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Examination Principle Issues	**Climate Change**

DEADLINE D1 : WRITTEN SUBMISSION

I am a scientist with a background in computer modelling of complex phenomena, including climate change. Between 1995 and 2006, I ran the high-performance computer service at the University of East Anglia. I also have 17 years' experience working on planning and climate change issues as a councillor both on Norwich City Council and on Norfolk County Council, and as an environmental consultant. My current work at CEPP is to promote the necessary rapid response to the Climate Emergency in mainstream institutions, such as local authorities, planning inquiries and government, through the lenses of science, policy, and litigation. (Further resume in Appendix D).

In so far as the facts in this statement are within my knowledge, they are true. In so far as the facts in this statement are not within my direct knowledge, they are true to the best of my knowledge and belief.

SUMMARY

The key issue of this Written Representation ("**WR**") is how the significance of the climate change impacts of carbon emissions associated with the scheme are assessed. This is also the question with respect to greenhouse gases ("**GHG**s") which the Secretary of State (SoS) must grapple with and reach a reasoned conclusion, and that the Examination recommendations from the ExA must deal with.

To assist, this WR starts by posing two questions "*to what extent does the project contribute, or undermine, securing the Net Zero Strategy ("NZS") - now Carbon Budget Delivery Plan (CBDP) - and the net zero target?"* and "*is there any emissions space[1] available for a project such as Lower Thames Crossing which has construction emissions of 1,762,967 tCO2e and opening year (2030) traffic model "DS" operation emissions of 8,996,305 tCO2e [Table 15.16]?"*

These questions are introduced in the introductory section 1 in the context of an overview of the evolving legal and policy framework, and these two related issues: *robust risk assessment of the related policy delivery;* and *robust assessment methodology of the significance of the greenhouse gas emissions* from the scheme.

Section 2 introduces the scale and logistical impact of net-zero. The purpose of this section is to explain "emissions space" particular in terms of the extraordinary, and unprecedented legislated emissions contraction rate via the 5-year carbon budgets, and the removal of any on-going background emissions space from 2020 following the 100% emissions reduction target set by net-zero in 2019. Considerable policy and delivery flexibility for climate budgets that existed prior to 2020 is simply and starkly no longer available.

Section 3 is on the revised Net Zero Strategy, the Carbon Budget Delivery Plan (CBDP). The topics of delivery risk and policy gap in securing delivery of net zero are explained in the context of the second NZS legal case launched in July 2023.

Section 4 presents key information from the Climate Change Committee (CCC) 2023 Progress Report published in June 2023 and the policy gaps and delivery risks relevant to the LTC project – the Industry sector for the construction emissions and the Surface Transport sector for the operation emissions. Key information is highlighted, relevant to assessing the LTC, and data is extracted for later use as benchmarks in contextualisation of the emissions from the LTC. Key CCC recommendations are noted, including the recommendation for a systematic review of current and future road-building projects.

Similar helpful and contextual information is highlighted from the Green Alliance Net Zero Policy Tracker from June 2023 in Section 5, and the excellent "Reverse Gear" paper from Professor Marsden on the massive back-pedalling by the Government on transport policy ambition is briefly discussed (in a sub-section of section 6).

[1] "Emissions space" is explained in the full WR submission

Section 6 presents information on the CBDP, and particularly the very large alteration to the domestic transport sector baseline compared to the original NZS. This baseline reset amounts to 130 million tonnes of carbon dioxide (CO2) across the 15 years of the 4th, 5th and 6th carbon budgets ("**4CB**", "**5CB**", "**6CB**"). I show that the baseline reset, for the domestic transport sector, is alone responsible for the Government now being unable to provide confidence that the UK Nationally Determined Contribution (2030) under the Paris Agreement and the 6th carbon budget can be met – this is before the risk of underlying policies not delivering is even considered. Three broad, high-level risks to delivery for the transport sector are also identified from the CBDP.

Section 7 just touches on my position remaining categorically that there is no assessment of the impact of cumulative carbon emissions in the Environmental Statement ("ES").

In Section 8, I give reasons for not accepting the validity of the so called "TDP Sensitivity test" method used in the Tables in ES Chapter 15. For the reasons given, I make no further reference to or use of it.

In Section 9, I highlight that if the Applicant is to use hydrogen as a substitute for diesel in the construction of the LTC, then it is essential that a full lifecycle GHG/carbon intensity assessment is made of the hydrogen being considered. First, the type(s) of hydrogen (gray, blue or green etc) must be specified, and then full estimation and assessment of the climate impacts of upstream methane leakage, CO2 emissions from hydrogen production, and downstream hydrogen leakage must be made.

Section 10 provides a contextualisation of the LTC with CBDP surface transport (operation) and industrial (construction) residual emissions. The Applicant has used this same comparison for its own contextualisation on another recent DCO scheme. Importantly, I explain how the contextualisation employed increases the precision of the scientific process for assessing the significance of the emissions for EIA purposes. The approach can be holistic and the effect on policy delivery (of the CBDP) may be also brought into consideration. It provides much greater confidence about the significance assessment made if the contextualisation forms part of it. Critically, the use of sector residual emissions contextualisation can change the value of the significance assessment made, and does in the case of the LTC.

I find the GHG impact of the scheme is "Major Adverse" on the IEMA significance assessment thresholds[2] for both construction in the 4CB and 5CB, and operation in the 5CB and 6CB.

Having determined this significance assessment, in Section 11, I provide an assessment of considerations that must be before the Secretary of State when determining the scheme.

In conclusion, the climate impacts of the GHG emissions from the scheme are Major Adverse for both construction and operation. This is overwhelmingly against the scheme in the planning balance. And in the context of policy (CBDP) and legislation (the Climate Change Act and the

[2] Institute of Environmental Management & Assessment (IEMA), "Assessing greenhouse gas emissions and evaluating their significance", version 2, 2022, page 26

carbon budgets and targets), the evidence of the risk to delivery of the CBDP itself, and the risk to the delivery of the CBDP from the scheme, and the current NNNPS requirement for the scheme not to have a material impact on the ability of Government to meet its carbon reduction targets, the scheme should not be consented.

The Applicant should reply to the full submission, not just this summary.

Contents

1 INTRODUCTION

1.1 The evolving legal and policy framework

1 The first paragraph of my Relevant Representation (RR) was:

> *'**(Q1)** The most important question is "to what extent does the project contribute, or undermine, securing the Net Zero Strategy ("NZS") - now Carbon Budget Delivery Plan (CBDP) - and the net zero target?". It requires contextualisation within a robust risk assessment of the related policy delivery, and a robust assessment methodology of the significance of the greenhouse gas emissions ("GHGs"). Neither exist in the environmental statement ("ES")'.*

2 I take *"to what extent does the project contribute, or undermine, securing the Net Zero Strategy ("NZS") and the net zero target?"* as the primary question for this WR ("**Q1**").

3 This Written Representation addresses the question and the issues of *robust risk assessment of the related policy delivery* and *robust assessment methodology of the significance of the greenhouse gas emissions* in the above paragraph in detail.

4 On the security and risks to delivery of UK climate policy and targets, my relevant representation also noted that:

> (A) the 2022 Progress Report from the Climate Change Committee ("CCC") shows that "*the success of the NZS and the related Transport Decarbonisation Plan ("TDP") are by no means secured, [and] no weight can be given to the proposition that they are.*"; and
>
> (B) "*The same delivery risk was highlighted by the High Court in 2022 Net Zero Strategy case*[3]"; and
>
> (C) "*Further, initial analysis of calculations underpinning the TDP*[4] *show that the TDP is far from being secured in any meaningful sense*."

1.2 Recent updates on the legal and policy framework

5 Since my RR was submitted on 16th February 2023, several very relevant things have occurred:

> (1) The Government published a revised Net Zero Strategy on 31st March 2023 with the overarching title "Powering Up Britain" (PUB), and the Carbon Budget Delivery Plan (CBDP) within it. A key admission from the Government was that

[3] R (Friends of the Earth) v Secretary of State for Business Energy and Industrial Strategy [2022] EWHC 1841 (Admin)

[4] DfT Information release "Traffic Level and Electric Vehicle Assumptions used in Decarbonising Transport: A Better, Greener Britain", Jan 12th 2023 https://www.whatdotheyknow.com/request/841974/response/2205457/attach/4/Response%20to%20EIR%20E0020915.xlsm

current proposals and policies in the CBDP were insufficient to meet both the 2030 UK international obligation NDC[5] under the Paris Agreement and the 6th carbon budget (6CB). The emission reduction shortfalls were 8% for the NDC at 2030 and 3% for the 6CB at 2035.

(2) On 28th June 2022, the Climate Change Committee (CCC) submitted its "Progress in reducing Emissions - 2023 Report to Parliament". This called out poor delivery of the NZS and carbon budget by the Government, identified large policy shortfalls and changes to the baseline for the surface transport sector, and called for "*systematic review of current and future road-building projects*".

Note, on terminology, that CCC refer to road transport being in the surface transport sector whilst the Government in the CBDP refers to the domestic transport sector[6].

(3) On July 7th 2023, Friends of the Earth, ClientEarth and Good Law Project, the same claimants as in the first NZS legal case, announced that they are taking the Government to court for the second time in under two years. The issues to be taken to court relate, in the broadest sense, to the delivery risks of the proposals and policies in the CBDP. This in turn is directly relevant to my Q1 on whether the delivery of the carbon budgets and net-zero are adequately secured, and does the project undermine or contribute that objective.

6 Each of these above events highlighted that delivery of the UK carbon budgets, UK international climate obligations and the Net Zero Strategy are not yet secured in any genuine or rigorous way. This is a crucial starting place for the assessment of GHGs from the LTC, and this WR will expand upon it.

7 In the context of these on-going developments, and the increasing evidence that UK climate policy is off course and unsecured, I now add a second question ("**Q2**") to Q1 which is:

> *"**(Q2)** is there any emissions space available for a project such as Lower Thames Crossing which has construction emissions of 1,762,967 tCO2e and opening year (2030) traffic model "DS" operation emissions of 8,996,305 tCO2e [Table 15.16]?"*

8 "Emissions space" will be explained in the next section.

[5] NDC = Nationally Determined Contribution: "UK's Nationally Determined Contribution, updated September 2022", https://www.gov.uk/government/publications/the-uks-nationally-determined-contribution-communication-to-the-unfccc

[6] The distinctions and difference between these sectorial definitions do not affect the arguments in this WR.

2 THE SCALE AND LOGISTICAL IMPACT OF NET-ZERO

9 Before discussing the Net Zero Strategy in detail, I wish to submit as a prelude, evidence on the scale of the logistical impact of the legislative and policy changes between the pre-net-zero world and the net-zero world, following the Climate Change Act 2008 (2050 Target Amendment) Order 2019[7]. This is high-level and background discussion to provide context for more detailed discourse later.

10 The "Net Zero" statutory instrument has one simple statement of substance at clause 2:

> *2.—(1) Section 1 of the Climate Change Act 2008 is amended as follows.*
>
> *(2) In subsection (1), for "80%" substitute "100%".*

11 The ramifications of the last four words 'for "80%" substitute "100%"' words have not yet been fully grasped and understood by many, including ministers making decisions on infrastructure.

12 As background, the original end target for 2008 Act was for an 80% reduction of greenhouse gas ("**GHG**") emissions[8] by 2050 from 1990 baseline and was based on outdated science. The new end target is for 100% reduction by 2050: this makes small step toward congruence with the science[9].

13 I use "Emissions space" ("**EmSp**") to mean that the available carbon emissions which may be legitimately emitted each year under the Climate Change Act 2008 (the "2008 Act") and the 100% target.

14 I provide the chart below for illustration and to explain three key effects of the legislative change in terms of how the numbers add up, or critically how they may not add up. The chart does **not** purport to be precisely accurate in terms of trajectories[10], but is provided to illustrate the principles discussed.

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[7] The Climate Change Act 2008 (2050 Target Amendment) Order 2019, Statutory instrument at https://www.legislation.gov.uk/ukdsi/2019/9780111187654

[8] The 2008 Act and 2019 "2050 Target Amendment" cover a number of GHGs. However, for this examination, carbon dioxide (CO2e), or "carbon" is the only gas of interest.

[9] Please see my later point, which I place on record, that the legislative targets, based on CCC, are not science-based. Science-based budgets are more rigorous and demanding, and are needed to comply with Paris Agreement

[10] The graph is based on approximate numbers from Figure 1 of the CCC 6th Carbon Budget Report "The Sixth Carbon Budget, The UK's path to Net Zero", December 2020, https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf . This includes emissions from international aviation and shipping (IAS) and shows 2020 levels at approximately 500MtCO2e (and approx. 56% of 1990 levels).

