

CASE REF: APP/U3100/V/23/3326625

Proof of evidence: carbon emissions and financial viability

Matters 8 (the effect of the proposal on climate change and carbon emissions) and 14 (other policy matters and the overall planning balance)

Ng Chien Xen

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Introduction

- 1 I am a transport economist with experience advising governments and companies on the business cases of large infrastructure projects. I have also worked on infrastructure costs on a number of regulatory price reviews, with a recent focus on estimating the impact of inflation on costs. In addition, my analysis has been submitted to courts and tribunals. My CV is provided in appendix 1.
- 2 My verbal statement broadly follows my submitted statement, and responds to some of the key points made by the Applicant. My verbal statement will be structured as follows. First, I will discuss HIF1's carbon emissions and whether they are consistent with the OCC's Local Transport and Connectivity Plan (LTCP). Next, I will discuss HIF1's financial viability, and therefore, its affordability and deliverability under the current funding envelop. I will conclude with my key messages.

Carbon emissions

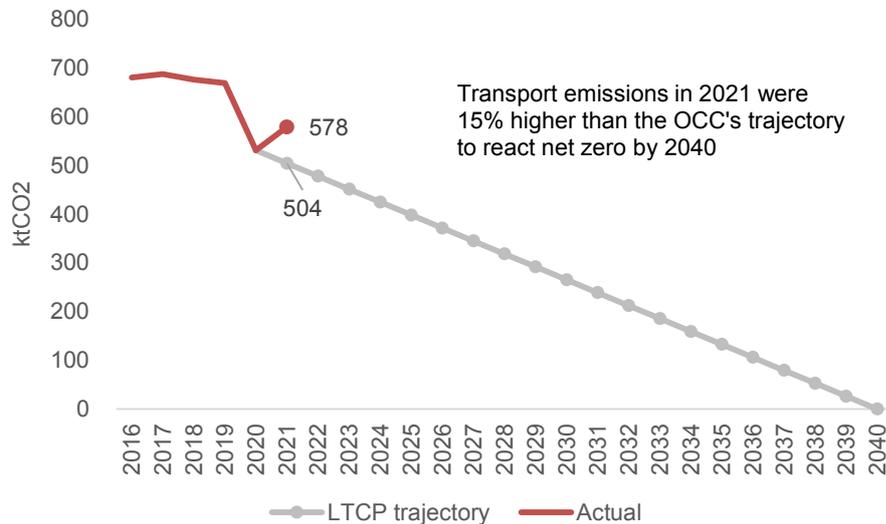
The OCC's climate targets are challenging; current evidence suggests a significant risk of missing these targets

- 3 The LTCP targets reducing current Oxfordshire car trips by a quarter by 2030, a third by 2040, and a net-zero transport network by 2040. Are HIF1's carbon emissions and traffic impacts consistent with these targets? HIF1 may be consistent with these targets if its emissions and traffic impacts can be offset by a reduction in emissions and traffic elsewhere in Oxfordshire so that Oxfordshire as a whole is able to meet its targets.
- 4 To assess whether this is possible, I consider the traffic and carbon pathway that Oxfordshire needs to follow to meet its targets. The latest 'LTCP monitoring report' sets out the emissions pathway required to reach a net-zero transport network by 2040.¹ This pathway shows that the emissions reduction achieved in 2020 due to lower travel demand during the pandemic needs to be maintained, with further reductions each year. Are we currently aligned with this pathway?
- 5 Figure 1 compares the LTCP monitoring report's pathway against actual emissions. It shows that actual emissions increased in 2021 and is around 15% higher than the trajectory set out

¹ OCC (2023), 'Local transport and connectivity plan—monitoring report 2022-2023', July, Figure 3, <https://shorturl.at/CJL01> (accessed 14 December 2023).

by the OCC; the methodology is available in appendix **Error! Reference source not found.**

Figure 1 Transport carbon emissions in South Oxfordshire and the Vale of White Horse: actual vs. net zero trajectory



