



Department for  
Business, Energy  
& Industrial Strategy

# 2021 Government Greenhouse Gas Conversion Factors for Company Reporting

Major changes to the Conversion Factors



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# 1. Major Changes to the Conversion Factors

The following table provides a summary of major changes in conversion factors for the 2021 Greenhouse Gas (GHG) Conversion Factors, compared to the equivalent factors provided in the 2020 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 other emission sources). Please refer to the Glossary section at the end of this document for any acronyms used in the table below.

**Please note that to correct a minor error, the direct conversion factor for light rail and the indirect/WTT conversion factors for rail (including National rail, International rail, Light rail and tram and London Underground) and rail freight were updated in January 2022.**

Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per “unit” of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
<b>Fuels</b>						
1	LPG	CH <sub>4</sub>	All	6% to 7%	Calculated as a weighted average of multiple sources, change caused by increase to relative contribution from domestic combustion	Section 2
2	LPG	N <sub>2</sub> O	kWh (Net CV) and kWh (Gross CV)	-7%	Absolute change is -2%, made larger due to rounding a small number	Section 2
3	Aviation spirit	CH <sub>4</sub>	All	-41% to -42%	Improvement to methodology regarding piston helicopter and piston aircraft emission factors	Section 8
4	Diesel (average biofuel blend)	N <sub>2</sub> O	litres, kWh (Net CV), and kWh (Gross CV)	5% to 6%	Updated vkm data for minor roads from DfT	Section 2
5	Diesel (100% mineral blend)	N <sub>2</sub> O	All	5% to 6%	Updated vkm data for minor roads from DfT	Section 2

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Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per "unit" of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
6	Fuel oil	CH <sub>4</sub>	All	14% to 15%	Calculated as a weighted average of multiple sources. Increase in miscellaneous industrial/commercial combustion and public sector combustion activities	Section 2
7	Petrol (average biofuel blend)	CH <sub>4</sub>	All	6% to 8%	Updated vkm data for minor roads from DfT	Section 2
8	Petrol (average biofuel blend)	N <sub>2</sub> O	All	8% to 10%	Updated vkm data for minor roads from DfT	Section 2
9	Petrol (100% mineral blend)	CH <sub>4</sub>	All	6% to 8%	Updated vkm data for minor roads from DfT	Section 2
10	Petrol (100% mineral blend)	N <sub>2</sub> O	All	8% to 10%	Updated vkm data for minor roads from DfT	Section 2
11	Processed fuel oils - residual oil	CH <sub>4</sub>	All	14% to 15%	Increase in miscellaneous industrial/commercial combustion and public sector combustion activities	Section 2
12	Coal (industrial)	CH <sub>4</sub>	All	-29%	Calculated as a weighted average of multiple sources therefore interannual variation is expected	Section 2
13	Coal (industrial)	N <sub>2</sub> O	All	20 to 21%	Calculated as a weighted average of multiple sources therefore interannual variation is expected	Section 2
14	Petroleum coke	CH <sub>4</sub>	All	9% to 10%	Increase in domestic combustion activity	Section 2
<b>Bioenergy</b>						
15	Grass/straw	CO <sub>2</sub> e	All	-19%	The proportion of grass/straw use between power stations and agriculture has changed significantly this year	Section 9
<b>Refrigerants and other</b>						
No changes						Section 4
<b>Passenger Vehicles</b>						
16	Cars (by size and segment): all, Diesel	CH <sub>4</sub>	km	19%	Due to revisions in DfT data, ANPR analysis causing revision to the age mix of diesel vehicles and rounding of a small number causing a large change	Section 5

