small).

The methodology used for the load factor analysis was described in detail in an Energy Trends article from September 2014². One additional quality assurance (QA) step has been added since 2015, to remove any installations from the analysis where more than one generation meter is attached. This step has only been applied to FIT year five to ten data; statistics for previous years have not been revised. Whilst all efforts have been made to quality assure the data in this publication, the results are based on a sample.

Data cleansing

Table A shows how many installations were registered on the Central Feed-in Tariff Register at the start of FIT year eleven and how many installations had meter readings in both March 2020 and 2021. To be included in the analysis, each installation needed a meter reading between February 28 and April 15 2020 and a corresponding reading between February 28 and April 15 2021. Furthermore, to cover the whole financial year and to avoid bias, readings that were less than 330 days or more than 400 days apart were also excluded. For the quarterly analysis, starting and closing meter readings for each quarter were determined using similar date ranges.

Coverage

Of the 869,617 schemes registered for FiTs at the start of the financial year³, 21 per cent were found to have sufficient meter readings for the annual analysis. Extreme load factor values were further excluded (as in previous years' analysis), accounting for around 4,200 (0.5%) of installations. The column 'Valid load factor' in Table A indicates how many installations were included in the final analysis for each technology for the annual generation data. Micro CHP data is included in the main results, but this data must be treated with caution as the number of installations covered in the analysis remains very low.

Table A: Installations included in analysis by technology – FIT Year 11

Technology	Commissioned by 31 st March 2019	Generation Data Reported*	Valid load factor	% remaining in analysis
Anaerobic digestion	425	165	155	36%
Hydro	1,177	260	245	21%
Micro CHP	525	21	14	3%
Solar PV	859,938	181,867	177,826	21%
Wind	7,552	1,981	1,876	25%
All Technologies	869,617	184,294	180,116	21%

* Meter readings at start and end of FIT year.

² The article published in September 2014 can be found at the following [link \(opens in a new window\)](#)

³ Subject to further revision.



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Energy Company Obligation (ECO) flexible eligibility

Helene Clark 020 7215 1259 energyefficiency.stats@beis.gov.uk

Key headlines

- This article summarises analysis of the Energy Company Obligation (ECO) flexible eligibility (Flex) mechanism, identifying trends in Flex delivery over time and geographically, to illustrate the variability in Flex delivery options.
- Since April 2017, when Flex was introduced, a total of 176,800 measures were delivered through this mechanism up to the end of September 2021.
- Under ECO3, 20.1 per cent of the obligation has been delivered through Flex to end September 2021.
- Through the duration of Flex, the types of measures installed has changed from predominantly boilers to a mixture of 'Other Heating' (largely heating controls), boilers and cavity wall insulation (CWI).
- The Local Authorities (LAs) delivering the most measures through Flex to date are Leicester and Rotherham - delivering eight and seven per cent of the total number of Flex measures respectively.

Background to ECO flexible eligibility (Flex)

The Energy Company Obligation (ECO) is an obligation on energy suppliers aimed at helping households cut their energy bills and reduce carbon emissions by installing energy saving measures. Local Authorities (LAs) can determine eligible homes under the 'Flexible Eligibility' mechanism (Flex). The flexible approach to identifying eligible households was introduced in April 2017. LAs¹ can define the eligible households living in, or at risk of fuel poverty, and where they find households vulnerable to the effect of cold homes.

Under ECO Help-to-Heat (ECO HTH), energy suppliers were able to achieve up to 10% of their Affordable Warmth obligation, in terms of lifetime bill savings, by installing energy saving measures in households declared eligible by LAs. Under ECO3, energy suppliers can deliver up to 25 per cent of the lifetime bill savings through Flex.

Flex delivery since April 2017

Since the introduction of Flex in April 2017, 176,800 measures have been installed in Great Britain through this mechanism to the end of quarter 3 (July to September) 2021. Under ECO3 (from October 2018 to end of September 2021), around 161,000 measures were installed under Flex, equivalent to 91 per cent of all Flex measures.

