



Department for
Business, Energy
& Industrial Strategy

2019 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 emission factors for the 2019 Greenhouse Gas (GHG) Conversion Factors, compared to the equivalent factors provided in the 2018 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).

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
Fuels						
1	Compressed Natural Gas (CNG)	All	tonnes and litres	-8%	Improvements were made to the assumptions of the composition of natural gas, now aligning with the National Atmospheric Emissions Inventory (NAEI). This has meant that the methane (CH ₄) content of natural gas has reduced, and therefore has had an impact on the emission characteristics of the fuel. This includes CNG as it is based on the uncompressed natural gas factor. Additionally, factors related to the natural gas network in the UK (incl. CNG) now account for the biogenic content of the gas, and therefore fossil-carbon. The change to the carbon factor on an energy basis is small (-0.1%).	Section 2

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
2	Liquified Natural Gas (LNG)	All	tonnes and litres	-8%	In the 2019 update, improvements were made to the assumptions of the composition of natural gas, now aligning with the NAEI. This has meant that the methane content of natural gas has reduced, and therefore has had an impact on the emission characteristics of the fuel. This includes LNG as it is based on the uncompressed natural gas factor. The change to the carbon factor on an energy basis is small (-0.1%).	Section 2
3	Liquified Petroleum Gas (LPG)	CH ₄	Kilowatt hours (kWh)	-7%	A small decrease is made larger by rounding of a very small number.	Section 2
4	Natural gas	All	tonnes	-8%	In the 2019 update, improvements were made to the assumptions of the composition of natural gas, now aligning with the NAEI. This has meant that the methane content of natural gas has reduced, and therefore has had an impact on the emission characteristics of the fuel. This includes CNG as it is based on the uncompressed natural gas factor. Additionally, factors related to the natural gas network in the UK now account for the biogenic content of the gas, and therefore fossil-carbon	Section 2
5	Aviation spirit	CH ₄	All	9%	Due to updated assumptions for taxi times for aircrafts	Section 2
6	Aviation turbine fuel	CH ₄	All	13% to 15%	Due to updated assumptions for taxi times for aircrafts	Section 2
7	Diesel (average biofuel blend)	CH ₄	All	-25% to -29%	Reduction in the fleet-weighted emission factors from road transport. This is due to a combination of fleet turnover (proportionally more vehicles which emit less CH ₄ per km), and a significant reduction in the emission factor used for Euro 5 and Euro 6 passenger cars and light goods vehicles on urban roads.	Section 2

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
8	Diesel (average biofuel blend)	CO ₂	All	-8%	Reduction in the emission factor for all diesel off-road machinery types to be more in line with the other transport sources. The emission factor for diesel off-road machinery is around 90% lower than the previous submission, which leads to a reduction in the weighted average value across all sources.	Section 2
9	Diesel (100% mineral diesel)	CH ₄	All	-25% to -29%	Reduction in the fleet-weighted emission factors from road transport. This is due to a combination of fleet turnover (proportionally more vehicles which emit less CH ₄ per km), and a significant reduction in the emission factor used for Euro 5 and Euro 6 passenger cars and light goods vehicles on urban roads.	Section 2
10	Diesel (100% mineral diesel)	N ₂ O	All	-8%	Reduction in the emission factor for all diesel off-road machinery types to be more in line with the other transport sources. The emission factor for diesel off-road machinery is around 90% lower than the previous submission, which leads to a reduction in the weighted average value across all sources.	Section 2
11	Gas oil	Carbon dioxide equivalent (CO ₂ e)	All	-7%	Due to the large change in the N ₂ O values, see below.	Section 2
12	Gas oil	N ₂ O	All	-87%	Changes to the N ₂ O gas oil factors for off road machinery (as for diesel, above), and for inland waterways to align with the NAEI shipping model.	Section 2
13	Lubricants	All	kWh	-4% to -7%	Change to the calorific values of lubricants in Digest of UK Energy Statistics (DUKES)	Section 2
14	Petrol (average biofuel blend)	N ₂ O	All	-7%	Revision to calorific values. Continued fleet turnover to less polluting engines, reduced the overall N ₂ O emissions.	Section 2
15	Petrol (100% mineral petrol)	N ₂ O	All	-7%	As above	Section 2