Source: LTCP monitoring report² and DESNZ.³

- 6 Similarly, the number of car trips increased by 4.5% from 2019–2022; however, a 25% reduction by 2030 is required.
- 7 This evidence suggests Oxfordshire is not on track to achieve its climate targets. This is consistent with the Climate Change Committee’s (CCC) June 2023 report to parliament, which states that without policy action traffic is likely to increase beyond the CCC’s decarbonisation pathway.⁴

HIF1’s emissions have been underestimated by approximately a factor of 4, and the impact on local carbon budgets have not been assessed.

- 8 I will now focus on HIF1’s carbon emissions and how it relates to the LTCP.

² OCC (2023), 'Local transport and connectivity plan—monitoring report 2022-2023', July, Figure 3, <https://shorturl.at/CJL01> (accessed 14 December 2023).

³ DESNZ (2023), 'UK local authority and regional greenhouse gas emissions national statistics, 2005 to 2021', July, 'Local Authority territorial carbon dioxide (CO2) emissions estimates within the scope of influence of Local Authorities 2005-2021' tab, <https://shorturl.at/dgtR7> (accessed 14 December 2023).

⁴ Climate Change Committee (2023), 'Progress in reducing emissions. 2023 report to parliament', p.113, <https://shorturl.at/ejtW2> (accessed 15 December 2023).

- 9 Policy 27 of the LTCP requires that the OCC assess the impact of HIF1 on Oxfordshire's carbon budgets, taking into account embodied, operational and user emissions. However, the OCC's assessment of HIF1's emissions is not compliant with this policy for two key reasons.
- 10 First, the OCC's approach to quantifying user emissions is flawed. It finds that road user emissions will fall if HIF1 proceeds compared to if it did not.⁵ This is because the OCC has assumed, without justification, that emissions will increase at the same rate regardless of whether HIF1 proceeds.⁶ In particular, paragraph 15.5.3 of the Applicant's Environmental Statement states that: "2034 emissions under the 'Do minimum' scenario have been estimated by assuming that they will increase from 2025 in the same ratio as the 2025 to 2034 increase for the 'Do Something' scenario".
- 11 This is counter-intuitive: if there is additional road capacity, I would expect that traffic growth, and therefore emissions growth, would be faster than if there were no additional road capacity. For example, the OCC's LTCP states: "we have found that road schemes often generate new demand and quick reach capacity again." Evidence from the DfT suggests that when additional road capacity is added and suppressed demand is unlocked, there can be significant additional traffic.⁷ This is known as 'induced demand'.
- 12 What is the carbon impact of this induced demand? I estimate that HIF1's user emissions up to 2050 are around 326ktCO₂. This accounts for the expected uptake of electric vehicles. When added to the OCC's estimates of embodied emissions, HIF1's overall emissions are around 481ktCO₂. This significantly exceeds the OCC's estimate of around 124ktCO₂, an underestimate by a factor of 3.9.^{8,9} The key message is that the OCC's carbon quantification approach is flawed because it does not account for the fact that when you expand a road, more people will drive, known as 'induced demand'.

⁵ AECOM (2021), 'Didcot Garden Town HIF1 Scheme. Chapter 15 – climate', para. 15.10.11, <https://shorturl.at/pAEMN> (accessed 16 December 2023).

⁶ AECOM (2021), 'Didcot Garden Town HIF1 Scheme. Chapter 15 – climate', para. 15.5.3, <https://shorturl.at/pAEMN> (accessed 16 December 2023). In this paragraph, it is explained that this assumption was used because 'existing plans for urban development in the area present methodological challenges for the traffic model when considering 2034 emissions' without providing further explanation as to what these limitations are. It also states that this assumption was agreed in consultation with the OCC and Wood Group UK Limited.