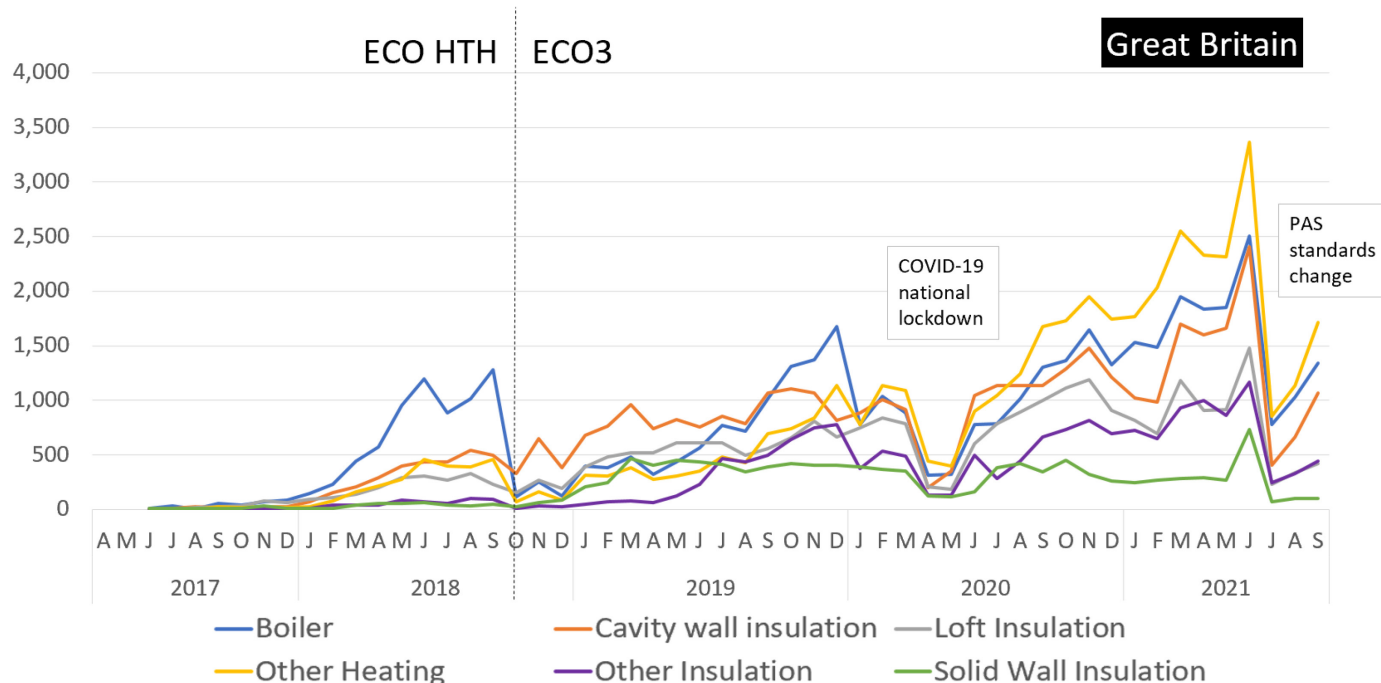
Monthly delivery of Flex has varied throughout its operation, with initial low delivery at the start of each obligation before gradually increasing. There was a noticeable drop in overall ECO scheme delivery and Flex delivery in April and May 2020, due to the first national lockdown in response to COVID-19. Since June 2020, measure delivery steadily increased and peaked at 11,700 Flex measures delivered in June 2021. This peak was partly due to the change in Publicly Available Specification (PAS) standards introduced on 1st July 2021 and, as with the overall ECO program delivery, was followed by a decrease in measure delivery in quarter 3 2021. In the [main statistical release](#), Tables 2.4 and 2.5 provide the monthly delivery levels, with Chart 5 illustrating the monthly trends.

Through the course of ECO HTH and ECO3, the measure mix of the obligations and Flex has varied (Chart 1). Under Flex in ECO HTH, the most popular measure installed was boiler with 44 per cent of Flex measures – this was a significantly higher proportion than that seen in all measures installed through ECO HTH, where boilers accounted for 17 per cent of measures installed. The second most installed Flex measure type under ECO HTH was cavity wall insulation (CWI), accounting for 20 per cent of Flex measures, which was lower than ECO HTH overall with 38 per cent of installed measures being CWI. Other significant Flex measure types installed under ECO HTH were 'Other Heating' (16 per cent) and loft insulation (14 per cent), both of which were similar percentages to those of the equivalent overall ECO HTH measures for those types.

¹ LAs should publish their Statement of Intent (SoI) on their website. BEIS publishes a list of known Sols here: <https://www.gov.uk/government/publications/energy-company-obligation-eco-help-to-heat-scheme-flexible-eligibility>

Under ECO3 only the Affordable Warmth sub-obligation applies – this includes boilers – so for the obligation overall, heating measures (boilers and ‘Other Heating’) account for more of the measure mix. When ECO3 overall and ECO3 Flex are compared, the measure mix is more similar than seen under ECO HTH. For Flex under ECO3, the most installed measure type to end September 2021 was ‘Other Heating’ (24 per cent). Both boilers and CWI accounted for 22 per cent of ECO3 Flex measures installed.

