

Chapter 1: Energy

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Key headlines

Energy production was low, down 14 per cent compared to last year and the lowest level in over 50 years. Extensive maintenance in the North Sea, including the long-delayed upgrade to the Forties Pipeline System, reduced oil and gas output by 17 per cent. Gas output reached a record low, with imports from Norway larger than net production. Nuclear output was also disrupted by maintenance, dropping to the lowest level since 1976. Coal reached another record low.

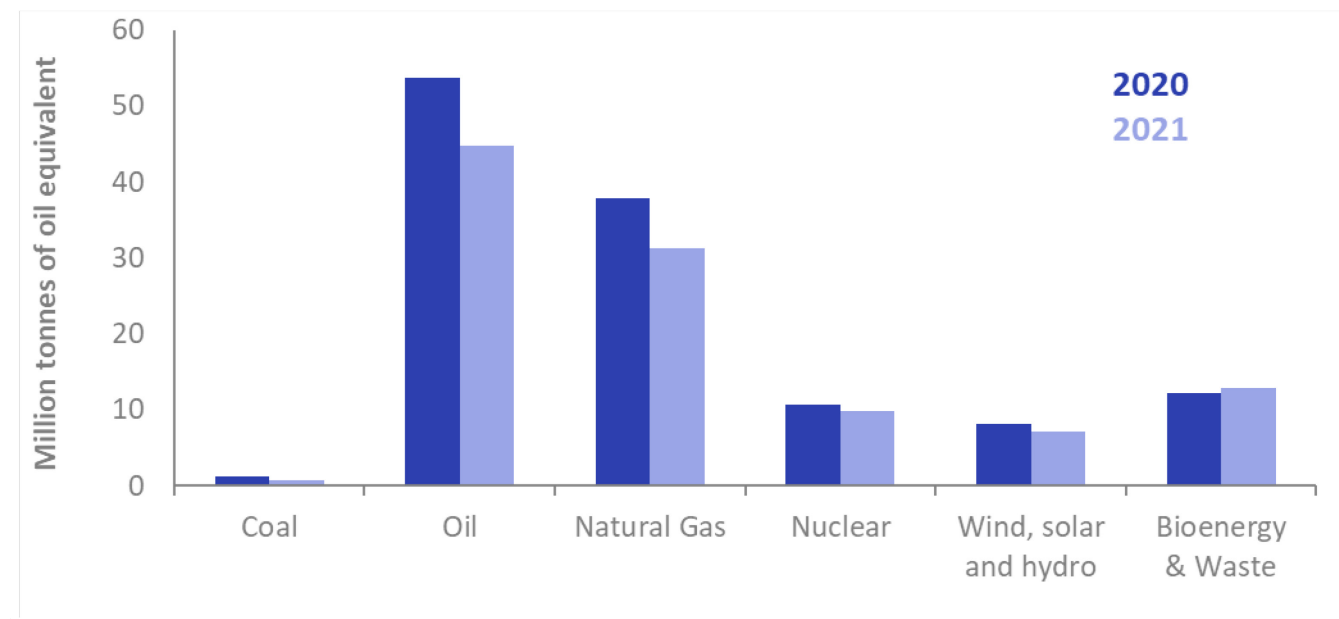
Energy consumption in 2021 remained low, up 4.6 per cent on 2020 but down 8.9 per cent on 2019. Consumption was low at the start of the year and increased from April onwards as restrictions eased. Energy requirements for industrial use and services (e.g., shops, restaurants, offices) were up and returning to near pre-pandemic levels. Domestic demand remained higher than usual as people continued to spend more time at home.

Transport demand increased 7.3 per cent compared to last year but remains 23 per cent below 2019 levels. Whilst petrol and diesel consumption ended the year not far short of 2019 averages, **aviation fuel fell to a record low**, down 8.2 per cent on last year, and down 62 per cent on 2019 despite trending up towards the end of 2021, and into 2022.

Net imports increased by 41 per cent to help meet demand. Imports increased by 8.2 per cent (though remain below the 10-year average) **but a drop in exports (mainly oil and gas) to the lowest level in over forty years** increased the UK's net import dependency to 38.0 per cent.

The bulk of the UK's energy imports, over 90 per cent, comprise oil and gas and **Norway is the UK's primary supplier of energy imports**. For the first time, **Norwegian imports of gas exceeded UK domestic production in 2021 and were equal to 63 per cent of total gas imports**. The largest share of oil imports also arrives from Norway, though the share is smaller at 25 per cent of total oil imports, with imports from the US coming in at 18 per cent and Russian imports at 13 per cent. In 2022, Russian imports of both oil and gas have shown very significant contractions.

