bp Target Neutral
Coolbeth-Nila Race Team
Sacramento Mile Race day activities and travel
Method for calculating greenhouse gas emissions

Version 1.0 September 2021

1.1 EXECUTIVE SUMMARY

Coolbeth-Nila Race Team are committed to measuring and reducing their carbon footprint. As part of their carbon reduction journey, they wish to calculate the emissions from race day activities and travel to the Sacramento Mile race and offset the calculated emissions through bp Target Neutral.

This method has been developed by bp Target Neutral to set out the overarching approach for calculating greenhouse gas (GHG) emissions associated with race day generator and fuel use, driving and flying.

1.2 EMISSIONS SOURCES

The methodology focuses on the following four emissions sources:

- Air travel
- Car travel
- Fuel use for motorbike on race day
- Fuel use for on-site generator on race day

1.3 EMISSION FACTORS

The methodology developed is aligned with the WRI/WBCSD GHG Protocol[1] and makes use of the 2021 UK Government Greenhouse Gas (GHG) Conversion Factors for Company Reporting [2]

1.3.1 Net Calorific Values and Fuel Density

The calorific value of a fuel is the quantity of heat produced by its combustion at constant pressure and under standard conditions. Default UK GHG DEFRA Fuel Density Values and Net Calorific Values (NCV) and are applied where available to convert the emission factors from CO_2e per unit of energy to CO_2e per litre of fuel.

1.3.2 Well-to-tank factors

When calculating emissions, not only are direct emissions of CO_2, CH_4 and N_2O from the combustion of fuel accounted for, but the indirect emissions associated with the extraction and transport of primary fuels as well as the refining, distribution, storage and retail of finished fuels, also known as the 'well-to-tank' emissions are also taken into consideration.

The applicable 'well-to-tank' emissions, whether relating to fuels or different travel modes, are used from the specific '*WTT*' table in the UK GHG Conversion Factors for Company Reporting document and added to the relevant conversion factor.

1.4 EXAMPLE CALCULATIONS

Vehicle travel

For passenger vehicle usage, the activity data used is distance travelled and the fuel efficiency in 'miles per gallon' (mpg). Emissions are calculated on the basis of fuel usage and the fuel-specific volume-based conversion factor, as in the example below:

Emissions for 10,000 miles travelled in a petrol-fuelled car with 'mpg' value of 36
= fuel usage in litres x volume based emission factor
= [(mileage/fuel efficiency) x conversion to litres] x emission factor
= [(10,000 miles/36 mpg) x 4.5461] x 3.8695 $kgCO_2e$/litre
= **4,886.4** $kgCO_2e$

Air travel

Two key elements form the basis of air travel emissions calculations:

(1) an uplift factor of 8% applied to the flight distance to factor in sub-optimal routing and stacking at airports during periods of heavy congestion; and

(2) the Radiative Forcing Index (RFI) of 1.9 applied to the CO_2 emissions factor of any given flight type to account for non-CO_2 climate change effects of aviation, for example, those associated with vapour trails or NO_x emissions.

These two factors have already been incorporated into the UK government GHG conversion factors. As mentioned in Section 1.3.2, 'WTT' emissions have been included in the relevant emission factors.

Flight distances are calculated using the Great Circle Flight methodology to account for the curvature of the Earth.

Emission factors are applied according to the route length, e.g. domestic, short-haul international or long-haul international. Band distances are used to determine the flight type[3]. Table 5 below outlines the band start point for each flight type as well as the associated emission factor.

Table 5. Flight type band start points and emission factors

Flight type	Band start (km)	Grand Total GHG ($kgCO_2e$/pkm)
Domestic	0	0.27104
Short-haul international	400	0.17256
Long-haul international	3700	0.21175

All air travel has assumed to be in economy class

As an example: emissions for a person making four return trips from San Francisco to London Heathrow
= 2 x (distance x long-haul international average emission factor x number of trips)
= 2 x (8615 km x 0.21175 $kgCO_2e$/pkm x 4)
= **14,593.8** $kgCO_2e$

Fuel Use

For race day motorcycle use and on-site generator use, volume of fuel consumed is the activity data used for calculations. Emissions are calculated on the basis of fuel usage and the fuel-specific volume-based conversion factor, as in the example below:

Generator using 10 gallons of diesel.
= fuel usage in litres x volume based emission factor
= [gallons x conversion to litres] x emission factor
= [10x 4.5461] x 3.12kgCO_2e/litre
= **142** kgCO_2e

[1] WRI/WBCSD The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard
Available online at:
https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf

[2] 2021 UK Government GHG Conversion Factors for Company Reporting.
Available online at:
https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021

[3] GHG Emissions Resulting from Aircraft Travel, Carbon Planet, 2009
Available online at:
http://www.trpa.org/documents/reisc/5_Comment%20References/LTSLT_FOWS_TASC_references/Airport/Flight_Calculator_Information_v9.2.pdf