

A14
Cambridge to Huntingdon
improvement scheme
Development Consent Order

FOLDER 1 of 1

TR010018

**HE/A14/EX/26 Impact of the scheme against UK
Government Carbon Budget**

June 2015

The Infrastructure Planning (Examination Procedure) Rules 2010

A14 Cambridge to Huntingdon improvement scheme

Development Consent Order Application
Impact of the scheme against UK Government Carbon Budget

HE/A14/EX/26

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1.1 Introduction

1.1.1 This report presents an assessment of the carbon emissions associated with the A14 Cambridge to Huntingdon improvement scheme ('the scheme') and compares them with UK national carbon budgets. Such an assessment is required by the National Policy Statement on National Networks, in particular at paragraph 5.17 of that statement.

1.2 UK Carbon management policy and budgets

1.2.1 The Government is seeking to cut greenhouse gas emissions by at least 80% by 2050.

1.2.2 The 1990 baseline is 783.1 megatonnes Carbon Dioxide equivalent (MtCO₂e) per year, with the 2050 target being 156.6 MtCO₂e (The Carbon Plan – Delivering our low carbon future, HM Government, (December 2011)).

1.2.3 Emission reductions will be delivered through a system of five year carbon budgets, setting out the total emissions that would be expected within those five years. These set a trajectory to 2050 (The Carbon Plan – reducing greenhouse gas emissions (December 2011) and successor documents). These carbon budgets are summarised in Table 1.1, which includes the percentage reduction from the 1990 base year that would be required in every year of the budget period to achieve the five-year goal.

Table 1.1: Carbon budgets

Budget	Carbon budget level	% reduction below base year
1st Carbon budget (2008-12)	3,018 MtCO ₂ e	23%
2nd Carbon budget (2013-17)	2,782 MtCO ₂ e	29%
3rd Carbon budget (2018-22)	2,544 MtCO ₂ e	35% by 2020
4th Carbon budget (2023-27)	1,950 MtCO ₂ e	50% by 2025

