

1.A.4.c iii - Agriculture/Forestry/Fishing: National Fishing

Short description

In NFR sub-category 1.A.4.c iii fuel consumption and emissions of Germany's maritime fishing fleet are reported.

Method	AD	EF	Key Category Analysis
T1, T2	NS, M	D, M, CS, T1, T2	no key category

Methodology

Activity Data

Primary fuel delivery data for national fishing is included in NEB lines 6 ('International Deep-Sea Bunkers') and 64 ('Coastal and Inland Navigation') for IMO-registered and unregistered ships respectively.

The actual annual amounts used are therefore calculated within (Deichnik (2020)), where ship movement data (AIS signal) allows for a bottom-up approach providing the needed differentiation.¹⁾

Table 1: Annual fuel consumption, in terajoules

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Diesel oil	711	549	531	488	473	442	431	429	472	555	1.117	1.208	2.529	512
Heavy fuel oil	23,7	18,1	17,7	16,1	15,6	14,6	14,2	14,1	13,4	NO	NO	NO	NO	NO
Σ 1.A.4.c iii	735	567	549	504	489	456	445	443	485	555	1.117	1.208	2.529	512

The strong increase after 2015 cannot be conclusively explained at the moment. However, even if the over-all fuel quantities delivered to the navigation sector would be somehow misallocated between the specific nautical activities, there would be no over- or under-estimation of over-all emissions.

Emission factors

The emission factors applied here, are derived from different sources and therefore are of very different quality.

For the main pollutants, country-specific implied values are used, that are based on tier3 EF included in the BSH model²⁾ which mainly relate on values from the EMEP/EEA guidebook 2019³⁾. These modelled IEFs take into account the ship specific information derived from AIS data as well as the mix of fuel-qualities applied depending on the type of ship and the current state of activity.

Table 2: Annual country-specific emission factors, in kg/TJ

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Diesel oil														
NH₃	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
NM VOC	50.0	50.0	50.0	50.0	50.0	50.0	50.0	49.8	50.4	49.6	50.7	51.5	52.9	
NO_x	1,099	1,099	1,099	1,099	1,099	1,099	1,099	1,090	1,090	1,092	1,092	1,091	1,093	
SO_x	466	419	233	186	70	65	56	53	50	42	42	42	43	
PM	291	262	145	116	44	41	41	43	41	43	40	39	36	
BC²	84.2	75.8	42.1	33.7	12.6	11.8	11.8	12.3	12.0	12.4	11.7	11.2	10.4	
CO	102	102	102	102	102	102	102	106	103	107	101	96	90	
Heavy fuel oil														
NH₃	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.34	0.35	NA				
NM VOC	33.2	33.2	33.2	33.2	33.2	33.2	33.2	30.6	30.2	NA				

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
NO_x	1,187	1,187	1,187	1,187	1,187	1,187	1,188	1,283	1,287			NA		
SO_x	1.319	1.332	1.323	1.336	496	496	496	496	506			NA		
PM_{2.5}¹	469	474	471	475	176	176	176	149	149			NA		
PM₁₀	516	521	518	523	194	194	194	164	164			NA		
TSP	516	521	518	523	194	194	194	164	164			NA		
BC²	56.3	56.8	56.5	57.0	21.2	21.2	21.2	17.9	17.9			NA		
CO	182	182	182	182	182	182	182	158	165			NA		

¹ ratios PM_{2.5} : PM₁₀ : TSP derived from the tier1 default EF as provided in ⁴⁾

² estimated from f-BCs as provided in ⁵⁾: f-BC (HFO) = 0.12, f-BC (MDO/MGO) = 0.31, chapter: 1.A.3.d.i, 1.A.3.d.ii, 1.A.4.c.iii Navigation, Table 3-2 and Table A1 - BC fractions of PM emissions from relevant studies

NOTE: For the country-specific emission factors applied for particulate matter, no clear indication is available, whether or not condensables are included.

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.

Trend discussion for Key Sources

NFR 1.A.4.c iii - National Fishing is no key source.

Recalculations

Recalculations occur only due to the revised **activity data**. As, based on expert information, no biodiesel is used in NFR 1.A.4.c iii, these amounts estimated so far based on official blending shares have been removed and replaced by notation key 'NO'.

In contrast, the amounts of diesel oil and heavy fuel oil modelled based on ship movement data remain unaltered.

Table 3: Revised biodiesel consumption estimates, in terajoules

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018
Diesel oil													
Submission 2021	711	549	531	488	473	442	431	429	472	555	1.117	1.208	2.529
Submission 2020	711	549	531	488	473	442	431	429	472	555	1.117	1.208	2.455
absolute change	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	74,4
relative change	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	3,03%
Biodiesel													
Submission 2021	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Submission 2020	NO	NO	NO	4,10	11,80	11,13	10,82	9,63	10,50	9,70	8,49	7,82	7,86
absolute change				-4,10	-11,8	-11,1	-10,8	-9,63	-10,50	-9,70	-8,49	-7,82	-7,86
relative change				-100%	-100%	-100%	-100%	-100%	-100%	-100%	-100%	-100%	-100%
Total fuel consumption													
Submission 2021	711	549	531	488	473	442	431	429	472	555	1.117	1.208	2.529
Submission 2020	711	549	531	492	485	453	442	438	482	565	1.126	1.216	2.463
absolute change	0,00	0,00	0,00	-4,10	-11,8	-11,1	-10,8	-9,63	-10,50	-9,70	-8,49	-7,82	66,53
relative change	0,00%	0,00%	0,00%	-0,83%	-2,43%	-2,46%	-2,45%	-2,20%	-2,18%	-1,72%	-0,75%	-0,64%	2,70%

All **emission factors** remain unrevised.



For pollutant-specific information on recalculated emission estimates for Base Year and 2018, please see the pollutant specific recalculation tables following [chapter 8.1 - Recalculations](#).

Uncertainties

Uncertainty estimates for **emission factors** were adopted from NFR 1.A.3.d i as a comparable emission source.

Planned improvements

Besides a routine revision of the underlying BSH model, further focus will be put on the correct allocation of activity data to the different navigation activities covered in different NFR sub-sectors.

^{1), 2)} Deichnik (2020): Aktualisierung und Revision des Modells zur Berechnung der spezifischen Verbräuche und Emissionen des von Deutschland ausgehenden Seeverkehrs. from Bundesamts für Seeschifffahrt und Hydrographie (BSH); Hamburg, 2020.

^{3), 4), 5)} EMEP/EEA, 2019: EMEP/EEA air pollutant emission inventory guidebook – 2019; Chapter 1.A.3.d.i, 1.A.3.d.ii, 1.A.4.c.iii Navigation; URL:
<https://www.eea.europa.eu/publications/emep-eea-guidebook-2019/part-b-sectoral-guidance-chapters/1-energy/1-a-combustion/1-a-3-d-navigation>