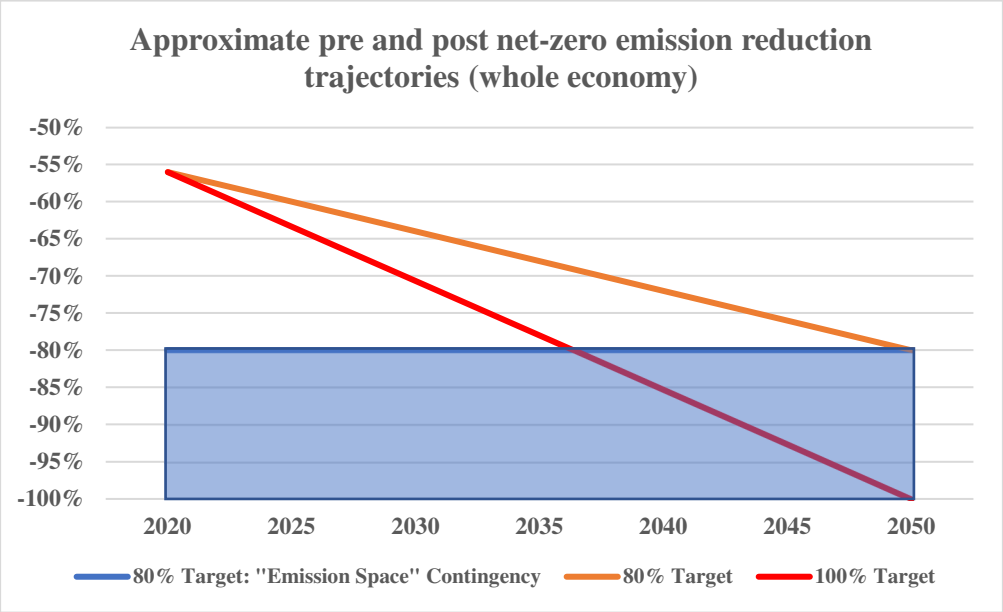

Figure 1: Approximate pre and post net-zero emission reduction trajectories (whole economy)

15 The keys effects of the legislative change can be seen in the graph as follows:

(A) *The UK economy EmSp rapidly contracts each year until 2050* at an average year-on-year rate of c.16.6 million tonnes of CO_2e[11] from 2020 under the 100% target. Based on 2020 level, the rate of decarbonisation is approximately 3-4% a year. All existing economic activity must be contained within this rapid contraction of the EmSp. Each sector of the economy must contract emissions, via sectorial decarbonisation. New activity, eg additional traffic growth, competes for emissions sustaining existing activity either within its own sector, or from other sectors.

(B) *The legislated emissions contraction rate via 5-year carbon budgets is extraordinary and is more challenging for transport than other sectors.* The contraction rate (3-4% a year from 2020) for the 100% target (red line) is an approximate doubling of the contraction rate for the 80% target (orange line). The Government's Carbon Budget Delivery Plan (CBDP) indicates an annual reduction in surface transport emissions of 58% (61 $MtCO_2e$) at 2035 compared to provisional 2022 emissions (CCC analysis[12]).

[11] Approximately equivalent carbon footprint to 16,000,000 return flights from London to New York

[12] Page 108, "Progress in reducing Emissions - 2023 Report to Parliament", Climate Change Committee (CCC), June 2023, https://www.theccc.org.uk/wp-content/uploads/2023/06/Progress-in-reducing-UK-emissions-2023-Report-to-Parliament.pdf

It should be noted that this is after virtually no change in transport emissions between 1990 and 2019[13] indicating the massive change required. It is clear that this huge step change cannot merely be facilitated by electric vehicles, and CCC warn that such a technology dominant route has greater risk (see later).

(C) *The removal of any on-going background EmSp from 2020*. This is most critical effect and the one not usually discussed. It is very relevant to the question of whether there is enough EmSp for an LTC to be developed.

A 20% background level of emissions were legally permitted under 2008 Act until 2050 equating to around c.180 million tonnes of CO2e a year, as indicated by the blue block on the figure. This allowed considerable policy and delivery flexibility **that is simply and starkly no longer available**: for example, legacy emissions from a "business as usual" transport system could possibly have been contained within the 80% at 2050 target if other sectors had rapidly decarbonised, but this is no longer possible.

16 In short, the approximate doubling of the rate of emissions contraction from 2020, ***and*** removing the legally permitted contingency of c.180 million tonnes CO2e a year in the economy, introduces immense delivery risks to:

- (A) the NDC international obligation for 2030, and
- (B) carbon budgets going forward, especially the 6CB and following budgets after 2033, and
- (C) the net-zero 2050 target (itself dependent on robust delivery of (A) and (B) first).

17 This logistical impact of the recent legislation requires a paradigm shift in policy and planning for the whole economy, and especially for surface transport, which we simply are not seeing yet. Where plans existing like the CBDP (and indirectly the TDP), they are under legal challenge for what proposals and policies do exist, as not being adequately risk assessed.

18 Please note that speculative technology like negative emissions has been built into Government policy to attempt to deal with the loss of the background contingency EmSp. However, negative emissions technologies (NETs) are widely criticised, and are not expected to deliver[14]. The delivery risks involved exert further pressure on the very limited EmSp.

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[13] Between 1990 and 2019, Domestic transport emissions (including domestic aviation) decreased by 5%, from 128 to 122 MtCO2e, Department for Transport, "Transport and environment statistics 2022", https://www.gov.uk/government/statistics/transport-and-environment-statistics-2022/transport-and-environment-statistics-2022

[14] This is again a complex subject which may be expanded upon later in the examination, if required. For the moment, and in short, greenhouse gas removals (GGR) and negative emissions technologies may provide extremely costly, speculative, and unproven at scale methods which proxy for an "overdraft facility" on carbon emissions. Even if these work, they would be like paying back a loan at a huge interest rate. See Kevin Anderson , John F. Broderick & Isak Stoddard (2020): A factor of two: how the mitigation plans of 'climate progressive' nations fall far short of Paris-compliant pathways, Climate Policy, DOI: 10.1080/14693062.2020.1728209, Appendix A "*However, there is wide recognition that the efficacy and global rollout of such technologies are highly speculative, with a non-trivial risk of failing to deliver at, or even approaching, the scales typically assumed in*

19 Further, I place on record that the legislative targets[15], based on CCC, are not science-based. Science-based budgets are more rigorous and demanding and are needed to comply with Paris Agreement[16]. More can be provided to the examination on this if required. The point is that even meeting the CCC targets is actually not enough to have any chance of keeping global average temperature to well under 2°C (the 1.5°C Paris Agreement target is now almost certainly breached[17]).

3 THE REVISED NET ZERO STRATEGY

20 The Government laid the original Net Zero Strategy (NZS) before Parliament on 19 October 2021 as a report under section 14 of the Climate Change Act (CCA) 2008. The strategy was intended to fulfil the duty, at section 13 of CCA 2008, to "prepare such proposals and policies" that will enable the carbon budgets under the CCA 2008 to be met, now extended by the 2019 amendment to the 2008 Act. That is proposals and policies that would secure delivery of the UK climate targets including the legislated carbon budgets.

21 The NZS was subsequently found to be unlawful in July 2022 ("first NZS legal case"), and the Government were ordered to lay before Parliament a fresh report under section 14 before the end of March 2023.

22 On March 31st 2023, the Government subsequently published a revised Net Zero Strategy (NZS) with the overarching title "Powering Up Britain" (PUB), and the Carbon Budget Delivery Plan (CBDP) within it, as well as many other related documents comprising nearly 3000 pages in total.

23 On July 7th 2023, Friends of the Earth, ClientEarth and Good Law Project, the same claimants as in the first NZS legal case, announced that they are taking the Government to court for the second time in under two years ("the second NZS legal case") because of "the Government's

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the models. … Whilst the authors of this paper are supportive of funding further research, development and, potentially, deployment of NETs, the assumption that they will significantly extend the carbon budgets is a serious moral hazard (Anderson & Peters, 2016)."

[15] under the 2008 Act

[16] A key issue is the "area under the curve" in the emissions trajectories. The near flat line trajectories in Figure 1 of the CCC 6th Carbon Budget Report "The Sixth Carbon Budget, The UK's path to Net Zero", December 2020, https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf are inadequate and are based on policy targets like "Net Zero 2050". Science-based carbon budgets such as those from the Tyndall Centre (research that the UK Department of Business, Energy and Industrial Strategy supported) demonstrate that the area under their curve of their emissions trajectories is consistent with the global carbon budgets from the Intergovernmental Panel on Climate Change (IPCC) where the CCC do not. The Tyndall budgets are consistent with IPCC global carbon budgets of 1.7°C degrees of global heating. This is not 1.5oC because, essentially, there are not enough degrees of freedom in the system to produce budgets consistent with 1.5°C, the lowest end of the Paris target. See more in Tyndall's "Factor of Two" research paper, Kevin Anderson, John F. Broderick & Isak Stoddard (2020) A factor of two: how the mitigation plans of 'climate progressive' nations fall far short of Paris-compliant pathways, Climate Policy, 20:10, 1290-1304, DOI: 10.1080/14693062.2020.1728209.

[17] "*Many climate experts believe that outcome is inevitable. Global temperatures will climb higher than 1.5 degrees compared with 150 years ago, they say, though often only in private.*", from article Scientific American, Chelsea Harvey, "The World Will Likely Miss 1.5 Degrees C—Why Isn't Anyone Saying So?", https://www.scientificamerican.com/article/the-world-will-likely-miss-1-5-degrees-c-why-isnt-anyone-saying-so/

failure to include a proper assessment of the delivery risks associated with the policies and proposals in the Carbon Budget Delivery Plan"[18].

3.1 Delivery risk and policy gap in securing delivery of net zero

24 In relation to securing the NZS, I highlight here what the Court said in the first NZS legal case judgment[19] on delivery risk and policy gap. Holgate J. recorded the NZS's acknowledgement that the delivery pathways to achieve the 6th Carbon Budget are highly ambitious and face considerable delivery challenges and recorded that achievement was subject to a wide uncertainty range. The judge noted at paragraphs 204 and 211 that in approving the Net Zero Strategy, "*one obviously material consideration which the Secretary of State must take into account is risk to the delivery of individual proposals and policies and to the achievement of the carbon budgets and the 2050 net zero target.*" In finding the NZS unlawful, the judge described risk to delivery as the critical issue when concluding that the information provided to the Minister when reporting on the NZS was insufficient to enable him to discharge his reporting obligations under section 14 of the Climate Change Act 2008.

25 Critically at paragraph 249 the judge says:

> *"… the ability to meet the statutory targets depends upon the contributions made by a multiplicity of proposals and policies adopted by the Secretary of State. This is obviously material to the risk of delivery. It is critical to any assessment by Parliament, and by the public, of how the statutory targets are likely to be met, by what means and with what implications."*

26 With the new PUB and CBDP, a number of issues arise which are likely[20] to be taken before the Court, these include:

(A) Delivery risks have not been assessed in the CBDP for each policy and proposal as they should have been;

(B) The CBDP (at paragraph 26) is based on the assumption that all quantified policies and proposals will be delivered in full;

27 Point (B) is important in consideration of the LTC and any subsequent decision on it, as the recent practice of DfT ministers has been to approve road projects also based on the assumption that all quantified policies and proposals under the NZS will be delivered in full That is, there has been an assumption in recent road DCO decisions that the delivery of NZS is fully secured when quite clearly it is not.

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[18] Good Law Project press release, July 2023, "The Government is still failing on net zero, so we are taking them back to court", https://actions.goodlawproject.org/net_zero_2

[19] R (Friends of the Earth) v Secretary of State for Business Energy and Industrial Strategy [2022] EWHC 1841 (Admin)

[20] Based on Good Law Project press release, July 2023, "The Government is still failing on net zero, so we are taking them back to court", and the Pre-Action Protocol (PAP) letter embedded within it at https://actions.goodlawproject.org/net_zero_2

28 Later, I will provide evidence on the new PUB and CBDP policy documents, and the relevance of them to how carbon emissions are dealt with for the LTC scheme. As signposting to my more detailed material, I now signpost these headline points (for substantive expansion later in this submission):

(i) An error of 130 million tonnes of CO2e for the road transport baseline was reported between the original NZS and the revised documents across the years 2023-2037 (carbon budgets 4CB, 5CB and 6CB).

(ii) No adequate risk assessment has been done by the Government in the revised NZS of the impact of this error on climate policy delivery. Risk assessment is required in two broad areas:

(a) How trustworthy is the revised road transport baseline itself (ie if traffic growth is unconstrained, may further corrections be required to it?); and

(b) How trustworthy are the policies within the revised NZS for road transport.

29 I now present further evidence form CCC, the Green Alliance and Prof Greg Marsden relating to the above issues.

4 CLIMATE CHANGE COMMITTEE (CCC) 2023 PROGRESS REPORT

30 On 28th June 2023, the Climate Change Committee (CCC) submitted its "Progress in reducing Emissions - 2023 Report to Parliament" [21] (referred to as CCC_2023_PROG) under Section 36 (1) of the Climate Change Act 2008. The report contained a clear analysis of the surface transport sector, and many recommendations for it. Some key points are now summarised.

4.1 Recommendation for a systematic review of current and future road-building projects

31 CCC_2023_PROG includes a recommendation that the Government should review its road-building proposals. Recommendation R2023-148 asked Government to:

> *Conduct a systematic review of current and future road-building projects to assess their consistency with the Government's environmental goals. This should ensure that decisions do not lock in unsustainable levels of traffic growth and develop conditions (which can be included in the Roads Investment Strategy 3 process and beyond) that*

[21] "Progress in reducing Emissions - 2023 Report to Parliament", Climate Change Committee (CCC), June 2023, https://www.theccc.org.uk/wp-content/uploads/2023/06/Progress-in-reducing-UK-emissions-2023-Report-to-Parliament.pdf

> *permit schemes to be taken forward only if they meaningfully support cost-effective delivery of Net Zero and climate adaptation.*

32 The CCC's recommendation includes "*current*" road-building projects, which includes the Lower Thames Crossing.

33 It also recommends that "*decisions do not lock in unsustainable levels of traffic growth*". The LTC application quite clearly does this as its forecasts both trip growth [APP-518, Table 6.3] and longer trips.

