Department for Business, Energy & Industrial Strategy

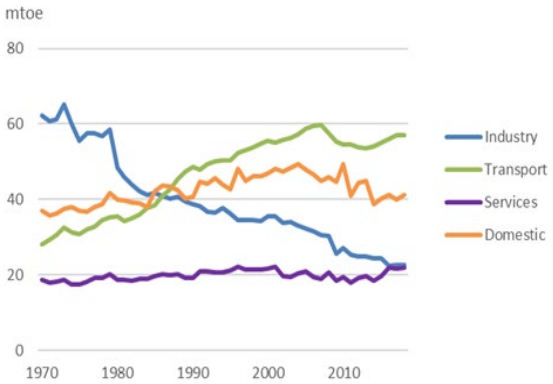
Energy Consumption in the UK (ECUK) 1970 to 2018

25 July 2019 **National Statistics**

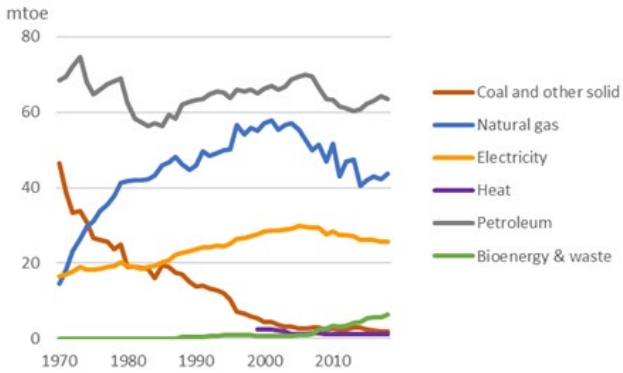
- Total energy consumption in the UK increased by 1.1 per cent in 2018 to reach 143 million tonnes of oil equivalent (mtoe), the highest level since 2013.
- This increase was driven by growth in gas final consumption of over 1.6 mtoe; nearly three-quarters of which was in the domestic sector because of the severe weather early in 2018 brought by the 'Beast from the East'.
- Consumption of petroleum fell by 1.1 per cent primarily because use for transport fell by 0.8 per cent. These were the first decreases in petroleum demand since 2013.
- Bioenergy consumption increased in all sectors but most notably in transport where bioenergy reached a record 3.3 per cent share of total road fuel. Overall transport consumption remained broadly stable.
- The energy ratio fell by 2.4 per cent (Table I1), meaning that increased efficiencies reduced the amount of energy needed to underpin each unit of GDP (£1 million).
- Figure 1 below shows the long-term trends in consumption by sector and fuel; by sector the most notable element is the growth in transport consumption and fall in industrial. By fuel, coal has fallen considerably since 1970 (by 96 per cent) with gas consumption more than tripling (though has since fallen by a quarter since consumption peaked in 2001).

Figure 1: Change in energy consumption by sector and fuel 1970 to 2018

By sector;



By fuel;



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Next publication: 30 July 2020

Department for Business, Energy & Industrial Strategy

What you need to know about these statistics:

Energy Consumption in the UK (ECUK) is an annual publication that covers final energy consumption. It is of interest to a wide range of users including academics, energy industry experts, government policy users, and members of the public. These statistics provide additional insights and analysis of final energy consumption to complement the Digest of UK Energy Statistics (DUKES), which focuses on detailed energy balances.[1]

This year, the Application Programme Interface (API) has been replaced with an updated product, which enables users to create and download charts and data tables on consumption according to interests and level of detail required. Additionally, the Excel data tables also contain methodology notes and supporting information along with additional charts. This enables users to see all relevant information in one place.

Consumption data are mostly sourced from DUKES and are of good quality. However, some of the modelled tables are based on research undertaken only periodically and have not been updated for some time. This is particularly relevant for end uses in the industrial sector but in the interest of providing a comprehensive picture of detailed consumption patterns, proportions obtained from historical modelling have been applied to updated consumption totals from DUKES. The proportions applied have now been included in the Excel tables marked as reference tables.

Secondly, although this publication covers the UK some of the modelling uses variables that do not have UK-wide coverage. For example, the English Housing Survey underpins some of the analysis in ECUK, but this survey is only for England and Wales. Where geographic coverage of variables used for modelling is not complete it has been assumed that characteristics apply to the whole of the UK.

In previous years this release was separated by consuming sectors, but this year the publication has been split into five themes: Energy Consumption; Energy Intensity; End Use; Primary Energy Equivalents; and Electrical Products.

Data are provided for the period 1970 to 2018 where possible though for some tables, updates are not yet available for 2018 and other series start more recently (e.g. industrial sub sector splits are only available from 1998).

The data are provisional and subject to revision. This year energy consumption data have been revised back to 2015 and the revisions are outlined in section IX of Chapter 1 in DUKES . Table C1 is based on DUKES Table 1.1.5 and revised values have been annotated with an "r" in that table. Tables 1.1 to 1.3 show which values have been revised at a more disaggregated level.

For data sourced from other government departments which are all classified as National Statistics, the reader should refer to the respective publications' revisions policy.

[1] https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes

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Contents

Introduction

Energy Consumption in the UK (ECUK) is a publication that complements the Digest of UK Energy Statistics (DUKES), also published by the Department for Business, Energy and the Industrial Strategy. Whilst DUKES provides detailed information on balances, including the supply side of energy to the UK, it does not provide much detail on consumption. ECUK provides supplementary analysis of consumption data to provide additional insights into the use of energy by sector in the UK.

This year, for the first time, data are presented under five key themes:

Energy Consumption
Taking headline consumption data from the Digest of UK Energy Statistics (DUKES), this section examines energy use by fuel and sector (e.g. use of electricity, biofuels and petroleum products in transport). This is helpful to obtain a summary of consumption by sector.

Energy Intensity
This section examines the relationship between energy used and output over time, for example the amount of fuel used in transport compared to the number of passenger numbers and miles travelled. Lower ratios can indicate improved energy efficiencies (among other effects) to achieve the same output using less energy.

End Use
To further explore the use of energy in the UK, this section models consumption reported in DUKES by estimating the proportions of end uses for each fuel. An example would be the amount of gas used in the domestic sector for space heating, water heating and cooking.

Primary Energy Equivalents
The above Sections on Consumption, End Use and Intensity examine final consumption of energy, which does not include use by the energy industry and losses. Primary demand includes these elements of demand and is therefore higher than final consumption. This section apportions energy on a primary demand basis to each sector. This is helpful to understand the total energy requirements to not only supply energy for final consumption, but also to generate the energy supplied to each sector.

Electrical Products
Using modelled data, this section shows how much electricity was used by electrical appliances. Only certain electrical products have been modelled, meaning that total use here does not match electricity demand elsewhere in ECUK or in DUKES. These tables are shown in Gigawatt Hours (GWh) only because they are not comparable to these other statistics.

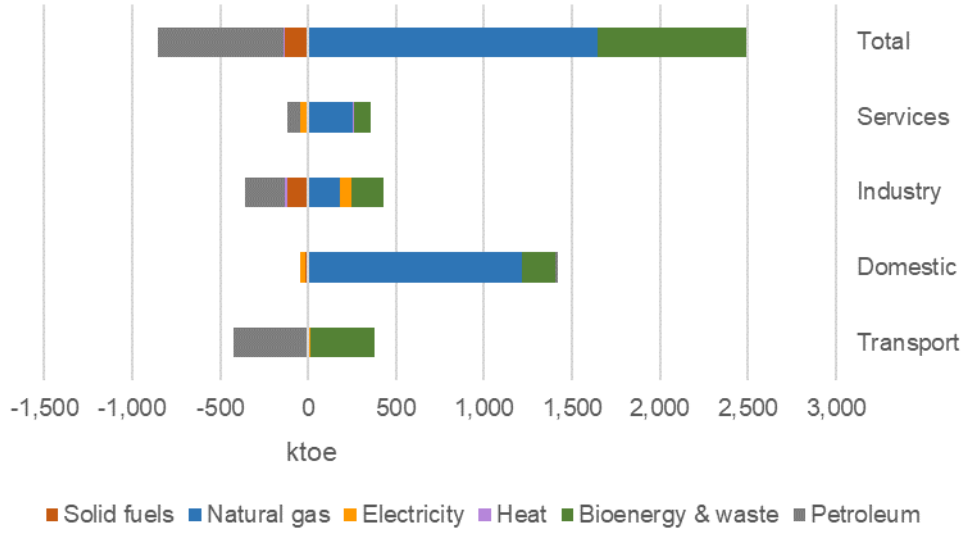
For comparison purposes across fuel types energy is quoted in thousand tonnes of oil equivalent (ktoe), unless stated; the electrical products tables are however, presented in Giga Watt hours (GWh) as these tables are not comparable with others in the publication. This is standard practice when considering electricity in isolation.

Energy Consumption

Between 2017 and 2018, consumption (excluding non-energy use) increased by 1,622 ktoe (1.1 per cent), see consumption tables accompanying this publication, Table C1.

Most of the increase can be accounted for by gas consumption in the domestic sector, as a result of the 'Beast from the East', which was an unusually cold spell during the first quarter of 2018. Figure 2 shows the high contribution of gas to the total increase, with the notable increase in domestic gas consumption. Figure 2 also shows the increase in use of bioenergy and waste in each sector in 2018 compared to 2017 and the decrease in petroleum consumption, the first decrease since 2013.

Figure 2: Change in consumption by sector and fuel, 2017 to 2018



Domestic

Table C1 shows that gas consumption in the domestic sector increased by 1,212 ktoe (4.8 per cent).

Although bioenergy and waste increased by less in absolute terms (by 196 ktoe), it showed the highest percentage increase (9.0 per cent).

The domestic sector is the most responsive to temperature changes as a larger proportion of consumption is used for space heating.

