

1.A.3.b v - Gasoline Evaporation

Short description

In category *1.A.3.b v - Road Transport: Gasoline evaporation* fugitive emissions from the evaporation of gasoline from road vehicles are reported.

Method	AD	EF	Key Category
T2	NS, M	CS, M	L & T: NMVOC

Methodology

Activity data

Specific data for gasoline evaporation from road vehicles are generated within TREMOD ¹⁾. - The following table provides an overview of annual amounts of gasoline evaporated from road vehicles in Germany.

Table 1: Annual amount of gasoline evaporated from road vehicles, in kilotonnes

	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
PCs	10,906	9,235	8,553	7,520	7,080	6,695	6,385	6,331	6,176	6,088	5,780	5,732	5,715	5,502	5,482	5,501	5,145	
LDVs	202	193	169	112	95	85	72	65	60	55	50	47	47	49	50	52	54	
Mopeds	52	34	38	44	45	49	52	60	57	56	54	56	57	59	59	59	57	
Motorcycles	108	99	204	219	203	200	186	169	155	143	131	124	130	136	138	140	137	
Σ 1.A.3.b v	11,283	9,561	8,964	7,895	7,424	7,030	6,695	6,625	6,447	6,342	6,015	5,959	5,948	5,747	5,730	5,752	5,392	

source: TREMOD 6.02 ²⁾

(Implied) Emission factors

Tier3 emission factors representing the effect of mitigation technologies are derived from TREMOD (Knörr et al., 2019a) ³⁾.

Table 2: Overview of implied emission factors per vehicle type, in kg/t

	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
~ PCs	> 18.8	> 12.4	> 5.63	> 3.15	> 2.98	> 2.95	> 2.68	> 2.58	> 2.56	> 2.63	> 2.66	> 2.73	> 2.80	> 2.78	> 2.84	> 2.91	> 3.03
~ LDVs	> 24.9	> 20.0	> 13.9	> 10.3	> 9.64	> 9.27	> 7.86	> 7.47	> 7.13	> 7.11	> 6.65	> 6.69	> 6.49	> 6.01	> 5.92	> 5.74	> 5.29
~ Mopeds	> 37.4	> 23.7	> 21.1	> 17.6	> 17.1	> 16.4	> 15.9	> 15.1	> 15.0	> 14.9	> 14.8	> 14.6	> 14.4	> 13.8	> 13.9	> 14.0	> 14.3
~ Motorcycles	> 23.3	> 24.8	> 16.2	> 15.8	> 16.5	> 16.5	> 16.1	> 17.4	> 18.8	> 20.5	> 21.8	> 23.6	> 23.3	> 21.8	> 22.2	> 22.4	> 22.4

+ [Discussion of emission trends](#)

NFR 1.A.3.b v - Gasoline evaporation is key category for emissions of **NMVOC** regarding the emissions' level and declining trend.

++ Non-Methane Volatile Organic Compounds - NMVOC (*fugitive emissions only; no NMVOC emissions from fuel combustion included*)

[gallery size="medium" : 1A3bv_AD.png : 1A3bv_EM_NMVOC.PNG gallery](#)

Since its maximum level of over 11,000 kilotonnes in 1990, the amount of evaporated gasoline is decreasing - and so are the related NMVOC emissions. The amounts of evaporated gasoline are connected directly with those of gasoline consumed.

~ Submission 2020	> 37.4	> 23.7	> 21.1	> 17.6	> 17.1	> 16.4	> 15.9	> 15.1	> 15.0	> 14.9	> 14.8	> 14.6	> 14.4	> 13.8	> 13.9	> 14.0
~ Submission 2019	> 3.27	> 3.16	> 3.32	> 3.30	> 6.48	> 6.71	> 6.71	> 6.95	> 6.89	> 6.71	> 6.64	> 6.70	> 6.64	> 6.56	> 6.55	> 6.49
~ absolute change	> 34.1	> 20.5	> 17.8	> 14.3	> 10.6	> 9.64	> 9.17	> 8.10	> 8.13	> 8.23	> 8.18	> 7.87	> 7.78	> 7.27	> 7.35	> 7.52
~ relative change	> 1043%	> 650%	> 537%	> 434%	> 164%	> 144%	> 137%	> 117%	> 118%	> 123%	> 123%	> 117%	> 117%	> 111%	> 112%	> 116%
< Motorcycles																
~ Submission 2020	> 23.3	> 24.8	> 16.2	> 15.8	> 16.5	> 16.5	> 16.1	> 17.4	> 18.8	> 20.5	> 21.8	> 23.6	> 23.3	> 21.8	> 22.2	> 22.4
~ Submission 2019	> 8.76	> 23.1	> 11.3	> 6.37	> 11.62	> 16.05	> 13.49	> 12.09	> 10.91	> 10.16	> 9.24	> 8.41	> 7.81	> 7.55	> 7.18	> 6.86
~ absolute change	> 14.6	> 1.66	> 4.94	> 9.47	> 4.90	> 0.49	> 2.60	> 5.36	> 7.84	> 10.3	> 12.6	> 15.2	> 15.5	> 14.3	> 15.0	> 15.6
~ relative change	> 166%	> 7.16%	> 44%	> 149%	> 42%	> 3.07%	> 19.3%	> 44.4%	> 71.8%	> 101%	> 136%	> 181%	> 198%	> 189%	> 209%	> 227%

As a result, **NM VOC emissions from gasoline evaporation** were re-estimated as follows:

Table 6: Re-estimated NMVOC emissions, in kilotonnes

	= 1990	= 1995	= 2000	= 2005	= 2006	= 2007	= 2008	= 2009	= 2010	= 2011	= 2012	= 2013	= 2014	= 2015	= 2016	= 2017
~ Submission 2020	> 215	> 122	> 54.6	> 29.1	> 26.1	> 24.7	> 21.5	> 20.7	> 20.0	> 20.1	> 19.3	> 19.7	> 20.1	> 19.4	> 19.7	> 20.3
~ Submission 2019	> 104	> 87.2	> 31.2	> 11.8	> 20.3	> 17.9	> 14.5	> 13.7	> 13.0	> 12.9	> 12.3	> 12.4	> 12.6	> 12.2	> 12.4	> 12.6
~ absolute change	> 110	> 34.9	> 23.4	> 17.3	> 5.83	> 6.82	> 6.95	> 6.95	> 7.00	> 7.29	> 7.07	> 7.32	> 7.54	> 7.19	> 7.35	> 7.61
~ relative change	> 106%	> 40.0%	> 75.2%	> 146%	> 28.7%	> 38.2%	> 47.8%	> 50.6%	> 53.9%	> 56.7%	> 57.6%	> 59.1%	> 59.9%	> 59.0%	> 59.3%	> 60.2%

For 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

[bibliography](#) : 1 : Knörr et al. (2019a): Knörr, W., Heidt, C., Gores, S., & Bergk, F.: ifeu Institute for Energy and Environmental Research (Institut für Energie- und Umweltforschung Heidelberg gGmbH, ifeu): Fortschreibung des Daten- und Rechenmodells: Energieverbrauch und Schadstoffemissionen des motorisierten Verkehrs in Deutschland 1960-2030, sowie TREMOD, im Auftrag des Umweltbundesamtes, Heidelberg & Berlin, 2019. [bibliography](#)

¹⁾ (bibcite 1)

²⁾ (bibcite 1)

³⁾ (bibcite 1)