4.2 Shortfalls on delivery of carbon budgets and targets (overview)

34 CCC_2023_PROG notes that, in the CBDP, there is a shortfall on the emissions reductions[22] required to meet the UK 6th carbon budget (6CB) and UK's Nationally Determined Contribution (NDC) for 2030, our international obligation under the Paris agreement.

35 CCC_2023_PROG, then reports on page 93 that, out of all the sectors in the whole economy, the surface transport sector is primarily responsible for the shortfall:

> *"The smaller emissions reduction embodied in the quantified policies and plans compared to the NZS[23] comes predominantly from surface transport (Figure 3.13)."*

36 Figure 3.13, reproduced over the page, compares the residual emissions (the emissions which are calculated to be left remaining after decarbonisation policies and proposals) for each sector for an average year in the 6CB (ie: the mid-year 2035). The red arrow shows that the residual emissions for surface transport were 29.4 MtCO2e in the NZS (published 2021) has now been recomputed as 44.2 MtCO2e in the CBDP (ie 50% higher).

37 Only the surface transport sector in the CBDP has a serious shortfall compared to the NZS. The shortfall is 14.8 MtCO2e/yr in the 6CB as highlighted on the figure below, and clearly shows surface transport as being by far the largest adjustment.

38 In terms of the simple diagram presented at Figure 1 above, and the extremely tight and inflexible emissions space, what is happening is that the surface transport sector already, at its existing levels, cannot fit into the EmSp for Net Zero. The result is that the country is projected not to meet its legislated near-term (2030 and 2035) carbon targets on the basis of the CBDP analysis. Whilst, the Government do say in the CBDP that they intend to make up the shortfall[24], it is not clear whether the gap will be, or can be, fully closed, nor how the proposals for closing the gap will be risk assessed (as they don't exist yet).

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[22] CCC _2023_PROG/page 93

[23] NZS here is the original NZS. The comparison is the CDBP with the NZS.

[24] For example, on the 2030 NDC, CBDP para 29 says:

> *"We have quantified emissions savings to deliver 88 Mt or 92% of the NDC. We are confident the delivery of emissions savings by unquantified policies detailed in this package will largely close this gap and the government will bring forward further measures to ensure that the UK will meet its international commitments if required."*

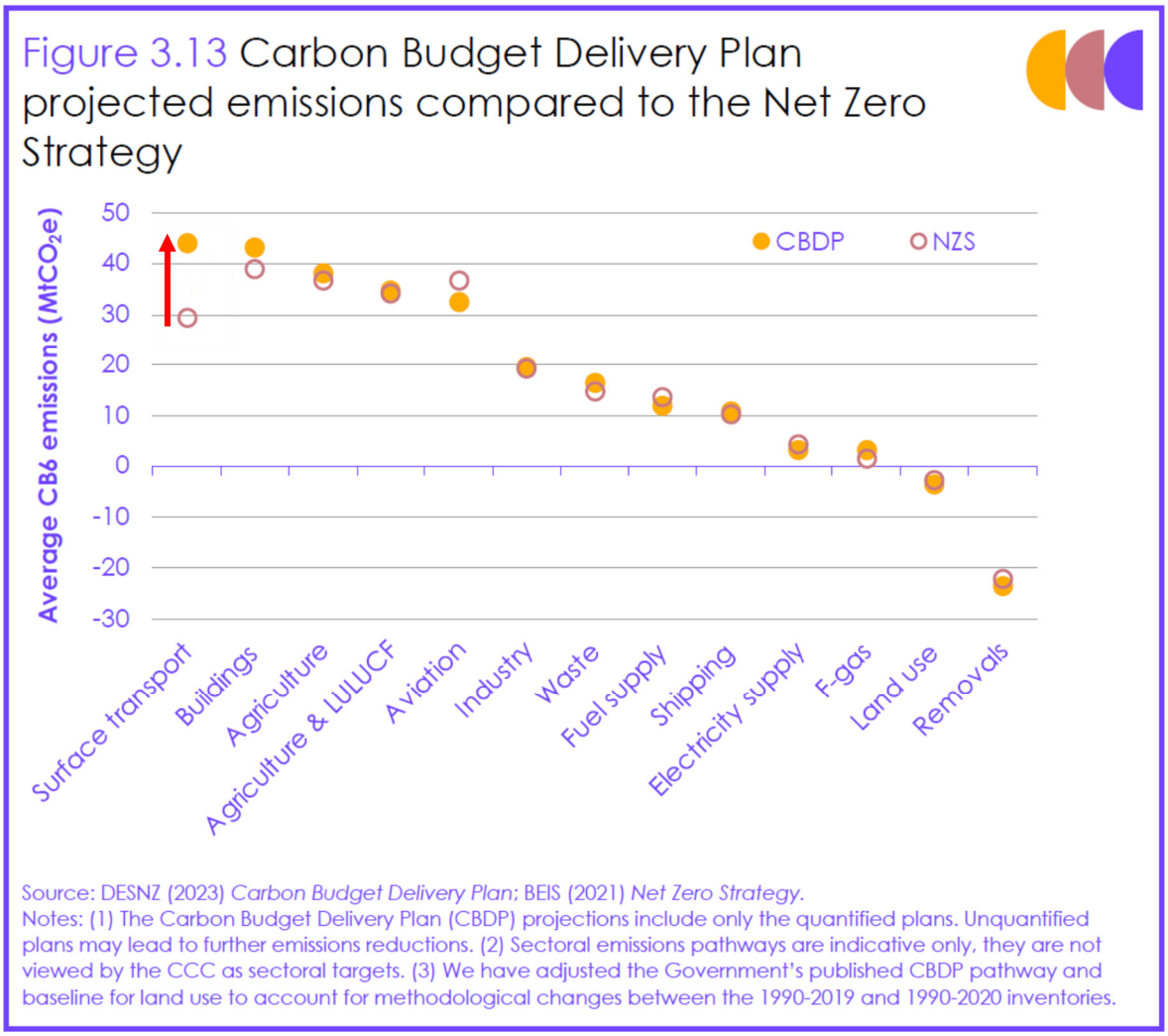

Figure 2: CCC Progress Report 2023, Fig 3.13 reproduced

39 CCC_2023_PROG then explains the causes for the shortfall in emissions reduction in surface transport on page 108 as being from two primary causes:

> *"The CBDP acknowledged new evidence showing that the carbon savings from plug-in hybrid (PHEV) cars are around three to five times lower in the real world than previously assumed. This means that the carbon savings accrued from the adoption of PHEVs are substantially smaller – by around 9 MtCO2e/year – than in the Net Zero Strategy analysis."*
>
> *"Most policies that aim to support and incentivise the public to choose lower-carbon modes of transport have been removed from the quantified pathway – over 5 MtCO2e/year of abatement that had been attributed to modal shift from cars to more sustainable modes of transport is no longer quantified. While these policies are still*

referenced in the Government's plan, making a choice not to quantify them signals a lack of commitment to modal shift. A pathway that is almost exclusively technology-dependent is likely to be less cost-effective, entails higher delivery risk (see Chapter 3)and risks missing out on opportunities to realise co-benefits to society."

40 It is important to note, the context of delivery risk being key, that the CCC highlight that by choosing a technology-dependent pathway in the CBDP that the Government have opted for a plan with higher delivery risk.

41 Further, it should be noted that the CBDP (and PUB TA) itself describes that the baseline for surface transport has been altered due to underestimates of projected traffic growth in the National Transport model[25]. This baseline shift appears not to be covered in the CCC analysis, but indicates further erosion of the emissions space due to surface transport, and also another area which requires risk assessment for the future (as described later).

42 I now look at the impact of near-term climate targets (ie 2030 NDC; and 6th carbon budget (average year 2035)), highlight the surface transport and industry sectors being relevant to the LTC scheme.

4.3 Operations/Surface Transport - Impact on UK international obligation(s) (2030 NDC)

43 Figure 4b on page 24 of CCC_2023_PROG, reproduced below, shows that the surface transport and industry sectors have the largest emission reductions[26] for the 2030 NDC.

44 Surface Transport is required to reduce from a baseline of 116.7 MtCO2e/yr to 75.3 MtCO2e/yr (the "CBDP pathway") in 2030. The CCC assess credible plans only existing for 40% of this (16.6 MtCO2e/yr – green on the Figure).

45 Industry is required to reduce from a baseline of 59.3 MtCO2e/yr to 35.4 MtCO2e/yr (the "CBDP pathway") in 2030. The CCC assess credible plans only existing for 4.6% of this (1.1 MtCO2e/yr – green on the Figure). The Industry sector is important in assessing the significance of the construction emissions from the LTC which fall in the Industry sector. The LTC construction emissions are 1.762 MtCO2e [ES Chapter 15, Table 15.14] and fall in the period up to the 2030 NDC.

[25] PUBTA, PDF page12, para 22

[26] The figures quoted are derived from the supplementary "Progress in reducing emissions - 2023 Report to Parliament - Charts and data" at https://www.theccc.org.uk/wp-content/uploads/2023/06/Progress-in-reducing-emissions-2023-Report-to-Parliament-Charts-and-data.xlsx

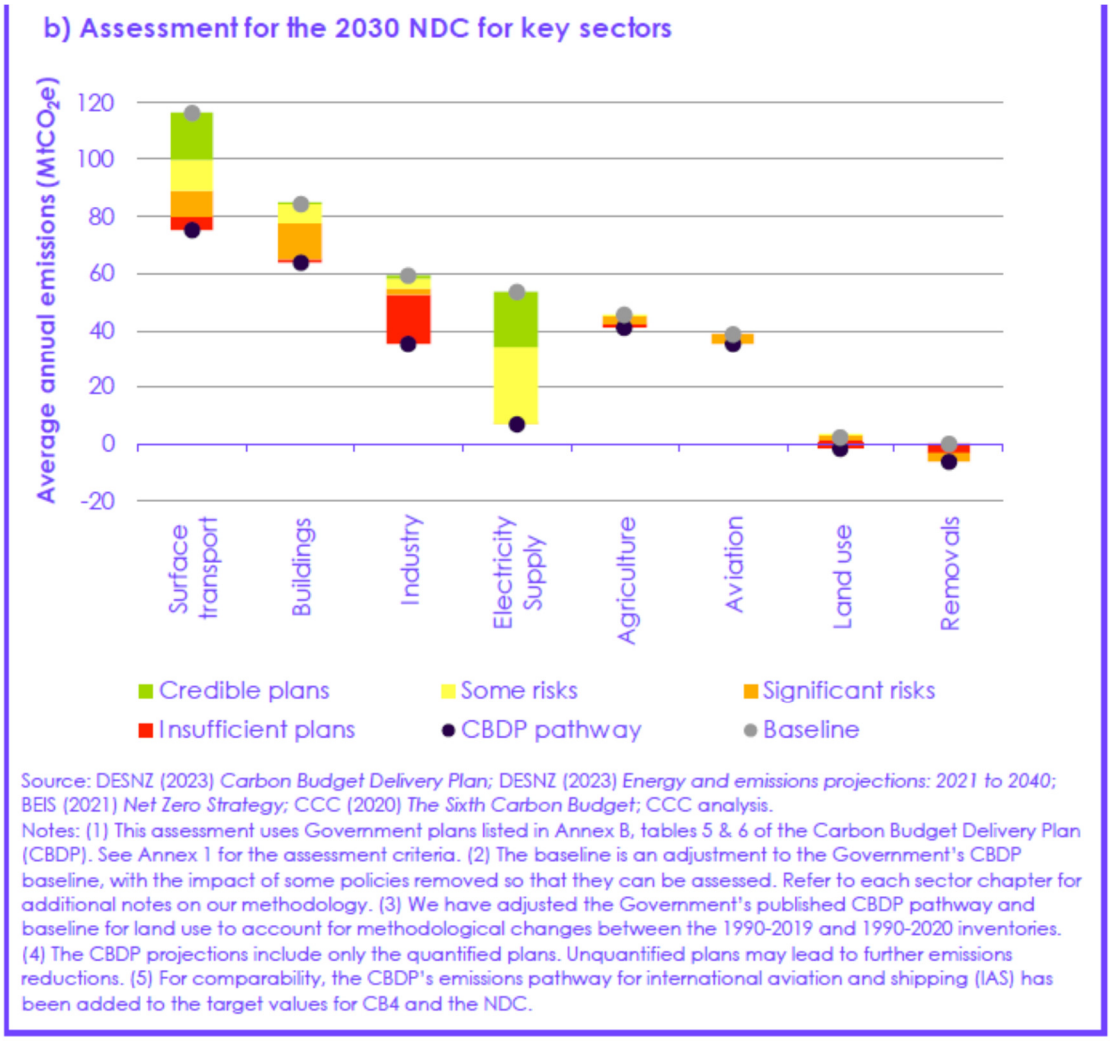

Figure 3:CCC Progress Report 2023, Fig 4b reproduced

4.4 Operations/Surface Transport - Impact on 6th carbon budget

46 Figure 4.10 on page 122 of CCC_2023_PROG, reproduced below, shows the assessment of policies and plans for surface transport across the 4th, 5th and 6th carbon budgets.

