

Keadby Next Generation Power Station

Planning Inspectorate reference EN0110001

Response of Climate Emergency Science Law (CESL) to the Secretary of State's invitation to comment of 24 September 2026¹

Comments on the responses to the Secretary of State's request for information of 4 September 2026², and on the responses to the request of 6 October 2026³

Climate change: upstream emissions, short- and long-term climate effects, operating hours, hydrogen intensity, the decarbonisation pathway and the reasoned conclusion required by regulation 21

Climate Emergency Science Law

Interested Party reference: **F6ADBC5E4**

Date of submission: 24 October 2026

CESL CONSULTANCY



CLIMATE EMERGENCY
SCIENCE LAW

This response in a nutshell

The Secretary of State is being asked to authorise a plant whose actual climate effects could be materially greater than those assessed. The assumptions that keep the assessed emissions down are neither adequately tested against current evidence nor secured through enforceable controls.

¹ Department for Energy Security and Net Zero (DESNZ), on behalf of the Secretary of State, letter of 24 September 2026, "All Interested Parties – Invitation to Comment", EN0110001-000668 (cited as [SoS letter 24 Sept 2026]), <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000668-SoS%20Consultation%20%20letter.pdf>

² DESNZ, on behalf of the Secretary of State, letter of 4 September 2026, "Request for Information", EN0110001-000656, published as a redacted version (cited as [SoS RFI 4 Sept 2026]), https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000656-Keadby%20Next%20Generation%20Power%20Station%20-%20Information%20Request%20Letter_2_Redacted.pdf

³ DESNZ, on behalf of the Secretary of State, letter of 6 October 2026, "Request for Information", EN0110001-000678 (cited as [SoS RFI 6 Oct 2026]), <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000678-20261006%20Information%20Request%20Letter%20-%20Keadby%20Next%20Generation%20Power%20Station.pdf>

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A Summary and requested decisions

A.1 The central assessment problem

- 1 CESL respectfully submits, “in a nutshell”, that the Secretary of State is being asked to authorise a plant whose actual climate effects could be materially greater than those presented and assessed in the EIA. The assumptions that keep the assessed emissions down are neither adequately tested against current evidence nor secured through enforceable controls.
- 2 The Secretary of State’s request of 4 September 2026 asked the right questions.
 - (a) Is the carbon intensity of hydrogen supply secured? (Q4 to Q7).
 - (b) Are the operating hours of the development secured? (Q8 to Q9).
 - (c) Is a mechanism provided that triggers carbon capture (Q10 to Q12)?

The responses confirm that none of the assumptions that determine the greenhouse gas (GHG) outcome, on these questions, is secured by the draft DCO, the environmental permit or any other control.

- 3 To these CESL adds questions raised, but not acceptably resolved, at the examination.
 - (a) Does the description of upstream emissions in the gas supply adequately describe current and likely future supply?
 - (b) Does the assessment adequately describe both the long-term and short-term climate impacts?
 - (c) Is the uncertainty in these matters dealt with?
- 4 A further issue at the assessment stage is how the full effects of the application (i.e. the absolute lifecycle emissions) and the territoriality of the effects are handled. The description currently does not distinguish between the effects of emissions arising in the UK and those arising outside the UK.
- 5 Where an uncertain operational parameter may materially affect the environmental outcome, the assessment must adequately address the range of likely significant effects, or the consent must secure an appropriately assessed envelope. CESL submits that issues with uncertainty testing, bounding and securing of the following list of factors, or parameters, to the likely significant environmental effects remain unresolved by the applicant:
 - (a) current knowledge on the supply sources and carbon intensity of the upstream gas supply;
 - (b) the short-term climate impacts from methane;
 - (c) the carbon intensity of hydrogen supply and securing it;
 - (d) absolute emissions and substitution issues;
 - (e) territoriality and appropriate assessment;
 - (f) securing the decarbonisation pathway;
 - (g) operating hours;
 - (h) project lifetime; and
 - (i) the cumulation of these factors together.

- 6 This submission will explain deficiencies in the description and assessment on each of these.
- 7 They each return to the nutshell issue, and its consequence: the ES has not adequately provided certain information, descriptions and uncertainty assessments necessary for an informed evaluation, and a reasoned conclusion by the Secretary of State. As background, it is now illustrated by two examples.

A.2 The principal concern – addressing uncertainty

A.2.1 The applicant's Rochdale envelope example

- 8 The applicant itself provides the first illustration of addressing uncertainty, and its impact on significance assessment, in its response on the operating hours [C1-004b, Q8]⁴: a first example, which illustrates the principles involved. The SoS asked Q8(c) [SoS RFI 4 Sept 2026] *"If the operating hours would not be subject to an enforceable limit, explain what would prevent the Proposed Development from operating for longer than assessed and quantify the greenhouse gas emissions that could arise under a higher utilisation worst-case scenario."* Two points in the applicant's response are key:

- (a) The applicant produced a quantification of a higher-utilisation case: 73.7 MtCO₂e over the lifetime at 8,760 hours a year. This shows the principle of the Rochdale envelope in a numerically simple example.

The point, at this stage, is not whether it is realistic or not: more realistic cases exist⁵ in any case. The core point is uncertainty may be tested by calculation, and other emission outputs may in principle be calculated which differ from the average operating hours figure (i.e. the ES case⁶ of 22.7 MtCO₂e). This is true wherever there is uncertainty as to the bounding of one or more parameters. The description of the uncertainty and the reasoned conclusion on it is what is required by law.

- (b) Considering the uncertainty is crucial, in the case, because the applicant can provide no mechanism to bound either the operating hours, or the lifetime: it suggests the Environmental Agency may require "operational limits" within the Environmental Permit but does not appear to requested this in its application to the Environment Agency (EA). The Environment Agency (EA) confirms in its response that the Applicant *"has not applied for any restrictions on annual operating hours"* [C1-002, Q9, Q11, Q12]⁷.

⁴ Applicant, "Response to Secretary of State's Request for Information" [C1-004b], EN0110001-000663, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000663-C1-004b%20-%20KNGPS%20Response%20to%20Secretary%20of%20State%20RFI%20draft.pdf>

⁵ Whilst the applicant states its chosen 100% load year-on-year would not be realistic, it would have been quite possible to select a plausible example such as running at 8,150 hours/yr for 30 years (which also tests the lifecycle uncertainty issue) – as reasonable worst case. CESL tests this scenario in Appendix D (Table 5) based as a stress case of a worst-case operating profile, both for annual hours and an extended 30-year lifecycle: a recent study for DESNZ that show 93% CCGT operation to be technically feasible [CEPA/GHD 2025, Table 1.1 and Table 3.2]. Keeping all other parameters the same (but including construction emissions), the lifecycle footprint is 82.80 MtCO₂e in this scenario.

[CEPA/GHD 2025]: CEPA and GHD for the Department of Energy Security and Net Zero, *Electricity Generation Cost Study: Final Report*, 31 March 2025, published by DESNZ as "Unabated gas: electricity generation cost study". Available at: <https://assets.publishing.service.gov.uk/media/696616c68d599f4c09e1ffae/unabated-gas-electricity-generation-costs-2025.pdf>

⁶ operating hours of 3,500 hours for the first 15 years of operation, and 1,500 hours thereafter

⁷ Environment Agency, response of 15 September 2026 to the Secretary of State's Request for Information of 4 September 2026 [C1-002], EN0110001-000659, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000659-C1-002%20-%20Environment%20Agency%20Response%2015-09-2026.pdf>

- 9 This illustrates the issues at play for each of the parameters listed above. Put simply: the climate impacts of the plant may be materially greater than those assessed if they are not secured.
- 10 In fact, the applicant's deployment of this simple Rochdale envelope quantification actually changed the significance rating. The Applicant's reported 73.7 MtCO₂e for operating at 8,760 hours a year would be a "*Major Adverse*" effect [C1-004b, Q8(c)] whereas the applicant finds the ES case (22.7 MtCO₂e) and "*Moderate adverse*" [APP-052, Tables 18.10 and 18.12]. Note, CESL later calculates 82.80 MtCO₂e for a reasonable worst case that is feasible from an engineering perspective⁸, so this is a realistic and material change.
- 11 So the significance category turns, in this case, on operating hours, and also the lifetime which can extend overall operation hours.
- 12 The situation in the EIA is that operating hours have been neither assessed for uncertainty at a realistic maximum, nor are they controlled. To avoid authorising a plant whose environmental impacts could be materially greater than those assessed, the SoS must either require that the ES tests the uncertainty, or secures the operating hours through enforceable controls.

A.2.2 Current knowledge and uncertainty

- 13 A second example comes from the further evidence which CESL submits, in this response, on the upstream (well-to-tank) factor. We first provided evidence on this issue in our written representation [REP1-038 to REP1-050]⁹, and asserted a requirement of testing of the uncertainty for the assessment with the Rochdale envelope approach.
- 14 The issue is that the upstream (well-to-tank) factor on which the assessment depends does not represent "*current knowledge*" (EIA regulation 14(3)(b)) of the environmental impacts of upstream natural gas supply to the UK. Nor does it describe the short-term and long-term environmental impacts (Reg 5(2) / Sch 4 para 5 / Reg 14(3)(b)).
- 15 DESNZ has recently confirmed, in response to an Environmental Information Regulations (EIR) request provided in Appendix A, that the WTT factor used in the EIA has not been updated since 2023. It rests on a 2015 study, treats all LNG as Qatari (whilst US LNG, with much greater emissions intensity, was 76% of UK LNG imports in 2025), and weights gas supply sources on 2021 data. Measurement based science and data on current and likely future UK's supply mix have both moved on substantially too since the 2015 study. All this leads to the DESNZ WTT factor underestimating the climate impacts of the upstream emissions.
- 16 In the operational hours example above, testing the uncertainty is a straight-forward scaling exercise. By the contrast, whilst the same principle of testing uncertainty applies, the factors affecting the WTT factor issue are complex. However, they are now well understood, with a considerable base of observational research and academic studies. Modelling this

⁸ See Appendix D, Table 5"

⁹ CESL, Deadline 1: "Written Representation" [REP1-038], EN0110001-000458, [https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000458-Written%20representation%20\(WR\).pdf](https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000458-Written%20representation%20(WR).pdf); "Summary of written representation" [REP1-039], EN0110001-000459, [https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000459-Summary%20of%20written%20representation%20\(WR\).pdf](https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000459-Summary%20of%20written%20representation%20(WR).pdf); and Appendices 1 to 11 to the Written Representation [REP1-040 to REP1-050], EN0110001-000460 to EN0110001-000470

uncertainty is not based in speculation: it relies on both well-understood science¹⁰, and robust data sets (for example, from the International Energy Agency, IEA 2025¹¹).

- 17 To assist the SoS, CESL has developed a model – for illustrative purposes – that demonstrates how the uncertainty of upstream emissions may be described. This illustrates the principles of uncertainty modelling for EIA purposes, being discussed, and is only used here to support arguments on the deficiencies in the application: by showing how they may, in principle, be resolved.
- 18 It also demonstrates that the territoriality of emissions (i.e. the quantification of the shares of UK and ex-UK emissions), and the temporality of climate effects (i.e. short-term and long-term climate effects) may also be described. Demonstrating this principle is important as the EIA assessment has so far not grappled, at all, with territoriality and temporality.
- 19 The details of the model are given in Appendices D, E and F.

A.3 The separate Keadby 3 issue

- 20 Article 40(5) of the DCO (for Keadby NGPS) would extend a quite different development consent order (the Keadby 3 Order) by about four years for commencement and six years for compulsory acquisition. It was added to the draft DCO at Deadline 5, ten days before the examination closed, with no environmental information.
- 21 Subsequently, the Applicant submitted an “assessment” within the Technical Note in response to the Secretary of State’s first letter: three months after examination closed. That “assessment” discloses that the Keadby 3 environmental impact assessment did not include upstream emissions. The Applicant submits new figures for upstream emissions and downstream Scope 3 emissions.
- 22 The upstream emissions are derived using the same WTT emission factor that the EIR from DESNZ at Appendix A shows does not correctly describe current natural gas supply to the UK. Putting aside that matter, that will be fully explained later¹², even using this factor the upstream emissions exceed the plant’s previously assessed direct emissions. In other words, the added environmental information more than doubles that original environmental information assessed. When considered on the emission intensity of operating the plant, it more than quadruples it: see below.

¹⁰ Both the science of the short-term methane heating as described by the most recent IPCC AR6 report, see AR6 WGI Figure 6.16 reproduced at Appendix C, and the science of full lifecycle estimations of upstream emissions e.g Howarth, “The greenhouse gas footprint of liquefied natural gas (LNG) exported from the United States”, Energy Science & Engineering, October 2024, <https://scijournals.onlinelibrary.wiley.com/doi/10.1002/ese3.1934> [REP1-041]

¹¹ International Energy Agency (IEA), *Assessing Emissions from LNG Supply and Abatement Options*, June 2025, supplied as a stand-alone Appendix

¹² The WTT factor does not provide a current description of UK gas supply and consequently it provides an underestimate of the climatic impacts

- 23 On the new figures, the Keadby 3 plant's carbon intensity (149.3 tCO₂e/GWh¹³) is about four times greater than the 35.9 tCO₂e/GWh certified in 2021, once both upstream and downstream emissions are counted. On the new figures, the share captured falls from the 90.7% recorded in the Keadby 3 decision letter to 86.1% on the same boundary, and to 74.1% once upstream emissions are included; allowing for the transport and storage network's own emissions, the net reduction is about 66.7%¹⁴. Both the carbon intensity and the share of emissions captured were material information about the plant's operation before the examination and the Secretary of State at the time.
- 24 The new information, therefore, introduces material changes since the decision making of the Keadby 3 order: although the carbon intensity and the share of emissions captured are implicit in the Technical Note's figures, they were not stated or reconciled with the certified figures.
- 25 The Technical Note introduces previously unassessed emission sources, and changes materially important environmental information since the original decision-making: this new "assessment" has not been examined, publicised or consulted¹⁵ on.
- 26 Article 40(5) attempts to achieve a DCO commencement extension by a "novel" route, for which no precedent is cited: a process which Parliament requires to be done through the statutory procedure, including updating its environmental impact assessment if required. CESL asks that Article 40(5) be deleted or, if the Secretary of State is minded to keep it, that Keadby 3 first go through a proper statutory extension procedures, including environmental impact assessment (see Section G).

A.4 Decisions requested

- 27 For each of factors identified for Keadby NGPS, as inadequately described and assessed, and which may materially change the environmental impact of the project, the SoS is respectfully requested to require the applicant to provide adequate testing of uncertainty against current evidence (i.e. the Rochdale envelope exercise), or for the factors to be secured at the level described in the Environmental Statement via enforceable controls.
- 28 Article 40(5) should be deleted, leaving any extension of the Keadby 3 Order to the statutory change procedure. Alternatively, if it is kept, the Keadby 3 extension should first go through the statutory process for extending a DCO Order with proper environmental impact assessment, with publicity and consultation.

¹³ Calculated by CESL at section G.4.1.1

¹⁴ Presented by CESL at section G.4.1.2

¹⁵ Except – indirectly - by the Secretary of State's invitation to comment of 24 September 2026 which is not a proper public consultation and only addressed to interested parties for the Keadby NGPS examination.

B Preliminaries

- 29 Climate Emergency Science Law (CESL), established in 2017 by Dr Andrew Boswell, brings together multidisciplinary expertise in science, computing, energy and climate governance, and evidence-based legal and policy analysis to deliver rigorous, scientifically grounded scrutiny of UK climate decision-making.
- 30 CESL provided oral evidence at the ISH1 and made a written representation at Deadline 1 [REP1-038 to REP1-050]¹⁶. This response therefore contains (a) comments on the responses to the 4 September request, as invited by the SoS; and (b) information that has arisen since Deadline 3¹⁷. CESL respectfully requests the SoS to take into account any new information provided here¹⁸.

B.1 Structure of this consultation response

31 The structure of this response is:

- (a) Section C sets out context;
- (b) Section D identifies issues;
- (c) Section E gives a brief description of CESL's indicative model;
- (d) Section F sets out legal requirements and identifies deficiencies;
- (e) Section G discusses the separate issue of interaction with the Keadby 3 Order;
- (f) Section H provides conclusions;
- (g) Section I is CESL's résumé;
- (h) Section J is a statement on the use of artificial intelligence;
- (i) The appendices then follow.

¹⁶ CESL, Deadline 1: "Written Representation" [REP1-038], EN0110001-000458, [https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000458-Written%20representation%20\(WR\).pdf](https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000458-Written%20representation%20(WR).pdf); "Summary of written representation" [REP1-039], EN0110001-000459, [https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000459-Summary%20of%20written%20representation%20\(WR\).pdf](https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000459-Summary%20of%20written%20representation%20(WR).pdf); and Appendices 1 to 11 to the Written Representation [REP1-040 to REP1-050], EN0110001-000460 to EN0110001-000470

¹⁷ At Deadline 3, CESL submitted a short request to defer its further submissions on the Applicant's Deadline 2 material to Deadline 4 [REP3-030] but continued over capacity prevented this. CESL, "Comments on any additional information/submissions received by deadline 2" [REP3-030], EN0110001-000518, [https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000518-Climate-Emergency-Science-Law-\(CESL\)-Comments-on-any-additional-information/-submissions-received-by-deadline-2-SD1F2421E.pdf](https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000518-Climate-Emergency-Science-Law-(CESL)-Comments-on-any-additional-information/-submissions-received-by-deadline-2-SD1F2421E.pdf)

¹⁸ CESL submits, in any case, that the Secretary of State is entitled, and obliged, to take this material into account. "Environmental information" includes "any representations duly made by any other person about the environmental effects of the development" (regulation 3(1)). Under regulation 21, the Secretary of State must examine the environmental information and reach a reasoned conclusion that is up to date at the time of the decision.

B.2 New information since DCO examination

32 The new information is:

- (a) the DESNZ EIR response on the well-to-tank (WTT) methodology. This is provided in full at Appendix A;
- (b) CESL's indicative model which is for illustration of the principles involved;
- (c) a number of documents supplied as stand-alone appendices¹⁹;
- (d) evidence and decisions since the examination closed, including:
 - the UNEP Emissions Gap Report 2026 (see section D.1);
 - DESNZ Energy Trends (April 2026);
 - National Gas's Gas Winter Outlook 2026 (see section D.2); and
 - the Secretary of State's Jackdaw decision of 14 October 2026 (see section C.3);

B.3 Other matters

33 I have used AI to assist with drafting and refining the textual content of this submission for clarity and presentation. Following the recent update to the PINS guidelines, a full statement²⁰ on the use of AI is provided at Section J.

¹⁹ This submission has six in-document appendices (A-F). In addition, eight full documents have been submitted as stand-alone appendices to be included in the submission on the planning portal, as noted in the footnote:

- (1) IEA (2025) *Global Methane Tracker 2025*. Paris: International Energy Agency, 7 May 2025. Licence: CC BY 4.0. Available at: <https://www.iea.org/reports/global-methane-tracker-2025>
- (2) MethaneSAT (2026) 'First look at a system wide view. The world according to MethaneSAT: Oil & gas methane emissions vary widely by region, greatly exceed both reported inventories and industry goals', *MethaneSAT Project Update*, published 2 February 2026 (updated October 2026). Available at: <https://www.methanesat.org/project-updates/first-look-system-wide-view>
- (3) Department for Energy Security and Net Zero (2026) *Energy Trends: UK, October to December 2025 and 2025* (Energy Trends March 2026). Statistical release, 2 April 2026. Accredited official statistics. Available at: <https://www.gov.uk/government/statistics/energy-trends-march-2026>
- (4) National Energy System Operator (2025) *Future Energy Scenarios 2025: Pathways to Net Zero*, V.5, 21 November 2025. Available at: [REDACTED]
- (5) Exergia S.A., E3M-Lab and COWI A/S (2015) *Study on Actual GHG Data for Diesel, Petrol, Kerosene and Natural Gas: Final Report*. Report for the European Commission, DG ENER, work order ENER/C2/2013-643, July 2015."
- (6) Carr, E.W., Winebrake, J.J., McCabe, S. and Elling, M. (2024) *Well-to-Tank Carbon Intensity of European LNG Imports*, v2, 26 August 2024. Energy and Environmental Research Associates, LLC, prepared for Transport & Environment.
- (7) IEA (2025) *Assessing Emissions from LNG Supply and Abatement Options*. Paris: International Energy Agency, June 2025. Licence: CC BY 4.0. Available at: <https://www.iea.org/reports/assessing-emissions-from-lng-supply-and-abatement-options>.
- (8) Sherwin, E.D., Rutherford, J.S., Zhang, Z., Chen, Y., Wetherley, E.B., Yakovlev, P.V., Berman, E.S.F., Jones, B.B., Cusworth, D.H., Thorpe, A.K., Ayasse, A.K., Duren, R.M. and Brandt, A.R. (2024) 'US oil and gas system emissions from nearly one million aerial site measurements', *Nature*, 627, pp. 328–334. <https://doi.org/10.1038/s41586-024-07117-5>.

²⁰ In accordance with PINS guidance on "Use of artificial intelligence in casework evidence", 6 September 2024, as updated 20 February 2026

C Context

C.1 The Proposed Development and its fuel envelope

- 34 The Proposed Development is a combined cycle gas turbine (CCGT) station of up to 910 MWe, which purports to be able to run on 100% natural gas, 100% hydrogen or a blend [REP2-005, 1.1.3]²¹. The GHG assessment uses a reference export of 892 MWe at 63% LHV efficiency, which gives a fuel input of 1,416 MWth [APP-052, 18.3.54]. Seven operating scenarios (A to G) are assessed, all at 3,500 hours a year for 15 years followed by 1,500 hours a year for 10 years. That is 67,500 hours over an operational period of 2031 to 2055 [APP-052, 18.6.12, 18.6.19]. The ES gives construction as 2027 to 2030 [APP-052, 18.3.28, 18.6.5].
- 35 For Scenario G (natural gas for the full lifetime), the EIA gives total emissions of 22,736,722 tCO₂e (intensity: 380 tCO₂e/GWh). Of this, 19,581,630 tCO₂e is Scope 1 combustion and 3,155,092 tCO₂e is Scope 3 fuel supply. Scenario A (hydrogen for the full lifetime) is given as 7,030,153 tCO₂e (119 tCO₂e/GWh), almost all of it Scope 3 [APP-052, Table 18.10]. Scenarios F and G are rated “*Moderate adverse*” (significant) and A to E “*Minor adverse*” (not significant) [APP-052, Table 18.12].
- 36 The consented Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order 2022 occupies the same footprint. Only one of the two can be built [REP1-030, 3.2; C1-002, Q11]²². The draft Order would extend the Keadby 3 commencement and compulsory-acquisition periods to dates construction might not commence until 2033 [SoS RFI 6 Oct 2026, para 9] (see Section G).

C.2 The parameters that determine the GHG outcome

- 37 The magnitude of the climate effect is determined by these parameters, each uncertain:
- (a) upstream carbon dioxide and methane emissions in the natural gas supply chain (numerically estimated by a WTT factor in the application);
 - (b) temporality of impacts and methane climate metrics (numerically based on solely on GWP100 in the application);
 - (c) the lifecycle carbon intensity of the hydrogen supplied²³;
 - (d) absolute emissions and substitution;
 - (e) territoriality;
 - (f) the decarbonisation pathway and its timing (hydrogen, carbon capture or neither);

²¹ Applicant, “8.7 Applicants Responses to Action Points for Deadline 2” [REP2-005], EN0110001-000500, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000500-KNGPS%208%207%20Applicants%20Responses%20to%20Action%20Points%20for%20Deadline%202.pdf>

²² Applicant, “8.3 Summary of Applicant’s Oral Submissions at Issue Specific Hearing 1 (Revision 0)” [REP1-030], EN0110001-000488, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000488KNGPS%208.3%20Summary%20of%20Applicant's%20Oral%20Submissions%20at%20ISH1%20Rev%200.pdf>

²³ in the case of blue hydrogen supply, this is dependent on (a) and (b) above, and also the assumed CO₂ capture rate in blue hydrogen production;

- (g) annual operating hours; and
- (h) the operational lifetime: start and duration.

38 Parameters (a), (b), (g) and (h) scale the gas-only case (Scenario G and the gas periods of Scenarios B to F), and (f) determines how long those gas periods last. The same parameters, with (c), scale the hydrogen cases, because blue hydrogen intensity itself depends on (a), (b) and the assumed carbon capture rate in blue hydrogen production.

C.3 Contextual comparison to the Jackdaw project

- 39 The Jackdaw project is introduced here to provide context on the materiality of the Keadby NGPS project before her. The Secretary of State will be well aware of the several years long national debate about consenting Jackdaw. CESL respectfully acknowledges, and notwithstanding the decision [Jackdaw decision]²⁴, that she fully understands the public interest in projects with the order of magnitude of material climatic effects associated with Jackdaw.
- 40 The high-case EIA assessment for Jackdaw identifies 35.8 MtCO₂e of downstream lifecycle Scope 3 emissions under the P10 production case [Jackdaw decision, para 43]. The Keadby NGPS EIA assesses 22.74 MtCO₂e of lifecycle emissions under Scenario G, comprising Scope 1 combustion and Scope 3 fuel-supply emissions [APP-052, Table 18.10]. Although the figures arise from different project and emissions-scope boundaries, both represent descriptions of full lifecycle emissions over the respective project lifetimes.
- 41 In Appendix D (Table 5), CESL estimates for illustrative purposes, uncertainty ranges for the project's climatic effects combined with sensitivity of hourly and lifetime operations. On the basis of standard Scenario G operation (i.e. 67,500 hours), and considering only long-term climate effects, the range for the lowest sensitivity case to reasonable worst case is 25.61 MtCO₂e to 33.24 MtCO₂e. When short-term climate impact and imported LNG is modelled as a marginal market supply case, the range is 25.61 MtCO₂e to 61.37 MtCO₂e. If this case is extended to a realistic engineering case for high-load operation with an extended 30 years lifetime, then the range is 92.32 MtCO₂e to 221.86 MtCO₂e. These figures are only for illustration, but it is reasonable to conclude that the climate effects of Keadby NGPS are on the same material order of magnitude as Jackdaw, and potentially depending upon operating conditions and uncertainty analysis, greater than Jackdaw.
- 42 CESL submits that the climatic effects of Keadby NGPS, being of the same order of magnitude as Jackdaw and arguably considerably greater, are a matter of significant public interest. More fundamentally, the applicable EIA Regulations require an adequately informed assessment of the likely significant environmental effects of the Proposed Development, including the material uncertainties involved.
- 43 Where a project with climatic effects on the scale of Jackdaw has warranted detailed assessment and consideration by the Secretary of State, as it has, it is particularly important that Keadby NGPS, with potentially comparable or greater emissions, is determined on the basis of an equally rigorous and properly informed EIA.

²⁴ Secretary of State for Energy Security and Net Zero, *Decision Document: The Offshore Oil and Gas Exploration, Production, Unloading and Storage (Environmental Impact Assessment) Regulations 2020 – Regulation 14 Decision – Jackdaw Field Development* (14 October 2026), https://assets.publishing.service.gov.uk/media/6ad77f4e13c9ff4fd08ed632/20261014_Jackdaw_decision_doc.pdf (accessed 24 October 2026).

C.4 The status of securing the EIA description

44 The table below describes each GHG determining parameter, and described how and if each is secured by the draft DCO, or by permit or other control, following the responses to the SoS.

