Chapter 3 E-Annex: Methodology for estimating mercury emissions to air and results of the 2015 global emissions inventory

A3.1 Main 'by-product' emission sectors and the chlor-alkali industry

A3.1.1 Description of methodology

The 2015 inventory estimates for most sectors are based on a three step approach.

Step 1: Compiling *activity data* – statistical data concerning the consumption of fuels and raw materials and the production of products that are relevant to calculation of mercury (Hg) emissions from energy/industrial sectors; and data on Hg consumption in intentional use sectors and in Hg-added products that allows estimates to be made of Hg emissions from waste streams, etc.

Step 2: Compiling 'emission factors' that can be applied to the activity data to derive estimates of *unabated/uncontrolled emissions to air* – a typical example might be the fraction of Hg in coal that is released to the atmosphere when the coal is burned (prior to any technological measures to reduce emissions of air pollutants). It should be noted that these are *unabated emission factors (UEFs)* and therefore differ from the *(abated) emission factors (AEFs)* that are commonly reported/used to produce end-of-pipe emissions estimates. These UEFs can be considered as being similar to the *input factors* applied in the UNEP Toolkit approach (UN Environment, 2017b), but differ in that – in most cases – they relate to the emissions/inputs only to air as opposed to the total release of Hg to all media that are obtained from the UNEP Toolkit input factors. To take this comparison a stage further, the UEFs employed in this work are approximately comparable to the UNEP Toolkit input factors multiplied by their respective *distribution factor (DF)* for the proportion of the input released to air; however, it should be noted that UNEP Toolkit factors were not always adopted, and that information developed during the current work is being used in updating of the UNEP Toolkit factors. The UEFs, when applied to the activity data from 'Step 1' yield estimates of unabated (uncontrolled) emissions to air from the activity concerned.

Step 3: Attempting to represent the 'technology' that is applied in the respective sectors in different countries to control (reduce) Hg emissions to the air – typically through the application of *air pollution control devices (APCDs)*. These technologies are characterized by their effectiveness (Hg emissions reduction efficiency) and their degree of application. In 'Step 3' it is necessary to recognize that available information – based on a relatively few (but increasing numbers of) measurements made at individual plants in certain (mainly developed) countries – demonstrates that effectiveness of APCDs is very variable and depends on plant operating conditions, and specific characteristics of fuel and raw materials, etc. In addition, the general scarcity of relevant information on both the effectiveness of APCDs and their degree of application in various sectors/countries means that assumptions need to be made. First, on the basis of available information, technologies have been grouped according to their general degree of effectiveness at reducing Hg emissions; and according to their degree of use (e.g., commonly applied APCD configurations). Second, countries have been assigned – on the basis of an assumed general level of technological implementation of APCDs – into five groupings (see Section 3.2.1.2 and this E-Annex, Section A3.9). Information on the effectiveness and degree of implementation of APCDs in those countries for which information is available (derived from published literature, grey literature and application of the UNEP Toolkit, etc.) has then been used to characterize the *technological profile* for the country-group to which the country belongs. The resulting technology profile – or a specific national profile for countries where such detailed data are available – has been applied to the unabated/uncontrolled emissions estimates resulting from 'Step 2' to produce abated (controlled) emission estimates for all countries/sectors for which activity data are available from 'Step 1'. These estimates constitute the global inventory of Hg emissions to air from the represented anthropogenic sectors.

As described, the applied methodology relies on statistical data and assumptions concerning emission factors and technological profiles, etc., that are based on often very limited available information. However, this methodology is designed to derive global emissions inventories and to compile relevant statistics and other information in a manner that allows it to be transparent, readily updatable as new information becomes available, and potentially useful for other purposes (such as emission scenario development).

A full description of the emission factors and technology profiles applied in this work is given in this E-Annex, Section A3.6, which also contains extensive notes explaining their basis, and comparisons with emission factors used in other studies, including the UNEP Toolkit (UN Environment, 2017b), the GMA2013 (AMAP/UNEP, 2013) and the 2005 inventory (AMAP/UNEP, 2008).

The documentation procedures described above and transparency regarding assumptions made are intended to allow for future updates of the inventory for individual countries and sectors as more detailed information becomes available.

A3.1.2 Example calculation

This example shows the calculations applied to estimate Hg emissions from cement production in China. Under the regionalization approach described in Section 3.2.1.2, China is in the Group 3 countries with respect to characterization of applied technology.

According to the US Geological Survey, China produced 2 492 000 kt of cement in 2014 (see this E-Annex, Section A3.8).

The (country-specific) UEF applied to cement production in China is 0.071 g/t cement produced (see this E-Annex,

Section A3.6). About 80% of cement production in China is based on coal; emissions from coal used in cement production are separately accounted under the SC-IND – stationary fossil fuel combustion in industrial uses – sector. The UEF applied to cement production in China is a nationally-specific UEF for cement production resulting from Hg in raw materials (limestone) with assumed 6% co-incineration of waste. The resulting unabated emission estimate for this sector in China is therefore 176.932 t (= 2 492 000 000 × 0.071 grams).

In Group 3 countries, the technology profile applied for cement production (see this E-Annex, Section A3.6) would imply that ~20% of the emissions from cement production in China are not subject to any emission control, and that 80% are subject to (basic particulate matter) emission controls that reduce Hg emissions by about 25%. On the basis of these assumptions, the associated (abated) Hg emissions would be reduced from around 177 t to around 142 t, with some 35.4 t (= 176.932 × 0.8 × 0.25) of Hg being captured by the APCDs.

However, national information provided by China indicated that a more accurate representation of the abatement technology applied in the Chinese cement sector is that all Chinese cement plants are fitted with dust removal systems (about 80% equipped with fabric filters and about 20–40% with electrostatic precipitators) with an effective Hg capture of 40%. Applying this new profile, about 56.7 t (= 176.932 × 1 × 0.4) of Hg are removed by the APCDs, resulting in an estimated emission to air from the cement sector in China of some 106 t.

To estimate an uncertainty range for this estimate, these calculations were repeated using low and high values of 1 744 400 kt and 3 239 600 kt, respectively for the activity data, that is ±30% applied to activity data from sources other than the International Energy Agency or official national data (see AMAP/UNEP, 2013: their Table 2.3). In addition, for the low range estimate the UEF was reduced from 0.071 to 0.042 g/t (= 0.071 minus half the difference between this value and the tabulated low UEF of 0.013 g/t); and for the high range estimate a UEF of 0.478 g/t was applied (= 0.071 plus half the difference between this value and the tabulated high UEF of 0.885 g/t) (see this E-Annex, Section A3.6). Finally, to account for uncertainties in the applied technology profile, a high and low range TF (technology factor) was applied. A TF of 0.6 (1 minus the 40% reduction due to abatement) was applied in calculating the 'mid-range' estimate. In calculating the high- and low-range estimates, TFs of 0.8 and 0.4, corresponding to lower- and higher-levels of abatement, respectively, were applied. The resulting range of (abated) estimates is therefore 29 t (= 1 744 400 000 × 0.042 × 0.000001 × 0.4) to 1239 t (= 3 239 600 000 × 0.478 × 0.000001 × 0.8), where the first term is the activity in tonnes, the second term is the UEF in grams per tonne, the third term is the factor to convert the emission estimate from grams to tonnes, and the fourth term is 1 minus the reduction due to abatement. In this example, the uncertainty range is primarily associated with the UEF applied in the high range estimate; in other cases the activity data may be the larger source of uncertainty.

On the basis of similar calculations, stationary combustion of coal in the cement industry was estimated to result in a further 26.6 t (11.2–50.7 t) of cement industry related Hg emissions to air from China in 2015.

A3.2 Artisanal and small-scale gold mining

A3.2.1 Description of methodology

The 2015 inventory estimate of Hg emissions from artisanal and small-scale gold mining (ASGM) is based on an understanding of ASGM based on direct field evidence and a wide variety of secondary information sources (including analysis of official trade data, and extrapolation of these data to regional and national scales). The quality of (purpose-specific) direct field evidence has improved significantly for a number of countries, mainly due to the implementation of Minamata National Action Plan (NAP) projects.

The general approach to estimate 2015 emissions from ASGM is the same as that applied in deriving the 2010 estimate (AMAP/UNEP, 2013). Reasonably good information exists about where ASGM is occurring (documented now for 81 countries compared to 70 in 2013) – this mainly reflects new data acquisition rather than new ASGM activity. Main information sources used include: decades of archives from the Northern Miner (a mining trade magazine that regularly reports the 'presence of artisanals'); reports and conference materials from the World Bank; information under work programs of the United Nations Development Programme, UN Environment and the United Nations Industrial Development Organization; reports from other intervention programs such as the Swiss Agency for Development and Cooperation, Global Affairs Canada, the United States Agency for International Development, the German Gesellschaft für Internationale Zusammenarbeit, the World Wildlife Fund, and Conservation International etc.; reports and abstracts from the International Conferences on Mercury as a Global Pollutant up to 2017 (13 congresses); follow-up on older reports, such as those of the Mining, Minerals and Sustainable Development (MMSD) articles published in the peer-reviewed literature; and new field reports from field programs and intervention programs such as the Minamata NAPs that are directly engaged with government ministries and individuals working in the ASGM sector, including miners and gold and Hg traders.

The information base that underpins the assumptions regarding use of Hg in ASGM has been significantly updated and improved for a number of countries since 2013. Improved knowledge has resulted in an adjustment of the factors applied in assigning ASGM emissions associated with whole ore amalgamation and concentrate amalgamation. This results in a 5% decrease in the estimate of emissions to air per unit Hg consumed in ASGM relative to the estimates reported for 2010 by AMAP/UNEP (2013).

Knowledge concerning ASGM practices has improved with continued social, environmental, and financial development efforts in the sector worldwide, particularly through on-the-ground observations and interviews with ASGM miners and stakeholders. Physical measurements of Hg use over a cross-section of ore processing techniques and operators has led to a better understanding of the amount of Hg used in producing gold in ASGM and its variations. The new knowledge has also led to adjustments in the distribution factors that apportion Hg losses into emissions (to air) and releases (to land and water) for the GMA2018. While concentrate amalgamation distribution remains unchanged from the GMA2013 (at 75% emission and 25% release), the distribution for whole-ore amalgamation (WOA) has changed to 20% emission and 80% release (from 25% and 75%, respectively). This reflects a change in the understanding of the global mercury:gold (Hg:Au) ratio for WOA; from 4:1 to 5:1.

The distribution of Hg consumed in ASGM between emissions and releases is derived from global statistics and the assumptions applied must capture the large variation of Hg:Au ratios across the global ASGM sector. The Hg:Au ratio varies widely due to metallurgy and practices. For example, when ore is relatively free of other metals and the gold is coarse, the WOA ratio tends to be low (at around 4:1). However, for other ores with fine-grained gold that contain silver, ratios of up to 60:1 can be observed. Other important factors are: variability in practices (methods employed in crushing, milling, and concentrating); whether Hg is being captured and recycled; the grade of the ore, with high grade ore using less Hg; the socio-economic circumstances of the miners; and other factors (Lacerda, 2003; Telmer and Veiga, 2009). Direct measurement of WOA ratios around the world have yielded ratios of 2:1, 8:1, and 11:1 in Nicaragua (AGC, 2016), and as high as 15:1 in Antioquia, Colombia (Cordy et al., 2011), 12:1 in Ecuador (Velasquez-Lopez et al., 2010), a range of 4–11:1 in China (Gunson, 2004), and a range of 40–60:1 in Indonesia (Pereira Filho et al., 2004). The adjustment of the global WOA ratio from 4:1 to 5:1 accommodates the occurrence of very high ratios in some countries (e.g., Indonesia), but remains conservative.

Based on information on practices used in different countries, it is estimated that, on average 40% of Hg used in ASGM is emitted to the atmosphere with the remainder released to land and water. In regions where concentrate amalgamation is practiced, while the absolute amount of Hg used is lower than for whole ore amalgamation, 75% of the Hg used is emitted to the atmosphere. In regions where whole ore amalgamation is practiced, more Hg is consumed per unit of gold produced, but here a much larger proportion of the Hg is released to aquatic and terrestrial systems than is emitted to air; some of the Hg released to aquatic and terrestrial systems is subsequently re-emitted to the atmosphere. Estimates from Australia and Canada (Winch et al., 2008; Parsons et al., 2011) suggest that a large proportion of the Hg used in historical gold mining operations in the 1800s has been remobilized. New work has identified that some historical practices used in silver mining in Latin America resulted in less (re)emission of Hg to the atmosphere than previously assumed (see Chapter 2).

The amount of Hg used in ASGM (see Table A3.2.1) can be estimated using four main approaches: (1) direct measurements – using a balance to directly weigh amounts of Hg used; (2) applying a Hg:Au ratio to the quantity of gold produced based on the type of process used (whole ore amalgamation, concentrate amalgamation, also taking account of the use of emission controls such as retorts, etc.); (3) interviewing miners and gold merchants who buy or sell Hg; (4) using official trade data. The first three approaches involve working directly with miners and gold merchants. This information can then be used to constrain other estimates, through triangulation, to produce

Table A3.2.1. Mercury consumption in artisanal and small-scale gold mining and calculation of associated emissions (Telmer, K. and J. O'Neill (AGC) pers. comm., 2017).

