

Section 5 - Electricity

Key results show:

Provisional 2018

In 2018, total UK electricity demand was broadly stable compared to 2017 at 354 TWh, with final consumption similarly stable at 301 TWh. Other final user (including commercial and transport) consumption was the only sector which increased compared to 2017. Industrial (including iron and steel) consumption declined by 0.3 per cent, while domestic consumption was broadly stable (-0.1 per cent). **(Table 5.2 and Chart 5.5)**

Total supply was stable for 2018 compared to 2017, given the stability in demand. Indigenous production was 1.4 per cent lower in 2018 than 2017 from 339 TWh to 334 TWh. Net imports were 30 per cent higher in 2018 than 2017 at 19 TWh, with this increase reflecting the full operation of the interconnector with France that was under repair in 2017. The level of net imports in 2018 is higher than the last two years, but lower than 2015 and 2014. **(Chart 5.4)**

Low carbon generation accounted for 52.8 per cent of generation in 2018, which was 2.7 percentage points higher than 2017 – this was a record high. The growth in renewables generation contributed significantly to this low carbon growth, with renewables accounting for 33.3 per cent of generation in 2018, reflecting increased capacity. The growth in low carbon in 2018 was despite a decline in nuclear generation, due to maintenance. **(Chart 5.3)**

Electricity generation's fuel mix continued to shift away from fossil fuels, due to the growth in renewable generation. Coal's share of generation was 5.0 per cent in 2018, down 1.6 percentage points on 2017. The share of generation from gas was 1.0 percentage point lower than in 2017 at 39.4 per cent, reflecting volatility in gas prices in 2018. **(Chart 5.1)**

Quarter 4 2018

In the fourth quarter of 2018, total demand was 92 TWh, which was 1.3 per cent lower than in Q4 2017. This decline occurred in all the sectors. **(Chart 5.6)**

Renewables share of generation increased to 37.1 per cent in Q4 2018, an increase of 7.0 percentage points on Q4 2017. This increase was driven by increased capacity. The share of generation from fossil fuel sources declined, with coal's share of generation at 5.7 per cent, which was 3.4 percentage points lower than Q4 2017. Gas remained the dominant fuel type with a 37.9 per cent share of generation, though 2.1 percentage points lower than Q4 2017. The share for renewables in Q4 2018 was very similar to gas, only 0.8 percentage points lower. **(Chart 5.2)**

Fuel use was 4.8 per cent lower in Q4 2018 than Q4 2017, due to increased renewable generation and lower fossil fuel generation. Coal use declined the most at 40 per cent, while gas use declined 10 per cent, compared to Q4 2017. **(Chart 5.7).**

Relevant tables

[5.1: Fuel used in electricity generation and electricity supplied](#)

[5.2: Supply and consumption of electricity](#)

