Sustainable Games Standard - Scope 3, Category 7

"Employee Commuting" GHG emissions

VERSION: 0.1.0

DATE: 15/11/2024

Top-level summary

Emissions from:	• Employee in-person commuting • Devices used while working from home (employee virtual commuting) • Heating/cooling energy consumed in the home office (employee virtual commuting)
Examples:	• Car trips by employees • Bus trips by employees • Train trips by employees • Device energy consumption emissions used while working in home offices • Heating and cooling energy use in home offices – when • **EXCLUDES**: business travel (measured under Scope 3 Cat 6)
Data sources:	• Staff surveys & self-reporting • Average commute distance estimates (city/country) • IT systems, device inventories, system specifications • Average household heating/cooling energy use (Govt or other sources) • Typical heating/cooling months for locations (Govt sources, staff surveys or own knowledge)
Data types:	• Employee transport modes (e.g. car, train, bike, etc) • Employee survey results – e.g. average days in office, etc • Employee attendance data (observations and/or other knowledge) • Device inventory lists (CSVs, etc) • Device inventory specifications, by type (e.g. Laptop, Desktop, Wacom tablet, video rendering desktop, etc with power ratings (W)) • Typical/average heating/cooling technology energy consumption

Consult with other SGA resources

Understanding the requirements and nature of this component of the GHG emissions standard may be aided by consulting the relevant data input spreadsheet to see the overall structure and major sections before reading the standard specification.

Standard Specification

Measurement of Scope 3, Category 7 "Employee commuting" GHG emissions shall employ methods to approach comprehensive measurement of: employee commuting to a physical workplace, the energy consumption and emissions from work-from-home (WFH) through the use of digital devices, home heating/cooling (for such periods of the year that WFH entails *additional consumption* of energy energy above baseline behaviour), and lighting for one standard size home office.

Measurements are to be obtained by surveying employees at least once a year, with data to be collected about individuals' usual working patterns and commute distances. These are to be collected in (or converted into) a full-time-equivalent (FTE) system (in which one day of work equals 0.2 FTE for 5 days a week of work), and which places results into pools (and in some cases sub-pools) of employee activity – for physical commuting from days attending the workplace (which can be zero for fully remote workers) with sub-pools for each mode – and (depending on appropriate methodology) either a single WFH pool, or role-specific sub-pools for WFH device energy use, and home heating, cooling, and lighting. Additional data sources for WFH devices include IT systems and direct observation by users of the Standard.

The SGA standard methodology for Scope 3 Category 7 employee commuting aims to improve granularity over the baseline GHG Protocol "distance-based method" for physical commuting, to support mode shift policy developments, and also adds new guidance for

digital device energy consumption and emissions. It provides three options for increasing the comprehensiveness of WFH digital device energy consumption and (location-based) GHG emissions. It is to apply to all WFH device energy consumption for any work done “at home” as well as in other remote workplaces chosen by the employee (coffee shops, coworking spaces, etc.).

It does not currently consider:

- Employee home renewable energy consumption (a future consideration)
- Direct surveillance of employee commuting (for reasons of both employee privacy and methodological simplicity)
- Direct measurement of WFH devices and their usage in real-time (for reasons similar to the above)
- Home heating emissions in regions where winter-time home heating remains constant regardless of employee presence at home (e.g. as applicable in most Scandinavian regions).

Establishing Baseline

The following set of baseline variables for the organisation will be established as the basis for calculations:

- Total number of employees ($Employees_{total}$)
- Total FTE represented by those employees (FTE_{total} which may ≤ $Employees_{total}$ in cases of one or more part-time employees)
- Total FTE of physical commuting ($Physical\ commute\ pool_{FTE\ total}$)
    - FTE subtotals for each distinct mode of physical commuting are to be assigned to sub-pools based on the totals from staff survey, according to the following modes: $Car_{FTE\ physical\ sub\text{-}pool}$, $Bus_{FTE\ physical\ sub\text{-}pool}$, $Train_{FTE\ physical\ sub\text{-}pool}$, $EV\ car_{FTE\ physical\ sub\text{-}pool}$, $Bike_{FTE\ physical\ sub\text{-}pool}$, $Walk_{FTE\ physical\ sub\text{-}pool}$, $Other_{FTE\ physical\ sub\text{-}pool}$

- Distance-based subtotals should be associated with each mode of physical commuting (if available via staff survey) as $[Car, Bus, etc.....]_{\text{FTE physical distance totals}}$
- In the partial or total absence of staff survey data for distance travelled totals, an average commute distance from published research, government sources, etc. may be used.

