Update to estimates of industrial consumption within *Energy Consumption in the UK* (ECUK)

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Key headlines

The Department for Energy Security and Net Zero (DESNZ) collects data on industrial energy consumption at a level which groups together various individual industry sectors into high level aggregates including (for example) chemicals, mechanical engineering, vehicles, food & beverages etc. These groupings form the basis for the annual energy balances that are published in the Digest of UK Energy Statistics (DUKES)[1].

DESNZ also provide more detailed estimates at the finer granularity of SIC division (2-digit SIC code level) in Energy Consumption in the UK (ECUK[2]), published annually in September. In ECUK, the high-level aggregates are broken down into smaller constituent elements using modelling and other data sources.

This paper outlines the steps we intend to take to revise the method for estimating the consumption levels of these finer-grained groupings and introduce detailed consumption breakdowns for bioenergy and waste for the first time.

ECUK industrial consumption

UK energy statistics in the Digest of UK Energy Statistics

The Department for Energy Security and Net Zero (DESNZ) is responsible for publishing data on the UK's energy system. The annual energy balances, which show the UK's production, consumption and trade of energy, are published in the Digest of UK Energy Statistics (DUKES). For industrial energy demand, data is collected in line with the requirements of the International Energy Agency (IEA)[3]. These aggregates collate industrial consumption into 13 sectors. To maintain consistency between publications and data providers these industry sectors in the energy balance are defined by the UK Standard Industrial Classification (SIC) codes, which provide a framework for collecting and publishing data on economic activity[4].

The SIC codes that make up each DUKES sector are given in the methodology documentation for the energy balances[5].

Energy Consumption in the UK

The DESNZ publication Energy Consumption in the UK (ECUK) builds on the data released in DUKES to provide a more detailed breakdown of end-use energy consumption. The methodology for ECUK differs from DUKES as it uses modelling and other data sources to estimate consumption at a greater level of disaggregation. For the industrial sector ECUK estimates the consumption for specific industry groupings (SIC division) and different types of industrial processes (e.g. high temperature processes, refrigeration).

Industry consumption by SIC division

ECUK Table C3 provides the industrial consumption data presented in DUKES disaggregated to SIC divisions (2-digit SIC codes). For example, the mineral products industry sub-sector consumption given in DUKES is split into SIC division 08 (other mining and quarrying) and SIC division 23 (manufacture of other non-metallic mineral products).

The data in Table C3 is generated using a reference table (labelled Ref 2 in the current ECUK data tables) which defines the proportion of consumption in each industry sub-sector that is allocated to each SIC division

[1] Digest of UK Energy Statistics (DUKES) - GOV.UK
[2] Energy Consumption in the UK - GOV.UK
[3] Questionnaires – Data and statistics - IEA
[4] Information on SIC codes can be found at: UK Standard Industrial Classification of Economic Activities - Office for National Statistics
[5] Energy balance: methodology note - GOV.UK

that makes up that sub-sector. This reference table is applied to each year of data from DUKES to generate the SIC division consumption data given in Table C3.

The reference table has been prioritised for updating in ECUK 2025 because:

- The table was last fully updated in the late 2000s using data from the ONS Purchases Inquiry survey[6]. Industrial energy consumption patterns have likely changed in the subsequent years, meaning the reference table may no longer provide an accurate representation of how energy is consumed.
- The fuel mix in use in the UK has evolved since the generation of the reference table. In particular bioenergy & waste and heat have increased in usage and are covered within the DUKES data. These were not present in the data used to generate the reference table and therefore estimates of consumption by SIC division for these fuels could not be provided in ECUK.

Methodological updates for ECUK 2025

Data sources

The Department now has access to data on energy and emissions from UK industry under two schemes, the EU (now UK) Emissions Trading Scheme (ETS)[7], and Climate Change Agreements (CCA)[8] which were not available at the time of the generation of the existing reference table. The CCA data runs in two-year target periods, with the latest data available at the time of this analysis being 2021-22 data. The ETS data is available on an annual basis.