Figure 3 shows domestic consumption compared to average temperatures, and temperature-corrected consumption (removing weather effects to show underlying trends)

Figure 3: Domestic consumption, temperature-corrected consumption and average annual temperatures

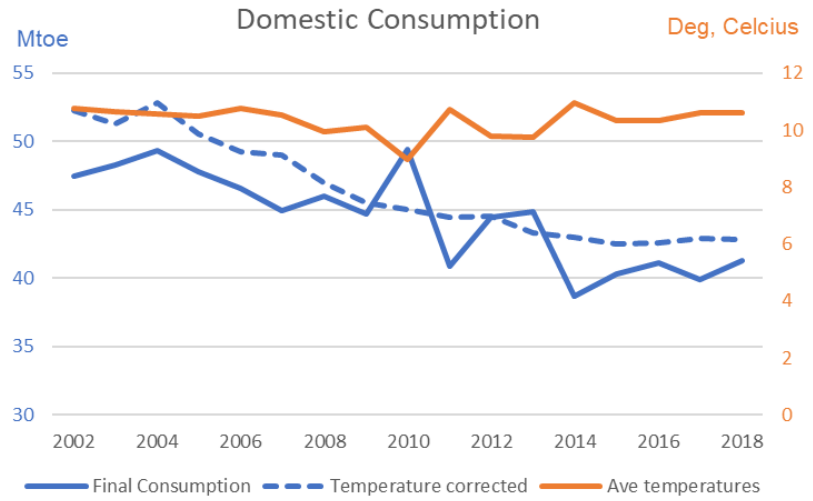
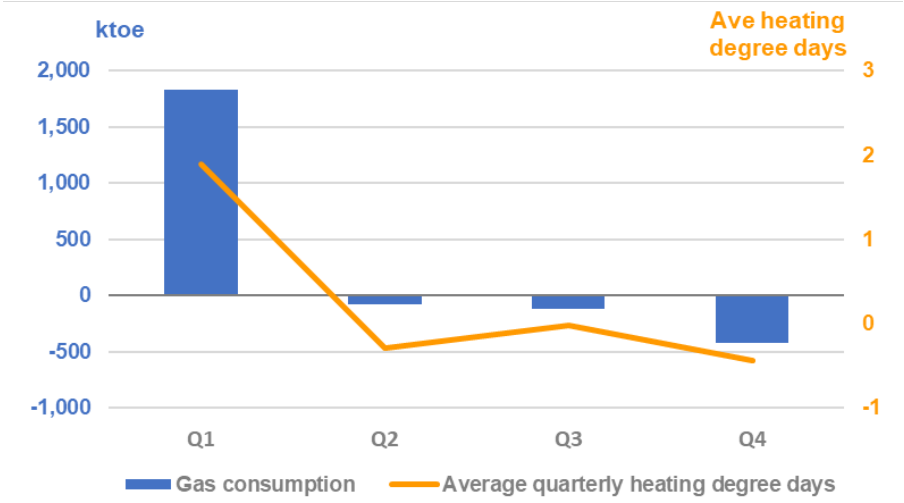


Figure 3 shows that average temperatures remained relatively stable between 2017 and 2018, and that on a temperature-adjusted basis gas consumption was also stable. However, an uptick in actual final consumption of gas can be seen in 2018, which was caused by the 'Beast from the East'. Gas consumption in the domestic sector was so high during this severe weather early in 2018 that annual demand increased despite the relatively warmer temperatures in the rest of the year.

The impact on consumption driven by the cold spell can be more clearly seen using quarterly data. Figure 4 shows the robust growth in gas consumption in the first quarter, with the higher number of heating degree days[2] compared to 2017. The effect of the weather on demand in Q1 was so high that the annual total in 2018 was up on 2017 despite the falls in consumption during the following three quarters of the year.

Figure 4: Change in quarterly domestic demand and heating degree days, between 2017 and 2018



Source; *Quarterly gas consumption Energy Trends Table 4.1*
Average annual temperatures Energy Trends Table 7.1

[2] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/728455/DUKES_1.1.8.xls

The increase in gas consumption in the first quarter was 1,828 ktoe, but smaller than the annual increase of 1,212 ktoe because the warmer average temperatures later in the year partially offset the effect of the severe weather in Q1.

Biomass consumption also increased (by 196 ktoe) which could be due to additional heating requirements due to the 'Beast from the East' alongside the increasing contribution of renewables in the fuel mix, although its share is still relatively small compared to gas consumption which accounts for 64 per cent of total domestic consumption, down from 69 per cent in 2004 when gas consumption in the domestic sector peaked. This compares to just 24 per cent in 1970 (before North Sea Gas came on line) and when solid fuels (coal, and other manufactured fuels) accounted for 49 per cent of domestic consumption (in the consumption tables, Table C1 shows a comparison of fuel mix and sector as a snapshot in 1970 compared to 2018).

Additional BEIS Statistics on Consumption in the Domestic Sector.

National Energy Efficiency Data Framework (NEED)

Published 27th June 2019;
Mean and median consumption of domestic energy by property characteristics.
Estimates of the impact on average consumption of energy efficiency measures.

Household Energy Efficiency Statistics

Published 18th July 2019 (headline release) and 18th April 2019 (detailed annual statistics);
Statistics relating to the Energy Company Obligation (ECO) and Green Deal.
The detailed report presents annual updates (last updated 18th April 2019) on in-depth ECO statistics and insulation levels.

Fuel Poverty Statistics

Published 13th June 2019 covering the year 2017

Sub-national consumption statistics (published 20th December 2018);

Sub-national electricity consumption data

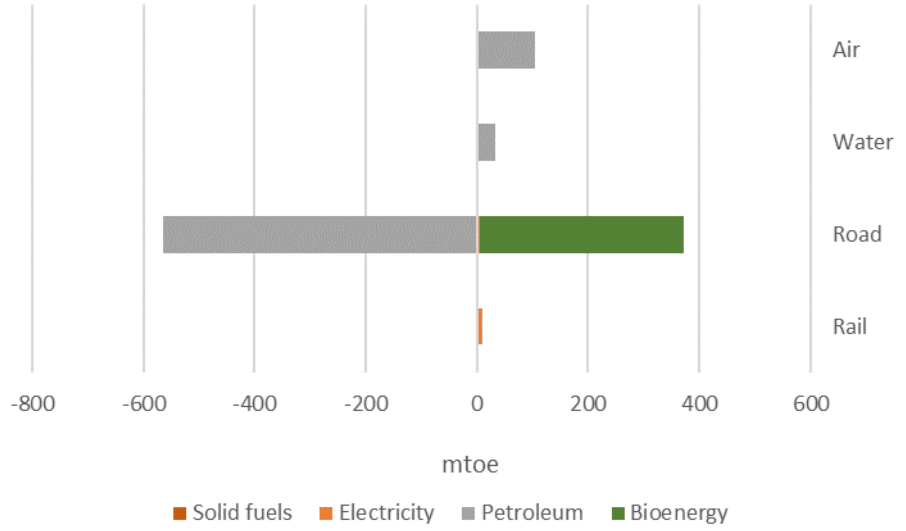
Sub-national gas consumption data

Transport

Transport consumption remained fairly stable in 2018 (Table C1), falling by just 48 ktoe (0.1 per cent).

Although overall transport consumption remained broadly stable, Figure 5 shows the increase in the use of liquid bioenergy (mostly biodiesel[3]), which offset a 0.8 per cent decrease in petroleum use for transport. The decrease in petroleum was the first fall since 2013 and was caused by a 1.4 per cent decrease in road fuel demand. There was a modest 105 ktoe (0.8 per cent) increase in petroleum use for air travel.

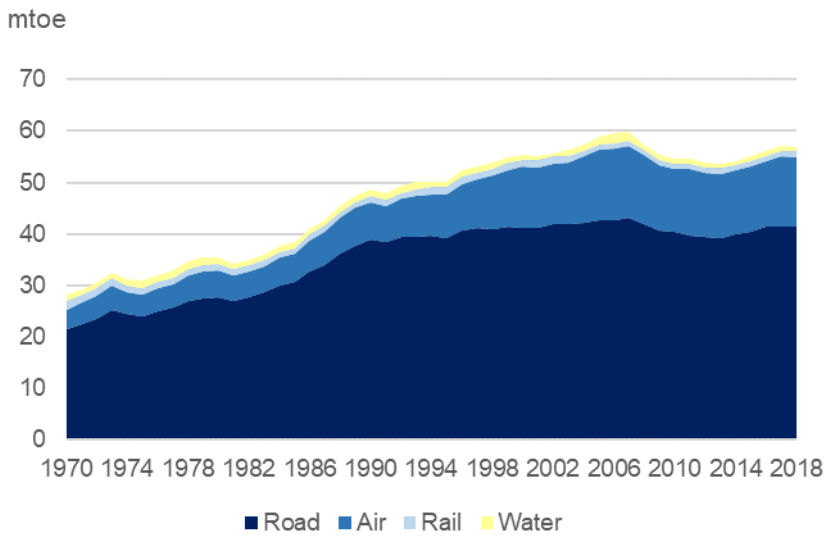
Figure 5: Change in consumption in transport by travel mode and fuel, 2017 to 2018



Road transport remains the dominant consumer in transport at 73 per cent (compared with 76 per cent in 1970). Figure 6 shows the increasing consumption in road and air transport; rail with water remaining comparatively small.

[3] See DUKES chapter 6, paragraphs 6.43 to 6.48; https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/736153/Ch6.pdf

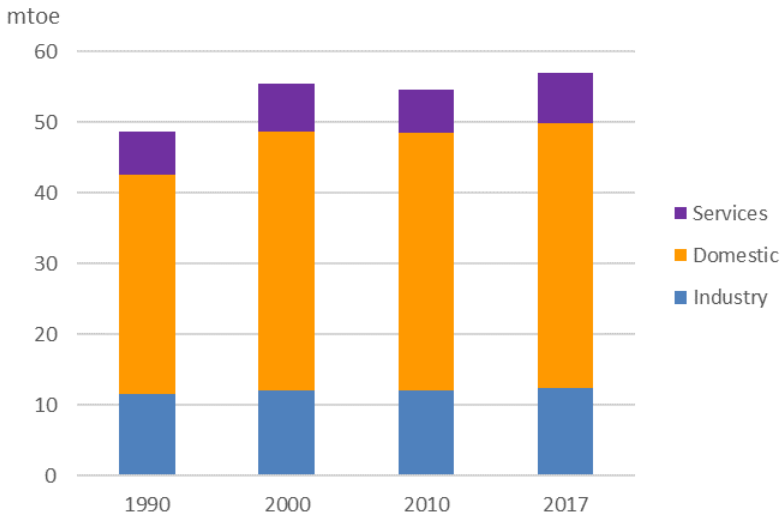
Figure 6: Trends in transport consumption from 1970



Although electricity in rail consumption has been a key component of rail travel since 1970, it has only recently seen increasing use in road transport; DUKES has been reporting this since 2004 with just 2 ktoe being consumed during that year. In 2018, this had increased 18 fold to 21 ktoe; although increasing rapidly, electricity remains a small proportion (less than 0.1 per cent) of road transport consumption[4].