- Basic information about the default 1.0 FTE employee work schedule regarding:
  - $Hours\ of\ workday_{usual}$ (i.e. 8, 7.5 etc)
  - $Days\ in\ week_{usual}$ (i.e. 5 days for 1 FTE)
  - $Number\ of\ weeks\ p.a.\ worked_{usual}$ (i.e. 52 weeks, minus 4 weeks leave = 48)
- The FTE total of all employees days worked from home ($WFH\ pool_{\text{FTE total}}$)
- A location-based emissions factor (in gCO2e per kWh)

From the above basic inputs, the following variables, totals and subtotals will be calculated using the following methods:

- $Physical\ commute\ annual\ trips_{\text{FTE multiplier}} = 2 * Days\ in\ week_{usual} * Number\ of\ weeks\ p.a.\ worked_{usual}$
- $Physical\ commute\ annual\ trips_{\text{Total}} = Physical\ commute\ pool_{\text{FTE total}} *$ Physical commute annual $\text{trips}_{\text{FTE multiplier}}$
- $WFH\ annual\ hours_{\text{FTE multiplier}} = WFH\ pool_{\text{FTE total}} * Hours\ of\ workday_{usual} * Days\ in\ week_{usual} * Number\ of\ weeks\ p.a.\ Worked_{usual}$

Physical commute totals

Two options for physical commute totals are permitted. The first is a simple method using average figures for commute distances by mode for the location being calculated. The second is a method that draws on more detailed employee commuting surveys, aggregating total distance travelled by employees for each commute mode in an ordinary week. For each physical commute mode, the most appropriate emissions factor shall be used to calculate emissions.

Option 1 – Average commute distance, by FTE pool allocation method

This method shall be applicable in the absence of employee survey data sufficient to produce aggregate distances travelled by employees for each mode in a given week. Instead, an FTE amount is to be allocated to each physical commute mode subool (e.g. 20 FTE to $Car_{\text{FTE physical sub-pool}}$, 30 FTE to $Bus_{\text{FTE physical sub-pool}}$, 15 FTE to $Train_{\text{FTE physical sub-pool}}$, etc) based on either survey data, or the standard users' knowledge of typical employee behaviour, WFH vs in-office working routines, etc.

Each physical commute mode FTE subpool is to be multiplied by an average commute distance for each mode (informed by published government or other authoritative research source), the $Physical\ commute\ annual\ trips_{\text{FTE multiplier}}$ and the most appropriate emissions factor for that mode. The physical commute total is to be the sum of each of these modes.

Example:

$Car_{sub\text{-}pool\ emissions\ subtotal}$ = 15.0 [car FTE physical commute sub-pool] * 480 [$Physical\ commute\ annual\ trips_{\text{FTE multiplier}}$] * 0.16391 [average car EF from DEFRA]

= 1180.152 kg CO2e

Option 2 – Enhanced commute distance, by total weekly commute distances

This method is preferred to the average commute distance by FTE allocation method, however it requires a high level of staff response rate to employee survey. A minimum expectation should be at least a 50% response rate to use this method, and users of the standard should (where possible) apply their own understanding of the workforce and whether any major potential "outliers" have not been captured in the survey. For example, if a number of known employees commute long distance by car, and these are among the only car commuters, their absence may have a distorting effect on the results, and the average commute distance method should be used instead.

If a high enough quantity of employee distance travelled data is available (>50% of staff response rate) and these can be allocated to a mode sub-pool (e.g. 200 km total commute associated with $Car_{FTE\ physical\ sub\text{-}pool}$ for a usual week of employee commuting) then the enhanced commute distance method may be used.

Each physical commute mode's emissions subtotal shall be that mode's total employee distance travelled (in km) multiplied by the *Number of weeks p.a. worked*$_{usual}$ and the most appropriate emissions factor.