Parameter	ES assumption and uncertainty	Secured by the draft DCO?	Secured by permit or any other control?
Upstream natural gas supply chain emissions	DESNZ 2025 factor held constant over the assessment period [APP-052, 18.3.53]. Based on pre-2015 data and frozen since 2023, does not model US LNG (see EIR in Appendix A) [REP2-006, 4.3.2]	Uncertainty not modelled. Carbon intensity of gas supply not secured.	No. Substantive ex-UK territorial component to full lifecycle emissions not reachable by UK controls such as permitting and UK ETS.
Short-term climate impacts of methane	GWP100 only [APP-052, 18.3.51]	Not assessed (GWP100 only). No control is possible.	No. Substantive ex-UK territorial component to full lifecycle emissions not reachable by UK controls such as permitting and UK ETS.
Hydrogen intensity	20 gCO ₂ e/MJ (LCHS ceiling) [APP-052, 18.3.57]	No. “There is no provision in the Draft DCO which relates to carbon intensity” [C1-004b, Q5(a)]. Requirement 33 offered but does not secure (see section D.4.3.1).	No. The LCHS is “not a policy or permitting arrangement” [REP1-030, 4.5]. There is “no feasible mechanism” to monitor [C1-004b, Q7].
Hydrogen connection	4 km spur to East Coast Hydrogen [REP2-005, 2.3.7]	No.	No. No connection point, offer, capacity reservation or binding agreement [C1-004b, Q3]
Carbon capture	None assumed. Space only (Work No. 11; R30 and R31)	Space only. R30 (reserve space) and R31 (readiness reports) are in the final draft DCO, but both fall away once the environmental permit is granted [REP6-003, Requirements 30(1), 31(3); C1-002, Q12].	No. EA has no “regulatory mechanism to require carbon capture”. The CCR Statement “is not sufficient” [C1-002, Q11, Q12].
Operational lifetime	25 years, 2031 to 2055 [APP-052, 18.6.12]	No. Latest construction start date set in DCO. Requirement 2 allows commencement up to seven years after the Order comes into force (about late 2033). No limit on operating life. Time limits can be changed later under Schedule 6 (Section G.6).	No. On monitoring “up to 30 years ... if the operational life ... extends beyond the anticipated 25 years” [REP3-024, Q1.0.7] ²⁵
Operating hours	3,500 h/yr for 15 years, then 1,500 h/yr [APP-052, 18.6.19]	No. The Applicant opposes any requirement [C1-004b, Q8(b)]	No. EA: “The applicant has not applied for any restrictions on annual operating hours” [C1-002, Q9]
Construction start	2027 to 2030 [APP-052, 18.3.28]	No. Requirement 2: allows seven years to commence i.e. about late 2033	No. “construction starting between 2027 and 2034, as per the Environmental Statement” [REP3-024, Q1.0.15]

Table 1: How and if each GHG determining parameter is secured

²⁵ Applicant, “8.10 Applicants Response to ExA Written Questions (Rev 0)” [REP3-024], EN0110001-000549, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000549-KNGPS%208%2010%20Applicants%20Response%20to%20ExA%20Written%20Questions%20Rev%200.pdf>; responding to the Examining Authority’s Written Questions 1 (ExQ1) [PD-008], EN0110001-000504, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000504-KNGPS%208%2010%20Applicants%20Response%20to%20ExA%20Written%20Questions%20Rev%200.pdf>

D The issues

D.1 The UNEP Emissions Gap Report 2026 and why methane is important

- 45 On 21 October 2026 the United Nations Environment Programme (UNEP) published²⁶ the *Emissions Gap Report 2026: The point of return* [UNEP EGR 2026²⁷]: after all three of the Secretary of State's letters of 4 September, 24 September and 6 October 2026, and three days before the close of this consultation.
- 46 It is the seventeenth report in UNEP's annual series. **CESL submits that the report is the most recent authoritative scientific assessment of global emissions, pathways and heating²⁸ available to the Secretary of State, and that it updates the scientific context for this decision in a material way.**
- 47 Reducing methane emissions is highlighted as current, urgent and central in bringing down global temperatures which the report explained will now overshoot the Paris agreement 1.5°C target. It finds that methane emissions are "heading in the opposite direction" and that methane emissions must fall by at least 25 per cent by 2035 and 40 per cent by 2040 below 2025 levels [UNEP EGR 2026, pp. xxi, 50].
- 48 UNEP's headline finding is that "*the opportunity to bridge the 1.5°C emissions gap with 'no or limited' overshoot has been lost*", so that a larger exceedance of 1.5°C is "*now imminent and unavoidable*", and that "*every additional fraction of a degree and additional year of warming above 1.5°C raises the risk of irreversible changes*" [UNEP EGR 2026, p. xiv]. In UNEP's words, "*the call to Governments remains fundamentally unchanged. What has changed is the context*": new mitigation pathways, "*replacing the outdated scenarios*" of IPCC AR6 and due to "*inform the IPCC AR7*", define a "*lowest 1.5°C overshoot scenario*" that peaks at 1.7–1.8°C and **requires global greenhouse gas emissions to fall by 18 per cent by 2030, 45 per cent by 2035 and 69 per cent by 2040 from 2025 levels**, together with roughly 320 GtCO₂ of CO₂ removal this century [UNEP EGR 2026, pp. xiv, xvii].
- 49 Against that benchmark, full implementation of the new NDCs would cut emissions by only 5–8 per cent by 2030 and 11–15 per cent by 2035, and, if similar efforts continue, give a 66 per cent chance of limiting warming to 2.6°C by 2100 (2.8°C under current policies), an outlook worse than last year's partly because of the United States' withdrawal from the Paris Agreement [UNEP EGR 2026, pp. xiv, xx]. The cost of delay is quantified: "*every five years*

[documents.planninginspectorate.gov.uk/published-documents/EN0110001-000504-Examining%20Authority's%20Written%20Questions%201%20\(ExQ1\).pdf](https://documents.planninginspectorate.gov.uk/published-documents/EN0110001-000504-Examining%20Authority's%20Written%20Questions%201%20(ExQ1).pdf)

²⁶ United Nations Environment Programme, "As temperatures spike, this new report outlines humanity's options for containing climate change", story, 21 October 2026, <https://www.unep.org/en/news-and-stories/story/temperatures-spike-new-report-outlines-humanitys-options-containing-climate>

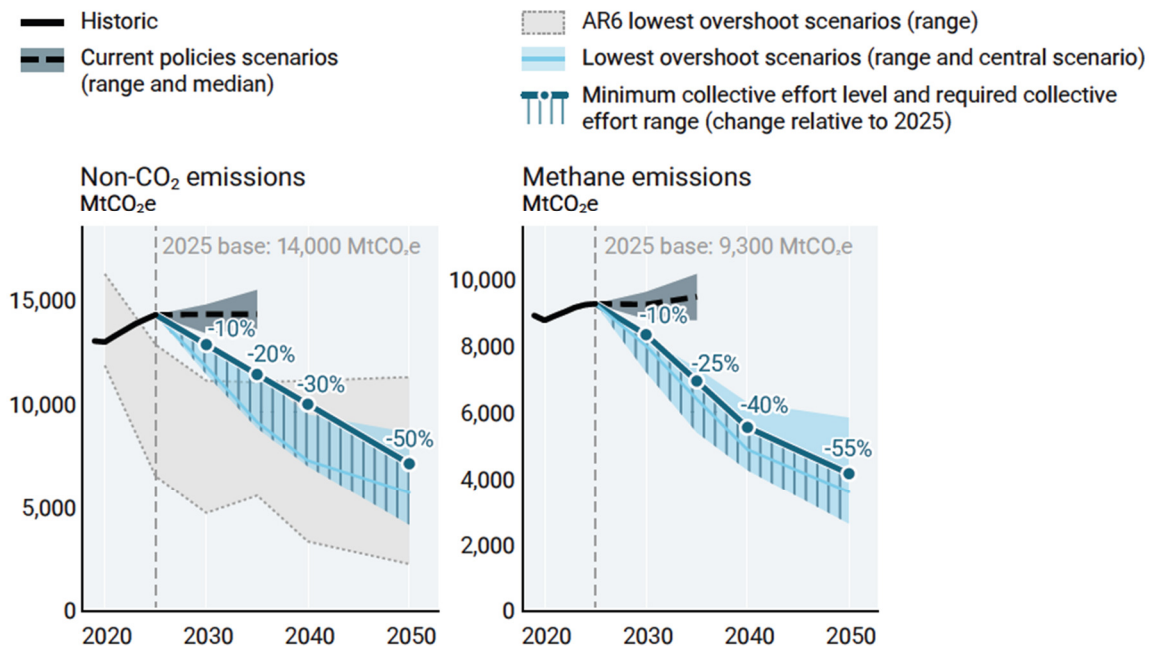
²⁷ United Nations Environment Programme (2026). Emissions Gap Report 2026: The point of return – Urgent emissions cuts needed to come back from overshoot of 1.5°C. Olhoff, A. (chief ed.), Lamb, W., Kuramochi, T., Rogelj, J., Pelz, S., Khanna, T., Boehm, S., den Elzen, M., Jeffery, L., Minx, J., Muûls, M., Pachauri, S., Pathak, M., Riahi, K. and Sudharma Vishwanathan, S. (eds). Nairobi. <https://doi.org/10.59117/20.500.11822/50038>.

²⁸ It assesses literature and data up to 1 September 2026, and its new mitigation pathways are "*replacing the outdated scenarios from the Intergovernmental Panel on Climate Change Sixth Assessment Report (IPCC AR6)*" and "*will inform the IPCC AR7*" [UNEP EGR 2026, pp. xiv, xvii, 13]. Its authorship is drawn substantially from the IPCC: of the 49 people credited as lead authors, contributing authors and data contributors, at least 16 contributed to AR6, seven of them as Coordinating Lead Authors, Lead Authors or Review Editors, and at least five have been appointed authors for the AR7 Working Group reports, while the IPCC Chair, Professor Jim Skea, is listed among its reviewers [UNEP EGR 2026, pp. iv–v]

AR6 roles from the IPCC AR6 author lists (WGIII Chapters 1–17; WGI Chapter 5): [redacted]: Keywan Riahi (CLA, WGIII Ch 3), Jan Minx (CLA, WGIII Ch 2), Navroz Dubash (CLA, WGIII Ch 13), Shonali Pachauri (LA, WGIII Ch 2), Glen Peters (LA, WGIII Ch 3), Joeri Rogelj (LA, WGI Ch 5), Vaibhav Chaturvedi (RE, WGIII Ch 3). AR7 appointments as announced by the authors' institutions (CICERO, 15 August 2025; IIASA, August 2025; Imperial College London, 20 August 2025): Glen Peters (CLA, WGIII Ch 2), Shonali Pachauri (LA, WGIII Ch 4), Joeri Rogelj (LA, WGIII Ch 3), Keywan Riahi (LA, WGIII Ch 9), Robin Lamboll (LA, WGI Ch 5). Jim Skea is described as "IPCC Chair" in the IPCC press release of 18 August 2025. [redacted]

of emissions at current levels adds around 200 GtCO₂ to the atmosphere, and pushes the peak warming up by around 0.1°C, and without stringent action from 2025 even the lowest overshoot pathways will “slip away” [UNEP EGR 2026, p. xviii]. On the energy system, the report finds that absolute emissions, “notably methane emissions, are heading in the opposite direction to the global stocktake targets”, that use of oil and gas “will likely continue to increase this decade”, and that methane emissions must fall by at least 25 per cent by 2035 and 40 per cent by 2040 below 2025 levels [UNEP EGR 2026, pp. xxi, 50; Figure 5.8]. Figure 5.8 of the report is reproduced below.

Figure 5.8 Global progress in reducing non-CO₂ emissions



Sources: See box 5.1, footnote 1 for data from the lowest 1.5°C overshoot scenario set, footnote 2 for data from the latest current policies scenarios, footnote 3 for historical data, and footnote 4 for data from the AR6 scenarios.

Figure 1: UNEP EGR 2026, Figure 5.8: methane cuts required

- 50 I have foregrounded this UNEP EGR 2026 report here, because, respectfully to the Secretary of State, it is one of the most important reports, generally and specifically to the decision on the application, that she must consider. It is the most up-to-date scientific report available to her specifically to provide context of the methane in upstream emissions from the Keadby NGPS plant in her decision making. Put simple Keadby NGPS with generate indirect methane emissions and contribute to global methane emissions “heading in the opposite direction”.
- 51 The UNEP EGR 2026 report relates directly and materially to the application because the methane in the upstream emissions is a significant and material part of the application’s full lifecycle emissions. This issue must be assessed on current knowledge, and the uncertainty around its full envelope must be tested. It has not been.

D.2 The upstream WTT factor is not current knowledge

- 52 The ES states that upstream WTT emissions are “*approximately 14%*” of fuel-consumption emissions for unabated gas. It says the DESNZ factor “*has been applied across the whole assessment period to 2050, assuming no decarbonisation of the supply chain*”, and that “*there are no reliable projections to base this on currently*” [APP-052, 18.3.52–18.3.53]. It accepts that “*there are considerable uncertainties with the calculation of the indirect effects (Scope 3 emissions)*” [APP-052, 18.6.17].
- 53 The Applicant’s case is that the DESNZ factor reflects the supply mix and is kept up to date. It says the factor is “*refreshed periodically by government to reflect the mix of gas supply into the UK system*” [REP1-030, 4.30], and is “*updated periodically to reflect the change in natural gas supplies to the UK*” [REP2-006, 4.3.1]. Yet it also accepts that the factor “*has remained constant since the dataset published in summer 2023*” [REP2-006, 4.3.2]. It told the Examining Authority that nothing had changed since Net Zero Teesside [REP1-030, 4.35], and it tells the Secretary of State that “*there is no material change since then*” [C1-004b, Q5(b)].

D.2.1 UK Gas supply trends

- 54 As background to considering the adequacy of the DESNZ 2025 WTT factor used, it is important that the Secretary of State considers the latest trends in natural gas supply to the UK. The DESNZ Energy Trends²⁹ release of 2 April 2026 reports that US liquefied natural gas (LNG) accounted for 76% of UK LNG imports in 2025, up from 68% in 2024, with US LNG volumes increasing by 38% year-on-year. LNG imports to the UK overall also rose in 2025. By contrast, Qatari LNG has declined to a negligible share, with Qatar accounting for just 1.8% of total UK gas imports in 2025. These statistics establish that the United States supplied approximately three quarters of UK LNG imports in 2025 and that its share increased between 2024 and 2025.
- 55 National Gas’s “Gas Winter Outlook 2026” report on 23 October 2026³⁰ – published following after the Secretary of States’ announcement of the Jackdaw decision earlier this week – stated³¹ that (1) domestic gas production from the UK Continental Shelf is forecast to decline by around 5%, continuing its long-term downward trend, and (2) LNG imports are forecast to increase by around 6% (for Winter 2026), highlighting the growing importance of global imports within Britain’s supply mix.

²⁹ DESNZ, “Energy Trends”, Statistical Release 2 April 2026, [supplied as stand-alone Appendix], https://assets.publishing.service.gov.uk/media/69cd1451b5210036050bc625/Energy_Trends_March_2026.pdf - supplied as stand-alone appendix. Page 14: “**Liquefied natural gas (LNG) imports increased by 24 per cent in 2025** compared with 2024, which included a 38 per cent increase in imports from the USA (though LNG imports were relatively low in 2024). The US remained the largest source of LNG in 2025 after overtaking Qatar for the first time in 2022. LNG imports from the US accounted for 76 per cent of LNG imports and 23 per cent of total imports, equivalent to 15 per cent of demand. Imports of LNG from Algeria increased by 56 per cent in 2025 compared with 2024, making it the second largest source of LNG and overtaking Qatar. Qatari LNG imports fell by 4.2 per cent in 2025, accounting for 1.8 per cent of total imports, down from a peak of 39 per cent in 2011.”

³⁰ National Gas Transmission, *Gas Winter Outlook 2026*, 23 October 2026,

³¹ National Gas, “National Gas publishes 2026 Gas Winter Outlook”, news release, 23 October 2026,

56 The DESNZ Energy Trends statistics also show that UK gas supply from imports in 2025 was broadly split between:

- Norwegian pipeline imports meeting around 47% of UK domestic demand;
- with US LNG meeting c.15% of demand;
- and other LNG around 4-5% of demand³².

57 This demonstrates that while UK and Norwegian pipeline gas dominates baseline supply, LNG is the predominant marginal gas supply layer, and it is now three quarters US-derived LNG. LNG is the swing, marginal supply in times of system stress when dispatchable power would be engaged.

58 CESL submits that, against this changing supply situation, the single DESNZ 2025 WTT factor (or DESNZ 2024 WTT factor which is numerically the same) used in the application for assessing upstream gas supply emissions is inadequate. It simply does not capture the current situation, let alone the future trend.

D.2.2 DESNZ's EIR on the DESNZ WTT factor

59 Substantive evidence of this inadequacy is provided in an EIR response, received by CESL from DESNZ on 27 March 2026, on its Natural Gas WTT Emission Factor Calculation Methodology: reproduced in Appendix A of this submission. The EIR response indicates the following:

- a. **The emission intensity data is severely out of date.** This matters because the underlying intensity data for the DESNZ WTT factor is based on a pre-2015 study³³ whilst recent satellite and research literature^{34,35,36,37} finds actual oil & gas emissions exceed inventories by significant margins. Emission intensities associated with upstream and midstream stages (extraction, processing, liquefaction, shipping) are frozen at pre-2015 values with no subsequent updates³⁸.

The International Energy Agency has highlighted under-reporting of methane emissions as a significant issue, stating in its Global Methane Tracker 2025 [supplied as a stand-alone appendix] (PDF page 46):

“Currently, most company and country methane inventories are based on multiplying activity data (e.g. the number of facilities or the extent of operations) by standardised emission factors (e.g. default values or leak

³² Actual domestic demand figures are: UK domestic production - ~48–50%; Norwegian pipeline gas - ~47%; US LNG - ~15%; Other LNG (Algeria, Qatar, etc.) - ~4–5%. Gross demand sums to >100% because the UK exports ≈ 10–12% of UK gross gas demand.

³³ Exergis et al. (2015). Study on actual GHG data for diesel, petrol, kerosene and natural gas. [supplied as separate appendix]. A study by Exergis, E3 Modelling and COWI for the European Commission, DG ENER. [REDACTED]

³⁴ There is now very comprehensive satellite-era evidence base by over a decade, see below: Sherwin (2024), Burdeau (2025), Cusworth (2026), IEA (2025) [supplied as stand-alone Appendix], MethaneSAT (2026) [supplied as stand-alone Appendix].

³⁵ Sherwin, E.D., Rutherford, J.S., Zhang, Z. *et al.* US oil and gas system emissions from nearly one million aerial site measurements. *Nature* **627**, 328–334 (2024). <https://doi.org/10.1038/s41586-024-07117-5> [supplied as stand-alone Appendix]

³⁶ Burdeau, P.M., Sherwin, E.D., Biraud, S.C. *et al.* High-resolution national mapping of natural gas composition substantially updates methane leakage impacts. *Nat Commun* **16**, 11297 (2025). <https://doi.org/10.1038/s41467-025-66465-6>

³⁷ Cusworth, D.H., Bon, D.M., Varon, D.J. *et al.* Duration of super-emitting oil and gas methane sources. *Nat Commun* **17**, 2011 (2026). <https://doi.org/10.1038/s41467-026-68804-7>

³⁸ DESNZ confirms that the source-specific emission intensities for upstream and midstream stages for UK, Norway, Netherlands, and Qatar LNG are taken from this single 2015 European Commission study and that “an updated version of the report has not been published since they were introduced into the methodology.”

rates for particular types of equipment). Measurements from satellites and airborne observations suggest that actual emissions levels are often much higher (e.g. in Europe and South America). Efforts are underway to reconcile these two approaches to estimating emissions, and these suggest that existing inventories often fail to capture certain sources of emissions, particularly accidental and high-emitting leaks.

Globally, we estimate that methane emissions from the energy sector are about 80% higher than the total reported by national governments. The quality of reporting also varies widely – with many oil and gas companies failing to report emissions at all.”

Measurement-based research also identifies substantial methane under-reporting in several US oil and gas production regions. Sherwin et al. (2024) [supplied as stand-alone appendix] estimated methane emissions across six oil and gas producing regions in the **United States**, including the Permian Basin, at approximately three times the US Environmental Protection Agency’s inventory estimate. The study assessed methane emissions from oil and gas production and associated midstream infrastructure, including pipelines, using approximately one million aerial site measurements.

- b. **The natural gas supply source data is severely out of date**. Only Qatar LNG intensity data exists in the DESNZ 2025 WTT method: **and all LNG is treated as Qatar LNG**. The response states explicitly that "*as only a factor for Qatar LNG is available this is used for all LNG imports.*" This is highly material as CESL notes above that approximately 76% of 2025 LNG imports originated from the United States. US LNG carries materially higher upstream emission intensity than Qatar LNG, due to the energy-intensive liquefaction process in US export terminals and higher wellhead leakage rates from US shale extraction³⁹, and the emissions footprint is systemically underreported, as in previous point.
- c. The DESNZ method, even if applied to recent years of UK DUKES data⁴⁰ to correct the natural gas supply sources, would therefore systematically apply an **outdated emission intensity from the wrong country** to the largest, most emissions intense, LNG import sector: US LNG. This is regardless of how the supply weightings are applied.
- d. **The DUKES data used to weight supply shares is also frozen**. Table 2 in the EIR response shows that the DUKES year used for the 2024 and 2025 conversion factor publications is the 2022 edition, covering supply chain mix data for 2021. The "DESNZ 2025" emission factor used by the applicant is in fact weighted on 2021 supply data — which predates the recent surge in US LNG imports.

³⁹ The distinctive characteristics between Qatar and US LNG production are structural. Qatar’s LNG is [was] produced from a highly concentrated conventional reservoir (the North Field) within a vertically integrated system operated by QatarEnergy, with short gathering distances and co-located liquefaction infrastructure. By contrast, US LNG is predominantly derived from shale gas systems (notably the Permian and Marcellus basins), characterised by very large numbers of wells, extensive gathering and transmission networks, and multiple operators. This structural distinction is directly relevant to greenhouse gas assessment because methane emissions scale with system complexity, component count, and operational heterogeneity. Empirical studies using aerial and satellite measurements demonstrate that oil and gas methane emissions are highly skewed, with a small number of “super-emitting” sources contributing a disproportionate share of total emissions, and that such emissions are more prevalent in large, distributed production systems. (For example, Sherwin, E.D., Rutherford, J.S., Zhang, Z. *et al.* US oil and gas system emissions from nearly one million aerial site measurements. *Nature* **627**, 328–334 (2024) [supplied as a stand-alone appendix, provides one of the most comprehensive, measurement-based estimates of methane emissions from the US onshore oil and gas system to date).

⁴⁰ Which it is not, see next bullet

- e. **Annual updates were explicitly discontinued from 2023 onwards.** The response confirms: "*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.*" CESL notes that this has continued with the DESNZ 2026 WTT emissions factor⁴¹ which is identical to the 2025 factor.
- f. **DESNZ intends to review and revise the WTT factors ahead of the 2027 publication.** The response ends: "*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.*" This is an official acknowledgement by the responsible department that the current factors require review.

- 60 Further it should be noted that UK gas supply is projected to rely increasingly on imported gas, including LNG. See NESO's FES 2025⁴² [supplied as separate appendix] Figure 68 which shows LNG and "generic imports"⁴³ categories both of which contain LNG imports: these categories increase in future years 2030, 2035, 2040 and 2050 during the lifetime of the application.
- 61 The quotes from the Net Zero Teesside Examiner's recommendation and SoS decision letter, relied on by the Applicant, were both expressly time-bound. The ExA regarded the BEIS/Defra factor as representing "*the best data and understanding available at the current time*" [NZE Recommendation Report, 5.3.47, quoted at REP2-006, 4.2.3]⁴⁴, and the SoS "*remains satisfied with the approach taken by the Applicant, notwithstanding the likelihood of variation in future emission factors*" [NZE Decision Letter, 4.54, quoted at REP2-006, 4.3.8]⁴⁵.

D.2.3 **Consequence**

- 62 Scenario G's Scope 3 figure (3.16 MtCO₂e, about 14% of the total) rests wholly on this factor.
- 63 For illustrative purposes, CESL reproduces the chart below which shows combustion and upstream emissions across a number of assumptions: these are described in Appendices D, E and F of the CESL indicative model. The purpose, here, is to show that there is potentially wide variability in the upstream emissions. Each of the "levels" below are based on published emission factors (from the IEA and EERA), or recent scientific literature.
- 64 The Application Scenario G is reconstructed in the bottom bar (with the orange bar being the 14% noted above). Whilst the combustion emissions remain constant for the Scenario G assumptions, the upstream emissions vary significantly. The absolute emissions are plotted in tCO₂e on the x-axis: it can be seen by eye that the total footprint can nearly triple depending upon the model of the upstream emission component.

⁴¹ See "WTT-fuels" tab in <https://assets.publishing.service.gov.uk/media/6a29392bade52dc0882218a8/ghg-conversion-factors-2026-full-set.xlsx>

⁴² Also used by the applicant in Appendix 8B (for the different purpose of sensitivity testing)

⁴³ NESO describes "Generic imports" as a balancing item that may comprise LNG and/or continental pipeline imports: in recent years, continental pipeline imports have been minimal, and LNG may be the substantive fraction of future "Generic Imports".

⁴⁴ Net Zero Teesside, Examining Authority's Recommendation Report, February 2023 (cited as [NZE Recommendation Report]), as quoted by the Applicant at [REP2-006, 4.2.3]

⁴⁵ Secretary of State, Net Zero Teesside decision letter, 16 February 2024 (cited as [NZE Decision Letter]); before the Examining Authority as CESL Deadline 1 Appendix 11 [REP1-050], EN0110001-000470, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000470-Appendix%2011%20to%20WR-%20Decision%20letter.%20Net%20Zero%20Teesside.%2016%20February%202024.pdf>

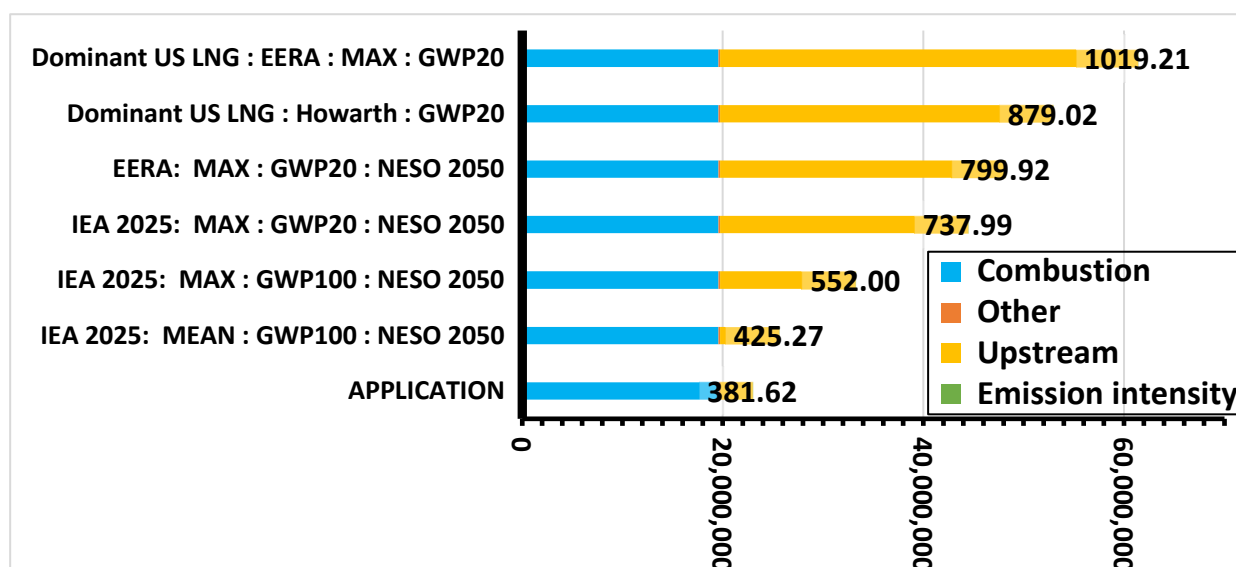


Figure 2: Scenario G: illustration of variation in upstream emissions

65 Whilst this is illustrative, the point is that the applicant has resisted grappling with the uncertainty involved, and testing its assumptions on upstream emissions in the ES.

