Department for Business, Energy & Industrial Strategy

Annex E: Energy and the environment

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Oil released and gas flaring Damon.Ying@beis.gov.uk 0207 215 2942

Carbon dioxide emissions

Provisional 2020 results for UK Greenhouse Gas emissions and progress towards targets were published on 25th March 2021. A copy of the statistical release and associated data tables are available at: https://www.gov.uk/government/collections/provisional-uk-greenhouse-gas-emissions-national-statistics

Oil pollution and oil releases

The total amount of oil released offshore during 2020 was approximately 7.9 tonnes. The amount of oil released around the coast of the United Kingdom and offshore in the North Sea is small in relation to total oil production. The number of oil release reports recorded in 2020 was 167, down from 215 in 2019. There was 1 incident where oil released exceeded 1 tonne (1.7 tonnes), down from 4 in 2019.

In 2020, the average content of oil in water was 23.9 milligrams per litre, compared to 19.8 in 2019. The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (OPPC) came into effect in August 2005. Under OPPC installations are granted a permit for activities discharging oil contaminated water to sea, but the oil content must not exceed 20 milligrams per litre.

Data on oil releases is available via the Environmental and Emissions Monitoring System (EEMS) which is maintained by the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED).

Gas flaring

Under the terms of petroleum production licenses, gas may be flared only with the consent of the Oil and Gas Authority (OGA) (formerly the Secretary of State). Flaring in 2020 was estimated to be 992 million cubic this was down more than 20 per cent on 2020. This reduction was largely due to fewer planned shutdowns because of the Covid-19 pandemic. In addition, 2020 saw an increase in use of flare reduction technology.

An additional 265 million cubic metres was vented. Cumulatively gas flared and vented accounted for the equivalent of 3.2 per cent of gross gas production, down from 4 per cent in 2019.

Gas flared and vented has declined in line with production since 2001. A time series of gas flared and vented at terminals, oil fields and gas fields can be found in Table E.1.

Department for Business, Energy & Industrial Strategy

Annex F: Oil and gas resources

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Data are received via the Oil and Gas Authority's (OGA) Petroleum Production Reporting System (PPRS). Further information is available via the OGA. The following supplementary tables can be downloaded here:

- Table F.1 Crude oil and Natural Gas Liquids Production
- Table F.2 Gas Production
- Table F.3 Natural Gas Liquids Net Production
- Table F.4 Disposals of Crude Oil
- For long term trends:
- Oil 3.1.1 Crude oil and petroleum products: production, imports and exports
- Gas 4.1.1 Natural gas and colliery methane production and consumption

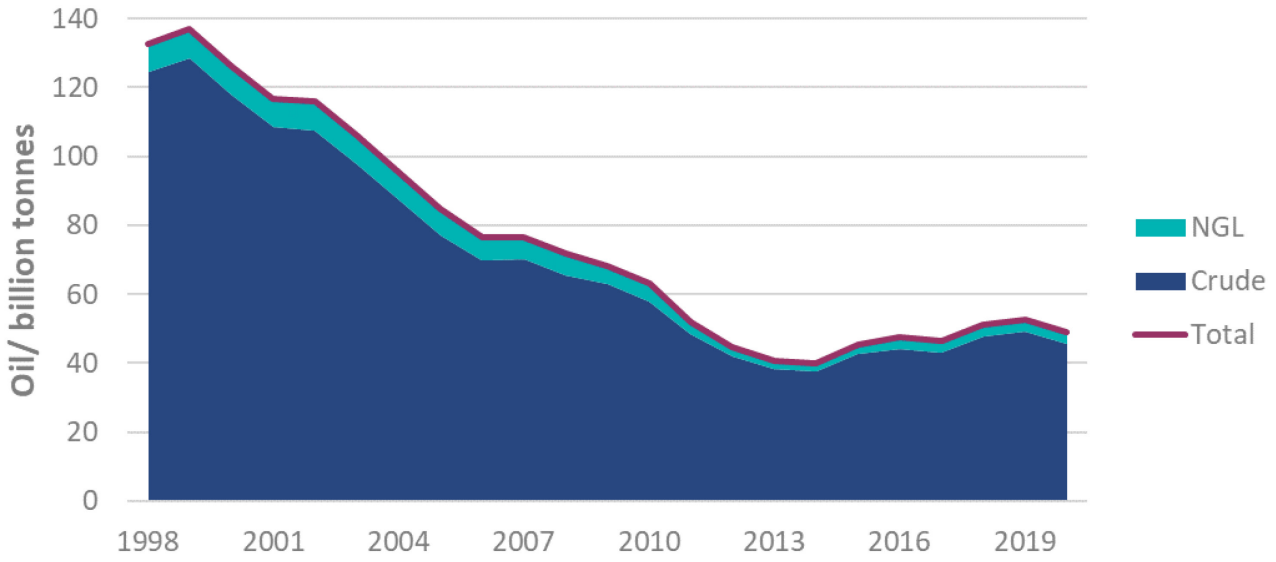
Oil and gas reserves

Data on oil and gas reserves is available from the OGA.

Production

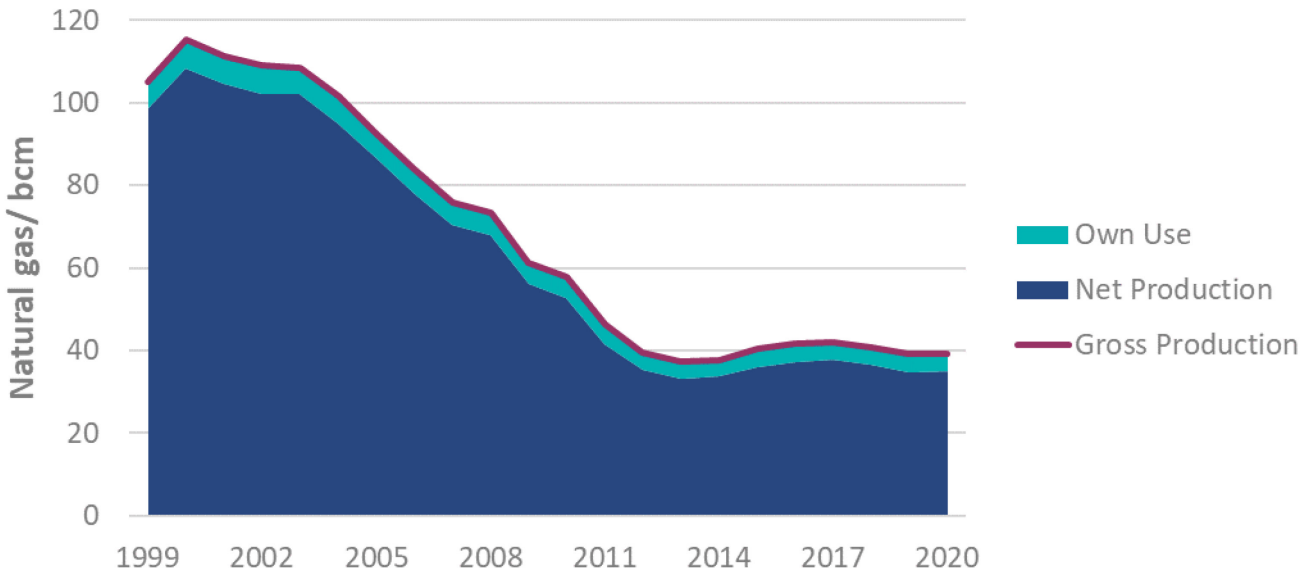
Tables F.1-F.3 show production of crude oil, natural gas and natural gas liquids (NGLs). Following the introduction of the Petroleum Production Reporting System (PPRS) in 2001, aggregate production figures are calculated using mainly terminal level data. Prior to this aggregate production figures were calculated using field level well-head data. The new method is more accurate because oil that leaves the terminal has been stabilised, that is any water, NGLs or other organic compounds have been removed. Field level data is still available via the OGA.

Chart F.1 Oil and NGL production 1998-2020, UK



Crude oil production peaked in 1999 at 137 million tonnes. Following this production has generally declined. Small increases from 2014 are due to new investment and the completion of new projects. In 2020, oil production was 48 million tonnes, 35 per cent of the peak but stable on 2019.

Chart F.2 Gas Production 1999-2020, UK

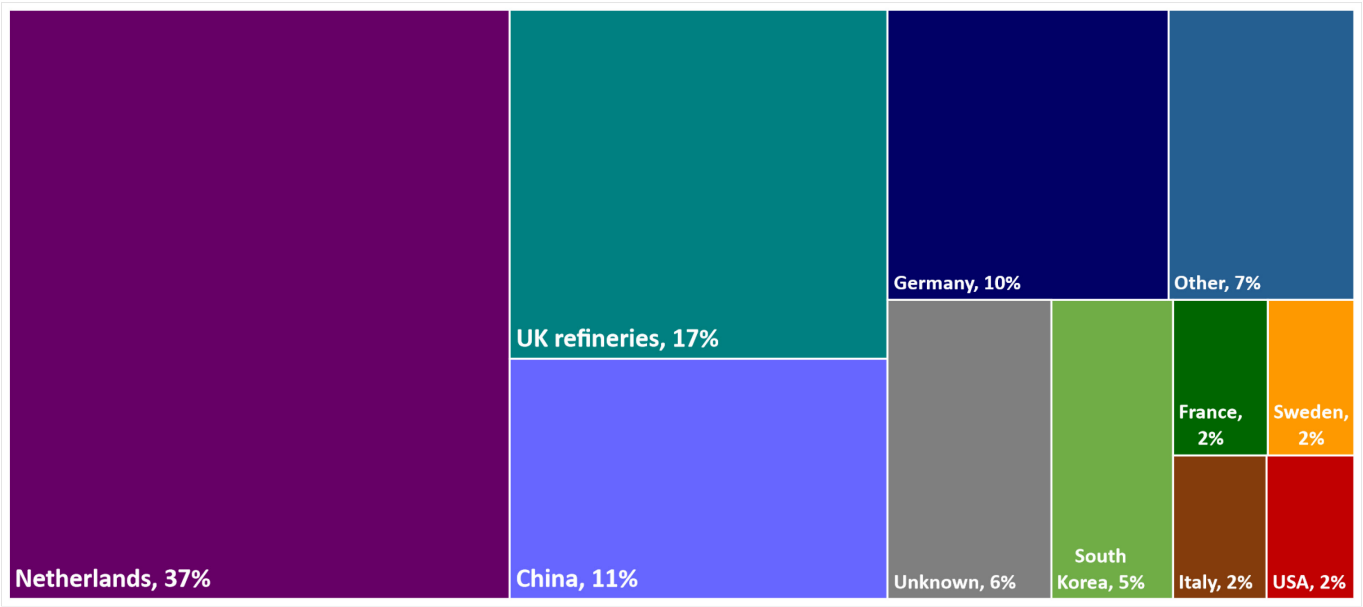


Natural gas production peaked in 2000 at 115 billion cubic metres. Similar to oil production, this peak was followed by several years of decline until 2015. Unlike oil, since 2017 declines in production from well-established fields have outstripped any gains following investment. In 2020, gas production was 39 billion cubic metres, 34 per cent of the peak. However, this was stable on 2019 despite a challenging year for maintenance.

