

# SILVERTOWN TUNNEL

Volume 8

## 8.112 Applicant's Response to Action Point 1 from the OFH on 28 March 2017

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## Silvertown Tunnel

# Applicant's Response to Action Point 1 from the OFH on 28 March 2017

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure)  
Regulations 2009

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## 1. INTRODUCTION

- 1.1.1 Discussion at the Issue Specific Hearings on Any other outstanding issues including environmental matters and the draft Development Consent Order on 28 March and 29 March respectively, indicated that the Examining Authority wished to see further discussion take place between the Applicant and the Motorcycle Action Group (MAG), to share evidence and attempt to resolve the two parties' positions.
- 1.1.2 Following the hearings, the Applicant and MAG met on 03 April 2017.
- 1.1.3 At the hearings, the ExA also indicated that the submissions so far presented by the Applicant on the issue of charges for motorcyclists had not been compelling.
- 1.1.4 Therefore in addition to presenting the key evidence discussed at the meeting on 03 April 2017, this note also seeks to distil the key arguments set out by MAG in support of an exemption from user charging for motorcyclists, and to provide the Applicant's response to these.
- 1.1.5 The Applicant considers that the most appropriate context to consider these issues is MAG's own stated aim of ensuring the *proportionate* treatment of motorcyclists (emphasis added), as recorded in its D1 submission (RR-155)

### **Relative congestion costs**

- 1.1.6 The Applicant remains of the view that motorcycles are themselves a contributor to congestion – albeit it acknowledges that individually, a motorcycle contributes less to congestion than a car.
- 1.1.7 Although MAG itself very reasonably acknowledges the limited relevance of the evidence it submitted in relation to motorcycle use in Vietnam, (REP4-067) the data in that report in fact implicitly supports the Applicant's position on this issue, given that despite the very high PTW mode share in the Vietnamese cities studies, there is still said to be a substantial level of congestion there.
- 1.1.8 The Applicant considers that the evidence it shared with MAG at the meeting on 03 April 2017 provides an empirical means of understanding why this would be so.
- 1.1.9 To ensure a sound appreciation of the individual congestion impact of different vehicle types on London's roads, clearly an important input to its

operations and planning, TfL commissioned the Transport Research Laboratory. TRL assessed 82 London street locations to take note of the highway characteristics, vehicle mix, and highway performance<sup>1</sup>.

- 1.1.10 From its analysis of the data arising, TRL concluded that motorcycles cause just over half as much congestion, per vehicle, as a car – suggesting an appropriate PCU value for detailed modelling purposes of 0.55.
- 1.1.11 Hence while the Applicant acknowledges that motorcycles cause less congestion than cars, it is not the case that motorcycles themselves cause no congestion, nor that an increase in motorcycle traffic (without a corresponding decrease in other traffic) will in itself cause congestion to reduce – in fact the opposite is true.
- 1.1.12 Accordingly, in view of the imperative to reduce congestion set out in Project Objective 1, the Applicant considers that the charging of motorcycles is warranted, albeit at a lower rate than for cars during the peak period reflecting their individually lesser contribution to congestion.

### **Environmental pollution**

- 1.1.13 MAG has argued that motorcycles make a negligible contribution to poor air quality in London. In general, MAG has drawn attention to GLA figures assessing the attribution of total emissions to different sources, in which motorcycles are indeed a small component – although it should be noted that even on this basis their contribution is not zero.
- 1.1.14 However, motorcycles are also a small component of the vehicle mix (around 1%), and so this small impact essentially reflects the prevalence of motorcycles rather than an unusually positive environmental performance of individual motorcycles.
- 1.1.15 In accordance with guidance, the Applicant has used the Emissions Factor Toolkit (EFT) in its assessment of atmospheric emissions impacts for the Scheme. The EFT uses London data, and shows that dependent on speed, emissions from a motorcycle range between ~25-110% of that of a car. (The figure of 40% quoted at the OFH on 28 March was based on the comparison of motorcycle and car emissions at the design speed for the Scheme of 50kph.) Again therefore, while it is arguable that motorcycles emit less than

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<sup>1</sup> The estimation of saturation flows at traffic lights in London, and the impact of cyclists on saturation flows, TRL, 2012

cars on average (albeit potentially not at high speeds), they do give rise to emissions. The Motorcycle Emissions note (Appendix A) sets out the Applicant's evidence on emissions from motorcycles in more detail.

