Department for Energy Security & Net Zero

Science and Innovation for Climate and Energy
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Dr Andrew Boswell
[redacted]

Our ref: EIR2026/02883

27 March 2026

Dear Dr Andrew Boswell,

Thank you for your email of 2 March where you requested the following information:

*"I write under the Environmental Information Regulations 2004 ("EIR").*

*This request concerns the Natural Gas Well-to-Tank (WTT) emission factor published in the annual DESNZ Greenhouse Gas Conversion Factors (advanced user datasets), specifically for the publication years 2019–2025 inclusive.*

*The requested information constitutes "environmental information" within the meaning of Regulation 2(1)(b) and (c), as it relates directly to greenhouse gas emissions, lifecycle carbon intensity of fossil fuels, and factors used in public environmental assessment and policy.*

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*1. Information Requested*

*I request disclosure of the following:*

*(A) Full calculation methodology*

*A complete, step-by-step description of the methodology used to derive the Natural Gas WTT emission factor for each publication year 2019–2025, including:*

*1. Identification of the exact Exergia (2015) tables and stage boundaries used;*
*2. Clarification of which lifecycle stages are included within the WTT-fuels boundary (including explicit confirmation of the treatment of:*

- *extraction,*
- *processing,*
- *liquefaction,*
- *shipping,*
- *gas transmission,*

*o gas distribution,*
*o storage,*
*o dispensing);*

*3. Confirmation of whether the Exergia "Gas distribution, transmission and storage" stage is:*

*o included,*
*o excluded,*
*o or replaced with a UK-specific estimate;*

*4. A precise description of how DUKES data are used in weighting, including:*

*o which DUKES edition corresponds to each publication year,*
*o the data year used in each calculation,*
*o treatment of interconnector imports,*
*o treatment of LNG provenance (e.g. whether Qatar, USA and other sources are differentiated or blended);*

*5. Confirmation of whether upstream production and LNG intensities have been updated since Exergia (2015), and if so, how.*

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*(B) Working calculation files*

*All working spreadsheets, internal models, scripts, intermediate calculation sheets, or other computational artefacts used to derive the published Natural Gas WTT values for 2019–2025.*

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*(C) Documentation relating to the 2021 methodology revision*

*The 2021 Methodology Report states:*

*"The methodology for calculating the indirect/WTT emission factors for natural gas and CNG have been improved to utilise updated DUKES data on leakage and energy use in transmission and distribution."*

*Please provide:*

*1. Any internal documentation explaining this revision;*
*2. Any comparison of pre-2021 and post-2021 calculation methods;*
*3. Any decision records describing boundary changes or reallocation of transmission/distribution emissions;*
*4. Any assessment undertaken of the impact of the revision on published values.*

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*(D) Post-2021 recalculation practice*

*For publication years 2023–2025, the Natural Gas WTT factor remains constant at 9.30 kg$CO_2$e/GJ (Net CV).*

*Please provide:*

*1. Confirmation of whether the factor was recalculated annually for 2023–2025 using updated DUKES data;*
*2. If recalculated, the working demonstrating how updated supply shares produced identical values;*
*3. If not recalculated, documentation explaining the decision not to update;*
*4. Any internal discussion of smoothing, averaging, or freezing of the Natural Gas WTT factor post-2021.*

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*2. Public Interest and Transparency*

*The Natural Gas WTT factor is relied upon in:*

- *Environmental Impact Assessments,*
- *Planning decisions,*
- *Infrastructure appraisals,*
- *Carbon accounting frameworks.*

*There is a clear and substantial public interest in ensuring:*

- *The factor is transparently derived,*
- *The boundary definition is explicit,*
- *The calculation is independently reproducible,*
- *The upstream methane assumptions are scientifically current.*

*Given the presumption in favour of disclosure under Regulation 12(2), any exceptions relied upon must be interpreted restrictively.*

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*3. Anticipated Exceptions*

*If DESNZ considers that any exception under Regulation 12 applies, please:*

- *Specify the exact Regulation relied upon;*
- *Explain why the exception applies;*
- *Provide the public interest balancing assessment;*
- *Confirm whether partial disclosure is possible;*
- *Confirm whether redacted versions of working files can be provided.*

*Please note that working calculation spreadsheets and methodological documentation relating to emission factor construction are prima facie environmental information and disclosure is strongly favoured.*

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*4. Format*

*Please provide the requested information electronically in original file format where possible (e.g. Excel workbooks, calculation models).*

*If any requested information is not held, please confirm explicitly.*

*5. Note*

*The annual DESNZ Greenhouse Gas Conversion Factors spreadsheet says "For technical queries, please contact Greenhouse Gas Statistics at greenhousegas.statistics@energysecurity.gov.uk".*

*This FOI/EIR request follows two attempts to acquire information relating to the above by email from the DESNZ Statistic team at the above address.*

*(1) Email subject "Question: Scope 3 emissions for Natural Gas", Date: 11 Jan 2024, 22:27 from my email, address.*
*- follow up "nudge" email: 19 Jan 2024, 17:32*
*Outcome: no response*

*(2) Email subject " Clarification request – Methodology and calculation steps for Natural Gas WTT factor", Date: Sat 21 Feb 2026, 21:00*
*Outcome: no response"*

We have considered your request in accordance with the Environmental Information Regulations 2004 ('the EIRs') as the information you request falls within the definition of 'environmental information' in the EIRs.