Disposals of Crude Oil

Table F.4 and chart F.3 show the disposals of crude oil following extraction from the UKCS in 2020; disposals include deliveries to UK refineries and exports abroad. Disposals to the Netherlands were the largest accounting for 37 per cent of the total, this was followed by disposals to UK refineries which accounted for 17 per cent. The other category includes 13 countries each accounting for 1 per cent or less of the total. The UK exported to Brunei for the first time in 2020.

Chart F.3 Disposals of crude from the UK in 2020



Other of which, Portugal 1.3%, Norway 1.2%, Spain 1.0%, Gibraltar 0.9%, Poland 0.6%, Brunei 0.6%, India 0.3%, Canada 0.2%, Greece 0.2%, Bulgaria 0.2%, Finland 0.2%, Belgium 0.1%, Denmark 0.1%.

The export figure in table F.4 and chart F.3 may differ from those in Chapter 3 or published by the United Kingdom Petroleum Industry Association (UKPIA). These figures also include oil that has previously been imported and therefore is not part of UKCS production.

Department for Business, Energy & Industrial Strategy

Annex G: Foreign trade

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Main points for 2020

Provisional data from HMRC show that:

- There was a total of 125.6 million tonnes of oil equivalent (mtoe) of fuels for energy use imported to the UK in 2020 which was 13 per cent lower than the amount imported in 2019 (Table G.1).
- Exports of fuels rose in 2020 by 2 per cent to 88.2 mtoe (Table G.1).
- The energy trade deficit stood at £1.3 billion (Overseas Trade Statistics basis), 62 per cent less than in 2019 (Table G.7).

By fuel type:

- Coal imports fell by 24 per cent to 5.4 million tonnes in 2020 (Table G.2).
- The UK was, for the first time since 2004, a net exporter of crude oil in 2020, net exports were 0.7 million tonnes (Table G.3).
- HMRC data shows that the UK was a net importer of petroleum product in 2020 by 2.2 million tonnes which was 80 per cent less than in the previous year (Table G.3).
- Gas imports in 2020 at 478 TWh were 8 per cent lower than previous year. There was an 11 per cent drop in imports of gas via the Norway pipelines to 200 TWh (Table G.5).

Introduction

This annex provides an overview of published trade data by HM Revenue and Customs (HMRC) on energy products in the UK. The data for this annex are presented in Tables G.1 – G.7 of DUKES, also available from the HMRC website; it provides an overview of the UK energy trade commodities which also corresponds with that published in the Overseas Trade Statistics for the United Kingdom. The first section covers energy trade volumes and the second covers energy trade value.

Volume information focuses on the declaration made to HMRC on UK imports and exports in relation to countries outside the European Union (EU) as well as on arrivals and despatches (equivalent to imports and exports respectively) in relation to EU member states. In Table G.1 BEIS has converted HMRC data into million tonnes of oil equivalent (mtoe), so that energy sources can be combined to provide an overview of total trade. The value information previously corresponded to that published by the Office for National Statistics energy trade value data but data for 2016 onwards uses data direct from source, the HMRC UK Trade Info data.

In this annex, BEIS has used estimates based on its industry trade reports for some recent gas data to improve on the accuracy and quality of the data. Those estimates are indicated and footnoted in the tables. There are some differences in methodology between the HMRC energy trade data and the Department for Business, Energy and Industrial Strategy's data presented in the main chapters of DUKES. In the main chapters, the trade data are produced from a combination of data from HMRC and direct from companies responding to BEIS statistical surveys.

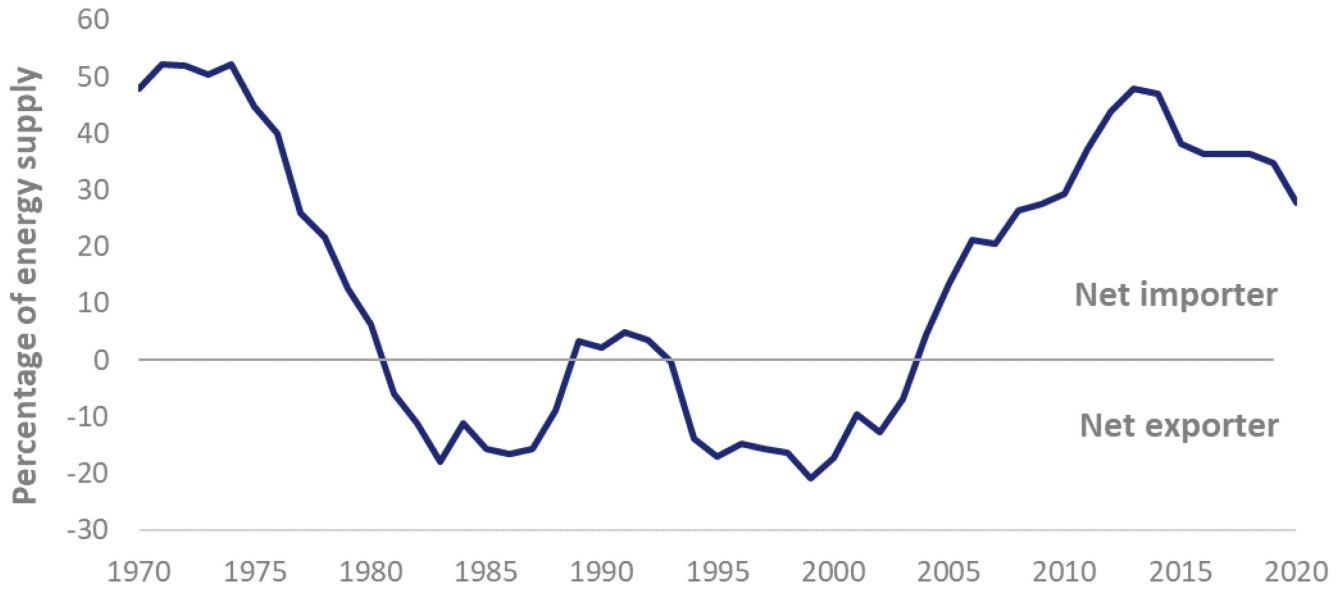
Volume

Overview - Import and export of fuels

In the 1970s the UK was a net importer of energy. Discoveries of oil and gas from the North Sea and the price spikes of 1973 led to a large rise in domestic UK crude oil production. In the early 1980s the UK became a net exporter of energy. However, because of the Piper Alpha disaster in 1988 oil production fell, leading to the UK reverting to being a net importer of energy. The UK once again became a net exporter in the mid-1990s because of growth in the North Sea production, but after the peak in 1999, North Sea production slowed and

since 2004 the UK once again became and has remained a net importer of fuels. Chart G.1 shows the UK net import dependence level (net imports compared to supply) from 1970 to 2020, based on BEIS data. Following the peak in 2013 net import dependency has fallen, with a sharp fall in 2015 (down 8.7 percentage points). Net import dependency also fell sharply in 2020 (down 7.1 percentage points on the previous year).

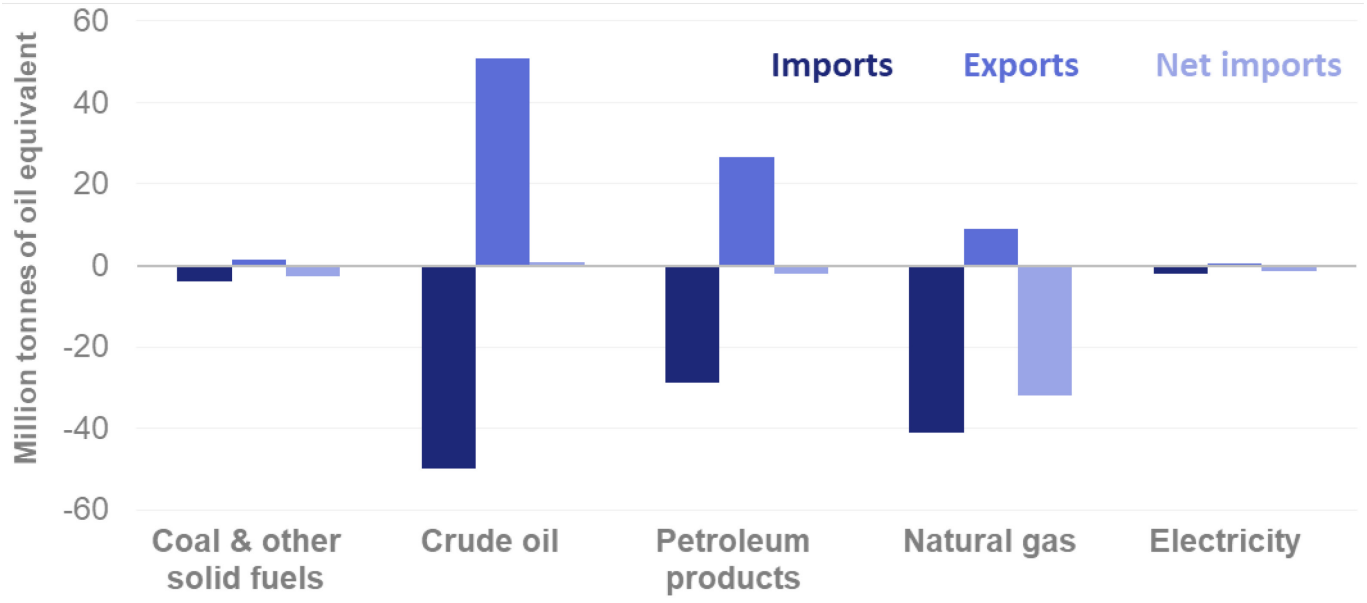
Chart G.1: UK import dependency, 1970 – 2020



Source: BEIS

Chart G.2 illustrates trade by fuel type based on HMRC volume data for coal, crude oil, and petroleum products and BEIS energy trends data on natural gas and electricity. The UK had for a long time been a net exporter of petroleum products. However, since 2014 the UK has become and remains a net importer of petroleum products (though remained a net exporter for some of the refined products). In 2020, the UK net import of petroleum products was around 2 million tonnes of oil equivalent which was 82 per cent less than in the previous year.

Chart G.2: Imports and exports by fuel type, 2020



Coal and manufactured solid fuels

Imports of coal peaked in 2006. Since then, there has been a gradual decrease, as coal demand for electricity generation has fallen. Generation from coal became more attractive again between 2012 and 2013 as gas prices peaked, resulting in increased imports.

Coal imports have since fallen steeply as less coal is used in electricity generation. In 2020, the UK recorded 5,147 hours of no coal use in generating electricity, up from 3,666 in 2019 . In 2020, the UK imported 5.4 million tonnes of coal and other solid fuels, 24 per cent (1.7 million tonnes) less than in the previous year. Chart G.3 illustrates the trends in the imports of coal by country for the years 2004-2020.

