Overview of Changes Introduced by EFT V7.0 and by CURED V2A

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1 Introduction

1.1 Defra has released an updated version of the Emissions Factors Toolkit (EFT) (V7.0), which replaces V6.02. It takes account of updated emissions functions and updated information on fleet compositions, particularly within the Ultra Low Emission Zone (ULEZ) in the centre of London. The Calculator Using Realistic Emissions for Diesels (CURED), developed by Air Quality Consultants Ltd (AQC) to address uncertainties in real-world emissions from diesel vehicles, has been updated to V2A to be consistent with the EFT V7.0.

1.2 This note presents some brief comparisons showing how the NOx emissions predicted in Defra's EFT V7.0 compare with those from EFT V6.02. It also shows how the NOx emissions predicted using CURED V2A compare with those from CURED V1A and with those from EFT V7.0.

2 High-level Comparisons

2.1 Both EFT versions and both CURED versions have been run for two area types (England – not London – Urban) and Central London. NOx emissions have been calculated first for a fleet entirely made up of Light Duty Vehicles (LDVs) and next for a fleet of 100% Heavy Duty Vehicles (HDVs). Emissions have been calculated for 2015, 2020, 2025, and 2030.

LDVs

Outside London

2.2 Figure 1 shows emissions from CURED as a percentage of the equivalent emissions from the EFT for both the 'Latest' (i.e. CURED V2A and EFT V7.0) and 'Previous' (i.e. CURED V1A and EFT V6.0.2) calculators for urban LDVs in England, outside London. The uplifts being introduced by CURED are substantially higher in V2A than they were in V1A.

2.3 The reason for this trend is shown in Figure 2. This shows the NOx emissions from CURED 2A as a percentage of those from CURED 1A, and the NOx emissions from EFT V7.0 as a percentage of those from EFT V6.0.2. NOx emissions in the EFT have dropped substantially between V6.0.2 and V7.0 (for example, speeds below 15 kph, predicted emissions in 2030 are almost 25% lower in EFT V7.0 than they were in EFT V6.0.2).

2.4 CURED sets emissions from Euro 6 diesel LDVs to be five times the respective emissions standards at 33.6 kph and so one would expect very little change in future-year LDV emissions at this speed. However, the changes to the speed-emissions curves in the EFT[1] are reflected in CURED, reducing predicted emissions at low speeds, and increasing them at higher speeds.

[1] EFT V6.02 and CURED V1A both use COPERT 4 V10 as a base, while EFT V7.0 and CURED V1B both use COPERT 4 V11

Key Message

2.5 On balance, the predictions made by the EFT have fallen considerably in this latest update, but the predictions made by CURED are not, on average, that different. This means that the difference between CURED and the EFT has increased. Changes to the shapes of the speed-emissions curves will, however, mean that CURED now predicts lower emissions at low speeds and higher emissions at high speeds.

In Central London

2.6 Figure 3 and Figure 4 show the same comparisons but within Central London. The comparisons have been carried out for the full speed range, even though the maxima are unlikely to be achieved in this location. These are interesting since they take account of the assumed effect of the Ultra-low Emissions Zone (ULEZ). As is the case outside London, the uplift (from the EFT) shown in CURED V2A beyond 2020 is much greater than that in CURED V1A and this is for the same reasons outlined above. However, owing to the assumed changes in fleet composition, both CURED and the EFT predict substantial improvements when compared with their earlier iterations.

Key Message

2.7 On balance, within the ULEZ, the predictions from both calculators have fallen considerably in this latest update. However, the predictions made using the EFT have fallen more than those from CURED, and this means that the difference between CURED and the EFT has increased.

HDVs

Outside London

2.8 Figure 5 and Figure 6 show the same comparisons as Figure 1 and Figure 2, but this time for HDVs. In this case, the degree of uplift introduced by CURED (Figure 1) is not that different for the latest calculators than it was under the previous iterations, but both CURED and the EFT are now predicting much lower emissions at lower speeds and much higher emissions at higher speeds. This reflects changes to the speed-emissions curves.

Key Message

2.9 On balance, while the uplift (from the EFT) introduced by CURED is not very different in the latest update, differences in the COPERT speed-emissions curves will result in lower predictions at low speeds and higher predictions at high speeds.

In Central London

2.10 Inside the ULEZ, the uplifts introduced by CURED V2A are accelerated based on the previous iteration (see Figure 7), since the uptake of Euro VI is accelerated. This is why the solid lines

in Figure 7 are clustered toward the top of the graph, while those in Figure 5 (outside London) were not.