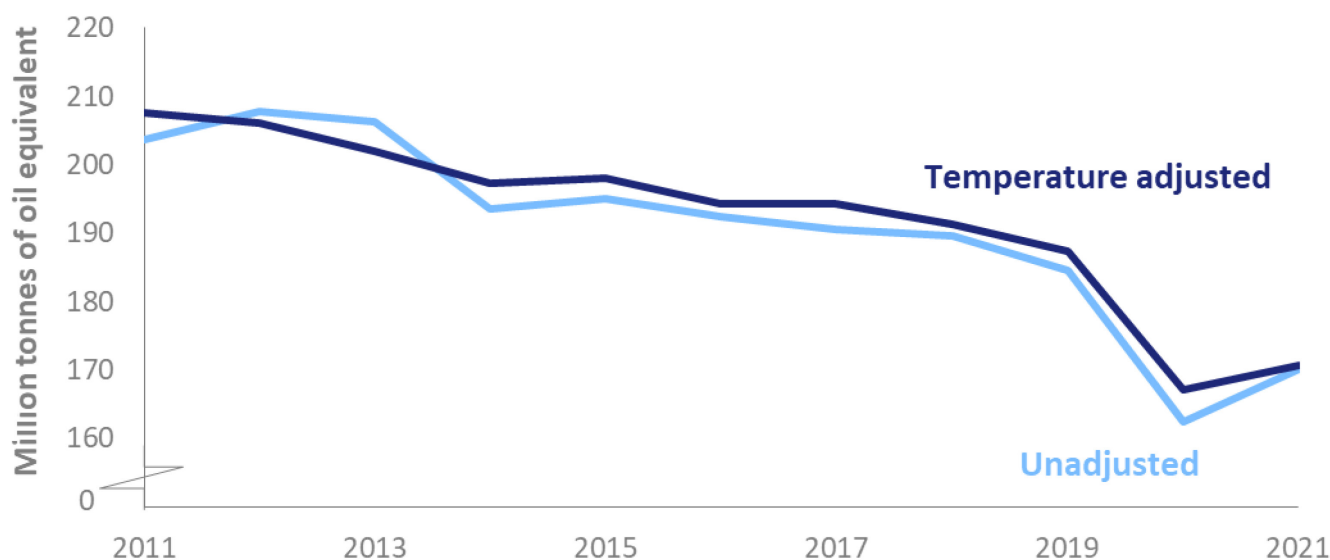
Chart 1.1 Production by fuels, 2020 and 2021 (DUKES table 1.1)



In 2021 total production was 106.6 million tonnes of oil equivalent (mtoe), 14 per cent lower than in 2020, and at the lowest level in the series commencing from 1970. Growth in renewable sources (bioenergy & waste) was offset by reduced fossil fuel and nuclear output, due to delayed North Sea maintenance activities caused by the Covid-19 pandemic, and numerous outages at UK nuclear power stations. UK production has fallen year on year since 2018, and production is now 64 per cent below the peak recorded in 1999.

In 2021 coal production fell by 36 per cent to a record low level, whilst output from oil & gas fell by 17 per cent to a record low level due to extensive maintenance activities being undertaken, which had been delayed from 2020 due to the Covid-19 pandemic. Nuclear output fell by 7.6 per cent to a record low level due to numerous outages throughout the year which reduced operational capacity at the UK's nuclear power stations. Wind, solar and hydro output fell by 14 per cent despite increases in capacity, due to less favourable weather conditions. In 2021 the average wind speed was 7.9 knots, 1.2 knots lower than in 2020; five named storms affected the UK during the year, including Storm Arwen in November 2021. Production of bioenergy and waste rose by 5.7 per cent.

