Update to industrial end use consumption estimates within *Energy Consumption in the UK*

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Key headlines

The Department for Energy Security and Net Zero (DESNZ) publishes data on industrial energy consumption within the annual energy balances that are published in the Digest of UK Energy Statistics (DUKES)[1] in July of each year. An accompanying publication to DUKES, Energy Consumption in the UK (ECUK[2]), is published annually in September. In ECUK, the high-level data from DUKES are broken down into detailed energy consumption estimates using historic assumptions and other data sources. For example, the ECUK consumption tables provide estimates of industrial consumption by UK Standard Industrial Classification (SIC) divisions, and the ECUK end use tables provide a further breakdown of this consumption into specific industrial end uses.

This paper outlines a plan to revise the methodology that is used to generate the industrial end use consumption estimates, and introduce detailed end use estimates for bioenergy and waste and heat for the first time.

This paper provides information on the incorporation of a new data source into ECUK which will provide updated estimates of industrial end use consumption in the UK. This will lead to changes in the way data is presented in ECUK. These changes are detailed throughout, but we are particularly interested to hear from stakeholders and users of the data on the impact of the following:

- Incorporating an updated set of industrial end uses based on up to date research, replacing the end uses previously used in ECUK Table U4,
- Using the most closely aligned research data or historical data to estimate industrial end uses for fuel/sub-sector combinations not covered by the new research (as opposed to not providing estimates for these fuel/sub-sector combinations in ECUK),
- Changing the aggregated end use categories in Tables U1 and U2 to align more closely with the updates to Table U4,
- Changing the format of ECUK Table U4 to show separate end use tables for each fuel,
- Restricting data published in ECUK to 2021 consumption data onwards due to the adoption of the updated industrial end use methodology.

[1] Digest of UK Energy Statistics (DUKES) - GOV.UK

[2] Energy Consumption in the UK - GOV.UK

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], which aggregates industrial consumption into sectors that are defined by the UK Standard Industrial Classification (SIC) codes (and the international equivalent frameworks)[4].

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 a mix of historic assumptions 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 divisions) and different types of industrial processes (e.g. high temperature processes, refrigeration).

For ECUK 2025 (published September 2025) the methodology for estimating industrial consumption at the SIC division (2-digit) level was updated. This was discussed in a special feature article in the June 2025 Energy Trends publication[5]. These breakdowns of industrial consumption by SIC division are available in ECUK Consumption Tables C3.1 and C3.2.

End use industrial consumption by SIC division

ECUK Table U4 breaks down the consumption data presented Tables C3.1 and C3.2 further into specific end use processes. Up to ECUK 2025 this table covered four fuels (solid fuels, oil, gas and electricity) and nine industrial end uses (high temperature process, low temperature process, drying/separation, motors, compressed air, lighting, refrigeration, space heating and other).

The data in Table U4 is generated using a static reference table which defines the proportion of consumption in each SIC division that is allocated to each end use. This reference table is applied to each year of data from Table C3.1 and C3.2 to generate the end use data. The reference table currently in use in ECUK is shown in Table U7.

The methodology used to generate the industrial end use estimates has been a focus for updating in ECUK 2026 because:

- The end use reference table has been in use in a broadly unchanged form for over 10 years due to the lack of any more recent UK specific research on industrial end use consumption. The energy usage patterns within industry have likely changed in the subsequent years, meaning the reference table may no longer accurately reflect the energy consumption within modern UK industries.
- The UK fuel mix has evolved over time. Of particular relevance to ECUK industrial end uses, consumption of bioenergy & waste and heat has increased and is now covered within the DUKES data. ECUK has previously been unable to provide end use estimates for these fuels as they were not covered in the original data used to generate the industry end use reference table.

Methodological updates for ECUK 2026

IDAE study and monitoring of energy consumption in industry for statistical purposes

The Spanish Instituto para la Diversificación y Ahorro de la Energía (Institute for Energy Diversification and Saving) and Ministerio para la Transición Ecológica y el Reto Demográfico (Ministry for the Ecological Transition and the Demographic Challenge) have published the results of a study on the monitoring of energy consumption in the industry sector (referred to in this paper as the IDAE study or IDAE data). This study consisted of a survey of more than 18,000 industrial establishments followed by on-site measurements of energy consumption in 200 establishments. The results from this study have been published in a series of

[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 Trends: June 2025, special feature articles - GOV.UK

fifteen publications[6]. Data was collected for industry sectors and end uses according to the classifications defined in the Eurostat industry questionnaire[7].