66 Either, the effects of upstream emissions must be secured by the DCO, or the full likely significant effects of the project must be described and assessed.

D.3 The short-term climate impacts of methane

D.3.1 Background: deep scientific and governmental concern

67 Concern over methane emissions is very high amongst climate experts. This is clear in the UNEP EGR 2026 report: “*Reducing CH₄ emissions is especially important to reduce peak warming, because CH₄ has a high global warming potential but remains in the atmosphere for a relatively short time (Ravishankara et al. 2021).*” [UNEP EGR 2026, p. 50]

68 This concern is reflected, internationally, when the UN Secretary-General António Guterres launching a global “Call to Action on Methane”⁴⁶ during London Climate Action Week in June 2026 to urge rapid reductions in methane emissions.

⁴⁶ <https://www.un.org/en/climatechange/methane>

69 It is reflected by the UK Government when the previous DESNZ Secretary of State stated to the UK parliament that methane reduction is a priority component of the UK's vision for international climate action, describing methane and other non-CO₂ greenhouse gases as “super-pollutants”⁴⁷ and, in international coalitions, when emphasising that cutting methane is among the fastest and most effective means of slowing global warming in the near term⁴⁸. These statements demonstrate, in line with the IPCC AR6 report (i.e. the information in Appendix C) that the temporal distribution of methane-related heating is regarded by the DESNZ SoS as a matter of requiring urgent priority and action. The UNEP ER 2026 report makes this all the more urgent, and the Secretary of State is respectfully requested to take this into account for the current application.

D.3.2 Short-term and long-term effects

70 The DESNZ 2025 WTT method only uses GWP100 (100-year “global warming potential”⁴⁹), and as a result the ES itself only uses GWP100. GWP100 measures the climate impact of methane over the longer-term (i.e. a hundred year horizon).

71 However, the science is clear⁵⁰ on the exceptional near-term climate heating caused by methane and how this differs from its longer-term climate impact⁵¹. IPCC AR6 WGI Figure 6.16⁵² (reproduced in Appendix C) assesses the global mean temperature response to a one-year pulse of global anthropogenic emissions in 2014. Its underlying numerical data⁵³ show that, ten years after the emissions pulse, the temperature response from methane emissions is approximately 0.028°C, compared with 0.0225°C from CO₂ emissions, a response approximately 24% greater for methane. After 100 years, the corresponding responses are approximately 0.0014°C for methane and 0.0183°C for CO₂, demonstrating the marked contrast between methane's near-term impact and the persistence of CO₂ warming.

⁴⁷ Before the UN COP30 Climate summit in Brazil, the Secretary of State for Energy Security and Net Zero told Parliament (4 November 2025) “We will also drive forward progress in tackling super-pollutants such methane, in order to deliver climate action and cleaner air”, Hansard, 4 November 2025, <https://hansard.parliament.uk/commons/2025-11-04/debates/251104100000008/UKCOP30Priorities>

⁴⁸ When launching a joint initiative with Brazil, called the “Super Pollutant Country Action Accelerator” (9 November 2025), the Secretary of State for Energy Security and Net Zero said “Cutting methane and other non-CO₂ greenhouse gases is one of the fastest and most effective ways to slow global warming and clean our air. The United Kingdom is proud to be at COP30 to work alongside our international partners to turn ambition into concrete action on tackling the climate crisis. The UK is leading the way through our Methane Action Plan which will drive real progress towards a safer, fairer, and cleaner future for our children and grandchildren.” From “A Turning Point for Methane: Leaders Move to Pull the Climate Emergency Brake at COP30”, Press Release, Climate and Clean Air Coalition (CCAC) Secretariat, 9 November 2025, <https://www.ccacoalition.org/news/turning-point-methane-leaders-move-pull-climate-emergency-brake-cop30>, downloaded 26 February 2026

⁴⁹ The ES is based on the DESNZ WTT Factor, itself based on the Exergia (2015) study, which uses a GWP for methane of 25 – consistent with a 100 year GWP (adapted from table 2.14 of the IPCC Fourth Assessment Report, 2007 – see Exergia report [supplied as separate appendix], PDF pages 487, 61, 109, 284).

⁵⁰ IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 3–32, doi:[10.1017/9781009157896.001](https://doi.org/10.1017/9781009157896.001).

⁵¹ Based on the IPCC AR6 report, Figure SPM.2 attributes approximately 0.5°C of the 1.07°C observed anthropogenic heating (2010–2019 relative to 1850–1900) to methane — that is, on the order of one third of the total anthropogenic heating presented in the figure (including other climate forcings in the diagram). Figure SPM.2 is reproduced in Appendix B. AR6 further explains that methane's shorter atmospheric lifetime results in a substantially greater heating effect when evaluated over a 20-year horizon than under a 100-year horizon. The AR6 mitigation assessment further explains that changes in short-lived climate forcings such as methane dominate the heating response in the near term and that reductions in methane concentrations can drive down near-term non-CO₂ heating before net zero CO₂ is reached.

⁵² AR6 WGI Figure 6.16 (reproduced in Appendix C) identifies methane as a dominant short-lived climate forcing whose total current emission levels induce heating on 10–20 year time scales at least as large as total current emission levels of CO₂ emissions. Figure 6.16 is reproduced in Appendix C, and shows that a one-year pulse of current emissions (“current” is 2014) produces a global mean temperature response of 0.0225°C for CO₂ and 0.028°C for methane i.e. current levels of methane emissions cause a greater temperature rise after 10 years than current levels of CO₂ emissions.

⁵³ [REDACTED]

- 72 More recent peer-reviewed research⁵⁴, using a 2022 global emissions mix and updated AR6-based temperature-response functions, also demonstrates methane's major near-term impact, finding that methane and CO₂ account for approximately 46% and 51%, respectively, of the modelled temperature response after ten years (Zieger et al., 2025). Although the two analyses use different emissions inventories and modelling approaches, they consistently demonstrate that methane emissions have a near-term temperature impact comparable in magnitude to that of global CO₂ emissions, an effect which is not adequately conveyed by consideration of 100-year global warming potentials alone.
- 73 This near-term temperature impacts are considered using the GWP20 metric which has not yet been used by the applicant.
- 74 The applicant acknowledges that it uses GWP100 only [APP-052, 18.3.51]. Yet it also recognises that the effects of methane “*are far higher if considered on a shorter time horizon such as 20 years*” [APP-052, 18.3.48]. The Applicant accepts that “*Both the Applicant and the IPCC recognise that a GWP with a 100-year time horizon is less well suited to reflect the short-lived warming effects of gases such as methane*” [REP2-006, 4.3.15].
- 75 However, the applicant then appears to lose sight of the issue of the short-term climate heating impacts from methane in saying “*Ultimately, GWP100 is much better suited to modelling and understanding the impacts of carbon dioxide and other gases that control long-term global temperature increases*”.
- 76 The ES's own description of the short-term methane heating metric is thirty years old: not current. It gives methane a GWP of 56 over 20 years “*as opposed to 21 over 100 years*” and misquotes it as from (IPCC, 2023)” [APP-052, 18.3.49]. The values quoted by the applicant originate from the IPCC Second Assessment Report published in 1995. The latest science from the IPCC AR6 WGI (2021) gives fossil methane a GWP20 of about 82.5 and a GWP100 of about 29.8 [IPCC AR6 WG1 Chapter 7, Table 7.15]. For full transparency, CESL notes that the IPCC AR6 WGI originally gave fossil methane a GWP20 of about 82.5 and a GWP100 of about 29.8 [Chapter 7, Table 7.15]; these were subsequently updated to 77.4 and 28.1 respectively in the IPCC's October 2025 erratum. This makes no difference to the conclusions of this document.
- 77 The ES also says that constant methane emissions over methane's lifetime add no further warming [APP-052, 18.3.50, citing Allen et al., 2018]. That proposition concerns a source that is already emitting methane at a steady rate. The Proposed Development would add a new source, sustained over 25 years or more, which is a step increase in emissions.
- 78 Schedule 4 paragraph 5 requires a description of short-term as well as long-term environmental effects. That description and assessment is missing for the methane component of both the gas upstream emissions and the blue hydrogen upstream emissions in the EIA.

⁵⁴ Zieger, V., Lecompte, T., Guihéneuf, S., Guevel, Y., Bazzana, M., Gasser, T. and He, Y. (2025) 'Climate change metrics: bridging IPCC AR6 updates and dynamic life cycle assessments', Earth System Dynamics, 16, pp. 2003–2019. <https://doi.org/10.5194/esd-16-2003-2025>

D.4 Hydrogen intensity: the LCHS ceiling used as the “worst case”

D.4.1 The assumed 20 gCO₂e/MJ ceiling

- 79 The Secretary of State notes that the 20 gCO₂e/MJ assumption i.e. the LCHS ceiling “*is not secured within the DCO*” [SoS RFI 4 Sept 2026, Q4]. The ES adopted it in response to the Planning Inspectorate’s request at the scoping stage to show “*the worst-case scenario for each use of fuel option*” [APP-059, ID 4.10.1, as summarised at APP-052, Table 18.1, 18.6.18]⁵⁵. The LCHS sets the maximum intensity at which hydrogen qualifies as “low carbon”.
- 80 Taking that threshold as the assessed value assumes compliance rather than assessing the intensity likely to be supplied.
- 81 In the cases of gas and hydrogen mixtures, the applicant’s case that blue hydrogen will meet the LCHS rests on the same DESNZ WTT factor as discussed above: “*The LCHS is achievable for blue hydrogen **if** the upstream Well-To-Tank emissions factors for natural gas from the UK government dataset is applied*” [C1-004b, Q5(a); REP1-030, 4.3; REP2-006, 4.4.4].
- 82 The factor, which DESNZ itself has acknowledged in the EIR response does not model current gas supply, and which CESL challenges centrally in this submission, is therefore outcome-determinative across all the hydrogen scenarios.

D.4.2 Is the assumed hydrogen supply is representative?

- 83 The 20 gCO₂e/MJ hydrogen intensity used for Scenarios A to F [APP-052, 18.3.57] is the LCHS compliance ceiling. As above, it is an arbitrary, and not secured, cap: not an assessment.
- 84 On the Applicant’s own blue hydrogen benchmark, the margin below the ceiling is about 3.4 gCO₂e/MJ, and the Applicant expects supply to be “*predominantly blue*” [REP2-006, 4.4.2]⁵⁶.
- 85 The effects observed from testing uncertainty for natural gas supply above will also manifest in blue hydrogen production. The applicant’s dependence of the LCHS being achievable for blue hydrogen **if** the DESNZ factor is applied, as a theoretical cap, is telling.
- 86 In practice, blue hydrogen production meeting the LCHS in the UK is extremely unlikely with the future trends on increasing shares of US LNG in the supply chain. The applicant has made no analysis to demonstrate that UK produced blue hydrogen could be LCHS compliant given the higher emission intensity of US LNG and its already high flows as part of UK gas imports.

⁵⁵ Applicant, “6.3.2 Environmental Statement Volume II: Appendix 1B Scoping Opinion Rev 0” [APP-059], EN0110001-000258, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000258-KNGPS%206.3.2%20Appendix%201B%20Scoping%20Opinion%20Rev%200.pdf>

⁵⁶ Applicant, “8.8 Applicants Comments on Deadline 1 Submissions” [REP2-006], EN0110001-000501, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000501-KNGPS%208%208%20Applicants%20Comments%20on%20Deadline%201%20Submissions.pdf>

- 87 It relies instead a Recommendation Report⁵⁷ for a project and application withdrawn by its promoters (H2 Teesside) [C1-004b, response to Q4, page 4] which uses the DESNZ factor. The H2 Teesside Recommendation Report was not a precedent for the currency of environmental knowledge of blue hydrogen lifecycles even before the DESNZ EIR release on the emission factor showed that it does not describe current gas supply chains. After the DESNZ EIR release, the conclusions of a report which never led to an SoS decision and order, are irrelevant.
- 88 The “*not significant*” ratings given to Scenarios A to E, therefore, rest entirely on a figure that cannot be secured by the DCO. The proposed Requirement 33 [C1-004b, response to Q7] does not assist the applicant for reasons given later.

D.4.2.1 Green hydrogen

- 89 Throughout the Environmental Statement and its later submissions, the Applicant relies on green hydrogen to present the assessed hydrogen emissions as “overstated”, but it never assesses green hydrogen supply. Chapter 18 states that green hydrogen has “considerably lower” scope 3 emissions and that the average supply mix “is expected” to fall below 20 gCO₂e/MJ. This, in itself, suggests that part of the supply mix could exceed 20 gCO₂e/MJ which contradicts the position that the LCHS level is a cap on the hydrogen supply.
- 90 On that basis it describes the LCHS figure as “extremely conservative” and the results as worst case [APP-052, 18.3.58–59, 18.6.18, 18.6.57, 18.8.2]. No green hydrogen share, source, volume or date is identified, and none is modelled. The only quantitative support offered is the EN-1 ambition that at least half of national low-carbon hydrogen production capacity be electrolytic by 2030, “*subject to affordability and value for money*” [APP-052, 18.3.59; C1-005b, Q5(b)]. That is a national capacity aspiration. It is not evidence of supply to this plant between 2031 and 2055.
- 91 The Applicant has meanwhile told the Examination that UK green hydrogen production is “*relatively small*”, that its use is not likely to be focused on power generation, and that supply is likely to be “*predominantly blue*” [REP1-030, 4.11.1, 4.21; REP2-006, 4.4.2].
- 92 In the assessment, green hydrogen therefore acts as an unquantified discount on emissions, and the Applicant’s own evidence contradicts it. It gives the Secretary of State no basis to conclude that hydrogen-related emissions would be lower than assessed. It also gives the Secretary of State no basis to conclude that hydrogen-related emissions would be lower than the LCHS cap when the carbon intensity of UK blue hydrogen production is considered against the current UK gas supply.

⁵⁷ Examining Authority, *H2Teesside Recommendation Report – Final*, 28 May 2025, EN070009-002187, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN070009-002187-H2Teesside%20Recommendation%20Report%20-%20Final.pdf>

D.4.3 Neither the LCHS nor Requirement 33 secures the assumption

93 Further, reasons why the LCHS is not a control on the hydrogen received by the Proposed Development:

- (a) The Standard applies to consignments at the point of production. As quoted by the Applicant, before production “*only claims of likely Standard Compliance may be made*” [C1-004b, Q4]
- (b) At Issue Specific Hearing 1, the Applicant described the LCHS as a document that “*is not a policy or permitting arrangement*” [REP1-030, 4.5]. It now presents the LCHS as a regime the Secretary of State may rely on under the *Gateshead* principle [C1-004b, Q4].
- (c) The Applicant has acknowledged “*There is no feasible mechanism for the Applicant or any operator to physically monitor whether hydrogen received meets the LCHS*” [C1-004b, response to Q7]. The offtaker cannot control what enters the network [REP1-030, 4.15].

94 **Supply is expected to be predominantly blue.** The Applicant’s view is that “*it is likely to be predominantly blue hydrogen that is available for use in the Proposed Development*” [REP2-006, 4.4.2], and that blue hydrogen “*will take the bulk*” [REP1-030, 4.11.2].

95 The argument that green hydrogen will pull the average down [C1-004b, Q5(b); APP-052, 18.3.59] relies on the EN-1 ambition that at least half of national low-carbon hydrogen production capacity will be electrolytic. That is a national capacity ambition for 2030. It is not evidence of the supply to this plant. Nor does the LCHS support averaging across the network. Compliance is assessed for consignments of an individual Hydrogen Production Facility, up to the point of production [LCHS v4, 1.2, 3.1, 7.2–7.3]; the only averaging the Standard provides for is within a single facility’s Consignments in a calendar month [LCHS v4, 7.29, 7.33–7.34].

D.4.3.1 Alternative: constrain by enforceable requirements

96 The alternative route to a lawful DCO - to the robust reasonable conclusion approach outlined above - is for the SoS to constrain the project to “fit” the ES, as provided by the applicant, via enforceable requirements.

97 **First, it is important to note, that the Applicant’s draft R33** [C1-004b, Q7], does not provide a step towards this, as it does not secure the assessed intensity:

- (a) the obligation is to take “reasonable steps”, yet the Applicant says compliance cannot be monitored;

The Applicant’s proposed hydrogen requirement would allow hydrogen that fails the LCHS to be used where the planning authority is “satisfied” that it would not give rise to “materially new or materially different environmental effects as compared to the environmental statement” [C1-004b, Q7, sub-paragraph (2)]. That authority is North Lincolnshire Council, the relevant planning authority [REP6-003, Article 2]⁵⁸.

⁵⁸ Applicant, “3.1 Draft Development Consent Order (Rev 6) Final” [REP6-003], EN0110001-000596, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000596-KNGPS%203%201%20Draft%20Development%20Consent%20Order%20Rev%206%20Final%20June%202026.pdf>

The Council is not a regulator of hydrogen production or of greenhouse gas emissions. LCHS compliance is assessed by a government-appointed Delivery Partner [LCHS v4, definitions], and combustion emissions are regulated by the Environment Agency [C1-002]. The Council would be asked to judge lifecycle climate effects, largely arising upstream and outside the UK, against an ES that assessed hydrogen only at 20 gCO₂e/MJ [APP-052, 18.6.18], and with no means of knowing what hydrogen is actually received [C1-004b, Q7].

Under the Order's discharge procedure, an application it does not determine within eight weeks is deemed granted [REP6-003, Article 47(2), Schedule 8, para 2(2)]. This is not reliance on an existing regulatory regime; it creates a new discretion and places it with a body that has neither the function nor the means to exercise it.

- (b) sub-paragraph (3) requires reporting only, with no consequence for non-compliance; and
- (c) sub-paragraph (4) defines the Standard "*as may be updated or substituted from time to time*", so the threshold could change after consent without assessment.

D.4.4 The answers to Q5.

- (d) *Could hydrogen above 20 gCO₂e/MJ be supplied and used?* Yes. Nothing in the draft DCO prevents it [C1-004b, Q5(a)].
- (e) *Would Scenarios A to F remain representative?* No. The Applicant answers that no update is needed because Scenario G is the worst case. But the question was whether the A to F estimates remain representative, and the significance ratings of A to E ("Minor adverse (Not Significant)" [APP-052, Table 18.12]) rest on 20 gCO₂e/MJ.
- (f) *Is G still the worst case?* Neither, the applicant, nor CESL can answer this until proper modelling is done on the hydrogen supply (hydrogen scenarios have not been assessed above the ceiling) or the LCHS ceiling is secured. The applicant has done neither.

D.5 Absolute emissions and the substitution argument

98 The significance conclusions for Scenarios F and G state that the plant “*will only be operational so long as it is replacing higher carbon energy generation on the grid ... so would result in a GHG reduction compared to the baseline scenario*” [APP-052, Table 18.12]. The Applicant relies on the plant being “*one of the most efficient dispatchable gas-fired generating stations*” [C1-004b, Q8(c)]. However:

- (a) the ES states that “*the baseline emissions are considered to be zero and all project emissions are considered as additional*” [APP-052, 18.4.3]. It states that, because of “*uncertainties around the type of power generation to be replaced*”, baseline emissions “*have not been subtracted*” [APP-052, 18.4.6]. The claimed reduction “*compared to the baseline*” is inconsistent with the ES’s own baseline;
- (b) the ES asserts that the plant “*would most likely displace electricity generated using unabated natural gas initially, in particular that combusted within older, less efficient Combined Cycle Gas Turbine (CCGT) power stations*” [APP-052, 18.4.7], and that under Scenarios F and G it would operate only “*if there is higher-carbon electricity on the grid for it to replace*” [APP-052, 18.6.61]. No evidence is given for either statement: which plant would be displaced, how much, or for how long. The ES leaves this to the UK ETS and the merit order [APP-052, 18.6.21]. That is a market outcome, not a control; and
- (c) the absolute emissions must be assessed in their own right. Finch⁵⁹ requires that a project likely to have significant adverse effects be “*authorised with full knowledge of these consequences*” [Finch, para 152]. In Whitehaven⁶⁰, the High Court held that the greenhouse gas emissions that inevitably follow from a project are “*significant likely indirect effects*”, which the environmental statement and “*the EIA process*” must assess, together with “*their implications*” [Whitehaven, para 101]. CESL submits that this is an obligation to assess the project’s absolute emissions, and that an asserted saving or substitution elsewhere does not discharge it.

99 The Applicant also relies on the UK ETS, which it says “*places a carbon cost on emissions from the power sector*” and, through the merit order, makes higher-emitting plant “*progressively less competitive*” [C1-004b, Q8(c); APP-052, 18.6.21]. In CESL’s model, upstream supply-chain emissions are 14% of Scenario G’s full lifecycle total on the application’s own basis, and 23% to 68% across CESL’s sensitivity cases (Appendix D, Table 4). The UK ETS applies to the installation’s own combustion CO₂. It does not apply to methane and CO₂ emitted overseas in producing, liquefying and shipping imported gas, which is almost all of the upstream component (D.6).

100 The Applicant has not separately quantified that component or explained how its significance is addressed by the regulatory framework on which the ES relies.

⁵⁹ *R (Finch) v Surrey County Council* [2024] UKSC 20 (cited as [Finch]), paragraph 152 “*It remains essential to ensure that a project which is likely to have significant adverse effects on the environment is authorised with full knowledge of these consequences.*”

⁶⁰ *R (Friends of the Earth Ltd) v Secretary of State for Levelling Up, Housing and Communities* [2024] EWHC 2349 (Admin) (Holgate J) (cited as [Whitehaven]). Para 101: “*Taking into account the common ground that the burning of the Whitehaven coal is an inevitable consequence of its extraction from the mine, in my judgment it is plain, following the decision of the Supreme Court in Finch, that the GHG emissions from that combustion are significant likely indirect effects of the project the subject of the planning application. Accordingly, the 2011 Regulations required WCM’s ES and the EIA process to assess those emissions and their implications. The Secretary of State was obliged to take into account that environmental information (including the GHG emissions from combustion of the Whitehaven coal) before deciding whether or not to grant planning permission on the application.*”

D.6 Territoriality and the carbon-budget benchmark

101 UK carbon budgets count territorial emissions. The ES compares total Scope 1 and Scope 3 emissions, including upstream emissions arising abroad, with UK budgets [APP-052, Table 18.11, 18.6.54–18.6.56]. Yet it accepts, for imported construction materials, that such emissions “*would fall outside the scope of the UK carbon budgets*” [APP-052, 18.6.10]. It names the receptor as the global climate [APP-052, 18.6.51, 18.9.2] and treats the budgets as “*a proxy for the global climate*” [APP-052, 18.9.4]. Two consequences follow:

- (a) the ex-UK component is neither described separately nor evaluated against any yardstick capable of measuring it; and
- (b) the economy-wide mechanisms the Applicant relies on (EN-1 paragraph 5.3.12; the UK ETS) [C1-004b, Q4, Q8(c)], and the Climate Change Act 2008, do not reach emissions arising outside the UK.

102 The UK and ex-UK split is not reported anywhere in the ES. CESL’s indicative split is in Section E (Figure 3) and Appendix D (Figure 7 and Table 4). The same point applies to the upstream component of blue hydrogen produced in the UK from imported gas.

103 Almost all of the upstream emissions arise outside the UK: 94% to 99% across CESL’s indicative sensitivity cases (Appendix D, Table 4).

104 They are methane and CO₂ emitted in overseas gas production, processing, liquefaction and shipping. For Scenario G at the ES operating hours, ex-UK emissions are about 5.6 MtCO₂e (22% of the full lifecycle total) in the lower sensitivity case, and about 40.5 MtCO₂e (66%) in RWC-ST (Section E, Figure 3; Appendix D, Figure 7 and Table 4). On the ES’s own reasoning about imported materials [APP-052, 18.6.10], none of these emissions falls within the UK carbon budgets against which the ES contextualises the project. At Jackdaw, the Secretary of State considered the national carbon-budget context and the global context separately [Jackdaw decision, paras 175–178].

D.7 The decarbonisation pathway is unsecured

105 The hydrogen pathway is not secured. A section 35 direction identifies Keadby as an anticipated hub location, but the Applicant says that “*no final connection point, connection offer, capacity reservation or binding agreement can yet be secured*”, and the East Coast Hydrogen DCO application is not expected until December 2028 [C1-004b, Q3]. Delivery “*remains subject to the UK Government publishing its hydrogen strategy, and to the continuation of government regulatory support and agreement of business models*” [C1-004b, Q3].

106 Nor is the carbon capture route secured. The Applicant has not applied for carbon capture in its permit application, and the EA has no “*regulatory mechanism to require carbon capture to be fitted*” [C1-002, Q11]. The EA considers the Carbon Capture Readiness Statement “*not sufficient*” [C1-002, Q12]. The Applicant’s decarbonisation readiness report to the EA is “*based on the conversion to hydrogen route*” [C1-002, Q12].

107 Asked whether it would assess both routes [SoS RFI 6 Oct 2026, para 4(b)], the EA replied that it does “*not consider that assessment of the Carbon Capture Readiness Report is necessary in the circumstances of this case*”; only the hydrogen conversion report will be

assessed [C3-004, 4(b)]⁶¹. The EA adds that “*the relevant readiness requirements will in any event be considered and secured through the permitting process*”. But once the permit is granted, the DCO’s carbon capture readiness conditions “*will cease to have effect*” [C1-002, Q12]. The two-yearly reassessment of decarbonisation readiness [APP-052, 18.6.23] is a review of feasibility; nothing in it requires conversion to hydrogen, or capture, by any date.

108 The ES treats Scenarios F and G as “*highly unlikely given the clear policy ambitions for hydrogen supply*” [APP-052, 18.6.61]. The Applicant has accepted that Scenario G “*could not be fully ruled out due to factors wholly outside the control of the Applicant*” [REP1-030, 4.24]. Article 40(5) would keep the Keadby 3 carbon capture project on the same site available to about 2033 [SoS RFI 6 Oct 2026, para 9] (Section G), but “*only one of these activities will be progressed*” [C1-002, Q11]. If the Proposed Development is built, Keadby 3 is not, and no carbon capture route at the site would then be required, assessed or protected. The decarbonisation pathway is therefore not secured, by either route. On the present record, Scenario G is a realistic outcome, not a remote one.

109 That is material. The ES rates Scenario G “Moderate adverse”, treats its impacts as “*partially mitigated*” only “*insofar as it is hydrogen-ready*”, and accepts that it is “*not considered to be fully aligned to the UK’s net zero trajectory*” [APP-052, Table 18.12]. Without a secured pathway, CESL submits that what would be consented is, in substance, an unabated gas-fired power station for its whole life. Its remaining claimed benefit is that, as “*one of the most efficient dispatchable gas-fired generating stations*” [C1-004b, Q8(c)], it would displace older, less efficient CCGTs [APP-052, 18.4.7]. That is unabated gas generation of the same kind, and the saving is limited to an efficiency margin that the ES does not quantify (D.5).

D.8 Operating hours: the reasonable worst case has not been assessed

110 The ES assumes 3,500 hours a year for 15 years and 1,500 a year thereafter, which it describes as “*a reasonable worst case*”. It adds that the plant “*is expected to operate below this level for many of the years*” [APP-052, 18.6.19]. The ES says the profile was selected “*to provide a realistic worst case ... rather than the average annual operating hours across the Proposed Development lifetime*” [APP-052, 18.6.16]. The Applicant now says the assumptions “*are averages, and so they cannot be transposed into annual caps*” [C1-004b, Q8(a)]. Either way, they are lifetime averages, and a rolling-average control could mirror them exactly (see “Hours controls are workable” below).

111 **The concession.** At the Secretary of State’s request, the Applicant quantified 8,760 hours a year on 100% natural gas. That gives 2,948,788 tCO₂e a year and 73,719,711 tCO₂e over the lifetime, 3.24 times Scenario G. The Applicant accepts that “*Applying the same significance criteria ... this operating scenario would be considered to represent a Major Adverse effect*” [C1-004b, Q8(c)]. The significance category therefore depends on operating hours.