Best estimate for ASGM Hg use and air emissions until August 2012											
Country, count = 81	Quality of data[a]	± error, %	ASGM Hg use, t			Percentage of total Hg applied in concentrate amalgamation, %*CA*	Percentage of total Hg applied in whole ore amalgamation, %WOA	Emission Factor, *EF* EF_{CA}=75% (1/1.3) EF_{WOA}= 20% (1/5)	Year of most recent data	Mean air emission, t	Release to water and land, t
			min	mean	max			(%CA × EF_{CA}) + (%WOA × EF_{WOA})		(Hg use) × (EF)	(Hg use) – (air emission)
Total		74	985.9	2058.9	3131.9					837.7	1221.2
Bolivia	4	30	84.0	120.0	156.0	25.0	75.0	0.34	2012	40.5	79.5
Guinea	4	30	13.4	19.1	24.8	100.0	0.0	0.75	2017	14.3	4.8
Nicaragua	4	30	2.5	3.5	4.6	0.0	100.0	0.20	1999	0.7	2.8
Peru	4	50	163.5	327.0	490.5	25.0	75.0	0.34	2017	110.4	216.6
Senegal	4	30	2.1	3.0	3.9	100.0	0.0	0.75	2015	2.3	0.8
Suriname	4	30	44.1	63.0	81.9	5.0	95.0	0.23	2016	14.3	48.7
Brazil	3	50	52.5	105.0	157.5	50.0	50.0	0.48	2015	49.9	55.1
Burkina Faso	3	50	17.6	35.1	52.7	100.0	0.0	0.75	2011	26.3	8.8
Cambodia	3	50	3.8	7.5	11.3	50.0	50.0	0.48	2006	3.6	3.9
Colombia	3	50	87.5	175.0	262.5	16.7	83.3	0.29	2014	51.0	124.0
Ecuador	3	50	42.5	85.0	127.5	20.0	80.0	0.31	2014	26.4	58.7
French Guiana	3	50	3.8	7.5	11.3	100.0	0.0	0.75	2008	5.6	1.9
Ghana	3	50	27.5	55.0	82.5	100.0	0.0	0.75	2016	41.3	13.8
Guyana	3	50	7.5	15.0	22.5	100.0	0.0	0.75	2008	11.3	3.8
Honduras	3	50	2.5	5.0	7.5	50.0	50.0	0.48	1999	2.4	2.6
India	3	50	3.0	6.0	9.0	100.0	0.0	0.75	2013	4.5	1.5
Indonesia	3	50	213.5	427.0	640.5	16.7	83.3	0.29	2014	124.5	302.5
Lao Peoples Democratic Republic	3	50	1.5	3.0	4.5	100.0	0.0	0.75	2007	2.3	0.8
Mali	3	50	6.3	12.5	18.8	100.0	0.0	0.75	2016	9.4	3.1
Mongolia	3	50	5.8	11.5	17.3	50.0	50.0	0.48	2007	5.5	6.0
Mozambique	3	50	2.0	4.0	6.0	100.0	0.0	0.75	2009	3.0	1.0
Nigeria	3	50	10.0	20.0	30.0	100.0	0.0	0.75	2011	15.0	5.0
Philippines	3	50	35.0	70.0	105.0	25.0	75.0	0.34	2010	23.6	46.4
Sierra Leone	3	50	5.5	11.0	16.5	100.0	0.0	0.75	2004	8.3	2.8
Venezuela	3	50	51.0	102.0	153.0	25.0	75.0	0.34	2017	34.4	67.6
Zimbabwe	3	50	12.5	25.0	37.5	20.0	80.0	0.31	2016	7.8	17.3
Botswana	2	75	0.2	0.8	1.4	50.0	50.0	0.48	2016	0.4	0.4
Cameroon	2	75	0.4	1.5	2.6	100.0	0.0	0.75	2011	1.1	0.4
Central African Republic	2	75	2.0	8.0	14.0	100.0	0.0	0.75	2016	6.0	2.0
Chile	2	75	1.0	4.0	7.0	50.0	50.0	0.48	2009	1.9	2.1
China	2	75	25.0	100.0	175.0	25.0	75.0	0.34	2015	33.8	66.3
Congo	2	75	0.4	1.5	2.6	100.0	0.0	0.75	2010	1.1	0.4
DRC	2	75	3.8	15.0	26.3	100.0	0.0	0.75	2010	11.3	3.8
Guatemala	2	75	0.4	1.5	2.6	50.0	50.0	0.48	2005	0.7	0.8
Kenya	2	75	0.9	3.5	6.1	100.0	0.0	0.75	2016	2.6	0.9
Kyrgyzstan	2	75	1.9	7.5	13.1	50.0	50.0	0.48	2004	3.6	3.9
Madagascar	2	75	0.4	1.5	2.6	100.0	0.0	0.75	2003	1.1	0.4
Malaysia	2	75	0.9	3.5	6.1	50.0	50.0	0.48	1992	1.7	1.8
Mexico	2	75	1.9	7.5	13.1	50.0	50.0	0.48	2003	3.6	3.9
Myanmar	2	75	3.8	15.0	26.3	100.0	0.0	0.75	2016	11.3	3.8
Panama	2	75	0.4	1.5	2.6	50.0	50.0	0.48	1999	0.7	0.8

Best estimate for ASGM Hg use and air emissions until August 2012											
Country, count = 81	Quality of data[a]	± error, %	ASGM Hg use, t			Percentage of total Hg applied in concentrate amalgamation, %*CA*	Percentage of total Hg applied in whole ore amalgamation, %WOA	Emission Factor, *EF* EF_{CA}=75% (1/1.3) EF_{WOA}= 20% (1/5) (%CA × EF_{CA}) + (%WOA × EF_{WOA})	Year of most recent data	Mean air emission, t (Hg use) × (EF)	Release to water and land, t (Hg use) – (air emission)
			min	mean	max						
Papua New Guinea	2	75	1.8	7.0	12.3	50.0	50.0	0.48	2010	3.3	3.7
Russia	2	75	2.8	11.0	19.3	50.0	50.0	0.48	2001	5.2	5.8
South Africa	2	75	0.9	3.5	6.1	50.0	50.0	0.48	2016	1.7	1.8
South Sudan	2	75	0.0	0.0	0.0	0.0	0.0	0.00	2016	0.0	0.0
Sudan	2	75	20.8	83.0	145.3	100.0	0.0	0.75	2015	62.3	20.8
Tajikistan	2	75	1.0	4.0	7.0	100.0	0.0	0.75	1996	3.0	1.0
Tanzania	2	75	8.8	35.0	61.3	100.0	0.0	0.75	2015	26.3	8.8
Thailand	2	75	0.4	1.5	2.6	100.0	0.0	0.75	2007	1.1	0.4
Togo	2	75	1.0	4.0	7.0	100.0	0.0	0.75	2002	3.0	1.0
Uganda	2	75	1.0	4.0	7.0	100.0	0.0	0.75	2016	3.0	1.0
Vietnam	2	75	1.9	7.5	13.1	50.0	50.0	0.48	2001	3.6	3.9
Angola	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2014	0.2	0.1
Azerbaijan	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2010	0.2	0.1
Benin	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2010	0.2	0.1
Burundi	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2010	0.2	0.1
Chad	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2010	0.2	0.1
Costa Rica	1	100	0.1	0.3	0.5	50.0	50.0	0.48	1998	0.1	0.2
Cote d'Ivoire	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2012	0.2	0.1
Dominican Rep.	1	100	0.1	0.3	0.5	100.0	0.0	0.75	1997	0.2	0.1
El Salvador	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2010	0.2	0.1
Equitorial Guinea	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2010	0.2	0.1
Eritrea	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2017	0.2	0.1
Ethiopia	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2010	0.2	0.1
Gabon	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2010	0.2	0.1
Gambia	1	100	0.1	0.3	0.5	100.0	0.0	0.75	1996	0.2	0.1
Guinea-Bissau	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2002	0.2	0.1
Iran	1	100	0.1	0.3	0.5	100.0	0.0	0.75		0.2	0.1
Kazakhstan	1	100	0.1	0.3	0.5	100.0	0.0	0.75		0.2	0.1
Lesotho	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2016	0.2	0.1
Liberia	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2003	0.2	0.1
Malawi	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2001	0.2	0.1
Mauritania	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2004	0.2	0.1
Niger	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2000	0.2	0.1
Paraguay	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2012	0.2	0.1
Rwanda	1	100	0.1	0.3	0.5	100.0	0.0	0.75	1992	0.2	0.1
Swaziland	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2017	0.2	0.1
Ukraine	1	100	0.1	0.3	0.5	100.0	0.0	0.75		0.2	0.1
Uzbekistan	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2001	0.2	0.1
Zambia	1	100	0.1	0.3	0.5	100.0	0.0	0.75	2008	0.2	0.1
Zambia	1	100	0.1	0.3	0.5	100	0	0.75	2008	0.2	0.1

[a] Class 4: recent quantitative data, error ±30% (5); Class 3: quantitative data but significantly updated within the past 5 years, error ±50% (20 countries); Class 2: some indication of quantity of Hg used, estimated average error ±75% (27 countries); Class 1: presence/absence, no quantitative information, error can be greater than ±100% (29 countries).

a more robust estimate of the amount of Hg used and thereafter emitted to the atmosphere or released to the terrestrial/aquatic environment.

The most reliable results are grounded in fieldwork and relationships established with stakeholder communities. In order to achieve this, personnel involved in collecting information and preparing estimates must be capable of understanding mining practices and the (local) gold trade. Mercury use practices and gold production are key items of necessary information. Determining these requires combining information from field data, miners, mining communities, buyers, traders, geological surveys, ministries responsible for mining, mining commissions, the private sector, exploration company press releases, industry magazines, environmental ministries, and others. This information must be analyzed to understand what is reasonable based on expert knowledge of geology, mining, ASGM practices, mining communities, and socio-economics. The results of the analysis should be discussed with stakeholders, such as miners, concession holders, local governments, and national governments to obtain their input and help constrain the analysis. A robust and comprehensive tool for making such estimates, that includes extensive background, examples, data entry forms and worksheets is now available (O'Neil and Telmer, 2017).

The fundamental questions to be answered in order to make an annual estimate of Hg use and emissions are:

1. What are the practices in use? (whole ore amalgamation; concentrate amalgamation; Hg recycling – retorts)
2. How much Hg is used per unit gold produced? (the Hg:Au ratio; grams of Hg lost per gram of gold produced); Do miners discard used Hg or recycle Hg?
3. How much gold do miners produce per year? It is important to evaluate the value of the gold and consider whether that value makes sense.
4. What is the total number of miners involved in this production?

Questions 3 and 4 are key to extrapolating to larger scales. For an elaboration of many important considerations and approaches in obtaining high quality information, see O'Neil and Telmer (2017).

The quality of estimates varies across countries and is grouped according to four main classes: Class 1 (presence/absence of ASGM activity, no quantitative information, uncertainties can be more than ±100%); Class 2 (some indication of the quantity of Hg used, estimated average uncertainty ±75%); Class 3 (quantitative data but not significantly updated within the past five years, uncertainty ±50%); Class 4 (recent quantitative data; uncertainty ±30%).

A3.2.2 Example calculation[3]

This example describes the method used to make a Class 4 estimate of Hg use from ASGM in Burkina Faso over a two-year period (2011–2012).

The Director of the Ministry of Mines, Geology, and Quarries estimates that 600 000 adults are living on 221 ASGM sites in Burkina Faso that are registered for ASGM exploitation permits and plotted on a cadastral map. About the same number operate on unregistered land informally or illegally. Meetings were held before and again after field visits with miners, government agencies, miners associations (formal + informal), gold traders and Hg traders. The results are as follows: All ASGM activities use Hg. The practice used by miners is exclusively concentrate amalgamation; whole ore amalgamation is not practiced. Mercury recycling is not practiced – amalgam is burned using an open flame. Miners do not throw away used ('dirty') Hg. The amount of Hg used per unit gold produced is on average 1.3 parts mercury to 1 part gold (i.e., a Hg:Au ratio of 1.3:1). This accounts for the Hg that ends up in the amalgam (1 part) and the Hg that is lost during processing to the tailings (0.3 parts). All Hg used is released to the environment, with 75% (that in the amalgam) directly emitted to the atmosphere during amalgam burning and the residual (0.3 parts) lost to the tailings. In Burkina Faso, it is likely that the amount lost to the tailings is re-emitted to the atmosphere on a relatively short timescale of one to several years as the tailings are accumulated in above ground piles and often later reprocessed.

A third of the 600 000 government reported ASGM population are estimated to be active miners. They produce 20 to 30 t of gold per year (~25). This is reasonable considering the known geology (abundance of gold-bearing formations of sufficient grade throughout the country), a processing lens (gold production per miner using the observed processing techniques), and a socio-economic lens based on the cost of living at ASGM localities. This estimate was discussed with the gold buyers and site owners and the Ministry of Mines and was found to be reasonable by these groups. The amount of Hg used and emitted to the atmosphere is thereby determined as follows: 25 t of gold are produced annually; all of which is amalgamated using 32.5 t of Hg per annum. All amalgam is burned openly thereby emitting 25 t of Hg directly to the atmosphere with the remaining 7.5 t being released to the land and water in the waste stream (tailings). The Hg contained in tailings is likely to also be emitted to the atmosphere within a decade.

It may be helpful to describe briefly some of the other supporting information that is typically used in determining the annual gold production and Hg use. In Burkina Faso, ASGM miners typically operate in five- to ten-person partnerships comprising diggers, haulers, crushers, millers, and amalgamators. Women also work in groups, but typically only haul, crush and process tailings. Relatively small amounts of Hg are used (1.3 units Hg for 1 unit gold). Awareness of the dangers of Hg is low and so health impacts are not minimized. Ore grades are high (often 10–50 g/t) but traditional mining is inefficient (15–50% recovery). On average, miners yield half a gram per day for about 270 days per year, equating to about 135 g/miner/y. They receive 70–80% of the international price when selling to the local buyer who has a relationship to the land holder of the site. Using 80% of a gold price of USD 1300/oz (USD 42/g), each miner makes about USD 4500/y. This income is expended on processing (milling and Hg), food, shelter, transport, and remittances to family, including off-site family.

This example estimate for Burkina Faso illustrates some useful points for emissions estimations in general. A 2005 emission estimate for Burkina Faso was about 3 t Hg/y based

[3] For further example calculations, see O'Neil and Telmer (2017).

on MMSD (Mining, Minerals and Sustainable Development) work in 2001. The current estimate of 32.5 t Hg/y represents a ten-fold increase. This increase is almost certainly not a result of increased use or more ASGM, but rather of better information drawn from purpose-specific studies. This example suggests that other countries with weak information on ASGM that are currently categorized as Class 1 (presence/absence with no quantitative data and assigned a conservative minimum Hg use of 0.3 t/y) are likely to report higher Hg use in the future as better data become available through better inventory work.

In conclusion, robust estimates of Hg emissions from ASGM remain sparse and the global estimate needs significant further work. The current estimate of roughly 1700 t total Hg use per year ±50% remains a conservative minimum by assigning small numbers and large errors to countries where little information exists. The estimate has risen since the 2010 estimate primarily due to improved information rather than increased use, although there have probably also been increased levels of ASGM activity as the global population grows. The price of gold remains high, and ASGM remains an important source of income for the rural poor. The estimation of Hg use in ASGM requires trained experts that can reliably assess the informal gold economy and its Hg use, as well as reliably upscale field observations to national levels. Aside from technical geo-scientific expertise, this frequently requires establishing adequate relationships with the many stakeholders. Significant knowledge gaps about Hg use in ASGM remain and the global community must continue to fill the gaps in order to reliably measure the rate of success of the Minamata Convention.

A3.3 Wastes associated with mercury-added products

A3.3.1 Description of methodology

Estimates of mercury (Hg) emission to air from Hg-added products (see text on sectors/activities below) are calculated using a slightly different but comparable methodology to that applied to calculate emissions from unintentional emission sectors (see this E-Annex, Section A3.1). Use is made of available data on regional patterns of consumption of Hg and Hg-containing products, since national consumption data are unavailable in most cases. Mercury releases at various points in the life-cycle of these products are calculated using assumptions regarding rates of breakage, waste handling, and factors for emissions to air, etc.

The method applied is the same as in the 2010 inventory (AMAP/UNEP, 2013) and a variation on the method used in the 2005 inventory (AMAP/UNEP, 2008) where product-related Hg emissions were estimated for 11 world regions. The methodology allows for a consistent and transparent treatment and calculation of product-related Hg emissions for each individual country, also taking country-specific information into account, where available. The method is illustrated schematically in Figure A3.3.1.

The input data comprise estimated Hg consumption in one year (2015) covering the product groups: batteries, measuring and control devices, lamps, electrical and electronic devices, and other use (Table A3.3.1).

Consumption is estimated for each product group for 11 world regions; East and Southeast Asia, South Asia, European Union, CIS and other European countries, Middle Eastern States, North Africa, Sub-Saharan Africa, North America, Central America and the Caribbean, South America, Australia New Zealand and Oceania. Consumption in this context refers to the region where the product is used and thus subsequently ends up in the waste stream, and not the region where it was produced.