The IDAE study gives estimates of industrial consumption at the 2-digit SIC code[8] level and the industrial end uses for which this consumption has been used. The publication of such a detailed and high-quality data set presents a unique opportunity to incorporate updated industrial end use estimates into the ECUK publication. DESNZ has been in contact with colleagues from IDAE who have lent their expertise to this update, and kindly shared their raw data to allow us to conduct a full analysis.

Incorporating the IDAE data into ECUK

DESNZ has conducted a detailed analysis of the IDAE data to assess its suitability for use as a source of information for updating the ECUK industry end use reference table. We have considered overall patterns of industrial consumption in the UK and Spain using IEA data, and have also compared the 2-digit SIC code splits within each industry sector between the IDAE data and the existing ECUK reference table. From this analysis we have concluded there is a sufficient level of similarity between the industrial sectors in the two nations, and that in the absence of UK specific research it is appropriate to use the IDAE data as a proxy for estimates of industrial end use energy consumption in the UK.

Fuels used

The detailed IDAE data set contains information on fuel consumption at a highly disaggregated level consistent with the international energy product definitions. For example, for solid fossil fuels data is presented separately for anthracite, coking coal etc. and for petroleum products the data is presented for LPG, fuel oil etc. For the ECUK end use estimates we intend to use the aggregated IDAE data for the main fuels presented in DUKES and ECUK.

ECUK fuel	IDAE energy product
Solid fuel	Solid fossil fuels
Oil	Oil and petroleum products
Natural gas	Natural gas
Electricity	Electrical energy
Bioenergy & waste	Renewable fuels (without ambient heat)
	Waste (renewable + non-renewable)
Heat	CHP (Heat)
	Other sources of self-generated thermal energy

End uses

The IDAE study collected data against nine different end uses which are consistent with the Eurostat definitions, the only difference being that energy used for heat production is split into three different temperature categories; very high temperature heat (≥500°C), high temperature heat (200°C – 500°C) and low and medium temperature heat (<200°C). The IDAE categories are broadly similar to those currently in use in ECUK, however there is one end use, electrochemical use of energy, which is not present in ECUK. In addition there are two ECUK categories, drying/separation and compressed air, which are not given in the IDAE data.

For ECUK we intend to broadly adopt the IDAE categories as the they are consistent with the international standard definitions. However, we will maintain the separate high temperature and low temperature heat production categories as used in the previous ECUK end use reference table. This means there will no longer be separate categories in ECUK for drying/separation and compressed air. Any consumption for these end uses will implicitly be included within the 'other' category. The table below represents how the categories we propose to use in ECUK 2026 relate to the categories from the IDAE study and the previous ECUK publications. *We invite specific user feedback on this proposed change in end use categories used in ECUK*.

[6] Estudio de consumos, costes y usos energéticos en la industria | IDAE

[7] Eurostat – Industry final energy consumption questionnaire

[8] The publication presents data for CNAE codes (Clasificación Nacional de Actividades Económicas in Spain) which, like the UK SIC 2007 framework, is aligned with the EU Statistical Classification of Economic Activities (NACE) Rev 2.

IDAE end use category	ECUK 2026	ECUK 2025
Energy used for heat production (very high temperature heat: >= 500ºC) Energy used for heat production (High temperature heat: 200ºC – 500ºC)	High temperature heat production (≥ 200ºC)	High temperature process
Energy used for heat production (Low and medium temperature heat: < 200ºC)	Low temperature heat production (< 200ºC)	Low temperature process
Energy used for cold production (refrigeration)	Cold production (refrigeration)	Refrigeration
Electrochemical use of energy	Electrochemical uses	-
Mechanical energy use (engines)	Mechanical uses (engines)	Motors
Energy used for space heating and cooling (air conditioning) and water heating	Space heating and cooling and water heating	Space heating
Energy used for lighting and electrical appliances	Lighting and electrical appliances	Lighting
Non-specified use of energy	Non-specified use of energy	Drying / separation* Compressed air Other

*some consumption for drying/separation may also be within the heat production end uses

Industry sectors

The IDAE study presents data for industry subsectors as specified in the Eurostat industry questionnaire. This is broadly equivalent to how industry subsectors are presented in DUKES/ECUK and other international standards, with some minor differences (see Annex 1 for more detail). As mentioned previously, the IDAE has kindly shared their raw data at SIC code level with DESNZ. This has allowed us to generate new industrial end use estimates for ECUK for each SIC code individually, meaning the outputs are not impacted by the use of slightly different industry sector classifications between the IDAE study and the UK energy statistics in DUKES and ECUK.