2.11 The accelerated uptake of Euro VI and alternative technologies within Central London is also reflected in Figure 8, which shows big reductions in predicted emissions in 2020. By 2030, however, both CURED V1A and CURED V2A predict that the HDV fleet will be dominated by Euro VI vehicles, and so the same pattern occurs that was commented on outside of London: of lower predicted emissions at low speeds and higher predicted emissions at high speeds (reflecting the changes to the shapes of the Euro VI speed-emissions curves in COPERT 4 V11).

Key Message

2.12 In Central London, anticipated changes to the HDV fleet will bring forward the benefits that were previously predicted for 2030.

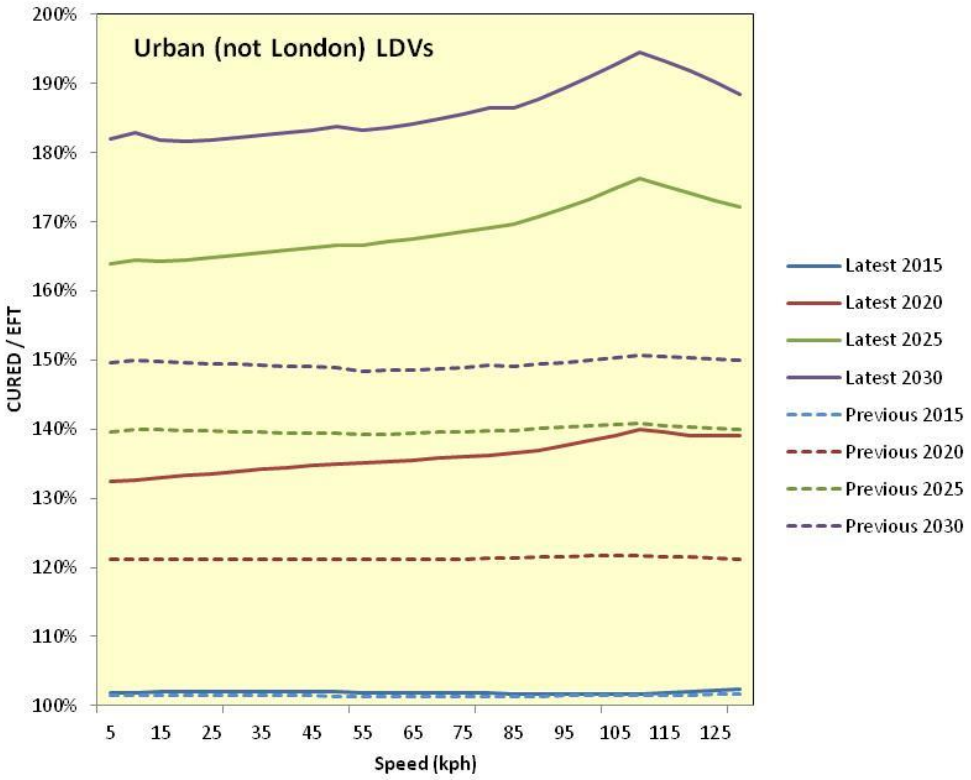

Figure 1: Effective Uplift in Predicted Emissions for Urban LDVs in England, outside London ('Previous' denotes emissions from CURED V1A divided by the equivalent emissions from EFT V6.0.2. 'Latest' denotes emissions from CURED V2A divided by the equivalent emissions from EFT V7.0)

