

Methodologies applied to the CEIP GNFR gap-filling 2023

Part II:

Heavy Metals (Cd, Hg, Pb)
and Persistent Organic Pollutants
(Benzo(a)pyrene, Benzo(b)fluoranthene,
Benzo(k)fluoranthene, Indeno(1,2,3-cd)pyrene,
Total polycyclic aromatic hydrocarbons, Dioxin
and Furan, Hexachlorobenzene,
Polychlorinated biphenyls)
of the year 2021

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CEIP

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Contents

1. Overview.....	4
2. Introduction.....	4
3. Gap-Filling.....	4
Applied methods for heavy metals.....	6
Applied methods for POPs.....	8
Annex I: EMEP Country Codes.....	22

1. Overview

This is a technical report providing a brief overview of the gap-filling methods used for the GNFR inventory year 2021 (as reported in 2023) for the mandatory heavy metals (lead, cadmium and mercury) and the Persistent organic pollutants (Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Indeno(1,2,3-cd)pyrene, Total polycyclic aromatic hydrocarbons, Dioxin and Furan, Hexachlorobenzene and Polychlorinated biphenyls).

2. Introduction

The EMEP Centre on Emission Inventories and Projections (CEIP) operates the UNECE/EMEP emission database (WebDab) which contains information on air pollutant emissions and projections from the Parties to the LRTAP Convention (UNECE 1979). Among these data sets, also emissions used in EMEP models (gap-filled emissions) and gridded emissions are available from the CEIP website (www.ceip.at, CEIP 2023).

Data used by CEIP were reported by the Parties to the LRTAP Convention as sectoral emissions in the NFR19 format and National Total emissions according to the UNECE guidelines for reporting emissions and projections data under the Convention on long-range transboundary air pollution, Annex I (UNECE 2014). For the use by CEIP, the 127 NFR categories are aggregated to 13 GNFR sectors. In several cases, no data were submitted by the countries, or the reporting is not complete or contains errors. Before the emission data is used by the 'modellers', missing or erroneous information is supplemented or replaced with specific methods and expert data. The supplemented emission data is used for e.g. spatial emission mapping to the EMEP grid.

3. Gap-Filling

Gap filling for the year 2021 has been performed for countries and components in case that:

- The country did not report under CLRTAP
- The country did not report data for any of the GNFR sectors A_PublicPower, B_Industry, C_OtherStationaryComb or E_Solvents.
- The country reported data for the first time without providing relevant information (in the Informative Inventory Report)
- The country reports comparably high/low values for specific components and GNFR sectors
- The trends in emissions show implausibly high fluctuations.
- The sum of the four PAH components is not equal to PAHs at sectoral or national total level

Furthermore, gap filling has been performed for mandatory heavy metals (Cd, Hg, Pb) and EMEP areas not covered by the LRTAP protocol:

- Asian Areas
- North Africa

- Russian Federation in the extended EMEP domain

The following gap filling methods have been applied:

- Use previous year LRTAP reported data
- Extrapolate previous year LRTAP by means of GDP, population or energy consumption (e.g. from the Common Reporting Format)
- The national total has been taken from an expert estimate (study) and divided to GNFR sectors by means of a comparable country sector distribution or the mean sector distribution (for heavy metals).
- Use the GNFR sector distribution of a comparable country.
- In case that the sum of reported components is smaller than total PAHs, estimate the missing component(s) under consideration of the default component share. This approach was mainly applied for the GNFR sector B_Industry for which the EMEP Guidance 2019 does not provide methods for individual PAH compounds but only for the total amount of PAHs (e.g. for NFR 2C1 iron and steel).

The mean GNFR sector distribution of mandatory heavy metals for the year 2021 is calculated by means of reported data from 29 countries and year 2021 and is presented in Table 1.

Table 1: Default share on GNFR sectors for mandatory heavy metals 2021.

Share on national total	Cd	Hg	Pb
A_PublicPower	7.93%	31.67%	5.04%
B_Industry	47.35%	45.17%	53.86%
C_OtherStationaryComb	24.50%	8.06%	11.14%
D_Fugitive	1.42%	2.57%	0.66%
E_Solvents	8.46%	1.03%	1.48%
F_RoadTransport	3.47%	3.75%	23.50%
G_Shipping	0.12%	0.30%	0.06%
H_Aviation	0.01%	0.01%	1.55%
I_Offroad	0.52%	0.36%	0.40%
J_Waste	4.54%	6.60%	1.70%
K_AgriLivestock	-	-	-
L_AgriOther	1.39%	0.30%	0.02%
M_Other	0.29%	0.18%	0.58%

The PAH component default split for national totals as presented in Table 2 has been calculated by means of data from 16 countries which report PAHs and its components in a consistent way.

Table 2: Default component share on total PAHs 2021.

Component	benzo(a)	benzo(b)	benzo(k)	Indeno
Share	30.3%	33.8%	17.7%	18.2%

Gap-filling methods by countries/areas and component are presented in Table 3: Gap-filling methods applied to countries and areas – heavy metals and Table 4: Gap-filling methods applied to countries – POPs. Applied methods for heavy metals