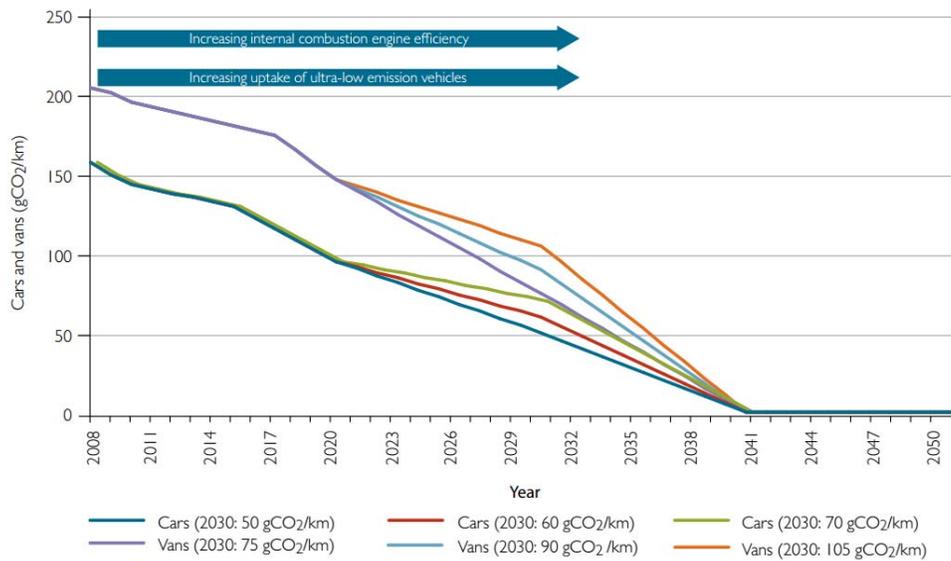
- 1.2.4 The Carbon Plan notes that the transport sector in the UK currently has emissions similar to those recorded in 1990. Emissions rose with a growing economy and rising transport demand from 1990 to 2007. Since then they have fallen due to a combination of the economic downturn, improved car fuel efficiency and use of biofuels. Domestic transport emitted around 137 MtCO₂e in 2009, accounting for around 24% of UK domestic greenhouse gas emissions.
- 1.2.5 By 2030 the UK government considers that current policies could mean that annual transport emissions reduce to around 116 MtCO₂e. It is noted in the Carbon Plan that in order to achieve overall UK targets, the 2050 transport system will need to emit significantly less carbon than today. The Government's vision is that by 2050 almost every car and van will be an ultra-low emission vehicle (ULEV). These ULEVs could be powered by batteries, hydrogen fuel cells, sustainable biofuels, or a mix of these and other technologies.
- 1.2.6 Within the Transport sector the Carbon Plan assesses sub-sector emissions, attributing 58% of emissions to cars, 12% to vans, and 17% to heavy goods vehicles in 2009, with the balance attributed to aviation, rail, buses and shipping. Over the next decade, the Government's policy focus will be on continuing improvements to the efficiency of conventional petrol and diesel cars, encouraging ULEVs, and supporting research and development into new ULEV technologies.
- 1.2.7 The Government's existing policy mix puts it on track to progressively reduce the carbon impact of cars and vans. Currently, a major driver of emissions reductions for both cars and vans are the EU new vehicle CO₂ targets. These are set at 130 gCO₂ /km in 2015 and 95 gCO₂ /km in 2020 for cars, and 175 gCO₂ /km in 2017 and 147 gCO₂ /km in 2020 for vans. EU emissions standards will continue to be vital in delivering the Government's carbon reduction goals for cars and vans. Over the next decade, average emissions of new cars are set to fall by around a third, primarily through more efficient combustion engines. Sustainable biofuels will also deliver substantial emissions reductions. The Government anticipates deeper cuts being facilitated by increasing take up of vehicles using ultra-low emission technologies such as electric batteries, hydrogen fuel cells and plug-in hybrid technology.
- 1.2.8 To ensure that these emissions savings are delivered, the Carbon Plan anticipates that Government will continue to work at EU level to press for strong EU vehicle emissions standards for 2020 and beyond in order to deliver improvements in conventional vehicle efficiency and give certainty about future markets for ultra-low emission vehicles. To support the growth of the ultra-low emission vehicle market, the Government is providing consumer incentives and further support for the research, development and demonstration of new technologies.

1.2.9 Based on current modelling the Government anticipates that average new car emissions could need to be 50–70 gCO₂ /km and new van emissions 75–105 gCO₂ /km by 2030.

1.2.10 Chart 3 from the Carbon Plan, presented as Figure 1.1, shows the projected average new vehicle emissions up to 2050.

Figure 1.1: Chart 3 from *The Carbon Plan: Delivering our Low Carbon Future*

Chart 3: Projected average new car and van emissions over the first three carbon budgets and illustrative ranges of average new car and van emissions in the fourth carbon budget period and to 2050



1.3 Outcome of Carbon assessment

1.3.1 The construction of the A14 Cambridge to Huntingdon improvement scheme (the scheme) is a major project, with considerable volumes of construction materials required. This type of scheme inevitably results in carbon emissions associated with the use of materials and energy expended in construction. In addition, the scheme seeks to increase road capacity, while making journeys quicker, safer and less congested. The additional capacity is predicted to increase numbers of vehicles using the road, which is likely to increase CO₂ emissions from traffic compared to the situation in the absence of the scheme.

Construction

1.3.2 In the Carbon Assessment for the scheme (Appendix 13.2 of the ES) it is reported that the carbon footprint of the construction phase of the scheme would be approximately 981,432 tonnes of CO₂e (tCO₂e) and that this is primarily due to materials and excavation (75%) and transport and logistics (24%).