To estimate consumption in each country of the world, the consumption figures (for batteries, measuring and control devices, lamps, electrical and electronic devices and other uses – see Table A3.3.1) as developed by the UN Environment (2017a) for each region were distributed among the countries in that region based on gross domestic product (GDP) at purchasing power parity (PPP). GDP-PPP data for individual countries were obtained from the data catalog at the World Bank (World Bank, 2016, 2017) and where countries were not available in the list from the World Bank, from the World Factbook by the U.S. Central Intelligence Agency (CIA, 2016, 2017). In the model the estimated amount of Hg in products consumed in a country is distributed to three initial pathways (Figure A3.3.1) using distribution factors. The main initial paths of the products containing Hg are collection for safe storage (no emissions assumed), breakage and release of Hg during use, and paths to the waste stream (with further differentiation of waste pathways). In the inventory for 2010 there was an additional pathway for products remaining 'in use' in society. This pathway, amounting to 30% of Hg consumed, did not contribute any emissions in those calculations since emissions were considered to be delayed. That way of thinking is more in line with reality, but only takes 70% of the Hg contained in products into account. To simulate emissions to air from one year's consumption of Hg, this pathway was removed in the 2015 inventory. It should be noted that only one years' consumption is taken into account, while any Hg emissions from stocks remaining in society from consumption of Hg-added products in previous years are not included in the estimates. This remaining Hg will be distributed

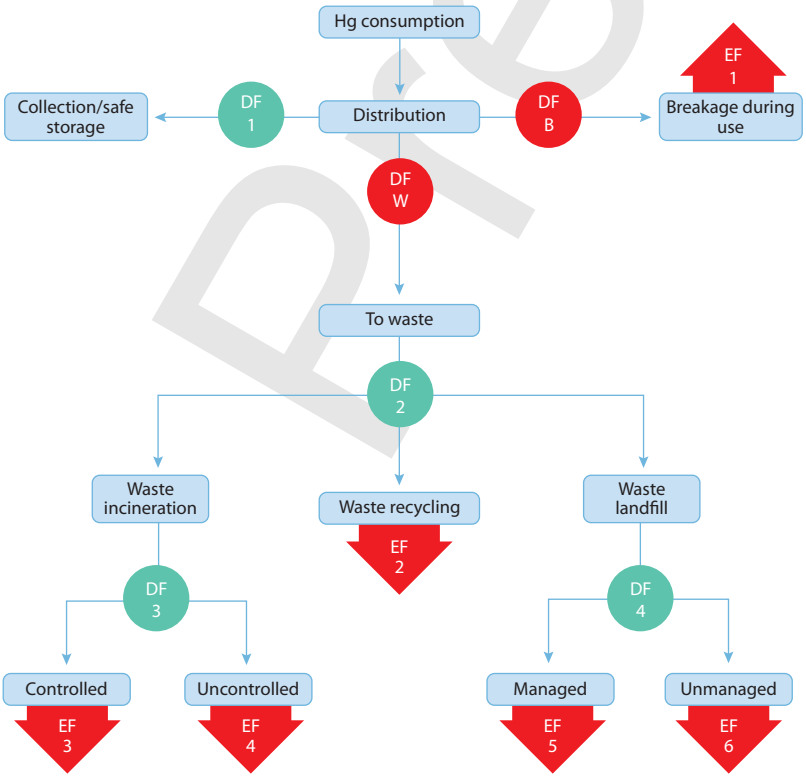

Figure A3.3.1 Schematic representation of the model used to estimate Hg emissions from waste streams associated with Hg-added products.

Table A3.3.1 Estimated Hg consumption[a] by world region and product group, 2015 (UN Environment, 2017a).

	Average, t						
	Batteries	Measuring and control devices	Lamps	Electrical and electronic devices	Other use[b]	Dental applications[c]	Sum
East and Southeast Asia	95	208	69	52	62	52	538
South Asia	33	39	12	12	59	72	227
European Union (28 countries)	8	3	13	1	84	56	165
CIS and other European countries	13	12	7	7	37	19	95
Middle Eastern States	13	18	7	9	9	13	69
North Africa	8	6	4	2	5	4	29
Sub-Saharan Africa	24	11	5	19	15	7	81
North America	9	2	8	19	61	32	131
Central America and the Caribbean	9	9	4	6	8	6	42
South America	18	20	9	8	13	12	80
Australia New Zealand and Oceania	1	1	3	13	1	3	22
Total	231	330	142	147	354	274	1478
	Minimum–Maximum, t						
	Batteries	Measuring and control devices	Lamps	Electrical and electronic devices	Other use[b]	Dental applications[c]	Sum
East and Southeast Asia	72–119	177–239	55–83	42–62	44–81	47–57	437–641
South Asia	23–43	32–47	10–14	10–14	30–89	61–83	166–290
European Union (28 countries)	6–9	2–3	11–15	0–1	59–110	44–67	122–205
CIS and other European countries	9–17	9–16	5–10	5–10	19–56	13–24	60–133
Middle Eastern States	9–17	13–24	5–9	6–11	4–13	10–16	47–90
North Africa	5–10	4–8	3–5	2–3	3–8	3–5	20–39
Sub-Saharan Africa	7–40	8–14	4–7	9–28	4–25	5–9	37–123
North America	7–10	2–2	7–9	16–21	42–79	27–37	101–158
Central America and the Caribbean	6–12	8–11	4–5	4–8	4–12	5–7	31–55
South America	13–	14–25	6–12	5–10	7–20	8–15	53–105
Australia New Zealand and Oceania	1–1	1–1	2–4	9–17	0–1	3–4	16–28
Total	159–304	267–392	112–173	109–185	215–492	226–322	1090–1867

[a] 'Consumption' is defined in terms of the end-use of Hg-added products (i.e., place of consumption), as opposed to regional 'demand' for Hg; tabulated values are means of wider ranges of estimates representing various levels of uncertainty (see source report); [b] the 'other use' category includes, for example, pesticides, fungicides, laboratory chemicals, chemical intermediates, pharmaceuticals, preservative in paints, traditional medicines, cultural and ritual uses, cosmetics – especially skin-lightening creams, etc.; [c] consumption in dental applications is not included in the calculations described in this section; the methodology employed to calculate emissions from dental amalgam use associated with human cremation are described in E-Annex 3, Section A3.4.

to one of the endpoints as the product reaches its end of life. This also implies that trends in consumption in recent years, and similar delayed trends in disposed Hg amounts, are not captured in the method used.

The share of Hg in products entering the waste stream is distributed between waste recycling, waste incineration and waste landfill. The amounts of Hg going to waste incineration and waste landfill are further distributed between two types of waste management: controlled incineration and uncontrolled waste burning, and managed and unmanaged waste landfill. Controlled incineration in this context represents waste incineration with efficient air pollution abatement installed. Uncontrolled waste burning includes, for example, open burning with no or poor abatement of air emissions. Managed landfill implies relatively low expected emissions of Hg. Unmanaged landfills (or waste dumps) are landfills such as those where a higher frequency of unintentional fires could be expected, resulting in higher Hg emissions to air.

To take into account varying waste management practices, five different 'profiles' of distribution factors and emissions factors were assumed. Each country has been assigned one of these five generic profiles based on assumptions (and available information) regarding national/regional waste handling practices, including discussions with regional representatives (see Section 3.2.1.2 and this E-Annex, Section A3.9). Four profiles were included in the inventory for 2010, while a fifth, representing least developed waste handling technologies was added in the 2015 inventory. Profile 1 represents the most technically advanced waste management practices while Profile 5 represents the least advanced.

In the model, several assumptions regarding distribution factors and emission factors have been made. Discussions have been held with representatives from all of the world's regions and assumptions have been adjusted accordingly. Rough generalizations are more or less inevitable, however, in order to achieve harmonized and transparent calculations for all individual countries, since country-specific information in most cases is still scarce or non-existent.

The initial distribution factors determine the amount distributed to the waste stream. Table A3.3.2 presents the general distribution factors used for the five profiles. The distribution for breakage and release during use is the same for all profiles, while the share collected for safe storage varies.

Table A3.3.2 Initial distribution factors for Hg-containing products.

Profile	Collection for safe storage, %	Breakage during use, %	To the waste stream, %	Total, %
1	15	3.5	81.5	100
2	5	3.5	91.5	100
3	1	3.5	95.5	100
4	1	3.5	95.5	100
5	1	3.5	95.5	100

The waste stream distribution pathways, given as distribution factors, are presented in Table A3.3.3. There are different assumptions regarding the share of Hg contained in products which is recycled, as well as on the shares going to waste incineration and landfill. For Profiles 3 and 4 the distributions between recycling, incineration and landfill are the same. A differentiation is introduced in the specific distribution factors for the share of the incinerated and landfilled waste that is treated under controlled/managed or uncontrolled/unmanaged conditions.

At this stage in the model calculations, the initial amount of Hg in products in a specific country has been distributed to all endpoints in the model (Figure A3.3.1) where emissions to air

Table A3.3.3 Waste distribution factors and specific distribution factors for controlled/uncontrolled waste incineration and managed/unmanaged waste landfill.

Waste distribution pathways			
Profile	Waste recycling, %	Waste incineration, %	Waste landfill, %
1	17	18	65
2	4	12	84
3	2	5	93
4	2	5	93
5	2	5	93

Specific distribution factors for incineration and landfill				
	Incineration		Landfill	
Profile	Controlled, %	Uncontrolled burning, %	Managed, %	Unmanaged, %
1	100	0	60	40
2	40	60	30	70
3	20	80	30	70
4	15	85	10	90
5	1	99	1	99

Table A3.3.4 Emission factors (fraction emitted) applied to distributed amounts of Hg in products.

Profile	Breakage/release during use	Waste recycling	Waste incineration, controlled	Waste incineration, uncontrolled	Landfill, managed	Landfill, unmanaged
1	0.1	0.03	0.1	0.9	0.05	0.07
2	0.1	0.03	0.1	0.9	0.05	0.14
3	0.1	0.03	0.1	0.9	0.05	0.14
4	0.1	0.03	0.1	0.9	0.05	0.23
5	0.1	0.03	0.1	0.9	0.05	0.23

can occur. Emissions are calculated by applying emission factors (EFs) according to Table A3.3.4 to the distributed individual amounts of Hg. For all endpoints, except for unmanaged landfill, the EFs are the same for all assigned generic profiles of waste management. The expected releases of Hg from unmanaged landfills are highly dependent on the frequency and duration of landfill fires. The more landfills under fire, the more Hg will be released. Rough assumptions and simplifications, largely based on Maxson (2009) and Wiedinmyer et al. (2014), have been applied for developing profile EFs for unmanaged landfills, taking landfill fires into account.

It should be noted that where relevant national information was available, factors applied to specific countries were adjusted accordingly, such was the case for the distribution factors applied in the case of Japan, Republic of Korea, China, Egypt, Tunisia and for countries in South America.

In the 2015 inventory, emissions using the above methodology are quantified under two main categories: emissions associated with controlled incineration (WI) and all other (waste) components (WASOTH). The WI component is assumed to be associated with incineration at (large incineration) facilities with applied air pollution control technology. The amount of Hg calculated as emitted from waste incineration in this exercise only includes the Hg-added product groups concerned in Section A3.3 (i.e. excluding dental). Additional emissions of Hg could arise from incineration of other types of Hg-containing waste, such as sewage sludge and industrial wastes.

A3.3.2 Example calculation

This example shows the calculation scheme applied to estimate product waste emissions for Mexico. Mexico belongs to the Central America and the Caribbean region, which has an estimated consumption of Hg in intentional use products (batteries, measuring control devices/lighting, electronic devices and other – with dental uses excluded) of 36 t (see Table A3.3.1). Based on GDP-PPP, 25.1 t of this Hg consumption is attributed to Mexico.

Under the regionalization approach described in Section 3.2.1.2, it is concluded that Mexico's general waste stream characterization and waste management practices are best described by Profile 3 (see Tables A3.3.2 to A3.3.4). Figure A3.3.2 illustrates how, on this basis, Hg emission estimates to air totaling about 3.5 t are calculated; of which about 0.024 t are estimated to be emitted from controlled waste incineration.

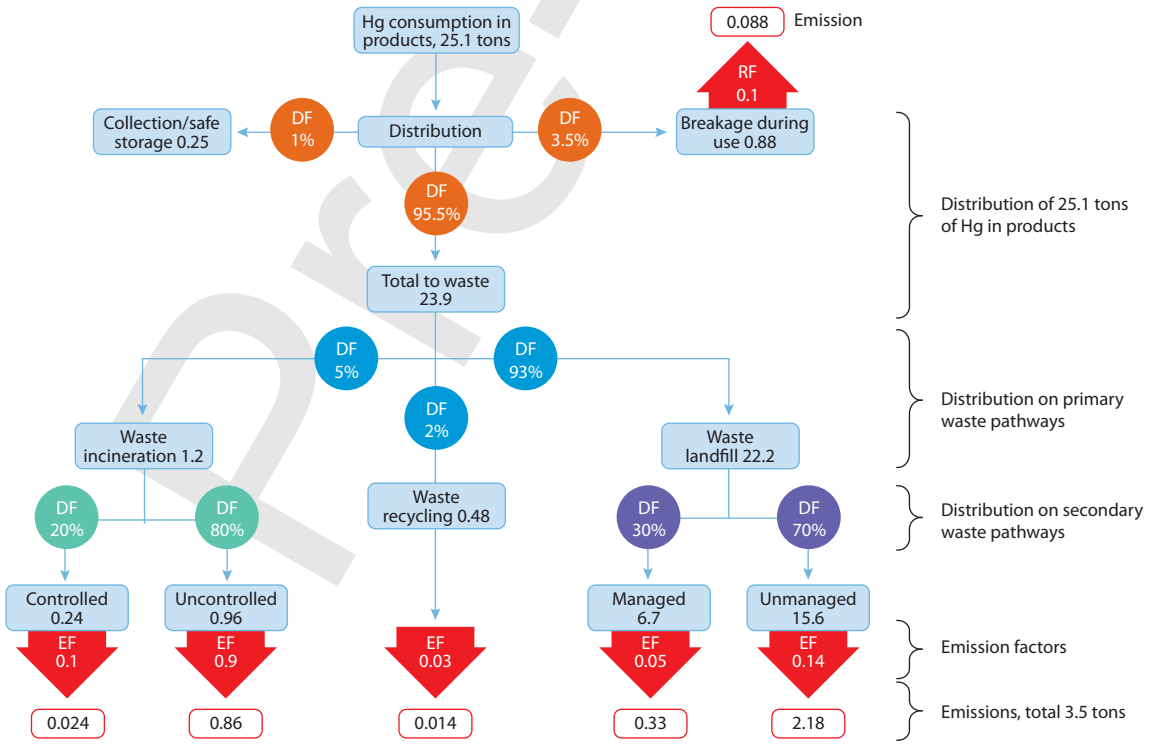

Figure A3.3.2 Example calculation of Hg emissions from waste streams associated with Hg-added products. The example is for Mexico.

A3.4 Dental amalgam and human cremation

Emissions from use of mercury (Hg) in dental amalgam fillings can occur during the preparation of the amalgams and their subsequent removal and disposal in wastes. Emissions can also occur when human remains with amalgam fillings are cremated.

