Update to transport energy intensity estimates within *Energy Consumption in the UK*

Gee Adnan | 07592 272 411 | energyconsumption.stats@energysecurity.gov.uk

Key headlines

The Department for Energy Security and Net Zero (DESNZ) publishes data on 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. ECUK brings together energy consumption with other data sources on economic output to provide estimates of energy intensity across different sectors of the economy. For example, transport energy intensity estimates combine energy consumption with measures of transport activity to show how energy use relates to passenger and freight movement across different modes of transport.

This paper outlines planned updates to the methodology used to estimate transport energy intensity within ECUK. The updates improve the alignment between energy consumption and measures of transport activity, including a clearer distinction between passenger and freight transport. These proposed changes are intended to be implemented in ECUK 2026, following user feedback.

ECUK energy intensity

UK energy statistics in DUKES and ECUK

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). ECUK builds on sectoral energy consumption data presented in DUKES by combining them with measures of economic output to produce energy intensity figures.

Transport energy intensity estimates in ECUK

Table I2 presents energy intensity by transport mode, combining energy consumption with activity measures such as passenger-kilometres or tonne-kilometres. The table currently covers road, rail, air and water transport, with road further split into passenger and freight. The underlying energy consumption totals are consistent with the transport consumption data published elsewhere in ECUK and DUKES, while the activity measures are drawn from other government departments.

Due to limitations in published data, transport energy use and output measures do not always cover the same activities. As energy intensity is calculated using consumption as a numerator and output as a denominator, parameter definitions should be aligned as far as possible. As DUKES and external transport datasets are updated over time, the methodology for Table I2 is reviewed periodically to maintain alignment and consistency.

Energy intensity numerator and denominator alignment

Coverage of energy consumption and output in transport in ECUK 2025

The table below shows the alignment between the coverage of energy consumption data and coverage of the output measures used in ECUK. This shows some inconsistency between the metrics, e.g. with the rail output measure only including passenger movements.

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

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

Transport mode	Energy consumption coverage	Output coverage
Road passenger	Fuel use by passenger vehicles	Passenger-km of passenger vehicles
Road freight	Fuel use by freight vehicles (LGVs and HGVs)	Tonne-km of freight vehicles (limited LGV coverage)
Rail transport	Fuel use by mainline and other rail	Passenger-km of mainline passenger rail
Air transport	Delivered fuel for all flights	Passenger-km of UK-registered commercial flights
Water transport	Delivered fuel for national navigation	Tonne-km of domestic waterborne freight

Reviewing the alignment of consumption and output in ECUK 2025

A review of transport energy intensity estimates has been undertaken to consider how updates in source data can improve consistency between the energy consumption and transport activity measures used in transport energy intensity estimates. From this we have identified a number of updates which, if implemented, will strengthen consistency in coverage across modes and introduce clearer passenger and freight definitions where possible. The proposed changes below are set out by transport mode and are presented for user feedback before implementation in ECUK 2026.

Methodological updates for ECUK 2026

Road transport

For road transport there will be some incremental updates that improve alignment between energy consumption and the output metrics due to planned improvements in DUKES coverage in DUKES 2026, These include completing the passenger-freight split for natural gas consumption for the years 2017-2022 and incorporating electricity use for buses.

For road freight, the underlying tonne-kilometre statistics include both heavy goods vehicles (HGVs) and light goods vehicles (LGVs) in earlier years, but from 2014 onwards LGVs are no longer included[3]. DfT also state that, following a methodology change in 2021, road freight data before and after quarter 3 of 2021 should not be compared, so a consistent time series is not available. To maintain coverage of LGVs and HGVs while preserving a continuous energy intensity time series, freight output will instead be based on vehicle-km travelled by LGVs and HGVs combined. This means the revised road freight series is more reflective of energy use relative to vehicle movement than to goods moved.