Chart 1: Monthly Flex Delivery in Great Britain by Measure Type (April 2017 to September 2021)

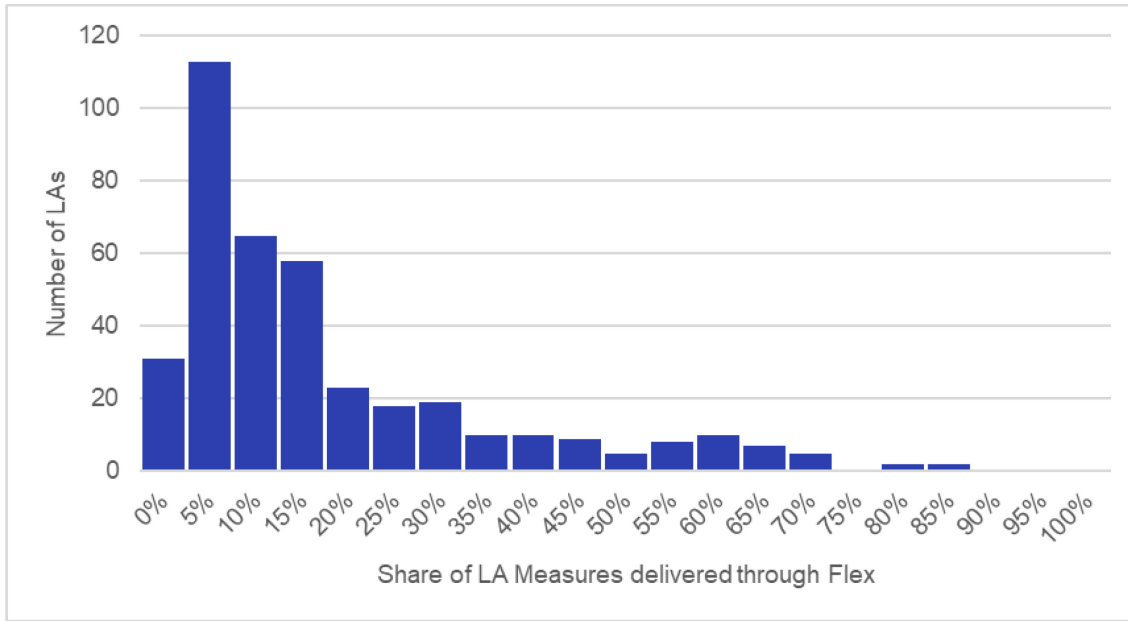


Delivery of Flex has also varied geographically, reflecting the involvement of Local Authorities (LAs) in identifying eligible households. To end of September 2021, England accounted for around 71 per cent of Flex measures installed, Scotland 19 per cent and Wales 11 per cent. The East Midlands had the highest share amongst regions in England, having around 17 per cent of all Flex measures installed in Great Britain.

Up to the end of September 2021, 229 local authorities had seen 50 or more measures installed through Flexible Eligibility, of which 74 had over 500 measures installed. There were 31 LAs that had no measures installed through Flex.