Emissions associated with cremation sources were estimated using a similar approach to that employed for estimating emissions associated with other intentional-use sectors. That is to say, Hg consumption in dentistry (see this E-Annex, Section A3.3, Table A3.3.1) was combined with assumptions regarding its use and fate. Dental amalgam fillings comprise an alloy with a Hg content of about 50% by weight. Emissions were calculated based on an emission factor of 0.04 g per g Hg consumption – derived using the UNEP Toolkit default factor of 2.5 g per cremation (UNEP, 2011b) and an average per capita (dental) consumption based on the European average, which may result in an overestimation of emissions for countries where the average number of amalgams per person is lower than the European average.

Mercury amounts associated with fillings in cremated human remains were allocated to countries based on regional consumption statistics and population distributions, also taking into account factors such as religious practices and regulations in some countries concerning human cremation. It is recognized that the approach does not account for the time lag between the placing of dental fillings and the death of individuals with Hg amalgam fillings, or the changes in regional patterns that have occurred over recent decades. In some regions (such as Scandinavian countries) cremation emissions are associated with dental use of Hg that was common in past decades but is now being phased-out; in other (developing) regions increased access to health care and the relatively low cost of amalgam fillings compared with Hg-free alternatives means that Hg fillings introduced now are likely to result in emissions from cremation several decades from now.

Some countries in the EU28 region and Asia (Japan, Republic of Korea) have informed that air pollution control devices (including activated carbon systems) are increasingly being introduced at crematoria. At present the degree of implementation and effectiveness of these controls are not well documented and therefore estimated emissions do not yet take account of these developments.

A significant amount of the amalgam prepared when placing a filling remains unused and enters the waste stream (recycled, going to solid waste, or wastewater). It has been estimated that 30–40% of the amalgam material prepared for a filling typically ends up as waste (EEB, 2007; UNEP, 2015). Emissions to air associated with the preparation of dental amalgam and subsequent loss and disposal of unused amalgam are not included in emissions calculated for crematoria.

A3.5 Methodology update: principal changes in methodologies applied to specific sectors

A3.5.1 Methodology update: Stationary combustion – coal burning

The methods are essentially the same as those applied in the GMA2013 (AMAP/UNEP, 2013).

For stationary combustion of coal in power plants (SC-PP-coal) and industry (SC-IND-coal) technology profiles for several countries have been updated. The updates are based on new information concerning the application of advanced air pollution control devices in some countries, and better information regarding their effectiveness at reducing emissions of mercury (Hg) to the atmosphere.

For hard coal (HC) and brown coal (BC) combustion, activity data for coal used in industry are now separated between cement (-CEM), iron and steel (-PIP), non-ferrous metal (-NFM), and other industrial uses (-OTH). This allows attribution of industrial coal burning emissions to specific industrial sectors. Unabated emission factors (UEFs) applied are equivalent to those defined for the IND-coal activities in the GMA2013. For more details see this E-Annex, Section A3.6.

A3.5.2 Methodology: Stationary combustion – biomass burning

Mercury is a trace contaminant present in varying concentrations in biomass fuel. Mercury emissions to air arise when biomass is combusted in power plants, in industry and in domestic/residential use. This source was not addressed in the 2010 global emission inventory.

Emission estimates for 2015 have been developed following the general inventory methodology and using activity data from the International Energy Agency (IEA) on amounts of biomass combusted as fuel in power plants, industry, and domestic/residential use. IEA data only cover solid biomass used as fuel for energy production, therefore the 2015 emission estimates presented do not include wildfires (a natural source) or agricultural burning, the latter an anthropogenic (or at least anthropogenically enhanced) source that can be a significant activity in some countries. Emission factors were derived using the heat value for air dried wood of 16 MJ/kg (OECD/IEA, 2005) and literature discussing the Hg content of biomass. Detailed information on the factors used in estimating emissions from biomass burning is presented in this E-Annex, Section A3.6.

A3.5.3 Methodology update: Cement production

Mercury emissions associated with cement production originate from the use of Hg-containing fuels (including conventional, mainly fossil fuels and co-incinerated wastes) and raw materials (limestone, iron oxides, fly ash, clay, silica). The majority of the emissions occur during clinker production (calcination) in high temperature kilns – they include contributions from both fuels and raw materials (further mixed and going through the same flue gas cleaning equipment). Emissions can also occur during drying and preheating processes, but are assumed to be much lower than from calcination. Very small amounts of Hg are bound in the clinker itself, therefore subsequent stages of cement production (blending clinker with other materials, such as gypsum to form cement) are assumed to be a negligible source of Hg emission (UNEP, 2015).

The main conventional fuels used in the cement industry are coal and petroleum coke. Allocation of Hg emissions from these fuels in emission inventories and studies can vary – they are often aggregated with other fossil fuel combustion or included in the emission factors for cement production. For example, coal combustion in the cement industry was included under the category 'stationary combustion of fuel in industry' in the 2010 inventory.

A new development in the methodology applied to prepare the 2015 inventory estimates is the way in which emissions associated with fuels and raw materials used in the cement industry are derived. In the 2015 global inventory (i.e., the work reported here), emissions associated with (conventional) fuel combustion in the cement sector are now allocated to new (sub-)activities under the sectors concerned with stationary combustion of coal, and in the case of petroleum coke a sub-activity under cement itself. This E-annex to Chapter 3 of the report therefore separately presents information on emission factors, activity data and Hg emissions for coal and petroleum coke combusted in the cement industry. This modification to the methodology also allows separate assignment of technology profiles for this sector and enables comparison of emission estimates and emission factors with data sources where emission contributions from fuels and raw materials are separated. For certain data sources (e.g., stack measurements results) a comparison would not be that straightforward, although still possible to make – by first applying assumptions on amounts of fuel per tonne produced clinker/cement, and then summarizing fuel-related and raw material-related emission inputs.

These changes have been implemented to allow better attribution of emissions between contributions from fuel and cement raw materials. This is done for all fuels, except co-incinerated waste. The contribution from alternative fuels (mainly comprising waste) varies considerably between countries and is considered in the emission factors applied in the current inventory (see this E-Annex, Section A3.6).

Key modifications to cement sector emission factors and technology profiles

The methodology used to estimate cement sector emissions is similar to that applied in the GMA2013, but with the following changes:

- Unabated emission factors (UEFs) are first calculated per tonne clinker and then adjusted with respect to country- or region-specific clinker/cement ratios.
- Conventional fuels (mainly petroleum coke and coal) are allocated to separate (sub-) sectors and not included in the emission factors for cement production. Region-specific default UEFs are developed for all countries based on data on clinker/cement ratios, energy demand and co-incineration

of waste as alternative fuel obtained from the GNR database (GNR, 2014). This means that a global-average default UEF is no longer applied for cement emission calculations, only country-specific or region-specific UEFs.

- Values of Hg content in raw materials and co-incinerated waste are adjusted in accordance with data presented in recent articles and reports and provided by national experts. The default Hg content of total raw mix is estimated assuming variable additions of Hg-rich materials such as fly ash and iron oxides and is thus higher than the Hg content of limestone alone.
- A distribution factor to air of 0.95 is used (as opposed to a value of 0.8 based on the default UNEP 2011 value that was applied in the 2010 global inventory calculations). This revision is based on information in UNEP (2016) and Wang et al. (2014a) indicating that only about 1–5% of the total Hg input is bound in clinker.
- All technology profiles associated with the cement sector (cement production and related fuel combustion) have been harmonized because process-related emissions (originating in raw materials) and energy-related emissions (originating in fuels) are usually treated in the same abatement system at cement facilities.

For further details see this E-Annex, Section A3.6.

A3.5.4 Methodology update: Primary iron and steel production

Primary pig iron and steel is typically produced at integrated facilities where raw materials (iron ore, limestone, lime, dolomite, metal scrap) undergo several processes. Emissions originate from Hg in these raw materials and fuels used (mainly coal/coke). Virtually all Hg emissions occur during thermal processes – sintering/pelletizing, pig iron production in blast furnaces, and steel-making in basic oxygen furnaces (UNEP, 2015).

Key modifications to pig iron and steel sector emission factors and technology profiles

The methodology used to estimate pig iron and steel sector emissions is similar to that applied in the GMA2013, but with the following changes:

- The steel-making stage in basic oxygen furnaces is included
- The Hg input from dolomite is included
- Values of Hg content in raw materials are adjusted with respect to data presented in recent articles and reports and provided by national experts.

Combustion of coal and other fuels in the production of pig iron and steel is now identified as a separate (sub-) activity under 'industrial stationary combustion emissions'. For further details see this E-Annex, Section A3.6.

A3.5.5 Methodology: Secondary steel production

Most secondary steel production is based on an electric arc furnace (EAF) process using steel scrap as the input material. Mercury may be present as a contaminant in the scrap steel, in amounts that are highly variable depending on the type of scrap. In some countries, Hg-containing scrap may be sorted and removed before the scrap enters the EAF. Mercury contained in scrap that is not removed in this way is released during the EAF smelting process. This source was not addressed in the 2010 global emission inventory.

Emission estimates for 2015 have been developed following the general inventory methodology using activity data on annual steel production by EAF from the World Steel Association. Default UEFs were derived from Roseborough and Linbad (2008), Kim et al. (2010a), Ocio et al. (2012), Burger Chakraborty et al. (2013), Remus et al. (2013) and Wang et al. (2016d) and a default technology profile was developed based mainly on national information by Kim et al. (2010a) and Roseborough and Lindblad (2008). For further details see this E-Annex, Section A3.6.

A3.5.6 Methodology update: Primary production of non-ferrous metals (copper, lead and zinc)

Primary production of the non-ferrous metals copper, lead and zinc is a significant source of Hg emissions and releases, originating from raw materials (metal ores) and fuels used in the process. Metal ores are mined and concentrated; concentrates are further pre-treated, roasted, smelted and refined. Most of the Hg present in metal concentrates evaporates during high-temperature roasting (or sintering) and smelting stages (UN Environment, 2017b). Releases from ore mining operations are not included in the scope of this inventory.

Most large smelters include acid plants that remove a substantial proportion of the Hg emitted from the off-gas during the smelting stage. This Hg is either treated as waste, sold as a commodity (if removed prior to acid production) or contained in the acid (UNEP, 2016). In the latter case, some of the Hg may subsequently be emitted during the use of the acid. Acid plants are considered a form of (air) pollution control device in the applied methodology.

Key modifications to primary non-ferrous (copper, lead, zinc) sector emission factors and technology profiles

The methodology used to estimate Hg emissions from the (copper, lead, zinc) non-ferrous metals sector is similar to that applied in the GMA2013, but with the following changes:

- Concentrate/metal ratios and values of Hg content in concentrates have been adjusted to reflect new information and data presented in recent articles and reports and provided by national experts. Assumptions concerning the metal content of concentrates are also revised based on concentrate/metal ratios provided in recent literature.
- A distribution factor to air of 1 was applied in the 2010 global inventory based on the default UNEP Toolkit value (UNEP, 2011). This value has now been adjusted to take account of information by Hui et al. (2017) indicating that about 3–10% of the total Hg input is bound in smelting slag. The proportion of Hg bound in smelting slag is assumed to be 0.9 for zinc (a weighted average over two main production processes, assuming that the hydrometallurgical process is used more widely than the pyrometallurgical process), 0.96 for copper and 0.97 for lead.

- Default technology profiles of country groups 1 and 2 are revised and imply higher abatement levels in the current inventory than in 2010.
- 'and other fuels' in production of non-ferrous metals is now identified as a separate (sub-) activity under 'industrial stationary combustion emissions'.

For further details see this E-Annex, Section A3.6.

A3.5.7 Methodology update: Primary production of non-ferrous metals – aluminum

The methodology used to estimate NFM-aluminum production sector emissions is similar to that applied in the GMA2013, but with a small adjustment to the applied bauxite/alumina ratio based on BREF data (JRC, 2014). For a group of countries producing alumina for export only, a new emission factor has been developed, see details this E-Annex, Section A3.6.

A3.5.8 Methodology update: Primary production of non-ferrous metals – large-scale gold production

The methodology used to estimate NFM-large-scale gold production sector emissions is similar to that applied in the GMA2013; however, the default technology profile for Group 1 countries has been revised and implies higher abatement levels in the current inventory than in the 2010 inventory. See this E-Annex, Section A3.6.

Activity data on large-scale gold production from the United States Geological Survey includes a number of footnotes concerning difficulties distinguishing artisanal and small-scale gold mining (ASGM) and large-scale gold production in some countries. Where possible, these footnotes have been considered in the light of other published information and or discussions with national experts to correctly characterize gold production; however, the possibility that (some) ASGM produced gold is included in activity data for large-scale gold production remains for some countries.

A3.5.9 Methodology update: Oil refining

The methodology used to estimate emissions from oil refineries is similar to that applied in the GMA2013; with some minor adjustments to the assumptions (weighting) applied when calculating the Hg content of oils refined in different countries. These adjustments result in a small decrease in total emissions from this sector if 2010 calculations are repeated, but may significantly influence estimates for individual countries. Industry sources have delivered some new information on the Hg content of oil from different regions (IPIECA, 2012), but for reasons of commercial confidentiality they are unable to specify the exact sources of these oils (i.e., the countries/fields of origin). Lack of detailed information on the Hg-content of refined oils therefore remains a limitation in estimating emissions and releases from oil refineries at a national level. Other knowledge gaps include information to resolve different assumptions regarding the fate of Hg emitted/released during refinery operations (see Section 3.4.3.8). See also this E-Annex, Section A3.6.

A3.5.10 Methodology: Vinyl chloride monomer production with mercury-dichloride ($HgCl_2$) as catalyst

Two processes are used in the manufacture of vinyl chloride monomer (VCM): the acetylene process that uses mercuric chloride on carbon pellets as a catalyst, and a process based on the oxychlorination of ethylene that does not use Hg. Production of VCM with Hg-containing catalyst occurs only in a few countries (China, India, Russian Federation). Mercury can be emitted during the production of VCM but a large proportion of the Hg remains in the used catalyst. Recycling of used catalyst is, however, an additional substantial source of Hg emissions. The 2015 estimates of Hg emissions to air from VCM production and from recycling of Hg-containing catalyst are based on national information, in combination with literature information. For further information see this E-Annex, Section A3.6.

This source was not addressed in the 2010 global emission inventory.

A3.5.11 Methodology update: Waste and waste incineration

Mercury emissions from waste originating from Hg-added products (lamps, batteries, measuring and control devices, electric and electronic devices, and other applications) have been estimated based on assumptions regarding their entry into different waste streams. The majority of wastes associated with Hg-added products end up in landfill or are incinerated or burnt. Mercury 'consumption' in these Hg-added products is defined in terms of final regional consumption of Hg products to reflect that, for example, although most measuring and control devices are produced in China, many of them are exported, 'consumed' and disposed of in other countries (UN Environment, 2017a).

It is important to recognize that estimates for Hg emitted from the waste sector do not currently include emissions due to incineration of industrial waste and sewage sludge, or (in most cases) hazardous waste. This is because it is not currently possible to obtain reliable information on the amounts of such wastes incinerated, and more importantly the Hg content of such wastes, which can be highly variable. This subject is further discussed below in relation to national comparisons, Section 3.3.3.

Key modifications to (mercury-added product) waste and waste incineration sector emission factors and technology profiles

The basic methodology applied to estimate Hg emissions from waste originating from Hg-added products is the same as that applied for the 2010 inventory, but with the following changes:

- In the 2010 global inventory (i.e., GMA2013) about 30% of the Hg was assumed to remain in products in society and not be emitted until later. In the 2015 global inventory this component is set to zero, to (some extent) take account of the continuous release of materials in societal use. Consequently, all Hg consumed in one year (2015) is now distributed on pathways of safe storage, breakage or flow into the waste stream.