Table C7 in the data tables models transport consumption by consuming sector; although overall transport has increased since 1990, each sector's share has remained relatively stable from 1990 to 2017 (the latest year for which data are available). Industry's share has fallen from 24 per cent in 1990 to 22 per cent in 2017 while domestic's share has increased from 64 per cent to 66 per cent over the timeframe. The service sector's share is the same in 2017 as it was in 1990 at 12 per cent.

Figure 7: Trends in transport consumption from 1970

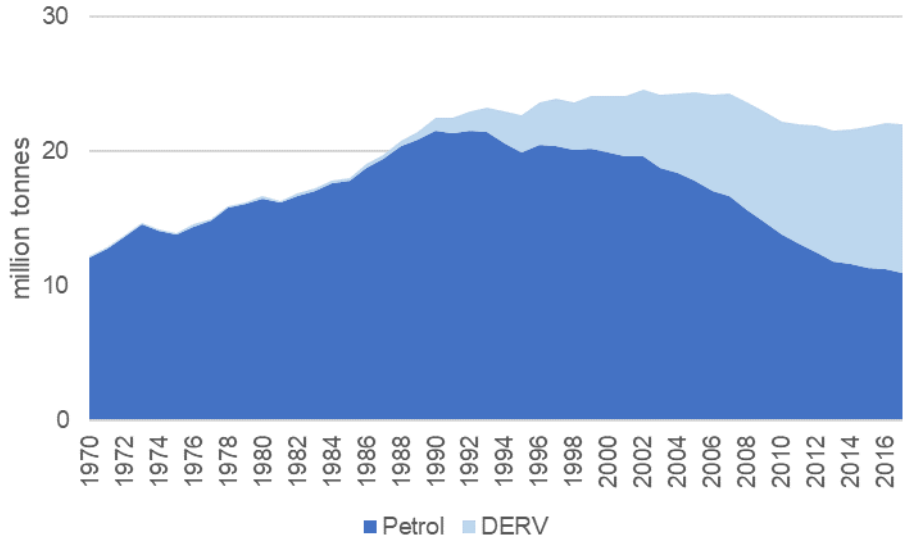


[4] See paragraph 5.18 of Chapter 5 of DUKES; https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/736152/Ch5.pdf

Road Transport Consumption

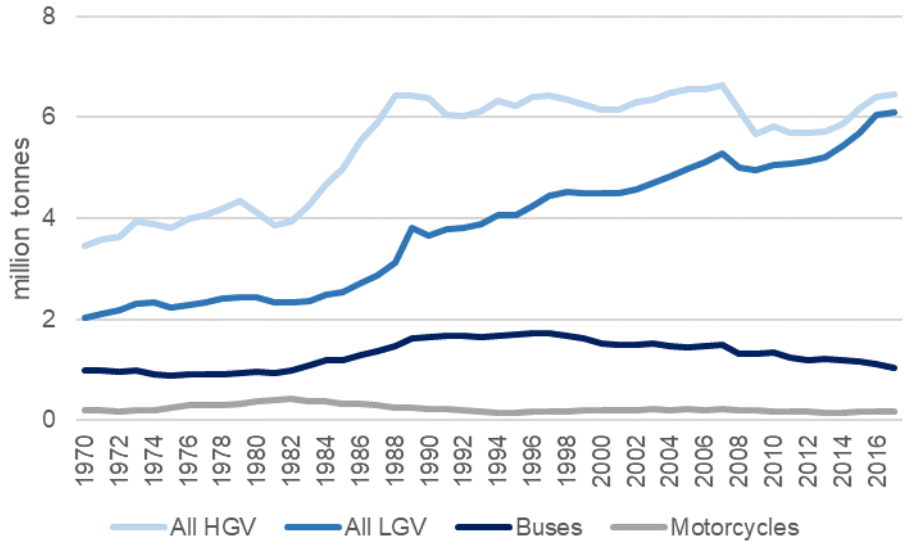
In 2017 diesel demand for cars (the latest year for which data by vehicle type are available) represented 50 per cent of total fuel used in cars; Figure 8 highlights diesel's increasing share (for all vehicles), notably from the early 1990s onwards. However, in a recent reversal of this trend diesel demand (excluding biodiesel) fell by 1.1 per cent in 2018 compared to 2017 and decreases in demand for petrol have been flattening. This has followed announcements of government policies to improve air quality after it was identified that diesel engines emit nitrogen dioxide and particulate matter more heavily than their petrol equivalents[5].

Figure 8: Petrol and Diesel (DERV) consumption for cars 1970 to 2017



Cars represent the largest consumers in road transport consumption. Other road transport vehicles' consumption is shown in Figure 9;

Figure 9: Consumption by other types of vehicles 1970 to 2017



[5] For more information see Energy Trends special article Road fuel consumption and the UK motor vehicle fleet: https://www.gov.uk/government/publications/energy-trends-june-2019-special-feature-article-road-fuel-consumption-and-the-uk-motor-vehicle-fleet

Growth in LGV consumption has levelled off and remains just below consumption for HGVs, although the stock of LGVs is increasing still with HGVs remaining stable.

Additional BEIS Statistics on Consumption in the Transport Sector.

Road transport energy consumption at regional and local authority level

Published 27th June 2019

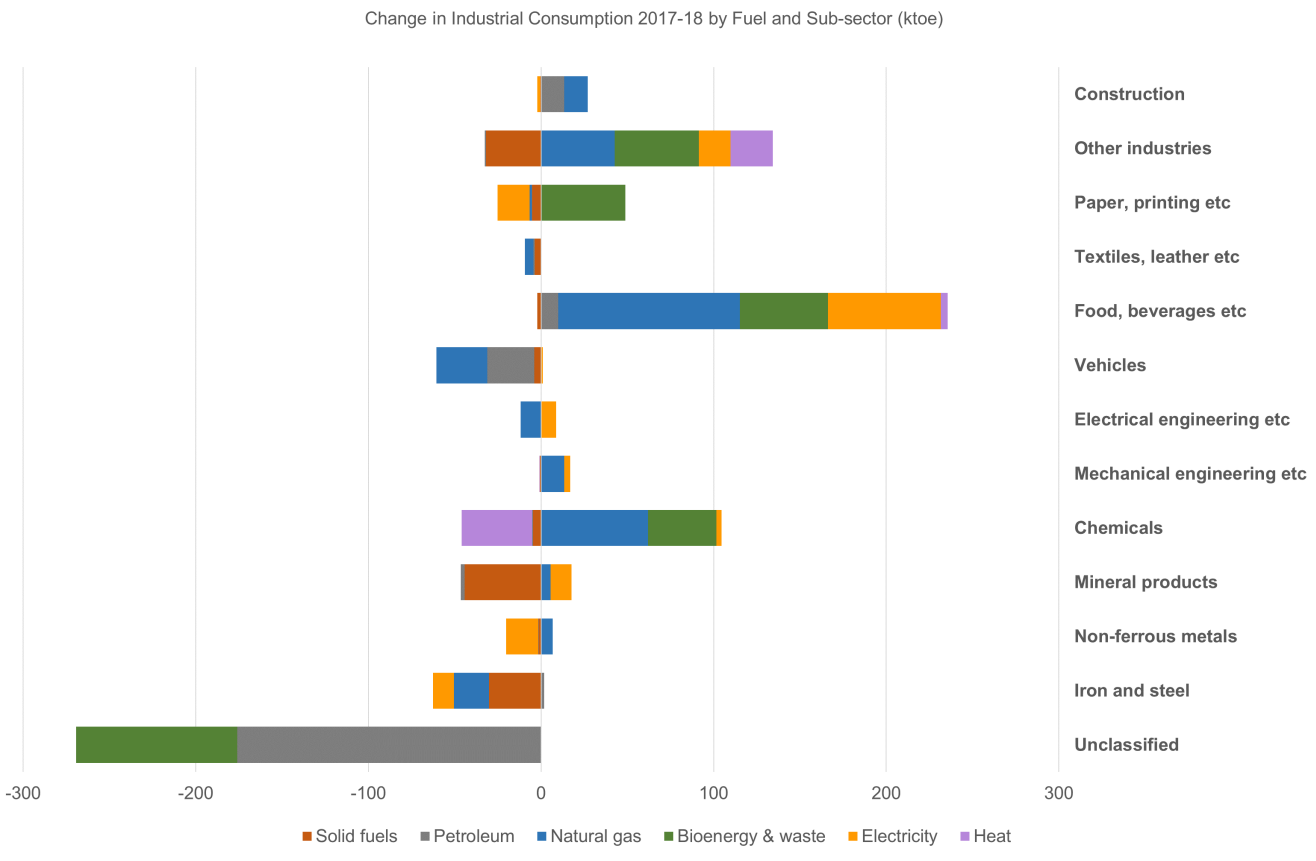
Industry

Industrial consumption was stable between 2017 and 2018 (Table C1), increasing by just 60 ktoe (0.3 per cent).

Within this, there were differing patterns for industrial sub-sectors (Table C2). The largest increase was in the food and beverage sub-sector which increased by 233 ktoe (8.1 percent). There was also a large increase in demand in the chemicals sector, for both gas and bioenergy & waste.

At the sub-sector level, consumption previously allocated to 'unclassified' has now been allocated to other sub-sectors as improved data have come to light, particularly for petroleum and renewables. Other sub-sectors seeing an increase are 'Other Industries' (across the fuel types).