⁷ Department for Transport (2018), 'Latest evidence on induced travel demand: an evidence review', May, <https://assets.publishing.service.gov.uk/media/5c0e5848e5274a0bf3cbe124/latest-evidence-on-induced-travel-demand-an-evidence-review.pdf> (accessed 18 March 2024).

⁸ I have calculated this by adding embodied emissions (155ktCO₂) to operational emissions (OCC's calculation shows a reduction of 5,752tCO₂ over 5 years, or 1,150tCO₂ per year) up until 2050. AECOM (2021), 'Didcot Garden Town HIF1 Scheme. Chapter 15 – climate', table 15.15, <https://shorturl.at/pAEMN> (accessed 16 December 2023).

⁹ Further details are provided in appendix **Error! Reference source not found.**

- 13 Second, the OCC has not assessed HIF1’s contribution to Oxfordshire’s carbon budget. Based on research by the Tyndall Centre at the University of Manchester, I have compared HIF1’s emissions (orange area) to South Oxfordshire and the Vale’s carbon budgets (orange and grey area) in Figure 2 below.¹⁰ I note that I have justified my choice of using South Oxfordshire’s and the Vale’s carbon budget, rather than all of Oxfordshire, in appendix 2. My analysis shows that HIF1 will consume a significant proportion of the carbon budget—around 20%.¹¹ This is equivalent to the annual car emissions of around 350,000 South Oxfordshire and Vale of White Horse residents.¹²
- 14 Instead, the OCC has only compared HIF1’s emissions to national carbon budgets. It finds that HIF1 uses up only 0.0077% of the carbon budget from 2023–2027, and reduces emissions in the following years; the OCC concludes that the greenhouse gas effects are ‘not significant’.¹³ However, comparing the emissions of HIF1, a local infrastructure project, to the national carbon budget—all the emissions from all sources in the whole UK economy—is fundamentally flawed. It neglects the impact HIF1 has on Oxfordshire’s own carbon reduction targets. The CCC has emphasised that strategic policy and practical action at local levels are critical to achieving the pathway towards net zero.¹⁴

Figure 2 Impact of HIF1 on South Oxfordshire and the Vale of White Horse’s remaining transport carbon budget

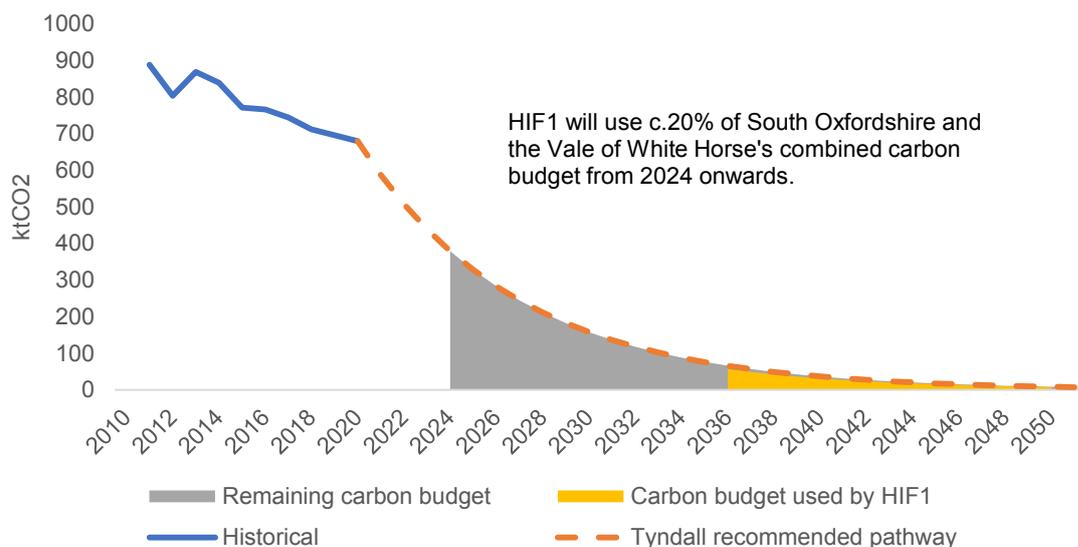
¹⁰ Further details are provided in appendix **Error! Reference source not found.**

¹¹ Or 10% of Oxfordshire’s remaining transport carbon budget, which is still significant. However, for reasons set out in appendix 2, it is more appropriate to consider South Oxfordshire and the Vale of White Horse’s carbon budget, rather than for Oxfordshire as a whole.

