

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, 2020) 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	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
diesel oil	126.920	105.800	96.425	85.293	84.674	84.918	85.850	90.599	89.516	91.362	90.044	93.377	97.410	101.911	105.895	108.752	101.519	102.654
biodiesel	0	0	0	5.460	9.376	10.468	8.163	7.239	6.863	6.375	6.355	5.538	5.986	5.575	5.614	5.806	5.901	5.845

	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
gasoline	26.036	17.264	14.881	14.151	13.487	12.161	12.224	9.354	9.204	8.637	5.358	5.257	4.941	8.329	7.991	7.484	7.204	7.000
biogasoline	0	0	0	97	194	164	234	267	356	354	237	225	215	361	347	316	324	302
LPG	0	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	20.844

In a first step, annual fuel deliveries to the military as provided in (BAFA, 2020) ²⁾ ...

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

	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
diesel oil	15.037	8.001	1.364	3.206	1.701	1.664	1.139	990	977	620	966	680	683	580	577	415	279	281
biodiesel	0	0	0	214	205	223	114	80	75	43	68	40	42	32	31	22	16	16
gasoline	21.508	9.800	7.477	6.857	6.128	4.789	4.955	4.907	4.862	4.696	4.175	4.092	3.695	3.342	3.009	2.503	2.341	2.269
biogasoline	0	0	0	47	88	65	95	140	188	192	185	175	161	145	131	106	105	98

...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
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	101.240	102.373
biodiesel	0	0	0	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	5.829
gasoline	4.528	7.464	7.404	7.294	7.359	7.372	7.269	4.447	4.342	3.941	1.183	1.165	1.246	4.987	4.982	4.981	4.863	4.731
biogasoline	0	0	0	50	106	100	139	127	168	162	52	50	54	216	216	210	219	204
LPG	0	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	20.844

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.

In another step, the following sub-sectors specific annual percentual contributions to NEB line 67 as computed within TREMOD-MM ³⁾ 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	= 2006	= 2007	= 2008	= 2009	= 2010	= 2011	= 2012	= 2013	= 2014	= 2015	= 2016	= 2017	= 2018	= 2019
1 A 2 g >	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>
vii	42.28%	45.40%	44.48%	40.15%	41.16%	39.76%	40.72%	40.59%	39.41%	39.70%	39.98%	40.13%	40.29%	39.81%	39.70%	39.60%	39.42%	
1 A 4 a >	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>
ii	6.95%	6.56%	6.64%	7.14%	6.92%	6.97%	6.91%	6.99%	7.02%	6.96%	6.91%	6.85%	6.78%	6.79%	6.79%	6.78%	6.75%	
1 A 4 c >	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>
ii (i)	48.39%	46.70%	46.83%	50.05%	49.05%	49.67%	49.76%	50.10%	50.90%	50.60%	50.57%	50.46%	50.33%	50.73%	51.00%	51.05%	51.24%	
1 A 4 c >	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>
ii (ii)	2.38%	1.34%	2.05%	2.65%	2.87%	3.60%	2.61%	2.32%	2.67%	2.74%	2.54%	2.56%	2.60%	2.66%	2.51%	2.57%	2.59%	
TOTAL NRMM	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1 A 2 g >	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>
vii	31.46%	59.71%	55.09%	58.38%	58.35%	52.61%	62.04%	66.08%	63.99%	63.84%	66.31%	66.48%	66.23%	65.94%	67.57%	67.26%	67.27%	
1 A 4 c >	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>
ii (ii)	68.54%	40.29%	44.91%	41.62%	41.65%	47.39%	37.96%	33.92%	36.01%	36.16%	33.69%	33.52%	33.77%	34.06%	32.43%	32.74%	32.73%	
TOTAL NRMM	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>	>
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

source: own estimates, based on TREMOD MM ⁴⁾

The final NFR-specific activity data is provided within the corresponding chapters as linked at the top of this page.

Recalculations

Table: Revised primary activity data for 2017, in terajoules

=	= Diesel oil	= Biodiesel	= Gasoline	= Biogasoline	= LPG
~ Submission 2020	> 108,752	> 5,768	> 7,484	> 316	> 16,971
~ Submission 2019	> 108,126	> 5,735	> 8,372	> 356	> 18,789
~ absolute change	> 626	> 33	> -888	> -40,9	> -1,818
~ relative change	> 0.58%	> 0.57%	> -10.6%	> -11.5%	> -9.68%

bibliography : 1 : AGEb, 2019: Working Group on Energy Balances (Arbeitsgemeinschaft Energiebilanzen (Hrsg.), AGEb): Energiebilanz für die Bundesrepublik Deutschland; URL: <https://www.ag-energiebilanzen.de/7-0-Bilanzen-1990-2017.html>, (Aufruf: 28.11.2018), Köln & Berlin, 2019. : 2 : 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_2016_dezember.xlsx?__blob=publicationFile&v=6, Eschborn, 2019. : 3 : ifeu, 2019b: Helms, H., Lambrecht, U., Knörr, W.; ifeu Institute for Energy and Environmental Research (Institut für Energie- und Umweltforschung Heidelberg gGmbH, ifeu): Aktualisierung des Modells TREMOD-Mobile Machinery, im Auftrag des Umweltbundesamtes, Heidelberg, 2019. **bibliography**

³⁾ (bibtex 3)

⁴⁾ (bibtex 3)