47 For the 6CB, surface transport is required to reduce[27] from a baseline of 118.8 MtCO2e to 44.2 MtCO2e. The CCC assess credible plans only existing for 38.8% of this (28.7 MtCO2e/yr – green on the Figure). A remaining 45.73 MtCO2e of surface transport emissions reductions require to be fully secured in the 6CB.

[27] The figures quoted are derived from the supplementary "Progress in reducing emissions - 2023 Report to Parliament - Charts and data" at https://www.theccc.org.uk/wp-content/uploads/2023/06/Progress-in-reducing-emissions-2023-Report-to-Parliament-Charts-and-data.xlsx

48 For the 5CB, surface transport is required to reduce[28] from a baseline of 116.8 MtCO2e to 75.3 MtCO2e. The CCC assess credible plans only existing for 39.9% of this (16.6 MtCO2e/yr – green on the Figure). A remaining 24.52 MtCO2e of surface transport emissions reductions require to be fully secured in the 5CB.

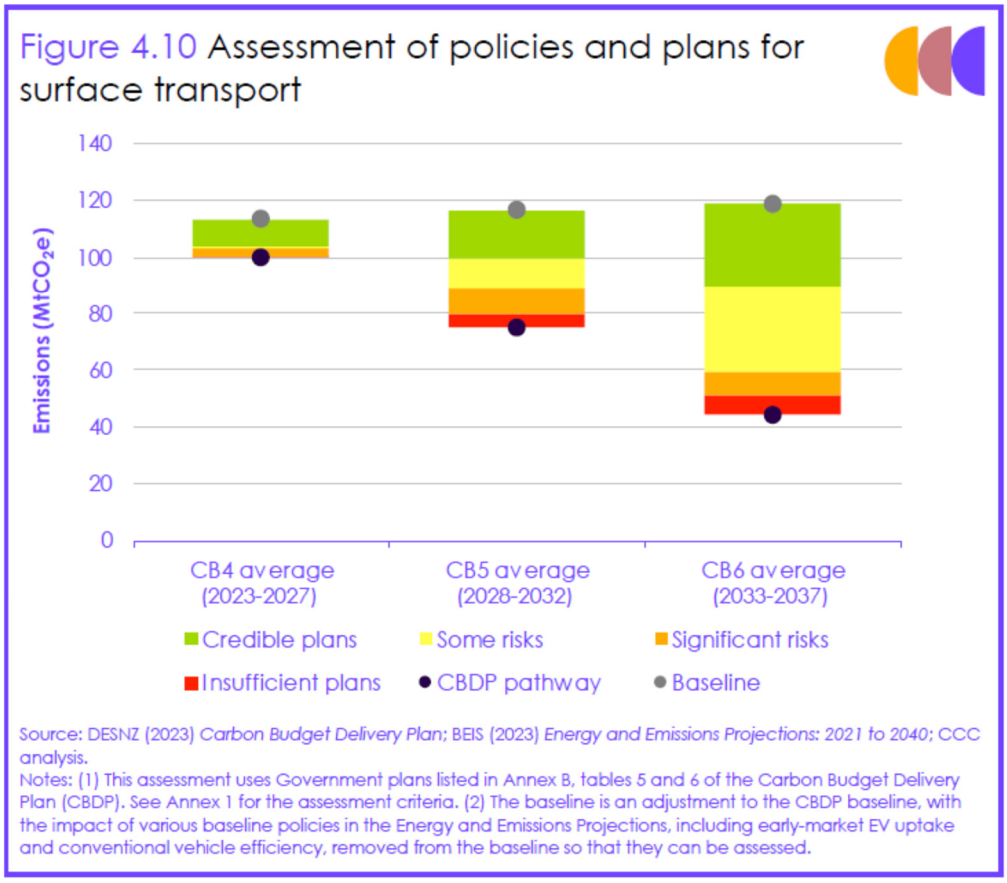

Figure 4: CCC Progress Report 2023, Fig 4.10 reproduced

49 The report finds that overall "credible plans" exist for less than 39% of the required emissions reduction in surface transport to meet the Sixth Carbon Budget. This means that **61% of the required emissions reductions in surface transport for the 6th carbon budget are not fully secured "on paper" yet**. This reveals the true extent of the "delivery gap" in transport decarbonisation policy from the Government's own advisors on climate change delivery.

50 I will return to the data highlighted above when providing contextualisation for the LTC scheme later.

[28] The figures quoted are derived from the supplementary "Progress in reducing emissions - 2023 Report to Parliament - Charts and data" at https://www.theccc.org.uk/wp-content/uploads/2023/06/Progress-in-reducing-emissions-2023-Report-to-Parliament-Charts-and-data.xlsx

4.5 Construction/Industry - Impact on UK international obligation(s) (2030 NDC)

51 The construction of the LTC scheme comes under the Industry sector.

52 Figure 6.5, reproduced below, on page 189 of CCC_2023_PROG, reproduced below, shows the assessment of policies and plans for Industry across the 4th, 5th and 6th carbon budgets.

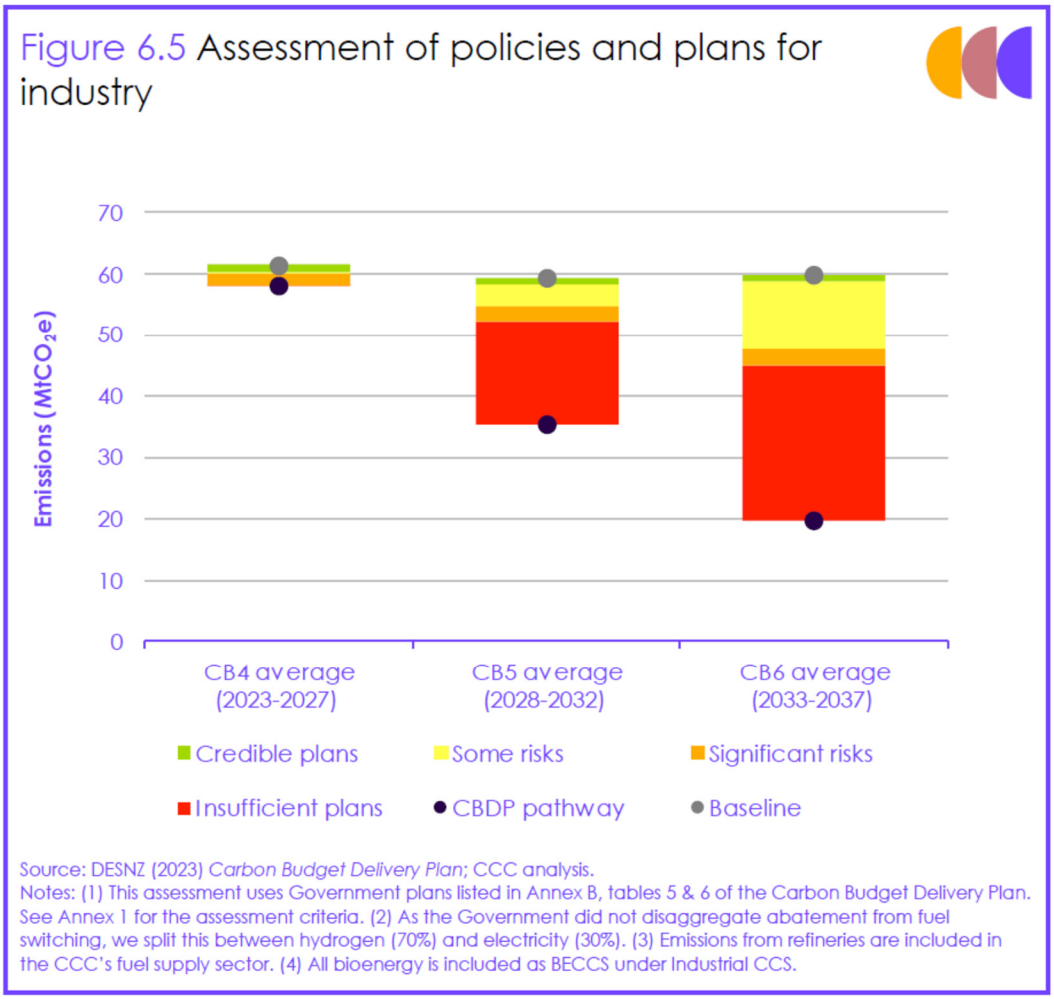

Figure 5: CCC Progress Report 2023, Fig 6.5 reproduced

53 It should be noted that the Applicant has proposed using hydrogen (to replace diesel) in some of the construction operation. The applicant has not provided any assessment of Direct and Indirect effects related to the use of hydrogen and this will affect the validity of any savings claimed by the fuel switch. This is discussed in a later section.

4.6 Relevant benchmarks summary

54 As a result of the discussion above, Table 1 below provides a summary of benchmarks derived for the 4CB, 5CB and 6CB, these are:

- The 5-year national carbon budgets (code B_1);
- The 5-year Domestic Transport Residual Emissions (code B_2)
- Annual and 5-year valued for Credible Plans and To Be Secured (sum of all non-credible plans) for Surface Transport[29] according to the CCC analysis (codes B_3 – B_6)
- The 5-year Industry Residual Emissions (code B_7)
- Annual and 5-year valued for Credible Plans and To Be Secured (sum of all non-credible plans) for Industry[30] according to the CCC analysis (codes B_8 – B_11)

55 The narrative above shows how the data relates to the figures in the CCC Report for Surface Transport. I have not repeated the narrative for Industry, although the same principles apply, and just show the figures below.

Code	tCO2e	Fourth (2023 to 2027)	Fifth (2028 to 2032)	Sixth (2033 to 2037)
B_1	National Budget - 5 years	1,950,000,000	1,725,000,000	965,000,000
B_2	Domestic Transport Residual Emissions (DTRE, CBDP, Table 2) - 5 years	546,000,000	422,000,000	254,000,000
B_3	Surface Transport (Credible plans - CCC) - Annual average	9,164,654	16,600,000	28,700,000
B_4	Surface Transport (To Be Secured - CCC) - Annual average	3,955,384	24,520,000	45,730,000
B_5	Surface Transport (Credible plans - CCC) - 5 years	45,823,269	83,000,000	143,500,000
B_6	Surface Transport (To Be Secured - CCC) - 5 years	19,776,919	122,600,000	228,650,000
B_7	Industry Residual Emissions (IRE, CBDP, Table 2) - 5 years	340,000,000	207,000,000	111,000,000
B_8	Industry (Credible plans - CCC) - Annual average	1,243,741	1,100,000	1,100,000
B_9	Industry (To Be Secured - CCC) - Annual average	2,301,741	22,973,854	39,148,353
B_10	Industry (Credible plans - CCC) - 5 years	6,218,707	5,500,000	5,500,000
B_11	Industry (To Be Secured - CCC) - 5 years	11,508,707	114,869,270	195,741,764

Table 1: Summary of relevant benchmarks

56 These benchmark figures will be used as part of a contextualisation process against the residual emissions in the CBDP surface transport and industry sectors later.

[29] From data for Figure 4.10 "Progress in reducing emissions - 2023 Report to Parliament - Charts and data" at https://www.theccc.org.uk/wp-content/uploads/2023/06/Progress-in-reducing-emissions-2023-Report-to-Parliament-Charts-and-data.xlsx

[30] From data for Figure 6.5 "Progress in reducing emissions - 2023 Report to Parliament - Charts and data" at https://www.theccc.org.uk/wp-content/uploads/2023/06/Progress-in-reducing-emissions-2023-Report-to-Parliament-Charts-and-data.xlsx

5 GREEN ALLIANCE NET ZERO POLICY TRACKER

57 The Green Alliance ("**GA**") have published a June 2023 update[31] to their "Net Zero Policy tracker". This approaches its analysis in a different way to the CCC, and it is new important material on in which to also consider the delivery risks of NZS.

58 The GA policy tracker focuses on the 5th carbon budget (2028-2032, average mid-year 2030) so it applies most to consideration of the construction emissions and the opening year operational emissions from the LTC.