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Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per "unit" of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
17	Cars (by segment): Upper medium, Unknown fuel	CH <sub>4</sub>	km and miles	-13%	Greater weighting toward lower emitting diesel vehicles and rounding of a small number causing a large change	Section 5
18	Cars (by segment): Executive, Luxury, Dual purpose, Unknown fuel	CH <sub>4</sub>	km and miles	13% to 19%	Greater weighting toward higher emitting petrol vehicles and rounding of a small number causing a large change	Section 5
19	Cars (by size): large, Hybrid and Unknown fuel	CH <sub>4</sub>	km and miles	13%	Due to greater weighting toward higher emitting petrol vehicles and rounding of a small number causing a large change	Section 5
20	Cars (by segment) - Supermini, Lower medium, Executive - Plug-in Hybrid Electric Vehicle (PHEV)	N <sub>2</sub> O	km and miles	11% to 35%	Revisions following through from changes made by DfT and the latest year of registrations having higher emissions	Section 5
21	Cars (by size) - Small, Large, Average - Plug-in Hybrid Electric Vehicle (PHEV)	N <sub>2</sub> O	km and miles	14% to 17%	As above	Section 5
22	Motorbike - small	N <sub>2</sub> O	km and miles	87%	Change to method for allocating emissions against small / medium / large size classes, for consistency with other gases	Section 5
<b>Delivery vehicles</b>						
23	Petrol Vans- All	N <sub>2</sub> O	km and miles	-14%	General decrease expected as more recent euro standards with lower emissions penetrate into fleet	Section 6
24	CNG Vans- Average class	N <sub>2</sub> O	km and miles	-16%	General decrease expected as more recent euro standards with lower emissions penetrate into fleet	Section 6
25	LPG Vans- Average class	N <sub>2</sub> O	km and miles	-16%	As above	Section 6

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Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per "unit" of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
26	HGVs (all diesel)- Articulated (>3.5 – 33t), All Artics- All	CH <sub>4</sub>	km and miles	10% to 18%	Improved estimates of the age of vehicles in the fleet	Section 6
27	HGVs refrigerated (all diesel)- All Artics- All	CH <sub>4</sub>	km and miles	11% to 18%	As above	Section 6
<b>SECR kWh pass &amp; delivery vehs</b>						
No changes						Section 14
<b>UK Electricity</b>						
27	UK Electricity	CO <sub>2</sub> e and CO <sub>2</sub>	kWh	-9%	There was a significant decrease in coal generation, and an increase in renewable and nuclear generation since the previous year	Section 3
28	UK Electricity	CH <sub>4</sub>	kWh	11%	Increase in MSW incineration which has higher CH <sub>4</sub> emissions	Section 3
<b>UK electricity for EVs</b>						
29	Cars (by segment) - Supermini, Lower medium, Upper medium, Executive, Dual purpose 4X4 - Plug-in Hybrid Electric Vehicle (PHEV)	CH <sub>4</sub>	km and miles	10% to 33%	Due to an increase in UK electricity emissions and rounding of a small number causing a large change	Section 5
30	Cars (by segment) - Luxury - Plug-in Hybrid Electric Vehicle (PHEV)	CH <sub>4</sub>	km and miles	14%	As above and the latest year of vehicle registrations being more energy intensive	Section 5
31	Cars (by segment) - Lower Medium, Luxury, Sports, Dual purpose 4x4 - Battery Electric Vehicle (BEV)	CH <sub>4</sub>	km and miles	13% to 17%	Due to an increase in UK electricity emissions for CH <sub>4</sub> and rounding of a small number causing a large change	Section 5