- Mercury consumed in Hg-added products is distributed on different pathways using distribution factors with emission factors applied to estimate emissions; some distribution factors have been revised based on information from national experts.
- A new technology group was added, covering the least developed level of technology for waste handling. Most countries in Sub-Saharan Africa were assigned to this technology level based on information from experts responsible for coordinating regional Minamata Initial Assessments (MIAs); some additional reclassifications of countries between technology groups, relative to assignments used in the 2010 global inventory, were also applied.

  For further details see this E-Annex, Section A3.3.

A3.5.12 Methodology update: Crematoria emissions

Methods employed were essentially identical to those applied in the GMA 2013. Updated information on regional Hg consumption in dental uses in 2015 was obtained from UN Environment (2017a) and, where available, cremation statistics were updated based on national information and data from the Cremation Society of Great Britain (CSGB, 2017). The methodology is considered sub-optimal in that it does not take account of, for example, the relationship between time of application of amalgam fillings and life-expectancy, and other factors that will determine cremation emissions following use of Hg in dental amalgam. However, it does provide a first-level estimate of emissions from this use of Hg that can be compared with other such estimates (e.g., those derived in national inventories or MIAs, see Section 3.3.3). See also this E-Annex, Section A3.4.

A3.5.13 Methodology update: Artisanal and small-scale gold production

The information base that underpins the assumptions applied regarding use of Hg in ASGM has been significantly updated and improved for several countries. Improved knowledge has also resulted in an adjustment to the factors applied in assigning ASGM emissions associated with the use of whole ore amalgamation and concentrate amalgamation. One result is a small decrease in the estimate of emissions to air per unit Hg consumed in ASGM that is reflected in both retrospectively updated (national) estimates for 2010, as well as for 2015. See Section 3.4 and this E-Annex, Section A3.2.

A3.6 Emission factors and technology profiles used in the calculation of Hg emission estimates

During the compilation of country-specific unabated emission factors (UEFs), an effort was made to use as much national data as possible.

In many of the literature sources, only abated country-specific EFs were reported, often with no specification on the abatement technologies and their implementation rates. Considering the methodology used in the current inventory, these abated emission factors (AEFs) were not directly applicable in the calculations. They were, however, used as benchmarks when calculating country-specific UEFs and generic UEFs. Where possible, information relating to abatement technologies was extracted and used in developing technology profiles.

The default technology profiles reflect assumptions based on available national information for countries in the respective groups regarding mercury (Hg) reduction efficiencies associated with typically employed air pollution control device (APCD) configurations and their degree of application (including the application of integrated acid plants in the case of copper, lead and zinc smelters). In particular, use was made of available information from European countries, the Republic of Korea, Japan and the USA (Group 1); Australia and China (for coal burning in power plants) (Group 2); South Africa and China (Group 3); Russia (Group 4); and India (Group 5). These profiles represent a starting point for further refinement as additional (national) information becomes available.

Section A3.6 provides detailed information for the following sectors:

A3.6.1 Coal combustion, hard coal (anthracite and bituminous coal)
A3.6.2 Coal combustion, brown coal (sub-bituminous coal and lignite)
A3.6.3 Oil combustion
A3.6.4 Natural gas combustion
A3.6.5 Biomass combustion
A3.6.6 Pig iron and steel production
A3.6.7 Secondary steel production (electric arc furnace, EAF)
A3.6.8 Non-ferrous metal production: copper (Cu)
A3.6.9 Non-ferrous metal production: lead (Pb)
A3.6.10 Non-ferrous metal production: zinc (Zn)
A3.6.11 Non-ferrous metal production: mercury (Hg) dedicated production from cinnabar ore
A3.6.12 Non-ferrous metal production: aluminum (Al) and alumina production from bauxite ore
A3.6.13 Large-scale gold production
A3.6.14 Cement production
A3.6.14a Fossil fuel combustion in cement production
A3.6.15 Oil refining
A3.6.16 Chlor-alkali industry
A3.6.17 Vinyl chloride monomer (VCM) production and recycling of mercury catalyst

A3.6.1 Coal combustion, hard coal (anthracite and bituminous coal)

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning combustion of hard coal (anthracite and bituminous coals).

Applied UEFs: These are shown in Table A3.6.1.

Comparative EFs: These are shown in Table A3.6.2.

Discussion of EFs: The generic default UEFs derived in this work are the result of expert evaluation and are intended to represent a reasonable general default factor, based on consideration of a wide range of literature, including the UNEP Toolkit (UNEP, 2011b; UN Environment, 2017b), Paragraph-29 (UNEP, 2010a) study data, recent UNEP reports on coal combustion in power plants in China, Russia and India, peer-reviewed journal articles and other literature, including country-specific data and national reports.

Basic assumptions during calculations of UEF: For hard coal combustion, the UEFs represent the Hg content of coal, which is generally reported on a dry weight basis.

Applied technology profile: This is shown in Table A3.6.3. Hg-specific abatement could, for example, be activated carbon injection, and/or additives to remove Hg.

Discussion of technology profile: In addition to discussions with representatives from different countries, the following references were important sources of information when deriving the technology profiles used in this work: EC (2006), Srivastava et al. (2006), Nelson et al. (2009), Pudasainee et al. (2009b, 2010), Kim et al. (2010a,b), Pavlish et al. (2010), UNEP (2010b: tables 1+4, 2011c,d, 2014), UNEP/CIMFR-CSIR (2012), Garnham and Langerman (2016), Wu et al. (2016b), US EPA (NEEDS v.5.15 Database).

Comparison with UNEP Toolkit factors: The default UEF has been updated in the UNEP toolkit (UN Environment, 2017b) to correspond to the default factor of 0.15 g/t applied in this work, both in the 2010 inventory and retained in this 2015 inventory.

Comparison with 2005 inventory factors: The default factor applied when calculating emissions in 2005 (0.2 g Hg/t coal) is a global average abated factor. The default factors used in the current inventory are unabated and differentiated by coal type.

Gaps/needs to improve factors and profiles: Information base for assumptions regarding technology profiles.

Table A3.6.1 Unabated emission factors applied for coal combustion, hard coal (anthracite and bituminous coal).

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default						
Anthracite – PP		0.15		g/t		Expert evaluation of reasonable general default factor based on the UNEP Toolkit (UNEP, 2011b), other literature, country-specific data
Bituminous – PP		0.15		g/t		
Hard coal – IND		0.15		g/t		
Hard coal – DR		0.15		g/t		
Country-specific						
Australia						
PP anthracite		0.068		g/t		P. Nelson (pers. comm.)
PP bituminous		0.068		g/t		P. Nelson (pers. comm.)
IND hard coal		0.042		g/t		
DR hard coal		0.068		g/t		
Canada						
PP bituminous		0.070		g/t	Mazzi et al. (2006: in figure 1)	Average of data in figure 1
China						
PP bituminous		0.17		g/t	Wang et al. (2012a), Zhang et al. (2015b)	
IND hard coal		0.17		g/t		
DR hard coal		0.19		g/t	Sloss (2008), UNEP (2011c)	
India						
PP bituminous		0.14		g/t	UNEP/CIMFR-CSIR (2012), UNEP (2014)	Average of coals burned in PPs in India
IND hard coal		0.292		g/t	Mukherjee et al. (2008)	
DR hard coal		0.292		g/t		
Japan						
PP bituminous		0.0454		g/t		National information
IND hard coal		0.0454		g/t		National information
DR hard coal		0.0454		g/t		
Republic of Korea						
PP anthracite		0.082		g/t	Kim et al. (2010a: table 3)	Table 3
PP bituminous		0.046		g/t	Kim et al. (2010a,b)	Mixed coals
IND hard coal		0.069		g/t	Kim et al. (2010a)	Average of 0.082 and 0.046
DR hard coal		0.046		g/t	Kim et al. (2010b)	Mixed coals
Russian Federation						
PP bituminous		0.063		g/t	UNEP (2011d)	Weighted average Hg content of coals consumed in Russia
IND hard coal		0.1		g/t		
DR hard coal		0.1		g/t		
South Africa						
PP bituminous		0.28		g/t	Garnham and Langerman (2016)	Weighted average
IND hard coal		0.28		g/t		
DR hard coal		0.28		g/t		
USA						
PP bituminous		0.1		g/t	Sloss (2008)	Srivastava et al. (2006)

Table A3.6.2 Comparative emission factors for coal combustion, hard coal (anthracite and bituminous coal).

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
All coals	0.05	0.15	0.50	g/t	UN Environment (2017b)	UNEP Toolkit default input factor same as this work
Abated EF						
2005 inventory All coals – power plants		0.2		g/t	AMAP/UNEP (2008)	
2005 inventory All coals – residential and commercial boilers		0.3		g/t	AMAP/UNEP (2008)	

Table A3.6.3 Technology profile applied for coal combustion, hard coal (anthracite and bituminous coal).

Abbreviations. ACI: activated carbon injection; B: bag filter; CYC: cyclone; (c/w) ESP (C/H): (cold-side=dry / hot-side=wet) electrostatic precipitator; FF: fabric filter; (SDA/ w) FGD: (spray drier absorber/ wet) flue gas desulfurization; IDRD: integrated dust removal; low NO_X: low NO_X burners; mod NO_X: modified combustion; PM: particulate matter control; PS: particle scrubber; SCR: selective catalytic reduction; SNCR: selective non-catalytic reduction; WET: wet scrubber; WS: wet scrubber.

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
PP anthracite									
Level 0: None		0							See Section A3.6.1
Level 1: Particulate matter simple APC: ESP/PS/CYC		25		30	65	70	100	100	
Level 2: Particulate matter (FF)		50		5	30	30			
Level 3: Efficient APC: PM+SDA/wFGD		65		20					
Level 4: Very efficient APC: PM+FGD+SCR		70		40	5				
Level 5: Mercury-specific		97		5					
PP bituminous									
Level 0: None		0							See Section A3.6.1
Level 1: Particulate matter simple APC: ESP/PS/CYC	15	25	60	30	65	70	100	100	
Level 2: Particulate matter (FF)	40	50	93	5	30	30			
Level 3: Efficient APC: PM+SDA/wFGD	35	65	99	20					
Level 4: Very efficient APC: PM+FGD+SCR	90	90	99	40	5				
Level 5: Mercury-specific	95	97	99	5					
IND hard coal									
Level 0: None		0				25	50	75	See Section A3.6.1
Level 1: Particulate matter simple APC: ESP/PS/CYC		25		25	25	50	50	25	
Level 2: Particulate matter (FF)		50		25	50	25			
Level 3: Efficient APC: PM+SDA/wFGD		50		25	25				
Level 4: Very efficient APC: PM+FGD+SCR		90		25					
Level 5: Mercury-specific		97							

Table A3.6.3 continued

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
DR hard coal									
Level 0: None		0		50	50	100	100	100	See Section A3.6.1
Level 1: Particulate matter simple APC: ESP/PS/CYC		25		50	50				
Country-specific									
Australia									
PP bituminous									
ESP		46.5			75				Nelson et al. (2009: Table 44)
FF		83.1			19				
ESP/FF		90.0			6				
Brazil									
PP coal not defined									
ESP+PS						100			This work
China and Hong Kong[a]									
PP all coals									
ESP+wFGD		60			13.9				Wu et al. (2016b)
FF+wFGD		86			0.2				
ESP-FF+wFGD		95			1.4				
SCR+ESP+wFGD		70			63.5				
SCR+FF+wFGD		88			4				
SCR+ESP+wFGD+wESP		94			2.5				
SCR+ESP-FF+wFGD		97			14.6				
IND all coals									
WET		23			47				
IDRD		38			41				
FF+(w)FGD		86			11				
ESP-FF+(w)FGD		95			1				
Europe (EU28+Norway)									
PP bituminous									
FF		40		40					EC (2006)
ESP/FF+FGD		75		30					
ESP/FF+FGD+high dust SCR		90		30					
India									
PP bituminous									
Mostly ESP (some PPs other APC and coal washing)		42						100	Average value in UNEP (2014)
Japan									
PP bituminous & IND bituminous									
APCD		72.9		100					Generic APCD for power plants and industry
Republic of Korea									
PP bituminous									
SCR+cESP+wFGD		75		100					National information

Table A3.6.3 continued

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
PP anthracite									
ESP		78		28					National information
cESP+wFGD		83		38					
SCR+cESP+wFGD		77		34					
Mexico									
PP coal not defined									
lowNO_X						35.6			This work
modNO_X						7.8			
ESP						5.2			
SCR						1.7			
Russian Federation									
PP bituminous									
Level 1: Particulate matter simple APC: ESP/PS/CYC		25					43		National information
Level 2: Particulate matter (FF)		50					53		
Level 3: Efficient APC: PM+SDA/wFGD		65					4		
IND bituminous									
Level 1: Particulate matter simple APC: ESP/PS/CYC		25					100		
South Africa									
PP coal not defined									
ESP		25				67			Garnham and Langerman (2016) (reduction efficiency generic)
FF		50				24			
ESP+FF		50				9			
Sweden									
PP bituminous									National comments
Particulate matter (FF)		50		20					
ESP/FF+FGD+high dust SCR		90		80					
USA									
PP bituminous									
No control		0		0.1					Derived from NEEDS v.5.15 Database (XLSX) Accessed 2017-03-02
ESPH		10		1.0					
ESPC		36		23.0					
ESPH+WS		42		1.4					
ESPC+WS+ SNCR (not all)		66		4.0					
ESPC+B+WS+SNCR		70		2.0					
ESPC+B		80		1.6					
B		89		2.3					
ACI+APC combination		90		58.5					
APC combinations 1		93		0.8					
APC combinations 2		95		4.6					
APC combinations 3		97		0.6					

[a] China – assigned to Group 2 for coal burning in power stations (in Group 3 for other sectors).

A3.6.2 Coal combustion, brown coal (sub-bituminous coal and lignite)

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning combustion of brown coal (sub-bituminous coal and lignite).

Applied UEFs: These are shown in Table A3.6.4.

Comparative EFs: These are shown in Table A3.6.5.

Discussion of EFs: The generic default UEFs are derived in this work as expert evaluation of a reasonable level of a general default factor, based on a literature survey including the UNEP Toolkit (UNEP, 2011b; UN Environment, 2017b) and other literature, including country-specific data.

During compilation of country-specific UEFs, an effort was made to use as much national data as possible. One issue that arose during this work was that some lignite and sub-bituminous coals have a very high moisture content (up to 50% in some coals burned in power plants in Australia; P. Nelson pers. comm.). If high moisture content coals are burned (without drying), then there is potential for over-estimating EFs if these are derived from coal Hg content values on a dry weight basis without adjusting for the moisture content.

Basic assumptions during calculations of UEF: For brown coal combustion, the UEFs represent the Hg content of coal as burned.

Applied technology profile: This is shown in Table A3.6.6.

Discussion of technology profile: In addition to discussions with representatives from different countries, the following references were important sources of information when deriving the technology profiles used in this work: EC (2006), Srivastava et al. (2006), Nelson et al. (2009), Pudasainee et al. (2009b, 2010), Kim et al. (2010a,b), Pavlish et al. (2010), UNEP (2010b: tables 1+4, 2011c,d), UNEP/CIMFR-CSIR (2012), US EPA (NEEDS v.5.15 Database).