Chart G.3 Imports of coal by country of origin, 2004 – 2020

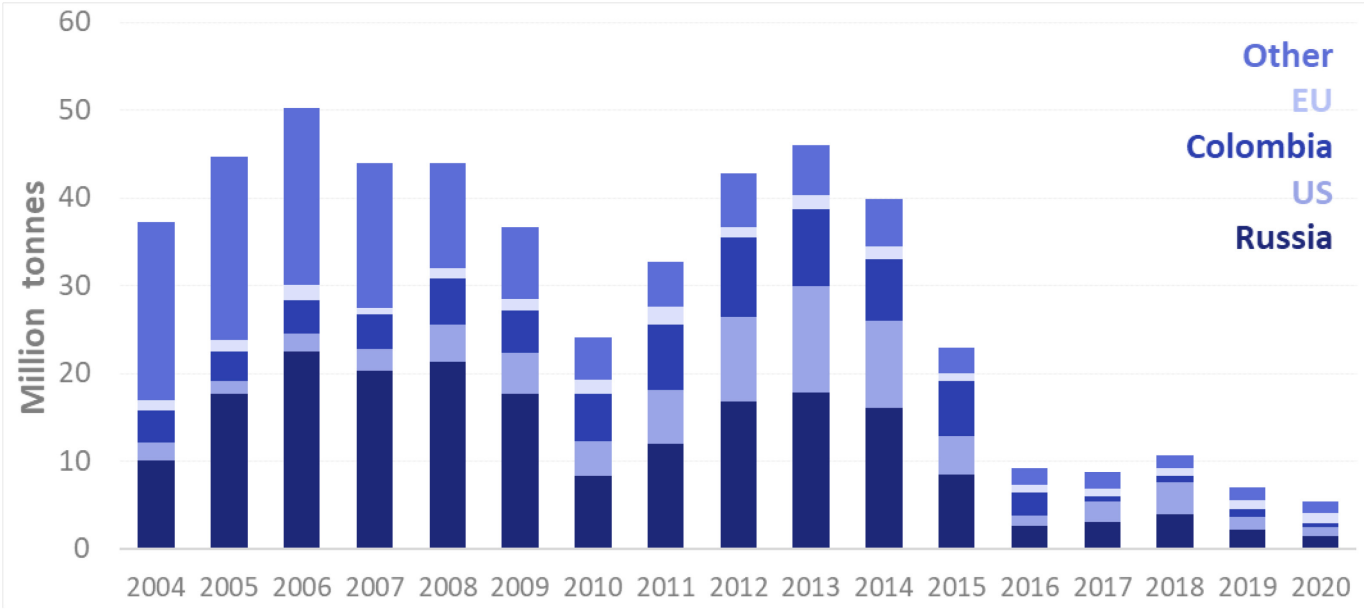


Table G.2, provides a breakdown of HMRC imports and exports of steam coal, coking coal (including coke and semi-coke of coal), anthracite and other solid fuels by country of origin and destination. Coal imports from Russia have been steadily increasing and in 2005, Russia overtook South Africa to become the UK's largest coal provider. Though it has since continued to be so; over the recent years imports of coal from Russia have declined sharply.

The bigger shares of coal imports in 2020, have been from Russia (27 per cent) and the EU (22 per cent). The EU taking over the second place from the US. In 2020 coal imports decreased by 24 per cent as imports from Russia and the US decreased by 33 per cent. Imports from the EU increased by 17 per cent. In 2020, coal from the US made up 19 per cent, and coal from Colombia made up 8 per cent of coal imports to the UK.

Of the total coal imported in 2020, 27 per cent was steam coal, 61 per cent was coking coal and the rest anthracite and other solid fuels. In 2020, steam coal imports were down by 53 per cent with imports from Russia down by 56 per cent to 0.6 million tonnes, from the US imports were down by 97 per cent to 0.02 million tonnes and from Colombia steam coal imports were down by 73 per cent to 0.1 million tonnes.

In 2020, 30 per cent of the UK coking coal imports (including coke and semi-coke of coal) came from the US followed by 26 per cent from Russia and another 15 per cent from Australia. The bulk of anthracite and other solid fuels imports were from EU countries.

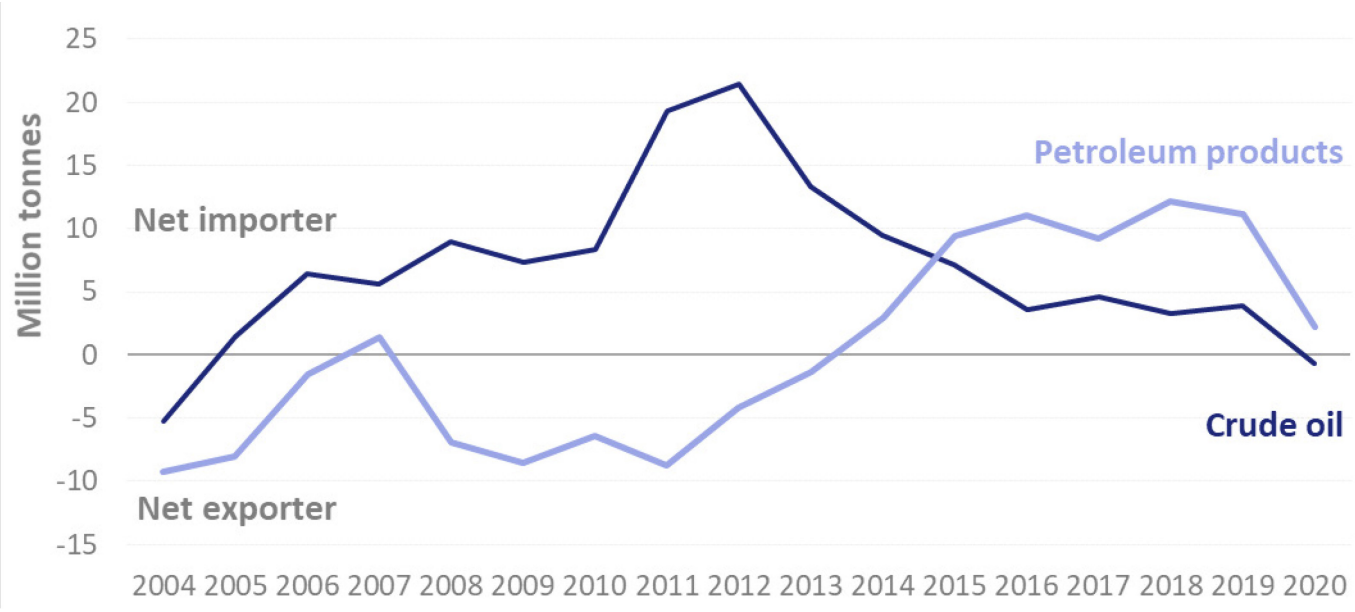
Exports of coal and other solid fuels rose by 88 per cent to 1.9 million tonnes in 2020 of which 23 per cent were to Germany and 19 per cent were to the Irish Republic.

Crude oil and petroleum products

Trade quantities, in thousands of tonnes, of crude oil and refined petroleum products are shown in in Table G.3. In the table, the import values per tonne are expressed on a cost, insurance and freight (c.i.f) basis while the export values are on a free on board (f.o.b) basis (e.g., costs of goods to the purchaser abroad) – see Value section for more details.

Table G.4 provides trade data in crude oil by country where the import data, as far as possible, are on a 'country of origin' (or production) basis. Since becoming a net importer of crude oil in 2005, the UK's net imports of crude oil have steadily increased, rising significantly between 2010 and 2012. Net imports of crude oil as reported by HMRC (and BEIS) have since been on the decline. In 2020, the UK became a net exporter of crude oil for the first time since 2004 (Chart G.4).

Chart G.4 Net trade of crude oil and petroleum products, 2004 – 2020

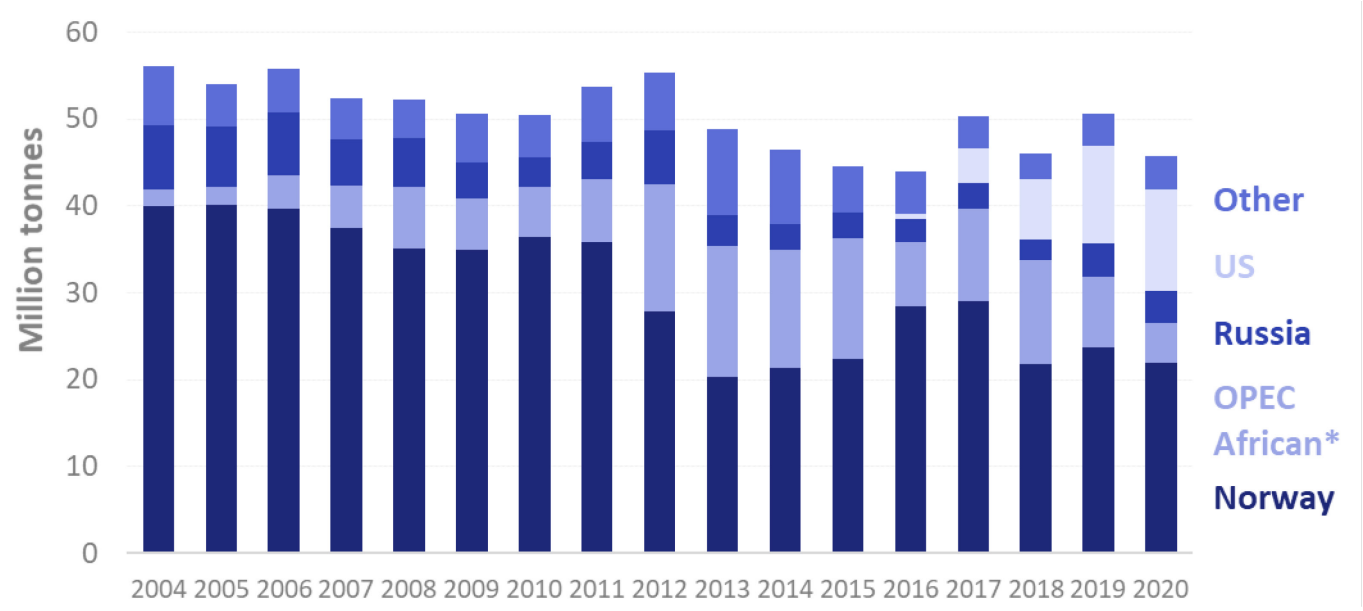


Norway remains the major crude oil supplier to the UK, suppling 48 per cent of all imports (chart G.5). In 2020, Norway imports were 7.5 per cent lower than the previous year and 24 per cent lower than the recent high in 2017. Of the remaining total crude imports 10 per cent (which was 44 per cent less than in the previous year) was from the OPEC African countries, namely Algeria, Libya, and Nigeria; 25 per cent was from the US while imports from Russia were 8.3 per cent of the total.