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
16	Processed fuel oils - distillate oil	CO ₂ e	All	-7%	Due to the large change in the N ₂ O values, see below.	Section 2
17	Processed fuel oils - distillate oil	N ₂ O	All	-87%	Changes to the N ₂ O gas oil factors for off road machinery (as for diesel, above), and for inland waterways to align with the NAEI shipping model.	Section 2
18	Marine gas oil	CH ₄	kWh	17%	A small decrease is made larger by rounding of a very small number.	Section 2
19	Coal (industrial)	N ₂ O	All	5% to 7%	Method change in the NAEI to more accurately reflect the net calorific value of coal.	Section 2
20	Petroleum coke	N ₂ O	All	-13%	Weighted average across various combustion sources, therefore the final factor is dependent on the relative contributions from each source.	Section 2
Bioenergy						
21	Grass/straw	CO ₂ e	All	-32%	Method change in the NAEI to directly use both gross calorific values (GCVs) and net calorific values (NCVs) which removes the necessity for an assumption of the GCV/NCV ratio for solid, liquid, and gas fuels. This causes a reduction in the emission factors for CH ₄ and N ₂ O emissions.	Section 9
22	Biogas	CO ₂ e	Tonnes	-6%	Due to changes in the underlying NAEI data set, linked to an increase of the proportion of sewage gas combusted in the public sector increasing.	Section 9
23	Biodiesel (all years)	CO ₂ e	All	-8%	Due to an 8% reduction in N ₂ O emissions in the underlying NAEI dataset (N ₂ O is 99% of the CO ₂ e factor for biodiesel)	Section 9
Refrigerants and other						
No changes						Section 4
Passenger Vehicles						
24	Cars by size: all size, Diesel	CH ₄	km and miles	-57%	Revision to Euro 5 and 6 passenger car diesel emissions factors which are now significantly lower than previously used, in addition to impact of fleet turnover.	Section 5

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
25	Cars by size: Medium car, Hybrid	CH ₄	km and miles	-12%	Revision to Euro 5 and 6 passenger car diesel emission factors which are now significantly lower than previously used, in addition to impact of fleet turnover.	Section 5
26	Cars by size: all sizes, LPG	CH ₄	km and miles	-29%	Revised values in the EMEP/EEA Guidebook 2016 caused the changes in the LPG factors. Additionally, the higher polluting earlier EURO standards are now reducing in terms of share of vkm, also contributing somewhat to the observed trend	Section 5
27	Cars by size: Large car, Hybrid	CO ₂	km and miles	-18%	According to the Society for Motor Manufacturers and Trading (SMMT), the test cycle gCO ₂ /km for hybrids have decreased	Section 5
28	Cars by size: Large car, Hybrid	CO ₂ e	km and miles	-18%	Predominantly as for CO ₂ , above.	Section 5
29	All Motorcycles	CH ₄	km and miles	-10.1% to -5.5%	Fleet turnover to vehicles with lower emissions.	Section 5
Delivery vehicles						
30	Heavy Goods Vehicles (HGVs) (all diesel)- Rigid (>3.5 - 7.5 tonnes)	CH ₄	km and miles	-20%	In line with expectation, as in general, we should see a downward trend of emission as more recent Euro standard (with lower emission factors) penetrate into the fleet	Section 6
31	HGVs (all diesel)- Rigid (>7.5 tonnes- 17 tonnes)	CH ₄	km and miles	-20%	As above	Section 6
32	HGVs (all diesel)- Rigid (>17 tonnes) and All rigids	CH ₄	km and miles	-21%	As above	Section 6
33	HGVs (all diesel)- Articulated (>3.5 - 33t)	CH ₄	km and miles	-11%	As above	Section 6
34	HGVs (all diesel)- Articulated (>33t)	CH ₄	km and miles	-12%	As above	Section 6