¹² CREDS, ‘Place-based carbon calculator’, <https://www.carbon.place/la/> (accessed 16 December 2023). Average of 2019 car emissions for South Oxfordshire and the Vale of White Horse.

¹³ AECOM (2023), ‘Didcot Garden Town HIF1 Scheme. Chapter 15 – Climate’, September, Table 15.15, <https://shorturl.at/prwHl> (accessed 29 December 2023).

¹⁴ Climate Change Committee (2020), ‘Local authorities and the sixth carbon budget’, December, p.16,



Source: Tyndall Centre¹⁵ and author's calculations.¹⁶

HIF1 is unlikely to encourage modal shift away from car travel towards active travel and buses

15 Now, I would like to address a key point that the Applicant has made, which is the claim that the Scheme will enable modal shift by providing “significant dedicated infrastructure for Active Travel and highway infrastructure which enables enhanced bus connectivity.” (Disley, para 2.5).

16 Would these measures be effective limiting the demand for private car travel and achieving modal shift towards active travel and buses? I would like to invite the inspector to consider the experience of other urban areas which have been successful in doing so.

17 Consider Oxford city as a case study. According to the Oxford Transport Strategy, published by the OCC in 2016, Oxford's population grew by 16,000, a 13% increase between 2001 and 2011. Yet, traffic flows on key roads actually dropped over the same period. How has this happened? The OCC explains that this was been achieved through a combination of measures, including not only public transport, walking and cycling improvements, but also city-centre traffic restrictions including bus gates, high public parking charges, and planning policies that restrict parking supply.¹⁷

¹⁵ Tyndall Centre, 'The Tyndall Carbon Budget Tool', <https://shorturl.at/bfrBY> (accessed 16 December 2023). The figure can be recreated by selecting both the Vale of White Horse and South Oxfordshire in the 'create a new combined authority' tool.

¹⁶ See appendix **Error! Reference source not found.** for further details and sensitivities.

¹⁷ Oxford Transport Strategy. <https://mycouncil.oxford.gov.uk/documents/s34993/OTS.pdf>, p.24.

- 18 In other words, public transport and active transport was improved, but car travel was restricted by increasing its cost and reallocating road space away from cars. To the best of my knowledge, a similar package of measures is not being proposed in the context of the HIF1 scheme.
- 19 Oxford's experience is common to other urban areas, including London, Singapore and Utrecht. In each of these areas, a combination of 'carrot' and 'stick' measures have been used, whereby the 'carrot' measures improve alternative modes of transport to car travel and the 'stick' measures make car travel more expensive and reduce roadspace for cars.
- 20 However, HIF1 is not consistent with the approaches taken in other areas to generate modal shift. Instead, by increasing road capacity for car travel, it will increase car traffic, even if it also buses and active travel at the same time, and risks failing to engender the modal shift that OCC seeks. I would like to highlight to the inspector that the Applicant has not provided modelling evidence to support its assertions of modal shift. In fact, its own modelling results, as set out in Ms. Currie's Proof of Evidence, shows that bus travel remains essentially the same, and even declines slightly, once the road is constructed.