Figure 10: Change in Industrial consumption sub-sectors from 2017 to 2018 by fuel (ktoe)

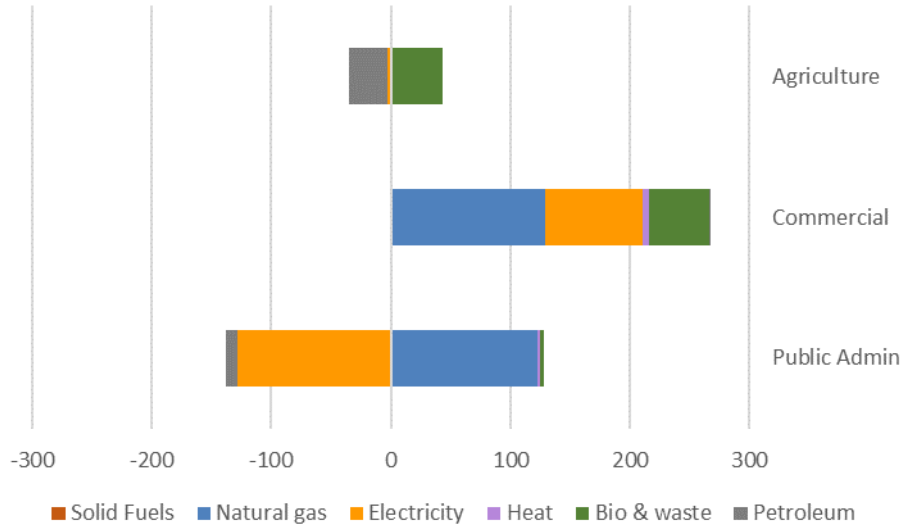


Services

Table C4 shows that consumption in the services sector increased by 227 ktoe (1.1 per cent) between 2017 and 2018 mostly in the commercial sector which increased by 258 ktoe.

Figure 11 shows that both the commercial and public administration sectors saw an increase in gas consumption between 2017 and 2018 in response to additional space heating requirements during the cold snap in early 2018;

Figure 11: Change in Services Consumption, 2017 to 2018



Consumption in the commercial and public administration sectors is responsive to temperature fluctuations as a relatively high proportion of their energy use is for space heating. At 52 per cent, its share of space heating is not as high as the domestic sector (65 per cent), but it is considerably higher than the industrial sector at just 9 per cent[6].

More information is provided in the end use section which provides an additional split for sub-sectors within the commercial and public administration sectors.

Sub-national consumption statistics (last updated published 20th December 2018;

Sub-national electricity consumption data

Sub-national gas consumption data

[6] Table U1 in the End Use data tables

Consumption; Accompanying Tables

C1	Final Energy Consumption by Sector and Fuel 1970-2018	table and charts
C2	Industrial Consumption by Sub-sector 1998 to 2018	table and charts
C3	Industrial Consumption by two digit SIC 2016 to 2018	table only
C4	Services Consumption by Sub-sector 1970 to 2018	table and charts
C5	Temperature Corrected Consumption by Sector 2002-2018	table and charts
C6	Temperature Corrected Consumption by Fuel 2002-2018	table and charts
C7	Transport Consumption allocated to consuming Sector	table and chart
C8	Road Transport Consumption by vehicle type	table and charts
C9	Domestic average gas and electricity consumption	table only

Reference Table 1	Industrial Consumption at 4 digit SIC 2007 (not updated)
Reference Table 2	Proportions to estimate Industrial Consumption to 2 digit SIC

Energy Intensity

What is Energy Intensity?

Energy Intensity is the amount of energy per unit of output. It includes (but is not limited to) energy efficiency changes. An example in the transport sector would be that if a train carries more passengers but uses the same amount of fuel to travel the same distance, then the energy intensity would fall (the output has increased in terms of number of passengers who travelled, but the fuel used has remained the same).

Units of output vary depending on the sector and sub-sector and relate to such economic activity as number of passengers and distance travelled for the transport sector, whilst changes in the ONS' Index of Production data are used to estimate trends in the output for the industrial sector.

The 'Methodology and Quality' sheet in the data tables include a comprehensive list of output factors used for each sub-sector.

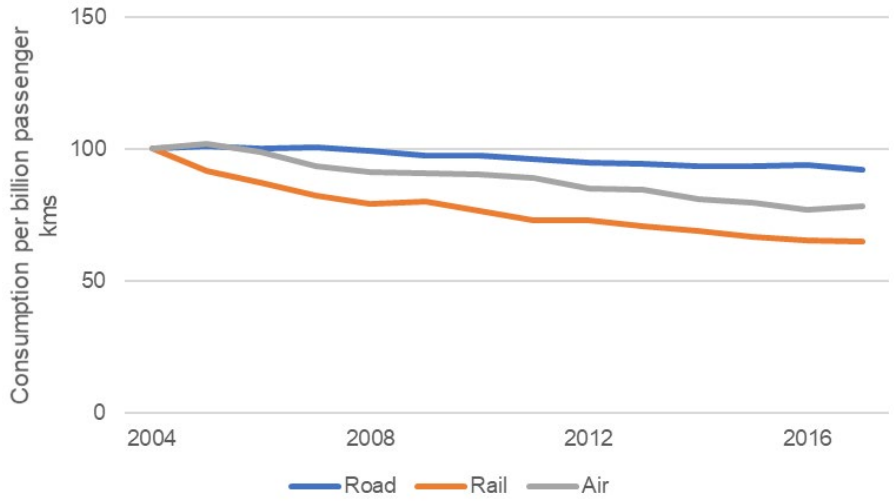
Table I6 in the data tables allocates changes in energy consumption by sub-sector to changes in both output and energy intensity.

The energy ratio fell by 2.4 per cent in 2018 compared to 2017, meaning that the energy used to obtain the same output decreased in 2018 (see Table I1 in the Intensity Tables accompanying this publication).

Transport

Energy intensity for passenger transport has fallen for the key modes of transport; road, rail and air with the largest decrease in rail passenger transport (see Figure 12) which has fallen by more than a third (35 per cent). The timeframe considered is from 2004 to 2017; 2004 has been selected as the start of the series in this instance as there was a step change in consumption by rail transport when energy consumption for providing building services was reallocated from transport to the commercial sector. Energy intensity in air transport fell by just less than a quarter (22 per cent) and by 7.7 per cent in road passenger transport.

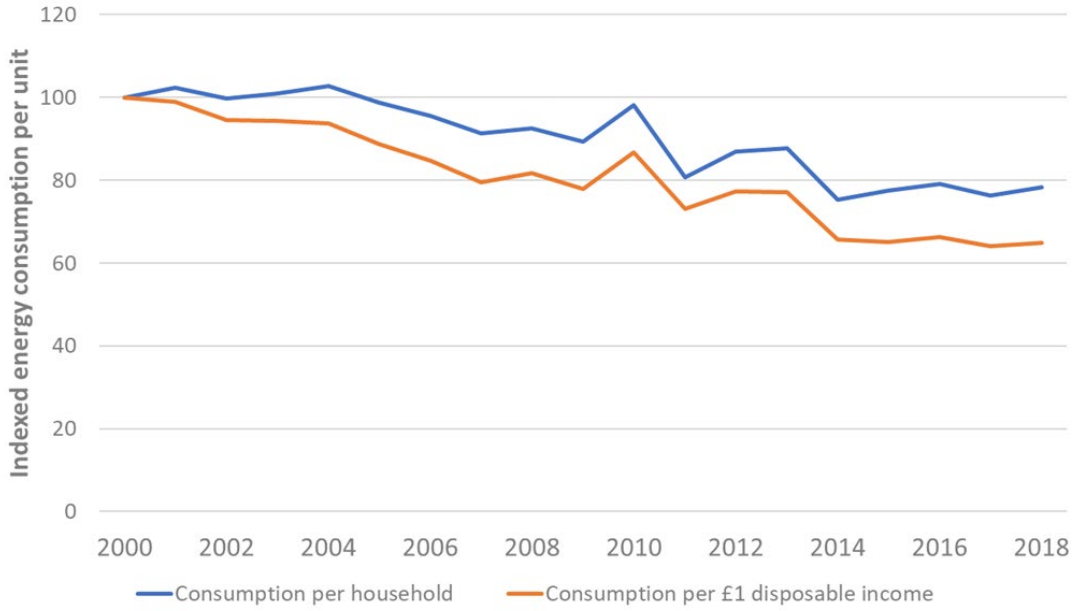
Figure 12: Change in energy intensity for passenger transport, 2004 to 2017



Domestic

Within the domestic sector the intensity of energy used has decreased both on a per household (down by one-fifth) and disposable income (more than one-third at 35 per cent) basis since 2000. Consumption per household is highly correlated with consumption per person so follows the same trends. The improvements to energy intensity in this sector are likely related to higher energy efficiency of homes resulting from improvements to insulation measures, boiler, and other appliance efficiencies[7].

Figure 13: Indexed change in energy intensity per household and on disposable income basis, 2000 to 2018

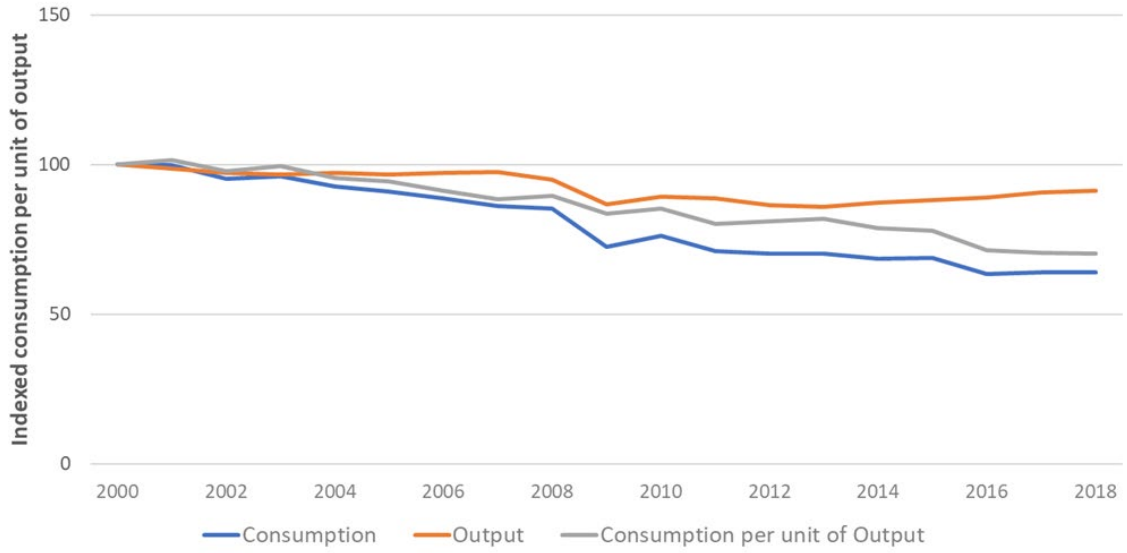


[7] For further information on the impact of energy efficiency measures see; https://www.gov.uk/government/statistics/national-energy-efficiency-data-framework-need-report-summary-of-analysis-2019

Industry

The industrial sector has shown decreases in the energy used to produce a unit of output since 2000 by nearly one-third (30 per cent). The improvements were driven particularly by improvements to intensity in the vehicle manufacturing, chemicals and iron & steel sectors.