This result is then to be generalised to the entire workforce in proportion to the FTE amount covered by the survey data, by adding to this total the equivalent percentage of the total that is the equivalent FTE data that is missing. I.e. If employee survey data covers 65% of the total commute FTE, then the final physical commute total result is to be +35% to account for the missing remainder.

Alternatively, in situations where the typical *mode of commuting* for the missing FTE physical commute data is known, then the average commute distance by FTE allocation may be used for the remaining FTE worth of commuters instead, and added to the Enhanced method total. **NB: this mixed method approach is not currently supported by the data input spreadsheet.**

The reportable physical commute total will be the sum of all $[Mode]_{sub\text{-}pool\ emissions\ subtotal}$.

Example:

Weekly physical commute total distance – Train = 125 km

Total weekly commute distance mode subtotal = 125 * 48 [*Number of weeks p.a. worked*$_{usual}$]

* 0.035463 [kg CO2e per km, DEFRA national rail EF]

Total weekly commute distance mode subtotal = 212.778 kg cCO2e

Work-from-home – WFH device totals

Three options for WFH devices are permitted, with requirements depending on the size of the organisation.

Option 1 – Simple method, emissions factor based

This method is appropriate and permitted when either:

A. insufficient data is available for Average device or Role specific methods – for example, when a staff survey has not been completed for the period under measurement as in the case of a first-time GHG inventory, or where data collection proves (temporarily) to be too complex. In cases of large organisations with data collection issues, the simple method is permissible for two years consecutively, with the view to implementing processes sufficient to calculate via the Average device method or Role-specific method in following periods.

B. when an organisation is considered a *micro*-business as determined by the EU thresholds (e.g. 10 or less employees, as of 2024). These organisations may still prefer to adopt the Average device method or the Role specific method for more accurate and actionable GHG measurement.

The 'Simple method' is to be considered a 'fallback' method that produces "good enough" information for sustainability information disclosure, however, users should always aim to utilise a more accurate method (average device or role-specific methods) that produces more actionable information.

Users attempting measurement using the 'Simple method' shall obtain a research agency published emissions factor or energy consumption data (exclusively for digital devices) from competent authorities in the location under measurement (WFH digital devices$_{\text{emissions factor}}$).

The total reportable WFH digital devices emissions shall be the annual hours of $WFH_{\text{FTE multiplier}}$ multiplied by the best available WFH digital devices emissions factor published or supplied by a research agency. If the published or supplied emissions factor is an energy consumption emissions factor, then this value is also to be multiplied by the most appropriate location-based electricity emissions factor for the location.

Option 2 – Average device method

This method is appropriate and permitted when either:

A. Users of the standard have access to their organisation's IT inventory data but not sufficient access to systems, or data collection about HR/employee data that would enable placing individual survey responses into specific FTE sub-pools for a given role within the company (e.g. "Art", "Engineering", "Leadership", etc – see Option 3 – Role specific method).
B. Where the organisation does not have defined employment roles sufficient to profile the entire organisation according to device usage/hardware specification/energy profile (as in the case of a 'flat', or cabal organisational structure, or in small teams with many overlapping etc).

The average device method involves taking an average power consumption figure across the organization's entire IT inventory of devices provided to employees for WFH. Because this method relies on averaging, it is preferable to use the role-specific average method.

Users of the average device method are required to collect the power profile information (in Watts) from IT or other systems, and find the 'average' max power consumption, which is to be considered the organization's WFH digital $devices_{\text{avg. device(W)}}$.

Option 3 – Role specific method

The role specific method is the recommended method for all users of the Standard, except in the circumstances described previously (where data may be lacking, or where the scale/complexity of building employee role profiles may be prohibitive).

Role specific method involves producing estimated energy consumption profiles for specific roles in the organisation, broadly determined by work department– e.g. “art”, “engineering”, “production”, “ops”, “leadership” etc – with the defining feature being the typical digital device(s) that are used in carrying out their work. Not all members of a role need to have precisely the same device(s), however it is assumed that similar work will involve similar device requirements and energy consumption.

The process of developing energy consumption profiles for roles can be done in one of the following ways:

- via an inventory of the IT devices provided to specific roles from IT
- via knowledge of the preparer (e.g. based on discussion with IT or with staff)
- via knowledge from SGA research (to be undertaken)
- via published research on the typical devices and/or power profiles of devices used across the games industry (as and when such research becomes available)

Users of this method shall apportion FTE WFH amounts from the staff survey to specific role subpools, and assign the most appropriate energy profile values available (rated max Watts) to the roles based on the profile of devices used by that role (e.g. “Ops” roles who use a 60 Watt laptop, “Art” roles using a 400 Watts desktop device plus 100watts in accessories).