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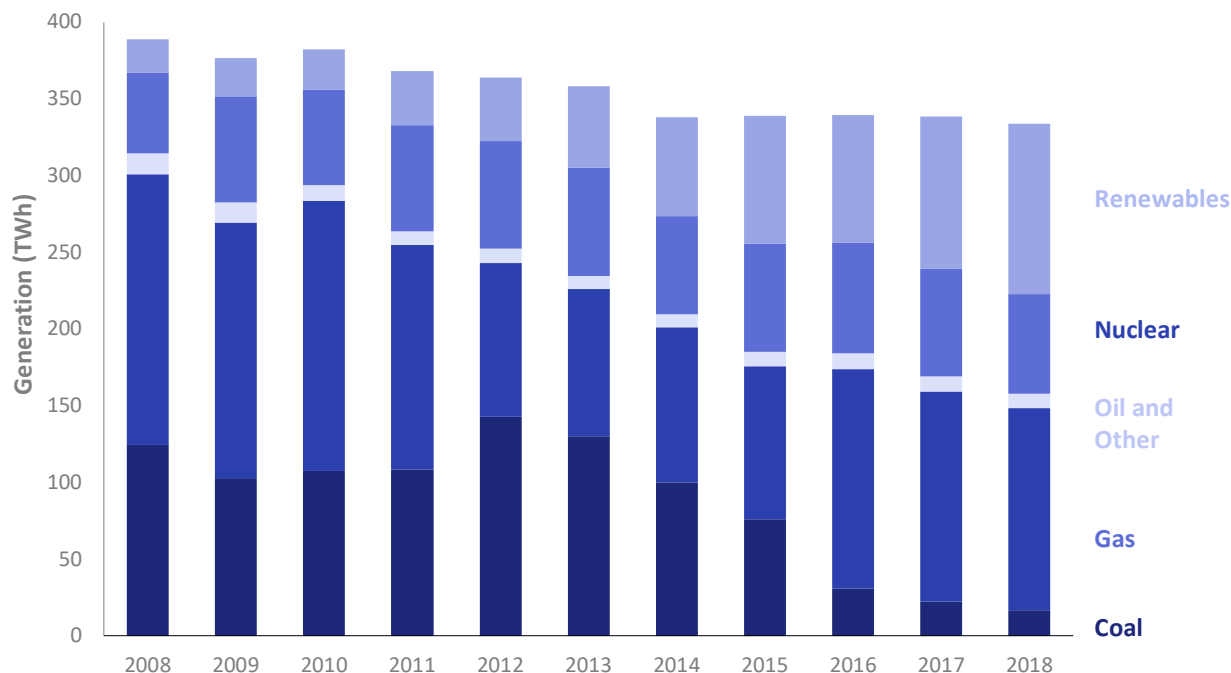
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Electricity

Chart 5.1 Electricity generated by fuel type (Table 5.1)



During 2018, total electricity generated decreased from 339 TWh in 2017 to 334 TWh in 2018, a decline of 1.4 per cent, the largest decline since 2014. Electricity generation is down 14 per cent since 2008, but within that are significant changes in the mix of fuels used to generate electricity.

The principal trend has been the move away from coal to renewables sources. Generation from coal decreased from 124 TWh in 2008 to 17 TWh in 2018, a decrease of 86 per cent. The trend for gas is more variable but has remained strong, with gas being the most dominant fuel source. Over the same period, electricity generation from renewables increased from 22 TWh in 2008 to 111 TWh, an increase of over 400 per cent. This increase in generation was due to a 550 per cent increase in total renewables capacity between the end of 2008¹ and end of 2018².

On an annual basis between 2017 and 2018, generation from coal decreased by 25 per cent, to reach a record low in 2018. Generation from gas decreased by 3.9 per cent in 2018 compared to 2017, partly due to increased gas prices in quarter 3 making gas less profitable. Declines in fossil fuel generation were driven by increased renewables generation, up 12 per cent on 2017. Generation from wind and solar increased by 14 per cent on 2017, due to increased capacity (9.9 per cent for wind and 2.5 per cent for solar)³. Bioenergy generation increased by 12 per cent, due to increased capacity (+27 per cent) and reduced outages. However, nuclear generation in 2018 was 7.5 per cent lower than 2017, due to outages

In 2018, the generation mix consisted of 5.0 per cent from coal (-1.6 pp on 2017), 39.4 per cent from gas (-1.0 pp), 19.5 per cent from nuclear (-1.3pp) and 33.3 per cent from renewables (+3.9 pp). Further, renewables increased their share of low carbon generation to 63 per cent in 2018, up from 29 per cent in 2008 and 59 per cent in 2017.