Applied methods for heavy metals

Table 3: Gap-filling methods applied to countries and areas – heavy metals

Country or Region	Component	Reported	Gapfilling/ replacement required	Rationale for Gapfilling/replacement	National total method	Sector method	Unit	Reported	Gapfilled
Albania	Cd	Yes	Yes	sectoral incomplete	TNO data (intra-/extrapolated or copy of data)	mean sector distribution for 2021	t	0.046	0.193
	Hg	Yes	Yes	sectoral incomplete	TNO data (intra-/extrapolated or copy of data)	mean sector distribution for 2021	t	0.080	0.189
	Pb	Yes	Yes	sectoral incomplete	TNO data (intra-/extrapolated or copy of data)	mean sector distribution for 2021	t	1.319	6.127
Asian Areas	Cd	No	Yes	no reporting obligation	copy of expert estimates (MSC-E, 2011)	mean sector distribution for 2021	t	0.000	27.596
	Hg	No	Yes	no reporting obligation	copy of expert estimates (MSC-E, 2011)	mean sector distribution for 2021	t	0.000	30.325
	Pb	No	Yes	no reporting obligation	copy of expert estimates (MSC-E, 2011)	mean sector distribution for 2021	t	0.000	1214.050
Azerbaijan	Cd	No	Yes	not reported	sum of sectors	trend/average (2013-2017), reported 2017.	t	0.000	0.104
	Hg	No	Yes	not reported	sum of sectors	trend/average (2013-2017), reported 2017.	t	0.000	0.275
	Pb	No	Yes	not reported	sum of sectors	trend/average (2013-2017), reported 2017.	t	0.000	2.104
Bosnia and Herzegovina	Cd	No	Yes	not reported	TNO data (intra-/extrapolated or copy of data)	mean sector distribution for 2021	t	0.000	1.490
	Hg	No	Yes	not reported	TNO data (intra-/extrapolated or copy of data)	mean sector distribution for 2021	t	0.000	1.728
	Pb	No	Yes	not reported	TNO data (intra-/extrapolated or copy of data)	mean sector distribution for 2021	t	0.000	35.530
Belarus	Cd	No	Yes	not reported	sum of sectors	mean value (2018-2020) from submission 2022	t	0.000	0.728
	Hg	No	Yes	not reported	sum of sectors	mean value (2018-2020) from submission 2022	t	0.000	0.268
	Pb	No	Yes	not reported	sum of sectors	mean value (2018-2020) from submission 2022	t	0.000	7.700
Croatia	Cd	No	Yes	not reported	sum of sectors	mean value (2018-2020) from submission 2022	t	0.000	0.789
	Hg	No	Yes	not reported	sum of sectors	mean value (2018-2020) from submission 2022	t	0.000	0.384
	Pb	No	Yes	not reported	sum of sectors	mean value (2018-2020) from submission 2022	t	0.000	6.305
Kyrgyzstan	Cd	No	Yes	not reported	TNO data (intra-/extrapolated or copy of data)	mean sector distribution for 2021	t	0.000	0.501
	Hg	No	Yes	not reported	TNO data (intra-/extrapolated or copy of data)	mean sector distribution for 2021	t	0.000	0.849
	Pb	No	Yes	not reported	TNO data (intra-/extrapolated or copy of data)	mean sector distribution for 2021	t	0.000	12.216

Country or Region	Component	Reported	Gapfilling/ replacement required	Rationale for Gapfilling/replacement	National total method	Sector method	Unit	Reported	Gapfilled
Kazakhstan	Cd	Yes	Yes	underestimated sector values	copy of 2011 MSC-E estimate	sector distribution like PL	t	8.340	11.056
	Hg	Yes	Yes	underestimated sector values	copy of 2010 GMA data	sector distribution like PL	t	7.243	24.554
	Pb	Yes	Yes	underestimated sector values	copy of 2011 MSC-E estimate	sector distribution like PL	t	106.662	696.025
Republic of Moldova	Cd	No	Yes	not reported	2020 data from submission 2022	2020 data from submission 2022	t	0.000	0.405
	Hg	No	Yes	not reported	2020 data from submission 2022	2020 data from submission 2022	t	0.000	0.099
	Pb	No	Yes	not reported	2020 data from submission 2022	2020 data from submission 2022	t	0.000	1.690
North Africa	Cd	No	Yes	no reporting obligation	copy of expert estimates (MSC-E, 2011)	mean sector distribution for 2021	t	0.000	8.493
	Hg	No	Yes	no reporting obligation	copy of expert estimates (MSC-E, 2011)	mean sector distribution for 2021	t	0.000	9.333
	Pb	No	Yes	no reporting obligation	copy of expert estimates (MSC-E, 2011)	mean sector distribution for 2021	t	0.000	791.098
Russian Federation	Cd	No	Yes	not reported	sum of sectors	copy of 2009 reported data; A_PublicPower: Extrapolation of reported data 2006 with 1A1a solid fuels consumption (-5%) from CRF submission 2023	t	0.000	26.203
	Hg	No	Yes	not reported	sum of sectors	copy of 2009 reported data; A_PublicPower: Extrapolation of reported data 2006 with 1A1a solid fuels consumption (-5%) from CRF submission 2023	t	0.000	9.080
	Pb	No	Yes	not reported	sum of sectors	copy of 2009 reported data; A_PublicPower: Extrapolation of reported data 2006 with 1A1a solid fuels consumption (-5%) from CRF submission 2023	t	0.000	155.596
Russian Federation in the extended EMEP domain	Cd	No	Yes	no reporting obligation	calculated from RU emissions RU:RUE factor 0.66 : 0.34	sector distribution like RU	t	0.000	13.499
	Hg	No	Yes	no reporting obligation	calculated from RU emissions RU:RUE factor 0.66 : 0.34	sector distribution like RU	t	0.000	4.678
	Pb	No	Yes	no reporting obligation	calculated from RU emissions RU:RUE factor 0.66 : 0.34	sector distribution like RU	t	0.000	80.155
Tajikistan	Cd	No	Yes	not reported	factor 0.56 from the Hg emissions calculated by extrapolation of unpublished expert estimates using population data	mean sector distribution for 2021	t	0.000	0.313
	Hg	No	Yes	not reported	copy of unpublished expert estimates	mean sector distribution for 2021	t	0.000	0.560
	Pb	No	Yes	not reported	copy of expert estimates (MSC-E, 2011)	mean sector distribution for 2021	t	0.000	63.719
Turkmenistan	Cd	No	Yes	not reported	factor 0.56 from the Hg emissions calculated by extrapolation of unpublished expert estimates using population data	mean sector distribution for 2021	t	0.000	0.268
	Hg	No	Yes	not reported	copy of unpublished expert estimates	mean sector distribution for 2021	t	0.000	0.479
	Pb	No	Yes	not reported	copy of expert estimates (MSC-E, 2011)	mean sector distribution for 2021	t	0.000	38.996