Comparison with UNEP Toolkit factors: The default UEF has been updated in the UNEP toolkit (UN Environment, 2017b) to correspond to the default factors of 0.1 and 0.15 g/t applied in this work, both in the 2010 inventory and retained in this 2015 inventory.

Comparison with 2005 inventory factors: The default factor applied when calculating emissions in 2005 (0.2 g Hg/t coal) is a global average abated factor. The default factors used in the current inventory are unabated and differentiated by coal type.

Gaps/needs to improve factors and profiles: Information base for assumptions regarding technology profiles. Moisture content of lignite and sub-bituminous coals burned in different countries and the implications of high moisture content for emission factors that are normally derived from coal Hg content expressed on a dry weight basis.

Table A3.6.4 Unabated emission factors applied for coal combustion, brown coal (sub-bituminous coal and lignite).

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default						
Sub-bituminous - PP		0.15		g/t		Expert evaluation of reasonable general default factor based on the UNEP Toolkit (UNEP, 2011b), other literature, country-specific data
Lignite – PP		0.10		g/t		
Brown coal – IND		0.15		g/t		
Brown coal – DR		0.15		g/t		
Country-specific						
Australia						
PP lignite		0.032		g/t	P. Nelson (pers. comm.)	UEF takes into account high moisture content of coal
PP sub-bituminous		0.032		g/t	P. Nelson (pers. comm.)	UEF takes into account high moisture content of coal
IND brown coal		0.068		g/t		
DR brown coal		0.032		g/t		
Canada						
PP sub-bituminous/ lignite		0.07		g/t	Mazzi et al. (2006: figure 1)	Average of data in figure 1
Germany						
PP lignite		0.063		g/t		UEF takes into account high moisture content of coal

Table A3.6.4 continued

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
India						
PP lignite		0.140		g/t	UNEP/CIMFR-CSIR (2012)	Average of Indian coals burned in PPs
IND brown coal		0.292		g/t	Mukherjee et al. (2008)	
Mexico						
PP sub-bituminous		0.293		g/t	This work	Non-washed coal, Maíz (2008)
IND brown coal		0.293		g/t		
Russia						
PP lignite		0.063		g/t	UNEP (2011d)	Weighted average Hg content of coals consumed in Russia
IND brown coal		0.1		g/t	UNEP (2011d)	
DR brown coal		0.1		g/t	UNEP (2011d)	
USA						
PP sub-bituminous		0.055		g/t	UNEP (2010a), This work	UEF takes into account high moisture content of coal

Table A3.6.5 Comparative emission factors for coal combustion, brown coal (sub-bituminous coal and lignite).

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
Sub-bituminous/ lignite	0.05	0.15/0.1	0.50	g/t	UN Environment (2017b)	UNEP Toolkit default input factor same as this work
Abated EF						
2005 inventory All coals – power plants		0.2			AMAP/UNEP (2008)	
2005 inventory All coals – residential and commercial boilers		0.3			AMAP/UNEP (2008)	

Table A3.6.6 Technology profile applied for coal combustion, brown coal (sub-bituminous coal and lignite).

Abbreviations. ACI: activated carbon injection; B: bag filter; CYC: cyclone; ESP(C/H): (cold-side / hot-side) electrostatic precipitator; FF: fabric filter; (SDA/ w) FGD: (spray drier absorber/ wet) flue gas desulfurization; PM: particulate matter control; PS: particle scrubber; SCR: selective catalytic reduction; SNCR: selective non-catalytic reduction; WS: wet scrubber.

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
PP sub-bituminous									
Level 0: None		0							See Section A3.6.2
Level 1: Particulate matter simple APC: ESP/PS/CYC	0	10	25	30	65	70	100	100	
Level 2: Particulate matter (FF)	20	50	85	5	30	30			
Level 3: Efficient APC: PM+SDA/wFGD	0	40	75	20					
Level 4: Very efficient APC: PM+FGD+SCR	0	25	47	40	5				
Level 5: Mercury-specific	50	75	95	5					

Table A3.6.6 continued

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
PP lignite									
Level 0: None		0							See Section A3.6.2
Level 1: Particulate matter simple APC: ESP/PS/CYC	0	2	10	30	65	70	100	100	
Level 2: Particulate matter (FF)	0	5	10	5	30	30			
Level 3: Efficient APC: PM+SDA/wFGD	0	20	55	20					
Level 4: Very efficient APC: PM+FGD+SCR	0	20	96	40	5				
Level 5: Mercury-specific	50	75	95	5					
IND brown coal									
Level 0: None		0				25	50	75	See Section A3.6.2
Level 1: Particulate matter simple APC: ESP/PS/CYC		5		25	25	50	50	25	
Level 2: Particulate matter (FF)		50		25	50	25			
Level 3: Efficient APC: PM+SDA/wFGD		30		25	25				
Level 4: Very efficient APC: PM+FGD+SCR		20		25					
Level 5: Mercury-specific		75							
DR brown coal									
Level 0: None		0		50	50	100	100	100	See Section A3.6.2
Level 1: Particulate matter simple APC: ESP/PS/CYC		5		50	50				
Country-specific									
Australia									
PP sub-bituminous									
ESP		46.5			100				Nelson et al. (2009: table 43)
Russian Federation									
PP sub-bituminous									
Level 1: Particulate matter simple APC: ESP/PS/CYC		10					43		National information
Level 2: Particulate matter (FF)		50					53		
Level 3: Efficient APC: PM+SDA/wFGD		40					4		
IND sub-bituminous									
Level 1: Particulate matter simple APC: ESP/PS/CYC		5					100		
USA									
PP sub-bituminous									
No control		0		0.04					Derived from NEEDS v.5.15 Database (XLSX) Accessed 2017-03-02
ESPC		3		21					
ESPH		6		0.1					
ESPC+WS+SCR		16		19					
ESPH+WS		20		2					
ESPC+B		25		6.5					
ESPC+		35		0.1					
B+SNCR		57		0.1					
ESPC+B+WS		70		0.6					
B		73		16					
ACI+APC		90		34					
PP lignite									
No control		0		15					
ESPC+CYC		38		0.4					
ESPC WS		44		41					
B		57		2.5					
ACI+APC comb		90		41					

A3.6.3 Oil combustion

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning combustion of crude oil, heavy fuel oil and light fuel oil.

Applied UEFs: These are shown in Table A3.6.7.

Comparative EFs: These are shown in Table A3.6.8.

Discussion of EFs: -

Basic assumptions during calculations of UEF: Default UEFs used in this work were based on the lower range default input factors employed in the UNEP Toolkit (UNEP, 2011b), using twice these values. This choice was based on comparison of the UNEP Toolkit defaults and available information on the Hg content of crude and refined oil.

Applied technology profile: This is shown in Table A3.6.9.

Discussion of technology profile: It was assumed that only major point sources in Group 1 to 3 countries will employ APCDs that reduce Hg emissions from oil combustion, and the reported effectiveness of such devices for reducing Hg emissions from oil combustion is generally low. For sources other than power plants and industrial facilities it was assumed that no emission abatement is applied.

Comparison with UNEP Toolkit factors: The UNEP Toolkit default input factors of 0.055 g/t for crude and heavy fuel oil and 0.006 g/t for light fuel oil are somewhat higher than the values selected for use in this work, which were based on the lower range UNEP default factors.

Comparison with 2005 inventory factors: An abated EF of 0.001 g/t was applied in the 2005 inventory calculations, comparable to that for light fuel oil burning in the 2010 inventory, but relatively low compared with the UEFs applied to crude oil and heavy fuel oil combustion in 2010.

Gaps/needs to improve factors and profiles: Information base for assumptions regarding technology profiles.

Table A3.6.7 Unabated emission factors applied for oil combustion.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default						
Crude oil – PP		0.01		g/t	UNEP (2011b)	Twice the UNEP Toolkit default minimum value, see discussion
Heavy fuel oil – PP		0.02		g/t		
Light fuel oil – PP		0.002		g/t		
Crude oil – IND		0.01		g/t		
Heavy fuel oil – IND		0.02		g/t		
Light fuel oil – IND		0.002		g/t		
Crude oil – DR		0.01		g/t		
Heavy fuel oil – DR		0.02		g/t		
Light fuel oil – DR		0.002		g/t		
Country-specific						
Republic of Korea						
PP crude oil		0.027		g/t	Kim et al. (2010a)	

Table A3.6.8 Comparative emission factors for oil combustion.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
Crude oil	0.005	0.055	0.300	g/t	UNEP (2011b)	
Heavy fuel oil	0.010	0.055	0.100			
Light fuel oil	0.001	0.006	0.010			
Abated EF						
2005 inventory		0.001			AMAP/UNEP (2008)	

Table A3.6.9 Technology profile applied for oil combustion.

Abbreviations. cESP: cold-side electrostatic precipitator; FGD: flue gas desulfurization; PM: particulate matter control

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
PP crude oil									
Level 0: None		0				50	100	100	
Level 1: PM+FGD (cESP, scrubbers+FGD)		50		100	100	50			
PP heavy fuel oil									
Level 0: None		0				50	100	100	
Level 1: PM+FGD (cESP, scrubbers+FGD)		50		100	100	50			
PP light fuel oil									
Level 0: None		0		50	50	50	100	100	
Level 1: PM+FGD (cESP, scrubbers+FGD)		50		50	50	50			
IND crude oil									
Level 0: None		0		50	50	50	100	100	
Level 1: PM (cESP, scrubbers)		10		50	50	50			
IND heavy fuel oil									
Level 0: None		0		50	50	50	100	100	
Level 1: PM (cESP, scrubbers)		10		50	50	50			
IND light fuel oil									
Level 0: None		0		50	50	50	100	100	
Level 1: PM (cESP, scrubbers)		10		50	50	50			
DR crude oil									
Level 0: None		0		100	100	100	100	100	
DR heavy fuel oil									
Level 0: None		0		100	100	100	100	100	
DR light fuel oil									
Level 0: None		0		100	100	100	100	100	

A3.6.4 Natural gas combustion

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning combustion of natural gas (activity data in TJ, gross calorific value).

Applied UEFs: These are shown in Table A3.6.10.

Comparative EFs: These are shown in Table A3.6.11.

Discussion of EFs: -

Basic assumptions during calculations of UEF: Calorific values of natural gas vary (e.g., North Sea natural gas 39 MJ/m^3, NPL, 2012; generic value 43 MJ/m^3, Engineering Toolbox, 2012); a value of 40 MJ/m^3 has been assumed for the purposes of developing a UEF in this work. The UNEP Toolkit emission factors (0.2 and 100 µg/m^3, for pipeline and raw/untreated gas respectively) used as a basis for suggested generic UEF values are derived based on analysis of Hg concentrations in natural gas. Emissions estimates assume combustion of pipeline/consumer gas (with low Hg content); if raw/untreated gas is burned at installations the emissions would be considerably higher (by a factor of 500).

Applied technology profile: This is shown in Table A3.6.12.

Discussion of technology profile: It was assumed that APCDs are either absent at sites where natural gas is burned, or are inefficient at reducing Hg emissions to air from this source.

Comparison with UNEP Toolkit factors: The UNEP Toolkit (UN Environment, 2017b) input factors are used as the basis for the UEFs.

Comparison with 2005 inventory factors: Emissions from natural gas combustion were not included in the 2005 inventory.

Gaps/needs to improve factors and profiles: Information base for assumptions regarding technology profiles and type of gas burned.

Table A3.6.10 Unabated emission factors applied for natural gas combustion.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default		0.005		g/TJ	UNEP (2011b)	Pipeline/consumer quality gas; UEF g/TJ based on UNEP (2011b) value of 0.2 µg/m^3
		2.5				Raw/pre-cleaned gas; UEF g/TJ based on UNEP (2011b) value of 100 µg/m^3

Table A3.6.11 Comparative emission factors for natural gas combustion.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
Natural gas		0.2		µg/m^3	UNEP (2011b)	Pipeline/consumer quality gas; DF=1
		100				Raw/pre-cleaned gas; DF=1

Table A3.6.12 Technology profile applied for natural gas combustion.

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
None		0		100	100	100	100	100	

A3.6.5 Biomass combustion

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning combustion of primary solid biomass (IEA, 2016, 2017).

Applied UEFs: These are shown in Table A3.6.13.

Comparative EFs: These are shown in Table A3.6.14.

Discussion of EFs: The generic default UEFs are derived in this work as expert evaluation of a reasonable level of a general default factor, based on a literature survey including the UNEP Toolkit (UN Environment, 2017b) and other general or country-specific literature, such as Kindbom and Munthe (1998), Friedli et al. (2009), Pirrone et al. (2010), Huang et al. (2011), Obrist et al. (2011), Zhang et al. (2013a) and literature cited in those papers.

Basic assumptions during calculations of UEF: For biomass combustion, the UEFs represent the Hg content of biomass as burned. A conversion of data on the Hg content of biomass in mg/t to mg/GJ was made using a heating value of 16 MJ/kg for air dried wood, moisture content 10–20% (OECD/IEA, 2005).

Applied technology profile: This is shown in Table A3.6.15.

Discussion of technology profile: The removal efficiencies of abatement technologies were adopted from the combustion of brown coal. The application rates of air pollutant abatement technologies for the technology groups were developed based on very limited national information and complemented with assumptions.

Comparison with UNEP Toolkit factors: In the UNEP toolkit (UN Environment, 2017b) the default UEF is 0.03 (0.007–0.07) g Hg/t (dry weight), which corresponds to 1.67 mg/GJ (using a heating value of 18 MJ/kg for oven dried wood (OECD/IEA, 2005). All of the Hg in biomass is assumed to be emitted to air (output distribution factor = 1).

Comparison with 2010 inventory factors: Biomass combustion was not included in the 2010 inventory.

Gaps/needs to improve factors and profiles: Technology profiles and removal efficiencies. National data on Hg content in biomass.

Table A3.6.13 Unabated emission factors applied for biomass combustion.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default						
Biomass* (unit mg/GJ)		1.25		mg/GJ		Expert evaluation of reasonable general default factor based on UNEP Toolkit (UN Environment, 2017b) and other literature. NB. Note that the data have different units.
Biomass (unit mg/t)	5	20	50	mg/t		

*Conversion using heating value of 16 MJ/kg (air dried wood, moisture content 10–20%) (OECD/IEA, 2005).

Table A3.6.14 Comparative emission factors for biomass combustion.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
Biomass	7	30	70	mg/t (dw)	UN Environment (2017b)	UNEP Toolkit default input factor

Table A3.6.15 Technology profile applied for biomass combustion.