- 1.1.16 Given the stated aim in Project Objective 5 to reduce the environmental impact of the Scheme, it is appropriate to charge motorcyclists alongside other vehicles, with the Ultra Low Emission Discount for the cleanest of these vehicles to encourage their uptake relative to other motorcycles in the same way as the Ultra Low Emission Discount would be available for cars.

### **Road maintenance costs**

- 1.1.17 The Applicant acknowledges that the impact of motorcycles on highway infrastructure maintenance costs is smaller than the impact of cars. However, similarly to the points above, there remains an impact. The Ricardo AEA handbook<sup>2</sup> of external costs commissioned by the European Union demonstrates that motorcycles impose on average about a third to a half of the road maintenance cost impact of cars. On the basis that Project Objective 7 requires the Scheme to achieve value for money<sup>3</sup>, the Applicant considers that it is appropriate to charge motorcycles. Indeed, this is an extremely important consideration for any public body.

### **Safety**

- 1.1.18 There are further relevant considerations about motorcycle use, most notably safety. Clearly motorcyclists are themselves vulnerable road users (heavily overrepresented in casualty statistics), and for this reason, despite ongoing improvements in safety, TfL is striving to improve safety for all road users including motorcyclists.
- 1.1.19 But it should also be acknowledged that motorcycles also have a disproportionate impact on the safety of *other* vulnerable road users in London. TfL's Casualties in Greater London 2015 fact sheet<sup>4</sup> demonstrates that in 2014 597 pedestrian casualties involved a PTW, whereas 3,366 pedestrian casualties involved a car. However, over this period, PTWs had a modal share of 1%, while cars had a modal share of 41%. Therefore, when

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<sup>2</sup> Handbook of External Costs of Transport, Ricardo-AEA, 2014  
[https://ec.europa.eu/transport/themes/sustainable/studies/sustainable\\_en](https://ec.europa.eu/transport/themes/sustainable/studies/sustainable_en)

<sup>3</sup> PO7: to achieve value for money, and through road user charging, to manage congestion. See Case for the Scheme (Document Reference 7.1)

<sup>4</sup> <http://content.tfl.gov.uk/casualties-in-greater-london-2015.pdf>

comparing the rate of pedestrian casualties occurring by vehicle mode share, these statistics suggest that the incidence of pedestrian casualty resulting from a PTW trip is approximately seven times greater than it is for a car trip (597 casualties per 1% of PTW mode share vs. 82 casualties per 1% of car mode share). (It should be noted that causality is not considered nor implied in these figures, for any mode.)

- 1.1.20 Since Project Objective 5 seeks to minimise the negative impacts of the Scheme on Health, these issues are not incidental but must directly bear on the Applicant's overall approach to user charging.

### **Income**

- 1.1.21 The case has been made by MAG that motorcycling is an important means for those on low incomes to travel because of the relatively low fixed and variable costs of owning and running a motorcycle. In response, TfL has presented evidence drawn from the large-scale rolling LTDS survey which demonstrates that over a number of years, the rate of ownership of motorcycles actually *increases* with income (REP3-015), and that their use as a commuting mode is not correlated with income (REP4-051, answer to SWQ GA2.4). No substantive data appears to have been advanced to support the view that motorcycling is in London a low income mode.
- 1.1.22 The Applicant considers that acknowledged concerns over the impact of user charges on those on low incomes is effectively addressed overall by the proposed Low Income Discount (see Policy 6 in Charging Policies and Procedures, REP4-039).

### **Precedent**

- 1.1.23 The issue of precedent is the final key issue which has been considered in relation to the proposed charging of motorcyclists in the Silvertown Tunnel scheme. The Applicant acknowledges that motorcycles are exempted from charges in a number of other user charging Schemes, including the central London Congestion Charging scheme.
- 1.1.24 However, the Applicant considers that each of these schemes has its own set of objectives, circumstances, and practical and technological constraints, and that the decision to charge or exempt motorcycles naturally reflects these in each case.
- 1.1.25 In the case of the Silvertown Tunnel scheme, the Applicant considers that the objectives around congestion, resilience, impacts on health, safety and the environment, and the need for funding to support the implementation of

the Scheme from which motorcyclists themselves will benefit justify its proposed approach.