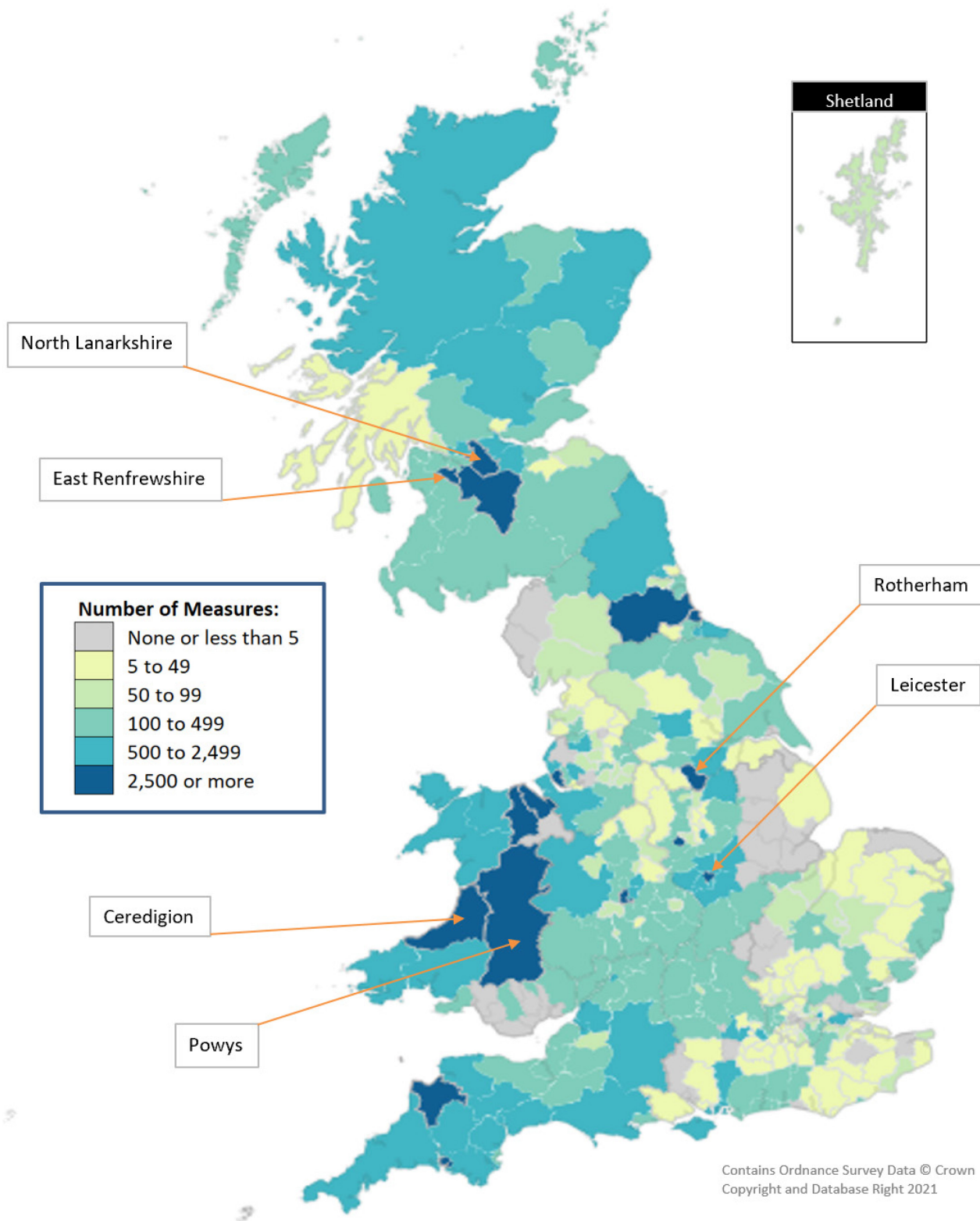
Further evidence of the variability in Flex delivered is provided if the share of Affordable Warmth measures delivered through Flex in each LA is examined. While 30 LAs had no measures installed via Flex to the end of September 2021, 34 LAs had over 50 per cent of measures delivered through Flex (Chart 2). However, for around 260 LAs (equivalent to 66 per cent of LAs), between one and 20 per cent of measures were installed through Flex.

Chart 2: Share of LA Affordable Warmth Measures delivered through Flex



Map 1 visualises the geographic pattern of delivery by local authority, indicating the areas of high and low delivery. The six highlighted local authorities are looked at in more detail in the sections below.

Map 1: ECO measures installed through Flexible Eligibility, by Local Authority (April 2017 to September 2021)