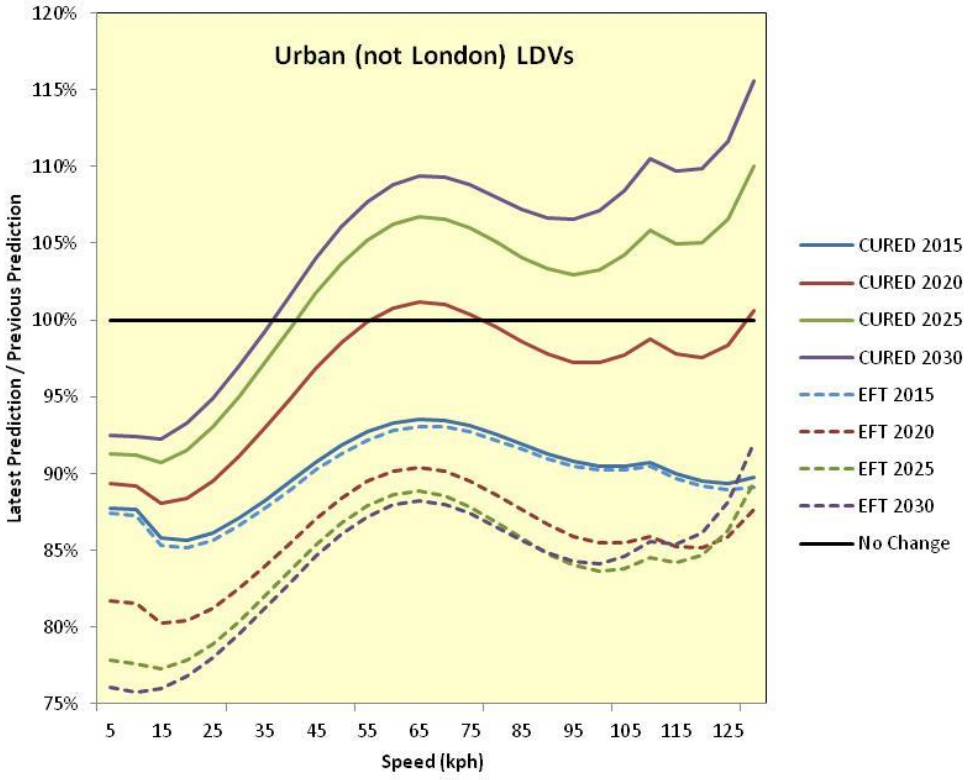

Figure 2: Effective Change from Previous Predictions for Urban LDVs in England, outside London (Showing Emissions from CURED V2A divided by Cured V1A, and from EFT V7.0 divided by EFT V6.0.2)

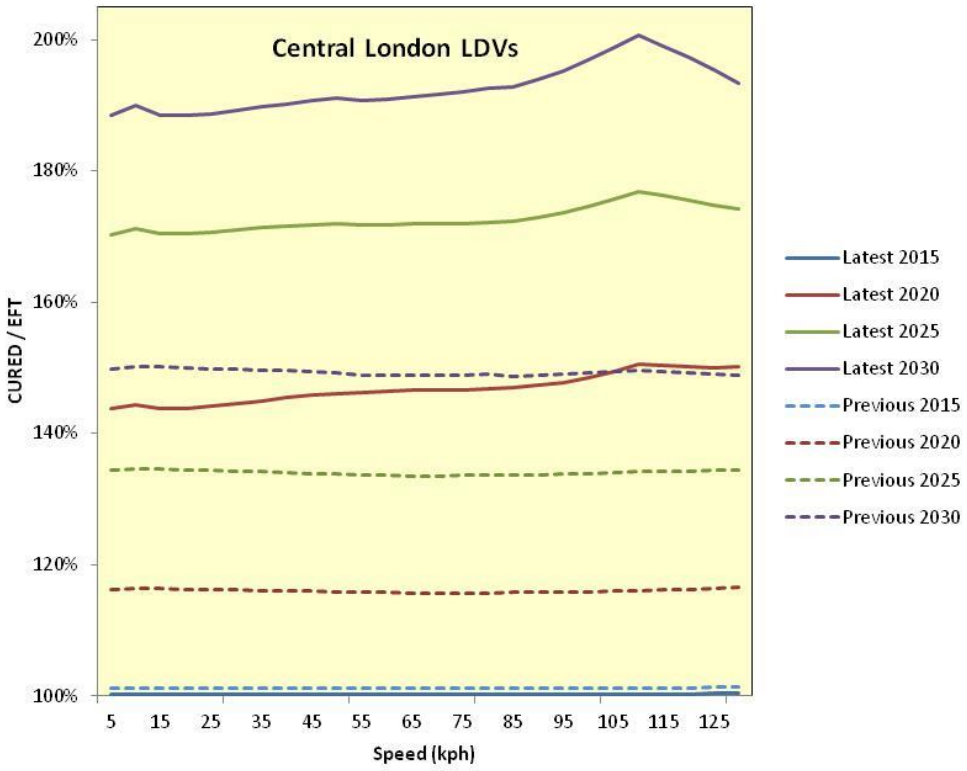

Figure 3: Effective Uplift in Predicted Emissions for LDVs in Central London ('Previous' denotes emissions from CURED V1A divided by the equivalent emissions from EFT V6.0.2. 'Latest' denotes emissions from CURED V2A divided by the equivalent emissions from EFT V7.0)