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Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per "unit" of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
32	Cars (by segment) - Supermini, MPV - Battery Electric Vehicle (BEV)	CH <sub>4</sub>	km and miles	23% to 33%	As above and the latest year of vehicle registrations being more energy intensive	Section 5
33	Cars (by segment) - MPV - Battery Electric Vehicle (BEV)	N <sub>2</sub> O	km and miles	17%	The latest year of vehicle registrations are more energy intensive	Section 5
34	Cars (by size) - All - Plug-in Hybrid Electric Vehicle (PHEV)	CH <sub>4</sub>	km and miles	10% to 25%	Due to an increase in UK electricity emissions for CH <sub>4</sub> and rounding of a small number causing a large change	Section 5
35	Cars (by size) - All - Battery Electric Vehicle (BEV)	CH <sub>4</sub>	km and miles	11% to 23%	As above	Section 5
36	Vans - All - Battery Electric Vehicle (BEV)	CO <sub>2</sub> and CO <sub>2</sub> e	tonne.km	-12% to -10%	The combined result of a reduction in UK electricity emissions and an increase in the average load carried	Section 6
37	Vans - Class I, II and Average - Battery Electric Vehicle (BEV)	CH <sub>4</sub>	km and miles	12% to 17%	Due to an increase in UK electricity emissions for CH <sub>4</sub> and rounding of a small number causing a large change	Section 6
38	Vans - Class II - Battery Electric Vehicle (BEV)	CH <sub>4</sub>	tonne.km	10%	As above combined with an increase in the average load carried	Section 6
<b>SECR kWh UK electricity for EVs</b>						
39	Cars (by segment) - Supermini, MPV - Battery Electric Vehicle (BEV)	kWh	km and miles	12% to 19%	The result of the latest year of vehicle registrations being more energy intensive	Section 14
<b>Heat and Steam</b>						
40	Onsite and district heating	CH <sub>4</sub>	kWh	6%	Small increase is due to increased consumption of biomass energy sources balanced by decrease consumption of natural gas, coal & lignite, and other liquid waste	Section 3

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Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per "unit" of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
41	Onsite and district heating	N <sub>2</sub> O	kWh	5%	Similar to CH <sub>4</sub> , small increase due to increased consumption of biomass energy but balanced by reduction in gas oil and other liquid waste	Section 3
<b>Well-to-tank (WTT) - fuels</b>						
42	CNG	CO <sub>2</sub> e	All	11%	Increase in LNG imports in 2019	Section 2
43	Natural Gas	CO <sub>2</sub> e	All	31% to 32%	As above	Section 2
44	Natural Gas (100% mineral blend)	CO <sub>2</sub> e	All	31% to 32%	As above	Section 2
45	Fuel oil	CO <sub>2</sub> e	All	16%	Improvement to assumptions used in methodology, now based on diesel	Section 2
46	Lubricants	CO <sub>2</sub> e	All	112%	Improvement to assumptions used in methodology, now based on Exergia data	Section 2
47	Processed fuel oils - residual oil	CO <sub>2</sub> e	All	112% to 113%	Improvement to assumptions used in methodology, now based on data for Lubricants	Section 2
48	Processed fuel oils - distillate oil	CO <sub>2</sub> e	All	112%	Improvement to assumptions used in methodology, now based on data for Lubricants	Section 2
49	Waste oils	CO <sub>2</sub> e	All	112%	Improvement to assumptions used in methodology, now based on data for Lubricants	Section 2
50	Marine fuel oil	CO <sub>2</sub> e	All	16%	Improvement to assumptions used in methodology, based on fuel oil (which is assumed to be the same as lubricants)	Section 2
<b>WTT - bioenergy</b>						
51	Biodiesel ME	CO <sub>2</sub> e	All	12%	Increase due to genuine trend of carbon intensity values in the RTFO 05 dataset	Section 9
52	Biomethane	CO <sub>2</sub> e	All	11%	Increase due to genuine trend of carbon intensity values in the RTFO 05 dataset	Section 9
53	Biodiesel ME (from UCO)	CO <sub>2</sub> e	All	20%	Increase due to genuine trend of carbon intensity values in the RTFO 05 dataset	Section 9