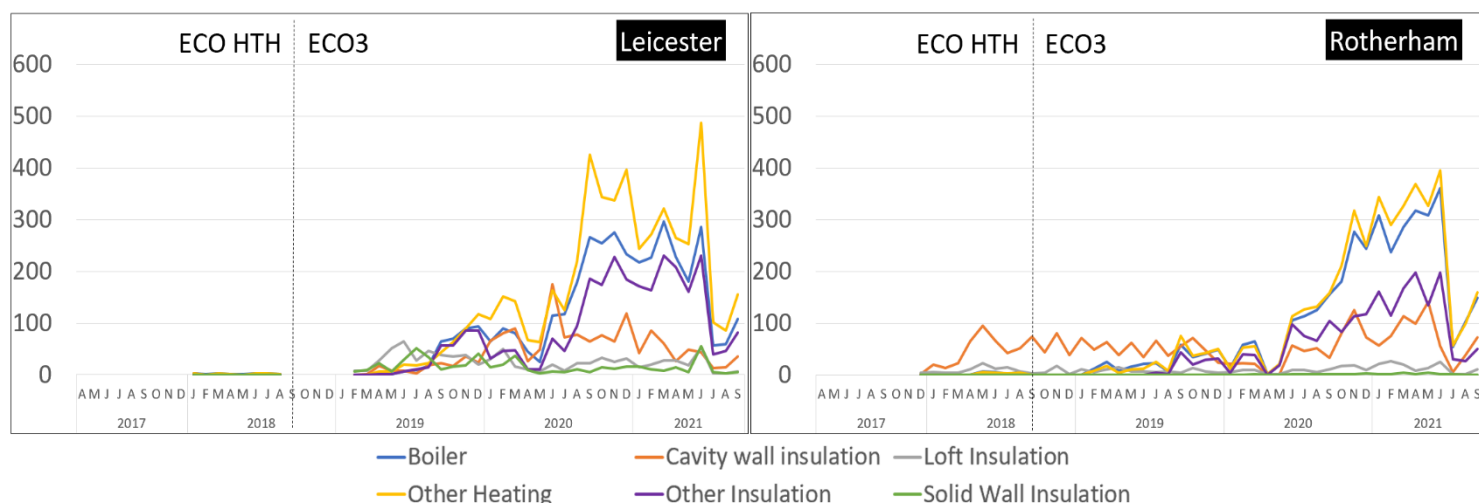


Local Authorities are shown only if they have at least 5 flexible eligibility measures. In total, 332 Local Authorities had at least 1 flex measure up to September 2021.

High delivery Local Authorities

Leicester and Rotherham local authorities have both seen a large number of Flex measures since mid-2020. Combined, these two LAs account for over 15 per cent of all Flex measures, to end September 2021. Chart 3 shows the volume of Flex measures delivered in these two LAs for the period of ECO (ECO HTH and ECO3) that Flex has operated, with a breakdown, by month and measure type (excluding the relatively small number of Flex micro-generation and windows/doors measures).

Chart 3: Monthly Flex measures in Leicester and Rotherham by Measure Type (April 2017 to September 2021)



The recent rise in Flex measures in these local authorities is largely in the ‘Other Heating’, Boiler and to a slightly lesser extent ‘Other Insulation’ (under floor insulation) measure types.

For context, Leicester and Rotherham Flex measures and households are shown against four other ‘high delivery’ Flex LAs in Table 1. Combined these six LAs account for around 28 per cent of all Flex measures installed, to end September 2021.

Table 1: Number of Flex measures installed and the corresponding number of Flex households; selected Local Authorities and Great Britain, April 2017 to September 2021

	Flex Measures	Flex Households	Avg measures per household	Flex households with more than one measure	
Leicester	14,490	6,525	2.22	4,218	65%
Rotherham	12,777	5,654	2.26	3,850	68%
Powys	2,582	2,165	1.19	396	18%
Ceredigion	2,757	1,729	1.59	742	43%
East Renfrewshire	8,063	4,043	1.99	2,593	64%
North Lanarkshire	8,665	4,206	2.06	2,537	60%
Great Britain	176,818	103,478	1.71	45,320	44%