Country or Region	Component	Reported	Gapfilling/ replacement required	Rationale for Gapfilling/replacement	National total method	Sector method	Unit	Reported	Gapfilled
Turkey	Cd	Yes	Yes	sectoral incomplete and inconsistent reporting for J_WASTE	sum of sectors	A_PublicPower: copy of Poland, J_WASTE: IIR 2022, C_OtherStationaryComb: copy of 2021 gap filling (2019 data)	t	60.748	3.968
	Hg	Yes	Yes	sectoral incomplete and inconsistent reporting for J_WASTE	sum of sectors	A_PublicPower: copy of Poland, J_WASTE: IIR 2022, C_OtherStationaryComb: copy of 2021 gap filling (2019 data)	t	31.512	10.731
	Pb	Yes	Yes	sectoral incomplete and inconsistent reporting for J_WASTE	sum of sectors	A_PublicPower: copy of Poland, J_WASTE: IIR 2022, C_OtherStationaryComb: copy of 2021 gap filling (2019 data)	t	35.383	94.783
Uzbekistan	Cd	No	Yes	not reported	copy of expert estimates (MSC-E, 2011)	mean sector distribution 2021 w/o shipping	t	0.000	3.277
	Hg	No	Yes	not reported	copy of expert estimates (MSC-E, 2011)	mean sector distribution 2021 w/o shipping	t	0.000	5.852
	Pb	No	Yes	not reported	copy of expert estimates (MSC-E, 2011)	mean sector distribution 2021 w/o shipping	t	0.000	184.821

Applied methods for POPs

Table 4: Gap-filling methods applied to countries – POPs

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
Albania	benzo(a)	Yes	Yes	sum of components not consistent with PAHs; missing sector data	sum of sectors	J_Waste, F_RoadTransport from MK	t	0.021	0.680
	benzo(b)	Yes	Yes	sum of components not consistent with PAHs; missing sector data	sum of sectors	J_Waste, F_RoadTransport from MK	t	0.033	0.678
	benzo(k)	No	Yes	not reported	sum of sectors	rest of PAH	t	0.000	0.313
	DIOX	Yes	Yes	implausible low value	TNO expert data	comparable country MK	g	0.002	9.183
	HCB	Yes	Yes	-			kg	0.016	0.132
	Indeno	Yes	Yes	sum of components not consistent with PAHs; missing sector data.	sum of sectors	J_Waste, F_RoadTransport from MK	t	0.197	0.574
	PAH	Yes	Yes	sum of components not consistent with PAHs; missing sector data.	sum of sectors		t	0.261	2.245
	PCB	Yes	Yes	-			kg	1.590	1.613
Armenia	benzo(a)	Yes	No	-			t	0.423	0.423
	benzo(b)	Yes	No	-			t	0.390	0.390
	benzo(k)	Yes	No	-			t	0.148	0.148
	DIOX	Yes	No	-			g	2.799	2.799

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
	HCB	Yes	No	-			kg	0.017	0.017
	Indeno	Yes	No	-			t	0.246	0.246
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of sectors	sum of components	t	1.206	1.207
	PCB	Yes	No	-			kg	0.006	0.006
Austria	benzo(a)	Yes	No	-			t	2.277	2.277
	benzo(b)	Yes	No	-			t	2.576	2.576
	benzo(k)	Yes	No	-			t	1.041	1.041
	DIOX	Yes	No	-			g	37.278	37.278
	HCB	Yes	No	-			kg	15.922	15.922
	Indeno	Yes	No	-			t	1.304	1.304
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of sectors	sum of components	t	7.198	7.197
	PCB	Yes	No	-			kg	3.094	3.094
Azerbaijan	benzo(a)	No	Yes	not reported	sum of sectors	reported value for 2017	t	0.000	0.396
	benzo(b)	No	Yes	not reported	sum of sectors	reported value for 2017	t	0.000	0.420
	benzo(k)	No	Yes	not reported	sum of sectors	reported value for 2017	t	0.000	0.353
	DIOX	No	Yes	not reported	sum of sectors	reported value for 2017	g	0.000	5.176
	HCB	No	Yes	not reported	sum of sectors	reported value for 2017	kg	0.000	0.043
	Indeno	No	Yes	not reported	sum of sectors	reported value for 2017	t	0.000	0.080
	PAH	No	Yes	not reported	sum of sectors	sum of components	t	0.000	1.250
	PCB	No	Yes	not reported	sum of sectors	reported value for 2017	kg	0.000	0.968
Bosnia and Herzegovina	benzo(a)	No	Yes	not reported	TNO expert data	sector distribution like SK gapfilled 2021	t	0.000	3.061
	benzo(b)	No	Yes	not reported	TNO expert data	sector distribution like SK gapfilled 2021	t	0.000	4.073
	benzo(k)	No	Yes	not reported	TNO expert data	sector distribution like SK gapfilled 2021	t	0.000	1.626
	DIOX	No	Yes	not reported	TNO expert data	sector distribution like SK gapfilled 2021	g	0.000	48.004
	HCB	No	Yes	not reported	Extrapolation of expert data (Pacyna et al. 1999) using population data	sector distribution like SK gapfilled 2021	kg	0.000	50.000
	Indeno	No	Yes	not reported	TNO expert data	sector distribution like SK gapfilled 2021	t	0.000	2.786