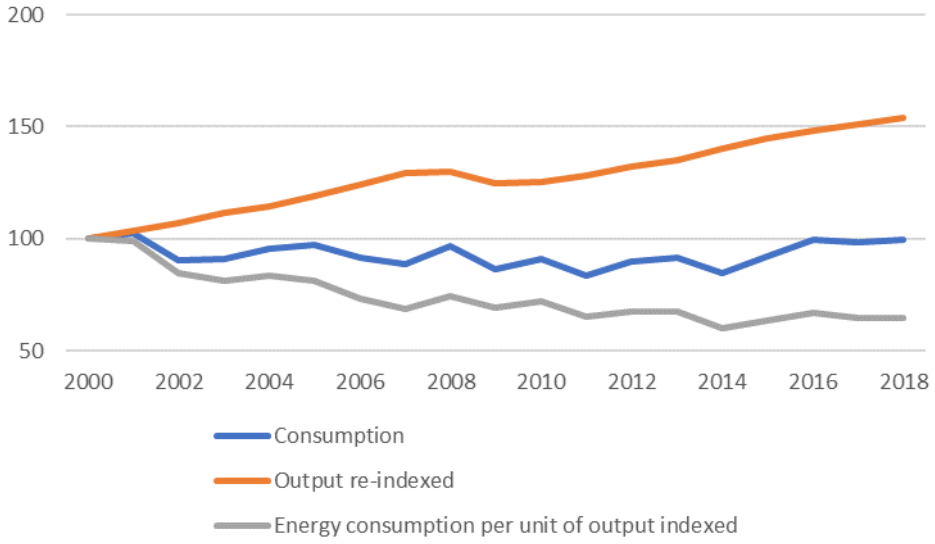
Figure 14: Indexed change in industrial consumption, output and intensity, 2000 to 2018



Services

Again, in the Services sector improvements to energy intensity can be seen. Between 2000 and 2018 the energy used to achieve the same output in the services sector reduced by more than one-third (35 per cent), reflecting improved efficiencies in this sector. However, this excludes agriculture. The energy intensity of agriculture increased by nearly one-fifth (19 per cent) between 2000 and 2018.

Figure 15: Indexed change in services consumption, output and intensity, 2000 to 2018

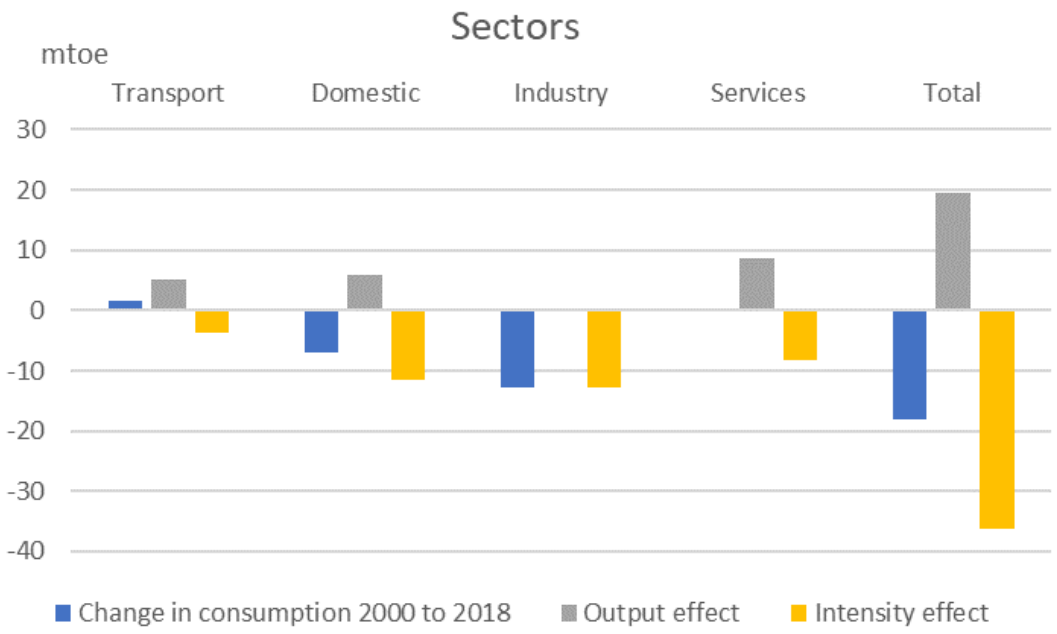


Output and Intensity Factors

Table I6 in the data tables shows a comparison of the effects on consumption due to output and intensity changes between 2000 and 2018 (2017 for transport). The output effect is the change in consumption which would have occurred had all other factors remained constant, specifically intensity changes. The remaining difference is then the intensity effect.

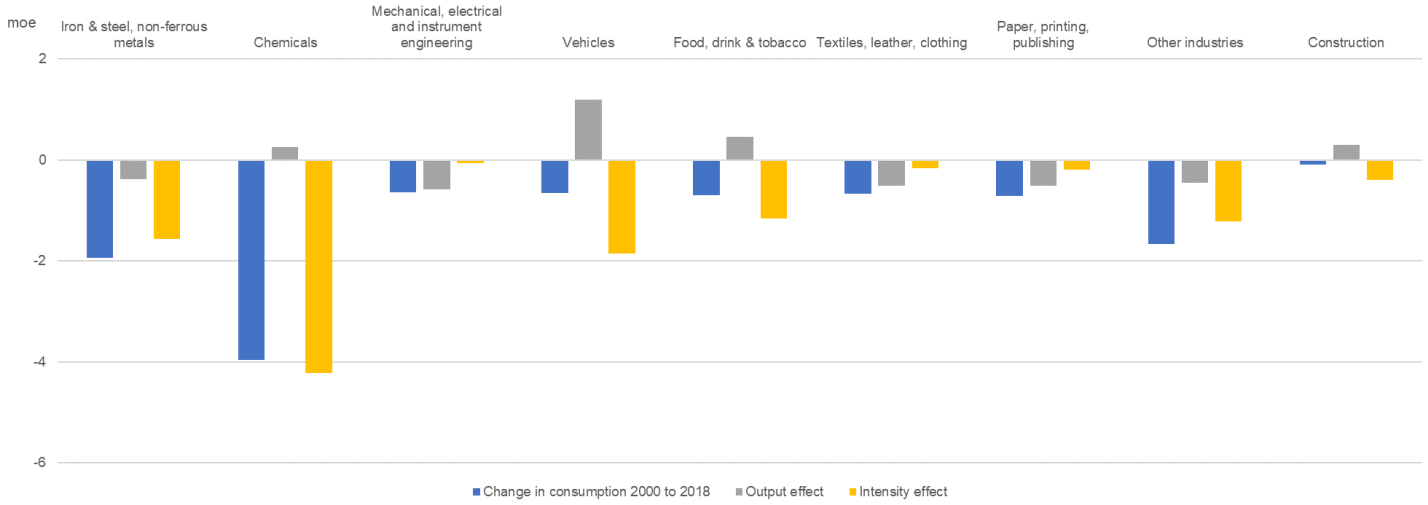
In Figure 16, all sectors saw a fall in energy consumption over the timeframe and an improvement in energy intensity. Industry was the only sector where most of the total change in consumption was down to intensity effects.

Figure 16: Output and Intensity Effects for All Sectors



However, when considering the impacts at the sub-sector level, there was some variation (see Figure 17); some showed an increase in output with improvements in energy intensity more than offsetting any potential increase in consumption due to the increase in output. This is notable in the chemicals sector which saw the largest relative impact of intensity improvements. The vehicle sector saw the largest increase in the output factor (in absolute terms) and, although this was more than offset by intensity effects, this was to a lesser extent than in the chemicals sector (relative to actual consumption).

Figure 17: Output and Intensity Effects for Industrial Sub-sectors



For all sectors of the impacts of changes in output and intensity between 2000 and 2018; the change in consumption due to the output effect is what would have been the expected change in consumption had outputs remained constant, and the intensity effect is difference between total change in consumption and the output effect

Energy Intensity; Accompanying Tables

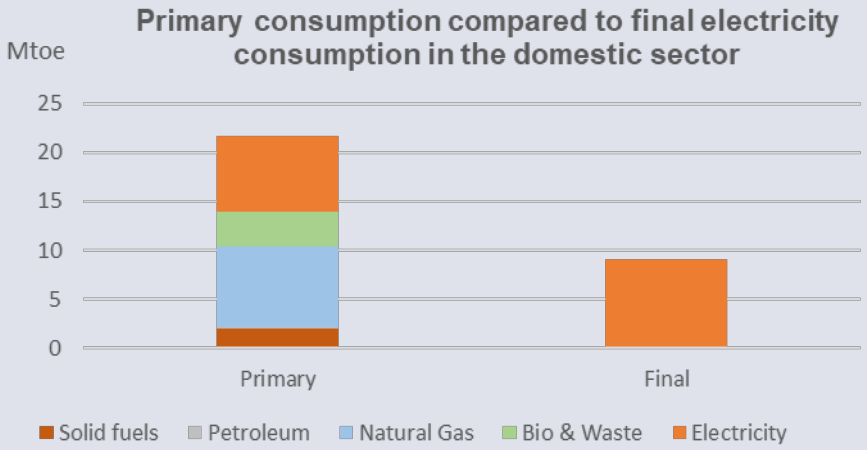
I1	The Energy Ratio 1970-2018	table and chart
I2	Transport Energy Intensities 1970-2017	table and charts
I3	Domestic Energy Intensities 1970-2018	table and charts
I4	Industrial Sub-sector Energy Intensities 1990-2018	table and charts
I5	Services Energy Intensities 1970 to 2018	table and charts
I6	All Sectors Impact of Output and Intensity Changes 2000-2018	table and charts
I7	Domestic Sector; Specific Energy Consumption 1990-2014	(not updated)

Primary Energy Consumption

What is Primary Energy Consumption?