1.3.3 The Highways England, and its construction contractors, are aware of the importance of reducing construction-related carbon, both to better meet environmental objectives and because carbon saving on site is almost always associated with a cost saving from materials, fuel reductions and reduced excavation.

1.3.4 As reported in the Carbon Assessment for the scheme (Appendix 13.2 of the ES), the energy use, excavation, transport and waste emissions associated with construction, which are the emissions areas that would contribute to the UK's Carbon Budget, add up to 643,137 tCO₂e (66% of the total construction phase emissions). This figure excludes embodied carbon within materials as the origin of these is currently unknown and embodied carbon emissions that occur outside of the UK are not included in the Carbon Budgets, nor do they count towards the UK's 2050 target.

1.3.5 If all of these construction related emissions were emitted in the 3rd Carbon Budget period (2018-2022) it would amount to 0.025% of the budget for that period, or 0.12% of the UK's allowable annual emissions.

Operations

1.3.6 It is reported in the Carbon Assessment (ES Appendix 13.2) that during the operational phase of the scheme, it is expected that the "fully utilised" scheme would result in the emission of an additional 68,238 tCO₂ per year from traffic in the 2035 assessment year, and that by 2041 when traffic growth is assumed to reach maximum likely levels there would be an additional 81,827 tCO₂ per year. Table 1.2 sets out the operational emissions anticipated for future carbon budget periods and compares these with the UK total budget levels.

Table 1.2: Impact of the scheme on the carbon budgets

Budget	UK Government Carbon budget level	Additional operational emissions (tCO ₂ / % of budget)
3rd Carbon budget (2018-22)	2,544 MtCO ₂ e	160,980 tCO ₂ / 0.0043%
4th Carbon budget (2023-27)	1,950 MtCO ₂ e	227,941 tCO ₂ / 0.012%
2030 projected transport emissions	116 MtCO ₂ e	56,913 tCO ₂ / 0.049%

1.3.7 The methodology used to calculate these mass emissions does not incorporate the potential reductions that would come about as a result of the policies that are described in the Carbon Plan and the supporting documents: for example, assumptions regarding uptake of ULEVs in the model result in the proportion of ULEVs remaining constant after approximately 2030. This means that the reported emissions levels are conservative worst-case estimates. The only assumptions that are used regarding ULEVs and progress in the Carbon Plan are those regarding the uptake of ULEVs up to 2030, as published by the Department for Transport.

1.3.8 Emissions attributed to fixed asset energy uses, such as lighting and Intelligent Transportation System (ITS) equipment, are small in comparison being estimated at approximately 135 tCO₂e per year. This contribution should diminish over the years with decarbonisation of the electricity grid.

1.4 Conclusion

1.4.1 The additional operational emissions of the scheme represent only 0.0043% and 0.012% of the third and fourth national carbon budgets respectively. Those percentages are considered to be negligible and have no bearing on the likely achievement of the relevant policy objectives.

Appendix A - Glossary

Term or abbreviation	Definition
CO ₂	Carbon Dioxide
Embodied Carbon	“Embodied carbon”, or “Embedded carbon”, refers to carbon dioxide emitted during the different stages of manufacture, transport and construction of building materials which together represent the total emissions associated with the use of that material.
Greenhouse Gas	Greenhouse gases are gases that trap heat in the atmosphere. The most abundant greenhouse gases in Earth's atmosphere are: Water vapor (H ₂ O); Carbon dioxide (CO ₂); Methane (CH ₄); Nitrous oxide (N ₂ O); Ozone (O ₃); Chlorofluorocarbons (CFCs)
MtCO ₂ e	Megatonnes Carbon Dioxide equivalent; a standard unit for measuring carbon footprints. Each different greenhouse gas is included in terms of the amount of CO ₂ that would create the same amount of warming.
ULEV	Ultra-Low-Emission Vehicle; a motor vehicle that emits extremely low levels of motor vehicle emissions compared to other vehicles.