New reference tables

Using the IDAE data new industry end use reference tables have been generated for use in ECUK for each fuel. These are presented in full in a workbook accompanying this publication. End uses splits have been calculated for each fuel and SIC code pair where possible[9]. Where the IDAE study did not collect data for a particular SIC code / fuel combination, IDAE data from other SIC codes within the same industry sector has been used to estimate the end use splits. For example, for solid fuels the IDAE study contained no end use consumption data for SIC code 26 within the electrical engineering sector. Therefore end use consumption data for the other SIC code within this sector (SIC code 27) has been used as the best estimate of end use consumption.

For cases where there were no IDAE data collected for a whole sector, end use estimates from the previous ECUK publications have been carried forward (grouping drying/separation, compressed air and other into one new non-specified use of energy end use).

We would welcome specific user feedback on whether this approach (where all consumption is assigned to end uses) is preferable to not using estimated end use splits (with the consequence being that end use consumption for some SIC divisions would be listed in ECUK as unknown).

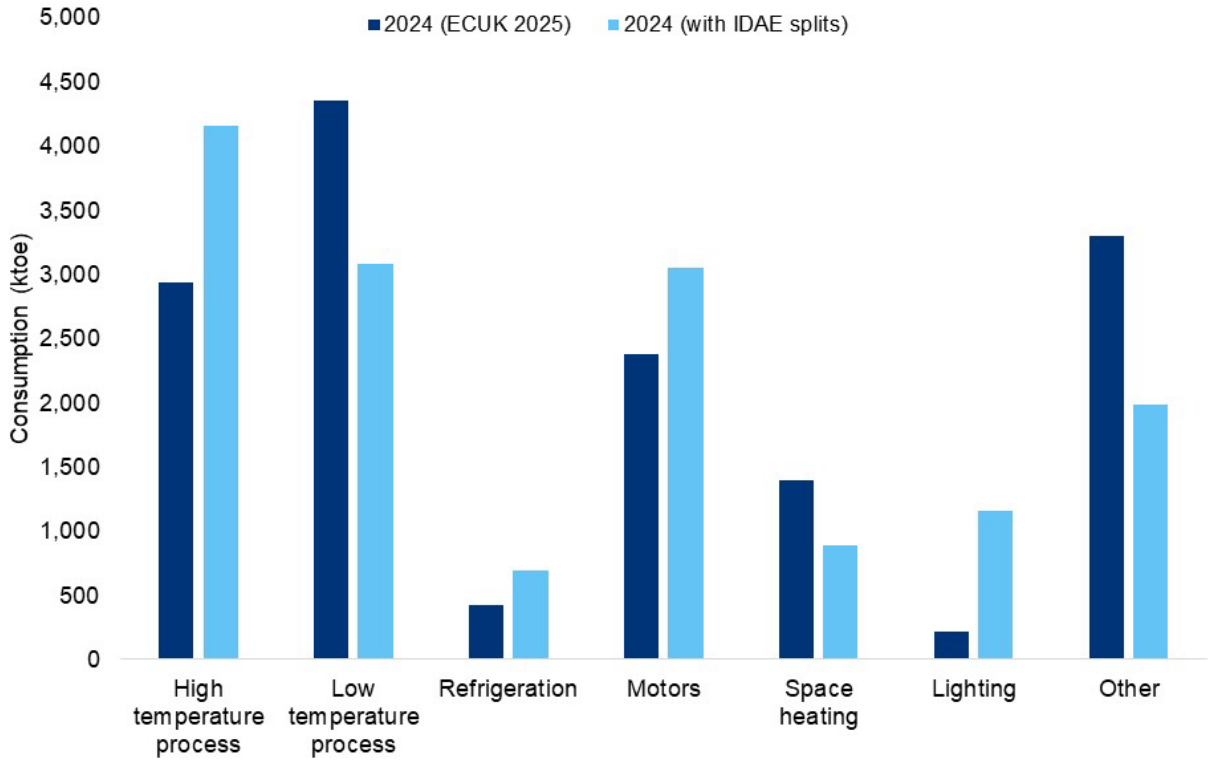
We are aware that during the data collection for the IDAE study large industrial complexes faced considerable challenges in differentiating consumption strictly linked to refining activities (SIC 19) from that for other chemical and petrochemical activities (DUKES chemicals sector, SIC 20 and 21). Therefore the end use consumption estimates for SIC codes 20 and 21 in the new reference table are likely to have been impacted by the inclusion of some consumption related to SIC 19, and end use estimates for SIC 20 and 21 should be considered to have a higher level of uncertainty than some of the other industry sectors and SIC codes.