The ETS and CCA are administrative schemes designed to contribute to the reduction of energy use and hence emissions. The ETS applies to energy intensive industries, the power generation sector and aviation. Climate change agreements are voluntary agreements available to a wide range of sectors from energy intensive processes to supermarkets and agricultural businesses. Under both schemes participants monitor and report their energy use. While many smaller businesses may not be part of the ETS or CCA, many large businesses will be covered by the reported data.

For the purposes of this analysis, we assume that the energy use reported through the ETS and the CCA can operate as a proxy for energy use in the UK. Users should note that smaller industrial users are not captured in these data because they are not captured in those schemes. Combined, around two thirds of the industrial consumption reported in ECUK is covered by one of these administrative schemes. There is reasonable coverage of most industrial sectors in the combined ETS/CCA data. Those with least coverage, and therefore highest uncertainty in the resulting estimates, are mechanical/electrical engineering and textiles and leather. The Department continues to investigate options to improve these estimates and reduce the associated uncertainty.

The SIC division a business sits within is not reported directly as part of the data provided under either the ETS or CCA. However, for the purposes of this analysis businesses have been allocated to SIC divisions by matching with data from Companies House and other government data sources[9]. While this allocation is likely to be imperfect, retrospective analysis of the largest consumers suggests the vast majority of businesses were allocated to an expected SIC division. Therefore, we assume any incorrect classification will have negligible impacts on any further analysis.

New reference table

The ETS and CCA data have been combined to generate a new industry SIC division reference table using 2021 and 2022 data (shown in full in Annex 1). In most cases (fuel/industry sector combinations) the ETS/CCA data has allowed for the generation of new estimates of the proportion of consumption for each SIC division within an industry sector. In a limited number of cases (typically when either a fuel wasn't covered by ETS/CCA, or there was no recorded consumption for a fuel within a particular industry sector) proxy estimation was necessary to provide a complete update to the reference table. In practice these proxy estimations are likely to have limited impact on ECUK outputs as a lack of data in ETS/CCA suggests there is likely to be low overall consumption of those particular fuels within the national level DUKES data.

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[6] Development of the Annual Purchases Survey - Office for National Statistics

[7] Participating in the UK ETS - GOV.UK

[8] Climate change agreements - GOV.UK

[9] It is possible for companies to operate in more than one SIC division (multiple SIC codes can be listed on Companies House for example). In these cases a SIC code was selected based on the most predominant output.

The new table improves on the reference table currently being used in ECUK by being estimated from the most recent available data, and including estimates for bioenergy & waste, for which SIC division splits were not previously available[10].

Implementation in ECUK 2025

The intention is to implement the new reference table in ECUK 2025. This will be used for each year of data from 2021 onwards, with the previous reference table used for 2020 and earlier. To implement within ECUK we are proposing making some changes to the way the industrial consumption data is presented:

- Table C3 will be adjusted to show a single years' worth of data. I.e. in ECUK 2025 Table C3 will show the industrial consumption data for the calendar year 2024 disaggregated to SIC divisions. This is a change from previous ECUK publications for which Table C3 has contained several distinct tables, with each one giving the data for a particular year. This change will improve the readability of Table C3 for users, giving a clear representation of the detailed industrial consumption for the latest year.
- A new table will be added to give users access to the time series of industrial consumption data containing the SIC division estimates. This will be presented in a two-dimensional 'flat-file' format. This addition will allow users to better interrogate and compare the consumption data over time and between fuels/sectors.

Next steps

The reference table presented in this article (Annex 1) is indicative, as we may refine the analysis before the publication of ECUK in September 2025. Going forward, the changes to the reference table described in this article are intended to be the first step in improving the industry consumption data within ECUK and providing more regular updates to the reference tables used. As and when new ETS/CCA data become available we will consider further analysis to generate new reference tables and implement those within ECUK as appropriate. Furthermore, we will continue to investigate other potential data sources to ensure we are basing our industrial consumption estimates on the best available evidence.