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
	PAH	No	Yes	not reported	sum of sectors	sector distribution like SK gapfilled 2021	t	0.000	11.546
	PCB	No	No	not reported	no data available	not applicable	kg	0.000	0.000
Belgium	benzo(a)	Yes	No	-			t	2.139	2.139
	benzo(b)	Yes	No	-			t	2.408	2.408
	benzo(k)	Yes	No	-			t	1.026	1.026
	DIOX	Yes	No	-			g	29.075	29.075
	HCB	Yes	No	-			kg	3.116	3.116
	Indeno	Yes	No	-			t	1.206	1.206
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of sectors	sum of components	t	6.779	6.779
	PCB	Yes	No	-			kg	14.026	14.026
Belarus	benzo(a)	No	Yes	not reported	2020 data from submission 2022	2020 data from submission 2022	t	0.000	7.266
	benzo(b)	No	Yes	not reported	2020 data from submission 2022	2020 data from submission 2022	t	0.000	14.290
	benzo(k)	No	Yes	not reported	2020 data from submission 2022	2020 data from submission 2022	t	0.000	3.988
	DIOX	No	Yes	not reported	2020 data from submission 2022	2020 data from submission 2022	g	0.000	30.214
	HCB	No	Yes	not reported	2020 data from submission 2022	2020 data from submission 2022	kg	0.000	0.920
	Indeno	No	Yes	not reported	2020 data from submission 2022	2020 data from submission 2022	t	0.000	4.141
	PAH	No	Yes	not reported	2020 data from submission 2022	2020 data from submission 2022	t	0.000	29.684
	PCB	No	Yes	not reported	2020 data from submission 2022	2020 data from submission 2022	kg	0.000	9.620
Czech Republic	benzo(a)	Yes	No	-			t	10.084	10.084
	benzo(b)	Yes	No	-			t	7.793	7.793
	benzo(k)	Yes	No	-			t	5.540	5.540
	DIOX	Yes	No	-			g	22.170	22.170
	HCB	Yes	No	-			kg	11.085	11.085
	Indeno	Yes	No	-			t	6.579	6.579
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	30.006	29.995
	PCB	Yes	No	-			kg	1.178	1.178

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
Germany	benzo(a)	Yes	Yes	incomplete (2C1)	sum of components	reported value plus 2C1 PAH disaggregated by compound share of BE for 2004	t	17.445	18.389
	benzo(b)	Yes	Yes	incomplete (2C1)	sum of components	reported value plus 2C1 PAH disaggregated by compound share of BE for 2004	t	25.239	26.428
	benzo(k)	Yes	Yes	incomplete (2C1)	sum of components	reported value plus 2C1 PAH disaggregated by compound share of BE for 2004	t	11.357	11.959
	DIOX	Yes	No	-			g	116.035	116.035
	HCB	Yes	No	-			kg	4.577	4.577
	Indeno	Yes	Yes	incomplete (2C1)	sum of components	reported value plus 2C1 PAH disaggregated by compound share of BE for 2004	t	17.004	17.437
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	75.081	74.214
	PCB	Yes	No	-			kg	220.730	220.730
Estonia	benzo(a)	Yes	No	-			t	0.818	0.818
	benzo(b)	Yes	No	-			t	0.805	0.805
	benzo(k)	Yes	No	-			t	0.536	0.536
	DIOX	Yes	No	-			g	3.770	3.770
	HCB	Yes	No	-			kg	0.466	0.466
	Indeno	Yes	No	-			t	0.797	0.797
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	2.956	2.956
	PCB	Yes	No	-			kg	0.500	0.500
Spain	benzo(a)	Yes	Yes	incomplete (2C1)	sum of components	reported value plus 2C1 PAH disaggregated by compound share of BE for 2004	t	9.270	10.215
	benzo(b)	Yes	Yes	incomplete (2C1)	sum of components	reported value plus 2C1 PAH disaggregated by compound share of BE for 2004	t	9.400	10.590
	benzo(k)	Yes	Yes	incomplete (2C1)	sum of components	reported value plus 2C1 PAH disaggregated by compound share of BE for 2004	t	4.152	4.754
	DIOX	Yes	No	-			g	477.030	477.030
	HCB	Yes	No	-			kg	2.053	2.053

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
	Indeno	Yes	Yes	incomplete (2C1)	sum of components	reported value plus 2C1 PAH disaggregated by compound share of BE for 2004	t	4.929	5.362
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	36.355	30.920
	PCB	Yes	No	-			kg	450.953	450.953
Georgia	benzo(a)	Yes	Yes	incomplete (2C1)	sum of components	reported value plus 2C1 PAH disaggregated by compound share of BE for 2004	t	1.444	1.629
	benzo(b)	Yes	Yes	incomplete (2C1)	sum of components	reported value plus 2C1 PAH disaggregated by compound share of BE for 2004	t	1.432	1.816
	benzo(k)	Yes	Yes	incomplete (2C1)	sum of components	reported value plus 2C1 PAH disaggregated by compound share of BE for 2004	t	0.559	0.907
	DIOX	Yes	No	-			g	10.155	10.155
	HCB	Yes	No	-			kg	29.007	29.007
	Indeno	Yes	Yes	incomplete (2C1)	sum of components	reported value plus 2C1 PAH disaggregated by compound share of BE for 2004	t	0.809	1.031
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	5.383	5.384
	PCB	Yes	No	-			kg	374.666	374.666
Greece	benzo(a)	Yes	No	-			t	5.436	5.436
	benzo(b)	Yes	No	-			t	5.903	5.903
	benzo(k)	Yes	No	-			t	3.226	3.226
	DIOX	Yes	No	-			g	25.682	25.682
	HCB	Yes	No	-			kg	0.959	0.959
	Indeno	Yes	No	-			t	2.385	2.385
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	17.056	16.950
	PCB	Yes	No	-			kg	72.082	72.082
Croatia	benzo(a)	No	Yes	not reported		mean value (2018-2020) from submission 2022	t	0.000	4.724
	benzo(b)	No	Yes	not reported		mean value (2018-2020) from submission 2022	t	0.000	4.386
	benzo(k)	No	Yes	not reported		mean value (2018-2020) from submission 2022	t	0.000	1.690