[9] End use energy consumption for manufacture of coke and refined petroleum products (SIC 19) and the construction sector (SIC 41 to 43) have not previously been included within ECUK. Therefore IDAE estimates for these industry sectors will not be incorporated into ECUK 2026.

Impact on end use estimates

The chart below shows the UK industry sector energy consumption data for 2024 (as shown in ECUK 2025) and a provisional estimate of how this would be impacted by implementing the IDAE end use splits. A full breakdown of these changes by fuel is shown in Annex 2. Note that this excludes the end use consumption for bioenergy & waste and heat as these were not included in in ECUK 2025 end use estimates. End use consumption for these fuels will be included in ECUK 2026 when the IDAE data is fully implemented.

The changes shown in the chart below are likely to be a mixture of actual changes in how industry consumes energy since the original ECUK research and a higher level of data quality in the new IDAE study. For example, in the existing ECUK reference table many SIC divisions have no electricity consumption apportioned to lighting, which does not seem plausible. The new industrial end use reference table for electricity apportions electricity consumption to lighting and appliances for each SIC division (ranging for 4% to 36%), which would seemingly provide a more accurate reflection of how electricity is consumed.



Implementation in ECUK 2026

The intention is to implement the new industrial end use reference table in ECUK 2026. To do this we are proposing to make some changes to the way the industrial end use data is presented.

- Table U4 will be adjusted to show only a single years' worth of data, i.e. in ECUK 2026 detailed industrial end use consumption data will be displayed for the calendar year 2025. This mirrors the approach taken in other areas of ECUK e.g. Table C3.1 and Table U6, where for the most disaggregated data a full table presentation is shown only for the most recent year.
- Table U4 will also be adjusted to present separate tables for end use consumption for each fuel (solid fuels, oil etc.). The intention is that showing the data in this form is clearer for users as the impact of the consumption split between end uses for each fuel will be much easier to read. This is in preference to the current presentation where each end use is presented together consecutively in a very wide table.
- To supplement the reformat of Table U4, a new table will be added showing a time series of industrial end use consumption in a two-dimensional 'flat file' format. This will allow users to better interrogate trends in the data over time, and aligns with the new presentation of Table C3.1 and Table C3.2 introduced in ECUK 2025. This table will cover data from 2021 to 2025 in ECUK 2026, and going forwards ECUK will continue to show the industrial end use estimates for the five most recent years of data. Industrial end use consumption for years prior to 2021 will no longer be presented in ECUK, however the previous estimates using the existing ECUK methodology will remain available to access on the DESNZ website.

The implementation of new industrial end use categories in Table U4 will lead to some minor changes in Tables U1 and U2, which aggregate the data across sectors and provide a longer time series. Both tables will

now present data for the latest five years, aligning with the date range in Table U4[10]. Table U2 will be adjusted to include the full suite of new industrial end uses. In the 'total' section of Table U2 and Table U1, an updated set of grouped end uses will be used for aggregating across the domestic, industry and services sectors. The are shown in the table below.

Table U1/U2 category	Domestic	Industrial	Services
Space heating and cooling and water heating	Space heating Water heating	Space heating and cooling and water heating	Space heating Water heating Cooling and ventilation
Heat production (industrial)		Heat production (>=200ºC) Heat production (<200ºC)	
Cooking/catering	Cooking/catering		Cooking/catering
Cold production (refrigeration)		Cold production (refrigeration)	
Lighting and appliances	Lighting and appliances	Lighting and appliances	Computing Lighting
Industrial processes		Electrochemical use Mechanical energy use (engines)	
Other		Non-specified use	Other
Construction		Construction	
Unknown (unclassified consumption)		Unknown (unclassified consumption)	

We invite comments from users on the impact of these changes to the presentation of end use data in ECUK tables U1, U2 and U4.

