Department for
Business, Energy
& Industrial Strategy

2022 Government Greenhouse Gas Conversion Factors for Company Reporting

Major changes to the Conversion Factors

June 2022

1. Major Changes to the Conversion Factors

The following table summarises the major changes in conversion factors for the 2022 Greenhouse Gas (GHG) Conversion Factors, compared to the equivalent factors provided in the 2021 GHG Conversion Factors, and a short explanation for the reason for the change. We have considered major changes to be those greater than 5% for Scope 1 and 2 emission sources (applies to most fuel and electricity sources) and greater than 10% for Scope 3 (applies to most of the other emission sources). Please refer to the Glossary section at the end of this document for any acronyms used in the table below.

Ref. number	Emission factor	GHG	Unit (all units are kgCO$_2$e per "unit" of GHG, unless stated)	Magnitude of change vs 2021 update	Reason for change	For more information see relevant section in methodology report:
Fuels						
No significant changes						Section 2
Bioenergy						
1	Wood logs, wood chips and wood pellets	CO$_2$e	All	-30.4%	Total use of domestic wood has been reduced substantially according to DUKES (to reflect the findings in the Defra solid fuel combustion survey) and the conversion factor is a weighted average for all users.	Section 9
Refrigerants and other						
No significant changes						Section 4

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Ref. number	Emission factor	GHG	Unit (all units are kgCO$_2$e per "unit" of GHG, unless stated)	Magnitude of change vs 2021 update	Reason for change	For more information see relevant section in methodology report:
Passenger Vehicles						
2	Cars (by market segment) – Lower Medium, Upper Medium - Plug-in Electric Vehicle (PHEV)	CO$_2$e and CO$_2$	km and miles	-6% to -7%	General decrease expected as more recent cars with lower emissions penetrate into fleet	Section 5
3	Cars (by size) – Medium - Plug-in Electric Vehicle (PHEV)	CO$_2$e and CO$_2$	km and miles	-7%	General decrease expected as more recent cars with lower emissions penetrate into fleet	Section 5
Delivery vehicles						
No significant changes						
SECR kWh pass & delivery vehs						
4	Cars (by size) – Medium - Plug-in Electric Vehicle (PHEV)	kWh (Net CV)	km and miles	-6%	General decrease expected as more recent cars with lower emissions penetrate into fleet	Section 14
5	Petrol Vans – Class II (1.305 to 1.74 tonnes)	kWh (Net CV)	tonne.km	6%	Emission factor for petrol vans increased due to revised NAEI fleet turnover model	Section 14
6	HGVs (all diesel)- Articulated (>3.5 - 33t) - Average Laden	kWh (Net CV)	tonne.km	9%	The increase in kWh/tonne.km factor reflects the increase in the gCO$_2$/tonne.km factor as DfT data has shown that average laden rigid HGVs have moved less goods and travelled less in 2020.	Section 14
7	HGVs (all diesel)- Rigid (>3.5 - 7.5 tonnes)- Average Laden	kWh (Net CV)	tonne.km	14%	As above	Section 14
8	HGVs (all diesel)- Rigid (>7.5 - 17 tonnes)- Average Laden	kWh (Net CV)	tonne.km	12%	As above	Section 14

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9	HGV refrigerated (all diesel) - Articulated (>3.5 - 33t) - Average Laden	kWh (Net CV)	tonne.km	9%	As above	Section 14
10	HGV refrigerated (all diesel)- Rigid (>3.5 - 7.5 tonnes)- Average Laden	kWh (Net CV)	tonne.km	14%	As above	Section 14
11	HGV refrigerated (all diesel)- Rigid (>7.5 - 17 tonnes)- Average Laden	kWh (Net CV)	tonne.km	12%	As above	Section 14
UK Electricity						
12	UK Electricity	CO$_2$e and CO$_2$	kWh	-9%	There was a significant decrease in coal generation and an increase in the renewable and nuclear generation since the previous year.	Section 3
UK electricity for EVs						
13	Cars (by market segment) - Upper medium - Battery Electric Vehicle (BEV)	CO$_2$e and CO$_2$	km and miles	23% to 24%	Previously, there was only one car model in the "Upper medium BEV" car segment. One more car model was added to this segment this year, with higher energy consumption and more vehicle registrations.	Section 5
14	Cars (by market segment) - Executive, Luxury, Dual purpose 4x4 - Battery Electric Vehicle (BEV)	CO$_2$e and CO$_2$	km and miles	-9% to -12%	Due to a decrease in UK electricity emissions and the latest year of vehicle registrations being less energy intensive.	Section 5
15	Cars (by market segment) – Mini, Lower medium - Battery Electric Vehicle (BEV)	CO$_2$e and CO$_2$	km and miles	-7% to -8%	Due to a decrease in UK electricity emissions and the latest year of vehicle registrations being slightly more energy intensive.	Section 5