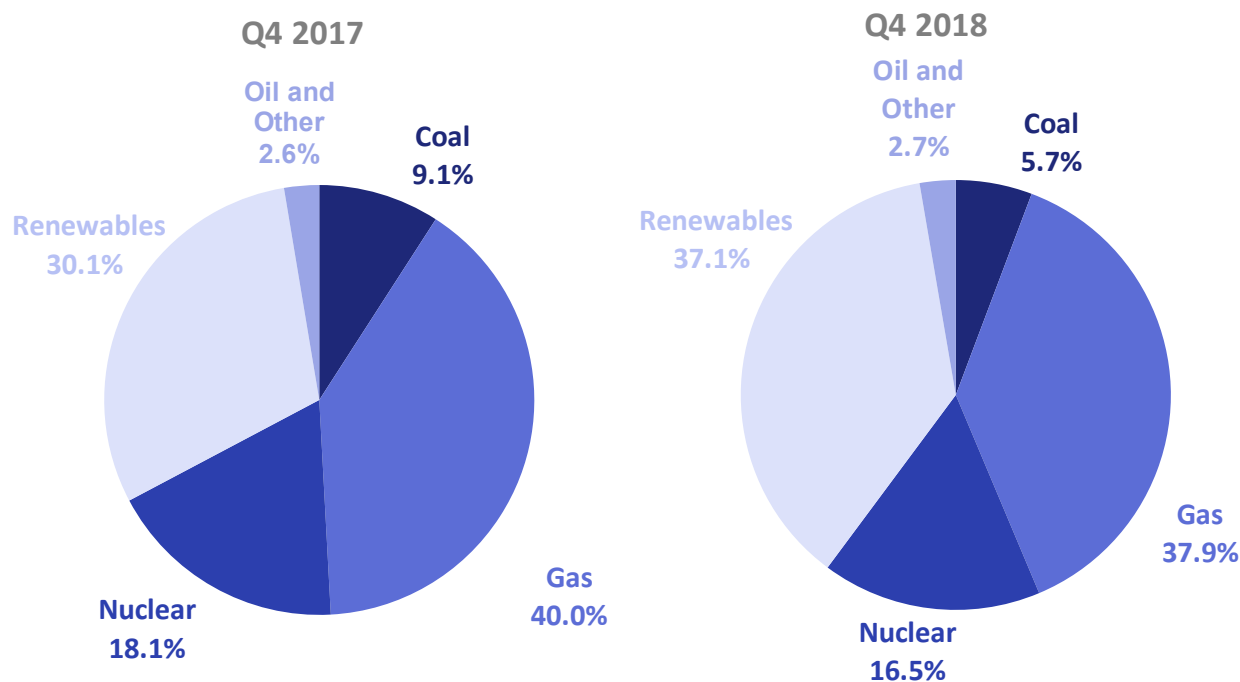
¹ Renewables capacity value for 2008 was 6,835 MW, taken from DUKES 6.4 available here:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/729373/DUKES_6.4.xls

² Renewables capacity value for 2018 was 44,427 MW taken from Energy Trends 6.1 available here:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766384/ET_6.1.xls

³ Average daily sun hours for 2018 increased by 14.7 per cent on 2017 to 4.7 hours, while wind speeds were very similar (-0.1 knots) – see Energy Trends tables 7.3 and 7.2, respectively: www.gov.uk/government/statistics/energy-trends-section-7-weather

Chart 5.2 Quarterly shares of electricity generation (Table 5.1)

In the fourth quarter (October to December) of 2018, only renewables had an increase in electricity generation share. Renewables share of electricity generation increased from 30.1 per cent in Q4 2017 to 37.1 per cent in Q4 2018 (+7.0 pp) - the highest renewables share of any quarter. The share from wind and solar increased by 3.1 pp to 23.3 per cent, as average daily sun hours increased 16.5 per cent compared to Q4 2017 and capacity increased by 9.9 per cent for wind and 2.5 per cent for solar. Bioenergy generation increased by 3.6 pp to 11.5 per cent, due to a 27 per cent increase in capacity.