Primary Energy Consumption is the amount of fuel used prior to any loss of energy through conversion or transformation. The primary energy equivalent includes the losses incurred during the transformation process.

If a particular sector consumes only one fuel type for direct combustion say for heat and no other fuel, then primary energy will equal final energy consumption where it is assumed there are no conversion losses. However, if that sector also consumes electricity from the grid, then the primary energy will reflect the fuel input used for thermal electricity generation (gas, biomass, coal, and petroleum); only primary electricity generation is included (hydro, solar, nuclear, and wind). Consequently, primary consumption is larger than final consumption. The example below shows how final electricity consumption in the domestic sector maps to primary equivalents for 2018;



Primary consumption data are calculated by taking the final consumption fuel mix and apportioning to the fuel input required to produce the final unit of consumption. Most of the conversion losses are in generating electricity from combustible fuels so those sectors with a high proportion of electricity consumption have a relatively large absolute primary equivalent value.

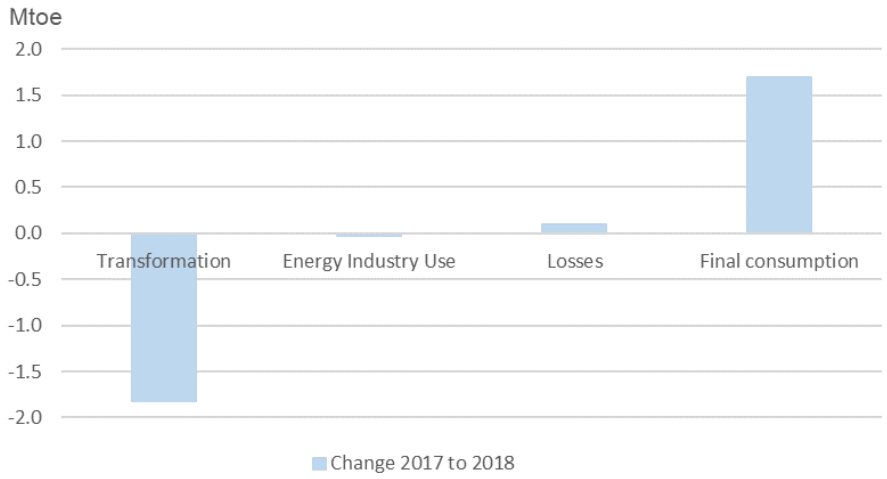
Similarly, large consumers of petroleum products, such as the transport sector, primary energy is the crude oil input some of which is used in the refining and manufacturing process before it is available for final consumption.

All sectors 2017 to 2018

In the primary equivalent tables, primary consumption fell by just 49 ktoe; an increase in final consumption driven by gas consumed in the domestic sector in response to the 'Beast from The East' was offset by a reduction in the fuel input to the transformation sector. Although final electricity consumption was stable between 2017 and 2018, the fuel mix going into generation shifted further away from combustible fossil fuels to primary renewables (which have no

conversion losses). Figure 18 below shows how the 49 ktoe change in consumption is down to changes in fuel input to the transformation sector, energy industry use, conversion losses and final consumption;

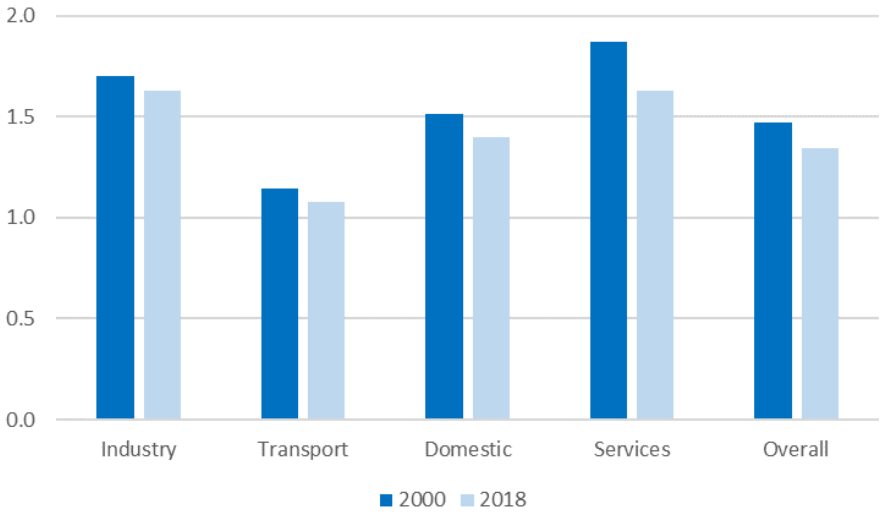
Figure 18: Impact on Primary Energy Consumption 2017-2018



All sectors 2000 to 2018

Conversion factors are a measure of the efficiency of transformation calculated as the ratio of primary energy and final energy consumption. These factors are presented in Table P3 in the Excel data tables. A comparison of factors across the sectors between 2000 and 2018 is shown in Figure 19 below;

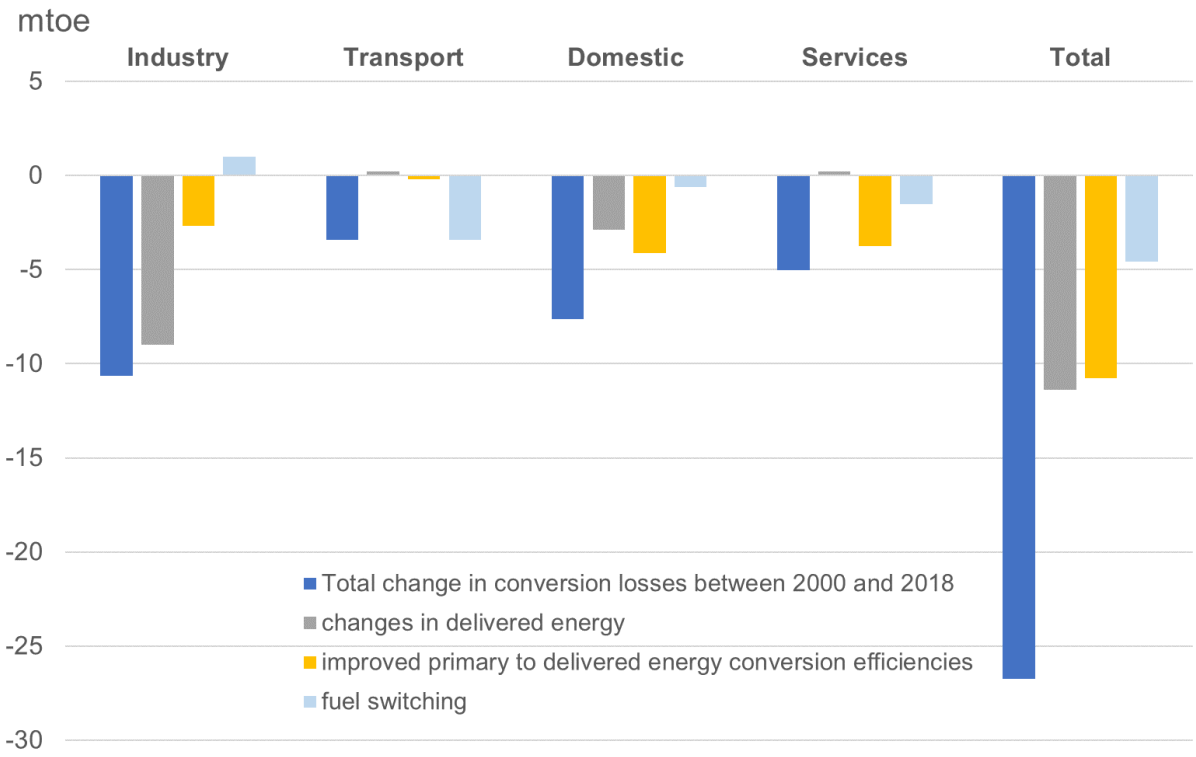
Figure 19: Changes in conversion factors from 2000 to 2018



All sectors show a reduction in conversion factors over the time period indicating improvements in efficiency in the transformation sector but also includes the effects of fuel switching whereby consumers shift from fuels requiring transformation to direct consumption which also includes the effect of the increasing proportion of primary electricity generation particularly renewables such as wind, and solar.

Table P5 in the Excel data tables quantifies actual changes in conversion losses due to changes in final consumption (conversion losses will fall if less fuel is being converted), efficiency improvements and fuel switching. All sectors show a reduction in final consumption (see figure 20 below) and most show a reduction in losses due to efficiency improvements and fuel switching effects except for the industrial sector which, shows an increase in losses due to fuel switching. This reflects the increasing share of electricity in the industrial final consumption mix which increased from 28 per cent in 2000 to 35 per cent in 2018.[8]

Figure 20: Changes in conversion losses 2000 to 2018



The data tables include more detailed information on the services and domestic sectors whereby the methodology to estimate final consumption to primary energy equivalents has been applied to produce end use by primary equivalent;

Primary Energy Equivalents; Accompanying Tables

P1 Primary Energy Consumption and Temperature Corrected 1970-2018
P2 All Sectors Primary Consumption by Sector and Fuel 1970-2018
P3 Primary Energy Required to Produce 1 toe of Final Consumption 1970-2018
P4 Factors Affecting Change in Primary Energy 2000-2018
P5 Factors Affecting Conversion Losses between 2000-2018 (table and chart)
Additional Sectoral Splits
P6 Domestic End Use
P7 Services by Sub-Sector and fuel
P8 Services by End Use

[8] Source; Table C1 in the Excel data tables published alongside this release.

Energy End Uses

Understanding what energy is eventually used for is useful in assessing consumer behaviours which in turn contributes to developing policies and establishing future strategies.

Estimating end uses is notoriously difficult though some sectors are more challenging than others, due to data availability. Most estimates are modelled and use assumptions.