In 2020, exports of crude oil dropped by 0.9 per cent on the previous year while exports to EU countries were up by 14 per cent and accounted for 75 per cent of the UK's total exports of crude oil.

The UK's two largest markets in the EU are the Netherlands (up 27 per cent), followed by Germany (up 18 per cent); the bulk of the exports to Germany are for refining and consumption, whilst exports to the Netherlands include oil destined for onward trade to other countries. The largest non-EU markets for crude oil in 2020 were China, down 43 per cent on the previous year and accounting for 55 per cent of the total non-EU exports.

Chart G.5 Imports of crude oil by country of origin, 2004 – 2020



** OPEC African members are Algeria, Angola, Nigeria and Libya*

The main refined petroleum products imported into the United Kingdom remained as gas diesel oil, which accounted for 43 per cent of the total followed by jet fuel (kerosene type jet fuel), which accounted for 22 per

cent. The main refined petroleum products exported in 2020 were motor & aviation spirits which accounted for 22 per cent of the total exported. Other light oils and spirit accounted for 21 per cent and gas diesel oil accounted for a further 19 per cent and fuel oils 19 per cent. Jet fuel exports accounted for 6 per cent.

On a net trade basis, in 2020 HMRC data show that the UK was again a net importer of petroleum products with net imports of 2.2 million tonnes (Chart G.4), which was 8.9 million tonnes less than in the previous year. In 2020 the UK net imports of jet fuel were 4.5 million tonnes and of gas diesel oil 6.9 million tonnes. However, in 2020 the UK was also a net exporter of some petroleum products, including petrol (3.2 million tonnes) and fuel oils (2.5 million tonnes).

Imports and exports of natural gas

Between 1997 and 2003 the UK was a net exporter of gas. UK gas production peaked in 2000 and has since been in general decline and broadly flat in recent years. As a result, the UK has sought to access additional supplies of gas from a range of sources to bridge the gap between indigenous production and demand as reserves on the UK Continental Shelf deplete.

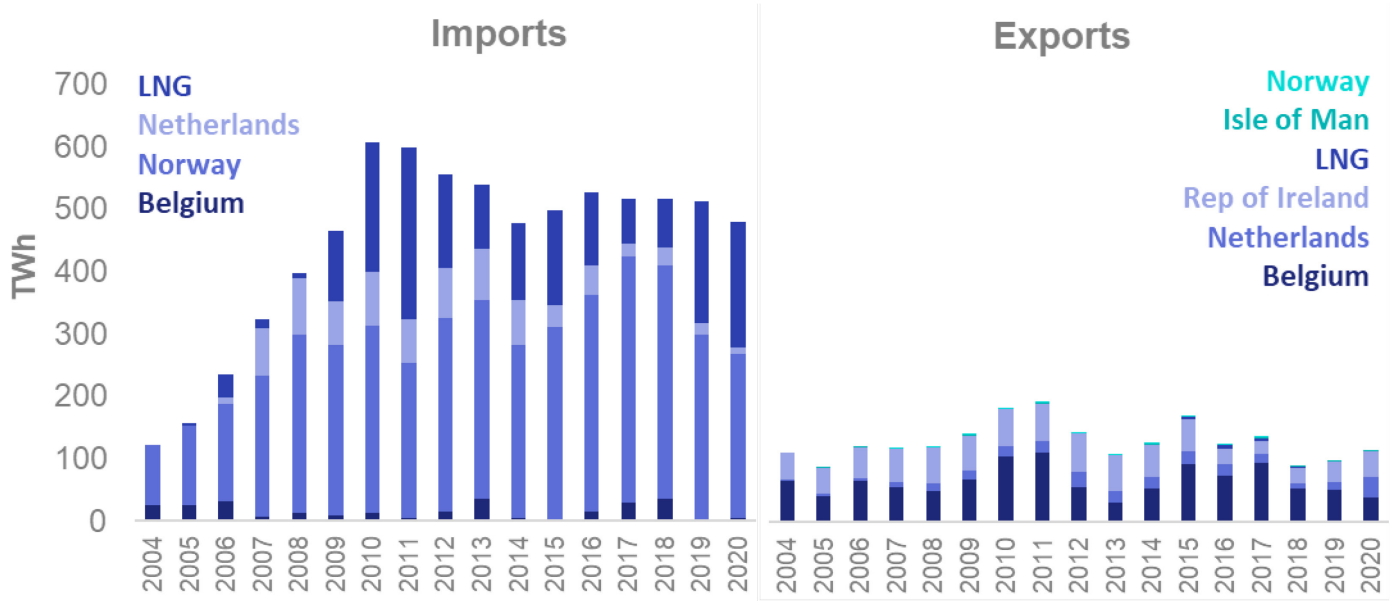
Since 1999 natural gas imports had been increasing sharply, reaching a peak in 2010 since when imports levels have declined, remaining broadly level in recent years. In 2020 gas imports were down by 6.5 per cent from the previous year. More than half (55 per cent) of gas imports came via the Norway pipelines, with 42 per cent coming via LNG. Chart G.6 depicts the trends in natural gas imports and exports by country. It also includes trends in the volume of LNG imports (see Chart G.7 for country breakdown of LNG imports).

The UK has one of the world’s largest LNG import capacities, and the largest at a single installation in Europe at South Hook near Milford Haven. The UK also has an established pipeline structure to trade natural gas with the continent. Between 2015 and 2018 the UK exported LNG as 'reloads' because a long-term supply contract fixed lower acquisition prices, making it financially viable to export. However, following the ending of this contract the UK has not exported LNG but has taken advantage of the low spot market prices to secure LNG supply from a diverse range of sources.

Table G.5 gives a breakdown of imports and exports of natural gas by country of origin and destination. The data in the table are physical flows as reported by the pipeline or terminal operators to BEIS. Whilst the data presented in the table differ from the nominated flows reported in Chapter 4, the overall net flows (e.g., net imports or net exports) are the same.

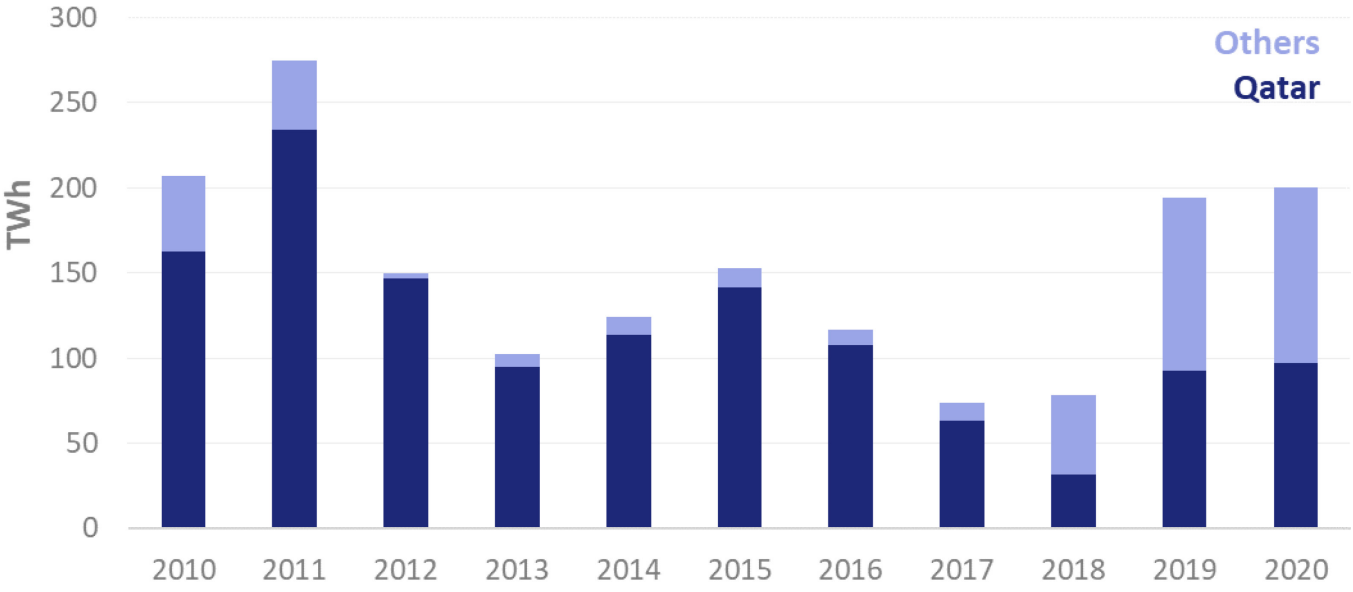
In 2020 the UK exported 106 TWh of gas which was 17 per cent higher than in 2020. Belgium was one of the main destinations of UK gas exports (from where it could be shipped elsewhere in mainland Europe), exporting 36 TWh of gas in 2020, a 25 per cent drop on the previous year. The Republic of Ireland was another where 38 TWh was exported, a 22 per cent increase on the previous year. The other main destination of UK gas exports was the Netherlands via the UK share gas fields using the Dutch WGT pipeline system to Den Helder and Uithuizen. The UK exported 31 TWh of gas to the Netherlands in 2020, more than tripling the volume in 2019.

Chart G.6 Imports and exports of natural gas by country, 2004 – 2020



LNG imports from various sources (Chart G.7) almost trebled and accounted for 38 per cent of total gas imports in 2019. These levels of LNG imports have continued into 2020, with LNG making up 42 per cent of all gas imports. LNG imports from Qatar accounted for 48 per cent of total LNG imports in 2020. Other sources of LNG came from the US, 27 per cent of the total, and Russia, 12 per cent of the total.

Chart G.7 Imports of LNG by country, 2010 – 2020



Imports and exports of electricity

For over a decade, the UK has been a net importer of electricity. In 2020, imports of electricity were mainly from France (10.4 TWh) and the Netherlands (4.7 TWh); whilst exports were mainly to Ireland (1.8 TWh) and France (1.7 TWh). In 2020, imports of electricity fell by 9 per cent to 22.4 TWh as falls in imports from France and Netherlands were only partially offset by increases in imports from Belgium and Ireland. Exports of electricity rose by 32 per cent to 4.5 TWh as exports to France, Belgium and the Netherlands rose. Overall net imports of electricity in 2020 was down by 15 per cent from 21.2 TWh to 17.9 TWh.