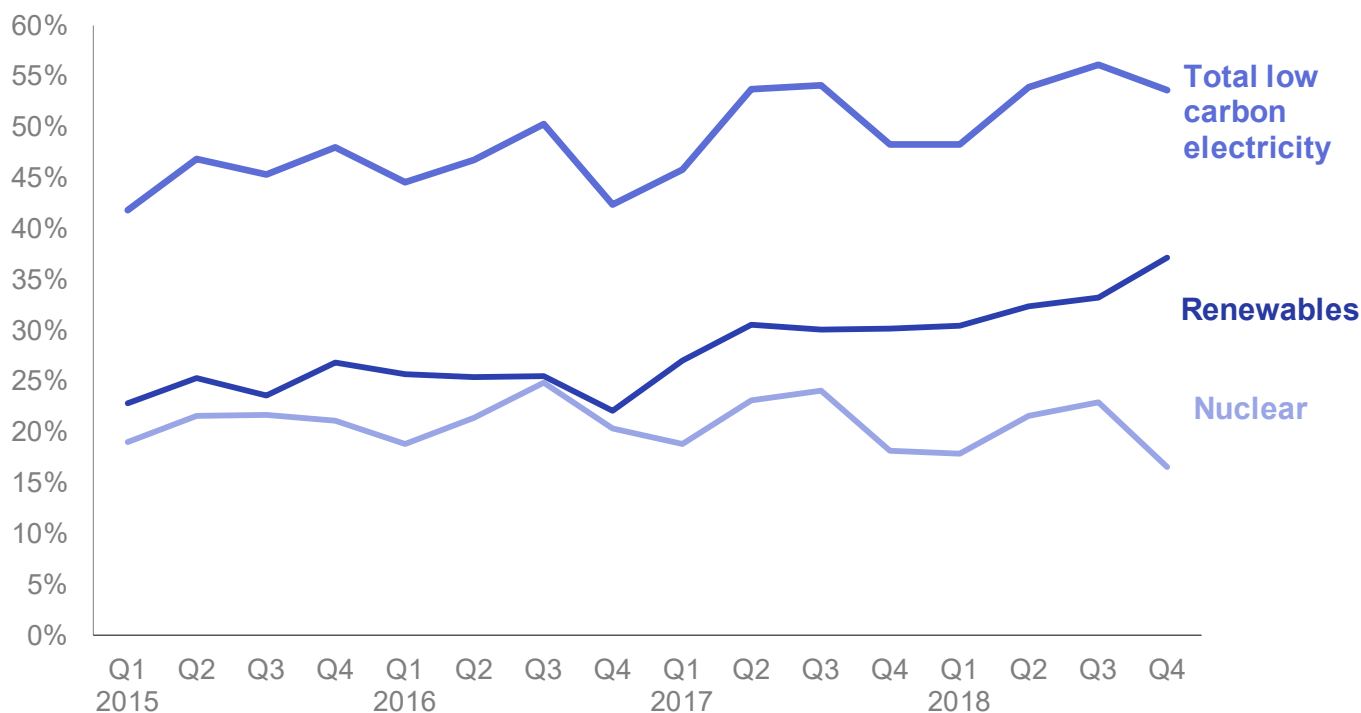
Fossil fuel's share of generation in Q4 2018 declined by 5.4 pp compared to Q4 2017, contributed to by decreases of 3.4 pp from coal and 2.1 pp from gas. Continued nuclear maintenance resulted in a 1.6 pp decrease in nuclear's share of generation to 16.5 per cent.

The share of generation from Major Power Producers (MPPs) decreased slightly from 87 per cent in Q4 2017 to 85 per cent in Q4 2018.

See Chapter 6 (Renewables) and table 6.1 for a more detailed breakdown of renewable generation at: www.gov.uk/government/statistics/energy-trends-section-6-renewables.

Electricity

Chart 5.3 Low carbon electricity's share of generation (Table 5.1)



In 2018, the share of electricity generation from low carbon sources reached 52.8 per cent (+2.7 pp on 2017). This increased share of generation was driven by increased renewable generation.

Low carbon electricity generation (from nuclear and renewables sources) continued to grow in quarter 4 2018. Over half of electricity generated was from low carbon sources (53.6 per cent) – a record high for a fourth quarter - continuing the trend from quarters 2 and 3 2018. The share from low carbon was 5.4 pp larger than in Q4 2017.