Abbreviations. CYC: cyclone; ESP: electrostatic precipitator; FF: fabric filter; (SDA/ w) FGD: (spray drier absorber/ wet) flue gas desulfurization; PM: particulate matter control; PS: particle scrubber; SCR: selective catalytic reduction

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
PP biomass									
Level 0: None		0		15	30	60	100	100	Sub-bituminous coal reduction efficiencies (Table A3.6.6) assumed
Level 1: Particulate matter simple APC: ESP/PS/CYC	0	10	25	60	50	30			
Level 2: Particulate matter (FF)	20	50	85	20	20	10			
Level 3: Efficient APC: PM+SDA/wFGD	0	40	75	5					
IND biomass									
Level 0: None		0				25	50	75	Sub-bituminous coal reduction efficiencies (Table A3.6.6) assumed
Level 1: Particulate matter simple APC: ESP/PS/CYC		5		25	25	50	50	25	
Level 2: Particulate matter (FF)		50		25	50	25			
Level 3: Efficient APC: PM+SDA/wFGD		30		25	25				
Level 4: Very efficient APC: PM+FGD+SCR		20		25					
DR biomass									
Level 0: None		0		50	50	100	100	100	Sub-bituminous coal reduction efficiencies (Table A3.6.6) assumed
Level 1: Particulate matter simple APC: ESP/PS/CYC		5		50	50				

A3.6.6 Pig iron and steel production

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning primary production of pig iron. Note: Emission estimates associated with secondary steel production are accounted for separately.

Applied UEFs: These are shown in Table A3.6.16.

Comparative EFs: These are shown in Table A3.6.17.

Discussion of EFs: During compilation of country-specific UEFs, an effort was made to use as much national data as possible. Most countries do not have complete mass balances but national data on material consumption and/or Hg content was used instead of generic values wherever possible.

The following literature sources were studied: Kim et al. (2010a), Mlakar et al. (2010), Fukuda et al. (2011), Won and Lee (2012), Remus et al. (2013), Burger Chakraborty et al. (2013), Wang et al. (2014a, 2016d), LKAB (2015), SSAB (2015), Zhang et al. (2015b), Hui et al. (2017), UN Environment (2017b), COWI, and national information provided by China, Republic of Korea, Japan and USA.

Basic assumptions during calculations of UEF: (1) Production processes included are pellet plant, sinter plant, blast furnace and basic oxygen steelmaking. (2) Materials included in the UEF are iron ore, lime/limestone and dolomite. Fuels – both combusted and injected in the process as reduction agents – are excluded. (3) Import/export of sinter pellets is not considered. (4) Hg content of products (pig iron, steel) is zero, almost all Hg is volatized during thermal processes, especially sintering and pelletizing. (5) Recycling of filter materials on-site is not considered for UEF since recycling is only possible if abatement is present. (6) Energy re-use (further combustion of off-gases) is not considered.

Raw material consumption per 1 t of pig iron, according to the BREF-based mass balance:

- Iron ore: 0.09–2.97 t, intermediate value – 1.42 t (Remus et al., 2013; SSAB 2015)
- Limestone/lime: 0.04–0.40 t, intermediate value – 0.23 t (Remus et al., 2013; SSAB 2015)
- Dolomite: 0–0.05 t, intermediate value – 0.02 t (Remus et al., 2013; SSAB 2015)

Range of Hg content of materials:

- Iron ore: 0.001–0.097 g/t, intermediate value – 0.04 g/t (Fukuda et al., 2011; Burger Chakraborty et al., 2013; Wang et al., 2016d; Hui et al., 2017; UN Environment, 2017b; national information provided by Republic of Korea)
- Limestone/lime: 0.001–0.39 g/t, intermediate value – 0.04 g/t (Mlakar et al., 2010; Fukuda et al., 2011; Won and Lee, 2012; Burger Chakraborty et al., 2013; Wang et al., 2014a; Zhang et al., 2015b; UN Environment, 2017b; national information provided by Republic of Korea, Japan and China)
- Dolomite: 0.04–0.07 g/t, intermediate value – 0.06 g/t (Wang et al., 2016d)

The ratio hot metal : liquid steel is 0.74–0.98 t/t, intermediate value – 0.94 t/t (Fukuda et al., 2011; Remus et al., 2013; SSAB 2015).

For all UEFs, distribution factor = 1. Other pathways (sector-specific treatment/disposal) are assumed to refer to treatment of residues from abatement equipment (UN Environment, 2017b).

Applied technology profile: This is shown in Table A3.6.18.

Discussion of technology profile: Steel-making facilities are usually complex systems including several processes at different sites, all of which are usually equipped with separate APCDs. In the technology profiles in Table A3.6.18 it is APCDs installed at sinter plants that are mainly considered because, according to available information (UN Environment 2017b, country inventories, reports, etc.), their contribution to Hg emissions is the most significant.

The following literature sources were studied: Nelson et al. (2009), Fukuda et al. (2011), Remus et al. (2013), UNEP (2015), UN Environment (2017b), and national information provided by Brazil, China, Republic of Korea and Mexico.

Comparison with UNEP Toolkit factors: The default UEF used in this inventory (0.063 g Hg/t pig iron production) is ~26% higher than the UNEP Toolkit default factor (0.05 g Hg/t pig iron production).

Potential for double counting: Generic EFs for primary pig iron production compiled by the Swedish Environmental Institute (IVL) based on BREF mass-balance exclude use of fuels: oil, gas, coke (produced from coal) and coal (added as pulverized coal and used for coke production). Emissions from fuel combustion are accounted for in the sector Stationary combustion of coal and oil in industry of this inventory, so there should be no double counting. Emissions from non-energy use of fuels, especially from use of injected coal and metallurgical coke as reducing agents and use of coking coal to produce metallurgical coke, are not accounted for under the pig iron and steel production sector. Neither are they accounted for under stationary combustion. Available activity data indicate that non-energy use of coal constitutes a very small component of the total use of coal. The contribution of non-energy use of coal and coke to total coal-associated emissions is therefore considered insignificant.

Country-specific emission factors are derived using the same principle.

Comparison with 2010 inventory factors: The default emission factor used in the current inventory (0.063 g Hg/t pig iron production) is 26% higher than the default emission factor applied when calculating emissions in 2010 (0.05 g Hg/t pig iron production – same as in the UNEP Toolkit). Hg contents of iron ore and limestone have been revised based on the latest available data in the literature; the intermediate values are now higher than those used in 2010. In addition, the current emission factor takes into account basic oxygen steelmaking, which was not considered in the 2010 inventory. It also includes the use of dolomite in the production process, which was excluded in 2010.

Gaps/needs to improve factors and profiles: Information base for assumptions regarding technology profiles.

Table A3.6.16 Unabated emission factors applied for pig iron and steel production.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default	0.0001	0.063	0.450	g/t (primary) pig-iron production		Expert evaluation based on Remus et al. (2013), UN Environment (2017b) and country-specific data
Country-specific						
Australia	0.003	0.054	0.253	g/t (primary) pig-iron production	Fukuda et al. (2011), Remus et al. (2013), UN Environment (2017b)	National data: 0.031 g Hg/t iron ore
Belarus	0.0002	0.074	0.360		Remus et al. (2013), UN Environment (2017b)	National data: 0.088 g Hg/t limestone
Brazil	0.003	0.054	0.253		Fukuda et al. (2011), Remus et al. (2013), UN Environment (2017b)	National data: 0.031 g Hg/t iron ore
Canada	0.0001	0.058	0.450		Remus et al. (2013), UN Environment (2017b)	National data: 0.017 g Hg/t limestone/lime
China	0.0001	0.033	2.247		Remus et al. (2013), Wu et al. (2017)	National data: 0.02 g Hg/t iron ore, 0.018 g Hg/t limestone, 0.009 g Hg/t dolomite, 0.22 t limestone/t pig iron, 0.04 t dolomite /t pig iron
Chile	0.050	0.525	1.000		COWI	National data: total Hg input 0.05–1 g Hg/t pig iron
Denmark	0.0004	0.056	0.296		Remus et al. (2013), UN Environment (2017b)	National data: 0.01 g Hg/t limestone/lime
Germany	0.0002	0.061	0.344		Remus et al. (2013), UN Environment (2017b)	National data: 0.03 g Hg/t limestone/lime
India	0.004	0.073	0.187		Remus et al. (2013), Burger Chakraborty et al. (2013), UN Environment (2017b)	National data: 0.065 g Hg/t limestone/lime, 0.04 g Hg/t iron ore
Japan	0.052	0.055	0.113		Fukuda et al. (2011)	National data: 0.02 g Hg/t limestone/lime, 0.031 g Hg/t iron ore; 0.29 t limestone/t pig iron; 1.59 t iron ore /t pig iron
Republic of Korea	0.028	0.029	0.030		Kim et al. (2010a)	UEFs reported by Kim et al. (2010a)
Russia	0.008	0.098	0.202		Remus et al. (2013), UN Environment (2017b)	National data: 0.06 g Hg/t iron ore, 0.05 g Hg/t limestone
Slovenia	0.0003	0.055	0.295		Mlakar et al. (2010), Remus et al. (2013), UN Environment (2017b)	National data: 0.008 g Hg/t limestone/lime
Sweden	0.001	0.048	0.146		LKAB (2015), SSAB (2015), UN Environment (2017b)	National data: 0.03 t limestone/t pig iron, 1.23 t iron ore /t pig iron, 0.02 t dolomite /t pig iron
Switzerland	0.001	0.059	0.304		Remus et al. (2013), UN Environment (2017b)	National data: 0.025 g Hg/t limestone/lime
USA	0.0001	0.034	0.257		Remus et al. (2013), UN Environment (2017b), national information	National data: 0.016 g Hg/t iron ore, 0.045 g Hg/t limestone/lime

Table A3.6.17 Comparative emission factors for pig iron and steel production.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
UNEP Toolkit-based unabated input to air		0.05		g/t (primary) pig-iron production	UNEP (2015)	Default input factor 0.05 g/t; DF=1 if no abatement assumed. Fuels are excluded
2010 inventory		0.05		g/t (primary) pig-iron production	AMAP/UNEP (2013)	Default input factor 0.05 g/t; DF=1. Fuels are excluded
EMEP/EEA	0.02	0.1	0.5	g/t (primary) steel production	EMEP/EEA (2016)	Numbers in g/t steel adjusted with the ratio 0.74–0.98 t pig iron/ t steel
	0.020	0.106	0.676	g/t (primary) pig-iron production		
	0.016	0.049	0.15	g/ t sinter		Numbers in g/t sinter adjusted with the ratio 0.116–1.621 t sinter/t pig iron (BREF)
	0.002	0.053	0.24	g/t (primary) pig-iron production		
Abated EF						
UNEP Toolkit abated input to air		0.048		g/t (primary) pig-iron production	UNEP (2015)	Default input factor 0.05 g/t; DF=0.95 assuming abatement (wet scrubber or similar)
EEA/EMEP	0.012	0.018	0.036	g/ t sinter	EMEP/EEA (2016)	Wet gas desulfurization
	0.006	0.009	0.018			Dry electrostatic precipitator
	0.004	0.006	0.012			Activated carbon injection + fabric filter
	0.001	0.020	0.058	g/t (primary) pig-iron production		Numbers in g/t sinter adjusted with the ratio 0.116–1.621 t sinter/t pig iron (BREF). Same abatement implied
	0.0007	0.010	0.029			
	0.0005	0.007	0.019			

Table A3.6.18 Technology profile applied for pig iron and steel production.

Abbreviations. ACT: activated carbon tower; AIRFINE: high-efficiency scrubber (trademark); CYC: cyclone; ESP: electrostatic precipitator; FF: fabric filter; (W/D) FGD: (wet/dry) flue gas desulfurization; RAC: regenerative activated carbon process; WS: wet scrubber

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
Level 0: None		0					20	100	Fukuda et al. (2011), Remus et al. (2013), UNEP (2015)
Level 1: Basic APC: WS(+FF) (sinter plant)		5			20	50	80		
Level 2: Standard APC: ESP/CYC/FGD (sinter plant)		20		30	80	50			
Level 3: Efficient APC: ESP+FGD/ACT/ ESP+ACT (sinter plant)	40	55	75	60					
Level 4: Very efficient APC: ESP+ACT/RAC (sinter plant)	95	97	99	10					
Country-specific									
Australia									
Sinter plant: Regenerative activated carbon process + Pelletising plant: AIRFINE = ESP/ CYC + quench. scrubber + fine WS	95	97	99		100				Nelson et al. (2009), Remus et al. (2013)
Brazil									
Level 1		5				33			National information
Level 2		20				67			
China									
WS		38				2.5			Wang, S., pers. comm.
Cooler		79				16.8			
Cooler +WS		95				16.8			
ESP		29				10.3			
WS+ESP		45				18.3			
FF		67				11.3			
ESP+WFGD		57				20			
ESP+DFGD+FF		72				4			
Japan									
Sinter plant ESP + Blast furnace FF/ESP		26		30					Fukuda et al. (2011)
Sinter plant ESP+FGD + Blast furnace FF/ ESP		47		30					
Sinter plant ESP+ACT + Blast furnace FF/ ESP		75		40					
Mexico									
Direct Flame Afterburner with Heat Exchanger / ESP / Wet cyclonic separator/ Gravity collector; venturi scrubbers; cyclones; mat or panel filter		20				51			National information
FF		5				30			
None		0				19			
Republic of Korea									
ESP+SCR+FGD		50		100					National information

A3.6.7 Secondary steel production (electric arc furnace, EAF)

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning secondary steel production with Electric Arc Furnace (World Steel Association, 2015).

Applied UEFs: These are shown in Table A3.6.19.

Comparative EFs: These are shown in Table A3.6.20.

Discussion of EFs: During compilation of country-specific UEFs, an effort was made to use as much national information as possible. National information was used instead of generic values wherever possible.

The following literature sources were studied: Roseborough and Lindblad (2008), Kim et al. (2010a), Ocio et al. (2012), Burger Chakrabortry (2013), Wang et al. (2016d), Remus et al. (2013: table 8.1).

Basic assumptions during calculations of UEF: The national literature emission factors are given as abated emission factors. These were transformed into UEFs assuming reduction efficiencies according to the technology profile.

Applied technology profile: This is shown in Table A3.6.21.

Discussion of technology profile: A technology profile was developed based on UN Environment (2017b) and national information by Kim et al. (2010a) and Roseborough and Lindblad (2008).

Comparison with UNEP Toolkit factors: The default UEF used in this inventory (0.032 g Hg/t EAF steel produced) is not directly comparable to the UNEP Toolkit default factor, which is based on the number of recycled vehicles (0.2–2 g Hg/vehicle).

Potential for double counting: No potential for double counting.

Comparison with 2010 inventory factors: Secondary steel production was not included in the 2010 inventory.

Gaps/needs to improve factors and profiles: Information base for assumptions regarding emission factors and technology profiles.

Table A3.6.19 Unabated emission factors applied for secondary steel production in Electric Arc Furnace.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default	0.002	0.032	0.200	g/t secondary steel produced (EAF)		Expert evaluation based on Remus et al. (2013: table 8.1 and country-specific data.
Country-specific						
China		0.026		g/t secondary steel produced (EAF)	Wang et al. (2016d)	Abated EF from source is 0.021
Republic of Korea		0.019			Kim et al. (2010a)	Abated EF from source is 0.009
Turkey		0.017			Ocio et al. (2012)	Abated EF from source is 0.014

Table A3.6.20 Comparative emission factors for secondary steel production.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
UNEP Toolkit-based unabated input to air	0.2		2	g/vehicle	UNEP (2015)	Unit for EF not comparable.

Table A3.6.21 Technology profile applied for secondary steel production.

Abbreviations. CYC: cyclone; ESP: electrostatic precipitator; FF: fabric filter; PS: particle scrubber.