5.1 Sectorial overview

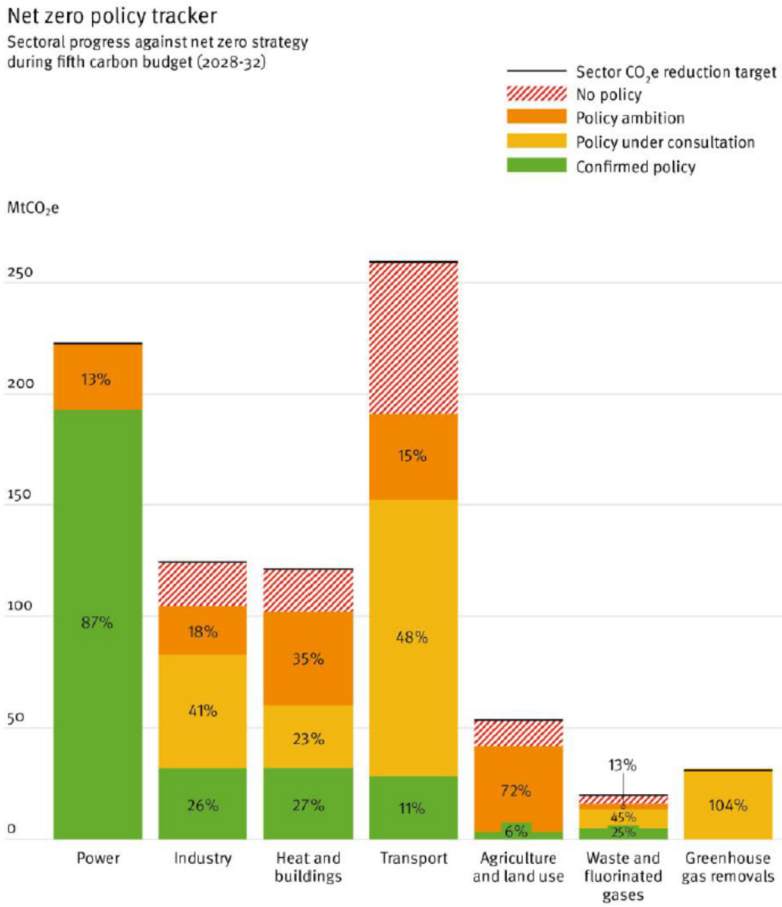

Figure 6: Green Alliance Net Zero policy tracker, sectorial overview

[31] "Net zero policy tracker: June 2023 update", Green Alliance, https://green-alliance.org.uk/publication/net-zero-policy-tracker-june-2023-update/

59 The figure above is for the 5-year carbon budget, 2028 – 2032, and GA note:

> A significant proportion of emission cuts required are still not targeted by government policy. Over half of those (68$MtCO_2e$) are attributed to the transport sector which has a policy gap of 26 per cent.

60 The policy gaps for surface transport where GA find no targeted government policy (26%) is 13.6 MtCO2e/yr.

61 The figure shows that for the industry sector around 20MtCO2e (4 MtCO2e/yr) of no targeted government policy corresponding to a policy gap of 15% for that sector.

6 CARBON BUDGET DELIVERY PLAN (CBDP)

62 Previously, I introduced the CBDP at a high-level in discussion of delivery risk in securing the Net Zero Strategy. I now wish to go into further detail on further losses in ambition on the surface transport sector (due to changes in the baseline between the NZS and the CBDP), and more on the lack of risk assessment in the CBDP. These were points signposted earlier in this WR.

6.1 Where is the error of 130 million tonnes of CO2e for the road transport baseline reported?

63 The "Powering Up Britain Technical Annex" (PUBTA) describes adjustments made to the baseline for the transport sector[32]. Baselines are the projected emissions BEFORE any of the NZS policies are accounted for: so they can be considered as "business-as-usual" emissions without an NZS. Para 23, reproduced below, states that the baseline error for surface transport is an average of 4MtCO2e/year for each year of 4th carbon budget (2023-2027), 9MtCO2e/year for each year of 5th carbon budget (2028-2032), and 13 MtCO2e/year for each year of 6th carbon budget (2033-2037).

> 23. Together, these adjustments lead to an increase in baseline emissions of 4MtCO2e/year on average in the 4th Carbon Budget period, 9Mt/year for 5th Carbon Budget, and 13Mt/year in the 6th Carbon Budget period.

64 MtCO2e is megatonnes of CO2e, or millions of tonnes of CO2e. So for the 15 years, 2023-2037, across 3 5-year carbon budgets, the error in the original NZS for the transport baseline was 130MtCO2e (4*5 + 9*5 + 13*5 = 130). What is described here is a correction made as result of a massive error/miscalculation in the original NZS, 130 MtCO2e is equivalent to the total annual emissions of a medium sized country like Nigeria or the Netherlands.

6.2 What are the causes of the baseline error for road transport?

65 The very large correction to the baseline is attributed in the almost entirely to two factors in road transport - optimistic projections of emission reductions from EV uptake[33] and underestimates of projected traffic growth[34].

66 **What is the impact on the TDP objectives?** The result of this baseline correction means that ambition for reducing emissions in the transport sector in the revised NZS has scaled down before even the proposals and policies are considered themselves. As the emissions reduction trajectories in the NZS and the Transport Decarbonisation Plan (TDP) are

[32] PUBTA, PDF page12, paras 21-23

[33] PUBTA, PDF page12, para 21

[34] PUBTA, PDF page12, para 22

essentially the same[35], the ambition for emission reductions in the TDP are similarly scaled down.

67 What is the wider impact to UK Climate targets?

(A) The error in the road transport baseline is solely sufficient to account for the shortfall on emission reductions for the NDC[36] (the UK Nationally Determined Contribution (NDC) at 2030[37] and the UK commitment under the Paris agreement) reported in the CBDP where it says, "*We have quantified emissions savings to deliver 88 Mt or 92% of the NDC*". The NDC was set before the COP26[38]. This missing 8% of emissions required to meet the target is around 8MtCO2e, where the loss of emissions reductions from the transport baseline error is 9MtCO2e in 2030.

This has to be considered alongside the shortfall in secure proposals and policies as identified by CCC in Figure 4.10 of the 2023 Progress Report. As above, the CCC assess credible plans only existing for 39.98% of the 5CB (surface transport). Whilst GA find that there is no targeted policy for surface transport of 13.6 MtCO2e/yr (26%), and for the industry sector of 4 MtCO2e/yr (15%).

On the current plans, the LTC would produce 1,762,967 tCO2e in the years leading up to 2030 from construction, and 8,996,305 tCO2e of traffic model "DS" emissions[39] from operation at 2030 [Table 15.16].

(B) The 13MtCO2e average loss in baseline emissions reductions in road transport in the 6th carbon budget (2033-2037) has a direct impact on the remaining policy gap in the revised NZS across all sectors. In discussing this, the CBDP[40] says only "*97% of the savings required to meet Carbon Budget 6"* have been identified (ie 3% short). Table 1 on CBDP, page 11 identifies the whole economy shortfall as 32 MtCO2e over the 5 years, or 6MtCO2e for each year (2033-2037). Again, the error in the transport baseline (13MtCO2e per year) accounts for more than all of this shortfall. And indicates that other sectors of the economy are already having to make up for failings in transport sector decarbonisation in the planning.

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[35] Figure 21 of the NZS, is a refined version of the Figure 2 of the TDP and comparison of the two demonstrates the policy linkage between the TDP and the NZS, and that the policy trajectory including carbon reductions is the same (the main difference is that TDP graph is 'fuzzier'). Essentially the same indicative delivery pathway for domestic transport has been carried forward from the TDP to the NZS.

[36] CBDP, PDF page 15, para 29 says *"We have quantified emissions savings to deliver 88 Mt or 92% of the NDC. We are confident the delivery of emissions savings by unquantified policies detailed in this package will largely close this gap and the government will bring forward further measures to ensure that the UK will meet its international commitments if required."*

[37] https://www.gov.uk/government/publications/the-uks-nationally-determined-contribution-communication-to-the-unfccc

[38] at 68% reduction of carbon emissions (against 1990 levels) by 2030

[39] Representing emissions for the traffic model area from existing traffic, new road and land-based development in the model, and emissions from the scheme itself

[40] CBDP, PDF Page 15, paras 30-35

This has to be considered alongside the shortfall in secure proposals and policies as identified by CCC in Figure 4.10 of the 2023 Progress Report. As above, the CCC assess credible plans only existing for 38.8% of the 6CB.

On the current plans, the LTC would be producing annual traffic model "DS" emissions from operation in the range 8,996,305 tCO2e (2030) to 6,974,840 tCO2e (2045) during the 6th carbon budget [Table 15.16].

6.3 Risk to policy delivery on transport in the CBDP

68 Risk to policy delivery in the CBDP come from two sources:

- risks to the baseline. This has already been hugely corrected as above, and a key question is will further corrections to it be required? and
- risks to the delivery of the policies themselves.

69 These risks are crucially important to considering how to deal with carbon emissions for the LTC scheme. If achieving the CBDP is risky, then the additional emissions being created from the construction and operation of the LTC are just not possible without materially further jeopardising the CBDP delivery.

70 On the policies themselves, Table 4 of CBDP[41] gives policies captured in the Energy and Emissions Projections (EEP). This has 7[42] policies relating to Domestic Transport. Table 5 of CBDP[43] gives quantified proposals and policies, with (17) proposals 128[44] to 144[45] for Domestic Transport. Table 6 of CBDP[46] gives quantified proposals and policies, with(14) proposals 20[47] to 33[48] for Domestic Transport. Overall over 35 policies.

71 Policy delivery risk is addressed in CBDP, Appendix D entitled "Appendix D: Sectoral summaries of delivery confidence". Paragraphs 37 to 41[49] address "Transport". Overall, the risk assessment is at a very high-level, and not quantified, and the individual policies have not

[41] Starting on CBDP, PDF page 23

[42] Policy **1**: Active Travel spending; Policy **8**: Car policies; Policy **28**: Heavy Goods Vehicles (HGV) policies; Policy **31**: Van policies; Policy **35**: Public service vehicles (PSV) policies ; Policy **44**: Renewable Transport Fuel Obligation, (RTFO) - 5% by volume; Policy **45**: Renewable Transport Fuel Obligation, (RTFO) - Increase target to meet RED;

[43] Starting on CBDP, PDF page 45

[44] Starting on CBDP, PDF page 85

[45] Ending on CBDP, PDF page 88

[46] Starting on CBDP, PDF page 106

[47] Starting on CBDP, PDF page 115

[48] Ending on CBDP, PDF page 118

[49] CBDP, PDF page 180

been risk assessed – an issue which will be addressed at the High Court for the second NZS legal case. I submit that the risk assessment is not fit for purpose.

72 Further, it is far too premature for any weight to be given to any claims that the surface transport sector will inevitably contribute to succeeding in securing the Government's carbon emissions reduction targets via the policies and emission trajectories in the NZS (or PUB, or CBDP), and the TDP. For the purposes of decision making on the LTC DCO, no reliance can be made on the security of delivering either the CBDP itself, or the surface transport sector within it.

73 Although the risk assessment is wholly inadequate, three broad, high-level risks for the transport sector were identified in CBDP, Appendix D:

(A) Insufficient regulation and incentives to drive the transition to zero emission vehicles at the speed required to enable carbon budgets to be met[50];

(B) Unanticipated growth in transport demand, going beyond "our high-end projections"[51];

(C) Reliance on nascent or immature technologies and associated markets, such as zero emission vehicle or flight technologies or utilisation of lower carbon fuels[52].

74 I now highlight further concerns on these identified risks, which again have strong implications for how carbon emissions are dealt with for the LTC scheme.

6.4 Projections on EV uptake

75 Percentage figures for the uptake of EVs in the original NZS and in the TDP were obtained under the Environmental Information Regulations (EIR) by Professor Greg Marsden[53]. Whilst CBDP[54] provides more recent data. Table 2 below aggregates the available data[55]:

[50] CBDP, PDF page 180, para 38

[51] CBDP, PDF page 180, para 39

[52] CBDP, PDF page 181, para 40

[53] https://www.whatdotheyknow.com/request/841974/response/2205457/attach/4/Response%20to%20EIR%20E0020915.xlsm?cookie_passthrough=1

[54] CBDP, Table 7 under "Appendix C: Deployment assumptions underpinning quantified savings". EV data at PDF Page 171 in Table.

[55] Note that the metric in the original NZS is "Proportion of mileage that is ZEV" (Marsden EIR) and is "percentage of fleet" in the CBDP. The DfT have not made clear how much difference this makes – I assume for this document that the proportion of fleet is reflected in mileage to a first approximation, sufficient for the purpose of my analysis.

	2025	2030	2035	2040	2045	2050
Cars (TDP ZEV upper)	9.71%	30.45%	58.58%	81.23%	93.64%	98.41%
Cars (TDP ZEV lower)	11.57%	47.03%	79.09%	92.82%	97.76%	99.46%
Cars (CBDP - ZEV)	7.00%	25.00%	52.00%	?	?	?
Vans (TDP ZEV upper)	3.98%	17.69%	49.50%	75.25%	88.53%	94.26%
Vans (TDP ZEV lower)	4.73%	42.64%	79.17%	92.29%	97.01%	98.58%
Vans(CBDP - ZEV)	3.00%	16.00%	43.00%	?	?	?
HGV (TDP ZEV upper)	0.31%	6.99%	24.92%	49.05%	76.84%	94.58%
HGV (TDP ZEV lower)	0.34%	10.22%	40.05%	76.00%	93.90%	98.25%
HGV (CBDP - ZEV)	0.40%	9.00%	37.00%	?	?	?
Bus/Coach (CBDP - ZEV)	14.00%	35.00%	61.00%	?	?	?

Table 2: Electric vehicle uptake assumptions between original NZS and revised NZS (CBDP)

Figure 6 below plots the data for cars.