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
	DIOX	No	Yes	not reported		mean value (2018-2020) from submission 2022	g	0.000	26.260
	HCB	No	Yes	not reported		mean value (2018-2020) from submission 2022	kg	0.000	0.505
	Indeno	No	Yes	not reported		mean value (2018-2020) from submission 2022	t	0.000	2.675
	PAH	No	Yes	not reported	sum of components	mean value (2018-2020) from submission 2022	t	0.000	13.476
	PCB	No	Yes	not reported		mean value (2018-2020) from submission 2022	kg	0.000	409.536
Hungary	benzo(a)	Yes	No	-			t	7.326	7.326
	benzo(b)	Yes	No	-			t	7.154	7.154
	benzo(k)	Yes	No	-			t	2.754	2.754
	DIOX	Yes	No	-			g	57.746	57.746
	HCB	Yes	No	-			kg	1.642	1.642
	Indeno	Yes	No	-			t	4.164	4.164
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	21.462	21.398
	PCB	Yes	No	-			kg	4.813	4.813
Iceland	benzo(a)	Yes	No	-			t	0.009	0.009
	benzo(b)	Yes	No	-			t	0.032	0.032
	benzo(k)	Yes	No	-			t	0.015	0.015
	DIOX	Yes	No	-			g	0.984	0.984
	HCB	Yes	No	-			kg	0.102	0.102
	Indeno	Yes	No	-			t	0.009	0.009
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	0.065	0.065
	PCB	Yes	No	-			kg	0.015	0.015
Italy	benzo(a)	Yes	Yes	incomplete	sum of sectors	component split	t	16.927	19.797
	benzo(b)	Yes	Yes	incomplete	sum of sectors	component split	t	19.812	23.023
	benzo(k)	Yes	Yes	incomplete	sum of sectors	component split	t	9.108	10.787
	DIOX	Yes	No	-			g	314.497	314.497
	HCB	Yes	No	-			kg	12.904	12.904

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
	Indeno	Yes	Yes	incomplete	sum of sectors	component split	t	11.171	12.899
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of sectors	sum of components	t	66.512	66.506
	PCB	Yes	No	-			kg	121.301	121.301
Kyrgyzstan	benzo(a)	No	Yes	not reported	sum of sectors	reported value 2017	t	0.000	4.112
	benzo(b)	No	Yes	not reported	sum of sectors	reported value 2017	t	0.000	5.860
	benzo(k)	No	Yes	not reported	sum of sectors	reported value 2017	t	0.000	2.310
	DIOX	No	Yes	not reported	sum of sectors	reported value 2017	g	0.000	14.595
	HCB	No	Yes	not reported	TNO expert data	sector distribution like ME 2020	kg	0.000	0.665
	Indeno	No	Yes	not reported	sum of sectors	reported value 2017	t	0.000	1.944
	PAH	No	Yes	not reported	sum of sectors	sum of components	t	0.000	14.226
Kazakhstan	PCB	No	Yes	not reported	sum of sectors	reported value 2017	kg	0.000	3.912
	benzo(a)	Yes	No	-			t	59.282	59.282
	benzo(b)	Yes	No	-			t	77.374	77.374
	benzo(k)	Yes	No	-			t	38.923	38.923
	DIOX	Yes	No	-			g	3 070.469	3070.469
	HCB	Yes	No	-			kg	18.384	18.384
	Indeno	Yes	No	-			t	22.937	22.937
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	202.947	198.516
Lithuania	PCB	Yes	No	-			kg	1 994.647	1994.647
	benzo(a)	Yes	No	-			t	2.966	2.966
	benzo(b)	Yes	No	-			t	3.362	3.362
	benzo(k)	Yes	No	-			t	1.542	1.542
	DIOX	Yes	No	-			g	18.058	18.058
	HCB	Yes	No	-			kg	0.579	0.579
	Indeno	Yes	No	-			t	1.588	1.588
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	8.748	9.458
PCB	Yes	Yes	sum of sectors not consistent with National Total			kg	1.246	1.246	

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
Luxembourg	benzo(a)	Yes	Yes	sum of sectors not consistent with National Total	sum of sectors		t	0.124	0.124
	benzo(b)	Yes	Yes	sum of sectors not consistent with National Total	sum of sectors		t	0.221	0.220
	benzo(k)	Yes	Yes	sum of sectors not consistent with National Total	sum of sectors		t	0.112	0.111
	DIOX	Yes	No	-			g	1.909	1.909
	HCB	Yes	No	-			kg	0.707	0.707
	Indeno	Yes	Yes	sum of sectors not consistent with National Total	sum of sectors		t	0.077	0.077
	PAH	Yes	Yes	sum of sectors not consistent with National Total	sum of sectors		t	0.533	0.532
	PCB	Yes	Yes	sum of sectors not consistent with National Total	sum of sectors		kg	2.595	2.578
Latvia	benzo(a)	Yes	No	-			t	2.513	2.513
	benzo(b)	Yes	No	-			t	2.324	2.324
	benzo(k)	Yes	No	-			t	0.893	0.893
	DIOX	Yes	No	-			g	15.129	15.129
	HCB	Yes	No	-			kg	0.517	0.517
	Indeno	Yes	No	-			t	1.338	1.338
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	7.068	7.068
	PCB	Yes	No	-			kg	0.127	0.127
Republic of Moldova	benzo(a)	No	Yes	not reported	sum of sectors	reported data 2020 from submission 2022	t	0.000	4.420
	benzo(b)	No	Yes	not reported	sum of sectors	reported data 2020 from submission 2022	t	0.000	4.763
	benzo(k)	No	Yes	not reported	sum of sectors	reported data 2020 from submission 2022	t	0.000	2.236
	DIOX	No	Yes	not reported	reported data 2019	reported data 2020 from submission 2022	g	0.000	47.315
	HCB	No	Yes	not reported	reported data 2019	reported data 2020 from submission 2022	kg	0.000	0.187
	Indeno	No	Yes	not reported	sum of sectors	reported data 2020 from submission 2022	t	0.000	2.390
	PAH	No	Yes	not reported	sum of sectors	reported data 2020 from submission 2022	t	0.000	13.809
	PCB	No	Yes	not reported	reported data 2019	reported data 2020 from submission 2022	kg	0.000	1.763