Imports and exports of renewables

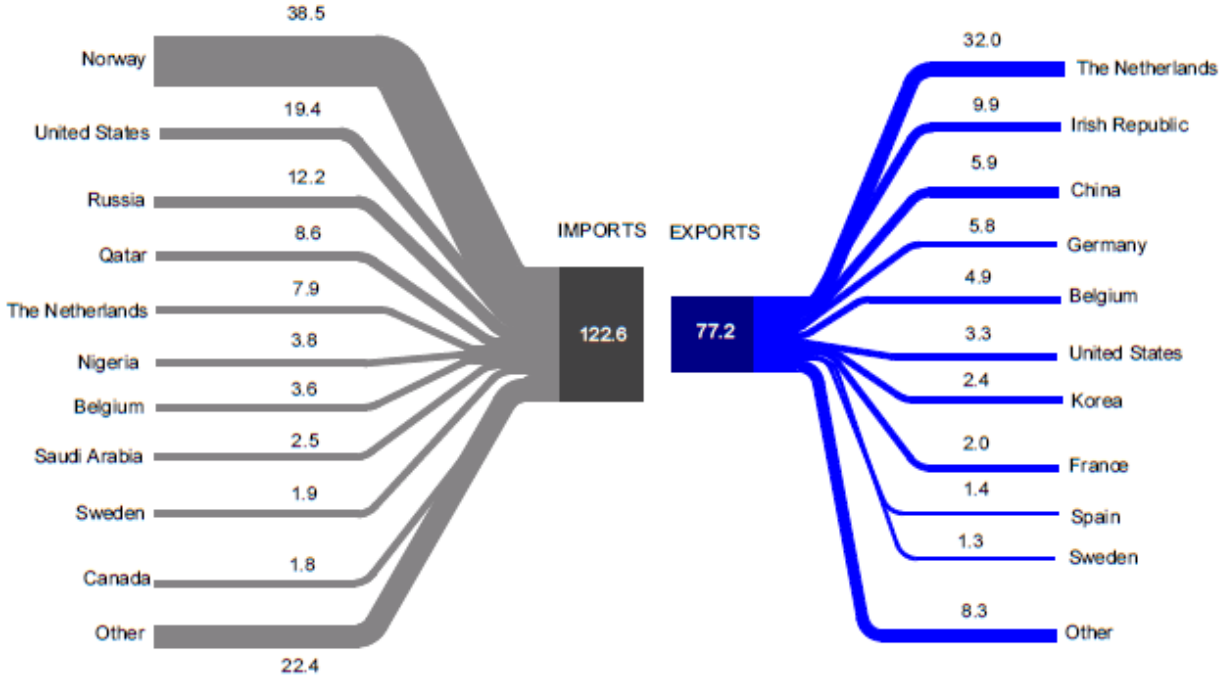
Apart from wood pellets and biodiesel, HMRC do not collect any other specific data on the imports of renewables intended to be used for energy purposes. In 2020, wood pellet imports to the UK, mainly from the United States, were around 8.9 million tonnes, an increase of 3 per cent on the previous year (table G.6). In 2020 BEIS estimates of total renewables imports to the UK which include wood, wood waste, biomass and

liquid biofuels were 5.7 mtoe, up 3 per cent on the previous year. Liquid fuels imports remained broadly stable (down just 0.2 per cent) and wood and wood waste imports were the same on the previous year.

UK markets in 2020

Chart G.8 shows the UK's ten largest markets in volume trade of coal, primary oils and oil products, gas, electricity, and renewables in 2020. Nearly one-third (31 per cent) of the total imports to the UK were from Norway, followed by 16 per cent from the United States and 10 per cent from Russia. Just over 40 per cent (42 per cent) of total UK exports were to the Netherlands and 13 per cent were to the Irish Republic.

Chart G.8 UK trade by country for imports and exports, million tonnes of oil equivalent



Source DUKES 2021

Value

Imports and exports of fuels (Overseas Trade Statistics basis)

For statistical purposes, the UK adopts the valuation basis for overseas trade statistics as recommended in the International Merchandise Trade Statistics Concepts & Definitions published by the United Nations. This means that the valuation of exports and dispatches is on a free on board (fob) basis (e.g., costs of goods to the purchaser abroad) while the valuation of imports and arrivals is on a cost, insurance, and freight (cif) basis which includes all the incurred expenses in moving the goods to the point of entry into the UK but excludes any duty or tax chargeable in the UK.

On an Overseas Trade Statistics basis, following the switch from the energy trade surplus of £0.6 billion in 2004, the UK has remained in deficit (Chart G.9). Between 2005 and 2008, the energy trade deficit grew steadily but fell back in 2009 reflecting lower oil prices. It then continued to grow significantly reaching £22 billion in 2012 before falling back again between 2013 and 2016 driven by a fall in the deficit of crude oil and petroleum products. In 2018 the energy trade deficit rose by 73 per cent to around £18.1 billion including an increase in deficit in oil and petroleum products as crude oil and gas prices increased.

In 2020 the energy trade deficit at £1.3 billion, was 62 per cent lower than in the previous year and on the same Overseas Trade Statistics basis there was a surplus in crude oil given the falls in crude oil prices. As a result, the combined surplus in crude oil and petroleum products at £3.5 billion (compared to a £2.2 billion surplus in 2004 – see chart G.10) was down by 9 per cent on the previous year.

Chart G.9 Value of net exports of fuel, 2004 – 2020

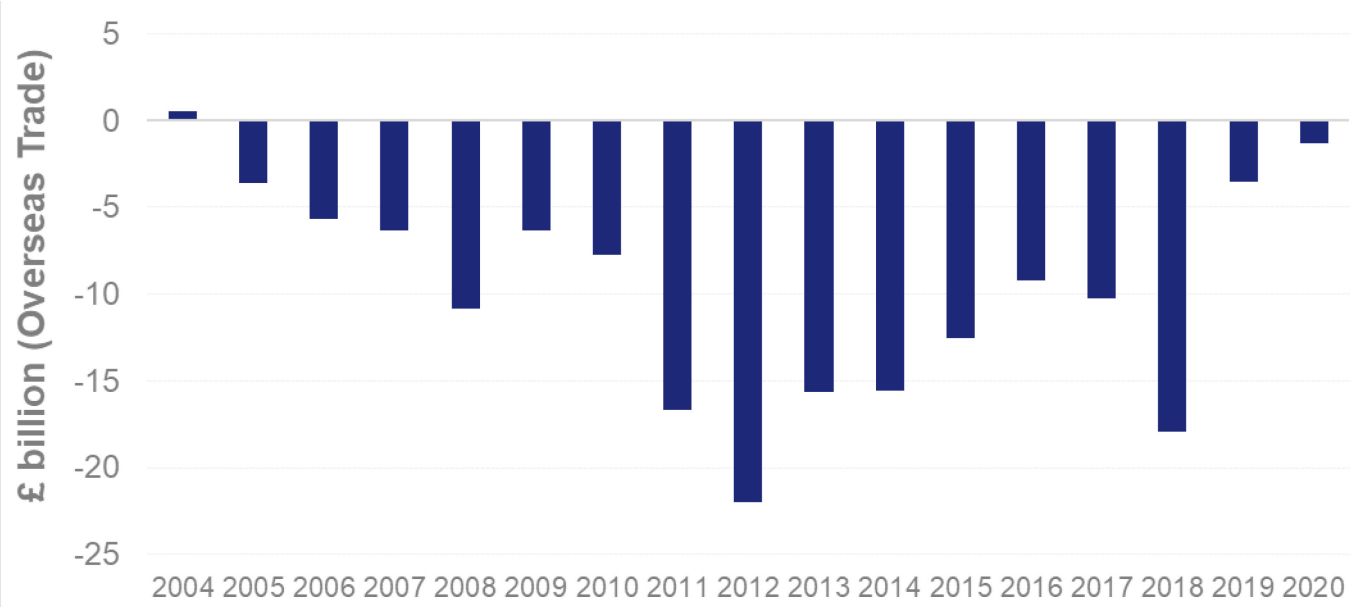
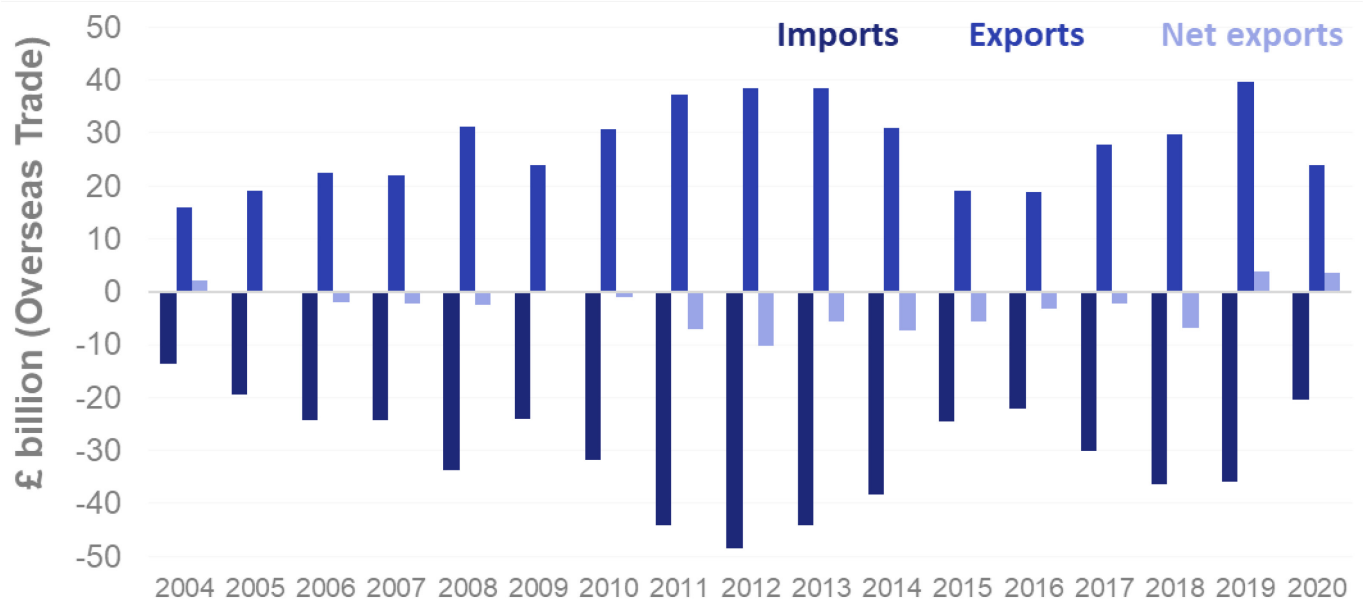


Chart G.10 Value in trade of oils, 2004 – 2020



Imports on CIF, exports on FOB basis

Imports and exports of fuels (Balance of Payment basis)

To conform with the International Monetary Fund (IMF), the Office for National Statistics (ONS) compiles their energy trade data on a Balance of Payment basis in which the value of goods is the value at the point of the exporting country (e.g., the freight and insurance costs to the UK is excluded from the value recorded by HMRC).

Chart G.11 shows the net exports of fuels in value terms on a Balance of Payments basis since 1970. The United Kingdom's trade in fuels was dominated by imports until exports started to grow substantially in the mid-1970s, when production from the North Sea started, resulting in a trade surplus in 1981. This surplus was sustained between 1981 and 2003, except for a small deficit in 1989, and amounted to just under £80 billion over that period. However, these surpluses were reduced by the fall in oil prices in 1986, and then by the fall in North Sea production following the Piper Alpha accident in 1988 and the resulting safety works. Although the trade surplus increased steadily from 1992 to 1996, there were falls in 1997 and 1998 due to the drop in the price of crude oil. Prices of crude oil and petroleum products increased in 1999 and again in 2000 giving it, in current price terms, the highest net surplus. In 2001 the value of the trade surplus fell, reflecting falls in the

price of crude oil and petroleum products; however, this was partly reversed by a 6.2 per cent increase in the net trade surplus during 2002.