⁶¹ Environment Agency, response of 16 October 2026 to the Secretary of State’s information request of 6 October 2026 [C3-004], EN0110001-000683, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000683-C3-004%20Environment%20Agency%20Response%2009-10-2026.pdf>

- 112 **The unassessed range.** The Applicant dismisses 8,760 hours because continuous operation “is not considered possible due to maintenance down-time and outages” [C1-004b, Q8(c)]. That is correct, but it disposes only of the physical maximum. The realistic maximum, limited by availability, lies between the ES average (2,700 hours a year on average over the lifetime) and 8,760 hours, and has never been assessed.
- 113 As an illustration only: at the 93% availability in DESNZ’s own generation cost study⁶², the realistic maximum is about 8,150 hours a year. Over a 30-year life, that gives 82.80 MtCO₂e for Scenario G on the DESNZ factor, before any correction to that factor (Appendix D, Table 5).
- 114 **The Applicant’s objection to a cap assumes higher running is realistic.** The Applicant objects that an hours limit might leave the plant “*legally unable to generate electricity during a prolonged low wind, low sun period, even if NESO requested it under a Capacity Market obligation*”. It says it would be “*perverse*” if “*the most efficient power station on the system was unavailable*” because of a restriction [C1-004b, Q8(c)]. That objection has force only if operation above the assessed envelope is realistic. The Applicant cannot both treat higher utilisation as unrealistic for assessment and rely on its likelihood to resist a control. The Applicant’s further reliance on the ETS making 8,760 hours “economically unviable” is a market forecast, not a control.
- 115 **Inconsistency within the ES.** For air quality, the ES assesses 8,760 hours a year as the precautionary basis that gives “*assurance that there are no adverse significant effects under any annual operating scenario*” [REP2-005, 2.1.4; REP1-030, 3.10]. The same figure is “*unrealistic*” for GHG.
- 116 **No control.** At ISH1, the Applicant said the upper edge of operating hours is “*safeguarded by (i) a number of appropriate mitigation measures for that worst-case scenario, and (ii) a number of controls in the environmental permit*” that ensure the plant is not operated “*beyond the extent as assessed by the ES*” [REP1-030, 3.11; repeated at REP2-005, 2.1.5(a)(i) and C1-004b, Q8(c)]. However:
- (a) the ES identifies “*No specific mitigation measures*” [APP-052, 18.7.1, 18.9.1], and the Applicant says “*no mitigation measures have been identified*” for Scenarios E to G [REP2-005, 2.1.8]; and
 - (b) the EA confirms that no restriction on operating hours has been applied for [C1-002, Q9].
- 117 **Hours controls are workable.** The Keadby 2 permit restricts open-cycle running to “*less than 1,500 hours per year as a rolling average over a period of five years with a maximum of 2,250 hours operated in any one year*” [C1-004b, Q8(b); REP2-005, 2.1.15]. The Applicant itself identifies the Progress Power, Hirwaun, Millbrook and Abergelli DCOs as imposing operating-hour restrictions [REP2-005, 2.1.22]. Whatever the regulatory rationale in those cases, a DCO hours requirement is an established and enforceable form of drafting.
- 118 **Both fuels.** Hours scale every scenario. In the hydrogen periods, hours multiply a hydrogen intensity that is itself unbounded (D.4).

D.9 Lifetime and timing: operation into the 2060s

⁶² CEPA and GHD for the Department of Energy Security and Net Zero, *Electricity Generation Cost Study: Final Report*, 31 March 2025, published by DESNZ as “Unabated gas: electricity generation cost study”. Available at: <https://assets.publishing.service.gov.uk/media/696616c68d599f4c09e1ffae/unabated-gas-electricity-generation-costs-2025.pdf>

119 The ES assumes operation from 2031 to 2055, 25 years, after construction from 2027 to 2030 [APP-052, 18.3.28, 18.6.12]. The Applicant's later answers widen both ends of that window:

- (a) *A later start.* In defending flexible drafting, the Applicant refers to "*construction starting between 2027 and 2034, as per the Environmental Statement*" [REP3-024, Q1.0.15]. DCO Requirement 2 allows seven years to commence. Gas and hydrogen connections are uncertain⁶³. A 3-year construction from 2034 could mean operation not starting until 2037.
- (b) *A longer life.* The Applicant describes 25 years as the "*anticipated design life*". It has extended biodiversity monitoring "*up to 30 years to match the operation phase if the operational life of the Proposed Development extends beyond the anticipated 25 years*" [REP3-024, Q1.0.7].
- (c) Taken together, an operational lifetime of 2037 – 2066 is plausible.

120 None of this has been considered or assessed. In particular:

- (a) The ES compares all construction emissions against the 5th Carbon Budget (2028 - 2032) [APP-052, 18.3.28 (method), 18.6.8–18.6.10, Table 18.9]; where they could fall in the 6th Carbon Budget (2033-2037).
- (b) the ES compares emissions with carbon budgets only to 2050 [APP-052, Table 18.11], on the basis that "*Beyond 2050, it is implied that the UK will remain at net zero*" [APP-052, 18.3.31]. Even on the ES timeline, five years of operation (2051 to 2055) are not compared with any budget or pathway, whilst this could be sixteen years of operation (2051 to 2066).
- (c) a WTT factor frozen at 2023, with 2021 supply weights and pre-2015 emission intensities would be applied to emissions occurring into the 2060s;
- (d) the operational lifetime is not limited by any control identified.

D.10 Cumulative directional bias

121 Every outcome-determinative input is set at or towards the favourable end of its range: a frozen 2023 upstream factor; GWP100 only (with superseded values in the description); average hours called a worst case; the LCHS ceiling as the hydrogen "worst case"; a 25-year life ending in 2055; and an unsupported substitution baseline. Bias in one direction across every parameter is not a set of individually defensible professional judgments. It goes to whether the assessment as a whole provides the reasonable worst case the law requires.

⁶³ The grid connection is at Gate 2 Phase 2 (2031 to 2035), with an offer expected by mid-January 2027 [REP2-005, 2.2.2–2.2.3]. The East Coast Hydrogen DCO application is now expected in December 2028 [C1-004b, Q3], having been programmed for 2027 with construction complete in 2031 [REP2-005, 2.3.6].

E CESL's indicative model

122 CESL has provided in Appendices D, E and F an indicative model which is designed to provide a demonstrator for resolving the EIA issues in the application.

123 The sensitivity analysis method is to estimate full lifecycle emissions of the project⁶⁴ using different descriptions of upstream emissions, temporality of methane climate impacts, the territoriality of the emissions in a parameter isolation ladder ("PIL"). The model provides descriptions of the full lifecycle of the project Scenario G based on the information in the application. The first level of the model is a reconstruction of the application data itself: this has been achieved to within 0.5% accuracy⁶⁵.

124 Having established an accurate reproduction of the EIA data, the model builds tests of the uncertainties that have outlined above, and which have not been addressed by the applicant. The methodology uses future gas supply data from the government owned NESO, and both recent IEA and EERA LNG Supply emission data, and peer reviewed science.

This approach addresses the failure to describe material uncertainty and apply current knowledge in the assessment of supply-chain emissions (Section F.3).

125 In particular, the model:

- (a) Identifies and describes the full lifecycle emissions, and also four component constituents: the CH₄ share, the CO₂ share, the UK share, the ex-UK share.
- (b) This provides a robust computational framework which addresses the failure to describe and assess ex-territorial upstream Scope 3 emissions (Section F.3). Once the uncertainty and realistic bounds of ex-UK emissions are known, ex-territorial emissions may be assessed in their own right via an appropriate significance methodology.
- (c) The model deals entirely in absolute emissions, including the key outputs - full lifecycle emissions, and also four component constituents: the CH₄ share, the CO₂ share, the UK share, the ex-UK share. This addresses the failure to evaluate absolute lifecycle GHG emissions (Section F.3).

⁶⁴ The model is general purpose and can also model carbon capture rate assumptions in CCS system. In the case of this project and Scenario G, carbon capture is not present.

⁶⁵ 100% accuracy is not possible because the application does not provide all the required information. The reasons for the differences are explained further in Appendices D, E and F and in its footnote.

E.1 Simple results

126 More detailed results are given in Appendices D, E and F. Just for illustration, some initial results are given here:

E.1.1 Uncertainty Ranges

127 The full lifecycle for Scenario G is the application is around 22.98 MtCO₂e including construction – based on the DESNZ WTT factor.

128 CESL's model suggests that for long-term climate effects the range from a lower sensitivity case to an upper bound from the available input data is in the range 25.61 MtCO₂e to 33.24 MtCO₂e. When short-term climate effects – the effects of great concern in the UNEP EGR 2026 report – are considered using static shares of annual supply sources, the range is 25.61 MtCO₂e to 48.16 MtCO₂e. If dynamic supply of LNG as the marginal supply when the project would operate in dispatchable mode is modelled, then the range is 25.61 MtCO₂e to 61.37 MtCO₂e. These outputs are summarised below.

Uncertainty ranges in MtCO ₂ e	Scenario G : 67,500 hours	
	Lower	Upper
Long-term climate impacts LSC ... RWC-LT	25.61	33.24
Short-term climate impacts, static annual gas share LSC ... STAT-ST	25.61	48.16
Short-term climate impacts, dominant marginal US LNG share LSC ... RWC-ST	25.61	61.37
APPLICATION reconstruction (incl construction)	22.98	

Table 2: Uncertainty ranges – climate impacts

129 An extension of this modelling is made in Appendix D for higher hours of operation. The scales the ranges accordingly showing the interaction of different uncertainties, not secured in the DCO. For example, the short term climate effects of operating at 3,734 hours/yr for 25 years with marginal LNG supply are in the range 35.35 MtCO₂e to 84.81 MtCO₂e.

E.1.2 Territoriality

130 The model can also separate the UK and ex-UK emissions.

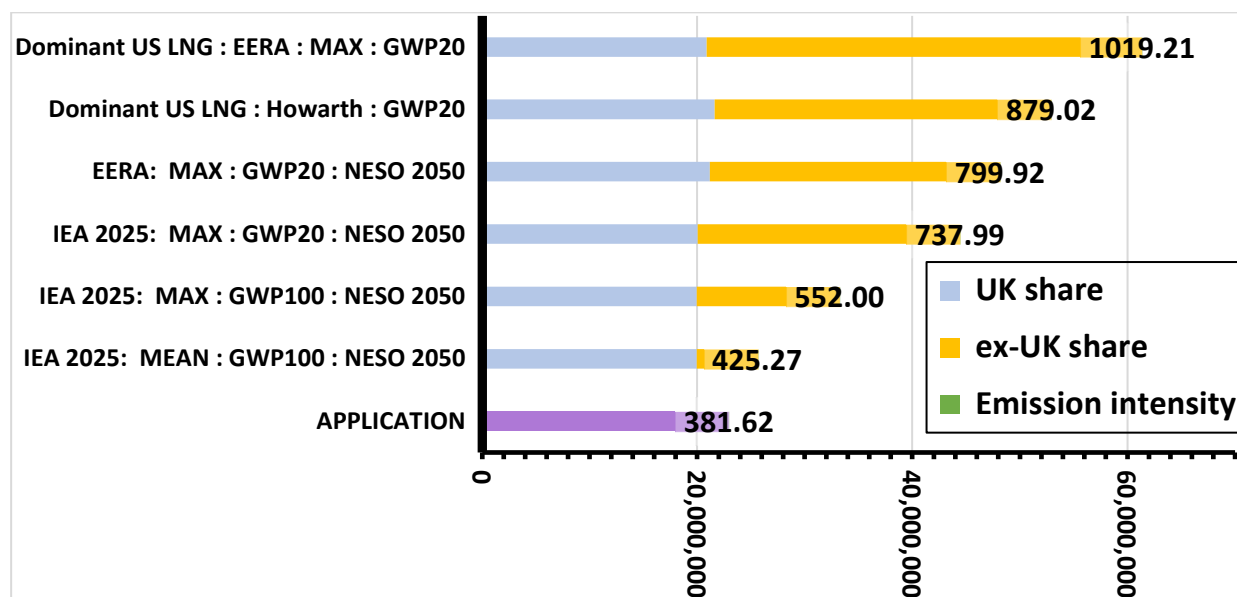


Figure 3: Scenario G: UK and ex-UK shares of full-lifecycle GHGs

131 The above chart shows the territoriality splits for the Scenario G range of 25.61 MtCO₂e to 61.37 MtCO₂e, as given above.

E.2 Why this is important

132 Whilst the PIL model is indicative and not intended as a substitute EIA, it provides “in principle” solutions to the issues which CESL has raised throughout the submission.

133 It demonstrates that determining the uncertainty ranges, and full knowledge of the project’s lower and upper bound impacts is entirely feasible, and can be done on available reports and scientific papers. Assumptions can be clear and transparent.

134 Information on territoriality can be modelled and extracted.

135 Such analysis leads to understanding of the materiality of the various issues. Such knowledge is required for the decision maker to make a reasoned conclusion of the environmental impacts under Regulation 30(2)(b)(i)(aa).

136 The current EIA does not attempt to provide such information, and it is based on a description of upstream emissions that simple is not current.

F Legal Requirements

137 This section sets out the legally required approach to the context, interdependencies and uncertainties above. The simple point is that unless the SoS obtains sufficient information regarding the uncertainties surrounding upstream emissions, the climate metrics (particularly with respect to the short-term impacts of methane), the Scope 1 combustion emissions, the territoriality of emissions – all in terms of absolute emissions – she is at risk of making an unlawful decision.

F.1 Applicable Law

138 Regulation 4 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (“the EIA Regulations”) requires that the “*the Secretary of State or relevant authority (as the case may be) must not (in the case of the Secretary of State) make an order granting development consent or (in the case of the relevant authority) grant subsequent consent unless an EIA has been carried out in respect of that application*”.

139 Regulation 4 requires that the EIA process must identify, describe and assess the direct and indirect significant effects of the development on (among other things) climate. The EIA must do so “*in an appropriate manner*” (reg. 5(2)) which necessarily involves taking into account all legally mandatory considerations (and thus all obviously material considerations), as to which see further below.

140 Regulation 14 requires that the Environmental Statement (“ES”) must describe the likely significant effects of the project. It also provides that the environmental statement must “*[take] into account current knowledge and methods of assessment*” (reg. 14(3)(b)). Those matters – what is “likely”, and matters arising out of current knowledge etc – must likewise be informed by all obviously material considerations.

141 Schedule 4 requires the description under regulation 14 to include “*the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions)*”, the “*technologies and the substances used*”, and “*short-term, medium-term and long-term*” effects: Schedule 4, paragraph 5. The description must also include “*A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved*”: Schedule 4, paragraph 6. Evaluation of these effects again requires the decision-maker to take into account all obviously material considerations.

142 A decision-maker must have “*full knowledge*” of the project’s likely significant effects on the environment, albeit that does not include “*every conceivable scrap of environmental information about a particular project*”: **R. v Rochdale M.B.C. exp Milne (no 1)** [2000] Env. L.R. 1, 29; but it must plainly take into account all obviously material – and thus mandatory – considerations. The assessment of likely significant effects should be based on a “*cautious ‘worst case’ approach*”: **R. (Associated Petroleum Terminals (Immingham) Ltd) v SST** [2025] EWHC 1992 (Admin) [47], applying Rochdale; again, all obviously material considerations must be taken into account.

143 In **R (Finch) v Surrey CC** [2024] P.T.S.R. 988, Lord Leggatt emphasised that “*conjecture and speculation have no place in the EIA process*” and “*if there is insufficient evidence available to found a reasoned conclusion that a possible environmental effect is “likely”, there is no requirement to identify, describe and try to assess this putative effect*” ([77]). Moreover, whether a possible effect is likely and capable of assessment may, depending on the circumstances, be a matter of planning judgment: [78].

144 Regulation 21 requires that the SoS must examine the environmental information, reach a reasoned conclusion on the significant environmental effects of the proposed development, and integrate that conclusion into its decision. Under regulation 21(2), the reasoned conclusion must be up to date when the decision is taken and is taken to be up to date if, in the Secretary of State's opinion, it addresses the significant effects of the Proposed Development on the environment that are likely to arise. These are substantive assessment duties, distinct from the requirement under Regulation 30 to provide the reasoned conclusion with a decision granting permission.

145 Regulation 30(2)(b)(i)(aa) requires the decision maker to include a “*reasoned conclusion*” on the significant effects of the development on the environment, taking into account the results of examining the environmental information.

146 There is no definition of “significant” in the EIA Regulations. In ***R. (Goesa) v Eastleigh Borough Council*** [2022] P.T.S.R. 1473 at [100] Holgate J, as he was then, said:

“100. It is well established that issues as to whether an effect is significant and the adequacy of any assessment of significant effects are matters of judgment for the decision maker, in this case the local planning authority. Such judgments are only open to challenge in the courts applying the conventional Wednesbury standard...”

102. In addition, the court should allow a substantial margin of appreciation to judgments based upon scientific, technical or predictive assessments by those with appropriate expertise.”

147 Such judgements must plainly be based on the taking into account of all obviously material considerations.

148 In ***R (Boswell) v SSESNZ*** [2025] EWCA Civ 669 the Court of Appeal (Sir Keith Lindblom SPT, Stuart-Smith LJ and Holgate LJ) said:

“80. In our view the evaluation of the significance of an estimated amount of GHG emissions and its acceptability is a matter of fact and judgment for the decision-maker. He or she may decide to choose benchmarks to help in arriving at that judgment. But that choice too is a matter of judgment for them. Any conclusion drawn on the acceptability of the GHG emissions in comparison with a benchmark is also a matter of judgment for the decision-maker. The 2017 Regulations do not determine how these matters should or may be approached...”

81. Nor is there any legal principle which requires a public authority deciding whether to grant a development consent to “contextualise” the GHG emissions or to compare them with a benchmark. It is not unlawful for the decision-maker, for example, to conclude, as in this case, that the GHG emissions will be managed across the economy to ensure consistency with carbon budgets and the 2050 net zero target. In any event, in the present case the Secretary of State did “contextualise” the GHG emissions from the development by making a sectoral comparison, whilst also relying upon the policy in EN-1 that made this exercise unnecessary...”

149 In that case, the essential basis for the challenge was to the adequacy of the reasoning given by the decision-maker ([15], [20]) rather than alleged irrationally in the way that benchmarks had been approached⁶⁶([82]).

⁶⁶ CESL's principal concerns in this submission concern alleged omissions and inadequacies in the identification, description and assessment of the environmental effects and their uncertainty. Evidence has not been provided concerning any particular significance rating made, except relating to the territoriality issue.

150 In ***R (Friends of the Earth) v SSBEIS*** [2023] 1 W.L.R. 225 (“FoE”) Holgate J, as he was then, held that when the Secretary of State was preparing such proposals and policies that he considered would enable the relevant carbon budgets to be met pursuant to section 13(1) of the Climate Change Act 2008 (“CCA 2008”) he was necessarily undertaking an exercise of predictive judgment (i.e. working out what was likely to happen or not with each planned policy or proposal to ascertain its contribution to a package which – per section 13 CCA 2008 – “will enable” the statutory targets to be met).

151 In the context of those predictive judgments, the obviously material considerations which he was required to take into account included ([204], [211], [213–214], [216–217], [221], [279]):

- a) risk to the delivery of individual proposals and policies and to the achievement of the carbon budgets and the 2050 net zero target contained in s.1 CCA 2008;
- b) the contribution which each quantified proposal or policy would make to meeting the budgets;
- c) matters relating to the issue of how to meet any shortfall between the emissions reductions required to meet the carbon budget and the emissions reductions which quantified proposals and policies were estimated to deliver.

152 At [213] Holgate J said (emphasis in original) “*without information on the contributions by individual policies to the 95% assessment, the minister could not rationally decide for himself how much weight to give to those matters and to the quantitative assessment in order to discharge his obligation under section 13(1).*”

F.2 Points arising

153 Whilst the evaluation of the significance of environmental effects, including the selection of appropriate benchmarks, involves judgment by the decision-maker, that discretion does not displace the statutory requirements for the identification, description and assessment of likely significant environmental effects under regulation 5(2), regulation 14 and Schedule 4 of the EIA Regulations. Those requirements include taking account of current knowledge and methods of assessment, describing relevant short-term and long-term effects, and identifying the main uncertainties in the assessment.

154 CESL submits that the Environmental Statement contains material deficiencies in the description and assessment of the project's climate effects, such that the Secretary of State has not been provided with adequate environmental information on which to reach the up-to-date reasoned conclusion required by regulation 21.

F.2.1 Uncertainty in Assessment

155 The Rochdale Envelope approach exists to address situations where a development is promoted with inherent uncertainties and operational flexibilities, by ensuring that the Environmental Statement nonetheless assesses the maximum likely significant environmental effects, or reasonable worst-case environmental effects, that could arise within the scope of the consent sought. This is so that the decision-maker has full knowledge of the consequences of authorising the project.

156 The Rochdale Envelope is not confined to spatial dimensions or layout flexibility⁶⁷, but is concerned with ensuring that the Environmental Statement has assessed the maximum adverse environmental effects that could arise from the Proposed Development.

F.2.1.1 Rochdale

157 The Applicant itself adopted the *Rochdale* approach. At scoping it said that, where alternatives remained at application, the ES would “*consider and assess the ‘worst-case’ impacts, in accordance with the Rochdale Envelope approach*” [APP-058, section 4]⁶⁸. The ES states that “*the Rochdale Envelope approach has been applied within the EIA*” and that “*Where this approach is applied, this has been confirmed within the relevant chapters of this ES*” [APP-036, 2.3.1]⁶⁹. It states that each technical chapter’s methodology includes the “*Rochdale Envelope Approach*” [APP-036, 2.2.5]. Chapter 18 contains no such section and does not refer to the Rochdale Envelope. In examination, the Applicant explained its operating hours “*In line with the concept of the Rochdale Envelope*” [REP2-005, 2.1.2], and it relies on that section before the Secretary of State [C1-004b, Q8(a)]. It “*recognises the importance of the Rochdale reasoning*” [REP2-006, 4.1.2 (p.21)].

158 The PINS Rochdale Envelope Advice Note⁷⁰ confirms that, where uncertainty exists, the ES must establish clearly defined parameters that are sufficient to enable a robust assessment of the likely significant environmental effects and must identify those parameters that would give rise to the worst-case scenario. In the context of climate change assessment, assumptions that mathematically determine the scale of greenhouse gas emissions—such as upstream emission factors, methane impact metrics and capture-rate assumptions—function as such parameters because they functionally bound the upper limit of environmental impact. Where those assumptions constrain the EIA assessed emissions below what could realistically occur during operation (also construction or decommissioning), the Proposed Development may later operate beyond the assessed Rochdale Envelope. In this situation, the ES cannot be said to provide the decision-maker with full knowledge of the project’s likely significant effects, as required by the EIA Regulations and established case law.

Uncertainty has already been laid out for a number of issues. This requires that the assessment of the scheme’s emissions must be done on a reasonable worst-case basis: Rochdale. CESL key position is that the EIA does not demonstrate this with respect to regarding the uncertainties outlined above including the upstream emissions and the climate metrics (particularly to the short-term impacts of methane).

F.2.2 Full knowledge

159 The “full knowledge” which a decision-maker requires from an ES must be based on “*current knowledge and methods of assessment*” (reg 14(3)(b)). There is a clear legislative steer in regulation 14 that knowledge and methods of assessment may evolve over time,

⁶⁷ Where an Environmental Statement relies on quantified non-physical assumptions that drive the assessment of significant effects—such as traffic volumes, operational limits, design-case performance assumptions, GHG calculation parameters or other modelling inputs—those assumptions can function as Rochdale envelope-defining parameters.

⁶⁸ Applicant, “6.3.1 Environmental Statement Volume II: Appendix 1A Scoping Report Rev 0” [APP-058], EN0110001-000257, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000257-KNGPS%206.3.1%20Appendix%201A%20Scoping%20Report%20Rev%200.pdf>

⁶⁹ Applicant, “6.2.2 Environmental Statement Volume I: Chapter 2 Assessment Methodology Rev 0” [APP-036], EN0110001-000177, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000177-KNGPS%206.2.2%20Chapter%202%20Assessment%20Methodology%20Rev%200.pdf>

⁷⁰ PINS (2018). Nationally Significant Infrastructure Projects - Advice Note Nine: Rochdale Envelope [online] (Accessed 23/01/2026). <https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-nine-rochdale-envelope/nationally-significant-infrastructure-projects-advice-note-nine-rochdale-envelope>

such that reliance on a particular assumption or metric might be lawful in relation to one planning decision but be unlawful in relation to a later planning decision – if the knowledge or methods of assessment relied upon is no longer “current” at the later point in time.

F.2.3 Temporal impacts

160 The EIA Regulations also make an important distinction between “short-term, medium-term and long-term” effects (Schedule 4 para 5), demonstrating that all three must be considered separately.

F.2.4 Risk and uncertainty

161 Further, applying by analogy FoE, there are circumstances where it would be irrational for a decision-maker not to factor in the breadth and degree of risk in climate-related matters (including being aware of the uncertainties around interdependencies and confidence in the relevant factors), notwithstanding the high level of discretion and margin of appreciation given to decision-makers in this field. That being so in FoE in relation to a matter of high policy, namely the content of the government’s Net Zero Strategy, it applies even more so in relation to risks associated with an individual DCO. There is a specific statutory requirement to set out forecasting uncertainties in the EIA Regulations (see Schedule 4, paragraph 6).

F.3 CESL’s submissions on deficiencies in the EIA

162 In addition to the above, CESL submits that the ES fails to meet the requirements of Reg 5(2), read with Schedule 4 paragraphs 5 and 6, and Reg 30(2)(b)(i)(aa) - in providing the SoS with sufficient information for a reasoned conclusion - in eight distinct and cumulative respects, each of which is addressed below.

F.3.1 Deficiency 1: Failure to describe material uncertainty and apply current knowledge in the assessment of natural gas supply-chain emissions [Reg 5(2) / Sch 4 paras 5 and 6 / Reg 14(3)(b)]

163 The central issue is not the selection of a particular emissions factor. Although the Applicant accepts “*a degree of uncertainty in how much leakage from natural gas is likely*”, it holds the factor constant to 2050 because “*there are no reliable projections to base this on currently*” [APP-052, 18.3.52–18.3.53], and calls that approach “*conservative*”. It considers only the possibility that leakage falls, never that it rises.

164 The current evidence points the other way, and materially so:

- (a) US LNG is now 76% of UK LNG imports;
- (b) the IEA estimates energy-sector methane at about 80% above the totals reported by national governments;
- (c) measurement studies find US emissions about three times inventory estimates;
- (d) National Gas and NESO both forecast rising LNG import dependence (D.2).

165 On CESL’s indicative model, even the lower sensitivity case, at mean IEA intensities, exceeds the application figure. Across the range tested, full-lifecycle emissions for Scenario G rise from 22.98 MtCO₂e to between 25.61 and 61.37 MtCO₂e at the ES operating hours (Section E).

166 CESL's indicative model demonstrates that alternative assumptions have a clear evidential basis and can be tested quantitatively. Uncertainty about future supply does not, by itself, establish that its potential implications are incapable of assessment.

167 This matters because the ES does not identify, describe or assess the material uncertainties associated with the chosen WTT methodology on which the lifecycle emissions assessment depends – for all scenarios because both the gas and hydrogen supply chains depend upon upstream natural gas supply chain emission (and the WTT factor) - despite those uncertainties being directly relevant to the magnitude of the project's likely significant climate effects. The ES then does not quantify its potential effect on the lifecycle total or adequately explain why the fixed-factor assumption remains sufficient (D.2).

168 Regulation 14(3)(b) requires the Environmental Statement to take account of current knowledge and methods of assessment. As demonstrated in D.2.1–D.2.3 and Appendix A, DESNZ's own EIR response confirms that the WTT factor relies on emission intensities derived from a 2015 study, gas-supply weightings based on 2021 data, and a single Qatari emission intensity for all LNG imports, although US LNG accounted for 76% of UK LNG imports in 2025. These are material deficiencies in the methodology because the source-specific intensities and supply mix directly determine the upstream Scope 3 emissions attributed to the Proposed Development over its potentially extended operational lifetime into the 2060s.