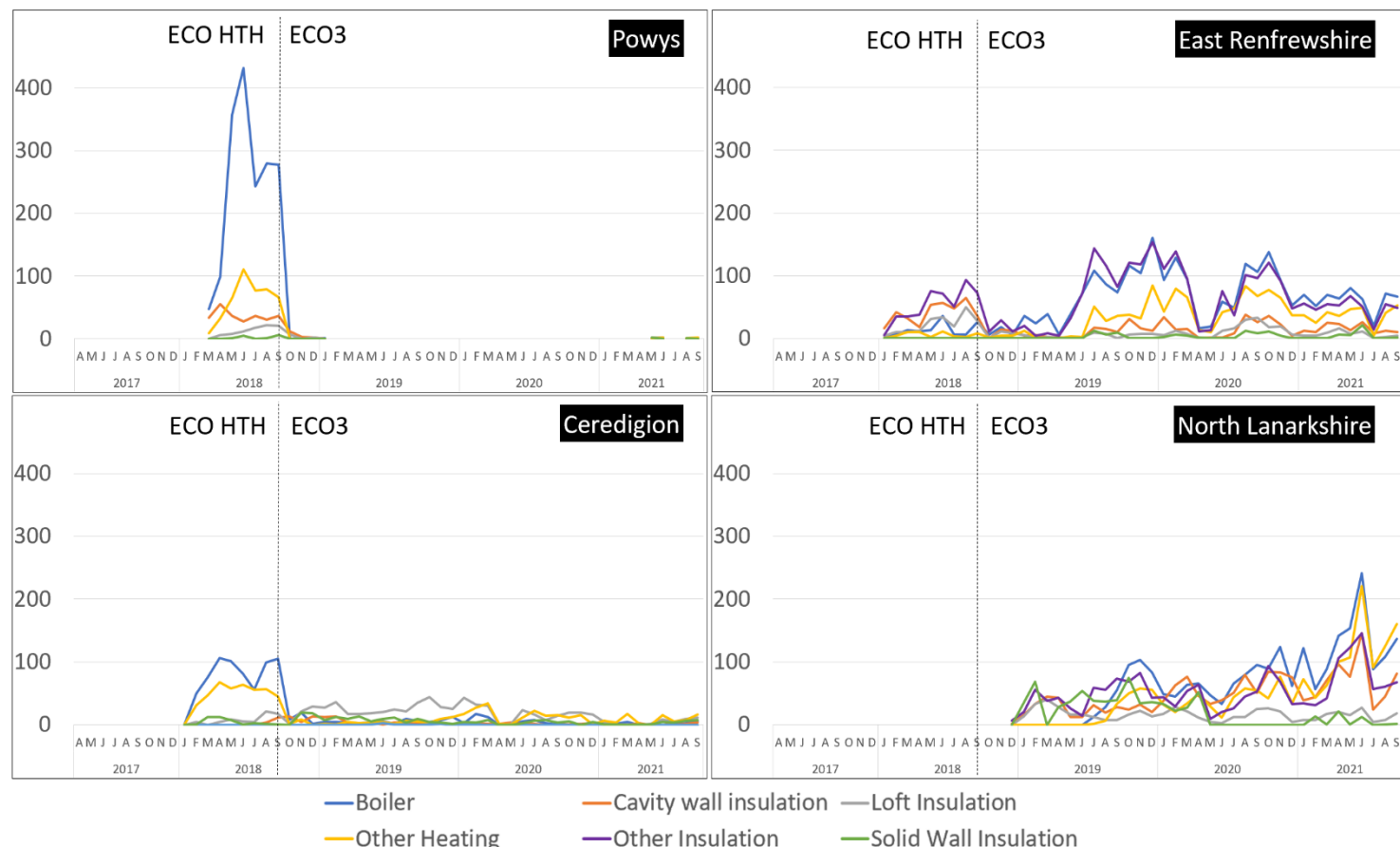
In Table 1, both Powys (1.19) and Ceredigion (1.59) figures are below the national average of number of Flex measures per household (1.71). The four other LAs are all above that national average, with Leicester and Rotherham, some margin above the average, at 2.22 and 2.26 respectively. Powys also only has 18 per cent of its Flex households having more than one Flex measure installed, in contrast to the two English and two Scottish LAs which are all substantially above the Great Britain average of 44 per cent.

The variation in these figures is likely down to measures being installed at different times across the different LAs, in particular timing differences between ECO HTH and ECO3, and different measure types being more commonly combined particularly under ECO3. For overall ECO, both Flex and non-Flex, during ECO HTH, the

average measures per household being installed each month was 1.26; while under ECO3 the average number of measures per household was 1.95. During ECO3, this has been a generally rising trend. For Flex only, it has been a similar trend: during ECO HTH, the average Flex measures per Flex household being installed each month was 1.24; while under ECO3, the average number of measures per household was 1.77. Through ECO3, this has been a generally rising trend.

The differing patterns of delivery over time for Powys, Ceredigion, East Renfrewshire, and North Lanarkshire is shown below in Chart 4:

Chart 4: Monthly Flex measures in Powys, Ceredigion, East Renfrewshire, and North Lanarkshire by Measure Type (April 2017 to September 2021)