Since 2005 the UK has been a net importer of fuels. The deficit increased sharply in 2008 due to a sharp rise in the price of crude oil with Brent prices increasing by $26 per barrel to $98 per barrel, before falling back to $63 per barrel in 2009. In 2011 there was another sharp increase in the size of the energy trade deficit, which more than doubled that in 2010, from £9.5 billion to £20.2 billion; this was mainly due to the oil deficit increasing from £4.3 billion to £10.9 billion, as oil prices rose sharply from an average of $80 per barrel in 2010 to $111 per barrel in 2011. Between 2013 and 2017 deficit fell as crude oil prices fell, reaching a low of $45 in 2016. In 2018 deficit increased, as the other fuels deficit increased.

In 2019 and 2020, the total deficit fell and was £2.4 billion in 2020, £1.6 billion less than in the previous year. This has been driven by a fall in the deficit in other fuels and a surplus in oil net exports. The price of crude oil fell by $22 per barrel to $42 in 2020.

Chart G.11: Value of net exports of fuels on a balance of payment basis, 1970 – 2020

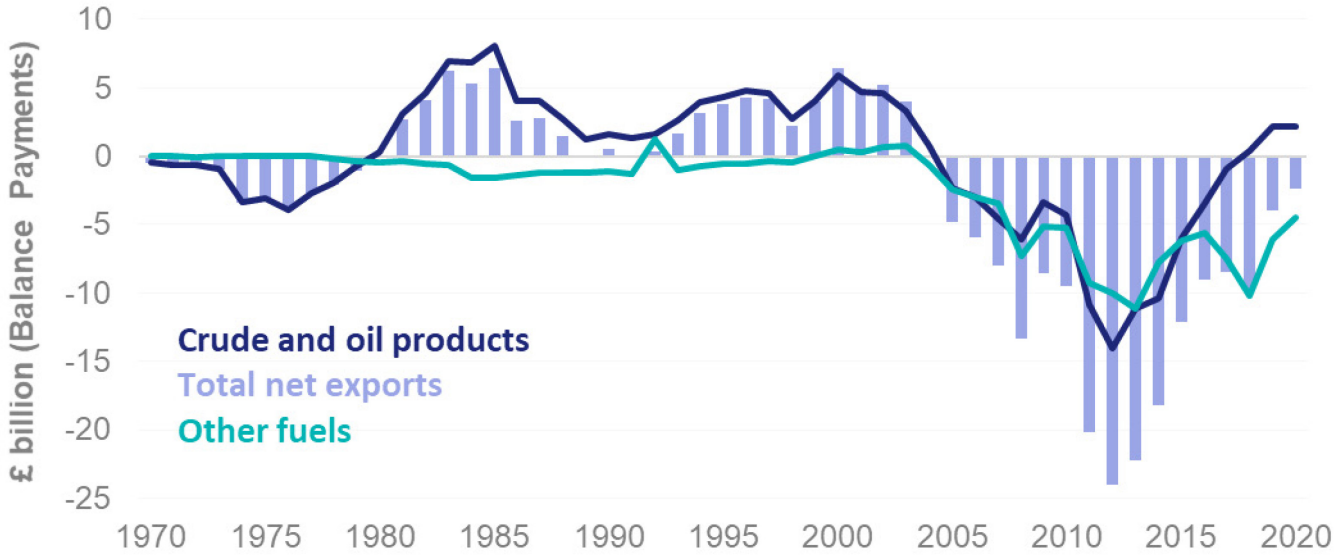


Table G.7 shows the trends in the UK trade values from 1970 to 2020 both on an Overseas Trade Statistics and Balance of Payments basis. Import values on a f.o.b. basis are also included in the table, to allow net exports to be presented on a comparable f.o.b. basis over the same period.

Technical notes and definitions

The figures of imports and exports quoted in this annex are derived from notifications to HM Revenue and Customs and may differ from those for actual arrivals and shipments, derived from alternative and/or additional sources, in the sections of the Digest dealing with individual fuels. Data in Table G.1 also include unpublished revisions to Customs data, which cannot be introduced into Tables G.3 to G.5.

All quantity figures in Table G.1 have been converted to million tonnes of oil equivalent to allow data to be compared and combined. This unit is a measure of the energy content of the individual fuels; it is also used in the Energy section of this Digest and is explained in Annex A, paragraphs A.45 to A.46. The quantities of imports and exports recorded in the Overseas Trade Statistics, in their original units of measurement, are converted to tonnes of oil equivalent using weighted gross calorific values and standard conversion factors appropriate to each division of the Standard International Trade Classification (SITC). The electricity figures are expressed in terms of the energy content of the electricity traded.

Except as noted in Table G.7, values of imports are quoted “c.i.f.". Briefly this value is the price that the goods would fetch at that time, on sale in the open market between buyer and seller independent of each other, with delivery to the buyer at the port of importation, the seller bearing freight, insurance, commission, and all other costs, etc, incidental to the sale and delivery of the goods except for any duty or tax chargeable in the United Kingdom. Values of exports are “f.o.b.", which is the cost of the goods to the purchaser abroad, including packing, inland and coastal transport in the United Kingdom, dock dues, loading charges and all other costs, charges and expenses accruing up to the point where the goods are deposited on board the exporting vessel or at the land boundary of Northern Ireland.

Figures of the value of net exports in Tables G.7 are derived from exports and imports measured on a Balance of Payments basis. The figures are consistent with the European System of Accounts 1995, the basis on which they are published by the Office for National Statistics and since 2016 HMRC through their UK Trade Info dataset. This means exports as recorded by HM Revenue and Customs on any other basis, will differ from those recorded by the Office for National Statistics and UK Trade Info on a Balance of Payment basis.

G.41 Figures correspond to the following items of SITC (Rev 3):

Coal	321.1 and 321.2
Other solid fuels	322 and 325 (part)
Crude oil	333
Petroleum products	334,335,342,344 (plus Orimulsion reclassified to division 278 in 1994)
Natural gas	343
Electricity	351

In 1993, the Single European Market was created. At that time, a new system for recording the trade in goods between member states, called INTRASTAT, was introduced. As part of this system only obliges small traders to report their annual trade and as some trading supply returns are late, it is necessary to include adjustments for unrecorded trade. This is particularly true of 1993, the first year of the system and of coal imports in that year.

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Annex H: Flow charts

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Introduction

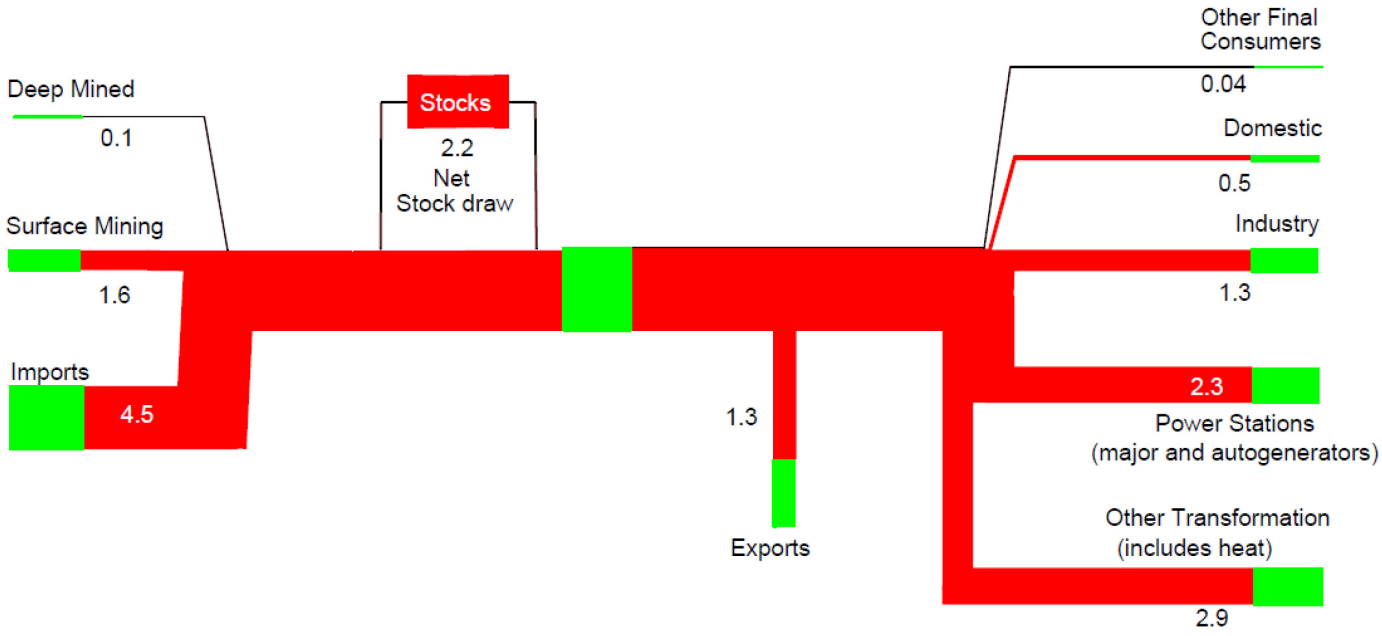
This section brings together the flow charts for individual fuels contained in the main Digest publication. Chart H.1 is for Coal, Chart H.2 is for Petroleum, Chart H.3 is for Natural Gas, Chart H.4 is for Electricity and Chart H.5 is for Renewables. Annual updates will appear in subsequent editions of the main Digest publication and on the BEIS section of the GOV.UK website.

Also included within the annex is an additional flow chart for Manufactured Solid Fuels (H.6). Annual updates will appear on the BEIS section of the GOV.UK website.

Summary flow chart

The summary flow chart updates the last energy flow chart which showed data for 2019. It is based on statistics taken from the main Digest publication, Table 1.1 – Energy Balance 2020. The chart is a simplification of the energy balance figures, illustrating the flow of primary fuels from the point at which they become available from home production or imports (on the left) to their eventual final uses (on the right). They are shown in their original state and after being converted into different kinds of energy by the secondary fuel producers. The flows are measured in million tonnes of oil equivalent, with the widths of the bands approximately proportional to the size of the flow they represent. The flow charts for individual fuels have been produced on a similar basis.