169 The sensitivity analysis in Section E demonstrates that applying more recent evidence and varying these assumptions can materially increase the calculated full-lifecycle emissions. Yet the Applicant has neither assessed the implications of these uncertainties nor adequately explained why continued reliance on the fixed DESNZ factor provides a sufficient description of the project's likely significant climate effects. CESL therefore submits that, in the particular circumstances of this application, the Environmental Statement fails to satisfy the requirement to take account of current knowledge and methods of assessment under regulation 14(3)(b).

F.3.1.1 Emission factors are not Government policy

170 The Applicant suggests that questioning the DESNZ WTT factor challenges policy “*by the back door*” [REP2-006, 4.1.11–4.1.12, citing *Spurrier* and *ClientEarth*]. The DESNZ conversion factors are a reporting dataset, not a policy. The endorsement the Applicant cites describes them as “*suitable for use by UK based organisations of all sizes, and for international organisations reporting on UK operations*” [REP2-006, 4.2.2]. That is, they are for organisational reporting, not for forecasting a single plant's emissions to the 2050s and beyond. The EIR response at Appendix A is DESNZ's own account of the factor's limitations.

171 DESNZ has stopped updating the factor and intends to review it before the 2027 publication (Appendix A). A dataset its own department is reviewing cannot be treated as settled policy.

F.3.2 Deficiency 2: Failure to describe and assess the short-term climate effects of methane [Reg 5(2) / Sch 4 para 5 / Reg 14(3)(b)]

172 The ES quantifies greenhouse gas emissions using GWP100 only and describes methane's short-term warming effects using superseded scientific values (D.3). The Applicant itself acknowledges that methane's effects are substantially greater over a 20-year horizon and that GWP100 is less well suited to representing its short-lived warming effects [REP2-006, 4.3.15]. Nevertheless, the ES does not quantify or otherwise adequately assess the short-term climatic consequences of methane emissions arising from either the natural gas supply chain or the upstream supply chains for blue hydrogen. Nor does it explain why its GWP100-only assessment adequately describes those effects.

173 This is a material omission because methane's greater near-term warming effect could materially alter the assessment of the Proposed Development's climate impacts, particularly in the context of the urgency of methane reductions identified by the latest IPCC and UNEP evidence (D.1 and D.3). Schedule 4 paragraph 5 requires the description of likely significant environmental effects to include short-term as well as long-term effects. CESL submits that this is a deficiency in the statutory description and assessment of environmental effects, not merely a disagreement over the choice of climate metric. A GWP20 sensitivity, or another adequately justified assessment of near-term climate effects, would enable the Secretary of State to understand their scale and materiality.

F.3.3 Deficiency 3: hydrogen intensity is capped, not assessed [reg 5(2); Schedule 4 paragraphs 5 and 6; Rochdale].

174 The Applicant has adopted the LCHS ceiling of 20 gCO₂e/MJ as the assessed worst-case carbon intensity for hydrogen in Scenarios A to F, rather than assessing the range of intensities that could arise from the hydrogen actually supplied (D.4.1–D.4.2). The Applicant expects that supply to be predominantly blue hydrogen, whose lifecycle intensity depends materially on upstream natural gas emissions and the carbon capture performance of hydrogen production. The Applicant's own blue hydrogen benchmark leaves headroom of only approximately 3.4 gCO₂e/MJ below the LCHS ceiling and depends upon the DESNZ WTT factor challenged under Deficiency 1. No adequate assessment has been provided of the implications of more recent upstream emissions evidence for the carbon intensity of the expected hydrogen supply. Consequently, the Applicant has not demonstrated that the assessed hydrogen intensities provide a representative or reasonable worst case for Scenarios A to F.

175 Nor is the assumed 20 gCO₂e/MJ ceiling secured by the draft DCO or an existing regulatory control (D.4.3–D.4.4). The Applicant has itself stated that the LCHS is “*not a policy or permitting arrangement*” [REP1-030, 4.5], and acknowledges that there is no feasible mechanism to physically monitor whether hydrogen received meets the Standard [C1-004b, Q7]. Proposed Requirement 33 imposes only a reasonable-steps obligation and permits departures from LCHS compliance subject to a further judgment about environmental effects by North Lincolnshire Council, the relevant planning authority, which has no regulatory responsibility for hydrogen production or certification of hydrogen lifecycle carbon intensity; it therefore does not secure the assessed intensity.

176 Accordingly, the Environmental Statement neither adequately describes and assesses the potential range of lifecycle emissions from hydrogen supply nor establishes an enforceable limit corresponding to its assumed worst case. CESL submits that this is a material deficiency in the description and assessment of the likely significant environmental effects required by regulation 5(2) and Schedule 4 paragraphs 5 and 6, rather than merely a disagreement about the Applicant's choice of hydrogen intensity.

F.3.4 Deficiency 4: Failure to evaluate the significance of absolute lifecycle GHG emissions, and reliance on an unsupported baseline [Reg 5(2) / Sch 4 paras 3 and 5 / Whitehaven]

177 The Applicant has quantified the absolute lifecycle GHG emissions of Scenario G as 22,736,722 tCO₂e [APP-052, Table 18.10]. However, as demonstrated in D.2–D.3, D.8–D.9 and Section E, this estimate does not adequately address material uncertainties concerning upstream emissions, the short-term climate effects of methane, operating hours and project lifetime. CESL submits that the assessment of the project's own likely significant GHG effects must be based on an adequately evidenced range of emissions, including an appropriately justified reasonable worst case, rather than reliance solely on the Applicant's selected operating and supply-chain assumptions. As established in Finch and Whitehaven, the GHG emissions arising from a development must be assessed as environmental effects in their own right; the Applicant's assertion that the Proposed Development would displace higher-carbon electricity generation on the grid, thereby reducing emissions compared with the baseline, does not remove that obligation.

178 Schedule 4 paragraph 3 requires the Environmental Statement to describe the baseline scenario and its likely evolution without the development, so far as this can reasonably be assessed. The ES expressly states that "*the baseline emissions are considered to be zero and all project emissions are considered as additional*" [APP-052, 18.4.3], and that baseline emissions have not been subtracted because of uncertainty about the type of electricity generation that might otherwise be provided [APP-052, 18.4.6]. Nevertheless, the Applicant's significance conclusions for Scenarios F and G rely on the assertion that the plant would replace higher-carbon electricity generation and thereby reduce GHG emissions compared with the baseline [APP-052, Table 18.12]. CESL submits that this introduces an unresolved inconsistency between the baseline adopted for the assessment and the counterfactual relied upon in its evaluation of significance.

179 The Applicant has not adequately substantiated which generation would be displaced, the quantity of emissions thereby avoided, or the period over which such displacement would occur (section D.5). CESL does not suggest that potential substitution benefits can never be considered in evaluating a development. Rather, such benefits must be distinguished from the project's own absolute emissions and supported by an adequate evidential basis where they are relied upon in determining significance. In the present case, the Applicant's significance conclusions rely on an asserted reduction relative to a counterfactual that has not been adequately established, while the absolute lifecycle emissions themselves remain subject to material unassessed uncertainties. CESL submits that these are deficiencies in the assessment of the project's likely significant climate effects, rather than merely a disagreement with the Applicant's ultimate significance judgment.

F.3.5 Deficiency 5: Failure to describe and assess ex-territorial upstream Scope 3 emissions [Reg 5(2) / Sch 4 para 5 / Reg 30(2)(b)(i)(aa)]

180 As demonstrated in section D.6, the Environmental Statement assesses the Proposed Development's lifecycle GHG emissions, including upstream Scope 3 emissions arising outside the UK, and contextualises the combined emissions against UK carbon budgets [APP-052, Table 18.11, 18.6.54–18.6.56]. However, it does not separately quantify or describe the UK territorial and ex-UK territorial components of those emissions, despite identifying the global climate as the environmental receptor [APP-052, 18.6.51, 18.9.2].

181 This omission is material because UK carbon budgets provide a framework for managing territorial emissions, whereas a substantial component of the Proposed Development's upstream Scope 3 emissions arises outside that framework. The ES itself recognises that emissions associated with imported construction materials fall outside UK carbon budgets [APP-052, 18.6.10]. It does not explain how the overseas component of the operational fuel-

supply emissions is accounted for in its evaluation of significance, or how reliance on UK territorial emissions-management mechanisms adequately informs consideration of those effects on the global climate.

CESL acknowledges that, as the Court of Appeal explained in *R (Boswell) v SSESNZ* [2025] EWCA Civ 669, paragraphs 80–81, the evaluation of GHG significance and the choice of benchmarks are matters of judgment for the decision-maker.

182 Rather, Deficiency 5 concerns the adequacy of the underlying environmental information and assessment. Without separately identifying the territorial and ex-territorial components, and explaining how the latter have been considered in the significance assessment, the ES does not adequately demonstrate how emissions outside the scope of UK carbon budgets have been evaluated. CESL's indicative model (Section E and Appendix D) demonstrates that this geographical disaggregation is practicable and material, particularly when current upstream emissions evidence is applied.

183 CESL therefore submits that the omission constitutes a material deficiency in the description and assessment of the Proposed Development's likely significant climate effects under regulation 5(2) and Schedule 4 paragraph 5. Unless the Secretary of State obtains sufficient information and explanation to address this deficiency, there is a risk that she will lack the environmental information necessary to reach an adequately informed, up-to-date reasoned conclusion under regulation 21.

F.3.6 Deficiency 6: the decarbonisation pathway, and the likelihood of unabated operation, are mischaracterised [reg 5(2); Schedule 4 paragraph 3].

184 The Environmental Statement characterises continued natural gas operation under Scenario G as “*highly unlikely given the clear policy ambitions for hydrogen supply*” [APP-052, 18.6.61]. However, as demonstrated in D.7, neither of the proposed decarbonisation pathways is secured. The hydrogen pathway depends on infrastructure for which there is currently no connection point, capacity reservation or binding supply agreement [C1-004b, Q3]. Nor is there any enforceable mechanism requiring installation and operation of carbon capture, as confirmed by the Environment Agency [C1-002, Q11–Q12]. Decarbonisation readiness and periodic reassessment do not themselves require decarbonisation to occur. The Applicant has acknowledged that Scenario G “*could not be fully ruled out*” [REP1-030, 4.24]. CESL submits that, in these circumstances, prolonged unabated natural gas operation is a credible outcome whose likelihood and environmental consequences require adequate consideration.

185 CESL acknowledges that the Applicant has quantified Scenario G, but submits that this does not resolve the deficiency. Its assessment is based on the selected operating-hours profile, 25-year lifetime and upstream emissions factor, each subject to the material uncertainties identified in Deficiencies 1, 2 and 7. Furthermore, the Environmental Statement has not adequately substantiated its characterisation of prolonged unabated operation as highly unlikely, given the absence of enforceable decarbonisation obligations and the uncertainties surrounding future hydrogen and carbon capture infrastructure. The issue is therefore the adequacy of the assessment of its likelihood, duration and associated climatic effects. CESL submits that, without addressing these matters, the Environmental Statement does not provide a sufficiently evidenced description and assessment of the development's likely significant climate effects, including the implications of uncertainty in its proposed decarbonisation pathway, as required by regulation 5(2) and Schedule 4 paragraphs 3, 5 and 6.

F.3.7 Deficiency 7: reasonable worst-case hours and lifetime are not assessed or controlled [reg 5(2); Schedule 4 paragraph 5; Rochdale; Immingham].

- 186 The Environmental Statement assesses operation at 3,500 hours annually for the first 15 years and 1,500 hours annually for the following 10 years, amounting to 67,500 hours over the assumed 25-year lifetime [APP-052, 18.6.19]. However, neither the operating hours nor the operational lifetime are secured by the draft DCO or environmental permit (D.8–D.9). At the Secretary of State's request, the Applicant calculated that operation on natural gas at 8,760 hours annually would produce 73.7 MtCO₂e over 25 years, compared with the 22.7 MtCO₂e assessed for Scenario G, and acknowledged that this would change the significance classification from Moderate Adverse to Major Adverse [C1-004b, Q8(c)].
- 187 Although the Applicant dismisses continuous operation as technically unrealistic, it has not assessed an availability-limited, realistic higher-utilisation case or adequately justified why the selected operating-hours profile represents a reasonable worst case. The Environment Agency confirms that no restriction on annual operating hours has been applied for [C1-002, Q9]. The Applicant's own calculations therefore demonstrate that an unsecured operational parameter can materially change the assessed significance of the development's climate effects.
- 188 Furthermore, the Environmental Statement assumes a 25-year operational lifetime commencing in 2031, whereas the draft DCO allows later commencement and the Applicant has acknowledged the possibility of operation beyond 25 years [REP3-024, Q1.0.7 and Q1.0.15]. As explained in D.9, a later start combined with an extended operational lifetime could result in operation continuing into the 2060s, with consequences for both cumulative emissions and their timing. These uncertainties apply to natural gas operation and to hydrogen or mixed-fuel scenarios, where higher operating hours would multiply emissions calculated using the unsecured hydrogen carbon intensity identified under Deficiency 3.
- 189 CESL submits that the Environmental Statement has not adequately described and assessed the reasonable range of operational hours, lifetime and resulting greenhouse gas emissions that could arise within the consent sought, nor secured the assumptions on which its assessment depends. Given the Applicant's demonstrated change in significance classification under higher utilisation, these are material deficiencies in the description and assessment of likely significant environmental effects under regulation 5(2) and Schedule 4 paragraphs 5 and 6, applying the Rochdale Envelope principles.

F.3.8 Deficiency 8: Failure adequately to assess the combined impacts of material uncertainties [Reg 5(2); Reg 14(3)(b); Schedule 4 paragraphs 5 and 6; Rochdale]

- 190 The deficiencies identified above do not operate independently. As demonstrated in D.10 and Section E, uncertainties concerning upstream gas supply intensity, the short-term climate effects of methane, hydrogen carbon intensity, the decarbonisation pathway, operating hours and operational lifetime can interact to produce materially greater climate impacts than those assessed in the Environmental Statement. For example, higher annual operating hours increase both direct combustion and upstream supply-chain emissions; greater reliance on LNG with higher methane emissions intensities increases the upstream component; and consideration of methane's short-term warming effects further changes the assessment of the resulting climatic impacts. Similarly, prolonged operation on predominantly blue hydrogen would combine uncertainties concerning hydrogen production emissions, upstream natural gas supply and operating hours. The Environmental Statement has not adequately assessed these combined uncertainties or their implications for the likely significant climate effects of the Proposed Development.

191 CESL's indicative model (Section E; Appendix D, Table 5) demonstrates that such interactions can be investigated quantitatively. Its illustrative sensitivities show that combining different assumptions concerning upstream emissions, methane climate metrics, gas supply sources, operating hours and lifetime may result in substantially increasing the calculated full-lifecycle GHG impacts relative to the Applicant's assessment.

192 These results are not presented as forecasts or definitive bounds, but demonstrate the potential materiality of assessing the uncertainties together. CESL submits that assessing individual parameters without adequately considering their combined consequences does not establish that the Environmental Statement describes the reasonable range of likely significant environmental effects arising within the consent sought. This is a further material deficiency under regulation 5(2), regulation 14(3)(b) and Schedule 4 paragraphs 5 and 6, which requires the Applicant to provide a suitably evidenced combined sensitivity assessment, or otherwise adequately demonstrate why the interactions do not materially alter the assessment. Without this information, the Secretary of State risks reaching a reasoned conclusion under regulation 21 that does not adequately address the development's likely significant climate effects.

F.4 Legal risks for the Secretary of State

193 CESL submits that the eight deficiencies identified in Section F.3, considered individually and together, give rise to a substantial risk of unlawfulness if the Secretary of State relies on the Environmental Statement without adequately addressing them. That risk arises on two related grounds. First, the deficiencies may result in breaches of the requirements of regulation 5(2), regulation 14(3)(b) and Schedule 4 paragraphs 3, 5 and 6 of the EIA Regulations, including the duties concerning current knowledge, short-term environmental effects, material uncertainties and reasonable worst-case assessment. Second, a failure to take account of obviously material evidence concerning the nature, magnitude and uncertainty of the Proposed Development's climate effects may render the decision irrational. This submission is therefore not simply a disagreement with the Applicant's assumptions or the Secretary of State's eventual evaluation of significance.

194 The existence of uncertainty does not excuse a failure adequately to assess likely significant environmental effects where there is a sufficient evidential basis for doing so: *Finch; Rochdale*. Schedule 4 paragraph 6 expressly requires the main uncertainties and relevant difficulties encountered in compiling the environmental information to be described.

195 Further, applying by analogy the reasoning in *R (Friends of the Earth) v SSBEIS* [2023] 1 W.L.R. 225 (FoE), a decision-maker exercising predictive judgment may need sufficient information about the extent and severity of material risks to decide rationally what weight to give them. In the present case, CESL submits that the Secretary of State needs an adequate understanding of the plausible range of climate impacts, the assumptions determining that range, and where the Proposed Development's effects might reasonably be expected to fall within it. This does not necessarily require a formal statistical probability distribution, or adoption of CESL's particular methodology, but it does require adequate examination of material uncertainties supported by current evidence.

196 The potential materiality of the deficiencies is demonstrated by the evidence in this submission. The Applicant's own operating-hours sensitivity changes the assessed significance of Scenario G from Moderate Adverse to Major Adverse (D.8). DESNZ's EIR response identifies limitations in the upstream emissions factor on which the assessment depends (D.2), while CESL's indicative model demonstrates that applying alternative assumptions based on current evidence can materially change calculated full-lifecycle climate impacts (Section E). The short-term climatic effects of upstream methane are also material, given methane's substantial contribution to near-term warming and the importance of such effects in current scientific evidence (D.3). These uncertainties can interact, as

identified under Deficiency 8. CESL does not suggest that every adverse assumption will necessarily occur, but submits that their potential implications must be adequately understood and evaluated rather than dismissed without sufficient examination.

197 Particular legal risks also arise insofar as the Secretary of State relies on comparisons with UK carbon budgets or on economy-wide emissions-management mechanisms. Underassessment of relevant emissions may affect the significance evaluation and, insofar as UK territorial emissions are concerned, the understanding of emissions reductions or additional measures needed elsewhere to secure carbon-budget delivery.

198 Separately, a substantial proportion of upstream Scope 3 emissions arises outside UK territory and is not accounted for within UK carbon budgets. CESL accepts that the selection and use of benchmarks involve evaluative judgment, as recognised in ***R (Boswell) v SSESNZ*** [2025] EWCA Civ 669, paragraphs 80–81. Nevertheless, where territorial carbon budgets are used to contextualise combined UK and overseas emissions, failure adequately to distinguish and explain the treatment of the ex-territorial component may give rise to both an inadequately informed assessment and a risk of irrationality. The Secretary of State's discretion over benchmarks does not remove the requirement for adequate environmental information or for material considerations to be properly addressed.

199 These legal risks arise notwithstanding the considerable discretion afforded to the Secretary of State in evaluating and weighing environmental effects. The statutory requirement to assess likely significant effects "*in an appropriate manner*" (regulation 5(2)), together with the duties concerning current knowledge and uncertainty, requires an adequately informed evidential basis for that judgment. CESL submits that, unless these deficiencies are adequately addressed, there is a substantial risk that the Secretary of State will lack the environmental information necessary to reach the up-to-date reasoned conclusion required by regulation 21. The further information and other measures requested by CESL are set out in Section F.5.

200 Other legally adequate approaches may be available, but none has yet been demonstrated by the Applicant to resolve them. Unless sufficient further environmental information is obtained and considered, or relevant operational assumptions are effectively secured where that can genuinely address the deficiency, there is a substantial risk that the Secretary of State will lack the information necessary to reach the up-to-date reasoned conclusion required by regulation 21. Appropriate publicity and consultation should accompany further environmental information where required by the EIA Regulations.

F.5 CESL's remedy

201 CESL respectfully requests that the Secretary of State require the Applicant to provide sufficient further environmental information to address the eight deficiencies identified in Section F.3, and that such information be published and consulted upon in accordance with the EIA Regulations. The primary requirement is for an adequately informed assessment of the Proposed Development's likely significant climate effects, including the material uncertainties identified in this submission. Where an uncertainty concerns an operational characteristic of the development, an effective and enforceable requirement securing the assessed parameter may provide an alternative to assessing a wider operational envelope. However, such controls cannot substitute for adequate environmental information concerning upstream emissions, short-term climatic effects or other deficiencies in the assessment methodology.

202 At a minimum, CESL requests a full-lifecycle GHG assessment and sensitivity analysis covering Scenario G and each of the hydrogen and co-firing Scenarios A to F. It should quantify the Proposed Development's absolute emissions, identify an appropriately evidenced range of potential impacts and assess their significance, including:

- (a) variations in the carbon intensity and supply-source composition of natural gas supplied to the UK, taking account of current evidence and reasonably foreseeable future changes;
- (b) the short-term and long-term climatic effects of methane emissions associated with natural gas and blue hydrogen supply chains;
- (c) separate identification of UK territorial and ex-UK territorial emissions, with an explanation of how the latter are evaluated;
- (d) sensitivity to hydrogen lifecycle carbon intensity, including whether the assessed LCHS ceiling of 20 gCO₂e/MJ is representative and can be secured;
- (e) the likelihood, timing and duration of the proposed decarbonisation pathways, including prolonged unabated natural gas operation;
- (f) appropriately justified reasonable worst-case operating hours, commencement dates and operational lifetime;
- (g) an assessment of the Proposed Development's absolute lifecycle emissions against the no-project baseline, distinguishing those emissions from any claimed benefits arising through displacement of other electricity generation; and
- (h) combined sensitivity cases addressing the interactions between these uncertainties, with a reasoned explanation of the assumptions adopted and their implications for the assessment of significance.

F.5.1 Minimum standards for the further information

203 The further information should address the identified deficiencies rather than merely recalculate emissions using the Environmental Statement's existing assumptions. CESL submits that an adequate response should meet the following standards, or provide an alternative methodology which demonstrably addresses the same material issues:

- (a) **Upstream intensity as well as supply shares.** The carbon intensity of natural gas supply chains should be varied by source, using current evidence.
- (b) **Future gas supply and marginal demand.** The analysis should consider reasonably foreseeable changes in UK gas supply over the operational lifetime. It should also examine the potential implications of LNG as a marginal source of gas supply when the Proposed Development operates as dispatchable generation, with the assumptions and limitations of any such sensitivity made explicit.
- (c) **Territoriality and significance.** The assessment should separately quantify UK and ex-UK emissions, so far as reasonably practicable, and explain how overseas emissions are considered in evaluating effects on the global climate. Where UK territorial carbon budgets or emissions-management mechanisms are relied upon, their relevance and limitations emissions should be explained.

- (d) **Short-term methane effects.** The assessment should adequately describe the short-term as well as long-term climatic effects of methane, using current scientific knowledge. The UNEP EGR 2026 report should be used for contextualisation of the assessment of the impact on the receptor, the global climate system.
- (e) **Operating hours.** The assessment should consider an appropriately evidenced, availability-limited higher-utilisation scenario, rather than relying solely on the Environmental Statement's assumed average operating hours or dismissing the physically unattainable case of continuous operation at 8,760 hours annually.
- (f) **Commencement and operational lifetime.** The assessment should address the effects of later commencement and operation beyond the assumed 25-year lifetime, including the possibility of operation continuing into the 2060s, unless those parameters are effectively secured by the DCO.
- (g) **Hydrogen intensity.** The assessment should derive the lifecycle carbon intensity of expected UK blue hydrogen production and supply from appropriate assumptions concerning upstream natural gas emissions, hydrogen production efficiency, CO₂ capture performance and transport and storage availability.

It should test compliance with the LCHS on the Standard's own terms, including the implications of upstream emissions uncertainty on UK production streams. It should also address whether the assessed intensity can be secured through enforceable requirements.

- (h) **Combined uncertainties.** In addition to individual sensitivity tests, the assessment should include appropriately justified combined cases examining the interaction of upstream intensity, gas supply mix, methane climate metrics, hydrogen intensity, decarbonisation, operating hours and operational lifetime.
- (i) **A reasoned assessment of the results.** The Applicant should identify the operating and supply-chain assumptions it considers representative, the cases it considers to constitute reasonable worst cases, and the evidential basis for those judgments. Where a higher-emissions scenario is excluded as "unrealistic", the Applicant should explain why, having regard to the operating flexibility sought, current knowledge and the available evidence. The resulting information should be sufficient for the Secretary of State to understand the material uncertainties, evaluate the likely significant effects and reach an adequately informed, up-to-date reasoned conclusion under regulation 21.

G Article 40 “Interaction with the Keadby CCS Order”

204 This section concerns paragraph (5) of Article 40.

G.1 What Article 40(5) does

205 Article 40(5) would amend the Keadby 3 Order⁷¹ in two ways [REP5-007⁷², 2.4; C1-004c⁷³, 2.1.1; SoS RFI 6 Oct 2026, para 9]:

- (a) **Commencement.** Keadby 3 must at present be commenced within seven years of the Keadby 3 Order, that is by 29 December 2029 [K3 DL⁷⁴, 1.8; SoS RFI 6 Oct 2026, para 9(a)]. Article 40(5) would make the period run for seven years from the Keadby Next Generation Power Station Order coming into force (so to around November 2033⁷⁵). This is, in effect, an extension to the Keadby CCS Order (“**the proposed Order extension**”).
- (b) **Compulsory acquisition.** The period for compulsory acquisition under the Keadby 3 Order would go from five years to seven, also running from the Keadby Next Generation Power Station Order. It would move from December 2027 to around 2033 [REP5-007, 2.4; SoS RFI 6 Oct 2026, para 9(b)] (“**the proposed CA powers extension**”).

206 Keadby 3 is a different project: a gas-fired power station with carbon capture, consented in December 2022 [K3 DL, 1.1, 1.8]. Article 40(5) is in substance an extension of the Keadby 3 development consent by up to about four years.

207 The questions CESL raises in this response about the Proposed Development’s greenhouse gas assessment arise equally for Keadby 3, which also burns natural gas. They are questions of currency of information, and of how uncertainty in the assessment is dealt with: up-to-date emission intensities for gas supply; up-to-date supply sources; and the short-term climate effects of methane. Keadby 3 adds a further uncertainty: the carbon capture rate. The Keadby 3 consent was assessed on the basis that the plant would capture 90% of its carbon dioxide [K3 ER⁷⁶, 4.14.26, 4.14.29]. None of these uncertainties or assumptions for Keadby 3 have been tested against recent evidence, at the Keadby 3 examination or since.

G.2 How the proposed Order extension entered the process

208 The record shows the following sequence relating to the proposed extension.

⁷¹The Keadby 3 (Carbon Captured Equipped Gas Fired Generating Station) Order 2022, S.I. 2022/1396 (cited as [Keadby 3 Order]); the Applicant calls it “the Keadby CCS Order”), <https://www.legislation.gov.uk/uksi/2022/1396>

⁷²Applicant, “3.4 Schedule of Changes to the Draft Development Consent Order (Rev 4) (Tracked)” [REP5-007], EN0110001-000581, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000581-KNGPS%203%204%20Schedule%20of%20Changes%20to%20the%20Draft%20Development%20Consent%20Order%20Rev%204%200tracked.pdf>

⁷³Applicant, “Technical Note Regarding Keadby CCS Power Station Time Extension”, September 2026 [C1-004c], EN0110001-000662, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000662-C1-004c%20-%20Technical%20Note%20Regarding%20Keadby%20CCS%20Power%20Station%20Time%20Extension.pdf> Most pages of Table 2 and of Section 4.2 (from 4.2.7) have no text layer; CESL has read them from the page images.

⁷⁴Secretary of State for Business, Energy and Industrial Strategy, decision letter on the application by Keadby Generation Limited for the Keadby 3 Low Carbon Gas Power Station, 7 December 2022 [K3 DL], EN010114-001189, https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN010114-001189-20221207_EN010114_Keadby.pdf

⁷⁵ The Applicant expects that the Keadby Next Generation Power Station Order to be made in November 2026 [C1-004c, 2.1.1].

