

1.A.4 - Small Combustion: Mobile Sources (OVERVIEW)

Short description

NFR-Code	Source category
1.A.4	Small Combustion
<i>including mobile sources sub-categories:</i>	
1.A.4.a ii	Commercial / Institutional: Mobile
1.A.4.b ii	Residential: Household and Gardening: Mobile
1.A.4.c ii	Agriculture/Forestry/Fishing: Off-road Vehicles and Other Machinery
1.A.4.c iii	Agriculture/Forestry/Fishing: National Fishing

Mobile sources reported under *NFR 1.A.4 - Small combustion* comprise of such versatile mobile equipment as forklifters (1.A.a ii), gasoline-driven lawn mowers used for gardening (1.A.4.b ii) over tractors in agriculture and harvesters and chain saws in forestry (1.A.4.c ii) to the German deep sea fishing fleet (1.A.4.c iii).



For further information on sub-sector specific consumption data, emission factors and emissions as well as further information on emission trends, recalculations and planned improvements, please follow the links above.

Method

Activity data

Primary activity data are available from National Energy Balances (NEBs) (AGEB, 2021) ¹⁾.

Here, aggregated data for NFRs *1.A.a ii*, *1.A.4.c ii* and *1.A.2.g vii* are included in line 67: 'Commercial, trade, services and other consumers'. In contrast, AD for is available directly from line 66: 'Households'. Furthermore, AD for is included partly in NEB lines 6: 'Maritime Bunkers' and 64: 'Coastal and inland navigation'.

Table 1 below tries to demonstrate the breaking-down of primary data in NEB line 67 onto NFRs *1.A.2.g vii*, *1.A.4a ii* and *1.A.4.c ii*. For further information on the resulting specific shares as well as the fuel consumption in NFRs *1.A.4.b ii* and *1.A.4.c iii* please refer to the respective sub-chapters.

Table 1: Primary AD from NEB line 67: 'Commercial, trade, services and other consumers', in terajoules

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
diesel oil	126,920	105,800	96,425	85,293	89,516	91,362	90,044	93,377	97,410	101,911	105,895	108,752	101,513	102,836	104,580	
biodiesel				5,460	6,863	6,375	6,355	5,538	5,986	5,575	5,614	5,806	5,901	5,857	8,687	
gasoline	26,036	17,264	14,881	14,151	9,204	8,637	5,358	5,257	4,941	8,329	7,991	7,484	7,315	6,913	7,050	
biogasoline				97	356	354	237	225	215	361	347	316	329	298	322	
LPG		7,963	9,238	28,246	24,605	19,193	19,582	19,559	17,945	19,916	23,260	16,971	19,426	22,054	20,622	

In a first step, annual fuel deliveries to the military as provided in (BAFA, 2021) ²⁾ ...

Table 2: Annual fuel deliveries to the military as included in NEB line 67, in terajoules

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
diesel oil	15.037	8.001	1.364	3.206	977	620	966	680	683	580	577	415	279	281	133	
biodiesel				214	74,9	43,2	68,2	40,3	41,9	31,7	30,6	22,1	16,2	16,0	11,1	
gasoline	21.508	9.800	7.477	6.838	4.792	4.624	4.106	4.027	3.635	3.287	2.959	2.463	2.300	2.269	1.770	
biogasoline				47,0	185	190	182	173	158	143	129	104	103	97,9	80,8	

...are deduced from these primary AD, giving the remaining amounts of gasoline and diesel oil for NFRs *1.A.2.g vii*, *1.A.a ii* and *1.A.4.c ii*:

Table 3: Annual fuel deliveries to the remaining sectors covered by NEB line 67, in terajoules

	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
diesel oil	111.883	97.799	95.061	82.087	82.973	83.253	84.710	89.608	88.539	90.742	89.078	92.697	96.727	101.331	105.318	108.337	101.234	102.555	104.447
biodiesel				5.245	9.171	10.246	8.049	7.159	6.788	6.331	6.287	5.497	5.944	5.543	5.583	5.784	5.885	5.841	8.676
gasoline	4.528	7.464	7.404	7.313	7.392	7.397	7.305	4.500	4.412	4.013	1.252	1.230	1.306	5.042	5.032	5.021	5.015	4.644	5.281
biogasoline				50,2	107	100	140	129	170	164	55,5	52,7	56,8	219	219	212	225	200	241
LPG		7.963	9.238	28.246	21.209	21.752	20.860	21.222	24.605	19.193	19.582	19.559	17.945	19.916	23.260	16.971	19.426	22.054	20.622

As the National Energy Balances provide no consumption data for LPG before 1995 and as part of the LPG provided in NEB line 67 is used for stationary combustion (whereas all diesel and gasoline fuels are allocated to mobile combustion), activity data for LPG used in in NRMM are taken directly from TREMOD MM (Knörr et al. (2021b))³⁾.

In another step, the following sub-sectors specific annual percentual contributions to NEB line 67 as computed within TREMOD-MM are applied to these primary AD to deduce sub-sectors specific AD.

Table 4: Annual percentual contributions of NFRs 1.A.2.g vii, 1.A.a ii and 1.A.4.c ii

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source: own estimates, based on TREMOD MM



For the **NFR-specific activity data and emission factors** please refer to the corresponding chapters linked at the top of this page.

Recalculations

Primary activity data for 2018 and 2019 were revised in accordance with the final National Energy Balance 2019 and the revision of gasoline used in military ground vehicles.

Table: Revised primary activity data, in terajoules

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
DIESEL OIL										
Submission 2022	126.920	105.800	96.425	85.293	89.516	101.911	105.895	108.752	101.513	102.836
Submission 2021	126.920	105.800	96.425	85.293	89.516	101.911	105.895	108.752	101.519	102.654
absolute change	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	-6,00	182
relative change	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-0,01%	0,18%
BIODIESEL										
Submission 2022				5.460	6.863	5.575	5.614	5.806	5.901	5.857
Submission 2021				5.460	6.863	5.575	5.614	5.806	5.901	5.845
absolute change				0,00	0,00	0,00	0,00	0,00	0,00	12,4
relative change				0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,21%
GASOLINE										

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
Submission 2022	26.036	17.264	14.881	14.151	9.204	8.329	7.991	7.484	7.315	6.913
Submission 2021	26.036	17.264	14.881	14.151	9.204	8.329	7.991	7.484	7.204	7.000
absolute change	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	111	-87,0
relative change	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	1,54%	-1,24%
BIOGASOLINE										
Submission 2022				97,2	356	361	347	316	329	298
Submission 2021				97,2	356	361	347	316	324	302
absolute change				0,00	0,00	0,00	0,00	0,00	4,99	-3,75
relative change				0,00%	0,00%	0,00%	0,00%	0,00%	1,54%	-1,24%
LPG										
Submission 2022		7.963	9.238	28.246	24.605	19.916	23.260	16.971	19.426	22.054
Submission 2021		7.963	9.238	28.246	24.605	19.916	23.260	16.971	19.426	20.844
absolute change		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1.210
relative change		0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	5,81%

¹⁾ AGEb, 2021: Working Group on Energy Balances (Arbeitsgemeinschaft Energiebilanzen (Hrsg.), AGEb): Energiebilanz für die Bundesrepublik Deutschland; URL: <https://www.ag-energiebilanzen.de/7-0-Bilanzen-1990-2019.html>, (Aufruf: 28.11.2021), Köln & Berlin, 2021.

²⁾ BAFA, 2021: 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_2019_dezember.html, Eschborn, 2021.

³⁾ Knörr et al. (2021b): 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) 2021, Heidelberg, 2021.