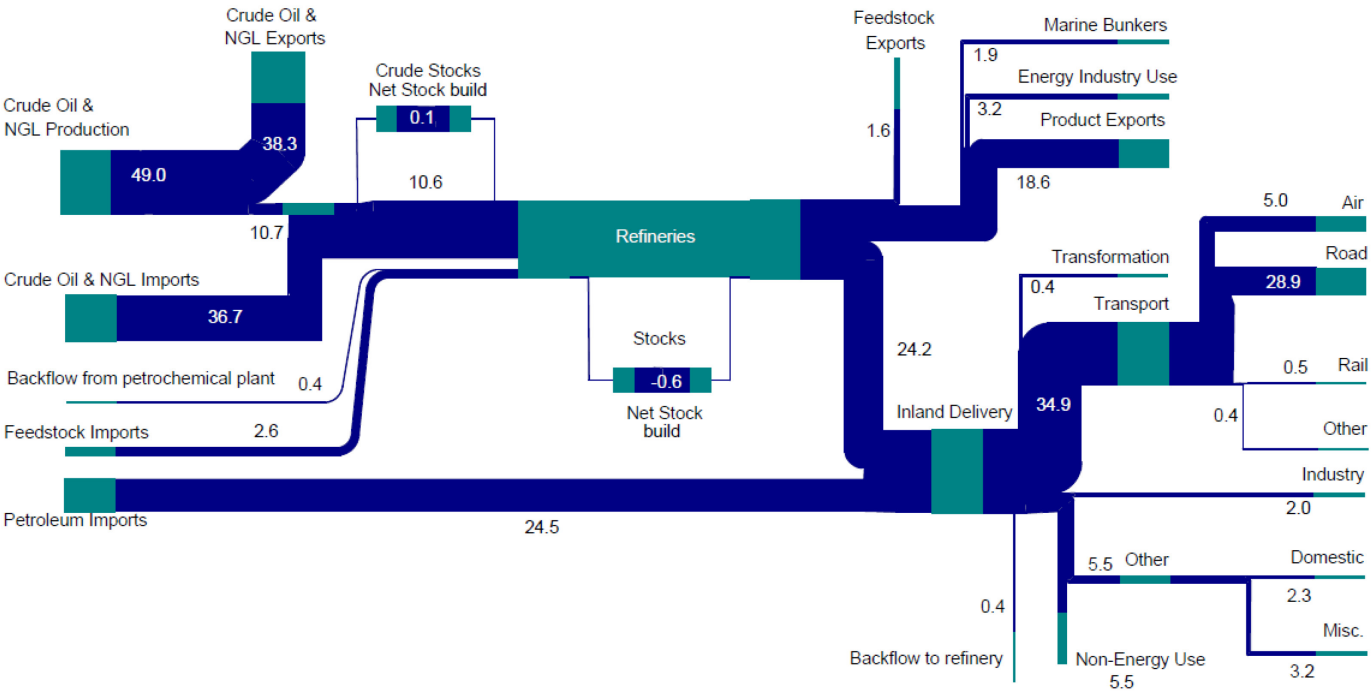
Chart H.1: Coal flow chart 2020 (million tonnes of coal)



Note:

This flow chart is based on the data that appear in DUKES tables 2.1 and 2.4.

Chart H.2: Petroleum flow chart 2020 (million tonnes)



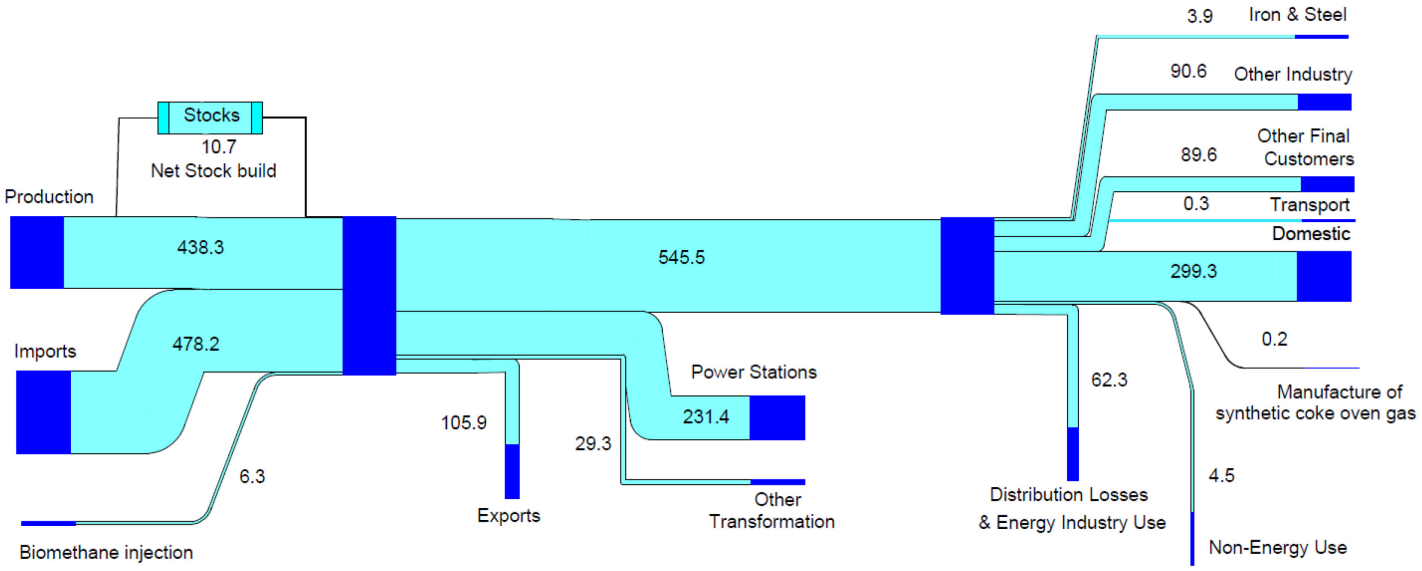
Notes:

This flow chart is based on the data that appear in DUKES tables 3.1 and 3.2.

The numbers on either side of the flow chart will not match due to losses in transformation.

Biofuels are not included.

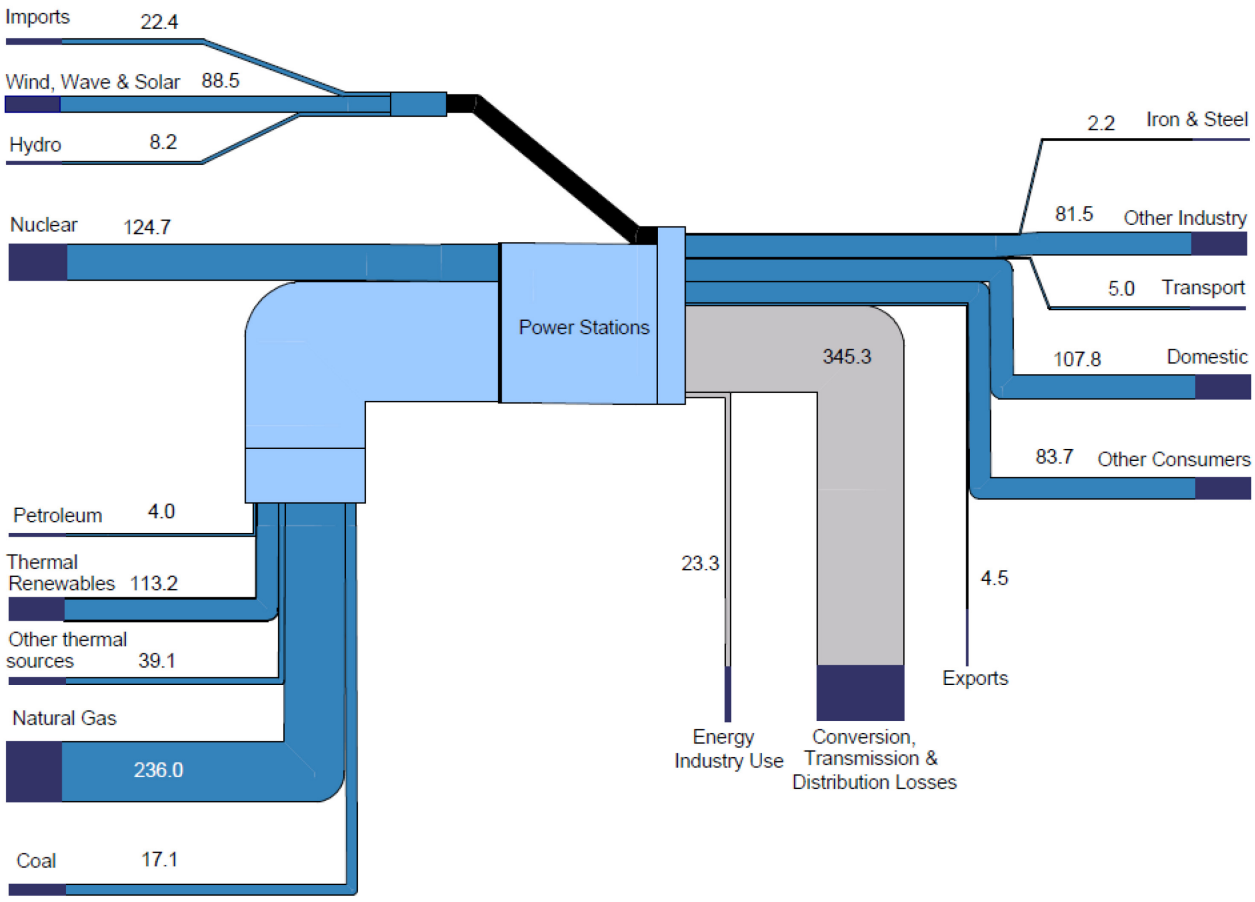
Chart H.3: Natural gas flow chart 2020 (TWh)



Note:

This flow chart is based on the data that appear in DUKES table 4.1, excluding colliery methane.