Proceeding with HIF1 leads to a significant risk that Oxfordshire's climate targets cannot be met

- 21 It is unlikely that HIF1's emissions could be absorbed by identifying emissions reductions in other areas, given that the transport sector is not currently aligned with the net zero trajectory. To illustrate this further, my analysis suggests HIF1's emissions would significantly exceed the potential carbon savings from Oxfordshire achieving its cycling targets by around 60%.¹⁸
- 22 The CCC is clear: 'constraining the growth in vehicle mileage is vital to reducing emissions'¹⁹ and that road-building projects should be reviewed to ensure that they 'do not lock in unsustainable levels of traffic growth' and 'permit schemes only if they can meaningfully support cost-effective delivery of Net Zero'.²⁰ My analysis suggests HIF1 does not meet these criteria.

Financial viability

¹⁸ See appendix **Error! Reference source not found.** for further details.

¹⁹ CCC (2020), 'Local authorities and the sixth carbon budget', December, p.81, <https://shorturl.at/dHR26> (accessed 19 December 2023).

²⁰ CCC (2023), 'Progress in reducing emissions. 2023 report to parliament', June, p.420, recommendation R2023-148, <https://shorturl.at/pPY08> (accessed 19 December 2023).

- 23 HIF1 is unlikely to be financially viable within the current funding envelope.²¹ This is for three key reasons.
- 24 First, the budget for HIF1, set in early 2022, failed to anticipate rising inflation, and allocated only £27m for inflation.²² My analysis, based on the BCIS All-in Tender Price Index,²³ suggests an inflation allowance of £62m is required, more than double what is available.²⁴
- 25 Second, there is insufficient allowance for risk. While a £52m risk and contingency fund is included, my analysis indicates this equates to only a P62 degree of certainty using the DfT's TAG framework,²⁵ meaning that there is only a 62% probability that HIF1 can be completed in the given budget. Typically, a P80 risk allowance is used instead²⁶—around £80m in the case of HIF1.
- 26 Taking these two factors together, I estimate the overall cost of HIF1 to be £366m, which significantly exceeds the current available funding of £296m.²⁷
- 27 Third, HIF1 is unlikely to be deliverable within the current funding availability period. Around 74% of HIF1's funding is from Homes England, which is available only up to 31st March 2026.²⁸ However, around half of HIF1's expenditure is 2026 and 2027, as shown Figure 3 below. The OCC has acknowledged that HIF1 is a significant financial risk because the scheme now cannot be completed before March 2026, and either will need to be stopped, or an extension to the funds and timeline will be needed.²⁹

Figure 3 HIF1 expenditure profile over time

²¹ Financial viability is a relevant planning consideration. See for example a recent CPO decision which explains that because it cannot be concluded that a scheme is financially viable, it cannot be shown conclusively that the CPO is justified in the public interest. See the Compulsory Purchase Order decision of case APP/PCU/CPOP/Z5060/3278231, dated 4 October 2022, Paras. 372–374. Furthermore, The CPO Guidance states: “The greater the uncertainty about the financial viability of the scheme, the more compelling the other grounds for undertaking the compulsory purchase will need to be.” Department for Levelling Up, Housing & Communities (2018), ‘Guidance on compulsory purchase process and The Crichel Down Rules’, para. 106

²² Oxfordshire County Council (2023), ‘Didcot Garden Town Housing Infrastructure Fund (HIF1). Amendments to the grant determination agreement’, para. 26, 15 March, <https://shorturl.at/ckEFG> (accessed 17 December 2023).

²³ This BCIS Tender Price Index measures the trend of contractors' pricing levels in accepted tenders at commit to construct, i.e. cost to client. BCIS (2022), ‘BCIS tender price index panel’, 15 March, <https://bcis.co.uk/insight/bcis-tender-price-index-panel/> (accessed 17 December 2023).

²⁴ See appendix **Error! Reference source not found.** for further details.