Chart 1.2 Primary energy consumption, 2011 to 2021 (DUKES tables 1.1 and 1.1.4)

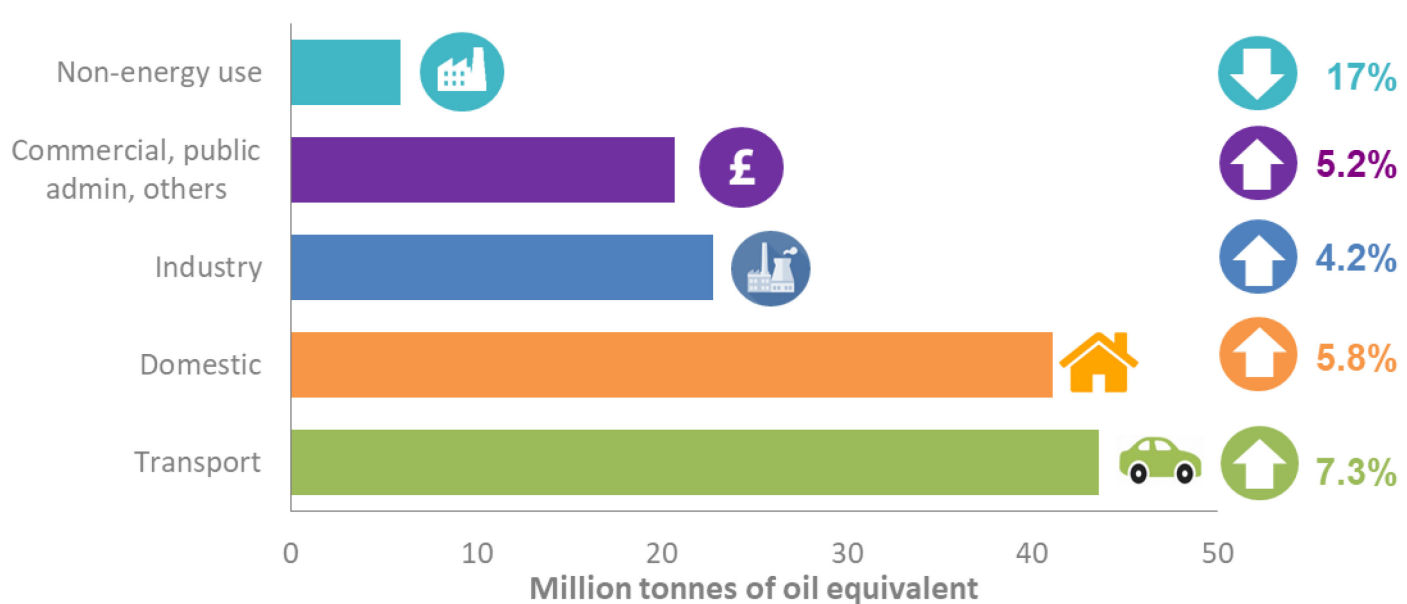


In 2021 total primary energy consumption was 170.1 mtoe, 4.7 per cent higher than in 2020, but 7.8 per cent lower than in 2019 (pre-pandemic).

Primary energy consumption includes use by consumers, fuel used for electricity generation and other transformation. On a seasonally adjusted and annualised rate that removes the impact of temperature on demand, consumption was 170.7 mtoe, 2.1 per cent higher than in 2020.

In 2021 total primary energy consumption levels recovered as Covid-19 lockdown restrictions were eased, with a noticeably sharp increase in petroleum consumption as demand for road transport fuels rose, however demand for air transport fuel remained low as international travel corridors remained closed. Consumption of oil rose by 7.7 per cent, with sales of petrol and diesel returning to near normal levels by the end of the year, but aviation fuel sales remaining muted. Consumption of coal and other solids rose by 4.0 per cent, whilst natural gas consumption rose by 6.2 per cent as electricity generators made more use of fossil fuels to offset reduced renewable generation. Consumption of bioenergy & waste rose by 3.3 per cent. Primary electricity consumption fell by 10 per cent, within which nuclear fell by 7.6 per cent to a record low level due to numerous outages during 2021, and wind, solar and hydro fell by 14 per cent, despite increases in capacity due to less favourable weather conditions.

Chart 1.3 Final energy consumption by sector, 2021 ([DUKES table 1.1](#))