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
35	HGVs (all diesel)- All Articulated	N ₂ O	km and miles	-11%	As above	Section 6
36	HGVs (all diesel)- All HGVs	CH ₄	km and miles	-15%	As above	Section 6
37	Petrol Vans- All classes	CH ₄	km and miles	-8%	As above	Section 6
38	Petrol Vans- All classes	N ₂ O	km and miles	-19%	as above	Section 6
39	Diesel Vans- All classes	CH ₄	km and miles	-52%	Significantly decreased CH ₄ emissions as Euro 5 and 6 for diesel light goods vehicle (LGV) emission factors was significantly lower than previously used. In addition, revised fleet composition values used from NAEI fleet composition data.	Section 6
40	CNG Vans- Average class	CH ₄	km and miles	-9%	This is due mainly to fleet turnover with new vehicles satisfying more stringent Euro standard requirements.	Section 6
41	CNG Vans- Average class	N ₂ O	km and miles	-20%	as above	Section 6
42	LPG Vans- Average class	CH ₄	km and miles	-32%	as above	Section 6
43	LPG Vans- Average class	N ₂ O	km and miles	-20%	as above	Section 6
44	Unknown fuel- All Vans	CH ₄	km and miles	-35%	This is due to the petrol and diesel changes seen above	Section 6
45	Vans- All fuels and classes	CO ₂	km and miles	+26% to -17%	Due to changes in the methodology used to disaggregate average LGV emissions factors to different LGV size classes, introduced in 2019.	Section 6
46	Vans- All fuels and classes	CO ₂	tonne.km	+31% to -21%	Due to changes in the data and methodology used to calculate average LGV loading (in tonnes), introduced in 2019.	Section 6
47	Vans- All fuels and classes	CH ₄ , N ₂ O	tonne.km	+30% to -45%	as above	Section 6

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
UK Electricity						
48	UK Electricity	CO ₂	kWh	-10%	There was a significant decrease in coal generation, and an increase in renewable generation since the previous year.	Section 3
49	UK Electricity	N ₂ O	kWh	-10.5%	As above	Section 3
50	UK Electricity	CO ₂ e	kWh	-10%	As above	Section 3
UK electricity for EVs						
	Passenger vehicles - Cars (by size) - Executive Plug-in Hybrid Electric Vehicle (PHEV); Business travel - land - Executive PHEV	All	km and miles	-13% to -20%	There has been a large increase in the number of executive plug-in hybrid models available in the market. Sales of new models available from 2017 were highest for models with lower average emissions per km than the vehicle models also sold in 2016. Therefore, emissions from fossil use have declined.	Section 5
	Passenger vehicles - Cars (by size) - Supermini PHEV; Cars (by market segment) - Small PHEV; Business travel - land	All	km and miles	30%	The introduction of a larger Mini Countryman model with a relatively smaller electric range, and therefore emissions have increased by 30% for most pollutants.	Section 5
	UK Electricity of EVs; UK Electricity Transmission & Distribution (T&D) for EVs; WTT-pass vehs & travel-land; Managed assets- vehicles	All	km and miles	10%	Continued decarbonisation of the electricity grid in 2017 has led to drops in the emission factors related to the electricity use in both plug-in hybrids and battery electric vehicles, typically on the order of 10%. Smaller effects of the increase in battery size in larger PHEVs has increased the importance of this change for some sectors (whilst the inverse is also true for the small PHEV sector).	Section 5

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
Heat and Steam						
	Onsite and district heating	CH ₄	kWh	62%	The change is due to changes within the DUKES fuel mix, notably increased use of biomass.	Section 3
	Onsite and district heating	N ₂ O	kWh	-13%	Mainly due to changes to the DUKES fuel mix and partially due to the change to the fuel emissions factors.	Section 3
	Onsite and district heating	CO ₂	kWh	-6%	Mainly due to changes to the DUKES fuel mix and partially due to the change to the fuel emissions factors.	Section 3
Well-to-tank (WTT) - fuels						
	CNG	CO ₂ e	All	-4% to 10%	In this 2019 update there is a method change to now use the NAEI values for the composition of natural gas. This causes a change to the fuel properties of natural gas which effects gas unit conversions. CNG is based on natural gas.	Section 2
	LNG	CO ₂ e	tonnes and litres	-6%	In this 2019 update there is a method change to now use the NAEI values for the composition of natural gas. This causes a change to the fuel properties of natural gas which effects gas unit conversions. LNG is based on natural gas.	Section 2
	Natural gas	CO ₂ e	All	-6% to -12%	Reduction in LNG imports as a proportion of total supply compared to 2018 update and change due to method change to composition of natural gas.	Section 2
	Coal (domestic)	CO ₂ e	tonnes	6%	Changes to the calorific values in DUKES	Section 2
WTT - bioenergy						
	WTT -Biodiesel	CO ₂ e	All	17%	Due to changes to the carbon intensity in the underlying DfT Renewable Transport Fuel Obligation (RTFO) 05 table	Section 9
	WTT -Biodiesel (from UCO)	CO ₂ e	All	-10%	Due to changes to the carbon intensity in the underlying DfT RTFO 05 table	Section 9
	WTT -Biodiesel (from Tallow)	CO ₂ e	All	-21%	Due to changes to the carbon intensity in the underlying DfT RTFO 05 table	Section 9