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Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per "unit" of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
<b>Transmission and distribution (T&amp;D)</b>						
54	UK Electricity T&D Losses	CO <sub>2</sub> e and CO <sub>2</sub>	kWh	-6%	Decreased factor for electricity generation partially offset by increased losses	Section 3
55	UK Electricity T&D Losses	CH <sub>4</sub>	kWh	16.7%	The burning of municipal solid waste for power generation has increased compared to last year which has higher CH <sub>4</sub> emissions. Also, the impact of rounding of a very small number. Actual change before rounding is 13%	Section 3
<b>UK electricity T&amp;D for EVs</b>						
56	Cars (by segment) - Dual purpose 4X4 - Plug-in Hybrid Electric Vehicle (PHEV)	N <sub>2</sub> O	km and miles	100%	Mostly due to rounding of a small number causing a large change, though the latest year of vehicle registrations are more energy intensive	Section 5
57	Cars (by segment) - MPV - Battery Electric Vehicle (BEV)	CO <sub>2</sub> and CO <sub>2</sub> e	km and miles	12%	The latest year of vehicle registrations are more energy intensive	Section 5
58	Cars (by segment) - Lower medium - Battery Electric Vehicle (BEV)	CH <sub>4</sub>	km and miles	100%	Rounding of a small number causing a large change	Section 5
59	Cars (by segment) - Dual purpose 4x4, MPV - Battery Electric Vehicle (BEV)	N <sub>2</sub> O	km and miles	33%	As above combined with the latest year of vehicle registrations being more energy intensive	Section 5
60	Cars (by size) - Medium and Average - Battery Electric Vehicle (BEV)	CH <sub>4</sub>	km and miles	100%	Rounding of a small number causing a large change	Section 5
61	Vans - Class II and Average- Battery Electric Vehicle (BEV)	CH <sub>4</sub>	km and miles	100%	Due to an increase in UK electricity emissions and rounding of a small number causing a large change	Section 6

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Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per "unit" of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
62	Vans - Class I and III - Battery Electric Vehicle (BEV)	CH <sub>4</sub>	tonne.km	17% to 20%	As above	Section 6
<b>WTT- UK electricity</b>						
63	WTT UK Electricity	CO <sub>2</sub> e	kWh	72%	Improved methodology to account for thermal renewables use in electricity generation, plus increase in WTT factor for gas used in power generation due to increased LNG imports	Section 3
64	WTT UK Electricity T&D Losses	CO <sub>2</sub> e	kWh	77%	As above, combined with a change to the total loss %.	Section 3
<b>WTT- overseas electricity (generation)</b>						
65	WTT- overseas electricity (generation) - All	CO <sub>2</sub> e	kWh	39% to 61%	Driven by a ~61% increase in the ratio of the UK WTT emission factor to the direct electricity factor, due to a methodology change to the UK Electricity WTT factor. Individual country variation caused by trends in underlying data set.	Section 10
<b>WTT- overseas electricity (T&amp;D)</b>						
66	WTT T&D losses - Electricity: Australia	CO <sub>2</sub> e	kWh	-29% to +735%	Driven by a ~61% increase in the ratio of the UK WTT emission factor to the direct electricity factor, due to a methodology change to the UK Electricity WTT factor. Individual country variation is driven by increases or decreases to % losses reported.	Section 10
<b>WTT- heat and steam</b>						
67	WTT- heat and steam	CO <sub>2</sub> e	kWh	21.5%	Driven by the increase in the natural gas WTT factor	Section 3

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Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per "unit" of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
<b>Water supply</b>						
68	Water supply	CO <sub>2</sub> e	All	-57%	Now using an average of water company data for 2020, where previously a value from a discontinued publication of UK industry wide intensity for 2012 was used. It is likely that significant reductions (>50%) in grid electricity carbon intensity since 2012 is a large or dominant contributor to the difference observed	Section 9
<b>Water treatment</b>						
69	Water treatment	CO <sub>2</sub> e	All	-62%	Now using a weighted average of water company data for 2020, where previously a value from a discontinued publication for 2012 was used. It is likely that significant reductions (>50%) in grid electricity carbon intensity since 2012 is a large or dominant contributor to the difference observed	Section 9
<b>Business travel- air</b>						
70	Flights International Business class	CH <sub>4</sub>	passenger.km	-50.0%	Rounding has halved a very small number	Section 8
<b>WTT- Business travel- air</b>						
No changes						Section 8
<b>Business travel- sea</b>						
No changes						Section 7
<b>WTT- Business travel- sea</b>						
71	WTT - ferry - All	CO <sub>2</sub> e	passenger.km	16%	Improvement to the WTT factor for marine fuel oil	Section 7
<b>Business travel- land</b>						
72	Cars (by size and segment): all, Diesel	CH <sub>4</sub>	km and miles	19%	Due to revisions in DfT data, ANPR analysis causing revision to the age mix of diesel vehicles and rounding of a small number causing a large change	Section 5