### **Overall considerations on proportionality**

- 1.1.26 On many of the issues described above, MAG's position appears to be that motorcycles have a directly positive impact, or no impact at all. The Applicant considers that this argument can only be sustained in the context of a comparison with the use of a car for the same journey.
- 1.1.27 In fact, when compared to alternatives such as travelling by public transport, these supposed advantages in many cases disappear or greatly reduce.
- 1.1.28 A further important consideration is that MAG's position overlooks the important issue of occupancy. While the average occupancy of a car in London is 1.6, and a typical car can carry up to five people, a motorcycle typically carries one rider, and (generally speaking) an absolute maximum of two. Hence, MAG's position tends to understate the per-person impact of motorcycles on congestion, emissions, and safety.
- 1.1.29 Motorcycles are assumed in the Assessed Case to pay a charge of £2 in the peaks, compared to £3 for cars, and hence the relative charges already reflect the lower impact of motorcycles compared to cars. Those on the lowest incomes would benefit further from the Low Income Discount, leading to an effective peak charge for these users of £1 at peak times, and £0.50 at other times.
- 1.1.30 The Applicant therefore considers that its approach to user charging achieves the proportionality that MAG is seeking – for motorcyclists as for other road users.

## Appendix A. Note on Motorcycle Emissions

### A.1 Introduction

- A.1.1 This Appendix clarifies TfL's evidence base on Motorcycle emissions as reported in the Open Floor Hearing on 28/03/17 as part of the Silvertown Tunnel DCO application. This document sets out the Euro standards for both Motorcycles and Cars, Speed-Emissions curves produced using output generated with the Defra published Emission Factor Toolkit (EFT) and the sources that inform the EFT.
- A.1.2 Emission of Oxides of Nitrogen (NO<sub>x</sub>) which lead to the formation of nitrogen dioxide (NO<sub>2</sub>) are generally acknowledged to be in exceedence of annual average Air Quality Strategy Objectives in more areas than any other pollutant. Therefore, the emphasis of this document is focussed on NO<sub>x</sub> emissions.
- A.1.3 It has been acknowledged in previous submissions that the contribution of motorcycle emissions to the total emissions on the roads is small. The source apportionment undertaken as part of a submission to the ExA at deadline 3 (REP3-028), highlighted that the total contribution to modelled roadside NO<sub>2</sub> concentrations was around 1%. This is due to their relative low numbers in comparison to other vehicles.

### A.2 Euro Standards

- A.2.1 Motorcycles are subject to different Euro emissions standards than those applied to cars. Table 1 below shows the relevant emissions standards set by the EU in order to reduce vehicular emissions over time.

**Table 1 - Euro Emissions Standards for Motorcycles and Cars**

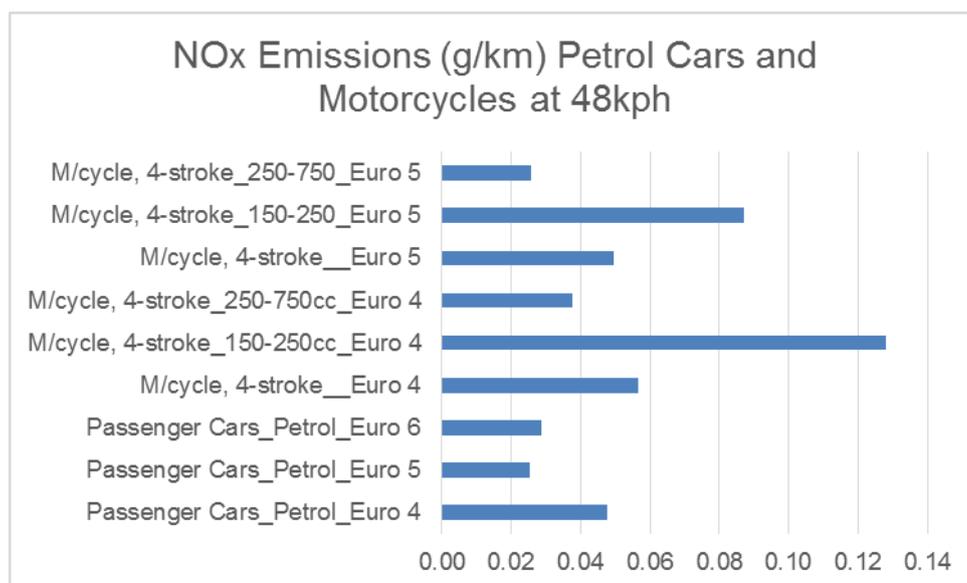
<b>Euro Standard</b>	<b>Implementation Date Cars</b>	<b>Implementation Date Motorcycles</b>	<b>NO<sub>x</sub> Emission Standard Cars (Diesel, Petrol) g/km</b>	<b>NO<sub>x</sub> Emission Standard Motorcycles</b>
Euro 1				