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
Transmission and distribution (T&D)						
	UK Electricity T&D Losses	CO ₂	kWh	-10%	The increase in lower GHG electricity generation was enhanced by a decrease in losses from the grid.	Section 3
	UK Electricity T&D Losses	N ₂ O	kWh	-7.7%	As above	Section 3
	UK Electricity T&D Losses	CO ₂ e	kWh	-10%	As above	Section 3
UK electricity T&D for EVs						
	Cars by market segment- PHEV, battery electric vehicles (BEV)	CO ₂ e and CO ₂	km and miles	-32.4% to -14.9%	Large change in CO ₂ electricity factor causes most of the change here.	Section 5
	Cars by market segment- PHEV, BEV	N ₂ O	km and miles	-50% to -25%	As above	Section 5
	Cars by size- PHEV, BEV	CO ₂ e and CO ₂	km and miles	-29.4% to -20.4%	As above	Section 5
	Cars by size- PHEV, BEV	N ₂ O	km and miles	-50% to -25%	As above	Section 5
	All Vans- BEV	CO ₂ e and CO ₂	tonne.km	-26.6%	As above	Section 5
	All Vans- BEV	N ₂ O	tonne.km	-36.4% to -28.6%	As above	Section 5
WTT- UK elec						
	WTT - UK Electricity	CO ₂ e	kWh	-15%	There was a significant decrease in coal generation, and an increase in renewable generation since the previous year.	Section 3

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
	WTT - UK Electricity T&D Losses	CO ₂ e	kWh	-15%	As above	Section 3
WTT- overseas electricity (generation)						
	WTT- overseas electricity (generation) - Electricity: Iceland	kg CO ₂ e	kWh	-19%	Large % change but a small absolute change.	Section 10
	WTT- overseas electricity (generation) - Electricity: France	kg CO ₂ e	kWh	11%	Reflects trend in electricity conversion factor as reported by the Réseau de Transport d'Électricité (RTE).	Section 10
	WTT- overseas electricity (generation) - Electricity: Netherlands	kg CO ₂ e	kWh	-15%	Reflects trend in electricity conversion factor as reported by the Netherlands Central Statistics Bureau (CBS).	Section 10
	WTT- overseas electricity (generation) - Electricity: Sweden	kg CO ₂ e	kWh	-10%	Large percentage change but a small absolute change.	Section 10
WTT- overseas electricity (T&D)						
	WTT T&D losses - Electricity: Australia	CO ₂ e	kWh	-12%	Reflects changes in reported losses from the International Energy Association (IEA) energy balance data set and estimated trends in CO ₂ per unit of electricity.	Section 10
	WTT T&D losses - Electricity: Bulgaria	CO ₂ e	kWh	-14%	As above	Section 10
	WTT T&D losses - Electricity: Greece	CO ₂ e	kWh	-28%	As above	Section 10

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
	WTT T&D losses - Electricity: Hong Kong, China	CO ₂ e	kWh	-63%	As above	Section 10
	WTT T&D losses - Electricity: Hungary	CO ₂ e	kWh	-13%	As above	Section 10
	WTT T&D losses - Electricity: India	CO ₂ e	kWh	-13%	As above	Section 10
	WTT T&D losses - Electricity: Indonesia	CO ₂ e	kWh	-10%	As above	Section 10
	WTT T&D losses - Electricity: Italy	CO ₂ e	kWh	-11%	As above	Section 10
	WTT T&D losses - Electricity: Malta	CO ₂ e	kWh	12%	As above	Section 10
	WTT T&D losses - Electricity: Mexico	CO ₂ e	kWh	-13%	As above	Section 10
	WTT T&D losses - Electricity: Netherlands	CO ₂ e	kWh	-14%	As above	Section 10
	WTT T&D losses - Electricity: Pakistan	CO ₂ e	kWh	-18%	As above	Section 10
	WTT T&D losses - Electricity: People's Rep. of China	CO ₂ e	kWh	-10%	As above	Section 10
	WTT T&D losses - Electricity: Slovak Republic	CO ₂ e	kWh	-11%	As above	Section 10