DUKES 2026 energy balance methodology changes

Alongside the publication of this article there is a separate Energy Trends special feature article on planned changes to sector definitions in DUKES 2026. In some cases SIC codes will move between sectors or sectors will be combined/disaggregated. For clarity for users, in this paper we have continued to use the industry sectors from DUKES and ECUK 2025 as the overall methodology changes are still in development and subject to change based on user feedback. When published in ECUK 2026 the industrial end use consumption estimates discussed in this paper will be adjusted to maintain consistency with the energy balances presented in DUKES.

Next steps

Pending feedback from users after the publication of this article, the new methodology for estimating industrial end uses will be incorporated into the ECUK 2026 publication in September 2026. Our intention with updating ECUK in the manner described in this article is to provide a higher quality set of industrial consumption end use estimates, with increased transparency for users on how the end use reference table has been derived. These changes represent further developments in our ongoing attempts to review and update the data and assumptions feeding into ECUK. Going forward we intend to continue these efforts, and will inform stakeholders of any planned changes in future Energy Trends articles ahead of implementation within ECUK.

As ever, we welcome comments on these changes.

[10] For consistency across the release, Table U5 will also be adjusted to show the most recent five years of data.

Annex 1. Comparison of industry sectors in the IDAE study and DUKES/ECUK

The differences between the industry sectors used in the IDAE study and those used in DUKES/ECUK, and the SIC codes within each sector, are shown in the table below. These differences have limited impact on the proposals in this paper as the IDAE has made their raw data available to us, allowing calculation of industrial end uses for each individual SIC division (2-digit SIC code).

IDAE industry sector	SIC codes	DUKES/ECUK sector	SIC codes
Mining and quarrying	07 (exc. 7.21), 08 (exc. 8.92) and 09 (exc. 9.1)	Fuel producers	05-07, 09, 19, 24.46, 35
		Mineral products	08, 23
Food, beverages and tobacco	10, 11, 12	Food, beverages etc.	10, 11, 12
Textiles and leather	13, 14, 15	Textiles, leather etc	13, 14, 15
Wood and wood products	16	Other industries	16, 22, 31, 32, 33, 36, 37, 38, 39
Pulp, paper and printing	17, 18	Paper, printing etc.	17, 18
Coke production and petroleum refining	19	Fuel producers	05-07, 09, 19, 24.46, 35
Chemicals and Petrochemicals	20, 21	Chemicals	20, 21
Non-metallic minerals	23	Mineral products	08, 23
Iron and steel industry	24.1, 24.2, 24.3, 24.51, 24.52	Iron and steel	24.1, 24.2, 24.3, 24.51, 24.52, 24.43
Non-ferrous metallurgy	24.4, 24.53, 24.54	Non-ferrous metals	24.4, 24.54
Machinery	25, 26, 27, 28	Mechanical engineering etc.	25, 28
		Electrical engineering etc.	26, 27
Transportation equipment	29, 30	Vehicles	29, 30
Construction	41, 42, 43	Construction	41, 42, 43
Other industrial subsectors	22, 31, 32 and 33*	Other industries	16, 22, 31, 32, 33, 36, 37, 38, 39

* Organisations within SIC 33 were surveyed, but the activity was considered to be part of the services sector for the purposes of energy statistics and therefore outside of the scope of the IDAE study.

Annex 2. Indicative changes to 2024 industrial end use estimates

The table below shows provisional estimates for how end use consumption for 2024 (as presented in ECUK 2025) would change with the use of the new end use reference table derived from the IDAE data. Note that this data is subject to change and the results as presented in ECUK 2026 may differ slightly from the below as a) the end use analysis may be refined ahead of publication, and b) ECUK 2026 will incorporate any revisions to industrial fuel consumption made in DUKES 2026.

Indicative update to industrial end uses by fuel for 2024 consumption data presented in ECUK 2025 (ktoe)

	High temperature process	Low temperature process	Refrigeration	Motors	Space heating	Lighting	Other
Solid fuel	55	-77	0	6	-9	0	25
Oil	-7	-31	1	61	-14	26	-36
Natural Gas	1,519	-461	21	232	-279	45	-1,078
Electricity	-299	-754	248	373	-208	865	-224
Overall	***1,268***	***-1,323***	***270***	***671***	***-510***	***937***	***-1,313***

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