⁷⁶Examining Authority, “Keadby 3 Low Carbon Gas Power Station: Report to the Secretary of State for Business, Energy and Industrial Strategy”, 7 September 2022 [K3 ER], EN010114-001184, https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN010114-001184-Keadby_3_RR_Recommendation_Report_Final_With_Appendices.pdf

- (a) **Not in the application.** The draft DCO Explanatory Memorandum versions at application [APP-008], Deadline 3 [REP3-004] and Deadline 4 [REP4-005⁷⁷] each say nothing about extending the Keadby 3 Order. Article 40(5) was added at Deadline 5, on 9 June 2026 [REP5-007, 2.4; REP5-005⁷⁸, 5.56–5.59].

With the addition of Article 40(5) in the draft DCO at Deadline 5, the title of Article 40 is changed from “*Restoration works*” [REP4-003⁷⁹] to “*Interaction with the Keadby CCS Order*” [REP5-003⁸⁰].

- (b) **No new environmental information was submitted in related to Article 40(5).** The Schedule of Changes refers only to the Explanatory Memorandum [REP5-007, 2.4].

The Explanatory Memorandum justifies:

- a. the extension of the compulsory acquisition period because the Applicant “*may not be in a position to make that decision*” between the two projects “*by December 2027, which is the current time limit in Article 20 of the Keadby 3 DCO*”, with the commencement period then brought “*into alignment*” [REP5-005, 5.56]; and
- b. the extension of the compulsory acquisition period also because a longer period “*would allow more time for the carbon capture transport and storage network to advance*” [REP5-005, 5.58].

It says nothing about environmental effects.

⁷⁷Applicant, “3.2 Explanatory Memorandum”: Rev 0 [APP-008], EN0110001-000134, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000134-KNGPS%203.2%20Explanatory%20Memorandum%20Rev%200.pdf>; Rev 1 (clean) [REP3-004], EN0110001-000527, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000527-KNGPS%203%202%20Explanatory%20Memorandum%20Rev%201%20clean.pdf>; Rev 2 (clean) [REP4-005], EN0110001-000560, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000560-KNGPS%203.2%20Explanatory%20Memorandum%20Rev%202%20Clean.pdf>

⁷⁸Applicant, “3.2 Explanatory Memorandum (Rev 3) (Clean)”, Deadline 5 [REP5-005], EN0110001-000580, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000580-KNGPS%203%202%20Explanatory%20Memorandum%20Rev%203%20clean%20D5.pdf>

⁷⁹Applicant, “3.1 Draft Development Consent Order (Rev 4) (Clean)” [REP4-003], EN0110001-000557, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000557-KNGPS%203.1%20Draft%20DCO%20Rev%204%20Clean.pdf>

⁸⁰Applicant, “3.1 Draft Development Consent Order (Rev 5) (Clean)” [REP5-003], EN0110001-000590, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000590-KNGPS%203%201%20Draft%20Development%20Consent%20Order%20Rev%205%20clean%20D5.pdf>

- (c) The Explanatory Memorandum calls it “An additional novel Article”. At deadline 5, its explanatory overview still explains the article only by reference to restoring the Keadby 2 haul road, the Pilfrey laydown area and the construction compound, and describes the change to the Keadby 3 Order only as an amendment to that Order’s Article 36 (restoration works) [REP5-005, 3.5–3.9, 4.4(g)(ii)].

The extension appears only in the article-by-article notes [REP5-005, 5.56–5.59]. The Deadline 6 version is the same in these respects [REP6-004⁸¹, 3.5–3.9, 4.4(g)(ii), 5.56–5.59].

- (d) **No examination of Article 40(5).** After Deadline 5 (9 June 2026), there remained Deadline 6 (16 June 2026), Deadline 7 (18 June 2026) and the close of the examination (19 June 2026).⁸² The Examining Authority asked no question on Article 40(5). Its only Rule 17 letter is dated 19 May 2026, before Deadline 5 [PD-010⁸³].
- (e) **Related environmental information was submitted three months after the examination close, unrequested.** The Technical Note was submitted on 18 September 2026 with the Applicant’s response to the Secretary of State’s request of 4 September. That request asked nothing about Article 40 or the Keadby 3 time limits [SoS RFI 4 Sept 2026]. The Applicant says it provides the Note “on a precautionary basis”, to give the Secretary of State “assurance that the provision can be included” [C1-004c, 1.1.6; C1-004a⁸⁴].

In her letter of 6 October 2026, the SoS refers to the information “proactively provided by the Applicant on 18 September 2026” [SoS RFI 6 Oct 2026, para 8]. She then asks the Applicant only for “any further justification beyond that set out in the Explanatory Memorandum” under section 120(5) [SoS RFI 6 Oct 2026, para 9].

The conclusion is that no environmental information on the proposed Order extension was before the Examining Authority, and it reached the Secretary of State only after the examination, unrequested.

CESL has not been able to find any previous discussion or reasons given, by any a party, on whether extending the Keadby 3 consent requires further environmental impact assessment. The only apparent explanations are the Applicant’s own in the Technical Note [C1-004c, 1.1.6, 3.3.1–3.3.3, 5.1.2]. It names no legal test. It does not refer to the EIA Regulations, to screening, or to the statutory procedure for changing a development consent order (Section G.6).

CESL respectfully provides its comments on these matters now.

⁸¹Applicant, “3.2 Explanatory Memorandum (Rev 4) (Clean)” [REP6-004], EN0110001-000610, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000610-KNGPS%203%202%20Explanatory%20Memorandum%20Rev%204%20Clean%20june%202026.pdf>

⁸²Deadline dates as published on the Planning Inspectorate’s project page

⁸³Examining Authority, Rule 17 letter, 19 May 2026 [PD-010], EN0110001-000569, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000569-Keadby%20R17%2019%20May%202026.pdf>

⁸⁴DWD, on behalf of the Applicant, letter of 18 September 2026 to the Planning Inspectorate, enclosing the Applicant’s response to the Secretary of State’s request of 4 September 2026 and the Technical Note [C1-004a], EN0110001-000664, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110001-000664-C1-004a%20-%20Letter%20-%20K3%20time%20extension%20and%20RFI%20request%20-%2018.09.2026.pdf>

G.3 Where, and how, the Technical Note “assesses” Keadby 3

209 **The Technical Note provides some considerations of EIA assessment issues** in four places: its approach (Section 3, 3.1–3.6); a topic-by-topic appraisal (Section 4.1, Table 2); a greenhouse gas update (Section 4.2, 4.2.1–4.2.16, Tables 3–4 and Figure 1); and its conclusions (Section 5, 5.1.1–5.1.3) [C1-004c].

210 **The Applicant decided for itself what “assessment” was needed on environmental issues.** It said that “a qualitative approach” had been taken, and that additional quantitative assessment or updated modelling was “not considered necessary or proportionate” [C1-004c, 3.3.2–3.3.3].

211 Despite scoping a qualitative approach, the applicant then carried out a new quantitative greenhouse gas “assessment” of Keadby 3 [C1-004c, 4.2]. That “assessment” applies:

- (a) new significance criteria [C1-004c, 4.2.2];
- (b) a new scope 1 emission factor [C1-004c, 4.2.5];
- (c) upstream emissions from gas supply, for the first time, under the heading “Assessment Updates to Reflect the Finch Case” [C1-004c, 4.2.4];
- (d) a 5% unavailability of the CO₂ transport and storage network [C1-004c, 4.2.7]; and emissions from that network [C1-004c, 4.2.8].

212 It presents new figures and a new significance rating [C1-004c, Tables 3–4].

213 It concludes that there would be “no materially new or different environmental effects” [C1-004c, 5.1.2].

214 This is a test the Applicant applied itself; it is not the statutory test carried out under the EIA regulations.

G.4 Material changes since the Keadby 3 Environmental Statement

215 For background, the original Keadby 3 EIA did not assess upstream emissions. The Keadby 3 Environmental Statement assessed operational emissions from generation only. It did not include the natural gas supply chain [K3 APP-060⁸⁵, Tables 17.3, 17.28]. It used the then 2020 Defra/BEIS conversion factors (Scope 1 combustion factor only), 8,000 operating hours a year and 90% capture [K3 APP-060, Table 17.28; K3 ER, 4.14.29–4.14.30]. The Examining Authority and the Secretary of State considered the same emission sources [K3 ER, 4.14.29–4.14.30; K3 DL, 4.38].

216 The Technical Note itself records changes since the certified Keadby 3 Environmental Statement: the *Finch* judgment and upstream emissions [C1-004c, 4.2.4]; new assessment guidance [C1-004c, 4.2.2]; a higher required development platform, from 2.8 m to 3.0 m [C1-004c, 3.4]; new committed developments, only one of which was in the Keadby 3 cumulative assessment [C1-004c, 3.5.4]; and new National Policy Statements [C1-004c, 2.1.5]. It still concludes that there would be no materially new or different effects [C1-004c, 5.1.2].

⁸⁵Keadby Generation Limited, Keadby 3 Environmental Statement, Volume I, “Chapter 17: Climate Change and Sustainability” (Document 6.2.17), May 2021 [K3 APP-060] (APP-060 in the Keadby 3 Examination Library [K3 ER, 4.14.26]), EN010114-000271, <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN010114-000271-K3%20-%20Document%206.2.17%20-%20ES%20Chapter%2017%20-%20Climate%20Change%20and%20Sustainability.pdf>

G.4.1 Material implications of the updated emissions information

217 **However, a number of changes have not been notified to the SoS.** The figures in the Technical Note's Table 3 show:

- (a) upstream gas supply emissions (45,913 kgCO₂e per hour) are greater than all the plant's direct (scope 1) emissions (39,004 kgCO₂e per hour): 117.7% of them;
- (b) upstream gas supply emissions are 42.1% of all the emissions in Table 3; and
- (c) total scope 3 emissions are 179.9% of the scope 1 emissions.

218 In other words, on the Applicant's own figures, the emissions that the certified Keadby 3 Environmental Statement did not assess are larger than the direct emissions it did assess. That is a material change in the information about the project's likely effects.

G.4.1.1 The plant's carbon intensity

219 The certified Keadby 3 Environmental Statement gave the abated plant (reference case) a carbon intensity of 35.9 tCO₂e/GWh, "*significantly less than the grid average emissions in 2020 of 198 tCO₂e per GWh*" [K3 APP-060, p.65, Tables 17.27, 17.29]. The Examining Authority recorded the same figures [K3 ER, 4.14.31, 4.14.54].

220 CESL has recalculated the carbon intensity of the electricity generated from the Technical Note's Table 3, using the net output certified in 2021 (731.121 MW) [K3 APP-060, Table 17.27] in the Table below:

Emissions counted	Source of the figure	tCO ₂ e/GWh
Plant emissions not captured (certified 2021)	K3 APP-060, Tables 17.27, 17.29	35.9
Plant emissions not captured, including the 5% network outage allowance	C1-004c, Table 3	53.3
As above, plus upstream gas supply	C1-004c, Table 3 (the Note's own 0.116 kgCO ₂ e/kWh)	116.1
As above, plus the transport and storage network's own emissions	C1-004c, Table 3	149.3

Table 3: Carbon intensity of the electricity generated from the Technical Note's Table 3

221 The third row reproduces the Note's own intensity of 0.116 kgCO₂e/kWh [C1-004c, Table 3]. On the full boundary the Note now uses including the transport and storage network's own emissions, it is about four times the certified figure (149.3/35.9 = 4.16). The Note leaves the network's emissions out of its own intensity [C1-004c, 4.2.10].

G.4.1.2 The 90.7% capture figure the Secretary of State recorded

222 The Keadby 3 decision letter records it twice: "*up to 90.7% of these emissions will be captured, geosequestered and not released into the atmosphere*" [K3 DL, 4.38]; and "*in*

abated mode (i.e. with carbon capture), c.90.7% of emissions would be captured and not released into the atmosphere” [K3 DL, 4.44]. In the Environmental Statement, 90.7% is the share of the plant’s own unabated emissions [K3 APP-060, p.63, Table 17.27].

223 The Technical Note introduces upstream and downstream Scope 3 figures with the consequences:

- (a) on the same boundary, the share of the plant’s emissions captured falls to 86.1% once the 5% network unavailability allowance is included, and the plant’s emissions to atmosphere rise by 48.6% (39,004 against 26,256 kgCO₂e per hour) [C1-004c, Table 3; K3 APP-060, Table 17.27];
- (b) if upstream gas supply emissions are included in the baseline,
 - the amount captured is 74.1% of plant and upstream emissions together; and
 - allowing also for the transport and storage network’s own emissions, the net reduction is about **66.7%**: i.e. approximately a third of those emissions remain.

G.4.1.3 Material changes not reported

224 **The Technical Note does not draw these changes to the Secretary of State’s attention.** The carbon intensity and 90.7% capture figure were in the Keadby 3 Environmental Statement, and considered by the examining authority. The 90.7% figure was recorded within the reasoning in the decision letter.

225 They are each materially parameters considered at the time of the Keadby 3 decision making: both of these parameters are indicative of the plant’s performance, and were part of the current environmental knowledge at the time. In 2022 the Examining Authority, having recorded those figures, found the effects minor adverse and climate change neutral in the planning balance, and the Secretary of State agreed [K3 ER, 4.14.53–4.14.55, 4.14.64; K3 DL, 4.44–4.46].

226 These indicators – reflecting the materiality of the Keadby 3 CCS plant’s operation - have changed with the new information in the Technical Note, but have not been reported to the SoS. Instead, the technical note concludes that there would be *“no materially new or different environmental effects”* [C1-004c, 5.1.2].

G.4.2 These figures understate the change

227 They use the DESNZ well-to-tank factor [C1-004c, 4.2.4]. That factor has not been updated since 2023; it rests on data from 2015; and it applies a single factor for Qatari LNG to all LNG imports (Appendix A). The International Energy Agency and recent science show that upstream methane emissions are larger than inventories report. The Note addresses none of this.

228 Further, the Note does not assess the period that Article 40(5) would allow. Its update assumes construction from 2028 and a first full year of operation in 2031 [C1-004c, 4.2.3]. Yet its Table 2 says that Section 4.2 uses *“the later potential construction start date of 2033”*, and that a shift *“back to as late as 2033”* would not affect the outcome [C1-004c, Table 2 (climate change), p.36]. The update does not assess the full bounds of the possible lifecycle; the statement on *“not affecting outcome”* is asserted, not assessed. With an operating life of *“up to approximately 25 years”* [C1-004c, 2.1.3], a Keadby 3 commencing construction in 2033 could operate into the early 2060s.

G.4.2.1 On the certified Keadby 3 criteria, the new figures would cross the significance threshold

229 The Keadby 3 Environmental Statement treated a contribution of 1% or more of a relevant carbon budget as a “High” increase, and so as “Major adverse” [K3 APP-060, Tables 17.12–17.13]. The Note acknowledges that the Keadby 3 assessment used the 1% threshold [C1-004c, 4.2.13]. Its new figures amount to 2.24% and 15.41% of the indicative Eighth and Ninth Carbon Budget comparators respectively [C1-004c, Table 4]. Neither budget has yet been set in legislation. It then applies different criteria and rates the effect minor adverse [C1-004c, 4.2.14–4.2.16].

G.5 Defects CESL would raise in a proper consultation

230 The Technical Note has not been examined, publicised or consulted on. CESL therefore notes only briefly the defects it would raise if it were, and reserves the right to make further comments.

- (a) **The emission factor.** The well-to-tank factor is frozen on old data. CESL has described the issues with this elsewhere in this submission.
- (b) **Temporality.** No adequate description or assessment is made of the short-term climatic effects of upstream emissions. CESL has described the issues with this elsewhere in this submission.
- (c) **Territoriality.** Upstream emissions, much of which occur outside the UK, are compared with UK territorial carbon budgets [C1-004c, Table 4]. CESL has described the issues with this elsewhere in this submission.
- (d) **Uncertainty.** In addition to the above, uncertainty in the assumed carbon capture rate is not described or assessed, despite no commercial plant demonstrating operation at the assumed level.
- (e) **Comparators instead of the baseline.** The Note’s stated baseline is “*no construction of a power station on site*” [C1-004c, Table 2 (climate change), p.36]. Yet Table 4 justifies its rating by comparing Keadby 3 with the intensity of fossil fuel production and the grid average, taken from KNGPS ES Plates 18.1 and 18.2 [C1-004c, Table 4]. That is a substitution argument. *Whitehaven*⁸⁶ holds that the greenhouse gas emissions that inevitably follow from a project are “*significant likely indirect effects*”, so that the environmental statement and “*the EIA process*” are required “*to assess those emissions and their implications*” [*Whitehaven*, para 101]. CESL submits that this is an obligation to assess the project’s absolute emissions, and that whether a displaced alternative would emit more or less does not answer it. *Finch*⁸⁷ requires the decision-maker to have full knowledge of those effects.

⁸⁶*R (Friends of the Earth Ltd) v Secretary of State for Levelling Up, Housing and Communities* [2024] EWHC 2349 (Admin) (Holgate J) (cited as [*Whitehaven*]). Para 101: “Taking into account the common ground that the burning of the Whitehaven coal is an inevitable consequence of its extraction from the mine, in my judgment it is plain, following the decision of the Supreme Court in *Finch*, that the GHG emissions from that combustion are significant likely indirect effects of the project the subject of the planning application. Accordingly, the 2011 Regulations required WCM’s ES and the EIA process to assess those emissions and their implications. The Secretary of State was obliged to take into account that environmental information (including the GHG emissions from combustion of the Whitehaven coal) before deciding whether or not to grant planning permission on the application.”

⁸⁷*R (Finch) v Surrey County Council* [2024] UKSC 20 (cited as [*Finch*]), paragraph 152 “*It remains essential to ensure that a project which is likely to have significant adverse effects on the environment is authorised with full knowledge of these consequences.*”

- (f) **Another project's method.** The Note borrows the KNGPS Environmental Statement's comparators and method [C1-004c, 4.2.2, 4.2.4, 4.2.15, Table 4], which CESL says are flawed (Section B). No environmental statement has been prepared for the Keadby 3 extension.
- (g) **A typical case, not a worst case.** The Note accepts that transport and storage emissions are "*highly variable*", but uses a "*typical scenario*", saying that "*Any deviation ... not expected to affect the outcome*" [C1-004c, 4.2.8–4.2.9]. No range or worst case is assessed.
- (h) **Policy is not assessment.** Table 4 quotes National Policy Statement EN-1, paragraphs 2.4.5, 2.4.6, 4.2.2 and 4.9.4 [C1-004c, Table 4]. Policy support for a type of development does not remove the requirement to assess its effects.
- (i) **Planned outages.** The Note assumes that planned outages of the transport and storage network will coincide with periods when Keadby 3 is not generating, and counts only unplanned unavailability, at 5% [C1-004c, 4.2.7]. It gives no evidence that the network's planned outages will coincide with those of the plant.

G.6 The statutory procedure for extending a development consent order

231 Parliament has provided a specific procedure. A development consent order is changed under Schedule 6 to the Planning Act 2008.⁸⁸ The Secretary of State may make a non-material change [2008 Act, Sch 6, para 2(1)], or by order make any other change [2008 Act, Sch 6, para 3(1)]. An application may be made only by the applicant for the order, a successor in title, a person with an interest in the land, or a person for whose benefit the order has effect [2008 Act, Sch 6, paras 2(4), 3(4)]. In deciding whether a change is material, the Secretary of State must have regard to its effect, together with any previous changes, on the order as originally made [2008 Act, Sch 6, para 2(2)]. She may refuse an application if the development should properly be the subject of a new application [2008 Act, Sch 6, para 3(5A)]. Where the original order was a statutory instrument, so is the change [2008 Act, Sch 6, paras 2(9), 4(7)].

232 The 2011 Changes Regulations set out the steps.⁸⁹ For a non-material change, these are publicity and consultation [2011 Changes Regulations, regs 6–7]. For a material change, they are pre-application consultation and publicity, an application, notice of it, and a decision whether to hold an examination [2011 Changes Regulations, regs 10, 14, 16, 19–21B, 22 onwards; Changes Guidance⁹⁰, paras 39–66].

233 Environmental impact assessment is built into that procedure. An application for a material change is treated as a "*subsequent application*" for the purposes of the 2017 EIA Regulations⁹¹: regulation 4 ("prohibition on granting consent without consideration of environmental information"); regulation 8 ("procedure for establishing whether environmental impact assessment is required"); regulation 10 (scoping); regulation 22 ("subsequent

⁸⁸Planning Act 2008 (cited as [2008 Act]), <https://www.legislation.gov.uk/ukpga/2008/29>

⁸⁹The Infrastructure Planning (Changes to, and Revocation of, Development Consent Orders) Regulations 2011, S.I. 2011/2055, as amended (cited as [2011 Changes Regulations]), <https://www.legislation.gov.uk/uksi/2011/2055>. Regulation 17(1) was amended from 24 July 2026 by The Infrastructure Planning (Development Consent) (Miscellaneous Amendments) Regulations 2026, S.I. 2026/735, regs 1(2), 3(4), so that it now refers to the 2017 EIA Regulations.

⁹⁰Department for Communities and Local Government, "Planning Act 2008: Guidance on Changes to Development Consent Orders", December 2015 (cited as [Changes Guidance]), https://assets.publishing.service.gov.uk/media/5a8037b4ed915d74e33f9248/Making_changes_guidance_to_Development_Consent_Orders.pdf. Paragraph 49 refers to the 2009 EIA Regulations then in force; regulation 17 of the 2011 Changes Regulations now refers to the 2017 EIA Regulations.

⁹¹The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, S.I. 2017/572 (cited as [2017 EIA Regulations]), <https://www.legislation.gov.uk/uksi/2017/572>

application for EIA development”); and regulation 24 [2011 Changes Regulations, reg 17(1)]. The Secretary of State “*will not be able to grant consent for a material change ... until the updated Environmental Statement and any other environmental information have been taken into account*” [Changes Guidance, para 49].

234 **On the Government’s own guidance**, this would be a material change. A change “*should be treated as material if it would require an updated Environmental Statement ... to take account of new, or materially different, likely significant effects on the environment*” [Changes Guidance, para 12]. So should a change that “would authorise the compulsory acquisition of any land ... that was not authorised through the existing Development Consent Order”, because the person affected must be able to be heard [Changes Guidance, para 15]. The first applies: the Applicant has itself produced an updated greenhouse gas assessment, with emission sources the Keadby 3 assessment did not include. Two key indicators of the material effects of the project, as before the Keadby 3 decision maker, have materially changed, but this has not been disclosed to the Keadby NPGS decision maker. The second applies too: after December 2027 the Keadby 3 Order would no longer authorise compulsory acquisition, and Article 40(5) would authorise it for about six more years [SoS RFI 6 Oct 2026, para 9(b)].

235 **Article 40(5) achieves the same result by a “novel” route, but with none of those steps.** The Explanatory Memorandum itself calls Article 40 “novel” [REP6-004, 3.5]. The Applicant cites no precedent for one order extending another order’s commencement period. Its precedents are for orders that amend related orders in other respects [REP6-004, 5.55], and for compulsory acquisition periods longer than five years within an order’s own terms [REP6-004, 5.57–5.58].

236 Article 40(5) avoids the regular change procedure; screening and EIA under regulation 17; publicity and consultation; consideration of whether the changes since the Keadby 3 Order was made are material; and the right of affected landowners to be heard on compulsory acquisition.

237 **Section 120(5)(b) does not fill the gap.** It allows an order to amend statutory provisions of local application where that appears “*necessary or expedient in consequence of a provision of the order or in connection with the order*” [2008 Act, s 120(5)(b)]. Whatever its scope, it does not displace the procedure that Parliament has prescribed for changing a development consent order, or the environmental impact assessment that procedure requires. The justification given is the Applicant’s wish to choose between two projects later [REP6-004, 5.56, 5.58].

238 Nothing in the Keadby Next Generation Power Station Order depends on the proposed Order extension.

G.7 Public participation

239 CESL is not aware of any newspaper notice, site notice or notice to those notified of the Keadby 3 application about Article 40(5).⁹² The Applicant records only that it notified landowners [REP6-004, 5.59]. Pre-application consultation took place before Article 40(5) existed (paragraph 4(d)). The present consultation is addressed to Interested Parties in this application [SoS letter 24 Sept 2026].

G.8 What CESL asks

240 CESL asks the Secretary of State to take one of two courses:

- (a) **Delete Article 40(5).** Any extension of the Keadby 3 Order should then be sought under Schedule 6 to the 2008 Act, as Parliament has prescribed; or
- (b) **Require an application for commencement extension under Schedule 6 to the Planning Act 2008.** If she is minded to keep Article 40(5), Keadby 3 should first go through a proper commencement extension process. As there are material changes to the environmental information, described above, this should include a proper environmental impact assessment: including an updated environmental statement covering the whole period that Article 40(5) would allow (commencement to around 2033 and operation into the 2060s); current evidence on upstream emissions, the short-term effects of methane, the capture rate and the availability of the transport and storage network; publicity and consultation; and her reasoned conclusion, before the extension is made.

⁹²Even the lightest route under Schedule 6, a non-material change, requires a notice published for at least two successive weeks in one or more local newspapers circulating in the vicinity of the land, and a copy sent to everyone notified when the original application was accepted, and to any other person who may be directly affected [2011 Changes Regulations, regs 6–7; Changes Guidance, paras 22, 30–31]. A material change also requires pre-application consultation and a notice in the London Gazette and at the site [2011 Changes Regulations, regs 10, 14; Changes Guidance, paras 40, 44–45].

H Conclusions

241 The Secretary of State's letter of 4 September 2026 asked whether hydrogen intensity, operating hours and a route to carbon capture are secured. The answers confirm that none of them is, whether by the draft DCO, the environmental permit or any other control (Section C.4, Table 1). CESL submits that the assessment of greenhouse gas (GHG) emissions is deficient in the following material respects:

- (a) the main uncertainties (upstream emissions, the short-term effects of methane, hydrogen intensity, the decarbonisation pathway, operating hours and lifetime) are neither described, as Schedule 4 paragraph 6 requires, nor tested at a reasonable worst case, as the Applicant's own adoption of the Rochdale approach requires (F.2);
- (b) the evidence base has changed materially since the assessment, and since Net Zero Teesside. DESNZ's EIR response confirms that the WTT factor has not been updated since 2023, rests on a 2015 study, treats all LNG as Qatari and weights supply on 2021 data (D.2; Appendix A). Meanwhile, US LNG was 76% of UK LNG imports in 2025. The factor is not "*current knowledge*" under regulation 14(3)(b);
- (c) the short-term climate effects of methane, which Schedule 4 paragraph 5 requires to be described, are not assessed at all. The ES uses GWP100 only (D.3). The UNEP Emissions Gap Report 2026 sets out the methane cuts required to limit near-term warming (D.1, Figure 1);
- (d) hydrogen intensity is capped at the LCHS ceiling of 20 gCO₂e/MJ rather than assessed. The ceiling is not shown to represent the likely supply, and it is not secured (D.4);
- (e) the uncertainties are capable of quantification, as the Applicant's own 8,760-hour figures and CESL's indicative model show. On the Applicant's figures, 8,760 hours a year gives 73.7 MtCO₂e, a "Major Adverse" effect [C1-004b, Q8(c)]. In CESL's model, Scenario G's full lifecycle emissions rise from 22.98 MtCO₂e on the application's basis to between 25.61 and 61.37 MtCO₂e at the ES operating hours. At an availability-limited 8,150 hours a year over 30 years, they rise to between 92.32 and 221.86 MtCO₂e (Section E; Appendix D, Table 5);
- (f) the project's absolute lifecycle emissions are not evaluated in their own right. The significance conclusions for Scenarios F and G rely on displacement of higher-carbon generation, which the ES does not evidence and which contradicts its own zero baseline (D.5);
- (g) the UK and ex-UK components are not separated. In CESL's model, ex-UK emissions are 22% to 66% of Scenario G's full lifecycle emissions at the ES operating hours. None of this falls within UK carbon budgets, and neither the UK ETS nor the permit reaches it (D.6);

- (h) the answers to the Secretary of State's questions confirm that no outcome-determinative assumption is secured, for gas or for mixtures:
- there is no secured hydrogen connection, no mechanism to require carbon capture, and the Environment Agency has declined to assess the Carbon Capture Readiness Report [C1-004b, Q3; C1-002, Q11; C3-004, 4(b)];
 - there is no limit on hours or lifetime [C1-002, Q9; REP6-003]; and
 - nothing secures the 20 gCO₂e/MJ hydrogen intensity [C1-004b, Q5(a)].