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73	Cars (by segment): Upper medium, Unknown fuel	CH <sub>4</sub>	km and miles	-13%	Greater weighting toward lower emitting diesel vehicles and rounding of a small number causing a large change	Section 5
74	Cars (by segment): Executive, Luxury, Dual purpose, Unknown fuel	CH <sub>4</sub>	km and miles	13% to 15%	Greater weighting toward higher emitting petrol vehicles and rounding of a small number causing a large change	Section 5
75	Cars (by size): large, Hybrid and Unknown fuel	CH <sub>4</sub>	km and miles	13%	Due to greater weighting toward higher emitting petrol vehicles and rounding of a small number causing a large change	Section 5
76	Regular taxi	CH <sub>4</sub>	passenger.km and km	19%	Due to revisions in DfT data, ANPR analysis causing revision to the age mix of diesel vehicles and rounding of a small number causing a large change	Section 5
77	Black cab	CH <sub>4</sub>	passenger.km and km	19%	As above	Section 5
78	Cars (by segment and size) - All - Plug-in Hybrid Electric Vehicle (PHEV), Battery Electric Vehicle (BEV)	As seen in Passenger vehicles, UK electricity for EVs and UK electricity T&D for EVs				Section 5
79	Motorbike - small	N <sub>2</sub> O	km and miles	87%	Change to method for allocating emissions against small / medium / large size classes, for consistency with other gases	Section 5
80	Local London Bus	N <sub>2</sub> O	passenger.km	13%	Increase due to newer Euro standard vehicles having higher emissions	Section 5
81	Average Local Bus	CH <sub>4</sub>	passenger.km	-50%	Decrease is due to newer Euro standard vehicles having lower emissions and rounding of a small number	Section 5
82	National Rail	CH <sub>4</sub>	passenger.km	17%	Caused by the increase in the UK Electricity CH <sub>4</sub> emission factor and the decrease in the UK Electricity CO <sub>2</sub> emission factor as the ratio of the two is used in the calculation	Section 5

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Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per "unit" of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
83	National Rail	N <sub>2</sub> O	passenger.km	10%	Caused by the revision to the N <sub>2</sub> O emission factor used for rail to align with the EMEP/EEA 2019 Guidebook	Section 5
84	International Rail	CO <sub>2</sub> e	passenger.km	-10%	Reflects trend of grid decarbonisation	Section 5
85	International Rail	CO <sub>2</sub>	passenger.km	-10%	Reflects trend of grid decarbonisation	Section 5
86	Light Rail and Tram	CH <sub>4</sub>	passenger.km	22%	Caused by the increase in the UK Electricity CH <sub>4</sub> emission factor and the decrease in the UK Electricity CO <sub>2</sub> emission factor as the ratio of the two is used in the calculation, further enhanced by rounding of a small number	Section 5
87	London Underground	CH <sub>4</sub>	passenger.km	25%	As above	Section 5
88	London Underground	N <sub>2</sub> O	passenger.km	13%	Caused by the change of ratio of N <sub>2</sub> O to CO <sub>2</sub> emissions from UK Electricity as the ratio of the two is used in the calculation, further enhanced by rounding of a small number	Section 5
<b>Freighting goods</b>						
89	Freighting Flights - Domestic	CH <sub>4</sub>	tonne.km	-16.1%	Improvements to VOC emission factors in NAEI.	Section 8
90	Freighting Flights - Long-haul	CO <sub>2</sub> and N <sub>2</sub> O	tonne.km	-10.1%	Updated fleet mix	Section 8
91	Freighting Flights - International	CO <sub>2</sub> and N <sub>2</sub> O	tonne.km	-10.1%	Updated fleet mix	Section 8
92	Diesel Vans- Class II	CH <sub>4</sub>	tonne.km	-50%	Small change causes value to be rounded down instead of up	Section 6
93	Petrol Vans- All	N <sub>2</sub> O	tonne.km, km and miles	-14% to -10%	General decrease expected as more recent euro standards with lower emissions penetrate into fleet	Section 6
94	CNG Vans- Average class	N <sub>2</sub> O	tonne.km, km and miles	-16%	General decrease expected as more recent euro standards with lower emissions penetrate into fleet	Section 6
95	LPG Vans- Average class	CH <sub>4</sub>	tonne.km	-10%	Small change causes value to be rounded down instead of up	Section 6
96	LPG Vans- Average class	N <sub>2</sub> O	tonne.km, km and miles	-16%	General decrease expected as more recent euro standards with lower emissions penetrate into fleet	Section 6

