

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
NMVO	191	156	130	80.2	46.5	42.4	38.7	35.0	31.4	28.1	25.3	22.9	20.9	19.1	17.6	16.3
NO_x	981	1.052	1.071	834	543	495	454	422	397	375	351	326	305	285	264	239
SO_x	79.6	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
BC⁵	84.5	60.7	41.7	27.7	21.6	21.0	20.4	19.3	17.8	16.1	14.5	13.0	11.5	10.1	8.73	7.39
PM⁴	155	111	75.8	45.3	30.4	28.8	27.3	25.3	23.1	20.8	18.6	16.5	14.6	12.8	11.1	9.51
CO	688	618	554	395	282	268	256	243	230	217	206	197	188	181	174	168
GASOLINE FUELS																
NH₃	0.075	0.083	0.083	0.086	0.087	0.088	0.091	0.092	0.092	0.092	0.092	0.092	0.092	0.092	0.092	0.092
NMVO²	3.04	6.37	4.67	4.56	4.83	4.74	5.23	5.22	5.11	5.00	5.32	5.19	4.30	4.07	3.46	3.35
NMVO³	5,819	5,099	5,099	5,320	5,424	4,858	3,596	2,897	2,897	2,897	2,897	2,897	2,897	2,901	2,910	2,915
NO_x	42.7	49.4	49.4	76.4	86.0	78.5	63.1	55.1	55.1	55.1	55.1	55.1	55.1	55.1	55.1	55.1
SO_x	10.1	8.27	3.22	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
BC⁵	5.09	3.73	3.73	3.86	3.91	3.96	4.08	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4.13
PM⁴	102	74.6	74.6	77.2	78.1	79.2	81.5	82.7	82.7	82.7	82.7	82.7	82.7	82.7	82.7	82.7
TSP⁶	2.35	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
CO	16,824	14,796	14,796	15,371	15,609	15,827	16,279	16,514	16,514	16,514	16,514	16,514	16,514	16,514	16,514	16,514
Pb	1.47	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0

¹ due to lack of better information: similar EF are applied for fossil and biofuels

² from fuel combustion

³ from gasoline evaporation

⁴ EF(PM_{2.5}) also applied for PM₁₀ and TSP (assumption: > 99% of TSP consists of PM_{2.5})

⁵ estimated via a f-BCs as provided in ⁵⁾, Chapter 1.A.2.g vii, 1.A.4.a ii, b ii, c ii, 1.A.5.b i - Non-road, note to Table 3-1: Tier 1 emission factors for off-road machinery

⁶ from leaded gasoline (until 1997)



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. ¹⁾

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.

Recalculations

Revisions in **activity data** result from slightly revised annual shares adapted EBZ 67 shares as well as the implementation of primary activity data from the now finalised NEB 2020.

Table 6: Revised annual shares of NEB line 67, in %

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
DIESEL FUELS															
Submission 2023	0.024	0.014	0.022	0.029	0.029	0.030	0.028	0.028	0.028	0.029	0.027	0.028	0.033	0.035	0.042
Submission 2022	0.024	0.014	0.022	0.029	0.029	0.030	0.028	0.028	0.028	0.029	0.027	0.028	0.034	0.035	0.042
absolute change	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
relative change	-0.03%	-0.09%	-0.13%	-0.13%	-0.13%	-0.12%	-0.12%	-0.12%	-0.12%	-0.12%	-0.12%	-0.12%	-0.1%	-0.12%	-0.12%
GASOLINE FUELS															
Submission 2023	0.685	0.403	0.449	0.414	0.355	0.356	0.331	0.329	0.331	0.333	0.316	0.319	0.358	0.368	0.403
Submission 2022	0.685	0.403	0.449	0.414	0.355	0.356	0.331	0.329	0.331	0.333	0.316	0.319	0.358	0.368	0.404

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
absolute change	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
relative change	0.00%	0.00%	-0.02%	-0.02%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%