Rail transport

For rail transport, separate passenger and freight energy intensity series are proposed. Previously, rail energy consumption was published as a combined total covering both passenger and freight services, while the output measure reflected only some passenger rail activity.

The proposed update splits rail energy consumption between passenger and freight services using ORR data on fuel consumption. Additionally, passenger rail output has been expanded to include underground, light rail and tram services in addition to mainline rail. A separate freight rail series is also proposed. Output data for passenger and freight rail are drawn from published sources by the Department for Transport and the Office of Rail and Road.

Air transport

In ECUK 2025, aviation energy consumption covered both commercial and non-commercial outbound flights, while output data included domestic and international passenger commercial flights.

Separate passenger and freight energy intensity series will be introduced, but total energy consumption figures remain unchanged. Output figures used in air transport intensity will also be updated, with passenger activity based on outbound flights only, and outbound freight activity included on a consistent basis. Some aviation activity not covered by passenger or freight output data (such as air taxi, private and general aviation) remains included in total consumption as no robust activity data are available to treat these separately. The resulting

[3] Freight: notes and definitions - GOV.UK

intensity estimates are modelled using simplifying assumptions and therefore do not fully capture the complexity of aviation fuel use.

Water transport

The current water transport intensity figure combines fuel delivered for national navigation with output of domestic waterborne freight. Although elements of numerator and denominator do not align, suitable activity data are not available to support further disaggregation into passenger and freight transport. No methodological change is therefore proposed at this stage, and we welcome views on alternative methods.

Impact on transport energy intensity estimates

Annex 1 shows the effect of the proposed methodological changes on the transport energy intensity time series, comparing the indexed energy intensity metrics published in ECUK 2025 and those proposed for ECUK 2026 series. The charts are presented as indices to support comparison of trends over time rather than absolute levels. The differences shown reflect methodological updates to improve consistency between energy consumption and output measures and should not be interpreted as changes in underlying transport efficiency between ECUK editions.

Implementation in ECUK 2026

The proposed methodological changes described above would be reflected in the transport energy intensity tables (Table I2) published in ECUK 2026. The overall table structure remains largely unchanged, with the same core presentation, and with the separate metrics for passenger and freight activity in rail and air transport as discussed above.

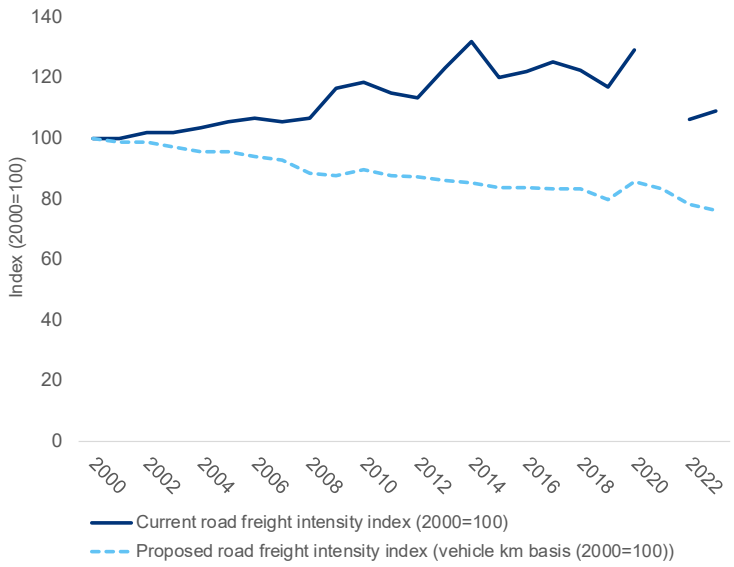
Due to limitations in the availability of suitable output data, the revised transport series will be reported from 2000 onwards only (2005 for rail). Data prior to 2000 will no longer be presented in the newly published ECUK data tables, however the existing publications will remain available to users on the DESNZ website. This approach places greater emphasis on the more recent part of the time series, where source data are generally more consistent and reliable. *We welcome views on whether this proposed reporting period is appropriate.*

Further information on the proposed changes to the calculation and interpretation of the revised transport energy intensity series can be provided on request.