Transport

The consumption tables published alongside this publication provide detailed data on energy consumption split by mode of transport and fuel type within the first section on consumption. There are detailed statistics published by The Department for Transport on transport usage within the series 'Transport Statistics Great Britain'. The Department for Transport also conducts an annual 'National Travel Survey' which also includes data on journey purpose and traveller characteristics. Data are used from both series to contribute to the section on Energy Intensity.

Domestic

End use estimates for residential consumers are now based on bespoke analysis using data collected by The Ministry for Housing, Communities and Local Government (MHCLG) for the English Housing Survey. The research is conducted by The Building Research Establishment (BRE) for the production of BEIS' Fuel Poverty Statistics. The methodology used to derive the end use splits (which for this publication are applied to DUKES' energy consumption for the domestic sector) can be found via the following link;

https://www.bre.co.uk/page.jsp?id=3176

At the time of publication, these estimates only cover the year up to 2017. For this reason, the spike in gas consumption relating to the 'Beast from the East' is not observed in the data yet and will not be until ECUK 2020. However, an estimate has been made to incorporate the effects of this unusually cold spell in space heating and to a lesser extent, water heating. The estimate has been derived based on the difference in actual and temperature corrected consumption; more details of this methodology can be found in the first section in this document on consumption.

Industry

End uses in the industrial sector are perhaps the most difficult to estimate considering the varied characteristics ranging from heavy industry such as iron and steel and those sub-sectors requiring lower grade heat for processing. There are also end uses relating to building services which are difficult to differentiate from processing related consumption.

Historic estimates for the end use splits were undertaken some time ago and have not been updated. Over this time, industry characteristics have evolved along with the fuel mix. For example, when the initial research was conducted, there was negligible or no bioenergy use and some sub-sectors such as paper, printing and publishing are now consuming a sizable proportion of bioenergy in their energy mix.

The updates for 2018 are based on historic estimates and the proportions estimates applied to updated DUKES consumption data. For reference, the actual percentages are included in the End Use tables as Reference Table 1.

Services

Up until 2015, the end use split was derived by The Building Research Establishment and modelled using a methodology;

http://projects.bre.co.uk/PDF_files/CarbonEmissionsFromNon-domesticBldgs%202000andBeyond.pdf

Since 2015, estimates have been used based on the BEIS Building Energy Efficiency Survey (BEES). The proportions used are applied to DUKES energy consumption data.

https://www.gov.uk/government/publications/building-energy-efficiency-survey-bees

End Use: Accompanying Tables

U1 Sectors Excluding Transport
U2 All Sectors 1990, 2000, and 2010-2018
U3 Domestic 1990-2018
U4 Industry by 2 digit SIC code
U5 Services (excl agriculture) 2016-2018
U6 Services (excl agriculture), detailed 2016-2018

Reference Tables
Reference Table 1; Proportions used to derive industrial split

Electrical Products

What you need to know about these statistics

Data in the electrical products tables are the results of modelling against a prescribed but quite wide-ranging set of electrical products used in the home and workplace. The model provides estimates of the total stock of these products and their consumption. The resulting outputs are a sub-set of energy consumption in the home and workplace which can be used to assess trends in consumption.

The tables are presented with the first row showing the last update of the model.

The modelled estimates are produced in support of the European framework setting ecodesign and energy labelling requirements for energy related products;

https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32009L0125

The Ecodesign Directive provides the overall framework through which implementing measures for specific energy-related products or product groups are introduced requiring improved energy and environmental performance. These are constantly being reviewed in line with technological progress. The Energy Labelling Regulation provides the overall framework through which delegated acts for specific energy-related products or product groups are introduced to require accurate energy labels. The purpose of the labels is to encourage consumers to buy more energy efficient products. The European Commission has published guidance on the labelling requirements;

https://ec.europa.eu/info/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/energy-label-and-ecodesign_en

This website also shows an overview of the legislation relating to both ecodesign and energy labelling;

https://ec.europa.eu/growth/industry/sustainability/ecodesign_en

On this page there are two links to comprehensive lists of the relevant legislative measures for both the ecodesign products and labelling regulations. More detailed definitions for products are included in each piece of legislation should users require more detail than provided in the methodology sheet contained in the associated workbook.

Domestic non-directional lighting

To demonstrate the impact of the example discussed above relating to the phasing out of incandescent light bulbs (general lamp shape), Figure 21 below shows the modelled consumption by non-directional lighting products and the growth in consumption for alternative technologies, while Figure 22 shows the stock of products;

Figure 21: Consumption for non-directional lighting

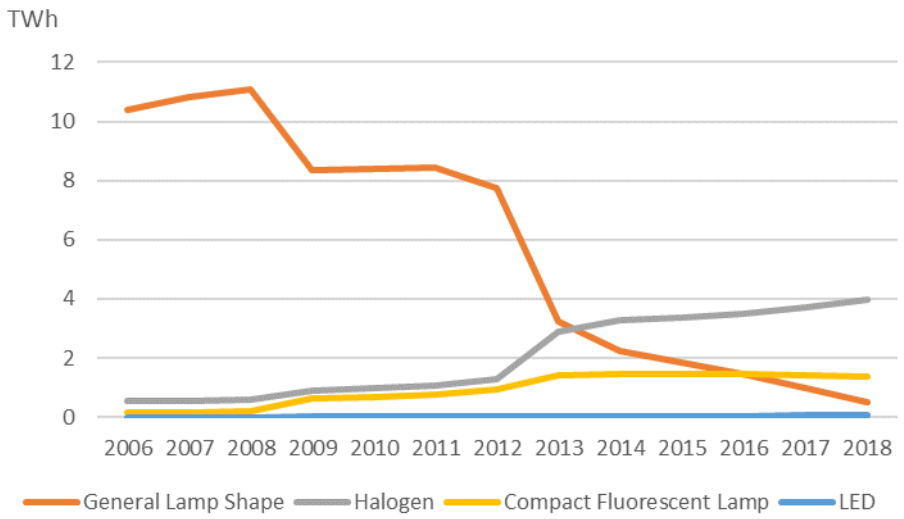
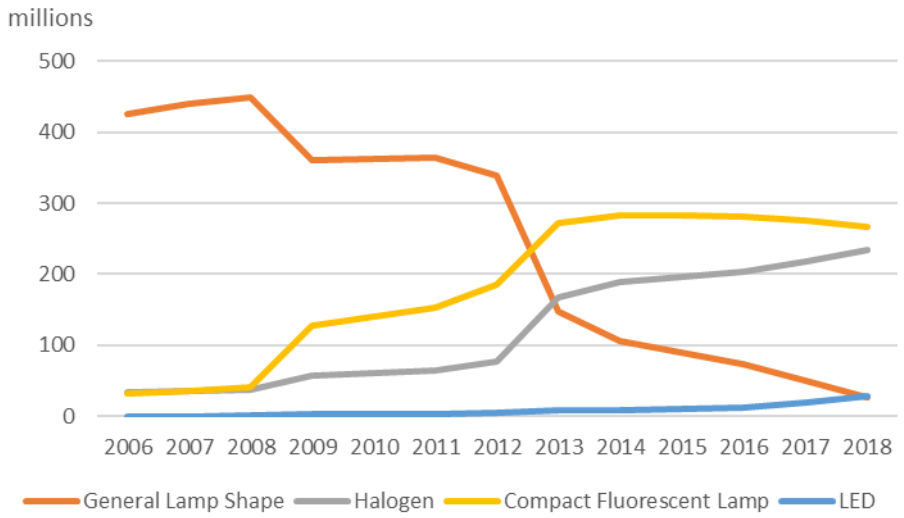


Figure 22: Stock of non-directional lighting



Both charts show a rapid fall in the use of general lamp shapes, most notably from 2012 onwards, the end of the phasing out period. During this time, there is a corresponding growth in both halogen lights and compact fluorescent lamps. Both the number and consumption of halogen lights increased by a factor of three. Although compact fluorescent lighting increased between 2012 and 2015, the number of appliances and consumption has been falling since.

All non-directional lighting consumption fell by 41 per cent between 2012 and 2018 compared to a fall in the stock of lighting of just 8 per cent highlighting the effect of replacing older incandescent bulbs with products with higher efficiencies.

Consumption for directional lighting remained fairly stable between 2012 and 2018, (increasing by just 0.1 per cent) though the number of appliances increased by 35 per cent.

Domestic computing

Trends in computing show that desktops are steadily being replaced by laptops (including notebooks) with the number of laptops exceeding desktops in 2010. However, as the average consumption for a laptop is less than for desktops, consumption overtook only in 2016. Figures 23 and 24 show the relative trends;

