1.B - Fugitive Emissions from fossil fuels

During all stages of fuel production and use, from extraction of fossil fuels to their û
be released as fugitive emissions.

While NMVOC, TSP and SO“ are the most important emissions with fugitive emissions of
and natural gas include substantial amounts of NMVOC and SO“.

1.B - Fugitive emission from fuels consist of following sub-categories:

NFR-Code	Name of category
1.B.1	Solid Fuels
1.B.2.a	Oil
1.B.2.b	Gas
1.B.2.c	Venting and Flaring
1.B.3	Geothermal Energy

Trends in emissions

Carbon Monoxide	NMVOC
SOx	Particulate Matter

Sulphur Dioxide emissions occur during the production of hard-coal coke. The value of the
GDR s emission report, chapter Produktion (=production) which has no clear diû eren
transformation and handling of coal. The total emission as reported in the emission re
1.B.1 and 2. The split factor is based on estimation of experts. The apparently steep
of a research project in 2010, where new emission factors were determined for coke p
category 1.B.2, one main driver of shrinking SO2 emission is the decreasing amount o
emissions are also attributed to the declining emissions from desulphurisation, that a
modern technology.

Particulate matter emissions occur during the transformation of lignite and hard coal. The
emissions in the early 1990s is due to the shrinking production of lignite briquettes (a
value of the year 1990 is partly based on the GDR s emission report, chapter Produkt
diû erentiation between mining, transformation and handling of lignite. The total emiss
is allocated in the NFR categories 1.B.1 and 2. The split factor is based on estimatio

NMVOC emission occur during the production of hard-coal coke. The shrinking emission
coal coke production and the decommissioning of outdated plants. The main sources o
distribution (1.B.2.a.v) were fugitive emissions from handling and transfer (ûlling/unl
breathing). These emissions have decreased by round about 65 % since 1990. The dec
period is the result of implementation of the Technical Instructions on Air Quality Co
21st Ordinance on the Execution of the Federal Immission Control Act (20. and 21. BI
vapour recovery systems. It is also the result of reduced petrol consumption. Current
are transported in Germany via railway tank cars. This transport volume entails a max
(loading and unloading). Some 5.000 to 6.000 railway tank cars for transport of petrol
(ûlling/unloading) and tank losses result in emissions of only 1,4 kt VOC per year. Th
technical standards that have been attained in railway tank cars and pertinent handlin
consumption is expected to stagnate or decrease. As a result, numbers of oil storage
as well.

Carbon monoxide emissions occur during the production of coke and charcoal. The rising e
to the increasing production of charcoal and coke. A trend-reversing issue was the de
the 1990s. Flaring in oil reûneries is the main source for carbon monoxide emission in
emissions from distribution of town gas were also taken into account in calculations.
network accounted for a total of 16 % of the entire gas network. Of that share, 15 % c
% consisted of steel and ductile cast iron lines. Since 1997 no town gas has been dis
gas was the only known source of CO emissions in category 1.B.2.b.

Recalculations

Recalculations covering the past two years have been carried out as a result of the p
statistics in this area.

Furthermore, some minor changes in activity data for distribution of mineral oil produ
emissions.

NMVOC	Unit	1990	1995	2000	2005	2010	2015	2018
2020 Submiss	kt	108,51	102,68	84,95	54,24	44,44	30,64	30,06
2021 Submiss	kt	108,41	102,85	84,95	54,14	44,34	30,53	29,93
Diûerence	kt	0,03	-0,17	0,04	0,03	0,10	0,09	0,13

In addition to this, the TERT noted in 2021 that the reported total PAHs did not equal
BaP, Benzo(b) Fluoranthene, benzo(k) Fluoranthene and Indeno (1,2,3-cd) Pyrene (to
1990-1993. Germany explained why the emission factors from the guidebook cannot be
EMEP factors were taken to generate the missing indicator substance. That led to foll
the ERT:

substance	unit	1990	1991	1992	1993	1994
BaP	kg	2,106	1,399	946	386	133
BbF	kg	2,631	1,749	1,183	483	166
BkF	kg	1,316	874	591	241	83
IxP	kg	921	612	414	169	58
Sum	kg	6,976	4,634	3,134	1,284	441
previous total	kg	12,022	7,287	5,158	7,677	4,662

Finally, the emissions from storage of chemical products were allocated under 2.B.10.

For pollutant-specûic information on recalculated emission estimates reported for Base Year and 2015, please see the pollutant specûic recalculation tables for NMVOC [Chapter 8.1 - Recalculations]

Improvements planned for future submissions

- emissions from storage of reû nery products will be divided up to fuels (under 1.B
- emission factors from natural gas transmission will be updated according to resu
  measurement programm (1.B.2.b.iv)