Our intention with updating the ECUK reference table in the manner described in this article is to provide higher quality industrial consumption estimates at the SIC division level, a consistent and accessible time-series in ECUK 2025, and to provide a basis on which to provide further updates as and when new information becomes available.

As ever, we welcome comments on these changes.

[10] Heat is not included within the ETS and CCA data sets, therefore SIC division consumption estimates for this fuel remains unavailable in the updated reference table

Annex 1. Updated SIC division reference table

Grey shading represents sectors/fuels for which there was not sufficient data within ETS/CCA to provide specific estimates. For these the average value from similar fuels was used to estimate SIC division splits. For example, for mineral products the manufactured fuel values are estimated using the results for coal, and the naphtha and DERV values are estimated from the outputs for LPG, burning oil, gas oil and fuel oil.

DUKES Sector	SIC code	SIC division	Coal	Manufactured fuel	LPG	Naphtha	Burning oil
Unclassified			100.0%	100.0%	100.0%	100.0%	100.0%
Iron and steel	24 (excl. 24.4, 24.54)	Iron and steel	100.0%	100.0%	100.0%	100.0%	100.0%
Non-ferrous metals	24.4, 24.54	Non-ferrous metals	100.0%	100.0%	100.0%	100.0%	100.0%
Mineral products	8	Other mining and quarrying	0.0%	0.0%	83.5%	52.0%	69.0%
	23	Manufacture of other non-metallic mineral products	100.0%	100.0%	16.5%	48.0%	31.0%
Chemicals	20	Manufacture of chemicals and chemical products	100.0%	100.0%	96.5%	100.0%	96.1%
	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	0.0%	0.0%	3.5%	0.0%	3.9%
Mechanical engineering etc.	25	Manufacture of fabricated metal products, except machinery and equipment	87.3%	87.3%	80.6%	90.1%	90.1%
	28	Manufacture of machinery and equipment n.e.c.	12.7%	12.7%	19.4%	9.9%	9.9%
Electrical engineering etc.	26	Manufacture of computer, electronic and optical products	92.0%	92.0%	100.0%	100.0%	100.0%
	27	Manufacture of electrical equipment	8.0%	8.0%	0.0%	0.0%	0.0%
Vehicles	29	Manufacture of motor vehicles, trailers and semi-trailers	38.9%	38.9%	76.4%	27.5%	0.0%
	30	Manufacture of other transport equipment	61.1%	61.1%	23.6%	72.5%	100.0%
Food, beverages etc	10	Manufacture of food products	99.9%	97.6%	68.4%	69.1%	92.4%
	11	Manufacture of beverages	0.1%	2.4%	31.6%	30.9%	7.6%
	12	Manufacture of tobacco products	0.0%	0.0%	0.0%	0.0%	0.0%
Textiles, leather etc	13	Manufacture of textiles	100.0%	79.4%	91.6%	81.0%	81.0%
	14	Manufacture of wearing apparel	0.0%	0.0%	0.0%	0.0%	0.0%
	15	Manufacture of leather and related products	0.0%	20.6%	8.4%	19.0%	19.0%
Paper, printing etc	17	Manufacture of paper and paper products	100.0%	98.2%	98.2%	87.3%	100.0%
	18	Printing and reproduction of recorded media	0.0%	1.8%	1.8%	12.7%	0.0%
Other industries	16	Manufacture of wood and of products of wood and cork	24.7%	24.7%	0.4%	100.0%	0.3%
	22	Manufacture of rubber and plastic products	43.8%	43.8%	75.9%	0.0%	32.5%
	31	Manufacture of furniture	0.1%	0.1%	0.0%	0.0%	0.0%
	32	Other manufacturing	8.4%	8.4%	22.3%	0.0%	7.9%
	33	Repair and installation of machinery and equipment	10.2%	10.2%	0.0%	0.0%	58.8%
	36	Water collection, treatment and supply	0.2%	0.2%	0.0%	0.0%	0.0%
	37	Sewerage	3.1%	3.1%	0.3%	0.0%	0.0%
	38	Waste collection, treatment and disposal activities; materials recovery	9.5%	9.5%	1.1%	0.0%	0.6%
	39	Remediation activities and other waste management services	0.1%	0.1%	0.0%	0.0%	0.0%
Construction	41-43	Construction	100.0%	100.0%	100.0%	100.0%	100.0%