The increased low carbon share was driven by an increase in renewables generation, with renewables accounting for 69 per cent of low carbon generation in Q4 2018, up from 62 per cent in Q4 2017. The increased renewables generation was largely driven by increased capacity.

Nuclear generation declined in Q4 2018 compared to Q4 2017, due to the continuation of outages as maintenance work continued. Nuclear generation decreased from 17 TWh in Q4 2017 to 15 TWh in Q4 2018 (-12.9 per cent), resulting in a 1.6 pp decrease in nuclear's share of total electricity generation.

Chart 5.4 UK trade in electricity (Table 5.6)



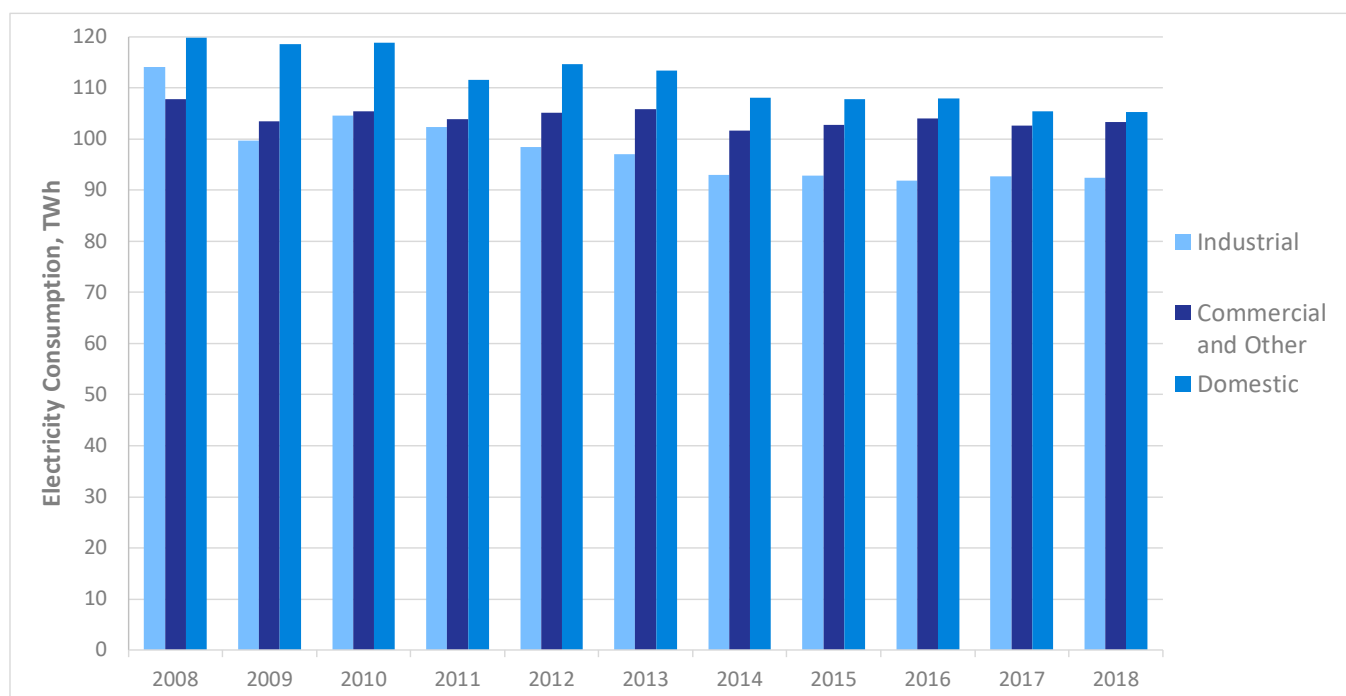
In 2018, net imports were 19 TWh, an increase of 30 per cent on 2017. The increased net imports were largely driven by the 17 per cent increase in imports to 21.3 TWh in 2018, but also due to a 35 per cent reduction in exports to 2.2 TWh. Imports from France to the UK and Ireland to Northern Ireland each increased by 40.9 per cent and 39.2 per cent respectively; for the French imports this reflects the interconnector being fully operational in 2018 after repairs. However, imports from the Netherlands and Ireland to Wales, each decreased by nearly 10 per cent. Exports from the UK increased for all the interconnectors, apart from with France. Exports to France were reduced in comparison to 2017, when high electricity prices in France led to particularly high exports from the UK. The level of net imports in 2018 were higher than 2016 and 2017, but lower than in 2015 and 2014.