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97	Vans- All- Battery Electric Vehicle (BEV)	As seen in Delivery vehicles, UK electricity for EVs and UK electricity T&D for EVs				Section 6
98	HGVs (all diesel)- Articulated (>3.5 - 33t)- Average Laden	CO <sub>2</sub> and CO <sub>2</sub> e	tonne.km	-11%	Average tonnes moved increased while emissions per km did not change significantly	Section 6
99	HGVs refrigerated (all diesel)- Articulated (>3.5 - 33t)- Average Laden	CO <sub>2</sub> and CO <sub>2</sub> e	tonne.km	-11%	As above	Section 6
100	HGVs (all diesel)- Articulated (>3.5 - 33t)- 50% Laden	CH <sub>4</sub>	tonne.km	100%	Improved estimates of the age of vehicles in the fleet causes a 15% increase, enough for the value to be rounded upwards rather than downwards	Section 6
101	HGVs refrigerated (all diesel)- Articulated (>3.5 - 33t)- 50% Laden	CH <sub>4</sub>	tonne.km	100%	As above	Section 6
102	HGVs (all diesel)- All Artics- All	CH <sub>4</sub>	km and miles	11% to 18%	Improved estimates of the age of vehicles in the fleet	Section 6
103	HGVs refrigerated (all diesel)- All Artics- All	CH <sub>4</sub>	km and miles	11% to 18%	As above	Section 6
104	Sea tanker - All	CO <sub>2</sub> e	tonne.km	16%	Improvement to the WTT factor for marine fuel oil	Section 7
105	Cargo ship - All	CO <sub>2</sub> e	tonne.km	16%	As above	Section 7
106	Freight train	N <sub>2</sub> O	tonne.km	35%	Driven by increase in underlying ORR data and an increase in N <sub>2</sub> O emission factor for National Rail	Section 6
<b>WTT passenger vehicles &amp; business travel- land</b>						
106	Cars (by size) - All - CNG	CO <sub>2</sub> e	km and miles	11%	Due to improvement work completed this year on WTT factors	Section 5
107	Cars (by segment) - All - Plug-in Hybrid Electric Vehicle (PHEV)	CO <sub>2</sub> e	km and miles	10% to 34%	As above	Section 5

