



Mobility:



The calculations in this section are based on average driving behavior. Only emissions from fuel use are factored in, road and vehicle construction related emissions are excluded.

Cars

All emission calculations are based on DEFRA (2009).

All the fuel conversion factors presented in the 2009 GHG Conversion Factors are based on the default emission factors used in the UK GHG Inventory (GHGI) for 2007 (managed by AEA). The CO₂ emissions factors are based the same ones used in the UK GHGI and are essentially independent of application (assuming full combustion). However, emissions of CH₄ and N₂O can vary to some degree for the same fuel depending on the particular use (e.g. emission factors for gas oil used in rail, shipping, non-road mobile machinery or different scales/types of stationary combustion plants can all be different). The figures presented in the 2009 GHG Conversion Factors are based on an activity-weighted average of all the different CH₄ and N₂O emission factors from the GHGI. The standard emission factors from the GHGI have been converted into different energy and volume units using information on Gross and Net Calorific Values (CV) from the Digest of UK Energy Statistics 2008 (BERR), available at: <http://www.berr.gov.uk>

Two tables are presented in the 2009 GHG Conversion Factors; the first provides emission factors on a Net CV basis and the second on a Gross CV basis¹¹. Emission factors per unit mass or volume are identical in these two tables. However values on an energy basis are different - emission factors on a Net CV basis are higher (see definition of Gross CV and Net CV in italics below). It is important to use the correct emission factor; otherwise emissions calculations will over- or under-estimate the results. When making calculations based on energy use, it is important to check (e.g. with the fuel supplier) whether the values were calculated on a Gross CV or Net CV basis and use the appropriate factor. UK Natural Gas consumption figures are quoted in kWh by suppliers (calculated from the volume of gas used) on a Gross CV basis.¹²

Train

The emissions of UK trains from DEFRA (2009) are used as a best source to estimate average train emissions. The emissions are mainly related to electricity consumption, so they may vary significantly for other electricity mixes. To get more precise estimate, one can divide train emissions by 0.50238 (UK electricity factor) and multiply by the electricity factor from each country. See DEFRA (2009), Annex 10 for a list of factors for several countries. Some trains still use diesel engines, so the estimate will still be slightly distorted. <http://www.defra.gov.uk>

The national rail factor refers to an average emission per passenger kilometre for diesel and electric trains in 2007-08. The factor is from the DfT Network Modelling Framework (NMF) Environmental Model and has been calculated based on total electricity and diesel consumed by the railways for the year (sourced from ATOC), and the total number of passenger kilometres (from DfT rail statistics). The factor for conversion of kWh electricity into CO₂ is based on the 2006 grid mix (the most recent figure available at the time). CH₄ and N₂O emission factors have been estimated from the corresponding emissions factors for electricity generation and diesel rail (from the UK GHG Inventory), proportional to the CO₂ emission factors. The emission factors were calculated based on the relative passenger km proportions of diesel and electric rail provided by DfT for 2006-7.

¹¹ Gross CV or higher heating value (HHV) is the CV under laboratory conditions. Net CV or 'lower heating value (LHV) is the useful calorific value in typical real world conditions (e.g. boiler plant). The difference is essentially the latent heat of the water vapour produced (which can be recovered in laboratory conditions).

¹² See information available on Transco website: <http://www.transco.co.uk>