In Q4 2018, total imports increased 24 per cent, while exports decreased 57 per cent; this combination resulted in an overall 128 per cent increase in net imports. France to UK and Ireland to Northern Ireland imports both increased by 87 per cent and 79 per cent, respectively. However, imports from the Netherlands and Ireland to Wales decreased by 25 per cent and 31 per cent, respectively. Exports on each interconnector increased, except to France reflecting the expensive prices at the end of 2017 in France driving up exports from the UK.

In December 2018, the NEMO interconnector between Belgium and the UK began commissioning services, becoming fully operation on 31st January 2019. The June edition of Energy Trends will contain the first data on the electricity trading via this interconnector.

Electricity

Chart 5.5 Annual Electricity final consumption (Table 5.2)



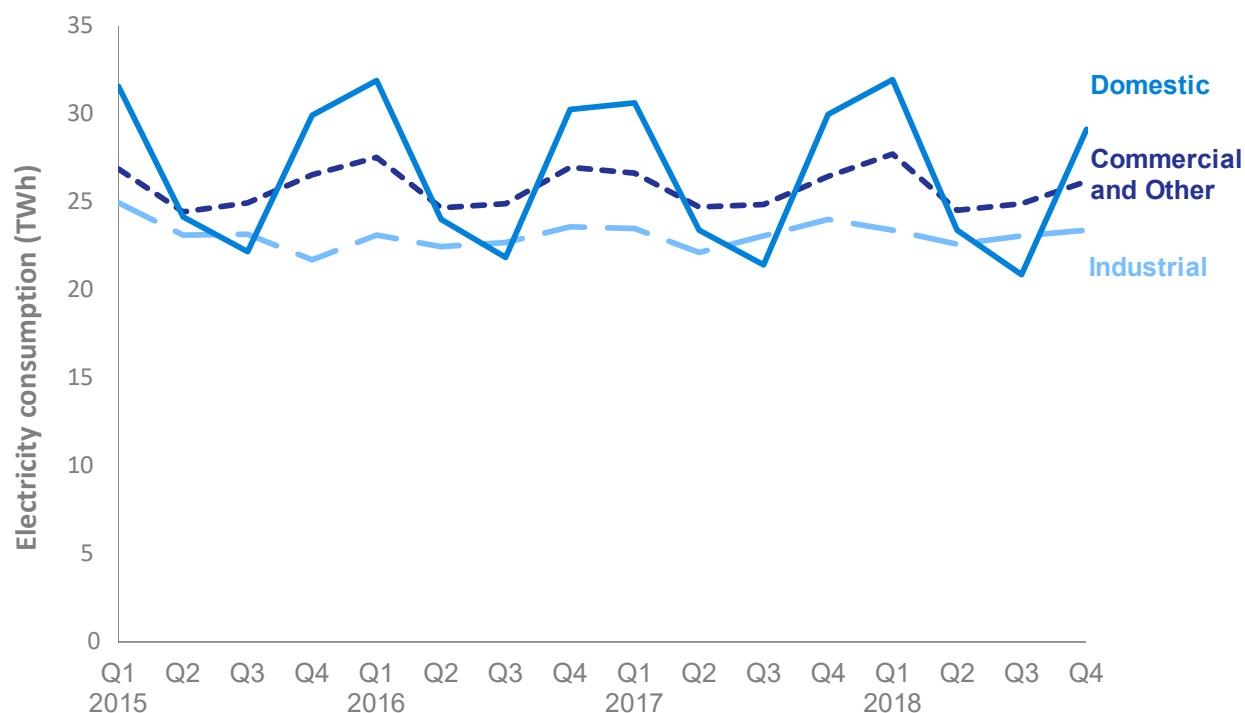
Final consumption in 2018 was 301 TWh, which was broadly stable compared to 2017 (+0.1 per cent). There were consumption decreases in the domestic and industrial sectors, but an increase for other final users (covering commercial and transport sectors).