Figure 23: Consumption for desktop and laptop computers

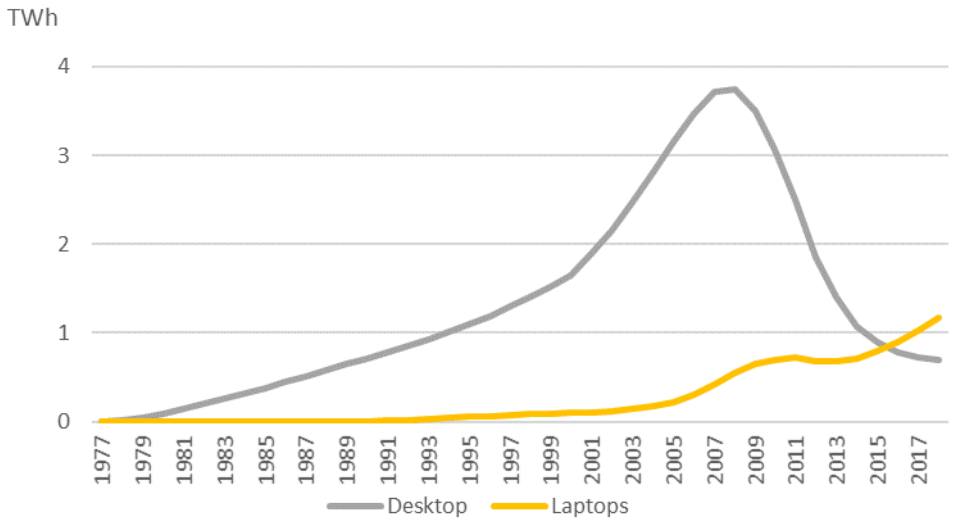
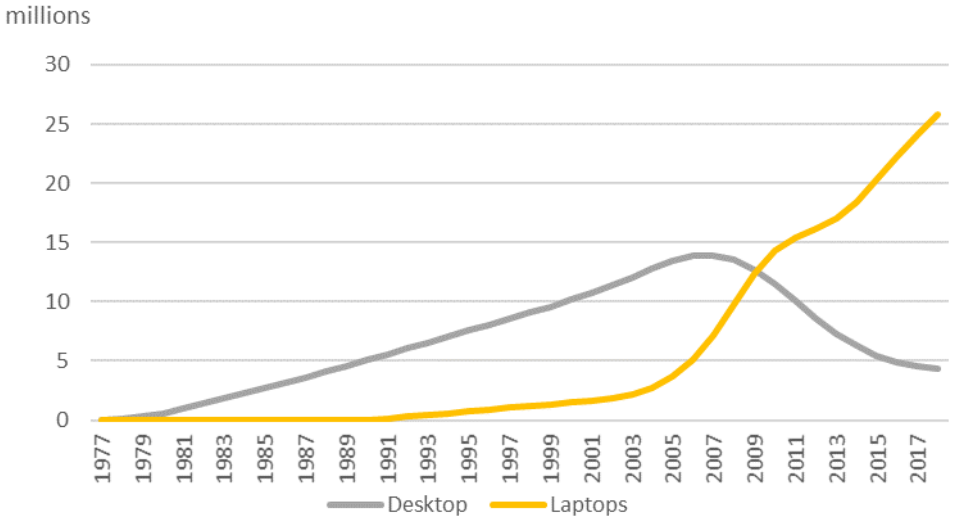


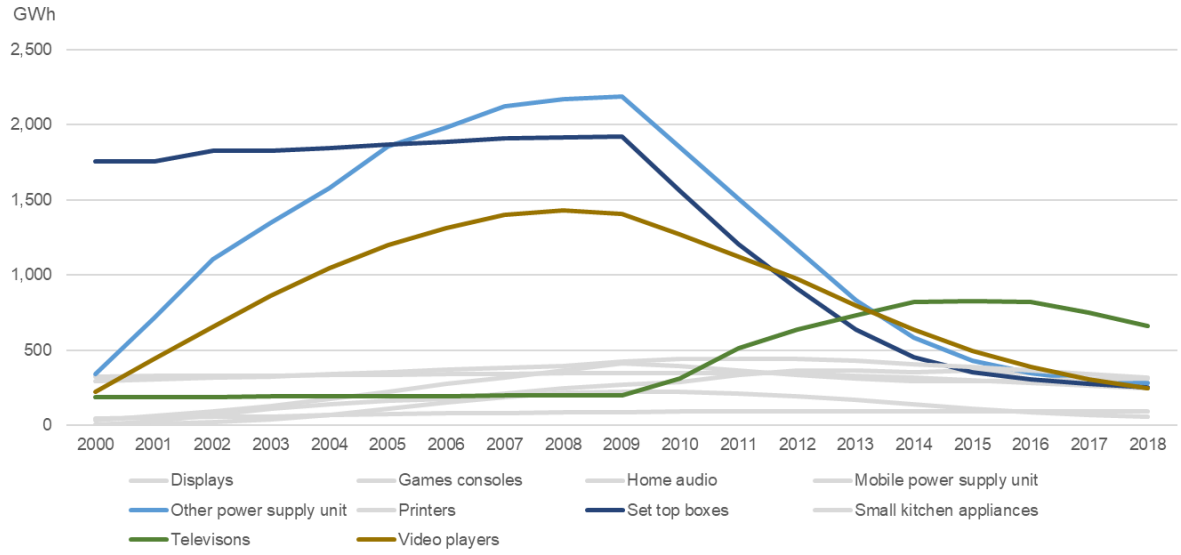
Figure 24: Stock of desktop and laptop computers



Domestic consumption for certain products in standby mode

Table A4 in the data tables shows the consumption of certain products while they are in standby mode. For many products, this falls alongside their overall usage. For example, consumption for video recorders in standby mode has fallen by 81 per cent between 2010 and 2018 (Table A2 shows a smaller decline of 35 per cent though this figure also includes DVD players). Those products which can be connected to the internet show an increase in consumption in standby mode reflecting additional consumption required if left on standby. This effect can be observed for televisions from 2010 when smart televisions became more prevalent.

Figure 25: Consumption for domestic appliances while in standby mode



Electrical Products; Accompanying Tables

A1	Domestic; appliance consumption 1970 to 2018	table and charts
A2	Domestic; stock of appliances 1970 to 2018	table and charts
A3	Domestic; average consumption 1970 to 2018	table and charts
A4	Domestic; consumption appliances on standby 2000 to 2018	table
A5	Domestic; consumption of new appliances (not updated)	table
A6	Domestic; stock of appliances by energy rating band 1970 to 2018	table
A7	Non-domestic; appliance consumption 1970 to 2018	table
A8	Non-domestic; stock of appliances 1970 to 2018	table

Technical information

This year, for user convenience, the methodology notes have been separated out and included in a separate tab within each Excel workbook which are now grouped by theme rather than sector. Background information is therefore easier to access whilst browsing the data tables.

Definitions

DUKES glossary	This covers definitions commonly used in energy statistics reporting. The majority if terms used in this publication are covered here; https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/729427/AnxB.pdf Definitions specific to this article are shown below;
Energy Intensity	The amount of energy required to produce one unit of output. A reduction in energy intensity could imply an improvement in energy efficiency.
Energy Ratio	Temperature corrected total inland consumption of primary energy per £1 million Gross Domestic Product (GDP) at market prices; it is a measure of how much energy is consumed per unit of economic activity (in this case £1m GDP).
Final Consumption	Energy consumed by final users after transformation
Freight Moved	The weight moved and by how far, measured in tonne kilometres
Passenger Kilometres	This measure is based on how far each passenger travels; i.e. it is dependent not only on how many passengers, but also how far each one has travelled.
Primary Energy Equivalents	Final consumed plus energy in the transformation sector and losses incurred during conversion and transformation.
Temperature Corrected Consumption	Energy consumption adjusted for changes due to fluctuations in the weather, to allow underlying trends to be identified. Details of the methodology can be found here; http://webarchive.nationalarchives.gov.uk/20130109092117/http:/www.decc.gov.uk/en/content/cms/statistics/publications/trends/trends.aspx
Tonne of oil equivalent (toe)	A common unit of energy measurement which enables different fuels to be directly compared and aggregated. One tonne of oil equivalent is set equal to 41.868 Giga Joules (GJ) or 11,630 kilo Watt hours (kWh). Quantities in this report are generally quoted in thousand tonnes of oil equivalent (ktoe) apart from the electrical products tables where comparison with other tables is not relevant and the more usual GWh are provided.
Train Kilometres	The number of kilometres a train travels.

Further information

Related statistics

Details of any related statistics are provided within this document alongside the relevant section.

A set of supplementary tables are also included with this publication. These tables contain data which is either not produced by BEIS or feed into any calculations but may be of interest to users looking for supporting information on energy consumption trends. A summary of the data included;

Supplementary Tables

S1 Overall drivers of energy consumption 1970 to 2017
S2 Standard Assessment Procedure (SAP) raging 1970 to 2017
S3 Internal and external temperatures 1970 to 2012 (not updated)
S4 Housing characteristics, heat loss parameters 2008 to 2012 (not updated)
S5 Installed central heating type in the UK 1970 to 2014 (not updated)
S6 Boiler types in the UK 1975 to 2017
S7 Housing characteristics, boiler efficiencies 2008 to 2012 (not updated)
S8 Installed hot water tank insulation in the UK 1976 to 2012 (not updated)
S9 Installed double glazing in the UK 1976 to 2016 (not updated)
S10 Ownership of loft insulation in the UK 1976 to 2018
S11 Ownership of cavity wall insulation in the UK 1976 to 2018
S12 Ownership of solid wall insulation in the UK 2008 to 2018
S13 Number of energy efficiency measures installed and energy savings (not updated)
S14 Number of measures delivered by suppliers (not updated)
S15 Detailed industrial energy consumption by fuel 2007 (not updated)
S16 Display Energy Certificates (DEC) for each government department 2013 (not updated)

Revisions policy

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.

Uses of these statistics

These statistics contribute to international reporting such as The International Energy Agency Energy Efficiency submission along with Eurostat's Final Energy Consumption in Households.

The data are also of interest to a wide range of users from individuals, academics, energy industry experts, and government.

User engagement

Users are encouraged to provide comments and feedback on how these statistics are used and how well they meet user needs. Comments on any issues relating to this statistical release are welcomed and should be sent to: energy.stats@beis.gov.uk

The BEIS statement on statistical public engagement and data standards sets out the department's commitments on public engagement and data standards as outlined by the Code of Practice for Statistics.

This year **we are seeking feedback on the new 'app'** which we have developed for the first time. This is an interactive tool enabling users to view charts and download data in machine readable format depending on selected boundaries specifically fuels and consuming sector. As this is a first launch, we have included consumption data only, however, we intend to develop this further in terms of both scope and usability and user feedback will contribute to future functionality.

National Statistics designation

National Statistics status means that our statistics meet the highest standards of trustworthiness, quality and public value, and it is our responsibility to maintain compliance with these standards.

The continued designation of these statistics as National Statistics was confirmed in February 2015 following a compliance check by the Office for Statistics Regulation. The statistics last underwent a full assessment against the Code of Practice for Statistics in 2014[9].

Pre-release access to statistics

Some ministers and officials receive access to these statistics up to 24 hours before release. Details of the arrangements for doing this and a list of the ministers and officials that receive pre-release access to these statistics can be found in the BEIS statement of compliance with the Pre-Release Access to Official Statistics Order 2008.

Contact

- Responsible statistician: Liz Waters
- Email: energy.stats@beis.gov.uk
- Media enquiries: 0207 215 1000
- Public enquiries: 0207 215 5000

[9] https://www.statisticsauthority.gov.uk/publication/statistics-on-energy-and-climate-change/

This publication is available from:

https://www.gov.uk/government/statistics/energy-consumption-in-the-uk

If you need a version of this document in a more accessible format, please email energy.stats@beis.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.