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108	Cars (by segment) - All - Battery Electric Vehicle (BEV)	CO <sub>2</sub> e	km and miles	71% to 106%	As above	Section 5
109	Cars (by size) - All - Plug-in Hybrid Electric Vehicle (PHEV)	CO <sub>2</sub> e	km and miles	12% to 34%	As above	Section 5
110	Cars (by size) - All - Battery Electric Vehicle (BEV)	CO <sub>2</sub> e	km and miles	72% to 86%	As above	Section 5
111	National rail	CO <sub>2</sub> e	passenger.km	22%	Due to improvement work completed this year on the UK WTT electricity factor	Section 5
112	International rail	CO <sub>2</sub> e	passenger.km	68%	As above	Section 5
113	Light rail and tram	CO <sub>2</sub> e	passenger.km	80%	As above	Section 5
114	London Underground	CO <sub>2</sub> e	passenger.km	91%	As above	Section 5
<b>WTT delivery vehicles &amp; freighting goods</b>						
115	CNG Vans- Average class	CO <sub>2</sub> e	tonne.km, km and miles	10% to 11%	Large increase in proportion of gas imports as LNG (which has a higher WTT factor), impacting the weighted average used for CNG	Section 6
116	Vans - All - Battery Electric Vehicle (BEV)	CO <sub>2</sub> e	km, miles and tonne.km	67% to 73%	Due to improvement work completed this year on WTT factors	Section 6
117	Freighting Flights - Long-haul	CO <sub>2</sub> e	tonne.km	-10%	Updated fleet mix	Section 8
118	Freighting Flights - International	CO <sub>2</sub> e	tonne.km	-10%	Updated fleet mix	Section 8
119	Freight train	CO <sub>2</sub> e	tonne.km	11%	Driven by increase in underlying ORR data	Section 6

2021 Government greenhouse gas conversion factors for company reporting: Major changes to the Conversion Factors

Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per "unit" of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
<b>Hotel Stay</b>						
120	Hotel stay	CO <sub>2</sub> e	Room per night	-34% to 23%	Changes in hotel stay factors are due to 1) changes in emission factors of purchased electricity in each country, as the majority of a typical hotel's footprint is from its electricity usage 2) 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 3) changes in weather and occupancy that cause energy load changes in each hotel. Further info can be found here: <a href="https://ecommons.cornell.edu/handle/1813/74089">https://ecommons.cornell.edu/handle/1813/74089</a>	Section 11
<b>Managed assets- electricity</b>						
121	See "UK electricity" for reasons for changes					Section 3
<b>Managed assets- vehicles</b>						
122	Managed Cars - Petrol, Diesel, Unknown	See equivalent conversion factors in Passenger vehicles for reasons for changes				Section 5
123	Managed Cars - Plug-in Hybrid Electric Vehicle (PHEV), Battery Electric Vehicle (BEV)	See equivalent conversion factors in Passenger vehicles, UK electricity for EVs and UK electricity T&D for EVs for reasons for changes				Section 5
124	Managed Vans - Petrol, Diesel, Unknown	See equivalent conversion factors in Delivery vehicles for reasons for changes				Section 6
125	Managed Vans - Plug-in Hybrid Electric Vehicle (PHEV), Battery Electric Vehicle (BEV)	See equivalent conversion factors in Delivery vehicles, UK electricity for EVs and UK electricity T&D for EVs for reasons for changes				Section 6
126	Managed HGV (all diesel)	See equivalent conversion factors in Delivery vehicles for reasons for changes				Section 6



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Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per "unit" of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
127	Managed HGV refrigerated (all diesel)	See equivalent conversion factors in Delivery vehicles for reasons for changes				Section 6
128	Managed motorbikes	See equivalent conversion factors in Passenger vehicles for reasons for changes				Section 5
<b>Outside of scopes</b>						
129	Diesel (average biofuel blend)	CO <sub>2</sub>	All	35%	Increase reflects RTFO 01 dataset which shows higher biodiesel and lower diesel sales; percentage of biofuels expected to increase over time due to legislative requirements	Section 9
<b>Material use</b>						
130	Other, Glass- Primary material production	CO <sub>2</sub> e	tonne	66%	Glass has been recalculated based on Ecoinvent market data. Previous value relied on data from 2005	Section 12
131	Other, Glass- Open-loop source	CO <sub>2</sub> e	tonne	55%	Glass has been recalculated based on Ecoinvent market data. Previous value relied on data from 2005	Section 12
132	Other, Glass- Closed-loop source	CO <sub>2</sub> e	tonne	56%	Glass has been recalculated based on Ecoinvent market data. Previous value relied on data from 2005	Section 12
133	Electrical items, WEEE - fridges and freezers - Primary material production	CO <sub>2</sub> e	tonne	14%	WEEE categories have been removed as factors are not intended for end-of-life materials but for procurement of materials; new factors are based on the Ecoinvent database.	Section 12
134	Electrical items, WEEE - large- Primary material production	CO <sub>2</sub> e	tonne	508%	As above	Section 12
135	Electrical items, WEEE - small- Primary material production	CO <sub>2</sub> e	tonne	221%	As above	Section 12
136	Electrical items, Batteries- Primary material production	CO <sub>2</sub> e	tonne	-62%	As above	Section 12