Since 2008, final consumption decreased from 342 TWh in 2008 to 301 TWh in 2018 (-12 per cent). The largest decrease in consumption occurred in 2014, when total consumption decreased by 4.3 per cent on the previous year, partly due to warmer temperatures (+1.2 degrees Celsius). Industrial consumption (including iron and steel) decreased by 19 per cent since 2008 to reach 92 TWh. Other final user consumption (including transport) was 4.3 per cent lower in 2018 than 2008, while domestic consumption was 12 per cent lower; these decreases partly reflect the annual average temperature being 0.6 degrees Celsius warmer (+6.4 per cent), but also the implementation of efficiency measures.

On an annual basis, total final consumption was broadly stable between 2017 and 2018 at 301 TWh (+0.1 per cent). Commercial consumption was the only sector with an increase (+0.6 per cent) between 2017 and 2018 with 103 TWh consumed; this reflects the increase in the Index of Services published by the Office for National Statistics. Industrial consumption declined by 0.3 per cent to 92 TWh, while domestic consumption was broadly stable at 105 TWh (-0.1 per cent).

For domestic consumption, the stability observed between 2017 and 2018 reflects the stability in the average annual temperature between the two years. However, consumption varied on a quarterly basis reflecting the temperature variability. While Q1 2018 was significantly colder than Q1 2017, resulting in a 4.2 per cent increase in domestic consumption compared to Q1 2017, Q3 and Q4 2018 had higher average temperatures than the previous year leading to consumption decreases.

Temperatures in 2018 were the same as in 2017 10.6 degrees Celsius – see Energy Trends table 7.1 at: www.gov.uk/government/statistics/energy-trends-section-7-weather.

Chart 5.6 Electricity final consumption (quarterly) (Table 5.2)

For the fourth quarter of 2018, final consumption was lower than in the same period in 2017. Final electricity consumption in Q4 2018 was 79 TWh down from 80 TWh in Q4 2017, (-2.1 per cent).