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
The former Yugoslav Republic of Macedonia	benzo(a)	Yes	No	-			t	1.287	1.287
	benzo(b)	Yes	No	-			t	1.460	1.460
	benzo(k)	Yes	No	-			t	0.570	0.570
	DIOX	Yes	No	-			g	9.421	9.421
	HCB	Yes	No	-			kg	0.164	0.164
	Indeno	Yes	No	-			t	0.699	0.699
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	4.175	4.016
	PCB	Yes	No	-			kg	238.777	238.777
Malta	benzo(a)	Yes	No	-			t	0.016	0.016
	benzo(b)	Yes	No	-			t	0.022	0.022
	benzo(k)	Yes	No	-			t	0.015	0.015
	DIOX	Yes	No	-			g	0.177	0.177
	HCB	Yes	No	-			kg	0.062	0.062
	Indeno	Yes	No	-			t	0.009	0.009
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	0.054	0.062
	PCB	Yes	No	-			kg	0.001	0.001
Netherlands	benzo(a)	Yes	No	-			t	1.512	1.512
	benzo(b)	Yes	No	-			t	1.386	1.386
	benzo(k)	Yes	No	-			t	0.701	0.701
	DIOX	Yes	No	-			g	30.209	30.209
	HCB	Yes	No	-			kg	3.468	3.468
	Indeno	Yes	No	-			t	0.725	0.725
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	4.325	4.325
	PCB	Yes	No	-			kg	0.185	0.185
Norway	benzo(a)	Yes	No	-			t	0.951	0.951
	benzo(b)	Yes	No	-			t	2.283	2.283
	benzo(k)	Yes	No	-			t	0.852	0.852

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
	DIOX	Yes	No	-			g	22.014	22.014
	HCB	Yes	No	-			kg	1.330	1.330
	Indeno	Yes	No	-			t	0.758	0.758
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	sum of components	t	4.844	4.844
	PCB	Yes	No	-			kg	25.308	25.308
Poland	benzo(a)	Yes	Yes	sum of components not consistent with PAHs	sum of components	PAH split	t	87.281	89.124
	benzo(b)	Yes	Yes	sum of components not consistent with PAHs	sum of components	PAH split	t	89.824	91.707
	benzo(k)	Yes	Yes	sum of components not consistent with PAHs	sum of components	PAH split	t	43.007	43.898
	DIOX	Yes	No	-			g	316.390	316.390
	HCB	Yes	No	-			kg	3.810	3.810
	Indeno	Yes	Yes	sum of components not consistent with PAHs	sum of components	PAH split	t	34.746	35.774
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	PAH split	t	260.507	260.503
	PCB	Yes	No	-			kg	160.051	160.051
Portugal	benzo(a)	Yes	Yes	sum of components not consistent with PAHs	sum of components	PAH split	t	5.261	5.831
	benzo(b)	Yes	Yes	sum of components not consistent with PAHs	sum of components	PAH split	t	4.342	4.950
	benzo(k)	Yes	Yes	sum of components not consistent with PAHs	sum of components	PAH split	t	2.305	2.636
	DIOX	Yes	No	-			g	59.736	59.736
	HCB	Yes	No	-			kg	1.271	1.271
	Indeno	Yes	Yes	sum of components not consistent with PAHs	sum of components	PAH split	t	2.948	3.289
	PAH	Yes	Yes	sum of components not consistent with PAHs	sum of components	PAH split	t	16.706	16.706
	PCB	Yes	No	-			kg	78.138	78.138
Romania	benzo(a)	Yes	Yes	incomplete	sum of sectors	PAH split	t	18.322	20.324
	benzo(b)	Yes	Yes	incomplete	sum of sectors	PAH split	t	17.440	19.438
	benzo(k)	Yes	Yes	incomplete	sum of sectors	PAH split	t	6.700	7.952
	DIOX	Yes	No	-			g	210.689	210.689

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
	HCB	Yes	No	-			kg	3.593	3.593
	Indeno	Yes	Yes	incomplete	sum of sectors	PAH split	t	10.334	11.780
	PAH	Yes	Yes	incomplete	sum of sectors	sum of components	t	59.494	59.493
	PCB	Yes	No	-			kg	19.790	19.790
Serbia	benzo(a)	Yes	Yes	incomplete	sum of sectors	PAH split	t	9.047	10.070
	benzo(b)	Yes	Yes	incomplete	sum of sectors	PAH split	t	9.420	10.495
	benzo(k)	Yes	Yes	incomplete	sum of sectors	PAH split	t	3.699	4.300
	DIOX	Yes	No	-			g	73.059	73.059
	HCB	Yes	No	-			kg	2.163	2.163
	Indeno	Yes	Yes	incomplete	sum of sectors	PAH split	t	5.198	5.828
	PAH	Yes	No	-			t	30.692	30.692
	PCB	Yes	No	-			kg	763.854	763.854
Russian Federation	benzo(a)	No	Yes	not reported	79% of expert data (Shen et al 2013) from 2007	sector distribution like IT 2021 (gapfilled)	t	0.000	86.900
	benzo(b)	No	Yes	not reported	79% of PAH Split using Benzo(a)	sector distribution like IT 2021 (gapfilled)	t	0.000	97.210
	benzo(k)	No	Yes	not reported	79% of PAH Split using Benzo(a)	sector distribution like IT 2021 (gapfilled)	t	0.000	50.821
	DIOX	No	Yes	not reported	79% of of expert data (Treger) from 2007	sector distribution like IT 2021 (gapfilled)	g	0.000	1409.676
	HCB	No	Yes	not reported	75% of Extrapolation of TNO data 2010 using GDP	sector distribution like IT 2021 (gapfilled)	kg	0.000	5.193
	Indeno	No	Yes	not reported	79% of PAH Split using Benzo(a)	sector distribution like IT 2021 (gapfilled)	t	0.000	52.300
	PAH	No	Yes	not reported	79% of sum of individual PAHs	sector distribution like IT 2021 (gapfilled)	t	0.000	287.231
	PCB	No	No	not reported	No data available	not applicable	kg	0.000	0.000
Russian Federation in the extended EMEP domain	benzo(a)	No	Yes	no reporting obligation	21% of expert data (Shen et al 2013) from 2007	sector distribution like IT 2021 (gapfilled)	t	0.000	23.100
	benzo(b)	No	Yes	no reporting obligation	21% of PAH Split using Benzo(a)	sector distribution like IT 2021 (gapfilled)	t	0.000	25.841
	benzo(k)	No	Yes	no reporting obligation	21% of PAH Split using Benzo(a)	sector distribution like IT 2021 (gapfilled)	t	0.000	13.509
	DIOX	No	Yes	no reporting obligation	21% of of expert data (Treger) from 2007	sector distribution like IT 2021 (gapfilled)	g	0.000	374.724
	HCB	No	Yes	no reporting obligation	25% of Extrapolation of TNO data 2010 using GDP	sector distribution like IT 2021 (gapfilled)	kg	0.000	0.460