Scenario G is therefore a realistic outcome, not a remote one (D.7). The answers do not cure the deficiencies;

- (i) proceeding on the present information carries the legal risks identified in Section F.4: breach of regulation 5(2), regulation 14(3)(b) and Schedule 4 paragraphs 3, 5 and 6, and a reasoned conclusion reached without the information the Regulations require;
- (j) the remedy is to assess or to constrain. That means either further environmental information covering the matters in section F.5 and meeting the minimum standards in section F.5.1, published and consulted on; or enforceable requirements that hold a parameter to its assessed level (D.4.3.1; D.8). Whilst hydrogen intensity, operating hours and lifetime may be controlled in this way, upstream supply-chain emissions and the short-term effects of methane can only be assessed; and
- (k) without one or the other, no lawful reasoned conclusion is available under regulations 21 and 30(2)(b)(i)(aa).

242 These uncertainties rest on evidence, not conjecture: DESNZ's own EIR response, IEA and EERA data, peer-reviewed measurement studies, NESO's supply projections and the Applicant's own figures (D.2–D.9). CESL's indicative model, using application data where available, shows that each can be tested quantitatively from published sources, and that each materially changes the calculated lifecycle emissions (Section E). The Applicant can therefore assess them and explain their relevance to the project; it cannot dismiss them as speculative. They are omissions of information that the Regulations require, not disagreements with the Applicant's professional judgment (Section F.3).

243 Separately, Article 40(5) would extend the Keadby 3 Order by about four years for commencement and six years for compulsory acquisition [SoS RFI 6 Oct 2026, para 9]. It does so by a "novel" route for which no precedent is cited, relying on an "assessment" in the Technical Note that has not been examined, publicised or consulted on (Section G). On the Note's own figures, the Keadby 3 plant's carbon intensity rises from the certified 35.9 tCO₂e/GWh to 53.3 tCO₂e/GWh like for like, and to 149.3 tCO₂e/GWh on the full boundary (Section G, Table 3).

Article 40(5) should be deleted, leaving any extension of the Keadby 3 Order to the procedure Parliament has prescribed in Schedule 6 to the 2008 Act. Alternatively, if it is kept, Keadby 3 should first go through that procedure, with an updated environmental impact assessment, publicity and consultation (Section G).

CESL therefore respectfully asks the Secretary of State to make the decisions requested in Section A.4 before determining the application.

! Resume

Dr Andrew Boswell – Professional Background

Climate Emergency Science Law (CESL), established in 2017 by Dr Andrew Boswell, provides independent, evidence-based scrutiny of UK climate- and energy-related decision-making. CESL brings together expertise in physical sciences, high-performance computing and modelling, energy systems, and climate governance, with a particular focus on the robustness of assumptions used in environmental assessment, policy appraisal, and regulatory decision-making.

Dr Boswell was educated as a scientist, obtaining a first degree in Chemistry from Imperial College London (1977) and a DPhil from the University of Oxford (1981) in structural biology, with a focus on molecular structure, protein binding dynamics, using the then very new field of nuclear magnetic resonance. This training underpins a career-long engagement with complex systems analysis and the interpretation of scientific evidence.

During the 1980s and 1990s, Dr Boswell worked as a software engineer specialising in the design, modelling, simulation, verification, testing and fault analysis of advanced software systems used to design Very Large Scale Integrated (VLSI) circuits, also a new field then. This work required rigorous design, formal mathematical verification methods, and validation of complex computational systems - skills directly transferable to the forensic analysis of environmental modelling and impact assessment.

From 1995 to 2006, Dr Boswell led the high-performance computing (HPC) service at the University of East Anglia (UEA), which he designed and developed from its initial implementation. Several incarnations of the hardware later, the service continues in operation today providing vital computing resources for campus wide scientific research at UEA. In parallel with developing the service, he supported researchers across multiple scientific disciplines, including climate science, in the execution, diagnosis, and optimisation of large-scale numerical models. His work included advising on model architecture, computational assumptions, executing large ensemble computer runs, and forensic investigation for scientists of model failures.

Between 2005 and 2017, Dr Boswell served as an elected councillor on Norfolk County Council and Norwich City Council whilst maintaining and developing his interests in scientific and environmental issues. Since 2017, he has worked as an expert adviser through his consultancy CESL (formerly Climate Emergency Planning and Policy, CEPP). For over two decades, he has submitted detailed, evidence-based responses to Government consultations, the Climate Change Committee, and Parliamentary select committees on climate, energy, and environmental policy. His work consistently focuses on scientific credibility, transparency of assumptions, and legal and policy compliance in the context of the UK's climate obligations.

J Statement on the use of Artificial Intelligence

244 This statement is made in accordance with PINS guidance on “*Use of artificial intelligence in casework evidence*”, 6 September 2024 and its update of 20 February 2026.

245 I have used standard commercially available artificial intelligence tools (eg OpenAI ChatGPT and Anthropic Claude) to assist with researching issues, and drafting and refining textual content for clarity, structure, and readability.

246 AI was used solely in response to prompts provided by me and drew on publicly available information and the content of documents and material supplied by me; it was not used to generate original evidence or data.

247 The text in this submission may therefore have been influenced by the use of AI for research support and proof-reading during the drafting process.

248 I submit that any use of AI in preparing this submission has been responsible and lawful, and has been directed to clarifying and structuring the issues presented.

249 I am responsible for the factual accuracy of this submission. All information has been reviewed and checked by me and, to the best of my knowledge and understanding, is true and accurate.

250 Numerical work, including any tables of figures or graphs in this document, is usually my own work, but may be assisted by AI in which case it is always thoroughly checked to my own standards.

251 No images, video, or visual material have been created, altered, or enhanced using artificial intelligence in this submission.

252 This submission does not contain any personal data, and no personal information has been disclosed or processed using AI. Any use of AI complies with data protection, confidentiality, and copyright requirements.

K Appendix A: DESNZ EIR response: DESNZ WTT factor methodology

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Department for
Energy Security
& Net Zero

Science and Innovation for Climate and
Energy
Department for Energy Security & Net
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SW1A 2AW

foi.requests@energysecurity.gov.uk

www.gov.uk/desnz

Our ref: EIR2026/02883

27 March 2026

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.

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 Exergias (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:*

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

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

3. Confirmation of whether the Exergias “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 Exergias (2015), and if so, how.

(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.

(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.
-

(D) Post-2021 recalculation practice

For publication years 2023–2025, the Natural Gas WTT factor remains constant at 9.30 kgCO₂e/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.
-

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.

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.

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 *Table 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

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 ₂ S 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 Exerga 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 Exerga 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 Exerga 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 Exerga 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 is 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 Exerga 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 Exerga study reported it had used. The second is a correction to convert the Exerga values which are only reported in gCO₂e (CO₂ equivalent) from AR4 GWPs to AR5 GWPs. As the Exerga 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 Exerga (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

Observed warming is driven by emissions from human activities, with greenhouse gas warming partly masked by aerosol cooling

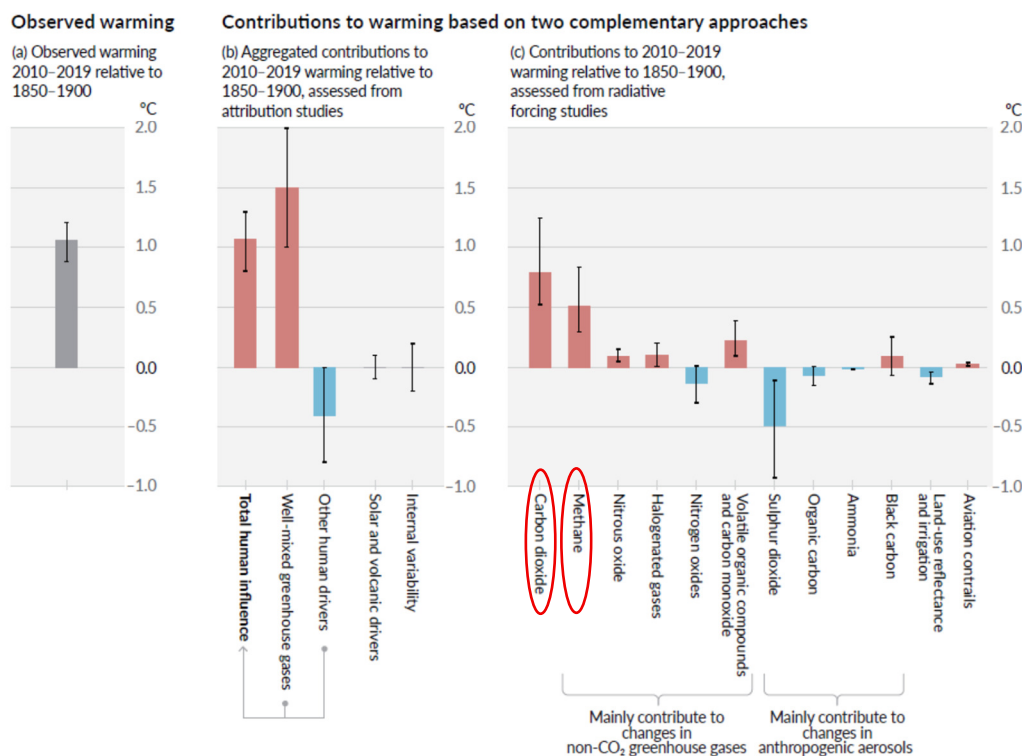


Figure SPM.2 Assessed contributions to observed warming in 2010–2019 relative to 1850–1900

Panel (a) Observed global warming (increase in global surface temperature). Whiskers show the *very likely* range.

Panel (b) Evidence from attribution studies, which synthesize information from climate models and observations. The panel shows temperature change attributed to: total human influence; changes in well-mixed greenhouse gas concentrations; other human drivers due to aerosols, ozone and land-use change (land-use reflectance); solar and volcanic drivers; and internal climate variability. Whiskers show *likely* ranges.

Panel (c) Evidence from the assessment of radiative forcing and climate sensitivity. The panel shows temperature changes from individual components of human influence: emissions of greenhouse gases, aerosols and their precursors; land-use changes (land-use reflectance and irrigation); and aviation contrails. Whiskers show *very likely* ranges. Estimates account for both direct emissions into the atmosphere and their effect, if any, on other climate drivers. For aerosols, both direct effects (through radiation) and indirect effects (through interactions with clouds) are considered.

[Cross-Chapter Box 2.3, 3.3.1, 6.4.2, 7.3]

Figure 4: IPCC AR6 WGI SPM Figure SPM.2 reproduced

253 The temperature impacts from CO₂ and methane highlighted with red rings.

⁹³ IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 3–32, doi:10.1017/9781009157896.001.

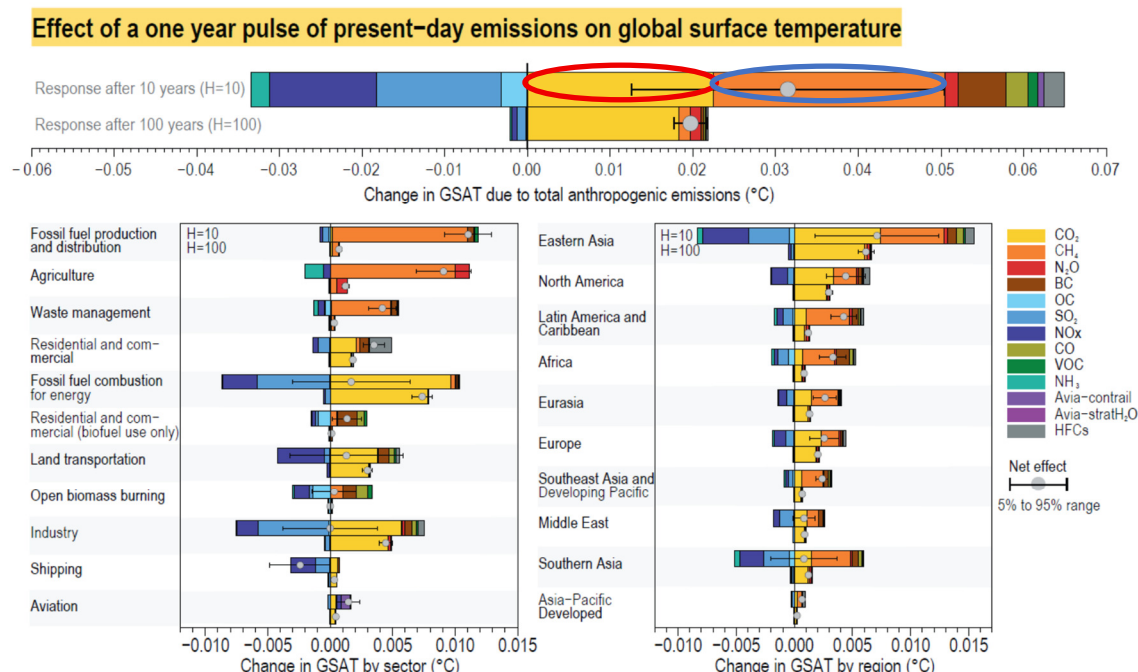


Figure 6.16 | Global mean temperature response 10 and 100 years following one year of present-day (year 2014) emissions. The temperature response is broken down by individual species and shown for total anthropogenic emissions (top), sectoral emissions (left) and regional emissions (right). Sectors and regions are sorted by (high-to-low) net temperature effect on the 10-year time scale. Error bars in the top panel show uncertainty (5–95% interval) in net temperature effect due to uncertainty in radiative forcing *only* (calculated using a Monte Carlo approach and best estimate uncertainties from the literature – see Lund et al. (2020) for details). CO₂ emissions are excluded from open biomass burning and residential biofuel use due to their unavailability in the Community Emissions Data System (CEDS) and uncertainties around non-sustainable emission fraction. Emissions for 2014 originate from the CEDS (Hoesly et al., 2018), except for HFCs which are from Purohit et al. (2020), open biomass burning from van Marle et al. (2017), and aviation H₂O which is from Lee et al. (2021). The split of fossil fuel production and distribution and combustion for energy and residential and commercial fuel use into fossil fuel and biofuel components is obtained from the GAINS model (ECLIPSE version 6b dataset). Open biomass burning emissions are not included for the regions. Emissions are aggregated into fossil fuel production and distribution (coal mining, oil and gas production, upstream gas flaring and gas distribution networks), agriculture (livestock and crop production), fossil fuel combustion for energy (power plants), industry (combustion and production processes, solvent-use losses from production and end use), residential and commercial (fossil fuel use for cooking and heating as well as HFCs leakage from A/C and refrigeration), waste management (solid waste, including landfills and open trash burning, residential and industrial waste water), transport (road and off-road vehicles, and HFC leakage from A/C and refrigeration equipment), residential and commercial (biofuels use for cooking and heating), open biomass burning (forest, grassland, savanna fires and agricultural waste burning), shipping (including international shipping), and aviation (including international aviation). Further details on data sources and processing are available in the chapter data table (Table 6. SM.3).

Figure 5: IPCC AR6 WGI Figure 6.16 reproduced

254 The 10-year temperature response from CO₂ and methane are highlighted with a red and blue ring respectively – showing the greater climate response from 2014 levels of methane.

N Appendix D: CESL's indicative model

255 CESL provides here an indicative sensitivity test of the full lifecycle greenhouse gas emissions for **Scenario G**: a “parameter isolation ladder” (PIL) in which only one, or a few, parameters are changed in each step to show the effects of changing single input parameters. Background technical derivation given in the further Appendices.

N.1 The model in overview and the key elements and assumptions

256 Seven steps/levels are presented in the PIL, the first step being the Application for reference. To the right of the vertical axis, the absolute emissions of each sub-type is shown as tCO₂e. The number at the right end of each level is the emission intensity of the full lifecycle (tCO₂e/GWh).

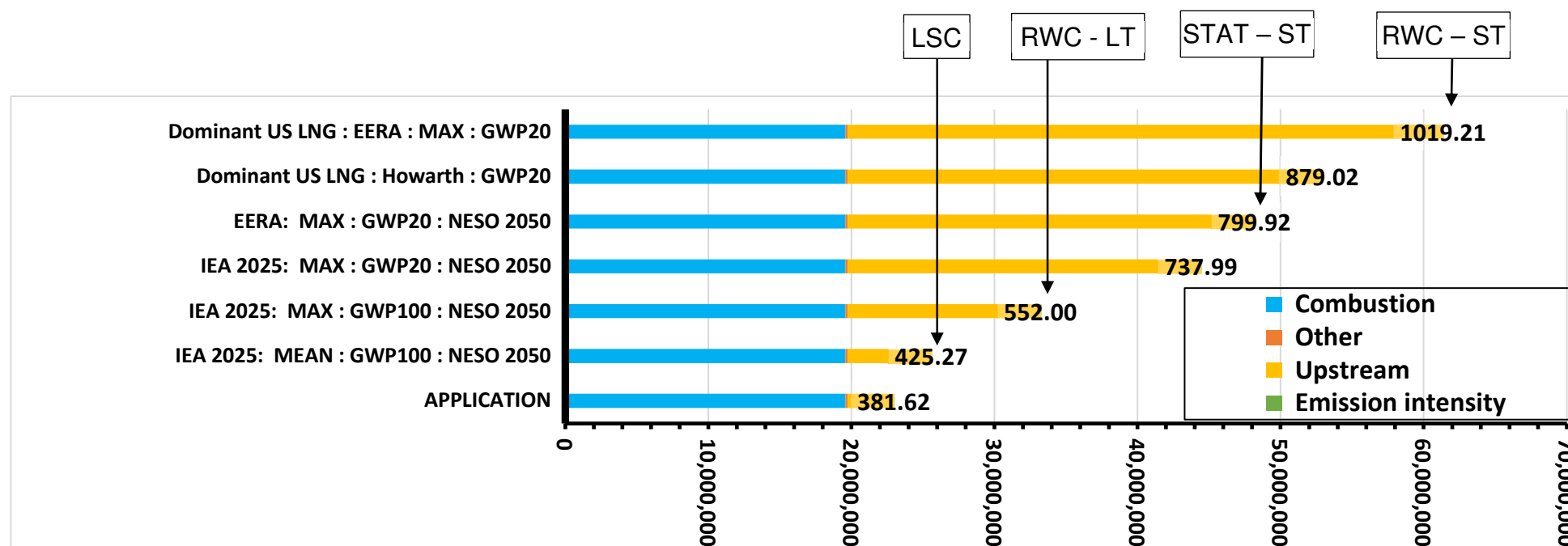


Figure 6: Seven level PIL: Scenario G: modelling uncertainty of full-lifecycle GHGs

N.1.1 The meaning of key output parameters: LSC, RWC-LT, STAT-ST, and RWC-ST:

The key to the labels is as follows, and these terms will be used in the Results section below:

- (a) “**LSC**” is a lower sensitivity case, differing from the applicant’s scenario G in terms of the upstream emissions calculation being based on mean data from the recent IEA report and reasonable worst case data for supply mix at 2050 from the NESO FES 2025 report⁹⁴;
- (b) “**RWC – LT**” is a reasonable worst case for the long-term climate impacts using recent maximum data on upstream emissions from the IEA
- (c) “**STAT – ST**” is a reasonable worst case for the short-term climate impacts using recent maximum data on upstream emissions from the EERA and using static annual gas supply projections from NESO for 2050 from NESO’s FES 2025 report, Figure 68;
- (d) “**RWC – ST**” is a reasonable worst case for the short-term climate impacts using recent maximum data on upstream emissions from the EERA and using “100% marginal US-LNG sensitivities” modelling the US LNG as the marginal supply source meeting 100% of additional demand in stressed gas supply market. This is explained further below.

N.1.2 Further details and modelling assumptions:

- (e) Calibration to application: [APP-052, Table 18.10] gives emission intensity for Scenario G as 380 tCO₂e/GWh. CESL’s reconstruction is 381.62 tCO₂e/GWh (100.43% of application, and within 0.5% of application⁹⁵).
- (f) extracts CO₂ and CH₄ emission intensities⁹⁶ in gas supply chains from the recent reports on natural gas supply chains: EERA/T&E (2024) [provided as a stand-alone appendix], IEA 2025 [provided as a stand-alone appendix] and Howarth (2024) [REP1-041].

⁹⁴ See Table 8. This may overestimate emissions before 2050 but is likely to underestimate emissions after 2050 when UKCS gas will be fully depleted.

⁹⁵ CESL’s written representation [REP1-038], Appendix L, presented reasons why it is not possible to precisely reproduce the applicant’s data from [APP-052].

⁹⁶ Note, that for each level, the CO₂ and CH₄ emission intensities for UKCS and Norwegian pipeline imports to the UK use the Exergica (2015) data: this is a conservative assumption particularly on the CH₄ emissions involved. CESL has used a calculation hybrid approach: generating upstream emissions factors with the IEA, EERA and Howarth data providing data for the LNG supply chains with UKCS and Norwegian pipeline supply being modelled on Exergica. This is because CESL has not found more recent reliable data on UKCS and Norwegian pipeline supply chains. The calculation method is explained in Appendix F.

- (g) CESL submits that the IEA and EERA data are suitable datasets to use for LNG emission factors for a comprehensive sensitivity analysis because:
- They are each based on a recent systematic review of many GHG factors⁹⁷ drawn from peer-reviewed, government, and industry literature; and
 - EERA⁹⁸ has already been used in developing international regulatory policy as it informed the development of new default LNG WTT emission factors under the International Maritime Organisations' LCA Guidelines framework; and
 - Each provide clear statistical information on data (minimum, mean, maximum values) which allows different data to be used for lower bound ranges and upper bound ranges.
- (h) Howarth (2024) [REP1-041] provides a peer-reviewed lifecycle calculation incorporating recent upstream-emissions research, including Sherwin et al. (2024) [supplied as stand-alone appendix], whose study used aerial measurements of upstream methane leaks over very large areas of the US.
- (i) Extracts future projections of natural gas supply sources based on the official NESO FES 2025 document, and uses 2050 data within the project lifetime, which itself is an unknown, but extends over 2050 in all cases.
- (j) Two of the levels – “*Dominant US LNG : Howarth : GWP20*”; and “*Dominant US LNG : EERA : MAX : GWP20*” are calculated with “100% marginal US-LNG sensitivities”. This is because gas supply and its associated upstream emissions intensity vary over time and with the conditions in which the plant operates reflecting the dynamic nature of the gas supply market. In modelling of dynamic

⁹⁷ For example, for the EERA study around 800 greenhouse gas emission factors were used

⁹⁸ The report was commissioned by Transport + Environment, a Brussels-based organisation with a direct engagement role in EU energy and shipping policy. Its policy relevance extends beyond EU shipping: the EERA methodology was subsequently deployed in a formal submission to the IMO's Intersessional Working Group on GHG Emissions from Ships (ISWG-GHG 20, document ISWG-GHG 20-3-9, submitted by the Clean Shipping Coalition), in which EERA conducted a further literature review — applying the same methodology as the original FuelEU WtT LNG study — to inform the development of new default LNG WtT emission factors under the IMO's LCA Guidelines framework.

T&E's own November 2024 briefing based directly on the EERA report explicitly called on the IMO's GESAMP group — the body responsible for developing default emission factors for shipping fuels — to set realistic LNG WtT emissions values grounded in that review. A further IMO submission at MEPC 83 (document MEPC 83-7-28) built directly on the EERA methodology to propose a conservative global default WtT factor of 27.95 gCO₂eq/MJ (the 75th percentile of global values) to govern LNG compliance under the IMO Net-Zero Framework. The EERA/T&E study has become the evidential foundation being deployed at the international regulatory level precisely to replace the outdated source intensity data embedded in frameworks equivalent to the DESNZ WTT factor.

The IMO's 2024 LCA Guidelines quantify GHG intensity on GWP100 but expressly provide for GWP20 values, and for GHG intensity on GWP20 to be given 'for comparative purposes' [MEPC 81, Annex 10, para 2.4 and Table 1]. An international regulatory framework thus treats the 20-year metric as relevant information alongside GWP100, which is the approach CESL proposes here.

The UK actively supported the IMO Net-Zero Framework and the GESAMP process at MEPC 83, and that process is itself deploying the EERA methodology as the basis for updating LNG WtT default emission factors. The UK's support for the IMO process is consistent with the regulatory relevance of updated LNG WtT evidence in the EERA report. See [REDACTED]

supply, rather than applying a fixed annual-average supply share (e.g. at 2050 from the NESO data) throughout its lifetime, the LNG component is modelled as a marginal supply source meeting 100% of additional demand in stressed gas supply markets. This tests the role of LNG under the stressed market conditions in which dispatch patterns associated with Dispatchable Power Agreements would be engaged. This models how the additional gas demand from the plant running in Scenario G under dispatchable operation would force rapid purchase and supply of LNG to the UK as a whole.

- (k) Models of both long-term climate impacts and short term climate impacts for methane, in different levels.
- (l) Full lifecycles with construction and other emissions included, as based on the application data (and explained in more detail in Appendix F).

N.1.3 Four emission sub-types enabling territoriality estimation

- (m) Enables calculation of four sub-types of emissions (in each of the scenarios, where possible**) for:

- UK CO2 emissions;
- UK CH4 emissions;
- ex-UK CO2 emissions; and
- ex-UK CH4 emissions.

** The DESNZ 2025 WTT factor does not permit the separation of CO2 and CH4, and UK and ex-UK emissions. For the purposes of illustration, the separate CO2 and CH4, and UK and ex-UK emissions are not shown on the figures below for the levels using the DESNZ 2025 WTT factor (a single full lifecycle emission is shown in purple on the figure below).

- (n) Form the remaining levels, this enables UK and ex-UK emissions to be separately described and identified – ready for separate assessment of UK and ex-UK emissions, as shown in the figure below.

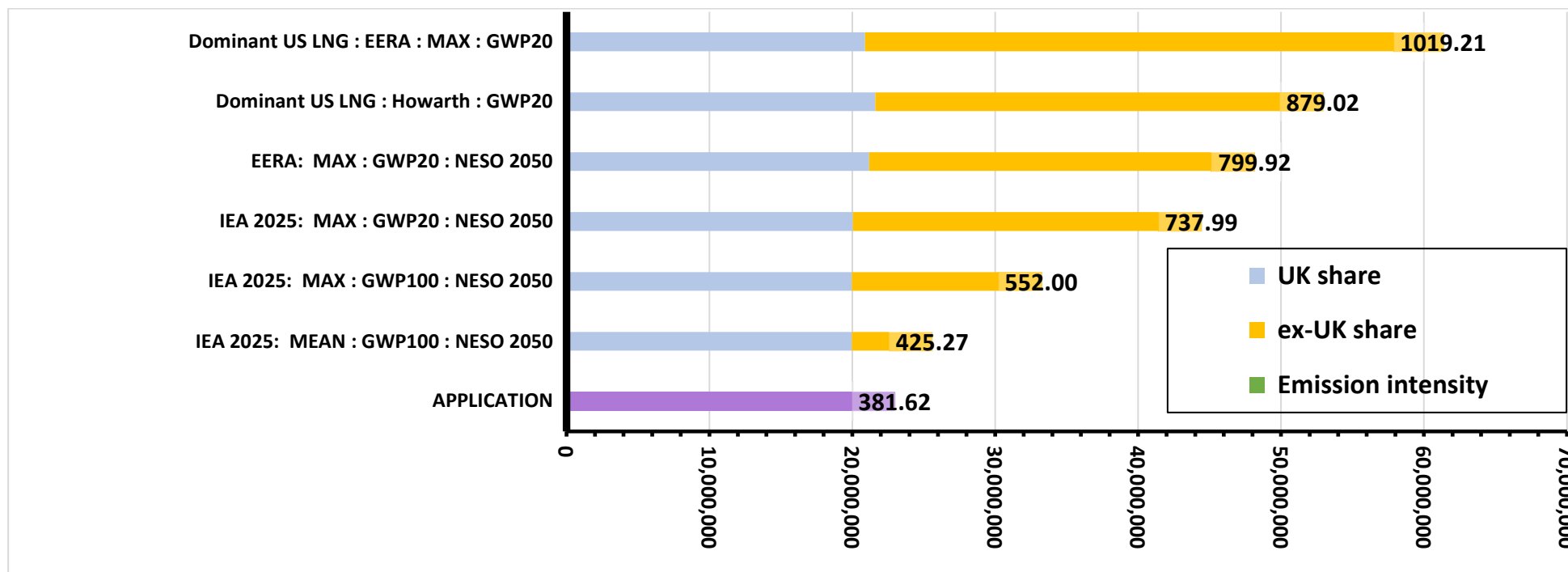


Figure 7: Seven level PIL: Scenario G: UK and ex-UK shares of full-lifecycle GHGs

(o) It also enables the CO₂ and CH₄ split to be described, although it is not formally required for assessment, as shown below.