Euro 2				0.30
Euro 3	January 2001		0.50, 0.15	0.15
Euro 4	January 2006	2016/17 (Motorbikes/Mopeds)	0.25, 0.08	0.07 v <sub>max</sub> <130km/h and 0.09 v <sub>max</sub> >130km/h
Euro 5	January 2011	2020 Onwards	0.180, 0.060	0.060
Euro 6	September 2015		0.080, 0.060	

A.2.2 Table 1 shows that NOx Euro emissions standards (in terms of grams emitted per kilometre) for petrol cars and motorcycles are very similar. Diesel cars generally have higher emission rates.

A.2.3 Diesel cars are subject to Euro Standards that are higher than petrol cars and motorcycles. Taking emissions from the Emission Factor Toolkit (v7) for petrol cars and motorcycle traveling at a speed of 48kph, the emissions for a petrol car are generally lower than a motorcycle.

**Figure 1 - NOx Emissions of Petrol Cars and Motorcycles at 48 kph (EFT v7)**



A.2.4 It is acknowledged that this information assumes that for a single journey, the duration for cars and motorbikes would be identical. It is likely that in reality, motorcycles could have a shorter journey time as they can weave

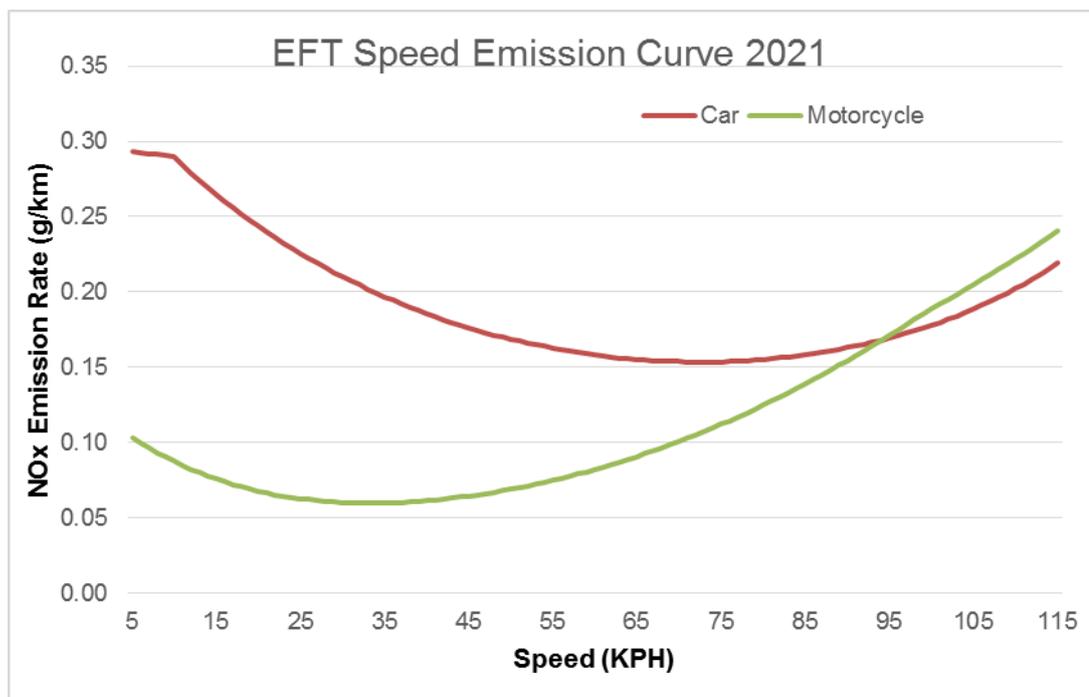
between traffic and get to the front of traffic queues quicker than cars which must wait in a queue. However, it does demonstrate that motorcycles do contribute to total roadside emissions.