As ever, we welcome comments on these changes.

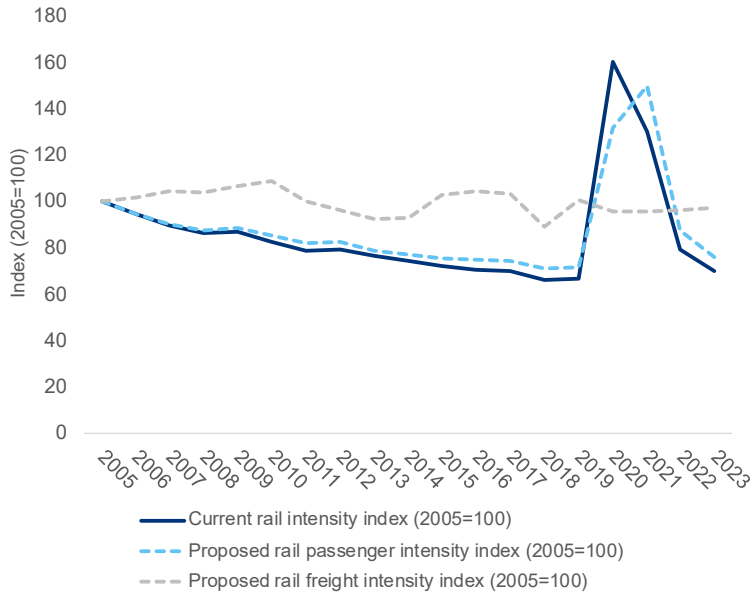
Annex 1. Updates to transport energy intensity figures

Road freight transport energy intensity index (2000 = 100)



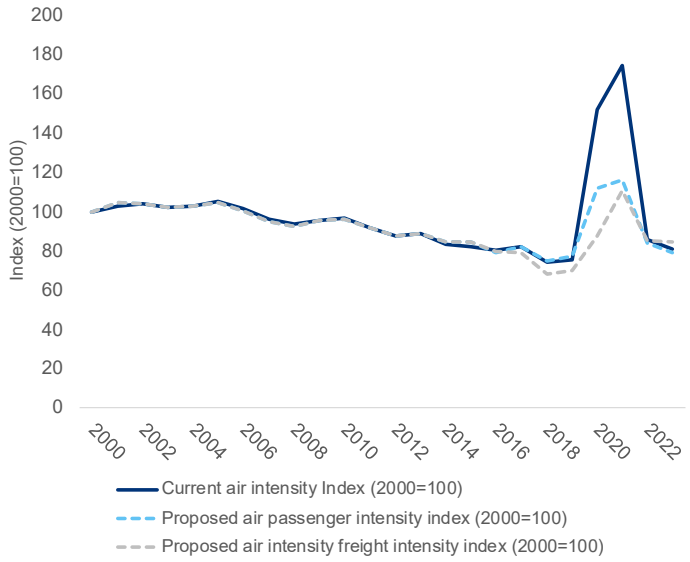
The proposed road freight series uses combined LGV and HGV vehicle-kilometres as the output measure, rather than road freight tonne-kilometres. This reflects the fact that LGVs are no longer included in the published DfT tonne-kilometre series from 2014 onwards, and that DfT advise road freight data before and after 2021 should not be compared following a methodology change.

Rail transport energy intensity index (2005 = 100)



In the proposed rail series energy consumption is split between passenger and freight services, and passenger output is expanded to include underground, light rail and tram services.

Air transport energy intensity index (2000 = 100)



The proposed air series differs from the current series because output is aligned more closely with the coverage of fuel consumption, and separate passenger and freight intensity measures are introduced.

This publication is available from: https://www.gov.uk/government/collections/energy-trends

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

Please tell us what format you need. It will help us if you say what assistive technology you use.