Breakdown of measure types in the selected Local Authorities

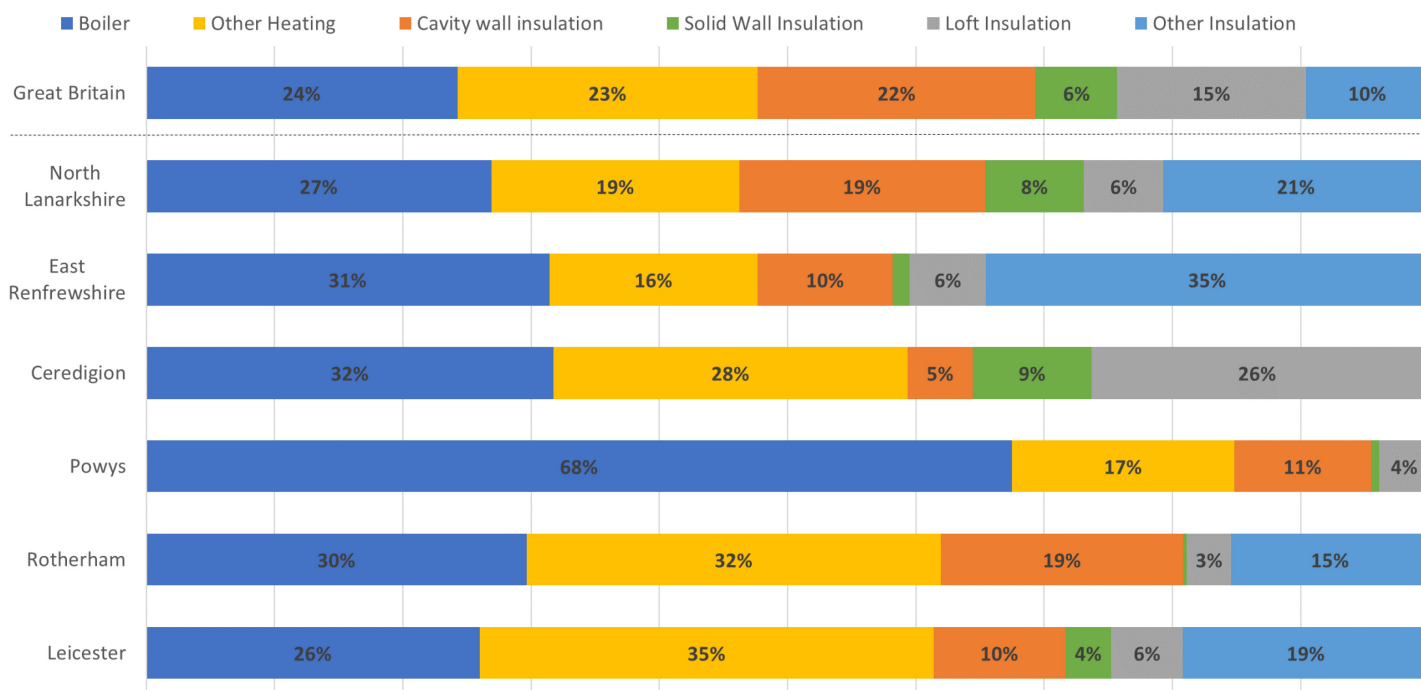
The percentage breakdown of measure types in each of the selected LAs, and nationally, is shown in Chart 5. The chart shows the higher percentage of ‘Other Heating’ in Leicester and Rotherham (35 and 32 per cent respectively) compared to other areas and the national average. The vast majority of these ‘Other Heating’ measures in those two LAs are heating controls, TRVs / smart thermostats and compensation, accounting for 79 per cent of ‘Other Heating’ measures in Leicester and 97 per cent of ‘Other Heating’ measures in Rotherham. Also shown is a higher percentage of ‘Other Insulation’ in East Renfrewshire (35 per cent) compared to other areas and these measures are almost entirely Under Floor Insulation measures. These higher proportions of both ‘Other Heating’ and ‘Other Insulation’ are partially reflective of these LAs delivering a lot of Flex work under ECO3, where these measure types have increased in both installation volume and in combination with other measures.

Powys has delivered substantially more boilers as a proportion of its Flex measures than other areas, 68 per cent compared to a national equivalent of 24 per cent. This is likely due to timing of installations. As shown in Chart 4 (above), Powys had a large proportion of boilers installed during ECO HTH, when other measures were less prevalent, but has delivered little Flex work under ECO3.

Of the selected LAs, only Ceredigion has a proportion of Flex delivery for loft insulation above the national average, 26 per cent compared to the national average of 15 per cent. As a percentage of the Flex work in their authorities, the other five LAs have low proportions for loft insulation, ranging from only three to six per

cent of the Flex work. Similarly, none of the selected local authority's CWI percentage of Flex work in their area is above the 22 per cent national average, with CWI accounting for 11 per cent or less of the Flex delivery in four of the six LAs.