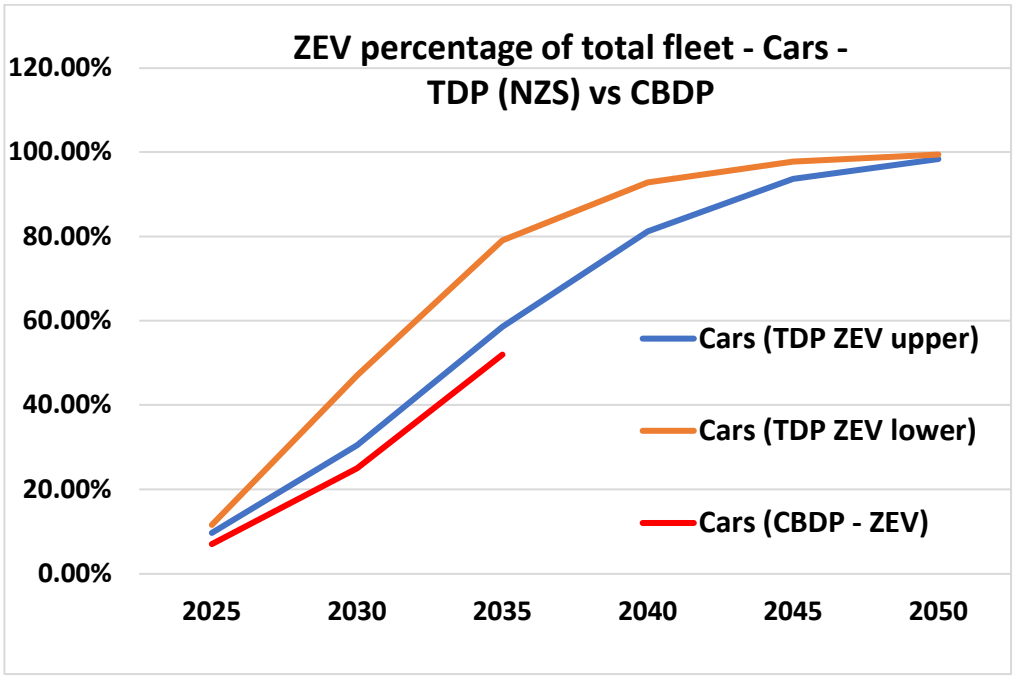

Figure 7: Electric vehicle uptake assumptions between original NZS and revised NZS (CBDP) for cars

76 The graph shows that new baseline trails around 7% below the previous worst case at 2035 (and 27% below the previous best case). Further, it is difficult to see it on the graph, but the CBDP percentage (red) is going up slower than the TDP worst case (blue), as evidenced by the difference/shortfall between the red and blue lines being for 2025: 2.71%, for 2030:5.45%, and for 2035:6.58%. This shows that the projected EV adoption is slower in the new baseline.

77 The situation is similar for vans with the CBDP projection being outside the bounds of the NZS lower and upper projections, and the CBDP rate of EV van adoption being slower than the NZS worst case, the difference/shortfall being for 2025: 0.98%, for 2030:1.69%, and for 2035:6.50%.

78 A further problem is that CBDP is not projecting beyond 2035 whereas the original NZS data projects to 2050.

79 The problem for policy delivery, and critically the risks to policy delivery, with this issue is further shortfalls in EV delivery are not easy to correct and turn around in a couple of years. The slower uptake with the red line (in the now corrected baseline) is locked in. If it, in turn, is not met, then an additional delivery shortfall will also be locked in for carbon emissions from the lifetime of on the non-EV vehicles involved. I submit that numerical risk assessment of such risks is startlingly missing in the CBDP for this issue. The policies being mooted to keep these new trajectories (cars, vans, HGVs etc) for EVs on track, but which have not been individually risk assessed, include:

- ZEV mandate in 2024 and "bolstering charging infrastructure roll-out across the country";
- end date for the sale of new, non-zero emission buses and "expectation" for when the entire fleet should be zero emission;
- Rapid Charging Fund
- Zero Emission Road Freight

80 These policies need to have quantified risks associated with them, and that needs to be seen at the higher level too. Then it would be possible for policy makers to have a clear idea of the impact if the above policies fail to different degrees. For example, at the moment it is not possible to answer a question such as the following because there is no available data: "*What is the impact in MtCO2e for the 6th Carbon Budget, and also the 7th and 8th Carbon Budgets*[56] *the EV uptake percentage for cars being 45% or 48% (instead of 52%) in 2035?*"

81 Please note that Professor Marsden has published the Reverse Gear[57] report ("**RG**") which also analyses the rate of electrification. It is an excellent report, briefly touched upon later. However, please note that his graphs should not be compared to mine as they are comparing different parameters. For example, where he compares the TDP electrification scenarios it is against the Climate Change Committee projections whereas I compare the NZS/TDP with the revised NZS (ie CBDP). He also provides other graphs which are based upon the ZEV

[56] Whilst the 7th and 8th carbon budgets are not required to be set until 2026 and 2031 respectively (CCA 2008, section 4(2)(b)), it is useful at this point in time to understand what impacts from failure to delivery policy to 2037 may be "carried forward" into these later budgets, especially when appraising a DCO road scheme over 60 years.

[57] "Reverse gear: The reality and implications of national transport emission reduction policies", Prof Greg Marsden, Centre for Research into Energy Demand Solutions (CREDS), 2023, https://www.creds.ac.uk/publications/reverse-gear-the-reality-and-implications-of-national-transport-emission-reduction-policies/

Mandate, or the annual targets for new ZEV vehicle sales, whereas I am comparing the percentage ZEVs in total vehicle fleet.

6.5 Estimates of traffic growth

82 CBDP Para 39[58] on traffic growth states "*Another risk is that we see considerable, unanticipated growth in transport demand, going beyond our high-end projections*". The CBDP makes no attempt to provide mitigation strategies[59] for the potential additional baseline carbon emissions in the road transport sector implied by this statement in the future, nor any quantified risk assessment of it.

83 For example, at the moment, it is not possible to answer a question such as the following because there is no available data: "*if the revised figure for cars is 550 bvkm[60] in 2030 (the TDP range was 352-547 bvkm from the response to Professor Marsden's EIR), what is the effect if this is 600 bvkm due to traffic growth exceeding 'our high-end projections'?".*

84 To answer this, new traffic growth figures out to 2050 (for each vehicle type, similar to as provided for the original NZS and TDP in Professor Greg Marsden's EIR response) need to be published by the DfT, with a risk analysis of the effects of different figures.

85 Further, it is not clear if the additional bvkm from all the RIS2 and RIS3 projects are expressed in the revised transport sector baseline. For example, how many more bvkm would schemes like the LTC scheme add to the baseline? How does that fit in the overall risk assessment of not delivering on the new baseline and policies in the revised NZS?

86 The key thing here to note is that DfT have just had to make an absolutely massive correction for road transport emissions baseline (correcting previous extremely optimistic projections) with the consequence of significantly increasing the risk to the delivery of UK climate targets. Now, the CBDP says that further unanticipated traffic growth may make carbon emissions exceed the high-end projections in the corrected baseline. The Government has provided no evidence that it has assessed the delivery of carbon emissions savings in CBDP against this risk.

87 So we have a situation where the transport emissions baseline has just been corrected by around the size of the annual emissions from a medium sized country (eg Nigeria), and yet it may need to be adjusted again, in a couple of years, if transport demand outsteps the latest projections. The growth in traffic and emissions from the Government's road building programme, including the LTC scheme, may be a significant driver contributing to this risk and the potential need for further baseline corrections. However, the ExA, and indeed the

[58] CBDP, PDF page 180, para 39

[59] The CDBP does say "recent lower GDP projections" might lower the projections, but as Government policy is to increase GDP and this is a recent short-term impact, this does not amount to a mitigation strategy, but rather observations on the data provenance.

[60] Billion vehicle kilometres per year

Secretary of State, do not have a clear data before them of this potential impact, nor any risk assessment of it.

6.6 Professor Marsden's report: Reverse Gear

88 I wish to draw attention to some headline points from Professor Marsden's report which is provide at Appendix A.

89 A key paragraph from the Executive summary is:

> *"In March 2023, just 21 months after the publication of the Transport Decarbonisation Plan, the revision to the whole of government Net Zero Strategy – the Carbon Budget Delivery Plan (CBDP) – was released. It set out a new carbon reduction pathway for transport. Analysis here reveals that 72 percent of the potential ambition set out in the TDP has been lost in the CBDP. As policies to lock down the transition to electric vehicles have been advanced, demand management has largely been abandoned. This is not gear change, this is reverse gear."*

90 Under Figure 3, on RG page 10:

> *"The estimated carbon gap in ambition between the most and least ambitious lines in the TDP was 567 MtC over the period 2023–2037. The CBDP pathway for domestic transport is a cumulative total of around 411 MtC above the most ambitious pathway in the TDP. This corresponds to a closing off of around 72% of the ambitions set out in the TDP, a document produced less than two years previously. The proposed CBDP pathway is around 180 MtC above the Balanced Pathway set out by the CCC in the 6th Carbon Budget."*

91 It should be noted that those 411 million tonnes of CO2e (cumulative lost emissions reductions over a 15-year period) are, again, a very large footprint. For example, they amount to more than Australia's annual emissions in 2020[61].

92 Further, it is not at all clear where such a massive loss of cumulative emissions reductions can be found in the remaining emissions space of other sectors.

93 RG page 11:

> "*The level of quantified carbon mitigation from surface transport demand management is, therefore, just over 8 MtC for the period 2023 to 2037 compared with the 211 MtC estimated by the CCC. Demand management seems to have disappeared from the decarbonisation agenda.*"

94 RG page 11:

[61] "Carbon footprint by country" table, at World Population Review website: https://worldpopulationreview.com/country-rankings/carbon-footprint-by-country

"*Transport is the largest emitting sector in the economy. It has been the slowest sector to decarbonise. This reduction in ambition places greater demands on other sectors, each of which has its own delivery challenges.*"

6.7 Conclusions on revised Net Zero Strategy / CBDP

95 The previous sections show that any assumption that the delivery of the CBDP is secured is a false assumption for many reasons:

(A) A 130 million tonnes of CO2e error was made in the transport baseline in the original NZS. This loss of emission reductions in the CBDP now has to be made up by other sectors of the economy.

(B) The error alone explains why the Government has had to concede in the CBDP that the UK has a shortfall on meeting its 2030 NDC under the Paris agreement and has a remaining policy gap for the 6th carbon budget.

(C) There remain significant risks in policy delivery for transport under the CBDP and these have not been risk assessed in any meaningful way. The CBDP is subject to further legal challenge as a result.

(D) Specifically, there are significantly different assumptions on electric vehicle uptake between the original NZS and the CBDP, and the risks have not been assessed.

(E) The Government has increased traffic growth projections, as part of a massive reset of the surface transport baseline, but still see (unassessed) risks of it "*going beyond our high-end projections".*

(F) Ambitions for 411 million tonnes of CO2e of carbon reductions in the transport sector have been lost between 2023 and 2037 in the CBDP.

(G) The CCC and the Green Alliance both report major lack of security for policy delivery for surface transport and industry sectors in the CBDP. These are relevant to the LTC and must be considered in assessing the operational emissions and construction emissions from the scheme, respectively.

(H) On the basis of its most recent analysis of the CBDP and the proposals and policies within it, the CCC has called for a systematic review of current and future road-building projects". The LTC fits within this scope of current schemes.

7 CUMULATIVE ASSESSMENT OF CARBON EMISSIONS FROM THE SCHEME

96 In my RR, I wrote:

> *"Significance of GHGs in Chapter 15 is assessed solely on "scheme-only" (DS-DM) estimates [percentage figures in Table 15.17]. This does not comply with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 which require that the applicant must provide the cumulative impacts of the project and other existing and/or approved projects. The section "Intra-project effects" under section 15.7 does not address this issue because the intra-project effects are expressed in both the DS and DM forecasts, and are subtracted out before the assessment based upon DS-DM."*

97 I wish to emphasise that my position remains that categorically, there is no assessment of the impact of cumulative carbon emissions in the ES.

98 The same issue on three other DCO schemes was heard at the High Court by Mrs Justice Thornton in my three Judicial Reviews, R(Boswell) v Sec of State for Transport CO/2837/2022, CO/3506/2022 & CO/4162/2022 on May 10th and 11th 2023. The acknowledge that the judgement went against me at this stage. However, I intend to appeal this judgement.

8 TRANSPORT DECARBONISATION PLAN (TDP) SENSITIVITY TEST

99 Several tables in ES Chapter 15 contain estimates from what the Applicant refers to as a TDP sensitivity test. This is an ad-hoc test which the Applicant has also introduced at some other DCO examinations. I do not recognise the validity of this approach for many reasons, including:

(A) It is not a sensitivity test;

(B) The details of the computations involved has not been published and, therefore, it is impossible for IPs to scrutinise it;

(C) As the forecasting method for the TDP Sensitivity test has not been made available, the method breaches paragraph 6[62] of Schedule 4 to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the "2017 Regulations") which requires the methodologies, forecasting methods and their shortcomings in making estimates and assessments of effects to be reported in the environmental statement;

[62] "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."

(D) There is no guidance provided on the method;

(E) Even if the approach was valid, the trajectories for surface transport in the TDP have been updated by the trajectories in the CBDP, so the method is using out-of-date, more optimistic data and the data tables need updating accordingly;

100 I, therefore, consider the TDP Sensitivity test data to be invalid and I do not make reference to it any further.

9 HYDROGEN

101 The Applicant has reported in its July 2023 "Sustainability report" (attached at Appendix B) that:

- it is kickstarting a hydrogen ecosystem in the Thames Estuary; and
- have also gone to market to buy one of the UK's largest ever purchases of hydrogen, accelerating the construction industry's shift away from fossil fuels.