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
	Indeno	No	Yes	no reporting obligation	21% of PAH Split using Benzo(a)	sector distribution like IT 2021 (gapfilled)	t	0.000	13.902
	PAH	No	Yes	no reporting obligation	21% of sum of individual PAHs	sector distribution like IT 2021 (gapfilled)	t	0.000	76.352
	PCB	No	No	no reporting obligation	no data available	not applicable	kg	0.000	0.000
Sweden	benzo(a)	Yes	Yes	incomplete	sum of sectors	PAH split	t	2.064	2.338
	benzo(b)	Yes	Yes	incomplete	sum of sectors	PAH split	t	2.183	2.484
	benzo(k)	Yes	Yes	incomplete	sum of sectors	PAH split	t	0.756	0.930
	DIOX	Yes	No	-			g	17.042	17.042
	HCB	Yes	No	-			kg	3.051	3.051
	Indeno	Yes	Yes	incomplete	sum of sectors	PAH split	t	1.120	1.306
	PAH	Yes	Yes	incomplete	sum of sectors	sum of components	t	6.956	7.059
	PCB	Yes	No	-			kg	9.069	9.069
Slovenia	benzo(a)	Yes	Yes	incomplete	sum of sectors	PAH split	t	1.795	1.920
	benzo(b)	Yes	Yes	incomplete	sum of sectors	PAH split	t	1.037	1.099
	benzo(k)	Yes	Yes	incomplete	sum of sectors	PAH split	t	0.997	1.062
	DIOX	Yes	No	-			g	14.257	14.257
	HCB	Yes	No	-			kg	0.463	0.463
	Indeno	Yes	Yes	incomplete	sum of sectors	PAH split	t	0.347	0.425
	PAH	Yes	Yes	incomplete	sum of sectors	sum of components	t	4.505	4.504
	PCB	Yes	No	-			kg	35.495	35.495
Slovakia	benzo(a)	Yes	Yes	incomplete	sum of sectors	PAH split	t	4.843	8.438
	benzo(b)	Yes	Yes	incomplete	sum of sectors	PAH split	t	4.053	8.086
	benzo(k)	Yes	Yes	incomplete	sum of sectors	PAH split	t	2.082	4.195
	DIOX	Yes	No	-			g	39.529	39.529
	HCB	Yes	No	-			kg	3.047	3.047
	Indeno	Yes	Yes	incomplete	sum of sectors	PAH split	t	2.684	4.862
	PAH	Yes	Yes	incomplete	sum of sectors	sum of components	t	25.582	25.582
	PCB	Yes	No	-			kg	25.235	25.235

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
Tajikistan	benzo(a)	No	Yes	not reported	extrapolation of Zhang&Tao data (2004) using population data	sector distribution like LV 2021	t	0.000	4.014
	benzo(b)	No	Yes	not reported	extrapolation of Zhang&Tao data (2004) using population data	sector distribution like LV 2021	t	0.000	3.297
	benzo(k)	No	Yes	not reported	extrapolation of Zhang&Tao data (2004) using population data	sector distribution like LV 2021	t	0.000	2.294
	DIOX	No	Yes	not reported	extrapolation of Hodjamberdiev data (2006) using population data	sector distribution like LV 2021	g	0.000	69.077
	HCB	No	Yes	not reported	copy from 2015 gap-filling	copy from 2015 gap-filling	kg	0.000	0.844
	Indeno	No	Yes	not reported	extrapolation of Zhang&Tao data (2004) using population data	sector distribution like LV 2021	t	0.000	1.104
	PAH	No	Yes	not reported	sum of individual PAHs	sum of individual PAHs	t	0.000	10.709
	PCB	No	No	not reported	no data available	not applicable	kg	0.000	0.000
Turkmenistan	benzo(a)	No	Yes	not reported	extrapolation of Zhang&Tao data (2004) using GDP data	sector distribution like HR 2021	t	0.000	1.186
	benzo(b)	No	Yes	not reported	extrapolation of Zhang&Tao data (2004) using GDP data	sector distribution like HR 2021	t	0.000	2.627
	benzo(k)	No	Yes	not reported	extrapolation of Zhang&Tao data (2004) using GDP data	sector distribution like HR 2021	t	0.000	1.822
	DIOX	No	Yes	not reported	extrapolation of Hodjamberdiev data (2006) using population data	sector distribution like HR 2021	g	0.000	44.805
	HCB	No	Yes	not reported	copy from 2015 gap-filling	copy from 2015 gap-filling	kg	0.000	1.057
	Indeno	No	Yes	not reported	extrapolation of Zhang&Tao data (2004) using GDP data	sector distribution like HR 2021	t	0.000	0.394
	PAH	No	Yes	not reported	sum of individual PAHs	sum of individual PAHs	t	0.000	6.030
	PCB	No	No	not reported	no data available	not applicable	kg	0.000	0.000
Turkey	benzo(a)	No	Yes	not reported	extrapolation of TNO data 2010 using population data	sector distribution like IT 2020 (gapfilled)	t	0.000	42.616
	benzo(b)	No	Yes	not reported	extrapolation of TNO data 2010 using population data	sector distribution like IT 2020 (gapfilled)	t	0.000	53.556
	benzo(k)	No	Yes	not reported	extrapolation of TNO data 2010 using population data	sector distribution like IT 2020 (gapfilled)	t	0.000	20.373
	DIOX	No	Yes	not reported	extrapolation of expert data 2010 (Pulles et al. 2006) using population data	sector distribution like IT 2020 (gapfilled)	g	0.000	1269.379
	HCB	No	Yes	not reported	extrapolation of TNO data 2010 using GDP data	sector distribution like IT 2020 (gapfilled)	kg	0.000	4.246
	Indeno	No	Yes	not reported	extrapolation of TNO data 2010 using population data	sector distribution like IT 2020 (gapfilled)	t	0.000	34.327
	PAH	No	Yes	not reported	sum of individual PAHs	sum of individual PAHs	t	0.000	150.871
	PCB	No	No	not reported	no data available	not applicable	kg	0.000	0.000