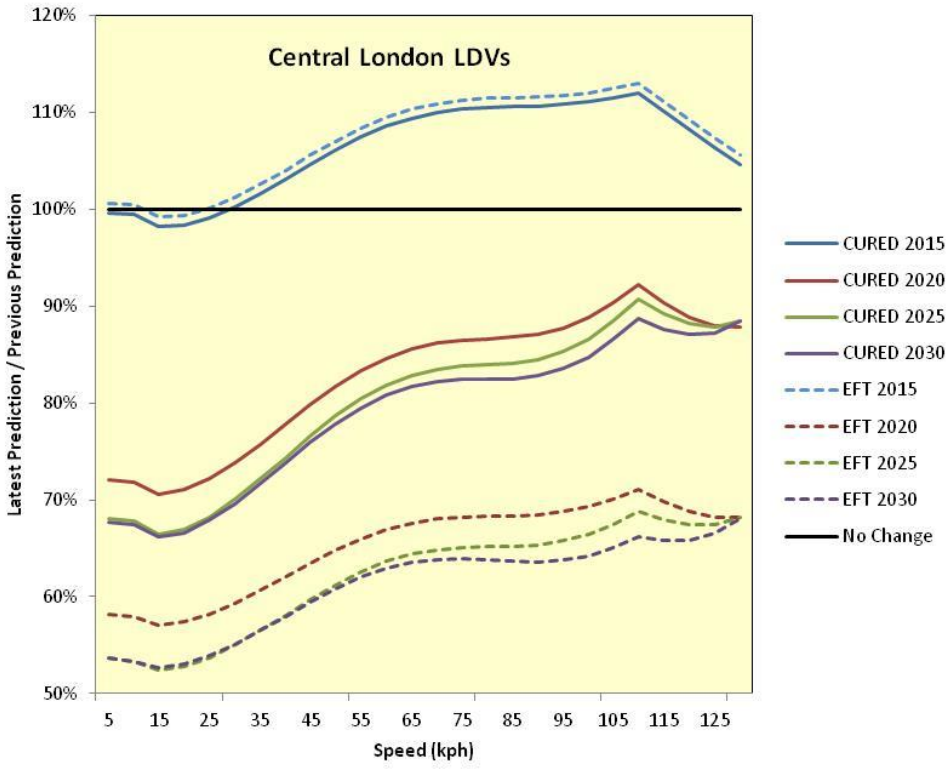

Figure 4: Effective Change from Previous Predictions for LDVs in Central London (Showing Emissions from CURED V2A divided by Cured V1A, and from EFT V7.0 divided by EFT V6.0.2)