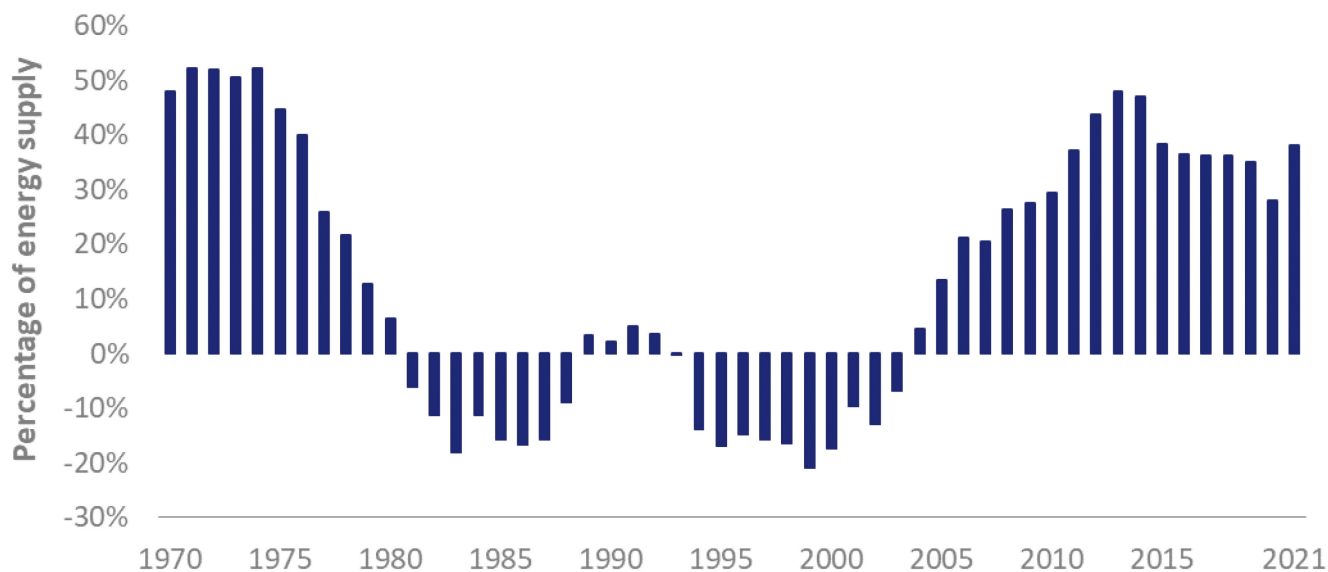
In 2021 total final energy consumption including non-energy use was 134.1 mtoe, 4.6 per cent higher than in 2020, but 8.9 per cent lower than in 2019 (pre-pandemic).

Consumption levels in 2021 all recovered from the low levels of 2020 as the Covid-19 pandemic lockdown restrictions were eased. Consumption was also increased by cooler temperatures in 2021 with the average number of heating degree days up from 5.1 to 5.5.

Domestic sector consumption rose by 5.8 per cent due to increased home working, whilst transport sector consumption rose by 7.3 per cent due to the easing of travel restrictions, with road transport consumption rising by 10 per cent but air consumption falling by 8.2 per cent. Industrial sector consumption rose by 4.2 per cent and service sector consumption rose by 5.2 per cent as factories, shops, offices and schools were all re-opened.

Final energy consumption excluding non-energy use also rose by 5.9 per cent, whilst on a temperature corrected basis consumption rose by 3.9 per cent. Domestic consumption on a temperature corrected basis rose by 0.1 per cent.

Chart 1.4 Net import dependency, 1970 to 2021 (DUKES table 1.1.3)



In 2021 net import dependency was 38.0 per cent¹, 10.1 percentage points higher than in 2020, and at the highest level since 2015.

Imports in 2021 at 132.7 mtoe were 8.2 per cent higher than in 2020, but still 26 per cent lower than their peak in 2013. The UK imported more fuel to meet increased demand in 2021 due to the easing of the Covid-19 lockdown restrictions as well as reduced UKCS production due to maintenance, with rises in imports of coal, primary oil, petroleum products, gas and electricity. The rise in imports of primary oil led to the UK becoming a net importer of primary oil again after becoming a net exporter in 2020 for the first time since 2004. Exports in 2021 at 65.0 mtoe were 13 per cent lower, with falls recorded by all fuels, and at the lowest level in over forty years.

Net imports at 67.6 mtoe were 41 per cent higher than in 2020 and accounted for 38.0 per cent of consumption in 2021, up from 27.9 per cent in 2020.

With net imports up, the UK increased its use of fossil fuels. The main fossil fuel sources in the UK are coal, gas and oil. In 2021, the share of primary energy consumption from fossil fuels increased to 78.3 per cent from the record low of 76.8 per cent in 2020, whilst that from low-carbon sources decreased to 19.4 per cent from the record high of 21.2 per cent last year due to reduced nuclear and renewables output, but still 9.3 percentage points up from 2010.

¹ Net imports as a proportion of primary supply (including an addition for the energy supplied to marine bunkers).



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