### **A.3 Emission Factor Toolkit (EFT)**

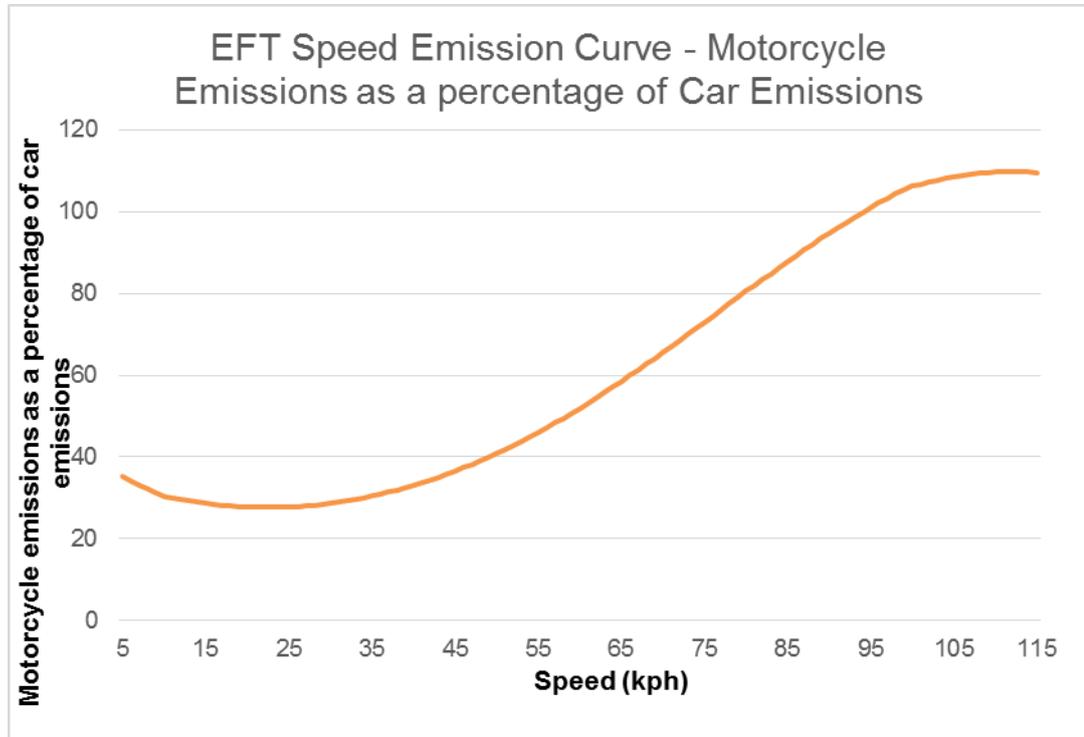
- A.3.1 The latest EFT(v7) provides emission predictions for 2013 through to 2030 and calculates emissions rates based on the COPERT outputs (Computer Programme to Calculate Emissions from Road Transport) and the following information available from the National Atmospheric Emissions Inventory (NAEI):
- fleet composition data for motorways, urban and rural roads in the UK;
  - fleet composition based on European emission standards from pre-Euro I to Euro 6/VI
  - scaling factors reflecting improvements in the quality of fuel and some degree of retrofitting;
  - technology conversions in the national fleet.
- A.3.2 In addition, the EFT utilises London-specific information (as shown in Figure 4) prepared by Transport for London (TfL) as part of the London Atmospheric Emissions Inventory (LAEI).
- A.3.3 The EFT is widely utilised amongst air quality consultants and was used to generate emission rates for the Silvertown Tunnel air quality assessment in accordance with section 5.8 of the National Policy Statement for National Networks (NPS NN) which states that the Applicant's assessment should be consistent with Defra's future national projections of air quality based on evidence of future emissions, traffic and vehicle fleet.
- A.3.4 To demonstrate the equivalent emission rate of an average car against an average motorcycle in London, speed emissions curves were plotted using EFT outputs. The term average car or motorcycle is used as the EFT uses London specific fleet and euro-class composition data to estimate the emission rate on a particular road. For example, the emissions for a car will be built up from the fleet mix of the cars (including fuel, petrol, diesel), size of car and Euro standard.
- A.3.5 The year 2021 was selected for the comparison as it represents the year assumed to be the opening for the Silvertown Tunnel in the Environmental Statement (ES).