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Ref. number	Emission factor	GHG	Unit (all units are kgCO$_2$e per "unit" of GHG, unless stated)	Magnitude of change vs 2021 update	Reason for change	For more information see relevant section in methodology report:
16	Cars (by market segment) – Supermini, Executive, Luxury, Sports - Plug-in Electric Vehicle (PHEV)	CO$_2$e and CO$_2$	km and miles	-6% to -9%	Due to a decrease in UK electricity emissions and the latest year of vehicle registrations being equally or slightly more energy intensive.	Section 5
17	Cars (by size) – Medium, Large, Average - Battery Electric Vehicle (BEV)	CO$_2$e and CO$_2$	km and miles	-6% to -9%	Due to a decrease in UK electricity emissions and the latest year of vehicle registrations being equally or slightly more energy intensive.	Section 5
18	Cars (by size) – Small - Plug-in Electric Vehicle (PHEV)	CO$_2$e and CO$_2$	km and miles	-9%	Due to a decrease in UK electricity emissions.	Section 5
19	Vans - Class III and Average - Battery Electric Vehicle (BEV)	CO$_2$e and CO$_2$	km and miles	14% to 22%	Due to an increase in Class III vans registrations this year with higher energy consumption.	Section 6
20	Vans - Class III - Battery Electric Vehicle (BEV)	CO$_2$e and CO$_2$	tonne.km	14%	Due to an increase in Class III vans registrations this year with higher energy consumption.	Section 6
21	Vans - Class I - Battery Electric Vehicle (BEV)	CO$_2$e and CO$_2$	km and miles	-9%	Due to a decrease in UK electricity emissions.	Section 6
22	Vans - Class I - Battery Electric Vehicle (BEV)	CO$_2$e and CO$_2$	tonne.km	-9%	Due to a decrease in UK electricity emissions.	Section 6

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SECR kWh UK electricity for EVs						
23	Cars (by market segment) - Upper Medium, Sport - Battery Electric Vehicle (BEV)	kWh	km and miles	15% to 36%	The result of the latest year of vehicle registrations in segments "Upper Medium" and "Sport" BEV is more energy intensive.	Section 14
24	Vans - Class II, III and Average - Battery Electric Vehicle (BEV)	kWh	km and miles	11% to 34%	Due to an increase in Class II and Class III vans registrations this year with higher energy consumption.	Section 14
Heat and Steam						
No significant changes						Section 3
WTT - bioenergy						
25	Bioethanol	CO$_2$e	All	-24%	Changes due to the underlying dataset from RTFO table 0105 on carbon and sustainability data of renewable transport fuels in the UK.	Section 9
26	Biodiesel ME	CO$_2$e	All	-13%	As above	Section 9
27	Biomethane (compressed)	CO$_2$e	All	-35%	As above, but also note that biomethane is now split into compressed and liquified forms, and this row refers only to the compressed biomethane.	Section 9
28	Biodiesel HVO	CO$_2$e	All	65%	Changes due to the underlying dataset from RTFO table 0105 on carbon and sustainability data of renewable transport fuels in the UK.	Section 9
29	Biopropane	CO$_2$e	All	-15%	as above	Section 9
30	Renewable petrol	CO$_2$e	All	-21% to -24.7%	as above	Section 9
31	Biogas	CO$_2$e	All	18%	Changes to the WTT biogas factor due to using the most recent version of the UK's biofuels calculator.	Section 9