Measurement of WFH emissions via the role specific method will consist of the multiplication of role specific WFH device usage subpool, with the developed energy profile value (in Watts)

multiplied by a utilization rate of 80%. (**Utilization rate subject to change pending further research and development**)

Heating and cooling

Measurement of heating and cooling will consist of either a simple method, or an enhanced technology-specific method.

Option 1 – Simple method, emissions factor based

Measurement will consist of an estimation of the total number of heating/cooling months per annum and the multiplication of the annual FTE working hours by an appropriate published emissions factor for WFH heating/cooling (where available), multiplied by the number of heating/cooling months per year/12.

Option 2 – Enhanced, Technology specific method

** TBC – requires further research and development **

Lighting

Measurement of WFH device lighting emissions shall consist of 10 watts of lighting, multiplied across the total FTE WFH hours.

Total Reportable Scope 3 Category 7

The reportable results for Scope 3 Category 7 employee commuting emissions will be the Sum across all the above calculations.

Additional guidance: requirements from employee survey

Users of the standard will employ at least one method of measurement for employee physical commuting (which can be zero for fully remote organisations) such as a staff survey, or other direct record or observation of days worked (e.g. data taken from timesheets, etc) that allow days to be recorded in FTE (where 0.2 FTE = 1 day of on-premise work).

The survey shall collect (at minimum) data to enable each worker's FTE across the year to be apportioned to either a physical commute mode, or WFH in proportion to their responses to the survey.

Data is to be collected in such a way as to enable the association of FTE physical commute mode totals with distances travelled by commuters in a particular mode, and to associate FTE WFH totals with an employee's role (where possible).

Where employees use more than one mode, advice is to be made to select the mode that employees *travel the furthest* via.

Users of the standard will also employ at least one method of measurement for virtual commuting that takes into account device energy consumption used in a work-from-home context.

Applied FTE examples:

- Lucas travels to the office by train 2 days a week, and virtually attends the office by working from home 3 days a week and maintains this routine throughout most of the year. Therefore Lucas contributes 0.4 FTE per annum of train commuting, and 0.6 FTE per annum virtual commuting.
- Kat works entirely from home at a fully remote studio, works only 4 days a week (though the usual days worked in the studio is 5), and maintains this routine throughout most of the year. Therefore, Katarzyna contributes 0.8 FTE per annum of virtual commuting.
- Andy joined the company mid-year, and travels to the office 4 days a week by car, and virtually attends the office 1 day a week. Therefore, Andy contributes ½ x 0.8 FTE per annum of car commuting + ½ x 0.2 FTE virtual commuting per annum.

Worked examples

	Example 1a	**Example 1b**	**Example 1c**	**Example 2b**
Type of emissions source	Car trips by distance	Bus trips by distance	Train trips by distance	Non-fossil transport modes (**recorded to calculate net benefits**)
Data source	Total number of trips taken by	Total number of trips taken by	Total number of trips taken by	Total number of trips taken by

	car; average distance of trips from staff survey	bus; average distance of trips from staff survey	train; average distance of trips from staff survey	active transport (bike, walking, etc)
Data type	Numerical quantity (car trips); Average distance (km)	Numerical quantity (bus trips); Average distance (km)	Numerical quantity (train trips); Average distance (km)	Numerical quantity (active transport trips)
Collected data:	681 (employee car trips), 6km (average distance)	322 (employee car trips), 6km (average distance)		122 (employee walking trips), 2km (average distance); 677 employee bike trips)
Type of emissions factor	CO2e for vehicle	CO2e for vehicle		Social benefit saving
Example emissions factor	0.163909 (kg CO2e per km) (DEFRA, average petrol car)	0.118363 (kg CO2e per passenger km) (DEFRA local bus)		
Calculation method	Multiplication (trips x average distance x emissions factor)	Multiplication (trips x average distance x emissions factor)		
Example calculation	681 x 6km x 0.163909 kg CO2e	322 x 6km x 0.118363 kg CO2e		
Result	669.73 (kg CO2e)	228.677316 (kg CO2e)		