Table 5: Revised activity data, in terajoules

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
DIESEL FUELS															
current submission	2,694	1,331	2,048	2,516	2,777	2,898	2,643	2,707	2,882	3,088	3,013	3,182	3,586	3,834	4,744
previous submission	2,695	1,332	2,051	2,519	2,781	2,902	2,646	2,711	2,886	3,092	3,016	3,185	3,590	3,838	4,702
absolute change	-0.90	-1.13	-2.71	-3.23	-3.51	-3.62	-3.27	-3.27	-3.45	-3.70	-3.60	-3.79	-4.23	-4.49	41.9
relative change	-0.03%	-0.09%	-0.13%	-0.1%	-0.1%	-0.12%	-0.12%	-0.12%	-0.12%	-0.12%	-0.12%	-0.12%	-0.12%	-0.12%	0.89%
GASOLINE FUELS															
current submission	3,093	3,005	3,324	3,050	1,628	1,488	433	422	451	1,751	1,660	1,668	1,875	1,781	2,802
previous submission	3,093	3,004	3,325	3,050	1,629	1,488	433	422	451	1,752	1,660	1,668	1,875	1,781	2,229
absolute change	-0.15	0.09	-0.63	-0.72	-0.43	-0.39	-0.12	-0.12	-0.12	-0.48	-0.46	-0.46	-0.49	-0.46	573
relative change	0.00%	0.00%	-0.02%	-0.02%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	25.7%
OVER-ALL FUEL CONSUMPTION															
current submission	5,787	4,335	5,372	5,565	4,405	4,386	3,076	3,129	3,333	4,839	4,673	4,849	5,460	5,614	7,545
previous submission	5,788	4,336	5,375	5,569	4,409	4,390	3,079	3,133	3,336	4,843	4,677	4,853	5,465	5,619	6,930
absolute change	-1.05	-1.05	-3.34	-3.95	-3.93	-4.01	-3.39	-3.38	-3.57	-4.18	-4.07	-4.25	-4.72	-4.95	615
relative change	-0.02%	-0.02%	-0.06%	-0.07%	-0.09%	-0.09%	-0.11%	-0.11%	-0.11%	-0.09%	-0.09%	-0.09%	-0.09%	-0.09%	8.88%

In contrast, all **emission factors** remain unrevised compared to last year's submission.



For **pollutant-specific information on recalculated emission estimates for Base Year and 2020**, please see the recalculation tables following chapter [8.1 - Recalculations](#).

¹⁾ AGEb, 2022: Working Group on Energy Balances (Arbeitsgemeinschaft Energiebilanzen (Hrsg.), AGEb): Energiebilanz für die Bundesrepublik Deutschland; <https://ag-energiebilanzen.de/daten-und-fakten/bilanzen-1990-bis-2020/?wpv-jahresbereich-bilanz=2011-2020>, (Aufruf: 23.11.2021), Köln & Berlin, 2022

²⁾ BAFA, 2022: Federal Office of Economics and Export Control (Bundesamt für Wirtschaft und Ausfuhrkontrolle, BAFA): Amtliche Mineralöl-daten für die Bundesrepublik Deutschland; https://www.bafa.de/SharedDocs/Downloads/DE/Energie/Mineraloel/moel_amtliche_daten_2021_12.xlsx?jsessionid=80E1FD32B36918F682608C03FDE79257.1_cid381?__blob=publicationFile&v=5, Eschborn, 2022.

^{3), 4)} Knörr et al. (2022b): Knörr, W., Heidt, C., Gores, S., & Bergk, F.: ifeu Institute for Energy and Environmental Research (Institut für Energie- und Umweltforschung Heidelberg gGmbH, ifeu): Aktualisierung des Modells TREMOD-Mobile Machinery (TREMOD MM) 2022, Heidelberg, 2022.

⁵⁾ EMEP/EEA, 2019: EMEP/EEA air pollutant emission inventory guidebook – 2019, Copenhagen, 2019.

¹⁾

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.