Chart H.4: Electricity flow chart 2020 (TWh)



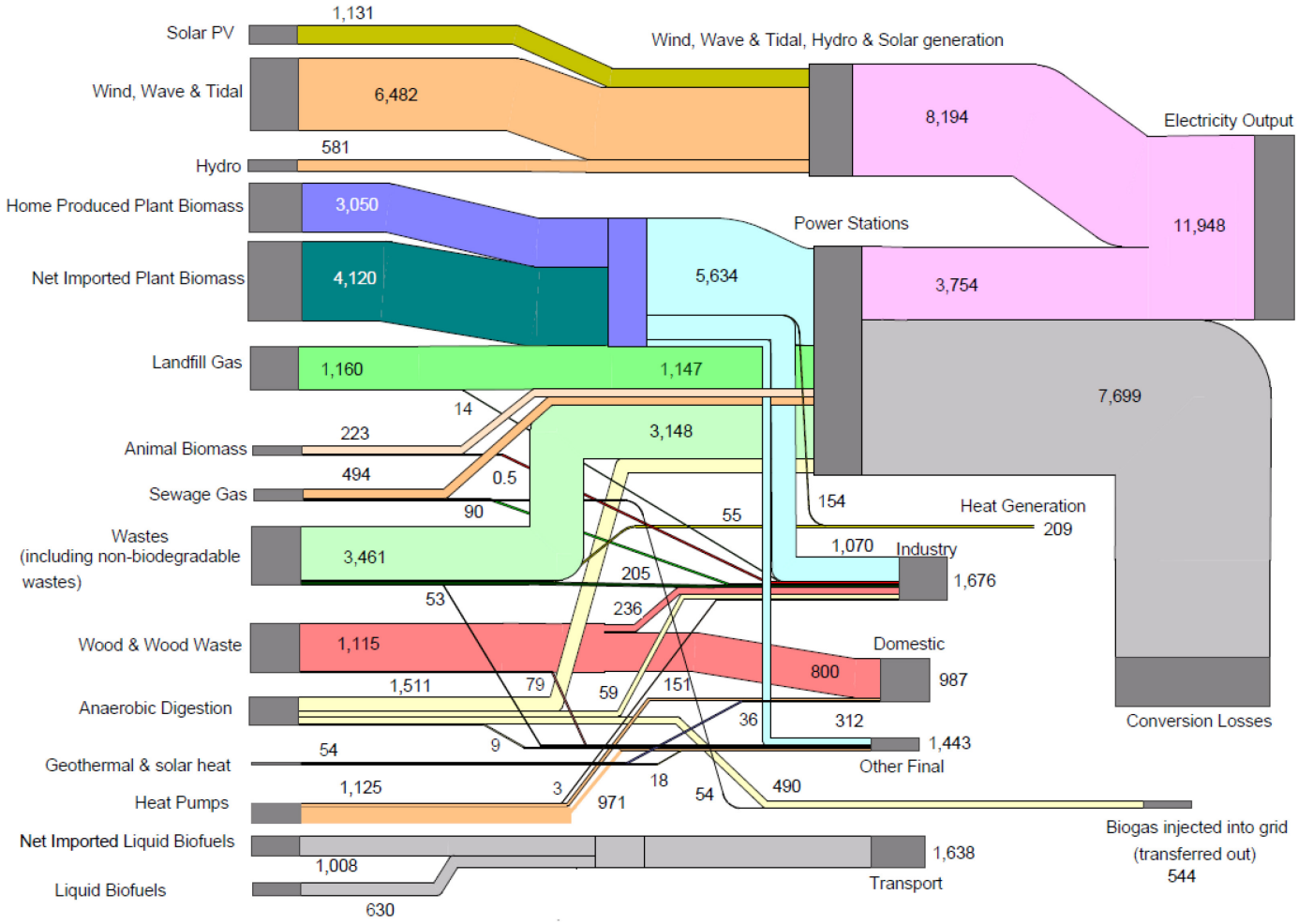
Notes:

This flow chart is based on the data in DUKES tables 5.1 (for imports, exports, use, losses and consumption) and 5.6 (fuel used).

Hydro includes generation from pumped storage while electricity used in pumping is included under Energy Industry Use

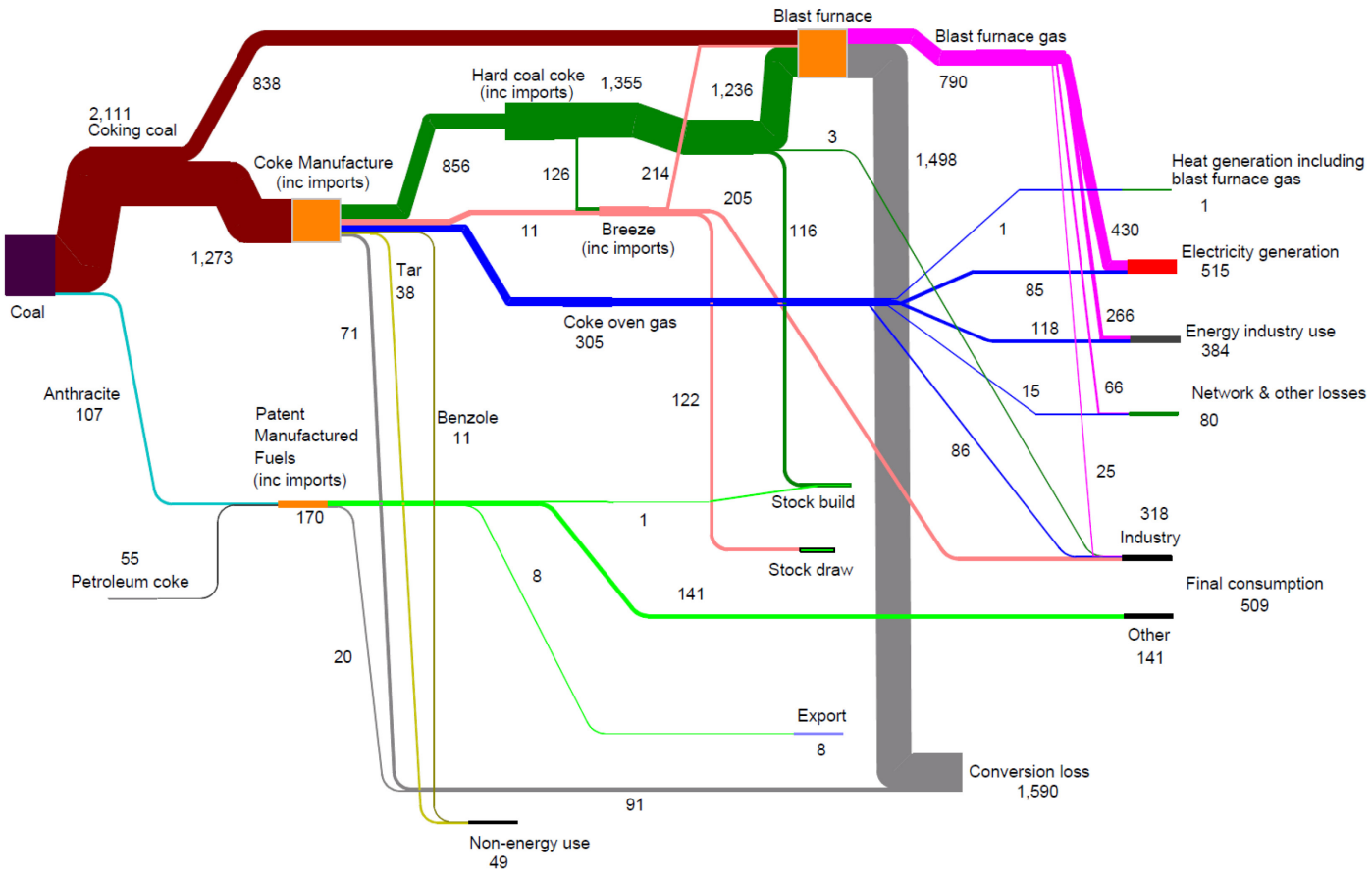
Conversion, Transmission and Distribution Losses is calculated as fuel used (Table 5.6) minus generation (Table 5.6) plus losses (Table 5.1)

Chart H.5: Renewables flow chart 2020 (thousand tonnes of oil equivalent)



Note: This flow chart is based on data that appear in DUKES tables 6.1 and 6.4.

Chart H.6: Manufactured Solid Fuels flow chart 2020 (thousand tonnes of oil equivalent)



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Annex I: Energy balance net calorific values

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Aggregate energy balance (Table I.1)

These tables show the flows of energy in the United Kingdom from production to final consumption through conversion into secondary fuels such as coke, petroleum products, secondary electricity and heat sold using Net Calorific Values (NCV) from 2004 to 2020. The NCVs used are detailed in table A.3 of DUKES available at: https://www.gov.uk/government/statistics/dukes-calorific-values.

Department for Business, Energy & Industrial Strategy

Annex J: Heat reconciliation

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Introduction

Heat sold has been separately identified in the energy balances since 1999. It is defined as heat that is produced and sold under the provision of a contract. The introduction of heat sold into the energy and commodity balances did not affect the individual fuel totals, since the energy used to generate the heat has been deducted from the final consumption section of the energy balances and transferred to the transformation section. Annex J tables show the detailed analysis of the heat generation row of the main energy balances, by sector generating the heat, and are available at:

www.gov.uk/government/statistics/energy-chapter-1-digest-of-united-kingdom-energy-statistics-dukes

For transparency, data on the quantity of fuel by consuming sector used to produce heat that is subsequently sold are being made available in the tables that accompany this annex.

Methodology

Data sources used to compile heat generation and heat sold are primarily from the Combined Heat and Power Quality Assurance Program (CHPQA) [1]) and also data collected for the Heat Metering and Billing Regulations[2] with some assumptions being carried over from the previous estimates prior to these regulations being in force.

CHPQA data

These data are supplied to BEIS annually by Ricardo Energy and Environment and form the basis of DUKES Chapter 7; Combined Heat and Power[3] . The data include heat exported and whether it's being exported to an entity declared 'not part of same qualifying group', in which case it is deemed to be sold under a contract thus satisfying the definition set out above.

A sectoral analysis of heat generators has shown that certain suppliers are classified as 'Electricity, gas, steam, and air conditioning supply'. This sector falls within the transformation sector in the energy balances and as such can't be deducted from any sector in final consumption and their main business is deemed to be supplying a heat network. It is therefore included in the heat generation row and for transparency, as an 'of which heat networks' row below this in the annex tables.

Non CHPQA data

Following the publication of experimental statistics collected in respect of the Heat, Metering and Billing Regulations (HMBR) database in the March 2018 edition of Energy Trends[4], the data have been evaluated and incorporated into the heat generation figures presented in this annex. As there are gaps in this data, CHPQA data have been used where possible. For other schemes, various assumptions were applied to the HMBR dataset:

[1] www.gov.uk/guidance/chpqa-guidance-notes
[2] www.gov.uk/guidance/heat-network
[3] www.gov.uk/government/statistics/combined-heat-and-power-chapter-7-digest-of-united-kingdom-energy-statistics-dukes
[4] www.gov.uk/government/publications/energy-trends-march-2018-special-feature-article-experimental-statistics-on-heat-networks

- Heat supplied was assumed to be heat sold
- The fuel input has been estimated by assuming the previous efficiency
- Where the fuel categories are not sufficiently disaggregated, historic proportions have been applied
- For those networks which have mixed final consumers, it is difficult to assign heat supplied to each sector. To address this, the average generation for domestic consumers (residential properties display considerably less variation compared to industrial and commercial consumers) was used with the remainder being allocated across industrial consumers, and the commercial and public sectors.

The decision not to use the HMRB data set for CHP schemes was deemed to be appropriate due to the CHPQA administration data being timely and subject to quality assurance. It also provides the correct level of detail such as fuel type, sector generating heat, and final customer types. In contrast, the previous non-CHP estimates were previously derived from the Building Research Establishment's "National Survey of Community Heating" that was carried out in 1997, a database of community heating schemes in social housing in 2000, and Community Heating Sales Surveys undertaken between 2003 and 2005. The estimates from these sources have been used to derive heat sold figures since 1999; these estimates are now considered less relevant than the more up to date data collected in the HMBR database despite having to use assumptions to achieve the correct estimates across generators and final customers.

This publication is available from: https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes

If you need a version of this document in a more accessible format, please email energy.statistics@beis.gov.uk

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