Appendix – References and Equations

Resources that have informed this draft:

- CarbonTrust/Vodafone Homeworking report
- EcoAct, Lloyds Banking Group and NatWest Group. Homeworking emissions paper.
- VMware, Carbon Impact of the Future of Work – The Environmental Implications of Remote Working, August 2021. (Broken link – PDF alternative)

DEFRA 2023 condensed set update – WFH EFs (for UK)

Activity	Unit	kg CO_2e
Office Equipment	per FTE Working Hour	0.03144
Heating	per FTE Working Hour	0.30234
Homeworking (office equipment + heating)	per FTE Working Hour	0.33378

GHG Protocol Distance Based method, for reference:

Calculation formula [7.1] Distance-based method

CO_2e emissions from employee travel =
first, sum across all employees to determine total distance travelled using each vehicle type: total distance travelled by vehicle type (vehicle-km or passenger-km) = ∑ (daily one-way distance between home and work (km) × 2 × number of commuting days per year) **then, sum across vehicle types to determine total emissions:** kg CO_2e from employee commuting = ∑ (total distance travelled by vehicle type (vehicle-km or passenger-km) × vehicle specific emission factor (kg CO_2e/vehicle-km or kg CO_2e/passenger-km)) + **(optionally) for each energy source used in teleworking:** ∑ (quantities of energy consumed (kWh) × emission factor for energy source (kg CO_2e/kWh))

Physical commute equations

Enhanced commute distance, by total weekly commute distances

None

$$[Mode]_{sub\text{-}pool\ emissions\ subtotal}\ (kg\ CO2e) = [Mode]_{FTE\ physical\ distance\ total} * Number\ of\ weeks\ p.a.\ worked_{usual} * Most\ appropriate\ emissions\ factor\ for\ [Mode]\ (g\ CO2e\ per\ km)\ /\ 1000$$

Average commute distance, by FTE pool allocation method:

None

$$[Mode]_{sub\text{-}pool\ emissions\ subtotal}\ (kg\ CO2e) = [Mode]\ FTE_{distance\ sub\text{-}pool} * Physical\ commute\ annual\ trips_{FTE\ multiplier} * Average\ commute\ distance\ per\ [Mode]\ for\ location\ (km) * Most\ appropriate\ emissions\ factor\ for\ [Mode]\ (g\ CO2e\ per\ km)\ /\ 1000$$

WFH devices equations

Simple method – equation for WFH digital devices emissions

```
None
WFH digital devices emissions_simple method total = WFH annual hours_FTE
          multiplier * WFH digital devices_emissions factor (in kg CO2e)
```

OR

```
None
WFH digital devices emissions_simple method total = WFH annual hours_FTE
          multiplier * WFH digital devices_emissions factor (in kWh per hour) *
          Location-based electricity emissions factor
```

Average device method – equation for WFH digital devices emissions

```
None
WFH digital devices emissions_average device method total (kg CO2e) = WFH
          annual hours_FTE multiplier * WFH digital devices_avg. device(W) *
          Location-based emissions factor (gCO2e/kWh) / 1000
```

Role specific method – equation for WFH digital devices emissions

```
None
WFH digital devices emissions_role specific method total (kg CO2e) = Role
          specific subpool_FTE total * WFH annual hours_FTE multiplier * role
```

```
specific energy profile_Watts * Location-based emissions
factor (gCO2e/kWh) * utilization rate (80%) / 1000
```

Heating/cooling equations

Simple method – equation for WFH heating/cooling emissions

None

```
WFH heating/cooling emissions_total (kgCO2e) = WFH pool_FTE total &+* WFH
annual hours_FTE multiplier * heating/cooling months (as
applicable) / 12
```

Enhanced method – TBC

Lighting equation

None

```
WFH lighting total (kg CO2e) = 10 (watts) * WFH pool_FTE total * WFH
annual hours_FTE multiplier * Location-based emissions
factor (gCO2e/kWh) / 1000
```

Total Reportable Emissions Sum Equation

None

```
Scope 3 Category 7 Total = ∑ Physical Commute total, WFH device
Total, WFH heating/cooling emissions_total, WFH lighting total
```