

1.A.5.b i - Military Ground Vehicles and Vehicles

Short description

In sub-category *1.A.5.b i - Other, Mobile (including Military)* emissions from military ground-vehicles and mobile machinery are reported.

Method	AD	EF	Key Category
T1, T2	NS	CS, D	see superordinate chapter

Method

Activity data

Basically, all fuel consumption in military vehicles is included in the primary activity data provided by the National Energy Balances (NEB) (AGEB, 2019).

As the NEB does not provide specific data for military use, the following additional sources are used:

For the years as of 1995, the official mineral-oil data of the Federal Republic of Germany (Amtliche Mineralöl-daten der Bundesrepublik Deutschland), prepared by the Federal Office of Economics and Export Control (BAFA), are used (BAFA, 2019)¹⁾. Provided in units of [1,000 t], these amounts have to be converted into [TJ] on the basis of the relevant net calorific values given by²⁾.

As the official mineral-oil data does not distinguish into fossil and biofuels but does provide amounts for inland deliveries of total diesel and gasoline fuels, no data on the consumption of biodiesel and bioethanol is available directly at the moment. Therefore, activity data for biofuels used in military vehicles are calculated by applying Germany's official annual biofuel shares to the named total deliveries (see also: info on EF).

Table 1: Annual fuel deliveries to the military for ground-vehicles and machinery, in terajoules

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018
Diesel Oil	15,037	8,001	1,364	3,366	990	622	972	681	683	580	578	415	279
Biodiesel	0	0	0	74	64	41	63	39	41	31	30	22	16
Gasoline	21,508	9,800	7,477	6,857	4,862	4,696	4,175	4,092	3,695	3,342	3,009	2,502	2,341
Biogasoline	0	0	0	47	188	192	185	175	161	145	131	107	105
Σ 1.A.5.b i	36,545	17,801	8,841	10,343	6,103	5,551	5,395	4,988	4,580	4,099	3,748	3,046	2,741

[gallery size="medium" : 1A5bi_AD.png : 1A5bi_AD_bio.png gallery](#)

++ Emission factors

Table 2: Annual country-specific emission factors¹, in kg/TJ

	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018			
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< Diesel fuels																			
~ NH ₃	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00		
~ NMVOC	> 316	> 274	> 274	> 274	> 274	> 274	> 274	> 274	> 274	> 274	> 274	> 274	> 274	> 274	> 274	> 274	> 274		
~ NO _x	> 1,195	> 1,360	> 1,360	> 1,360	> 1,360	> 1,360	> 1,360	> 1,360	> 1,360	> 1,360	> 1,360	> 1,360	> 1,360	> 1,360	> 1,360	> 1,360	> 1,360		
~ SO _x	> 125	> 60.5	> 14.0	> 0.37	> 0.37	> 0.37	> 0.37	> 0.37	> 0.37	> 0.37	> 0.37	> 0.37	> 0.37	> 0.37	> 0.37	> 0.37	> 0.37		
~ PM	2		> 100	> 100	> 100	> 100	> 100	> 100	> 100	> 100	> 100	> 100	> 100	> 100	> 100	> 100	> 100	> 100	> 100
~ BC	3		> 53.0	> 53.0	> 53.0	> 53.0	> 53.0	> 53.0	> 53.0	> 53.0	> 53.0	> 53.0	> 53.0	> 53.0	> 53.0	> 53.0	> 53.0	> 53.0	> 53.0
~ CO	> 515	> 350	> 350	> 350	> 350	> 350	> 350	> 350	> 350	> 350	> 350	> 350	> 350	> 350	> 350	> 350	> 350		
< Gasoline fuels																			
~ NH ₃	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00	> 4.00		
~ NMVOC	> 594	> 373	> 373	> 373	> 373	> 373	> 373	> 373	> 373	> 373	> 373	> 373	> 373	> 373	> 373	> 373	> 373		
~ NO _x	> 682	> 725	> 725	> 725	> 725	> 725	> 725	> 725	> 725	> 725	> 725	> 725	> 725	> 725	> 725	> 725	> 725		
~ SO _x	> 11.8	> 8.30	> 3.20	> 0.40	> 0.40	> 0.40	> 0.40	> 0.40	> 0.40	> 0.40	> 0.40	> 0.40	> 0.40	> 0.40	> 0.40	> 0.40	> 0.40		
~ PM	2		> 3.63	> 3.55	> 3.13	> 2.66	> 2.66	> 2.51	> 2.39	> 2.27	> 2.14	> 2.09	> 2.03	> 1.97	> 1.91	> 1.91	> 1.91	> 1.91	> 1.91
~ BC	3		> 0.44	> 0.43	> 0.38	> 0.32	> 0.32	> 0.30	> 0.29	> 0.27	> 0.26	> 0.25	> 0.24	> 0.24	> 0.23	> 0.23	> 0.23	> 0.23	> 0.23
~ CO	> 4,199	> 4,010	> 4,010	> 4,010	> 4,010	> 4,010	> 4,010	> 4,010	> 4,010	> 4,010	> 4,010	> 4,010	> 4,010	> 4,010	> 4,010	> 4,010	> 4,010		
~ TSP	4		> 2.46	> 0.82	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00
~ Pb	4		> 1.54	> 0.52	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00
1																			
2																			
3																			
4																			