Calculation of the UK greenhouse gas conversion factors is conducted by a contractor (the Inventory Agency). This response includes information held by DESNZ, as well as information held on behalf of DESNZ by the Inventory Agency.

Please see responses to your requests below:

*A). Full calculation methodology*

The well-to-tank (WTT) factor for natural gas supply is calculated from two main sources:

1. Emissions associated with upstream and midstream stages (extraction, processing, liquefaction, shipping) are based on data from Exergia et al. (2015)[1]. This is combined with data on sources of gas supply from UK energy statistics.
2. Emissions associated with downstream stages (transmission, distribution and storage) are based on data from UK energy statistics on leakage and own gas use in the gas industry, and an estimate of electricity use in transmission activities from Exergia et al. (2015).

More detail on the methodology and specific sources for emissions factors is given below.

1). Calculation of emission factors for upstream and mid-stream stages

Data from the upstream and mid-stream stages for gas supplied from UK, Norway, Netherlands and Qatar liquefied natural gas (LNG) are taken from T*able 5-23 Carbon Intensity of Natural Gas streams arriving to North EU*. Values which are used are shown in Table 1. These are the most up to date values as an updated version of the report has not been published since they were introduced into the methodology.

[1] Exergia et al. (2015). Study on actual GHG data for diesel, petrol, kerosene and natural gas. A study by Exergia, E3 Modelling and COWI for the European Commission, DG ENER. Retrieved from https://energy.ec.europa.eu/publications/study-actual-ghg-data-diesel-petrol-kerosene-and-natural-gas_en

**Table 1 Emissions factors for upstream and midstream stages of gas supply**

| Step in pathway | GHG emitted (g $CO_2$eq/MJ) | | | |
|---|---|---|---|---|
| | UK | Norway | Qatar LNG | Netherlands |
| Fuel production and recovery | 5.949 | 2.203 | 11.272 | 1.300 |
| $CO_2$, $H_2S$ removed from NG (gas processing) | 0.026 | 0.113 | 1.380 | 0.001 |
| Feedstock transportation (pipeline and LNG) | 0.802 | 2.403 | 4.383 | 0.684 |

These country specific emissions factors are combined with data on the quantities and sources of natural gas supplied to the UK from the Digest of UK Energy Statistics (DUKES)[2] for the relevant year. Data for imports and exports is taken from *Table 4.5 Natural gas imports and exports (GWh)* in DUKES and total supply from Table 4.1 in DUKES (*Commodity balances*). This allows the calculation of UK supply. As the Exergia report only supplies data for pipeline supply from the UK, Norway, and Netherlands, pipeline imports from Belgium are assumed to have the same emissions factor as pipeline imports from the Netherlands. In the case of LNG, as only a factor for Qatar LNG is available this is used for all LNG imports. There is some re-export of LNG so data from Tables 4.5 and 4.1 in DUKES are used to determine net imports. Quantities of gas supplied from each source are then combined with the emissions factors from Exergia for mid-stream and upstream stages (reproduced as Table 1 here) to produce a weighted average emission factor for supply to the UK. The year of the DUKES publication used for each year of the conversion factors publication is shown in Table 2.

**Table 2 DUKES edition corresponding to each publication year of conversion factors**

| Publication year for Conversion Factors | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|---|
| Year of DUKES publication | 2018 | 2019 | 2020 | 2021 | 2022 | 2022 | 2022 |
| Year for which energy data relevant | 2017 | 2018 | 2019 | 2020 | 2021 | 2021 | 2021 |

2). Calculation of emission factors for downstream stages

In the case of compressed natural gas (CNG) supplied for use in vehicles, emissions from dispensing are estimated based on estimates of electricity required for dispensing and fugitive emissions of natural gas from dispensing, both of which are derived from Exergia et al. (2015).

An estimate of emissions from downstream stages, gas distribution, transmission and storage, activities which occur in the UK, is made based on data in *Table 4.3 UK continental shelf and onshore natural gas production and supply* in DUKES. An estimate of the electricity use in transmission activities is taken from *Table 3-54 UK Downstream Gas Data UK* in Exergia et al. (2015). Data in Table 3.4 in DUKES is used to calculate own use of natural gas in the industry, which is assumed to be combusted and to produce CO2 emissions; these are calculated using the emission factor for natural gas combustion. Table 3.4 in DUKES is also used to calculate the percentage of gas transported which is fugitively emitted (leakage). The methane content of natural gas and its net calorific value are then used to convert the natural gas leakage rate to a methane emission. Emissions associated with electricity use in transmission activities are

[2] DESNZ (2025). Digest of UK Energy Statistics (DUKES) - GOV.UK

calculated using the estimate of electricity use from Exergia et al. (2015), and the emission factor for UK electricity as calculated elsewhere in the UK GHG Conversion Factors.