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
	WTT T&D losses - Electricity: Switzerland	CO ₂ e	kWh	-10%	As above	Section 10
	WTT T&D losses - Electricity: Thailand	CO ₂ e	kWh	-13%	As above	Section 10
	WTT T&D losses - Electricity: Turkey	CO ₂ e	kWh	-15%	As above	Section 10
	WTT T&D losses - Electricity: Ukraine	CO ₂ e	kWh	-10%	As above	Section 10
	WTT T&D losses - Electricity: United States	CO ₂ e	kWh	-15%	As above	Section 10
	WTT T&D losses - Electricity: Africa (average)	CO ₂ e	kWh	-23%	As above	Section 10
WTT- heat and steam						
	WTT- heat and steam	kg CO ₂ e	kWh	-7.1%	WTT factors are based on the direct factors so this is due to the reasons found in heat and steam.	Section 3
Water supply						
No changes						Section 9
Water treatment						
No changes						Section 9
Business travel- air						
	Domestic flight-average passenger, with and without radiative forcing	CO ₂ e, CO ₂ , N ₂ O; CH ₄	passenger.km	-15%	Reflects the increases in flight distances and load factors	Section 8

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
WTT- Business travel- air						
	WTT - Flights	As for Business travel- air				Section 8
Business travel- sea						
	Car passenger	CH ₄	passenger.km	-12%	The ratio of CH ₄ to CO ₂ , in the underlying NAEI database, is approximately 10% lower this year compared to 2018. Driven by improvement in engine efficiency.	Section 7
	Average (all passenger)	CH ₄	passenger.km	-11%	As above	Section 7
WTT- Business travel- sea						
No changes						Section 7
Business travel- land						
	Local London bus	CO ₂	passenger.km	14%	Reduced bus occupancy rates based on data from TfL	Section 5
	Local London bus	CO ₂ e	passenger.km	14%	As above	Section 5
	Local bus (not London)	CH ₄	passenger.km	-25%	Partly due to increase in bus occupancy according to DfT stats and partly due to expected decreased emissions as recent Euro standard (with lower emission factors) penetrate into the fleet	Section 5
	Local London bus	CH ₄	passenger.km	-50%	As above	Section 5
	Coach	N ₂ O	passenger.km	20%	Emissions are higher but as expected as Euro V and VI diesel vehicles equipped with deNO _x after-treatment penetrate in the fleet, which have higher N ₂ O emissions	Section 5
	Cars by size: all size, Diesel	CH ₄	km and miles	-57%	Revision to Euro 5 and 6 passenger car diesel emission factors which are now significantly lower than previously used, in addition to impact of fleet turnover.	Section 5
	Cars by size: Medium car, Hybrid	CH ₄	km and miles	-12%	Revision to Euro 5 and 6 passenger car diesel emission factors which are now significantly lower than previously used, in addition to impact of fleet turnover.	Section 5

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
	Cars by size: all sizes, LPG	CH ₄	km and miles	-29%	Revised values in the EMEP/EEA Guidebook 2016 caused the changes in the LPG factors. Additionally, the higher polluting earlier EURO standards are now reducing in terms of share of vkm, also contributing somewhat to the observed trend	Section 5
	Cars by size: Large car, Hybrid	CO ₂	km and miles	-18%	According to SMMT, the test cycle gCO ₂ /km for hybrids have decreased	Section 5
	Cars by size: Large car, Hybrid	CO ₂ e	km and miles	-18%	Combination of reasons led to this major change; due to the SMMT raw data which indicate that test cycle gCO ₂ /km for hybrids have decreased and due to revision to Euro 5 and 6 passenger car diesel emission factors which are now significantly lower than previously used.	Section 5
	Regular taxi	CH ₄	passenger.km and km	-57%	Revision to Euro 5 and 6 passenger car diesel emission factors which are now significantly lower than previously used, in addition to impact of fleet turnover.	Section 5
	Black cab	CH ₄	passenger.km and km	-57%	Revision to Euro 5 and 6 passenger car diesel emission factors which are now significantly lower than previously used, in addition to impact of fleet turnover.	Section 5
	All Motorcycles	CH ₄	km and miles	-10.1% to -5.5%	Fleet turnover to vehicles with lower emissions.	Section 5
	National rail	CH ₄	passenger.km	-13%	Reflects trend in data from the Office of Rail and Road (ORR), in addition to the impact of rounding on small numbers.	Section 5
	International rail	CO ₂ e and CO ₂	passenger.km	-51%	Change to the underlying raw data set (from Eurostar).	Section 5
	International rail	N ₂ O	passenger.km	-57%	As above	Section 5
	Light rail and tram	CO ₂ e and CO ₂	passenger.km	-12%	Due to a decrease in the majority of raw data sources (TFL and DfT) which feed into this factor. Somewhat driven by a decrease in the electricity emission factor.	Section 5
	Light rail and tram	N ₂ O		-10%	As Above	Section 5