102 Whilst moving away from fossil fuels (diesel) in construction may be a good objective, the ExA is warned to be careful of "greenwash" with this and other announcements by the Applicant.

103 There are many potential issues with hydrogen, and I focus here on just those relating to the GHG effects.

104 First, the Applicant has not made clear what type of hydrogen it intends to purchase. There are several types, of which the main three are gray, blue and green as shown below.

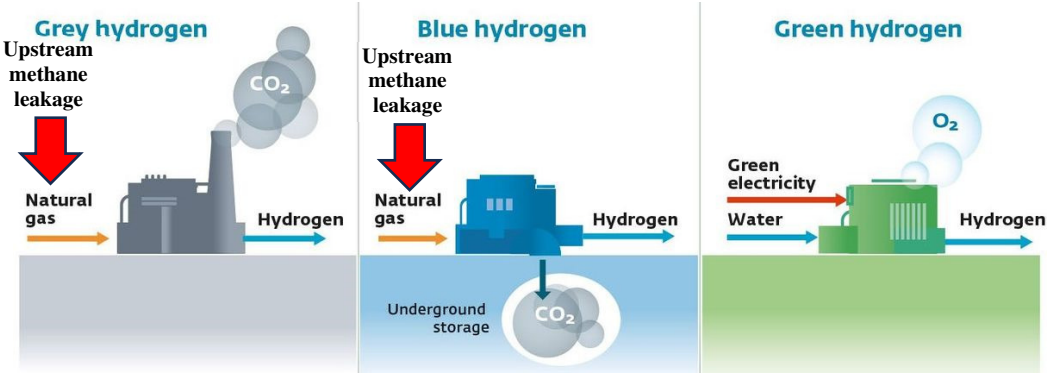

Figure 8: Types of hydrogen

105 The applicant must first make clear what type of hydrogen it intends to purchase.

106 The first detrimental effect is upstream methane leakage. This applies to both gray and blue hydrogen as shown on Figure above. Methane is a very dangerous GHG which is considerably stronger than CO2 in its greenhouse effect. Consequently, even small amount of leakage can considerably increase the carbon intensity of the output hydrogen.

107 For gray and blue hydrogen the methane reformation process produces CO2, similar to burning gas in a power station. For gray hydrogen, this comes with a significant carbon intensity for the output hydrogen.

108 Blue hydrogen proposes to use speculative carbon capture and storage (CCS) technology. No commercial CCS plant has achieved over 80% capture of CO2; most considerably less. Therefore, although there might be some reduction in the carbon intensity of the hydrogen within a blue hydrogen process, there is no commercial demonstration to date that it will a significant benefit.

109 All pipes and equipment handling hydrogen are also subject to hydrogen leakage. Hydrogen leakage itself also contributes to climate change, because hydrogen in the atmosphere has an indirect global warming effect through mechanisms that extend the lifetime of methane and other greenhouse gases (GHG) in the atmosphere (Paulot et al. 2012; Derwent et al. 2020). Please see the report from the Center for Global Energy Policy[63] at Columbia University at Appendix C for more detail. The hydrogen leakage issue applies to gray, blue and green hydrogen, as it relates to downstream handling of hydrogen once it has been produced.

110 The Applicant must provide quantified estimates of, and EIA assessment of, any effects and climate impacts by moving to hydrogen-based plant and equipment which include each of the above effects:

(A) upstream methane leakage; and

(B) CO2 emissions from gray and blue hydrogen production; and

(C) downstream hydrogen leakage; and

(D) full lifecycle carbon intensity of hydrogen used.

111 Further, even with green hydrogen, it is far preferrable to use the input electricity directly (rather than making hydrogen) as energy from green hydrogen is about 6 times less efficient than the source electricity.

[63] The Center on Global Energy Policy (CGEP) at Columbia University's School of International and Public Affairs develops evidence-based research to help address the world's most challenging energy and climate problems through research, education, and dialogue. We accomplish this by: producing best-in-class research, providing a global platform to communicate, and training tomorrow's leaders and communicators.

10 CONTEXTUALISATION OF LTC WITH CBDP SURFACE TRANSPORT AND INDUSTRIAL RESIDIUAL EMISSIONS

112 In a recent closing submission (Application Document Ref:TR010060/EXAM/9.74, REP7-078) on another DCO Application (A12 Chelmsford to A120 widening scheme), the Applicant has provided a "Contextualisation against the Carbon Budget Delivery Plan".

113 At 7.3.26, the Applicant states:

> *"Accordingly, the CBDP provides indicative projected sectoral-based residual emissions. The CBDP confirms, therefore, that these figures are only projections and are not to be interpreted as hard sectoral policy targets. The CBDP further sets out the reasons why it is necessary to retain flexibility within the overall carbon budgets."*

114 The Applicant then volunteers a contextualisation of the DCO scheme against the CBDP Table 2 projections. In a rare moment of potential agreement, I concur with the Applicant that contextualisation against indicative sectorial emissions is a valuable exercise.

115 I now produce the same for the LTC scheme with the additional use of the CCC data of "Credible plans" and "To Be Secured". Just to be clear, I am not attempting to repeat exactly the same process as the Applicant does on the other scheme, so details may differ.

10.1 Construction

116 Table 3 provides a contextualisation for the LTC Construction emissions.

	tCO2e	Fourth (2023 to 2027)	Fifth (2028 to 2032)	Sixth (2033 to 2037)
B_1	National Budget - 5 years	1,950,000,000	1,725,000,000	965,000,000
B_7	Industry Residual Emissions (IRE, CBDP, Table 2) - 5 years	340,000,000	207,000,000	111,000,000
B_10	Industry (Credible plans - CCC) - 5 years	6,218,707	5,500,000	5,500,000
B_11	Industry (To Be Secured - CCC) - 5 years	11,508,707	114,869,270	195,741,764
CONS	Construction	1,148,319	614,648	0
Z = CONS/B_1	Construction /National Budget	0.059%	0.036%	
Y = CONS/B_7	Construction /IRE	0.338%	0.297%	

Table 3: Contextualisation: Construction emissions

117 The construction is estimated by the Applicant to fall over two carbon budget periods as shown in the row CONS. When the construction is compared to the CBDP Industrial Residual Emissions, the estimates are 0.338% and 0.297% of the residual emissions for 4CB and 5CB respectively [row Y]. These figures are very significant additional emissions, both in their absolute quantities (over 1 million tonnes in 4CB) and sector percentages, to be adding to the sector when considering that the entire rest of UK Industry which extends well beyond construction.

118 It should be noted, according to CCC, the Industry sector still has to secure 11.5MtCO2e of reductions in the 4CB and 115MtCO2e in the 5CB. There is therefore very considerable risk of generating these new emissions, especially in the 5CB.

119 Put together, the LTC scheme brings in its construction with a very high carbon footprint. This is around 0.3% of the industry residual emissions for the whole UK in each of the 4CB and 5CB, and this sector is much more construction covering the whole of UK Industry. The Applicant is asking to use 1/300th of the whole allocation of UK Industry whilst at the same time as the country needs to find 11.5 MtCO2e and 115 MtCO2e of as yet unsecured emissions reductions in the 4 CB and 5CB respectively. We are already in the 4CB (as of January 2023), so it is although it is a smaller figure, there is much less time available to secure the emissions reductions.

120 My conclusion is that there is not available emissions space for this additional project to be constructed. Were it to come forward, it is contending with many other areas of Industry. For the 4CB phase of construction, the project is at significant risk to busting the residual emissions allocation as the probability of delivering all of the 11.5MtCO2 of unsecured emissions reductions is high. In the 5CB, there is a much larger figure of unsecured emissions, which again makes it highly probable that the project will bust the residual emissions allocation.

121 I conclude that there is not sufficient emissions space in the 4CB and 5CB residual emissions allocations for the project to be constructed.

10.2 Operation

122 Table 4 provides a contextualisation for the LTC Operation emissions.

123 Some figures have been derived from the Applicant's Chapter 15: a brief explanation is given in the footnotes.

124 Comparisons with the Domestic Transport Residual Emissions is given for both the solus DS-DM estimates produced by the Applicant and for DS. DS represents the emissions in the Applicant's traffic model arising from existing traffic, other land-based and road developments included in the models, and for the scheme itself. It therefore provides a cumulative indicator of the scheme and its cumulative effects. In effect, it provides the emissions from the traffic system in which the scheme is to be developed and which the Applicant's traffic model computes.

	tCO2e	Fourth (2023 to 2027)	Fifth (2028 to 2032)	Sixth (2033 to 2037)
B_1	National Budget - 5 years	1,950,000,000	1,725,000,000	965,000,000
B_2	Domestic Transport Residual Emissions (DTRE, CBDP, Table 2) - 5 years	546,000,000	422,000,000	254,000,000
B_5	Surface Transport (Credible plans - CCC) - 5 years	45,823,269	83,000,000	143,500,000
B_6	Surface Transport (To Be Secured - CCC) - 5 years	19,776,919	122,600,000	228,650,000
SOL_1	Solus Road users (DS-DM)[64]		283,840	457,033
SOL_2	Solus (DS-DM) + O&M		284,451	462,173
A = SOL_2/B_1	Solus (DS-DM) + O&M /National Budget		0.016%	0.048%
B = SOL_1/B_2	Solus Road users (DS-DM) / DTRE		0.07%	0.18%
CUMU_1	Cumulative Traffic Model (DS) Road Users		26,584,622	41,612,417
C = CUMU_1/B_1	Cumulative Traffic Model (DS) Road Users / National Budget		1.54%	4.31%
D = CUMU_1/B_2	Cumulative Traffic Model (DS) Road Users / DTRE		6.30%	16.38%

Table 4: Contextualisation: Operation emissions

125 It should be noted that the figures also shows that 740,000 tonnes of Co2 are emitted from the scheme in the 5CB and 6CB when the operation emissions are calculated solely for the scheme itself (ie "solus" not cumulative) [row SOL_1]. When the entire traffic system which is modelled for the scheme is considered (the DS case), the scheme produces over 68 million tonnes in the 5CB and 6CB [row CUMU_1].

126 I have explained above that the risk assessment for the CBDP is not fit for purpose and is under legal challenge as a result. Further, the domestic[65] transport sector is the sector which has already caused shortfalls (since the original NZS) which have meant that climate targets for 2030 and 2035 are currently planned to be missed.

127 The DS emissions from the scheme (ie: the modelled traffic system with the LTC) is due to consume 6.3% of the 5CB Domestic Transport Residual Emissions, and 16.4% of the 6CB (row D). This is a very large proportion of the residual emissions available considering that the modelled traffic system is still a relatively small part of the total UK traffic system.

128 It should further be noted that according to the CCC Progress Report the surface transport sector has yet to secure 122.6 MtCO2e of emission reductions in the 5CB and 228.6 MtCO2e in the 6CB.

129 Put together, the LTC scheme brings with it a traffic system, as modelled, with a very high carbon footprint (16.4% of the residual surface transport emissions for the whole UK in the

[64] It is necessary to calculate road user emissions without the non-road use operation and maintenance emissions. It is also necessary to calculate this for the 5-year carbon budgets. Data was taken from Tables 15.15 to Tables 15.17 to do this. The Do Minimum and Do Something figures from Table 15.16 for 2030 and 2045 were extracted and a linear interpolation applied so that annual figures could be calculated. The DM and DS figures for years were then summed into carbon budgets. Non road user operation and maintenance emissions were calculated to 2039 and subtracted to give the DS-DM road user emissions. The non road user operation and maintenance emissions do not seem entirely consistent in the Applicant's table to me, however, the amounts are small are do not make a significant difference to the final figures.

[65] Note, on terminology, that CCC refer to road transport being in the surface transport sector whilst the Government in the CBDP refers to the domestic transport sector.

6CB) at the same time as the country needs to find 228.6 MtCO2e of as yet unsecured emissions reductions.

130 My conclusion is that there is not available emissions space for this additional project to be operated in the 5CB and 6CB, particularly impacting the chances of the UK meeting the sixth carbon budget. Were it to come forward, it is contending with the entire rest of the transport system whilst consuming over 16% of the available entire emissions space (the scheme as traffic modelled with the traffic system in which it resides). For the 6CB phase of operation, the project is at significant risk to busting the residual emissions allocation as the probability of delivering all of the 228.6MtCO2 of unsecured emissions reductions is high.

131 I conclude that there is not sufficient emissions space in the 5CB and 6CB residual emissions allocations for the project to be operated.

10.3 Approaches to Contextualisation discussion

132 The Applicant addresses the use of contextualisation differently to me. There has been a trend of the Applicant's generating contextualisations, as in the A12 example mentioned above. However, the Applicant uses contextualisation as an afterthought, having already decided the significance of the GHG emissions for EIA purposes. The contextualisation therefore adds nothing to the process and is just going through the motions of doing something which looks "impressive" in some sense.

133 However, my approach is that contextualisation is a holistic part of the whole assessing significance process. The best practice guidance from IEMA states that the national carbon budgets are "a starting point"[66] for determining the EIA significance of the impacts of carbon emissions but expressly recommends that further valuable contextualisation can be provided by comparisons with other budgets, in this case sectorial residual emissions from the CBDP and the CCC assessment of credible and non-secured emissions reductions. The approach to contextualisation in this submission is then consistent with IEMA of a holistic approach where comparisons with national budgets has been performed as a starting point.