A.3.6 Figure 2 shows speed-emissions curves between 5-115kph in London for a motorcycle and a car. Figure 3 demonstrates the motorcycle emissions as a percentage of car emissions between 5-115kph.

**Figure 2 – Nox Speed Emissions Curve for a Motorcycle and a Car in London (2021)**



**Figure 3 Motorcycle NOx Emissions as a percentage of Car NOx Emissions**



- A.3.7 Figures 2 and 3 demonstrate that dependent on speed, emissions from a motorcycle range between ~25-110% of that of a car. The figure of 40% quoted at the ISH on 28/03/17 was based on the comparison of motorcycle and car emissions at 50 kph.
- A.3.8 Sources of data which inform the EFT are presented in Figure 4 which is a snapshot of the EFT v7 user guide.

Figure 4 - EFT Data Sources

Appendix C: Data Sources		
Source	Data Set	Date
Ricardo-E&E <sup>14</sup>	UK (Outside London) Euro Compositions <sup>15</sup>	03/10/2013
	Fleet Compositions per Road Type (Outside London) <sup>12</sup>	03/10/2013
	Vehicle Size Proportions <sup>11</sup>	03/10/2013
	PM <sub>10</sub> to PM <sub>2.5</sub> Conversion <sup>16</sup>	23/05/2010
	PM <sub>10</sub> Assumptions	11/08/2009
	Brake, Tyre and Road Abrasion PM assumptions <sup>13</sup>	30/10/2009
	HDV SCR/EGR Proportions <sup>13</sup>	13/02/2012
	Treatment of Failed Catalytic Convertors <sup>11</sup>	13/02/2012
	Fuel Scaling <sup>17</sup>	03/10/2013
	Alternative Vehicle NO <sub>x</sub> and PM Emissions Assumptions <sup>18</sup>	06/02/2013
EEA (COPERT 4v11)	NO <sub>x</sub> vehicle emissions	July 2014
	PM vehicle emissions	July 2014
TRL	C vehicle emissions	07/08/2009
	Mileage Rates	07/08/2009
TfL	London Fleet Compositions	June 2016
	London Euro Compositions	June 2016
	Alternative Vehicle CO <sub>2</sub> Scaling Factors <sup>19</sup>	June 2016

<sup>14</sup> Formerly Ricardo-AEA / AEA Technology. Data listed here are data developed for or by the 2011 version of the National Atmospheric Emissions Inventory and NAEI UK road transport emission projections (Base 2013 version). The methodology used in the NAEI can be found at [http://naei.defra.gov.uk/reports/reports?section\\_id=2](http://naei.defra.gov.uk/reports/reports?section_id=2)

<sup>15</sup> Fleet projections based on fleet turnover model used in NAEI UK road transport emission projections (Base 2013 version) using vehicle sales projections provided by DfT (2013)

<sup>16</sup> Assumptions used in the NAEI based on information from the EMEP/EEA Emissions Inventory Guidebook (2013), <http://www.eea.europa.eu/publications/emep-eea-guidebook-2013>

<sup>17</sup> Factors used in NAEI UK road transport emission projections (Base 2013 version) derived from the effects of fuel quality on emission factors, including effect of low-strength biofuel blends. Biofuel effects report at [http://uk-air.defra.gov.uk/reports/cat15/0901151441\\_NAEI\\_Road\\_Transport\\_Biofuels\\_report\\_2008\\_v1.pdf](http://uk-air.defra.gov.uk/reports/cat15/0901151441_NAEI_Road_Transport_Biofuels_report_2008_v1.pdf)

<sup>18</sup> [http://naei.defra.gov.uk/resources/NAEI\\_Emission\\_factors\\_for\\_alternative\\_vehicle\\_technologies\\_Final\\_Feb\\_13.pdf](http://naei.defra.gov.uk/resources/NAEI_Emission_factors_for_alternative_vehicle_technologies_Final_Feb_13.pdf)

<sup>19</sup> Factors are consistent with those applied in the LAEI 2013. However, in the absence of any clear evidence, CO<sub>2</sub> scaling factors for the Biomethane Bus and Biogas Bus categories are assumed to be equal to those for CNG Buses. Also, LAEI factors Biodiesel have been applied to B100 categories within the EFT.