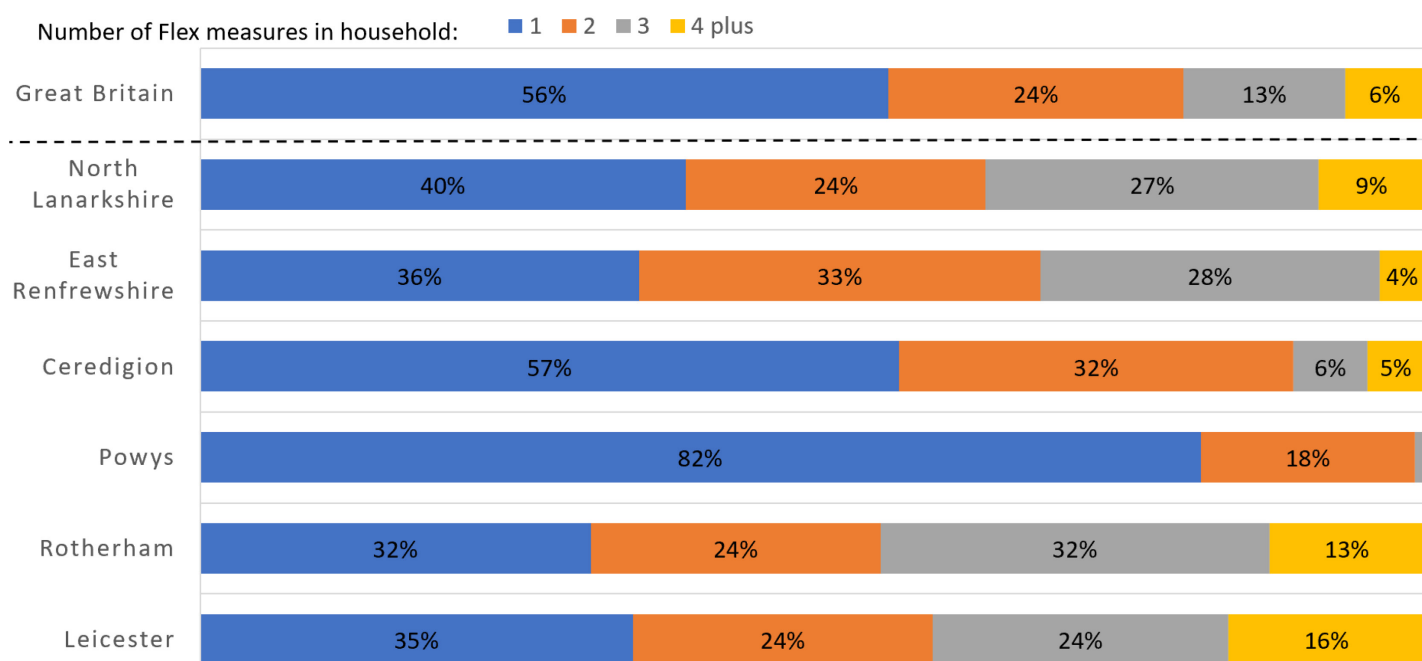
Chart 5: Percentage of Flex measure type installed in selected Local Authorities and in Great Britain (April 2017 to September 2021)



Number of Flex measures being installed per household in the selected Local Authorities

As well as measure type, the number of measures being installed per household differs across the selected LAs. Chart 6 shows that on average in Great Britain, 56 per cent of Flex households only had one Flex measure installed, 24 per cent had two measures and around 19 per cent had three or more measures.

Chart 6: Number of Flex measures installed in each Flex household – percentage breakdown in selected Local Authorities and Great Britain (April 2017 to September 2021)



For the two Welsh LAs, most of the Flex households only had one measures installed. For Powys 82 per cent of Flex households received one measures, compared with 57 per cent in Ceredigion, with a very low

proportion of households in these LAs receiving three or more measures. As indicated above, this is likely due to these two LAs delivering a large volume of their Flex measures under ECO HTH.

Comparatively, Leicester (40 per cent) and Rotherham (45 per cent) both had a far higher proportion of Flex households receiving three or more measures, than either the average for Great Britain (19 per cent) or the two Welsh LAs.

Both East Renfrewshire and North Lanarkshire also had a higher proportion of three or more measures per household than the national average. This is likely due to more of the measures being delivered during ECO3, when it has been more likely to combine measure installations in a household, compared to work under ECO HTH.

From Chart 5, in the two English and two Scottish authorities the combination of measures in multiple-measure households looks to be largely across the boiler, CWI, 'Other Heating' and 'Other Insulation' measure types.



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