Country	Component	Reported	Gapfilling/ replacement required	Rationale for Gap-filling/replacement	National total method	Sector method	Unit	Reported Value	Gap-Filled Value
Ukraine	benzo(a)	Yes	Yes	implausible low values	copy of expert data (National Implementation Plan for the Stockholm Convention on POPs) from 2002	sector distribution like PL 2020 (gapfilled)	t	0.111	51.950
	benzo(b)	Yes	Yes	implausible low values	copy of expert data (National Implementation Plan for the Stockholm Convention on POPs) from 2002	sector distribution like PL 2020 (gapfilled)	t	0.154	83.562
	benzo(k)	Yes	Yes	implausible low values	copy of expert data (National Implementation Plan for the Stockholm Convention on POPs) from 2002	sector distribution like PL 2020 (gapfilled)	t	0.123	30.610
	DIOX	No	Yes	incomplete	30% of: National Implementation Plan of UA for the Stockholm Convention on POPs, extrapolated using population data	sector distribution like PL 2020 (gapfilled)	g	0.000	235.833
	HCB	No	Yes	implausible low values	30% of: National Implementation Plan of UA for the Stockholm Convention on POPs, extrapolated using population data	sector distribution like PL 2020 (gapfilled)	kg	0.000	165.951
	Indeno	Yes	Yes	implausible low values	copy of expert data (National Implementation Plan for the Stockholm Convention on POPs) from 2002	sector distribution like PL 2020 (gapfilled)	t	0.121	30.160
	PAH	Yes	Yes	-	sum of individual PAHs	sector distribution like PL 2020 (gapfilled)	t	330.439	196.282
	PCB	No	Yes	-		not applicable	kg	0.000	187.765
Uzbekistan	benzo(a)	No	Yes	not reported	extrapolation of Zhang&Tao data (2004) using GDP data	sector distribution like SK 2020	t	0.000	2.800
	benzo(b)	No	Yes	not reported	extrapolation of Zhang&Tao data (2004) using GDP data	sector distribution like SK 2020	t	0.000	5.478
	benzo(k)	No	Yes	not reported	extrapolation of Zhang&Tao data (2004) using GDP data	sector distribution like SK 2020	t	0.000	4.261
	DIOX	No	Yes	not reported	extrapolation of Hodjamberdiev data (2006) using population data	sector distribution like SK 2020	g	0.000	173.994
	HCB	No	Yes	not reported	copy from 2015 gap-filling	copy from 2015 gap-filling	kg	0.000	1.030
	Indeno	No	Yes	not reported	extrapolation of Zhang&Tao data (2004) using GDP data	sector distribution like SK 2020	t	0.000	1.248
	PAH	No	Yes	not reported	sum of individual PAHs	sum of individual PAHs	t	0.000	13.788
	PCB	No	No	not reported	no data available	not applicable	kg	0.000	0.000

Annex I: EMEP Country Codes

AL	Albania	KZ	Kazakhstan (alternative code: KZT)
AM	Armenia	LI	Liechtenstein
AST	Asian areas in the extended EMEP domain	LT	Lithuania
AT	Austria	LU	Luxembourg
AZ	Azerbaijan	LV	Latvia
BA	Bosnia and Herzegovina	MC	Monaco
BE	Belgium	MD	Republic of Moldova
BG	Bulgaria	ME	Montenegro
BY	Belarus	MK	North Macedonia
CA	Canada	MT	Malta
CH	Switzerland	NL	Netherlands
CY	Cyprus	NO	Norway
CZ	Czechia	NOA	North Africa
DE	Germany	PL	Poland
DK	Denmark	PT	Portugal
EE	Estonia	RO	Romania
ES	Spain	RS	Serbia
EU	European Union	RU	Russian Federation in the former official EMEP domain
FI	Finland	RUE	Russian Federation in the extended EMEP domain
FR	France	SE	Sweden
GB	United Kingdom	SI	Slovenia
GE	Georgia	SK	Slovakia
GR	Greece	TJ	Tajikistan
HR	Croatia	TM	Turkmenistan
HU	Hungary	TR	Türkiye
IE	Ireland	UA	Ukraine
IS	Iceland	US	United States
IT	Italy	UZ	Uzbekistan
KG	Kyrgyzstan		

Table A.1: Countries of the EMEP West and EMEP East region

EMEP West countries	AL, AT, BA, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LI, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK
EMEP East countries (9 EECCA countries + TR)	AM, AZ, BY, GE, KG, KZ, MD, RU, TR, UA
Non-EMEP EECCA countries (CLRTAP not ratified)	TJ, TM, UZ
EMEP countries outside the EMEP domain	CA, US

Note: EECCA = Eastern Europe, Caucasus and Central Asia

emep

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