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
	London underground	CO ₂ e and CO ₂	passenger.km	-18%	Due to change in data provided by TfL.	Section 5
	London underground	CH ₄	passenger.km	-11%	Due to a combination of changes in raw data provided by TfL and the trend in the decrease in the electricity emission factor, which is used to bring the TfL data inline to the latest year.	Section 5
	London underground	N ₂ O	passenger.km	-15%	As above	Section 5
Freighting goods						
	Sea tanker, all types	CH ₄	passenger.km	-9% to -50%	Due to rounding of a very small number. Actual difference which is mainly hidden by the rounding would be approximately -10% as the ratio of CH ₄ to N ₂ O, in the underlying NAEI database, is approximately 10% lower this year compared to 2018. Driven by improvement in engine efficiency.	Section 6
	Cargo ship, all types	CH ₄	passenger.km	-9% to -30%	As above	Section 6
	Freight train	No significant changes				Section 6
	Vans	As seen in Delivery vehicles				Section 6
	HGVs (all diesel)- Rigid (>3.5 - 7.5 tonnes)	CH ₄	tonne.km	-23.3% to -12.4%	In line with expectation, as in general, we should see a downward trend of emission as more recent Euro standard (with lower emission factors) penetrate into the fleet	Section 6
	HGVs (all diesel)- Rigid (>7.5 tonnes- 17 tonnes)	CH ₄	tonne.km	-17.2% to -29.0%	As above	Section 6
	HGVs (all diesel)- Rigid (>17 tonnes)	CH ₄	tonne.km	-21.8% to -12%	As above	Section 6
	HGVs (all diesel)- All rigids	CH ₄	tonne.km	-21.8% to -14.6%	As above	Section 6

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
	HGVs (all diesel)- Articulated (>3.5 - 33t)	CH ₄	tonne.km	-28% to -20%	As above	Section 6
	HGVs (all diesel)- Articulated (>33t) - average	CH ₄	tonne.km	+23.5% to -38.3%	As above	Section 6
	HGVs (all diesel)- All artics- average	CH ₄	tonne.km	+23.2% to -38.4%	As above	Section 6
	HGVs (all diesel)- All HGVs	CH ₄	tonne.km	-35.7% to -15.7%	As above	Section 6
	HGVs (all diesel)- Rigid (>7.5 tonnes- 17 tonnes)- Average	CO ₂ and CO ₂ e	tonne.km	19%	As above and lower loading of this powertrain	Section 6
	HGVs (all diesel)- Rigid (>3.5 tonnes- 7.5 tonnes)- Average	N ₂ O	tonne.km	15%	As above	Section 6
	HGVs (all diesel)- All rigids Average	N ₂ O	tonne.km	11%	As above	Section 6
	Domestic flights	CO ₂ e, CO ₂ , N ₂ O; CH ₄	tonne.km	-14%	Increased load factor, reduced share of less freight-efficient aircraft reduces the average emission factor	Section 6
	Short-haul flights	CO ₂ e, CO ₂ , N ₂ O; CH ₄	tonne.km	22%	Decreased load factor, also reduced share of more efficient aircraft means higher emission factor	Section 6
WTT passenger vehicles & business travel- land						
	Local London bus	CO ₂ e	passenger.km	15%	Reduced bus occupancy rates	Section 5