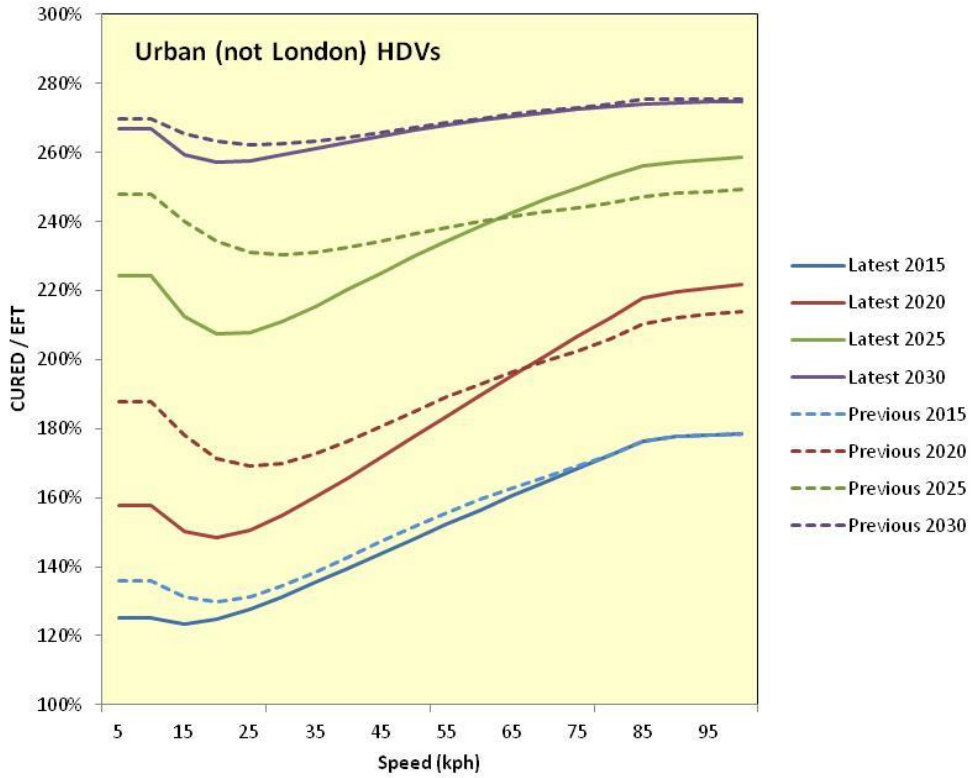

Figure 5: Effective Uplift in Predicted Emissions for Urban HDVs in England, outside London ('Previous' denotes emissions from CURED V1A divided by the equivalent emissions from EFT V6.0.2. 'Latest' denotes emissions from CURED V2A divided by the equivalent emissions from EFT V7.0)

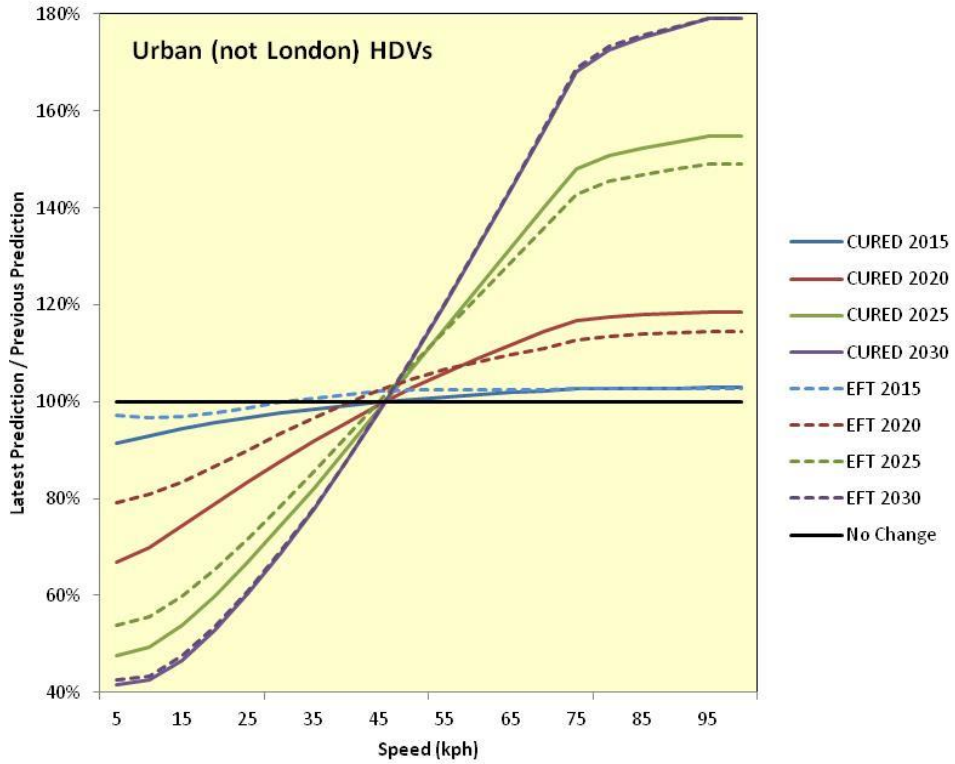

Figure 6: Effective Change from Previous Predictions for Urban HDVs in England, outside London (Showing Emissions from CURED V2A divided by Cured V1A, and from EFT V7.0 divided by EFT V6.0.2)