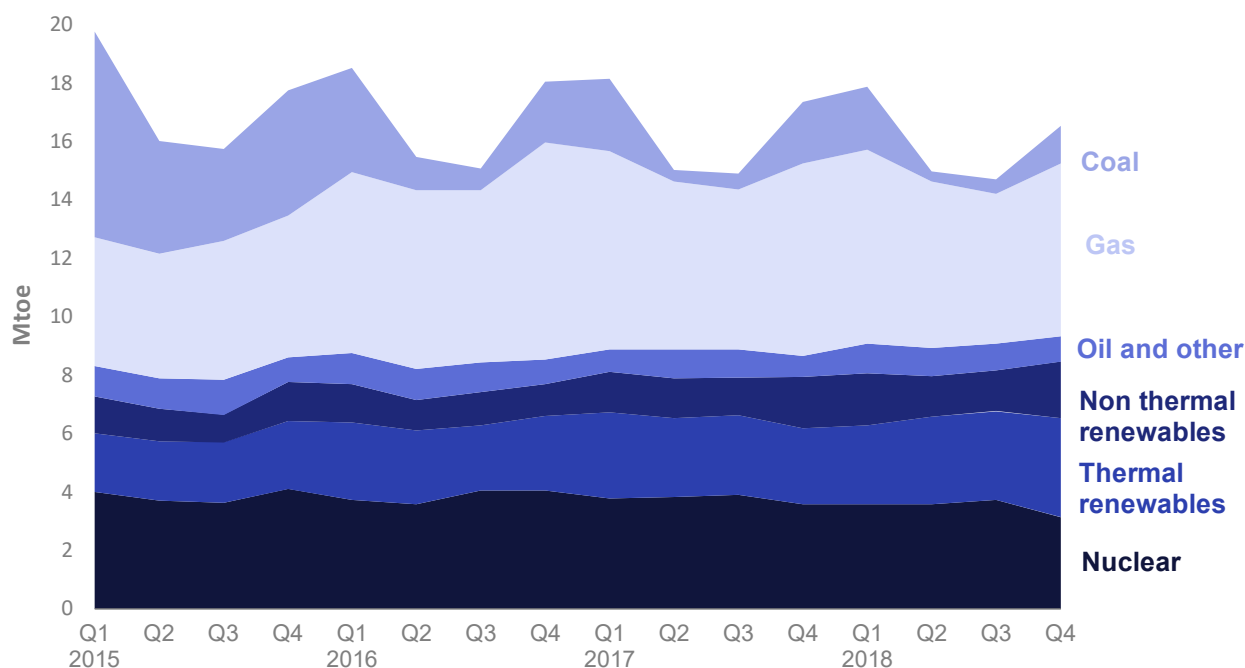
Consumption in each of the three main sectors decreased in the fourth quarter of 2018. Domestic consumption decreased by the most (-2.8 per cent) from 30 TWh in Q4 2017 to 29 TWh in Q4 2018 which reflects the warmer temperature during the quarter. Industrial consumption (including iron and steel) decreased by 2.5 per cent to 23 TWh in Q4 2018. Other final users' (including commercial and transport) consumption decreased by 1.0 per cent in the fourth quarter of 2018 compared to the preceding year; this in part reflected the warmer temperatures.

The average temperature was 0.5 degrees Celsius warmer in the fourth quarter of 2018 compared to the same period a year earlier – see Energy Trends table 7.1 at:

www.gov.uk/government/statistics/energy-trends-section-7-weather.

Electricity

Chart 5.7 Fuel used for electricity generation (Table 5.1)



Generators use of fuel for electricity generation continued to decline in 2018. When compared to 2017, fuel use by all generators decreased by 2.1 per cent in 2018 to reach 64 mtoe. This decline was driven by a reduction in fossil fuel and nuclear generation. (Note that for wind and other primary renewable sources the fuel used is assumed the same as the electricity generated, unlike thermal generation where conversion losses are incurred).

Coal use for electricity generation declined by 24 per cent in 2018 to 4.2 mtoe – a record low for coal use. Gas use declined 4.7 per cent to 23 mtoe, the lowest level since 2015; this reduction in gas use was partly a result of higher gas prices in Q3 2018 making it less profitable. Nuclear sources fell by 7.0 per cent in 2018 in comparison to 2017 - the lowest level since 2014. These reductions in fuel use were moderated by increases in production from all non-thermal renewable sources, except hydro, and increased net imports.

The type of fuel used for electricity generation varies seasonally, shown in Chart 5.7 above. The chart indicates the reduction in fuel used over time, but also the seasonality between fuel types. Fuel use increases in winter months due to increased demand, as a result of the colder weather. In 2018, fossil fuel use peaked in Q1, due to the exceptionally cold weather caused by the Beast from the East, when temperatures were 30 per cent lower than in Q1 2017. In contrast, renewable sources peaked in Q4, reflecting increased capacity.

In the last quarter of 2018, fossil fuel use decreased. Coal use decreased by 40 per cent compared to Q4 2017, down to 1.3 mtoe – a record low usage level for quarter 4. Gas use declined by 10 per cent on Q4 2017 to 5.9 mtoe – the lowest gas use since Q4 2015. This decline in gas use reflected lower demand and increased use of renewables. The outages at nuclear plants continued in Q4 2018 resulting in a 12 per cent reduction in use to 3.1 mtoe – the third lower nuclear use level. However, use from wind and solar increased by 10 per cent, while bioenergy use increased 31 per cent, due to increased capacity and reduced outages.