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Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per "unit" of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
137	Paper, Paper and board: board - Primary material production	CO <sub>2</sub> e	tonne	9.5%	Revised factors to correct misinterpretation of last year's FeFCO update; FeFCO LCA study only included emissions from site. Factors now account for emissions from purchased electricity and chemical inputs (where available).	Section 12
<b>Waste disposal</b>						
138	Construction, Wood-Composting	CO <sub>2</sub> e	tonne	-12%	Composting and activity data altered to remove impact of on-site vehicle movement (this is a process emission and so out of scope)	Section 12
139	Refuse, Organic: food and drink waste - Composting	CO <sub>2</sub> e	tonne	-12%	As above	Section 12
140	Refuse, Organic: garden waste-Composting	CO <sub>2</sub> e	tonne	-12%	As above	Section 12
141	Refuse, Organic: mixed food and garden waste-Composting	CO <sub>2</sub> e	tonne	-12%	As above	Section 12
142	Refuse, Household residual waste- Anaerobic digestion	CO <sub>2</sub> e	tonne	-12%	No separate data is available for anaerobic digestion, so transport figure for composting is used. Data was altered to remove impact of on-site vehicle movement (this is a process emission and so out of scope)	Section 12
143	Refuse, Organic: food and drink waste- Anaerobic digestion	CO <sub>2</sub> e	tonne	-12%	As above	Section 12
144	Refuse, Organic: garden waste- Anaerobic digestion	CO <sub>2</sub> e	tonne	-12%	As above	Section 12
145	Refuse, Organic: mixed food and garden waste- Anaerobic digestion	CO <sub>2</sub> e	tonne	-12%	As above	Section 12

2021 Government greenhouse gas conversion factors for company reporting: Major changes to the Conversion Factors

Ref. number	Emission factor	GHG	Unit (all units are kgCO <sub>2</sub> e per “unit” of GHG, unless stated)	Magnitude of change vs 2020 update	Reason for change	For more information see relevant section in methodology report:
146	Refuse, Commercial and industrial waste- Anaerobic digestion	CO <sub>2</sub> e	tonne	-12%	As above	Section 12
147	Electrical items, Batteries- Landfill	CO <sub>2</sub> e	tonne	-90%	The revised approach to calculating landfill factors for non-organic materials is to count only transport emissions, in line with how emissions are calculated for other waste management methods. The factor has been revised to reconcile the batteries factor with this approach.	Section 12
148	Paper, Paper and board: board- Composting	CO <sub>2</sub> e	tonne	-12%	Composting activity data altered to remove impact of on-site vehicle movement (this is a process emission and so out of scope)	Section 12
149	Paper, Paper and board: mixed- Composting	CO <sub>2</sub> e	tonne	-12%	As above	Section 12
150	Paper, Paper and board: paper- Composting	CO <sub>2</sub> e	tonne	-12%	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 <sub>4</sub>	Methane
CHP	Combined Heat and Power
CHPQA	Combined Heat and Power Quality Assurance
CNG	Compressed natural gas
CO <sub>2</sub>	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
MSW	Municipal solid waste
NAEI	National Atmospheric Emissions Inventory
NCV	Net calorific value
NEDC	New European Driving Cycle

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N <sub>2</sub> O	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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