134 The precision of the scientific process of evaluating the significance of the emissions is enhanced by using different sources of benchmark for comparison. Carbon emissions may have a global environmental impact. However, it is standard practice for many years that they are sub-divided into national budgets (under the UN international climate accounting process). Further, within countries, their policy effect is considered by consideration of their sectorial contribution – that is exactly what the CBDP and the CCC Progress Report are all about.

135 Therefore, greater precision results from evaluating the impacts of emissions through the sectorial residual emissions – the effect on policy delivery may be brought into the consideration, as I have done above.

[66] Institute of Environmental Management & Assessment (IEMA), "Assessing greenhouse gas emissions and evaluating their significance", version 2, 2022, page 27

136 This is important because the greater precision, and sector specific policy considerations, gives a much better perspective of how the estimated emissions relate to the significance threshold (for example, the IEMA Guidance significance thresholds). It also provides much greater confidence about the significance assessment made.

137 This is critical as the use of sector residual emissions contextualisation can change the value of the significance assessment made. And so such contextualisation strongly assists the EIA requirement to assess the significance of environmental impacts of the scheme, and for the decision maker to give consideration to that environmental impact.

138 For example, a scheme identified as "Minor Adverse" by comparison with only a national carbon budget may be found to be "Major Adverse" when contextualisation with sector residual emissions is a holistic part of the overall significance assessment and contextualisation process.

139 The Applicant's approach of treating contextualisation as an afterthought after significance assessment has been made by comparison with national budgets actually equates to the Applicant predetermining the significance assessment.

10.4 Contextualisation discussion

140 I now return to the two questions from the beginning of this WR:

> *'**(Q1)** The most important question is "to what extent does the project contribute, or undermine, securing the Net Zero Strategy ("NZS") and the net zero target?"'.*

> *'**(Q2)** Is there any emissions space available for a project such as Lower Thames Crossing which has construction emissions of 1,762,967 tCO2e and opening year (2030) traffic model "DS" operation emissions of 8,996,305 tCO2e [Table 15.16]?'*

141 I have already provided my conclusions on (2) - there is not sufficient emissions space in the 4CB and 5CB (Industry) residual emissions allocations for the project to be constructed, and there is not sufficient emissions space in the 5CB and 6CB (Surface Transport) residual emissions allocations for the project to be operated.

142 If the project does not have the available emissions space, then by definition it undermines *securing the CBDP and the net zero target.* I therefore assess it to be "Major Adverse" on the IEMA significance thresholds[67]. Major adverse is defined as :

> *"**Major adverse:** the project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A*

[67] Institute of Environmental Management & Assessment (IEMA), "Assessing greenhouse gas emissions and evaluating their significance", version 2, 2022, page 26

project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.

143 I have provided evidence that the project risks the further necessary emissions reductions required by existing national policy for projects of this type (ie: meeting the residual emissions, and associated policies, for both the Industry and Surface Transport sectors) as there is no emissions space for it. It has the major adverse effect of locking in emissions rather than meeting the residual emissions allocation. It therefore does not make a meaningful contribution to the UK's trajectory towards net zero.

144 It is worth noting that the question of whether the contextualisation shows the scheme to be "Minor Adverse", or more than "Minor Adverse" (ie "Moderate Adverse" or "Major Adverse") is important on the IEMA thresholds. This is because this is the threshold point for significance in the IEMA guidance[68]. A "Minor Adverse" scheme is not significant whereas a more than "Minor Adverse" scheme has significant adverse effects.

11 COMMENTS ON DECISION MAKING FOR THE LTC

11.1 Considerations that must be before the Secretary of State

145 These are points which I respectfully submit that the ExA may wish to drill into as the SoS must considers them in his/her decision making.

(A) It is clear from the ES from the Applicant's own data that LTC scheme creates additional, and very significant, carbon emissions: over 1.1 million tonnes of CO2e from construction in the 4CB. A further 740,000 tonnes are emitted from the scheme in the 5CB and 6CB when the operation emissions are calculated solely for the scheme itself (ie "solus" not cumulative). When the entire traffic system which is modelled for the scheme is considered (the DS case), the scheme produces over 68 million tonnes in the 5CB and 6CB.

(B) It is also clear from the evidence above on CBDP that there is no evidence that delivery of this critical climate policy under the Climate Change Act 2008 is secured. In fact, the evidence strongly supports the opposite case that the CBDP is unlikely to be delivered successfully, and, in any case, the risks to delivery have not been adequately assessed. Currently, there are shortfalls for delivering the 2030 NDC and the 6th carbon budget, and much of the underlying policy is not supported by credible plans (CCC 2023 Progress Report).

(C) At the time of his/her decision, the SoS should consider the latest evidence on CBDP, and the status of the on-going legal challenge to it, any related reports from the Transport Select committee (eg on the draft NNNPS). He/she should

[68] Institute of Environmental Management & Assessment (IEMA), "Assessing greenhouse gas emissions and evaluating their significance", version 2, 2022, page 26

also consider the 2023 CCC Progress Report, any updates to the Green Alliance Net Zero Policy Tracker, Professor Marsden's research and my submissions here.

(D) I have provided contextualisation of the scheme against the residual emissions in the CBDP for the surface transport (operation) and industry (construction) sectors, and have used the contextualisations to respond to the question:

> *"Is there any emissions space available for a project such as Lower Thames Crossing which has construction emissions of 1,762,967 tCO2e and opening year (2030) traffic model "DS" operation emissions of 8,996,305 tCO2e [Table 15.16]?"*

(E) I conclude that there is not sufficient emissions space in the 4CB and 5CB (Industry) residual emissions allocations for the project to be constructed, and there is not sufficient emissions space in the 5CB and 6CB (Surface Transport) residual emissions allocations for the project to be operated.

(F) By definition, given this, the project undermines securing the CBDP and the net zero target. I therefore assess it to be "Major Adverse" on the IEMA significance thresholds.

(G) This equates to failing the existing NPSNN 5.18 test as the increase in carbon emissions resulting from the proposed scheme are so significant that it would have a material impact on the ability of Government to meet its carbon reduction targets.

(H) As the application has an applicable national policy statement (ie the existing NNNPS), section 104 of the Planning Act 2008 ("the 2008 Act") applies to the decision making. This states that the Secretary of State must decide an application in accordance with the relevant NPSs except to the extent s/he is satisfied that to do so would:

- lead to the UK being in breach of its international obligations (s104(4));
- be in breach of any statutory duty (s104(5));
- be unlawful (s104(6));
- result in adverse impacts from the development outweighing the benefits (s104(7)); or
- be contrary to regulations about how its decisions are to be taken (s104(8)).

(I) As far as s104(4) is concerned, the scheme generates over 1.1 million tonnes CO2e from construction up to 2030. This consumes 1/300th of the whole allocation of UK Industry whilst at the same time as the country needs to find 11.5 MtCO2e and 115 MtCO2e of as yet unsecured emissions reductions in the 4CB and 5CB respectively. This creates a strong risk that the UK will fail to deliver its 2030 NDC.

(J) An 8 MtCO2e shortfall on the NDC has already been noted in the CBDP – the LTC scheme makes the possible shortfall worse by over another 1.76 MtCO2e. Critically, as the CBDP contains no fit for purpose risk assessment, the Applicant can provide no evidence that the project can be built whilst securing the 2030 NDC. Therefore, the scheme risks the UK being in breach of its international obligations, and the SoS cannot have any legal certainty that approving the scheme will not lead to the UK being in breach of its international obligations.

(K) As far as s104(5) is concerned, the statutory duty to deliver the 5th and 6th carbon budgets depend upon the successful delivery of the CBDP. Construction emissions affect the 5CB as above. The surface transport sector has yet to secure 122.6 MtCO2e of emission reductions in the 5CB and 228.6 MtCO2e in the 6CB. The LTC scheme brings with it a traffic system, as modelled, with a very high carbon footprint (16.4% of the residual surface transport emissions for the whole UK in the 6CB) at the same time as the country needs to find 228.6 MtCO2e of as yet unsecured emissions reductions.

(L) Therefore, by adding new construction and operation emissions to the vital 5th and 6th carbon budget periods, the scheme risks the UK being in breach of the Climate Change Act 2008, and the SoS being in breach of his/her statutory duty. The SoS cannot have any legal certainty that approving the scheme will not lead to him/her being in breach of a statutory duty.

(M) As far as s104(6) is concerned, the legal requirement to deliver the 5th and 6th carbon budgets under the Climate Change Act 2008 depend upon the successful delivery of the CBDP. As above, the scheme risks the UK being in breach of the Climate Change Act 2008, and the SoS being in breach of the law. The SoS cannot have any legal certainty that approving the scheme will not lead to him/her being in breach of the law.

12 CONCLUSIONS

146 The Net Zero Strategy, the CBDP and the UK carbon budgets are not secured. Further it is contested in the High Court that there has been no adequate or lawful risk assessment of the policy delivery of the CBDP.

147 In this situation, any additional emissions from new infrastructure, such as the construction and operation emissions of the LTC scheme, have a material impact on the ability of Government to meet its carbon reduction targets which is itself dependent on policy delivery of the CBDP.

148 I have provided an analysis of the implications for the decision making on the LTC scheme.

149 I respectfully request that the ExA considers the points listed under the section "Considerations that must be before the Secretary of State" in the Examination Report and requests that the SoS considers them in his/her decision making.

150 Specifically, as the CBDP is not secured, and the UK carbon budgets and UK NDC are not secured, the Secretary of State must consider if his/her decision would lead to the UK being in breach of its international obligations, to him/her being in breach of a statutory duty, to him/her being in breach of the law under section 104 of the 2008 Act.

151 The climate impacts of the GHG emissions from the scheme are Major Adverse for both construction and operation. This is overwhelmingly against the scheme in the planning balance. And in the context of policy (CBDP) and legislation (the Climate Change Act and the carbon budgets and targets), the evidence of the risk to delivery of the CBDP itself, and the risk to the delivery of the CBDP from the scheme, and the current NNNPS requirement for the scheme not to have a material impact on the ability of Government to meet its carbon reduction targets, the scheme should not be consented.

Dr Andrew Boswell,
Climate Emergency Policy and Planning, July 18th 2023

13 APPENDIX A: MARSDEN REPORT, May 16th 2023

Marsden, G. 2023. Reverse gear: The reality and implications of national transport emission reduction policies. Centre for Research into Energy Demand Solutions. Oxford, UK. ISBN: 978-1-913299-17-0

<supplied in a separate file>

14 APPENDIX B: LTC SUSTAINABILITY REPORT, JULY 2023

152 Lower Thames Crossing, Sustainability report, "Delivering the UK's greenest road" July 2023

<supplied in a separate file>

15 APPENDIX C: MARSDEN REPORT, May 16th 2023

Marsden, G. 2023. Reverse gear: The reality and implications of national transport emission reduction policies. Centre for Research into Energy Demand Solutions. Oxford, UK. ISBN: 978-1-913299-17-0

<supplied in a separate file>

16 APPENDIX D: RESUME, Dr Andrew Boswell

I am a retired scientist and environmental consultant, working at the intersection of science, policy, and law, particularly relating to ecology and climate change.

- Undergraduate degree, BSc 1977, 1st class honours, Chemistry, Imperial College London
- Postgraduate, DPhil 1981, Oxford University, supervisor Professor R J P Williams, FRS, in Structural Biology, protein binding sites and dynamics
- 1984-1993, software engineering, testing, simulation systems for high-level design and logic synthesis of Very Large Scale Integrated (VLSI) circuits
- MSc, 1994, Parallel Computing Systems, University of the West of England
- 1995-2006, Manager high-performance and computing service across science departments at the University of East Anglia (UEA). System management and scientific modelling including climate modelling
- 2005-2017, Green Party Councillor and sometimes group leader, Norfolk County Council and Norwich City Council
- 2017-2022, Climate Emergency Policy and Planning. CEPP is my own consultancy to promote the necessary rapid response to the Climate Emergency in mainstream institutions, such as local authorities and government, through the lenses of science, policy, and litigation. Expert contributor to the proposed UK Climate and Ecology Bill[69]. Foundation for Integrated Transport[70]fellowship on "*Exposing the flaws in carbon assessment and transport modelling for road schemes*." Interested party and expert witness on many current UK infrastructure planning examinations[71]. Climate and science-based litigation on three schemes[72]: three judicial reviews launched in the London High Court in summer and autumn 2022.

[69] https://www.ceebill.uk/bill

[70] https://integratedtransport.co.uk/work-we-fund

[71] including A38 Derby Junctions; A417 Missing Link; A57 Link Road; A303 Stonehenge; A47 Blofield to North Burlingham; A47 North Tuddenham to Easton; A47-A11 Thickthorn Junction; A47 Wansford to Sutton; A66 Northern Trans-Pennine Project; A720 Sheriffhall Roundabout, Edinburgh; Net Zero Teesside; Drax Bioenergy with Carbon Capture and Storage Project

[72] A47 Blofield to North Burlingham; A47 North Tuddenham to Easton; A47 -A11 Thickthorn Junction