

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	105,634	106,432
biodiesel				5,460	6,863	6,375	6,355	5,538	5,986	5,575	5,614	5,806	5,901	5,857	8,775	7,394
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	8,410	8,691
biogasoline				97.2	356	354	237	225	215	361	347	316	329	298	384	413
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	16,960	14,810

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	138
biodiesel				214	74.9	43.2	68.2	40.3	41.9	31.7	30.6	22.1	16.2	16.0	11.1	9.55
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	1,921
biogasoline				47.0	185	190	182	173	158	143	129	104	103	97.9	80.8	91.4

...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	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
diesel oil	111,883	97,799	95,061	82,087	88,539	90,742	89,078	92,697	96,727	101,331	105,318	108,337	101,234	102,555	105,501	106,294
biodiesel				5,245	6,788	6,331	6,287	5,497	5,944	5,543	5,583	5,784	5,885	5,841	8,764	7,384
gasoline	4,528	7,464	7,404	7,313	4,412	4,013	1,252	1,230	1,306	5,042	5,032	5,021	5,015	4,644	6,640	6,770
biogasoline				50.2	170	164	55.5	52.7	56.8	219	219	212	225	200	303	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	16,960	14,810

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 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

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1.A.2.g vii	43.0%	46.4%	47.1%	43.8%	43.2%	43.5%	43.8%	43.3%	43.6%	43.2%	43.1%	43.0%	42.6%	42.5%	42.2%	41.9%
1.A.4.a ii	7.01%	6.65%	6.98%	7.17%	6.51%	6.35%	6.20%	5.95%	5.81%	5.73%	5.83%	5.77%	5.67%	5.59%	5.45%	5.31%
1.A.4.c ii (i)	47.5%	45.6%	43.8%	46.2%	47.4%	47.2%	47.2%	48.0%	47.8%	48.2%	48.4%	48.5%	48.4%	48.4%	48.2%	48.6%
1.A.4.c ii (ii)	2.41%	1.36%	2.15%	2.88%	2.91%	2.99%	2.77%	2.76%	2.81%	2.89%	2.72%	2.79%	3.35%	3.54%	4.15%	4.25%
TOTAL NRMM	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1.A.2.g vii	31.5%	59.7%	55.1%	58.6%	64.5%	64.4%	66.9%	67.1%	66.9%	66.7%	68.4%	68.1%	64.2%	63.2%	59.7%	59.2%
1.A.4.c ii (ii)	68.5%	40.3%	44.9%	41.4%	35.5%	35.6%	33.1%	32.9%	33.1%	33.3%	31.6%	31.9%	35.8%	36.8%	40.3%	40.8%
TOTAL NRMM	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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 2020 were revised in accordance with the now finalised National Energy Balance 2020.

Here, the most significant changes occur for gasoline fuels and LPG.

Table 2: Revised primary activity data 2020, in terajoules

	Diesel oil	Biodiesel	Gasoline	Biogasoline	LPG
current submission	105,2634	8,775	8,410	384	16,960
previous submission	104,580	8,687	7,050	322	20,622
absolute change	1,054	87.4	1,360	62.1	-3,662
relative change	1.01%	1.01%	19.3%	19.3%	-17.8%

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.