NOTE: With respect to the emission factors applied for particulate matter, given the circumstances during test-bench measurements, condensables are most likely included at least partly.[footnote](#) During test-bench measurements, temperatures are likely to be significantly higher than under real-world conditions, thus reducing condensation. On the contrary, smaller dilution (higher number of primary particles acting as condensation germs) together with higher pressures increase the likeliness of condensation. So over-all condensables are very likely to occur but different to real-world conditions. [footnote](#)

For information on the **emission factors for heavy-metal and POP exhaust emissions**, please refer to [Appendix 2.3 - Heavy Metal \(HM\) exhaust emissions from mobile sources](#) and [Appendix 2.4 - Persistent Organic Pollutant \(POP\) exhaust emissions from mobile sources](#)].

+ Discussion of emission trends

This sub-category is **not considered separately in the key category analysis**.

Due to the application of very several tier1 emission factors, most emission trends reported for this

~ relative change	> 0.00 %	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> -0.60%	> -0.70%	> -1.37%										
< Gasoline																			
~ Submission 2020	> 4,907	> 4,862	> 4,696	> 4,175	> 4,092	> 3,695	> 3,342	> 3,009	> 2,502										
~ Submission 2019	> 4,907	> 4,862	> 4,695	> 4,175	> 4,092	> 3,695	> 3,342	> 3,009	> 2,605										
~ absolute change	> -0.11	> 0.00	> 0.10	> 0.00	> 0.00	> 0.00	> 0.08	> 0.07	> -103										
~ relative change	> 0.00 %	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> -3.96%										
< Biogasoline																			
~ Submission 2020	> 140	> 188	> 192	> 185	> 175	> 161	> 145	> 131	> 107										
~ Submission 2019	> 140	> 188	> 192	> 185	> 175	> 161	> 145	> 131	> 106										
~ absolute change	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.00	> 0.13										
~ relative change	> 0.00 %	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.00%	> 0.12%										



For pollutant-specific information on recalculated emission estimates for Base Year and 2018, please see the pollutant specific recalculation tables following chapter [8.1 - Recalculations](#).

Planned improvements

Given the limited quality of the emission factors applied, the inventory compiler will check a possible revision at least for the main pollutants.

bibliography : 1 : BAFA, 2019: Federal Office of Economics and Export Control (Bundesamt für Wirtschaft und Ausfuhrkontrolle, BAFA): Amtliche Mineralöl-daten für die Bundesrepublik Deutschland; URL: https://www.bafa.de/SharedDocs/Downloads/DE/Energie/Mineraloel/moel_amtliche_daten_2017_dezember.html, Eschborn, 2019. : 2 : AGEb, 2019b: Working Group on Energy Balances (Arbeitsgemeinschaft Energiebilanzen (Hrsg.), AGEb): Daten - Sondertabellen - Heizwerte der Energieträger und Faktoren für die Umrechnung von spezifischen Mengeneinheiten in Wärmeinheiten (2005-2017); URL: <https://ag-energiebilanzen.de/#heizwerte2005bis2016>, Köln & Berlin, 2019. : 3 : Knörr et al. (2019b): Knörr, W., Heidt, C., Gores, S., & Bergk, F. (2018b): ifeu Institute for Energy and Environmental Research (Institut für Energie- und Umweltforschung Heidelberg gGmbH, ifeu): Aktualisierung des Modells TREMOD-Mobile Machinery (TREMOD MM) 2019, Heidelberg, 2019 : 4 : EMEP/EEA, 2019: EMEP/EEA air pollutant emission inventory guidebook 2019; Copenhagen, 2019. : 5 :

Rentz et al., 2008: Nationaler Durchführungsplan unter dem Stockholmer Abkommen zu persistenten organischen Schadstoffen (POPs), im Auftrag des Umweltbundesamtes, FKZ 205 67 444, UBA Texte | 01/2008, January 2008, URL:
<http://www.umweltbundesamt.de/en/publikationen/nationaler-durchfuehrungsplan-unter-stockholmer-bibliography>

¹⁾ (bibcite 1)

²⁾ (bibcite 2)