Ref. number	Emission factor	GHG	Unit (all units are kgCO$_2$e per "unit" of GHG, unless stated)	Magnitude of change vs 2021 update	Reason for change	For more information see relevant section in methodology report:
Transmission and distribution (T&D)						
32	UK Electricity T&D Losses	CO$_2$e and CO$_2$	kWh	-6%	The decreased factor for electricity generation is partially offset by increased losses.	Section 3
UK electricity T&D for EVs						
33	Cars (by market segment) – Upper Medium - Battery Electric Vehicle (BEV)	CO$_2$ and CO$_2$e	km and miles	28%	Previously, there was only one car model in the "Upper medium BEV" car segment. One more car model was added in this segment this year, with higher energy consumption and more vehicle registrations.	Section 5
34	Vans - Class III and Average - Battery Electric Vehicle (BEV)	CO$_2$e and CO$_2$	km and miles	18% to 26%	Due to an increase in Class III vans registrations this year with higher energy consumption.	Section 6
35	Vans - Class III - Battery Electric Vehicle (BEV)	CO$_2$e and CO$_2$	tonne.km	18%	As above	Section 6
WTT- UK electricity						
36	WTT UK Electricity	CO$_2$e	kWh	-16%	Improved methodology to account for plant and animal biomass use in electricity generation; this was specifically to use improved data on the WTT emissions associated with plant and animal biomass use in electricity generation; the values for the generation step were not affected.	Section 3
37	WTT UK Electricity T&D Losses	CO$_2$e	kWh	-14%	As above, and combined with a change to the total grid losses.	Section 3
WTT- overseas electricity (generation)						
No longer publishing WTT overseas electricity factors						
WTT- overseas electricity (T&D)						
No longer publishing WTT overseas electricity factors						
WTT- heat and steam						
No significant changes						Section 3

Ref. number	Emission factor	GHG	Unit (all units are kgCO$_2$e per "unit" of GHG, unless stated)	Magnitude of change vs 2021 update	Reason for change	For more information see relevant section in methodology report:
Water supply						
No significant changes						Section 9
Water treatment						
No significant changes						Section 9
Business travel- air						
No significant changes						Section 8
WTT- Business travel- air						
No significant changes						Section 8
Business travel- sea						
No significant changes						Section 7
WTT- Business travel- sea						
No significant changes						Section 7
Business travel - land						
38	Cars (by market segment) – Upper Medium and Dual purpose 4x4 -, Battery Electric Vehicle (BEV)	As seen in UK electricity for EVs and UK electricity T&D for EVs				Section 5
Freighting goods						
39	Vans- Class III and Average I- Battery Electric Vehicle (BEV)	As seen in UK electricity for EVs and UK electricity T&D for EVs				Section 6
40	HGVs (all diesel)- Rigid (>3.5 - 7.5 tonnes)- Average Laden	CO$_2$ and CO$_2$e	tonne.km	16%	The increase in the emissions per tonne/km factor reflects the decrease in distance travelled and amount of goods transported per "average laden" vehicle during the 2020 year which was affected by the traffic restrictions due to COVID-19.	Section 6

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41	HGVs (all diesel)- Rigid (>7.5 - 17 tonnes)- Average Laden	CO$_2$ and CO$_2$e	tonne.km	14%	As above	Section 6
42	HGV refrigerated (all diesel)- Rigid (>3.5 - 7.5 tonnes)- Average Laden	CO$_2$ and CO$_2$e	tonne.km	16%	As above	Section 6
43	HGV refrigerated (all diesel)- Rigid (>7.5 - 17 tonnes)- Average Laden	CO$_2$ and CO$_2$e	tonne.km	14%	As above	Section 6
44	HGV (all diesel) - Articulated (>3.5 - 33t) - average	CO$_2$ and CO$_2$e	tonne.km	11%	As above	Section 6
45	HGV refrigerated (all diesel) - Articulated (>3.5 - 33t) - average	CO$_2$ and CO$_2$e	tonne.km	11%	As above	Section 6
WTT passenger vehicles & business travel- land						
No significant changes						
WTT delivery vehicles & freighting goods						
No significant changes						Section 6

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Ref. number	Emission factor	GHG	Unit (all units are kgCO$_2$e per "unit" of GHG, unless stated)	Magnitude of change vs 2021 update	Reason for change	For more information see relevant section in methodology report:
Hotel Stay						
46	Hotel stay	CO$_2$e	Room per night	-63% to 23%	Changes in hotel stay factors are due to 1) improved methodology this year to use median values instead of mean values from the Cornell Hotel Sustainability Benchmarking Index (CHSB) Tool, 2) improved methodology this year to use Measure 1 (HCMI Rooms Footprint Per Occupied Room (kgCO$_2$e)) from the CHSB Tool instead of Measure 3 (Hotel Carbon Footprint Per Occupied Room (kgCO$_2$e) in previous years' conversion factors as it gives a better representation of the carbon footprint of a guest's stay, 3) changes in emission factors of purchased electricity in each country, as the majority of a typical hotel's footprint is from its electricity usage 4) changes in the data set used to generate the median value for each country, as the data set tends to increase in size each year and add more records and 5) changes in weather and occupancy that cause energy load changes in each hotel. Further information can be found here: https://ecommons.cornell.edu/handle/1813/74089	Section 11
Managed assets- electricity						
47	See "UK electricity" for reasons for changes					Section 3
Managed assets- vehicles						
48	Managed Cars -, Battery Electric Vehicle (BEV)	See equivalent conversion factors in UK electricity for EVs and UK electricity T&D for EVs for reasons for changes					Section 5
49	Managed Vans -, Battery Electric Vehicle (BEV)	See equivalent conversion factors in UK electricity for EVs and UK electricity T&D for EVs for reasons for changes					Section 6
Outside of scopes						
50	Diesel (average biofuel blend)	CO$_2$	All	-27%	Changes reflect underlying RTFO data which show a decrease in biodiesel use compared to last year	Section 9