DUKES Sector	SIC code	Gas oil	DERV	Fuel oil	Petroleum coke	Natural gas	Electricity	Bioenergy & waste	Heat
Unclassified		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Iron and steel	24 (excl. 24.4, 24.54)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Non-ferrous metals	24.4, 24.54	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Mineral products	8	28.3%	52.0%	79.3%	0.0%	12.0%	51.7%	0.0%	[x]
	23	71.7%	48.0%	20.7%	100.0%	88.0%	48.3%	100.0%	[x]
Chemicals	20	88.7%	96.8%	99.4%	100.0%	90.6%	95.4%	100.0%	[x]
	21	11.3%	3.2%	0.6%	0.0%	9.4%	4.6%	0.0%	[x]
Mechanical engineering etc.	25	99.6%	90.1%	90.1%	90.1%	81.8%	78.3%	87.3%	[x]
	28	0.4%	9.9%	9.9%	9.9%	18.2%	21.7%	12.7%	[x]
Electrical engineering etc.	26	100.0%	100.0%	100.0%	100.0%	84.0%	78.2%	92.0%	[x]
	27	0.0%	0.0%	0.0%	0.0%	16.0%	21.8%	8.0%	[x]
Vehicles	29	6.0%	27.5%	27.5%	27.5%	73.0%	94.1%	99.8%	[x]
	30	94.0%	72.5%	72.5%	72.5%	27.0%	5.9%	0.2%	[x]
Food, beverages etc	10	61.0%	69.1%	54.6%	69.1%	80.1%	85.5%	80.6%	[x]
	11	39.0%	30.9%	45.4%	30.9%	19.9%	14.5%	19.4%	[x]
	12	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	[x]
Textiles, leather etc	13	52.4%	81.0%	99.0%	81.0%	94.3%	93.4%	87.5%	[x]
	14	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	[x]
	15	47.6%	19.0%	1.0%	19.0%	5.7%	6.6%	12.5%	[x]
Paper, printing etc	17	98.5%	87.3%	52.4%	87.3%	96.2%	79.5%	100.0%	[x]
	18	1.5%	12.7%	47.6%	12.7%	3.8%	20.5%	0.0%	[x]
Other industries	16	17.7%	23.7%	0.0%	23.7%	29.8%	8.2%	73.6%	[x]
	22	15.5%	44.8%	100.0%	44.8%	38.9%	70.6%	0.0%	[x]
	31	0.0%	0.0%	0.0%	0.0%	0.4%	0.3%	0.0%	[x]
	32	7.1%	7.5%	0.0%	7.5%	13.3%	18.2%	0.0%	[x]
	33	1.4%	12.0%	0.0%	12.0%	0.8%	0.2%	0.0%	[x]
	36	1.2%	0.2%	0.0%	0.2%	0.0%	0.0%	1.6%	[x]
	37	15.2%	3.1%	0.0%	3.1%	3.0%	0.0%	24.8%	[x]
	38	41.9%	8.7%	0.0%	8.7%	13.6%	2.2%	0.0%	[x]
	39	0.0%	0.0%	0.0%	0.0%	0.3%	0.2%	0.0%	[x]
Construction	41-43	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

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