Fugitive emissions from dispensing of natural gas are estimated as 0.34% based on *Table 5-21 Average Carbon Intensities of Natural Gas for the considered EU Regions* in Exergia et al. (2015). These are converted into methane emissions per MJ CNG by taking into account the proportion of methane in natural gas and the density and net calorific value of natural gas. Electricity consumption in dispensing is derived from the overall emissions factor for CNG fuel dispensing given in *Table 5-23 Carbon Intensity of Natural Gas streams arriving to North EU* in Exergia et al. (2015) by subtracting emissions associated with fugitive emissions during dispensing and dividing the remaining emissions by the carbon intensity of electricity given in Exergia et al. (2015) in *Table 3-139 Carbon Intensities of Member States' electric power systems.* A time series is then created by multiplying the electricity consumption by the electricity emission factor for the appropriate year as published in the UK GHG Conversion Factors and adding it to the fugitive emissions.

Total well-to-tank emission factor for natural gas supply

The total WTT emission factor is calculated by summing the above components and then applying two corrections.

The first an adjustment downwards of 3%. This is applied as the result of a comparison between the value produced by the methodology in 2012, with that reported in Exergia et al. (2015) for UK supply in 2012, which showed a small discrepancy. The comparison of values was completed when the methodology was first developed and was done using the same IEA gas supply data for the UK for 2012 that the Exergia study reported it had used. The second is a correction to convert the Exergia values which are only reported in gCO2e (CO2 equivalent) from AR4 GWPs to AR5 GWPs. As the Exergia report does not separate out the contribution of individual GWPs, an estimate was made of the contribution of CO2, CH4 and N2O to the overall gCO2e value based on data from the JEC well-to-wheel analysis of the CNG fuel cycle which separately identifies the contribution of each gas (2020)[3].

*B). Working calculation files*

The calculation of the natural gas WTT conversion factors is embedded in a workbook which calculates many other Scope 1 and Scope 3 WTT conversion factors for fuels. There are no separate calculation files for producing the natural gas WTT conversion factors that can be shared.

*C). Documentation relating to the 2021 methodology revision.*

Pre-2021 emissions from gas distribution, transmission and storage in the UK were taken from *Table 5-23 Carbon Intensity of Natural Gas streams arriving to North EU* in Exergia (2015) and were 1.114 g CO2e/MJ. Post-2021 the calculation method is as described in the response to (A) and are calculated annually based on UK specific data on the gas industry from UK energy statistics. There is no change to the boundary of the assessment. The impact of the revision in 2021 was to increase the published values for 2019 by 0.68 gCO2e/MJ and the value for 2020 by 0.52 gCO2e/MJ.

[3] JEC WTW v5. (2020). JEC Well-to-Tank report v5. Luxembourg: By European Commission, JRC-EUCAR-CONCAWE. Prussi, M., Yugo, M., De Prada, L., Padella, M., Edwards, R. and Lonza, L. doi:10.2760/959137

DESNZ does not hold any internal documentation or decision records which describe or directly lay out this revision.

*D). Post-2021 recalculation practice*

The calculation of the emissions factors was updated using data for the most recent year available for sources of gas supply for the 2019, 2020, 2021, 2022 and 2023 publications of the GHG conversion factors. Since 2023, annual updates of the WTT factors, including that for natural gas, were ceased. The value supplied in 2024 and 2025 publications is therefore the value published in 2023. DESNZ does not hold any internal documentation which describe or directly lay out this particular decision.

Not all factors in the publication are updated every year. Annual improvements to the Conversion Factors are prioritised and implemented through established governance processes, including a steering group and expert peer review. The primary purpose of the UK GHG Conversion Factors is to support company reporting under the UK's Environmental Reporting Guidelines, including Streamlined Carbon and Energy Reporting regulations (SECR). A risk-based approach is adopted to updating the factors which focuses on high-emitting or variable sources which are key sources for most companies, with priority given to those relevant to SECR. Reporting of well-to-tank emissions is voluntary under SECR and so these factors have been deprioritised in recent updates to focus on delivering robust and accurate Scope 1 and 2 factors.

DESNZ intend to review the well-to-tank factors for fuels, including those for LNG and natural gas, ahead of next year's publication of the UK GHG Conversion Factors 2027.

**Appeals Procedure**

If you are dissatisfied with the handling of your request, you have the right to ask for an internal review. Internal review requests should be submitted within two months of the date of receipt of the response to your original request and should be addressed to the Information Rights Team. It would be helpful if you can tell us why you are dissatisfied with the response to your request so we may address this during the internal review.

Information Rights Team
Department for Energy Security & Net Zero
3 - 8 Whitehall Place
London
SW1A 2AW
Email: FOI.Requests@energysecurity.gov.uk

Please remember to quote the reference number above in any future communications.

If you are not content with the outcome of the internal review, you have the right to apply directly to the Information Commissioner for a decision. Complaints can be made to the Information Commissioner via their website at: https://ico.org.uk/make-a-complaint/foi-and-eir-complaints/foi-and-eir-complaints/.

Yours sincerely,

Science and Innovation for Climate and Energy Directorate