Ref. number	Emission factor	GHG	Unit (all units are kgCO$_2$e per "unit" of GHG, unless stated)	Magnitude of change vs 2021 update	Reason for change	For more information see relevant section in methodology report:
51	Petrol (average biofuel blend)	CO$_2$	All	22%	Changes reflect underlying RTFO data, which show an increase in bioethanol use compared to last year	Section 9
Material use						
52	Construction, Aggregates, Bricks, Concrete, Tyres, Wood- Open-loop source	CO$_2$e	tonne	-100%	Removal of the factors for open-loop source materials. The material use tab is intended only for reporting the Scope 3 emissions from procured products and materials. An open-loop option, in this case, makes little sense since the emissions are associated with the product purchased, not the previous end of life material used as feedstock. Any saving in the manufacture of primary raw materials is likely to be better represented by the "closed loop" factor than by the previously published open-loop factor, which was applicable only to companies producing sorted waste materials, not finished products.	Section 12
53	Other, Glass, Clothing- Open-loop source	CO$_2$e	tonne	-100%	As above	Section 12
54	Plastic, All – Open-loop source	CO$_2$e	tonne	-100%	As above	Section 12
Waste disposal						
55	Refuse, Household residual waste- Open-loop disposal, Closed-loop disposal & Anaerobic digestion	CO$_2$e	tonne	-100%	These factors have been removed as this is not a viable end destination for this material	Section 12
56	Refuse, Commercial and industrial waste- Closed-loop source & Anaerobic digestion	CO$_2$e	tonne	-100%	As above	Section 12

Glossary

Abbreviation	Definition
ANPR	Automatic Number Plate Recognition
BEV	Battery electric vehicle
CAA	Civil Aviation Authority
CBS	National Bureau for Statistics in the Netherlands
CEF	Carbon emission factor
CH_4	Methane
CHP	Combined Heat and Power
CHPQA	Combined Heat and Power Quality Assurance
CNG	Compressed natural gas
CO_2	Carbon dioxide
DfT	Department for Transport
DUKES	Digest of UK Energy Statistics
EEA	European Environment Agency
EF	Emission factor
ETS	Emissions Trading System
FAME	Fatty Acid Methyl Ester
GCV	Gross calorific value
GHG	Greenhouse gas
GVW	Gross vehicle weight
GWP	Global Warming Potential
HGVs	Heavy goods vehicles
IPCC	Intergovernmental Panel on Climate Change
LCA	Life cycle assessment
LGVs	Light goods vehicles
LPG	Liquefied petroleum gas
MTBE	Methyl tert-butyl ether
NAEI	National Atmospheric Emissions Inventory
NCV	Net calorific value
NEDC	New European Driving Cycle
N_2O	Nitrous oxide
ORR	Office of Rail and Road

PHEV	Plug-in hybrid electric vehicle
RoPax	Roll on/roll off a passenger
RTE	French transmission system operator
RTFO	Renewable Transport Fuel Obligation
RW	Real-world
SEAI	Sustainable Energy Authority of Ireland
SECR	Streamlined Energy and Carbon Reporting
SMMT	Society of Motor Manufacturers and Traders
T&D	Transmission & Distribution
TfL	Transport for London
TTW	Tank-To-Wheel (i.e. direct emissions at the point of use)
UK GHGI	UK's Greenhouse Gas Inventory
UNFCCC	United Nations Framework Convention on Climate Change
WLTP	Worldwide Harmonised Light Vehicle Test Procedure
WTT	Well-To-Tank (i.e. upstream emissions from the production of fuel or electricity)
WTW	Well-To-Wheel (= Well-To-Tank + Tank-To-Wheel)
xEV	Generic term for battery electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV), range-extended electric vehicles (REEV) and fuel cell electric vehicles (FCEV)

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