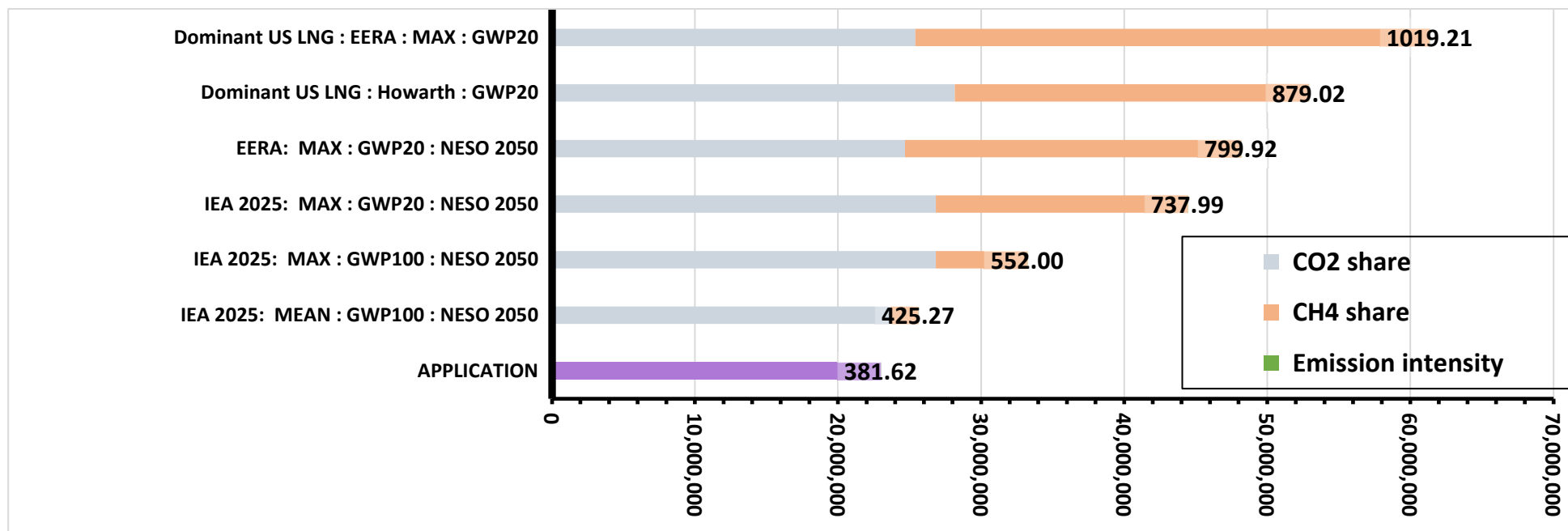


Figure 8: Seven level PIL: Scenario G: CO₂ and CH₄ shares of full-lifecycle GHGs

(p) The approach in presenting the model in these Appendices is top-down. Next the top-level data for the charts above is shown.

N.1.4 Top-level data

257 For each of the seven ladder steps (levels), the absolute emissions for the full lifecycle, upstream and other parts of full lifecycle share, UK share, ex-UK share, CO2 share and CH4 share; and the emission intensity and the energy penalty proportion, are shown in the Table below.

LEVEL	tCO2e	Key output code	Other	Combustion	Upstream	Emission intensity	Full lifecycle	UK share	ex-UK share	CO2 share	CH4 share
0	APPLICATION ***		162229	19,581,630	3,233,336	381.62	22,977,195	**	**	**	**
1	IEA 2025: MEAN : GWP100 : NESO 2050	LSC	162,229	19,581,630	5,861,581	425.27	25,605,440	19,963,248	5,642,192	23,655,251	1,950,189
2	IEA 2025: MAX : GWP100 : NESO 2050	RWC-LT	162,229	19,581,630	13,491,782	552.00	33,235,641	19,963,248	13,272,393	26,847,592	6,388,049
3	IEA 2025: MAX : GWP20 : NESO 2050		162,229	19,581,630	24,690,330	737.99	44,434,189	20,034,436	24,399,752	26,847,592	17,586,596
4	EERA: MAX : GWP20 : NESO 2050	STAT-ST	162,229	19,581,630	28,419,279	799.92	48,163,138	21,183,147	26,979,991	24,687,454	23,475,684
5	Dominant US LNG : Howarth : GWP20		162,229	19,581,630	33,181,962	879.02	52,925,821	21,623,695	31,302,126	28,167,520	24,758,301
6	Dominant US LNG : EERA : MAX : GWP20	RWC-ST	162,229	19,581,630	41,622,976	1019.21	61,366,835	20,892,569	40,474,266	25,410,395	35,956,440

** The DESNZ WTT factor does not facilitate separation of UK and ex-UK, and CO2 and CH4, effects

*** CESL reconstruction of the application (DESNZ 2025 WTT, kWh basis) ⁹⁹

Table 4: Seven level PIL: Scenario G: top-level data: modelling uncertainty of full-lifecycle GHGs

⁹⁹ Exact reconciliation is not possible. Two data differences have been established : (1) **The application's Table 18.10 total leaves out construction.** $19,581,630 + 3,155,092 = 22,736,722$ exactly, yet its 380 intensity includes construction ($22,898,951 / 60,210 = 380.3$). This error in [APP-052, Table 18.10] was flagged in my Written Representation [REP1-038, Appendix L.3]. (2) **The WTT ratio is on a different basis.** CESL uses $H_0 = 0.1651209$ is exactly $0.03347 / 0.2027$, the DESNZ "Natural gas" (grid gas) per-kWh factors. The applicant used $0.3366 / 2.0891$ per m^3 ("100% mineral blend") which would give an H ratio of 0.16112.

N.1.5 Results

258 CESL submits that the application (level 0): i.e. application scenario G modelled with the DESNZ 2025 WTT factor – underestimates the absolute emissions of even the reasonable lowest bound case.

259 CESL submits that a lower sensitivity case is given by the “LSC” row of data, and as shown on the first chart above: “IEA 2025: MEAN : GWP100 : NESO 2050”. This uses recent average data on upstream emissions from the IEA, and is not subject to the issues with the DESNZ WTT factor. Three uncertainty upper bounds are given by the rows RWC-LT, STAT-ST, and RWC-ST, as defined in the section above.

N.1.5.1 Uncertainty ranges – climate impacts combined with hourly operation sensitivity

260 Based on the data in the Table above, and the lower bound, and the three uncertainty upper-bounds, CESL generates 3 lower to upper bound uncertainty ranges in the table below. The yellow shaded figures derive directly from the table above, and are for Scenario G as defined in the application as 67,500 hours over 25 years. The figures are full lifecycle emissions in MtCO₂e.

Uncertainty ranges in MtCO ₂ e	Scenario G : 67,500 hours		3,734 hours/yr for 25 years		8,760 hours/yr for 25 years		8,150 hours/yr for 30 years	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
Long-term climate impacts LSC ... RWC-LT	25.61	33.24	35.35	45.90	82.71	107.47	92.32	119.96
Short-term climate impacts, static annual gas share LSC ... STAT-ST	25.61	48.16	35.35	66.55	82.71	155.90	92.32	174.03
Short-term climate impacts, dominant marginal US LNG share LSC ... RWC-ST	25.61	61.37	35.35	84.81	82.71	198.74	92.32	221.86
APPLICATION reconstruction (incl construction)	22.98				74.18		82.80	
APPLICATION reconstruction (no construction)**					74.02			

** The applicant reports 73,719,711 tCO₂e (without including construction emissions). CESL calculates this as 74,021,889 tCO₂e. (100.4% reconciled¹⁰⁰)

Table 5: Uncertainty ranges – climate impacts combined with hourly operation sensitivity

261 CESL then generates 3 sensitivity tests for annual hourly operation as follows:

¹⁰⁰ The difference is believed to be because the applicant's Base scope 1 combustion figure (19,581,630 tCO₂e, APP-052, Table 18.10) is built on the “mineral blend” factor of 0.20489 kg/kWh, which is 56.91 kg/GJ. CESL has used the DESNZ “Natural gas” (grid gas) per-kWh factors (corresponding figure 0.2027) which is 56.31 kg/GJ. This implies about 1.06% more fuel than the applicant's 95.58 TWh, so every upstream figure is about 1.06% higher. CESL submits that the “grid gas” is the correct description of natural gas supply to the project. The numerical impact of these differences is small over all.

- (a) 3,734 hours/yr for 25 years. This taken from a recent study for DESNZ [CEPA/GHD 2025¹⁰¹, Table 1.1]: 3,734 operating hours a year for the generic H-class CCGT (p.7) - representing “a flexible and efficient CCGT gas-fired power plant that provides reliable electricity to the grid system”
- (b) 8,760 hours/yr for 25 years: the applicant’s “higher utilisation scenario as requested by the Secretary of State” [C1-004b, 8(c), PDF pp 17-24]. CESL agrees with the applicant that operation for 100% of annual hours is unrealistic. The applicant reports 73,719,711 tCO₂e (without including construction emissions): CESL calculates this as 74,021,889 tCO₂e (100.4% reconciled).
- (c) 8,150 hours/yr for 30 years. This is presented as a reasonable worst case both for annual hours and an extended 30-year lifecycle. This is based on the same recent DESNZ study [CEPA/GHD 2025, Table 3.2]: availability of 93.0%, with Leigh Fisher’s 2016 figures of 92.3%, 93.0% and 93.6% (p.17) that shows 93.0% operation is technically plausible.

262 With the potential increasing demand for electricity for data centres, such loads from a possible operation start post 2035, is not impossible: the Department for Energy Security and Net Zero (DESNZ) SoS acknowledged in February that “*future demand from data centres, and interaction with wider energy system demands, remains inherently uncertain*” [Miliband letter 20 Feb 2026¹⁰²]. Such a technically feasible operating envelope requires assessment or a reasoned explanation for exclusion.

¹⁰¹ CEPA and GHD for the Department of Energy Security and Net Zero, *Electricity Generation Cost Study: Final Report*, 31 March 2025, published by DESNZ as “Unabated gas: electricity generation cost study”. Available at: <https://assets.publishing.service.gov.uk/media/696616c68d599f4c09e1ffae/unabated-gas-electricity-generation-costs-2025.pdf>

¹⁰² Department for Energy Security and Net Zero, letter from the Rt Hon Ed Miliband MP, Secretary of State for Energy Security and Net Zero, to Toby Perkins MP, Chair of the Environmental Audit Committee, “Data centres and the Seventh Carbon Budget (CB7)”, 20 February 2026 (cited as [Miliband letter 20 Feb 2026]), published by the Environmental Audit Committee,

O Appendix E: High level calculation table: “parameter isolation ladder”

263 The table on the next page gives the high-level calculation table. Data and formulae are given in the green highlighted section for sub emission factor ratios and sub Scope 3 emissions. The calculation of the sub emission factors is given in Appendix F.

264 This enables the calculation of full lifecycle shares for “CH4 share”, “CO2 share”, “UK share” and “ex-UK share” in additional to the full lifecycle across all sub emissions in the yellow highlighted section.

265 The data in the yellow highlighted section is transferred to Table 4 (“Seven level PIL: Scenario G: top-level data: modelling uncertainty of full-lifecycle GHGs”).

266 The table on the next page presents the absolute emissions contributing to each category of the full lifecycle, and also the “CH4 share”, “CO2 share”, “UK share” and “ex-UK share”.

267 All figures are rounded to the nearest tCO₂e, and some minor rounding propagation may be expected.

Level		0	1	2	3	4	6	5
Supply Source model		2021 DUKES	NESO FES 2050	NESO FES 2050	NESO FES 2050	NESO FES / 2050	Dynamic LNG	Dynamic LNG
Emission Factor		DESNZ WTT	IEA Mean	IEA Max	IEA Max	EERA Max	EERA Max	Howarth
GWP		GWP100	GWP100	GWP100	GWP20	GWP20	GWP20	GWP20
		APPLICATION Derived ***						
A	Scope 1 : unabated natural gas combustion	19,581,630	19,581,630	19,581,630	19,581,630	19,581,630	19,581,630	19,581,630
H	Emission factor ratio: Upstream natural gas supply chain emissions	0.1651209	0.2993	0.6890	1.2609	1.4513	2.1256	1.6945
α	Sub Emission factor ratio		0.0018	0.0018	0.0055	0.0641	0.0587	0.0960
β	Sub Emission factor ratio		0.0978	0.3244	0.8927	1.1347	1.7776	1.1684
γ	Sub Emission factor ratio		0.0094	0.0094	0.0094	0.0094	0.0000	0.0000
δ	Sub Emission factor ratio		0.1904	0.3534	0.3534	0.2431	0.2894	0.4302
J=A*H	Scope 3: Upstream natural gas supply chain emissions	3,233,336	5,861,581	13,491,782	24,690,330	28,419,279	41,622,976	33,181,962
J(α)=A* α	Sub Emission Scope 3		35,594	35,594	106,782	1,255,493	1,148,710	1,879,836
J(β)=A* β	Sub Emission Scope 3		1,914,595	6,352,455	17,479,814	22,220,192	34,807,730	22,878,464
J(γ)=A* γ	Sub Emission Scope 3		183,795	183,795	183,795	183,795	-	-
J(δ)=A* δ	Sub Emission Scope 3		3,727,597	6,919,938	6,919,938	4,759,800	5,666,536	8,423,661
M=A	Total Scope 1	19,581,630	19,581,630	19,581,630	19,581,630	19,581,630	19,581,630	19,581,630
N=J	Total Scope 3	3,233,336	5,861,581	13,491,782	24,690,330	28,419,279	41,622,976	33,181,962
P=M+N	Total Scope 1 & 3	22,814,966	25,443,211	33,073,412	44,271,960	48,000,909	61,204,606	52,763,592
S	Construction, maintenance & decommissioning GHG emissions	162,229	162,229	162,229	162,229	162,229	162,229	162,229
U=P+S	Full Lifecycle	22,977,195	25,605,440	33,235,641	44,434,189	48,163,138	61,366,835	52,925,821
V= (U*1000)/ 60,210,000	OVERALL Emission Intensity gmCO ₂ e/kWh (60,210,000 MWh electrical output)	381.62	425.27	552.00	737.99	799.92	1019.21	879.02
AA = J(α) + J(β)	CH ₄ share	**	1,950,189	6,388,049	17,586,596	23,475,684	35,956,440	24,758,301
BB = A + J(γ) + J(δ) + S	CO ₂ share	**	23,655,251	26,847,592	26,847,592	24,687,454	25,410,395	28,167,520
CC = A+ J(α)+ J(γ) + S	UK territorial allocation	**	19,963,248	19,963,248	20,034,436	21,183,147	20,892,569	21,623,695
DD = J(β)+ J(δ)	ex-UK allocation	**	5,642,192	13,272,393	24,399,752	26,979,991	40,474,266	31,302,126

** UK / ex-UK and CH₄/CO₂ cannot be calculated from DESNZ WTT Factor

*** CESL reconstruction of application (DESNZ 2025 WTT, kWh basis)¹⁰³

Table 6: Seven level PIL: Scenario G: high-level calculation table: modelling uncertainty of full-lifecycle GHGs

¹⁰³ Exact reconciliation is not possible. Two data differences have been established : (1) **The application's Table 18.10 total leaves out construction.** 19,581,630 + 3,155,092 = 22,736,722 exactly, yet its 380 intensity includes construction (22,898,951 / 60,210 = 380.3). This error in [APP-052, Table 18.10] was flagged in my Written Representation [REP1-038, Appendix L.3]. (2) **The WTT ratio is on a different basis.** CESL uses H₀ = 0.1651209 is exactly 0.03347 / 0.2027, the DESNZ "Natural gas" (grid gas) per-kWh factors. The applicant used 0.3366 / 2.0891 per m³ ("100% mineral blend") which would give an H ratio of 0.16112.

P Appendix F: Calculation of sub emission factors

268 The sub-emissions factors – for CH₄, CO₂, UK and ex-UK are based on the general formula for weighted emission factors, in equation 1 below:

$$EF_{\text{total}} = \sum_{i=1}^n (S_i \times EF_i)$$

EF_{total} is the total weighted WTT emissions factor
 S_i fractional share of gas supply from source (i)
 EF_i emissions intensity for source (i)
 n number of gas supply sources

269 Emission factor data is provided for upstream and midstream emissions – this is the case for the Exergia study which the DESNZ WTT factors are based on, and also for the EERA data. To calculate the full supply chain, it is necessary to add in the downstream factor – for the UK, this is emissions from the UK distribution network and UK processing of gas (whether it is UKCS or ex-UK gas supply). So the formula is extended as follows in equation 2 below for the UK based emission share¹⁰⁴. For the IEA data, the $EF_{\text{UK-network}}$ factor is set to 0¹⁰⁵.

$$EF_{\text{total}} = \sum_{i=1}^n (S_i \times EF_i) + EF_{\text{UK-network}}$$

270 As an example of this formula – consider a UK gas mixture of UKCS, Norwegian, Qatar LNG and US LNG as follows:

Source	Share	GWP100 Emission intensity
UKCS	40%	6.777 kgCO ₂ e/GJ
Norway	45%	4.719 kgCO ₂ e/GJ
Qatar LNG	5%	17.035 kgCO ₂ e/GJ
US LNG	10%	27.25 kgCO ₂ e/GJ
UK network residual	—	1.39 kgCO ₂ e/GJ

Table 7: Example source country emission intensities

¹⁰⁴ Assumption: Based on calculations, CESL assumes the additional UK downstream gas-network emissions factor $EF_{\text{UK-network}}$ is 1.39 kgCO₂e/GJ

¹⁰⁵ This is a conservative simplification: if the IEA boundary excludes UK distribution, adding the UK network factor would increase the IEA-based levels, so those levels may understate emissions.

271 On a GWP100 basis, the UK gas emission factor, for all shares in this case, is then calculated as follows:

$$EF_{\text{total}} = (S_{\text{UKCS}} \times EF_{\text{UKCS}}) + (S_{\text{Norway}} \times EF_{\text{Norway}}) + (S_{\text{Qatar LNG}} \times EF_{\text{Qatar LNG}}) + (S_{\text{US LNG}} \times EF_{\text{US LNG}}) + EF_{\text{UK-network}}$$

$$EF_{\text{total}} = (0.40 \times 6.777) + (0.45 \times 4.719) + (0.05 \times 17.035) + (0.10 \times 27.25) + 1.39$$

$$EF_{\text{total}} = 2.711 + 2.124 + 0.852 + 2.725 + 1.390 = 9.802 \text{ kgCO}_2\text{e/GJ}$$

To convert this to a Scope 1 combustion uplift¹⁰⁶:

$$\frac{9.802}{56.31} = 0.174$$

272 In this example, the WTT factor would add 17.4% to the scope 1 emissions.

273 Note that CESL uplifts the downstream gas-network emissions factor for GWP20 cases to 3.3 kgCO₂e/GJ, and is included in the GWP based calculations at this level.

274 CESL's model applies this formula for each respective share (CH₄, CO₂, UK, ex-UK) as well as for all shares together. These share calculations are presented in the table above at a high-level by the α , β , γ and δ sub-emission factors and the $J(\alpha)$, $J(\beta)$, $J(\gamma)$, and $J(\delta)$ absolute emissions for each respective share. The details of the calculations under these high-level figures are now explained in terms of how equation 2 is applied.

¹⁰⁶ **56.31 kgCO₂e/GJ** is the Scope 1 combustion emissions factor for natural gas, expressed per unit of fuel energy input on a Net Calorific Value (Net CV) basis. It is derived from the DESNZ / UK Government combustion factor of 0.2027 tCO₂e/MWh of fuel energy.

P.1 Supply sources

275 In the mixed-supply cases using EERA intensities (level 4) and IEA intensities (levels 1 to 3), US LNG is assumed to constitute its 2025 level: 76% of LNG supply to the UK. This is a conservative assumption given that the US LNG proportion is projected to increase.

276 Levels 1 to 4 use the NESO FES 2025 projections for 2050 (see below). Levels 5 to 6 uses a 100% “dynamic” LNG on the basis that LNG forms a core component of the flexible marginal supply layer under stressed or elevated demand conditions, exactly the conditions under which the plant would be supplying dispatchable power.

277 The NESO data is taken from the NESO FES 2025 workbook, Tab F.21, sub table “Annual gas supply snapshot. bcm/yr” using the “Falling Behind” scenarios 2050. The LNG and “Generic imports” types are assumed to be supplied by LNG, as discussed in section D.2 and the footnote on “Generic Imports”.

278 LNG is split into US LNG (76%) and non-US LNG (24%).

279 Based on this the supply matrix is:

	Levels 1-4	Levels 1-4	Levels 5-6
	NESO FES (2050)	NESO FES (2050)	2032-2056
	2050 Falling behind bcm/yr	2050 Falling behind %	
UKCS	2.26	3.89%	0.00%
Green gas	3.15	5.42%	0.00%
Norway	4.94	8.50%	0.00%
Continent	0	0.00%	0.00%
LNG - US	36.32	62.47%	100%
LNG - not US	11.47	19.73%	0.00%

Table 8: Supply source data

P.2 Emission intensities

280 For LNG data, IEA Mean data is used for level 1, IEA Max data for levels 2 -3, EERA Max data in level 4 (with GWP20).

281 For EERA (level 4 is the EERA Max case), the CO₂ and CH₄ proportions for each source may be calculated from the relative GWP20 data which is provided by EERA. For IEA, the GWP20 is calculated from the GWP100 data.

282 **Assumptions:** US LNG is modelled on US LNG specific data (from 47 different studies in the EERA AR5 data, EERA Tables 8 and 9). As EERA does not provide data for all the other LNG sources to the UK, non-US LNG types are grouped and modelled as Qatari LNG for which there is ready data (from 15 different studies in the EERA AR5 data, EERA Tables 8 and 9). This is conservative estimate, and CESL notes EERA comment that Qatari underreporting¹⁰⁷. For the IEA data, "Middle East" is used for Qatar LNG as no country division is given.

283 The Tables below gives the emission factor matrix for the EERA Mean case and EERA Max cases. Note, EERA Mean data is not used in the model run in this submission and just presented for illustration of the principle.

284 **Assumptions:** As EERA provides no data for UKCS and Norwegian pipeline supply, CESL use a hybrid approach where the Exergia data is used (for the shaded rows in the table below) for pipeline supply from UKCS and Norway, and EERA is used for LNG supply. UK Green gas is modelled as the same as UKCS pipeline. The UK and Norwegian pipeline figure are conservative estimates. The same approach is used for the IEA data.

285 So the Table below gives EERA LNG mean and max intensities, with conservative Exergia pipeline values for UKCS and Norway.

Emission intensities kgCO ₂ e/GJ	Exergia	EERA Mean	EERA Mean	EERATable 8 (Mean)	EERA Mean	EERA Mean	EERATable 9 (Mean)
		GWP100 CO2	GWP100 CH4	GWP100	GWP20 CO2	GWP20 CH4	GWP20
UKCS Pipeline	6.777	5.68	1.1	6.78	5.68	3.3	8.98
Green gas		5.68	1.1	6.78	5.68	3.3	8.98
Norway (pipeline)	4.719	3.29	1.43	4.72	3.29	4.29	7.58
LNG - US	17.035	16.775	10.475	27.25	16.775	31.425	48.2
LNG - not US (Qatar)	17.035	16.365	1.695	18.06	16.365	5.085	21.45

Table 9: EERA LNG mean intensities (long-term and short-term climatic effects)

286 These figures are derived from EERA (supplied as stand-alone appendix), Table 8 at page 22, and Table 9 at page 23. The US LNG GWP100 figure is the mean from 47 studies, and the US LNG GWP20 figure is the mean of 12 studies.

¹⁰⁷ Reproduced from EERA report, page 33: "Qatar has faced criticism for underreporting or failing to report national emissions. Although the U.N. Framework Convention on Climate Change (UNFCCC) requires countries to provide regular and detailed updates on their GHG emissions, Qatar's last formal submission only included emissions up to 2007."

287 For the EERA Max case, the data is as below (and as used for level 4). The approach is again hybrid, so the Table gives EERA LNG Max intensities, with Exergia pipeline values for UKCS and Norway, with UK network emissions added in to each supply source, as shown below.

Emission intensities kgCO ₂ e/GJ	Exergia	EERA Max	EERA Max	EERA Table 8 (Max)	EERA Max	EERA Max	EERA Table 9 (Max)
		GWP100 CO2	GWP100 CH4	GWP100	GWP20 CO2	GWP20 CH4	GWP20
UKCS Pipeline	6.777	5.68	1.1	6.78	5.68	3.3	8.98
Green gas		5.68	1.1	6.78	5.68	3.3	8.98
Norway (pipeline)	4.719	3.29	1.43	4.72	3.29	4.29	7.58
LNG - US	17.035	16.295	33.365	49.66	16.295	100.095	116.39
LNG - not US (Qatar)	17.035	16.365	1.695	18.06	16.365	5.085	21.45

Table 10: EERA LNG Max intensities (long-term and short-term climatic effects)

288 These figures are derived from EERA (supplied as stand-alone appendix), Table 8 at page 22, and Table 9 at page 23. The US LNG GWP100 figure is the maximum from 47 studies, and the US LNG GWP20 figure is the maximum of 12 studies. A similar approach is used for IEA Max.

289 These emission factors are cross calculated with the supply matrices in the previous section, to produce the sub-emission factor ratios α , β , γ and δ in the High-level calculation table in Appendix E using equation 2.

290 Level 5 use 100% dynamic LNG with the data from a recent peer-review academic paper [REP1-041]. The shares of UK CH₄, UK CO₂, ex-UK CH₄ and ex-UK CO₂ are calculated directly from the data table in the paper (Supplemental Table 2 using “2-stroke engine tankers powered by LNG” case [REP1-041]). It is assumed that the vast majority (ie 100%) of UK based downstream emissions is methane leakage. This data, as reproduced in the table below, is then allocated to sub-emission factor ratios α , β , γ and δ for the High-level calculation table in Appendix E for level 5 using equation 2.

Howarth / GWP20/2-stroke LNG		g CO ₂ -eq/kg
Combustion	UK CO ₂	2750
Upstream/Midstream CH ₄	ex-UK CH ₄	2794
Upstream/Midstream CO ₂	ex-UK CO ₂	720
Liquefaction CH ₄	ex-UK CH ₄	300
Liquefaction CO ₂	ex-UK CO ₂	359
Tanker CH ₄	ex-UK CH ₄	119
Tanker CO ₂	ex-UK CO ₂	104
Final transmission CH ₄	UK CH ₄	264
Final transmission CO ₂	UK CO ₂	0

Table 11: Extracted data from Howarth paper