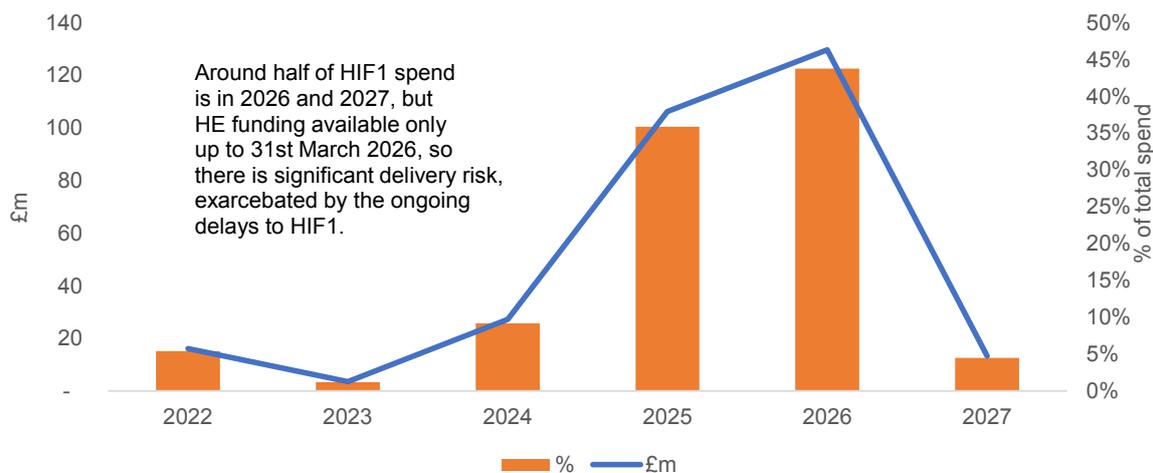
²⁵ DfT (2023), ‘TAG: optimism bias workbook’, 30 November, <https://shorturl.at/bfRT> (accessed 17 December 2023). I used the ‘Road cost and schedule’ and assumed that the scheme was at the Full Business Case (FBC) stage.

²⁶ RICS (2015), ‘RICS professional guidance, UK. Management of risk’, section 4.1.3.1, <https://shorturl.at/bfyZ8> (accessed 17 December 2023)

²⁷ OCC (2022), ‘Didcot Garden Town Housing Infrastructure Fund (HIF) Revised Grant Determination Agreement’, 21 June, para. 20, <https://shorturl.at/ditCE> (accessed 18 December 2023).

²⁸ Although there appears to be assurance that ‘risks to the delivery time frame caused by exceptional circumstances outside the Council's direct control will be mitigated’. OCC (2022), ‘Didcot Garden Town Housing Infrastructure Fund (HIF) Revised Grant Determination Agreement’, 21 June, paras. 2 and 20, <https://shorturl.at/ditCE> (accessed 18 December 2023).

²⁹ OCC (2023), ‘Capital programme update and monitoring report’, 17 October, para. 78, <https://shorturl.at/jjrmQ> (accessed 18 December 2023).



Source: OCC.³⁰

Conclusion

28 To summarise, HIF1 is inconsistent with the LTCP for the following reasons.

- First, the Applicant has not correctly estimated road user emissions because they have failed to account for induced demand, underestimating emissions by a factor of almost four.
- Second, they have not compared emissions against Oxfordshire’s carbon budgets, as required by the LTCP.
- Third, these carbon impacts are significant, equivalent to the annual car emissions of 350,000 South Oxfordshire and Vale residents. This is large enough to offset the potential carbon savings from meeting Oxfordshire’s cycling targets by a margin of 60%.
- Fourth, it supports significant additional traffic that are inconsistent with the LTCP as it is difficult to identify sufficient traffic reductions elsewhere in Oxfordshire.
- Fifth, the Scheme is unlikely to support modal shift towards active travel and buses, .

29 In addition, HIF1’s cost of £296m has been underestimated and a cost of £366m is more likely to be appropriate. Without an extension to the funding amount and deadline, the scheme is not affordable and deliverable.

30 For these reasons, I consider that planning application for the Scheme should be rejected.

³⁰ OCC, ‘Capital programme 2022/23 to 2032/33’, p.7, <https://shorturl.at/egilJ> (accessed 28 December 2023).