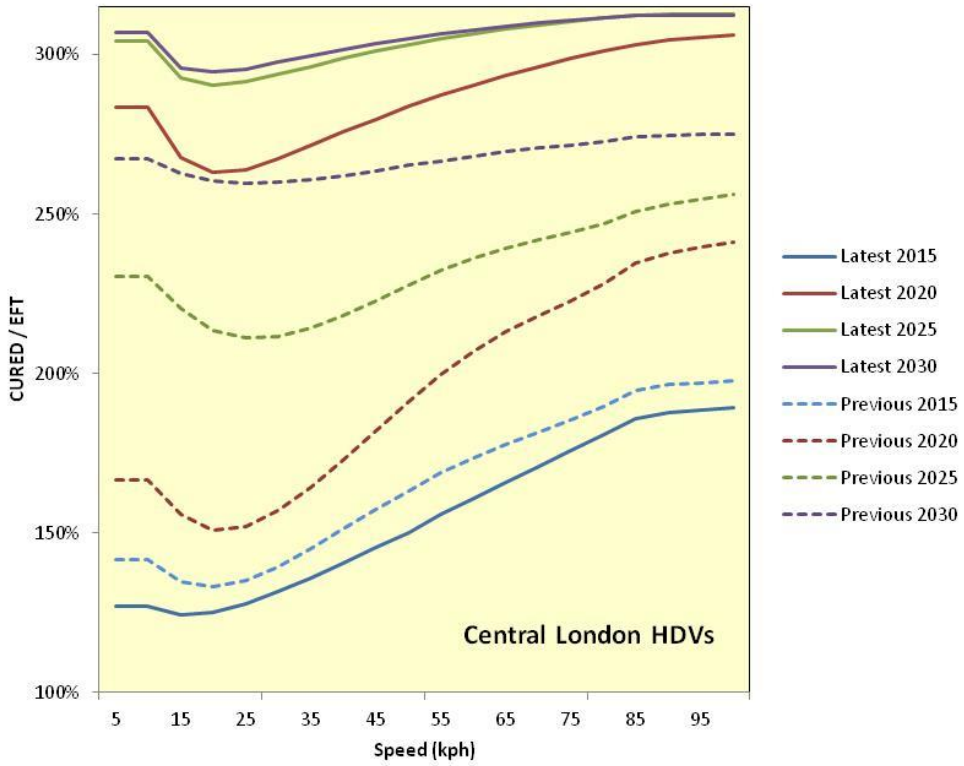

Figure 7: Effective Uplift in Predicted Emissions for HDVs in Central London ('Previous' denotes emissions from CURED V1A divided by the equivalent emissions from EFT V6.0.2. 'Latest' denotes emissions from CURED V2A divided by the equivalent emissions from EFT V7.0)

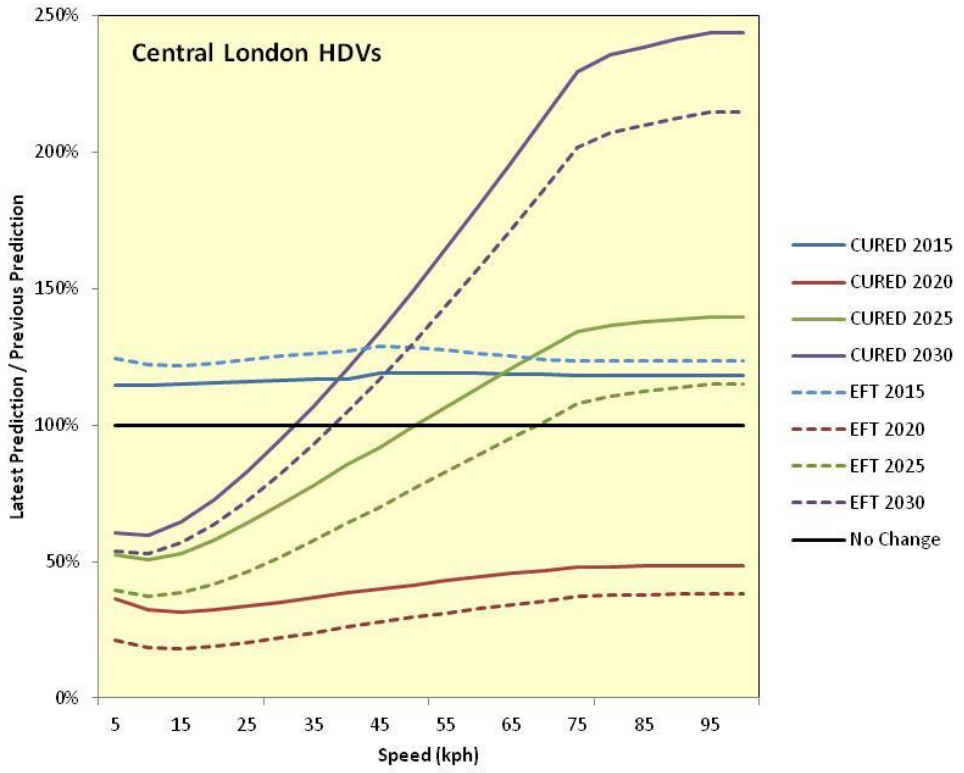

Figure 8: Effective Change from Previous Predictions for HDVs in Central London (Showing Emissions from CURED V2A divided by Cured V1A, and from EFT V7.0 divided by EFT V6.0.2)