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
	Cars by size: Large car, Hybrid	CO ₂ e	km and miles	-18%	Due to the SMMT raw data which indicate that test cycle gCO ₂ /km for hybrids have decreased	Section 5
	WTT- International Rail	CO ₂ e	passenger.km	-54%	WTT emissions are linked to the direct emissions so proportionate decrease.	Section 5
	WTT- Light rail and tram	CO ₂ e	passenger.km	-17%	As above	Section 5
	WTT- London Underground	CO ₂ e	passenger.km	-23%	As above	Section 5
	WTT - All Motorcycles	No significant changes				Section 5
	WTT- Freight train	No significant changes				Section 5
WTT delivery vehicles & freighting goods						
	WTT- HGV (all diesel) Rigid (>7.5 tonnes-17 tonnes) tonne.km	CO ₂ e	tonne.km	18.9%	Increase in WTT factors is due to change in source for this data in 2019 update (and increased emission factors) and due to new accounting for biofuel component	Section 6
	WTT – Vans (all fuels and classes)	WTT CO ₂ e	km and miles	+26% to -17%	As seen in Delivery vehicles	Section 6
	WTT – Vans (all fuels and classes)	WTT CO ₂ e	tonne.km	+31% to -21%	As seen in Delivery vehicles	Section 6
	WTT - Freight train	No significant changes				Section 6
	WTT- Freight flights	As seen in Freighting goods				Section 6
Hotel Stay						
	Changes due to the data source, see: https://scholarship.sha.cornell.edu/cgi/viewcontent.cgi?article=1255&context=chrrpubs					Section 11
Managed assets- electricity						
	See "UK electricity" (which is identical for managed assets electricity)					Section 3

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
Managed assets- vehicles						
	Cars by size: all size, Diesel	CH ₄	km and miles	-57%	Revision to Euro 5 and 6 passenger car diesel emission factors which are now significantly lower than previously used, in addition to impact of fleet turnover.	Section 5
	Cars by size: Medium car, Hybrid	CH ₄	km and miles	-12%	Revision to Euro 5 and 6 passenger car diesel emission factors which are now significantly lower than previously used, in addition to impact of fleet turnover.	Section 5
	Cars by size: all sizes, LPG	CH ₄	km and miles	-29%	Revised values in the EMEP/EEA Guidebook 2016 caused the changes in the LPG factors. Additionally, the higher polluting earlier EURO standards are now reducing in terms of share of vkm, also contributing somewhat to the observed trend	Section 5
	Cars by size: Large car, Hybrid	CO ₂	km and miles	-18%	According to SMMT, the test cycle gCO ₂ /km for hybrids have decreased	Section 5
	Cars by size: Large car, Hybrid	CO ₂ e	km and miles	-18%	Predominantly as for CO ₂ , above.	Section 5
	All Motorcycles	CH ₄	km and miles	-10.1% to -5.5%	Fleet turnover to vehicles with lower emissions.	Section 5
	Managed HGV refrigerated (all diesel)	See Delivery vehicles				Section 6
	Managed HGV (all diesel)	See Delivery vehicles				Section 6
	Managed LGV	See Delivery vehicles				Section 6
Outside of scopes						
	Diesel (average biofuel blend)	CO ₂	All	52%	The % of biodiesel within forecourt diesel increased from 2.3% to 3.5% this year (which is a 52% increase).	Section 9
Waste: Material use						
	No significant changes					Section 12

Ref. number	Emission factor	GHG	Unit (all units are kgCO ₂ e per "unit" of GHG, unless stated)	Magnitude of change vs 2018 update	Reason for change	For more information see:
Waste: Waste disposal						
	Construction, Wood – Composting	Total as CO ₂ e	kg CO ₂ e/ tonne	-52%	Revision to WRAP model to replace a value based on a transport factor that includes an element of overseas transport and is more applicable to recycling. The revised value is the "standard" compost transport value, based on the landfill value, but the haulage from the transfer station to the landfill is doubled, to represent onward movement of the composted material.	Section 12
	Other, Books – Composting	Total as CO ₂ e	kg CO ₂ e/ tonne	-52%	As above.	Section 12
	Refuse, All – Anaerobic digestion	Total as CO ₂ e	kg CO ₂ e/ tonne	-52%	As above.	Section 12
	Electrical items, All – Landfill	Total as CO ₂ e	kg CO ₂ e/ tonne	-46%	This is an update of the previous factor (from a 2005 Environment Agency report) to the standard transport-only value for landfill. Introduced for consistency.	Section 12
	Paper, All - Composting	Total as CO ₂ e	kg CO ₂ e/ tonne	-52%	Revision to WRAP model to replace a value based on a transport factor that includes an element of overseas transport and is more applicable to recycling. The revised value is the "standard" compost transport value, based on the landfill value, but the haulage from the transfer station to the landfill is doubled, to represent onward movement of the composted material.	Section 12

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