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
Level 0: None		0					25	50	Roseborough and Lindblad (2008), Kim et al. (2010a)
Level 1: Particulate matter (ESP/PS/CYC)		10		20	20	50	75	50	
Level 2: Particulate matter (FF)		30		80	80	50			
Level 3: Particulate matter plus other abatement		50							
Level 4: Advanced abatement		80							

A3.6.8 Non-ferrous metal production: copper (Cu)

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning primary copper production (and in some cases total copper production where primary production is not separately distinguished).

Applied UEFs: These are shown in Table A3.6.22.

Comparative EFs: These are shown in Table A3.6.23.

Discussion of EFs: Information on mass balances for non-ferrous metal production and Hg content of ores and concentrates produced and used in different countries is sparse. National data on consumption of raw materials and/or Hg content was used instead of generic values where available.

The following literature sources were studied: Hylander and Herbert (2008), Nelson et al. (2009), BREF NF (2009), Kribek et al. (2010), Kumari (2011), Zhang et al. (2012a), Joint Research Centre (2014), Wu (2012, 2016a), Boliden (2015), EMEP/EEA (2016), Hui et al. (2017), UN Environment (2017b), OUTOTEC, Hylander, pers. comm.; Maag, pers. comm.

Basic assumptions during calculations of UEF: (1) Initial oxidation stage (roasting or sintering of concentrate) is considered to be major source of Hg emissions. (2) Mining and concentrating processes are not considered due to lack of data. Inputs from these processes are considered as insignificant because they do not involve thermal processes. (3) Fuels can be a source of minor Hg inputs (UN Environment, 2017b) but these inputs are considered insignificant compared to inputs from metal ores. Eventual Hg emissions from fuels in the non-ferrous metals production are allocated to a separate activity under 'industrial stationary combustion emissions'. (4) An integrated acid plant is considered as a part of applied technology profile, see discussion of technology profile.

Metal contents, recovery rates, concentrate/metal ratios:

- Copper content of concentrates: 15–51%, intermediate value 28% (Kribek et al., 2010; Joint Research Centre, 2014; Boliden, 2015; EMEP/EEA, 2016; UN Environment, 2017b; OUTOTEC)
- Mercury content of concentrates: 1–100 g/t, intermediate value 26 g/t (Hylander and Herbert, 2008; Kribek et al., 2010; Kumari, 2011; Wu, 2012, 2016a; Zhang et al., 2012a; Boliden, 2015; UN Environment, 2017b)
- Rate of copper recovery from concentrates: 85–97%, intermediate value 93% (Boliden, 2015; UN Environment, 2017b)
- Concentrate/copper ratios: 2.0–7.8, intermediate value 3.8 (BREF, 2009; Zhang et al., 2012a; Boliden, 2015; OUTOTEC).

For all UEFs, distribution factor = 0.96. 4% of the total Hg input is assumed to be bound in smelting slag (Hui et al., 2017). Other pathways are assumed to refer to the treatment of residues from abatement equipment (UN Environment, 2017b; Maag, pers. comm.).

Applied technology profile: This is shown in Table A3.6.24.

Discussion of technology profile: Particular attention should be given to the comments in table note 'b'. When considering Hg reduction efficiencies for combinations of acid plant removal (assumed 90%) and APCDs, the AP reduction efficiency applies to the remaining Hg that is not removed by the APCDs. Therefore the removal efficiency of an efficient basic particle matter + wet gas control configuration in combination with an acid plant is 50% plus 90% of the remaining 50% = effective 95% reduction; similarly the removal efficiency of an efficient particle matter + wet gas control + Hg-specific control configuration in combination with an acid plant is 98% plus 90% of the remaining 2% = effective 99.8% reduction.

The following literature sources were studied: Hylander and Herbert (2008), BREF (2009), Kim et al. (2010a), Li et al. (2010), Boliden (2015), UNEP (2015), Wu (2016a), BAT/BEP (2017), UN Environment 2017b), national information provided by South Africa, Botswana, Namibia, Zambia, Australia, and Republic of Korea; Maag, pers. comm.; Wang, pers. comm., Euripidou, pers. comm.

Comparison with UNEP Toolkit factors: The default factor used (96.0 g/t Cu produced) is 11% lower than the default factor in the UNEP Toolkit (107.5 g/t Cu produced).

Potential for double counting: UNEP Toolkit EFs are derived based on analysis of Hg concentrations in ores, metal concentrates and reject materials. Country-specific EFs are derived based on the same principle. Fuels are not included so there should be no double counting.

Emissions estimates are calculated separately for each (non-ferrous) metal. In cases where large parts of the production are associated with co-production of several metals from the same concentrate/ore, there may be an over-estimation of the summed emissions for the non-ferrous metal sector.

Comparison with 2010 inventory factors: The default unabated EF applied in calculations for 2010 (107 g Hg/t Cu produced) is higher than the default unabated EF used in the current inventory (96 g/t Cu produced). This is due to the updates in Hg content of the concentrates and distribution factor (both are lower in this inventory than in calculations for 2010), based on the latest available national data as well as information in the literature.

Acid plants decrease Hg emissions significantly, and are often combined with Hg-specific abatement measures that decrease Hg emissions even more. Applying abatement technology (especially acid plants) to the UEF of 96 g/t would correspond to an abated EF of around 1–10 g/t; however under the current work this assumption is not applied to all production in all countries as some countries still have artisanal production where abatement factors are considerably lower.

Gaps/needs to improve factors and profiles: (1) Information on the Hg and metal content of concentrates processed in different countries, including details of co-production of non-ferrous metals. (2) Information base for assumptions regarding technology profiles, especially detailed information on the amount of production in different countries that is associated with facilities with integrated acid plants as opposed to artisanal production or production at larger facilities with no integrated acid plant.

Table A3.6.22 Unabated emission factors applied for non-ferrous metal production: copper.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default	1.9	96.1	748	g/t Cu produced (primary production)	Hylander and Herbert (2008), BREF (2009), UN Environment (2017b), OUTOTEC, country-specific data	Expert evaluation; intermediate based on 26 g/t in concentrate (low/high based on 1 and 100 g/t in concentrate, respectively)
Country-specific						
Australia	2.0	71.6	449	g/t Cu produced (primary production)	Hylander and Herbert (2008), BREF (2009), Nelson et al. (2009)	National data: 38% copper in concentrate
Canada	4.5	8.5	17.2		BREF (2009), UN Environment (2017b), OUTOTEC	National data: 2.3 Hg/t concentrate
China	6.4	16.1	245		Wu (2012, 2016a), Zhang et al. (2012a)	National data: 3.7 Hg/t concentrate, concentrate/copper ratio of 4.6
India	4.5	8.5	17.2		BREF (2009), Kumari (2011), OUTOTEC	National data: 2.3 Hg/t concentrate
Sweden	4.5	116.8	449		Boliden (2015), UN Environment (2017b)	National data: 24% copper in concentrate, 91% recovery rate, concentrate/copper ratio of 4.7
Zambia	4.5	5.2	6.2		BREF (2009), Kribek et al. (2010)	National data: 1.13 g Hg/t concentrate, 23% copper in concentrate

Table A3.6.23 Comparative emission factors for non-ferrous metal production: copper.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
UNEP Toolkit-based unabated input to air	1	30	300	g/t concentrate used	UN Environment (2017b)	Default input factor (Hg content of concentrate) 1–100 g/t; DF=1
	2.1	107.5	716.8	g/t Cu produced	UN Environment (2017b)	Default input factor (Hg content of concentrate) 1–100 g/t; DF=1
2010 inventory	2	107	717	g/t Cu produced	AMAP/UNEP (2013)	Default input factor (Hg content of concentrate) 1–100 g/t; concentrate/Cu ratio 2.8–3.3; DF=1.
Abated EF						
EMEP/EEA	0.021	0.031	0.052	g/t Cu produced	EMEP/EEA (2016)	Abatement not specified
UNEP Toolkit abated input to air	1.9	96.8	645.1	g/t Cu produced	UN Environment (2017b)	Default input factor 2.1–716.8 g/t. No filters or only coarse, dry PM retention. DF=0.9
	1.0	52.7	351.2	g/t Cu produced	UN Environment (2017b)	Default input factor 2.1–716.8 g/t. Wet gas cleaning. DF=0.49
	0.2	10.8	71.7	g/t Cu produced	UN Environment (2017b)	Default input factor 2.1–716.8 g/t. Wet gas cleaning and acid plant. DF=0.1
	0.04	2.2	14.3	g/t Cu produced	UN Environment (2017b)	Default input factor 2.1–716.8 g/t. Wet gas cleaning, acid plant and Hg specific filter. DF=0.02

Table A3.6.24 Technology profile applied for non-ferrous metal production: copper.

Abbreviations. AP: acid plant; DC: dust collector; DCDA: double contact and double absorption tower; ESD: electrostatic demister; ESP: electrostatic precipitator; (W/D) FGD: (wet/dry) flue gas desulfurization; FGS: flue gas scrubber; HgX: Hg-specific abatement technologies; WGC: wet gas cleaning.

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
Level 0: None or simple particle filters		0				2.5	5	10	Hylander and Herbert (2008), BREF (2009), Kim et al. (2010a), Li et al. (2010), UNEP (2015)
Level 1: Simple APC: particle control[a] only		10							
Level 2: Basic APC: particle control + WGC[a]		50				2.5	5		
Level 3: Efficient APC: particle control + WGC + AP[b]		95			20	95	90	90	
Level 4: Very efficient APC: particle control + WGC + HgX[c] + AP		99.8		100	80				
Country-specific									
Australia									
Level 4		99.8			100				National information
Botswana									
Simple APC – particle control only		10					100		Euripidou, pers. comm
China									
DC+FGS+ESD+DCDA		97				52.5			Wu (2016a), Wang, pers. comm.
DC+FGS+ESD+DCDA+DFGD		98.5				28.5			
DC+FGS+ESD+DCDA+WFGD		99.0				19.0			
Namibia, South Africa									
Level 1: Simple APC: particle control only		10				15			Euripidou, pers. comm
Level 2: Basic APC: particle control + WGC		50				25			
Level 3: Efficient APC: particle control + WGC + AP[b]		95				60			
Republic of Korea									
ESP-Venturi Scrubber-ESP-Boliden Norzink-DCDA		99.9		100					Kim et al. (2010a), and national information
Sweden									
ESP + scrubber + Boliden/Norzink + DCDA		99.7		100					Boliden (2015), BAT/BEP (2017)
Zambia									
Level 1: Simple APC: particle control only		10					15		Euripidou, pers. comm
Level 2: Basic APC: particle control + WGC		50					25		
Level 3: Efficient APC: particle control + WGC + AP[b]		95					60		

[a] Particle control = cyclones and ESP, [b] integrated acid plant (AP) downstream of APCDs is assumed to remove 90% of the remaining Hg from gas flow; [c] Hg-specific abatement technologies (HgX) can be the following processes and equipment types: Boliden/Norzink process, Outokumpu process, Bolchem, Sodium thiocyanate process, activated carbon filter/Lurgi process, Tinfos/Miltec process, selenium scrubber or filter, lead sulfide process, Hg reclaiming tower. Average removal efficiency of Hg-specific abatement technologies is assumed to be 98%.

A3.6.9 Non-ferrous metal production: lead (Pb)

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning primary lead production (and in some cases total lead production where primary production is not separately distinguished).

Applied UEFs: These are shown in Table A3.6.25.

Comparative EFs: These are shown in Table A3.6.26.

Discussion of EFs: Information on mass balances for non-ferrous metal production and Hg content of ores and concentrates produced and used in different countries is sparse. National data on consumption of raw materials and/or Hg content was used instead of generic values where available.

The following literature sources were studied: Hylander and Herbert (2008), BREF (2009), Kumari (2011), Wu (2012, 2016a), Zhang et al. (2012a), Joint Research Centre (2014), EMEP/EEA (2016), Hui et al. (2017), UN Environment (2017b), COWI, OUTOTEC, national information provided by Brazil; Hylander, pers. comm.; Maag, pers. comm.

Basic assumptions during calculations of UEF: (1) Initial oxidation stage (roasting or sintering of concentrate) is considered to be a major source of Hg emissions. (2) Mining and concentrating processes are not considered due to lack of data. Inputs from these processes are considered as insignificant because they do not involve thermal processes. (3) Fuels can be a source of minor Hg inputs (UN Environment, 2017b) but these inputs are considered insignificant compared to inputs from metal ores. Eventual Hg emissions from fuels in the non-ferrous metals production are allocated to a separate activity under 'industrial stationary combustion emissions'. (4) An integrated acid plant is considered as a part of an applied technology profile.

Metal contents, recovery rates, concentrate/metal ratios:

- Lead content of concentrates: 35–90%, intermediate value 50% (BREF, 2009)
- Mercury content of concentrates: 2–62.2 g/t, intermediate value 30 g/t (Hylander and Herbert, 2008; Kumari, 2011; Wu, 2012, 2016a; Zhang et al., 2012a; UN Environment, 2017b)
- Rate of lead recovery from concentrates: 80% (Paragraph 29 study (UNEP, 2010a) response from Brazil)
- Concentrate/lead ratios: 1.4-3.6, intermediate value 2.5 (COWI, OUTOTEC, Zhang et al., 2012a).

For all UEFs, distribution factor = 0.97. 3% of the total Hg input is assumed to be bound in smelting slag (Hui et al., 2017). Other pathways are assumed to refer to treatment of residues from abatement equipment (UN Environment, 2017b; Maag, pers. comm.).

Applied technology profile: This is shown in Table A3.6.27.

Discussion of technology profile: Particular attention should be given to the comments in table note 'b'. When considering Hg reduction efficiencies for combinations of acid plant removal (assumed 90%) and APCDs, the AP reduction efficiency applies to the remaining Hg that is not removed by the APCDs. Therefore the removal efficiency of an efficient basic particle matter + wet gas control configuration in combination with an acid plant is 50% plus 90% of the remaining 50% = effective 95% reduction; similarly the removal efficiency of an efficient particle matter + wet gas control + Hg-specific control configuration in combination with an acid plant is 98% plus 90% of the remaining 2% = effective 99.8% reduction.

The following literature sources were studied: Hylander and Herbert (2008), BREF (2009), Kim et al. (2010a); Li et al. (2010), Boliden (2015), UNEP (2015), Wu (2016a), BAT/BEP (2017), UN Environment (2017b), national information provided by Republic of Korea; Maag, pers. comm.; Wang, pers. comm., Seo, pers. comm.

Comparison with UNEP Toolkit factors: The default factor used (73.1 g/t Pb produced) is slightly lower than the default factor in the UNEP Toolkit (75 g/t Pb produced).

Potential for double counting: The UNEP Toolkit EFs are derived based on analysis of Hg concentrations in ores, metal concentrates and reject materials. Country-specific EFs are derived based on the same principle. Fuels are not included so there should be no double counting.

Emissions estimates are calculated separately for each (non-ferrous) metal. In cases where large parts of the production are associated with co-production of several metals from the same concentrate/ore, there may be an over-estimation of the summed emissions for the non-ferrous metal sector.

Comparison with 2010 inventory factors: The default unabated EF applied in calculations for 2010 (75 g Hg/t Pb produced) is slightly lower than the default unabated EF used in the current inventory (73.1 g/t Pb produced). This is due to the updated distribution factor (lower in this inventory than in calculations for 2010).

Acid plants decrease Hg emissions significantly, and are often combined with Hg-specific abatement measures that decrease Hg emissions even more. Applying abatement technology (especially acid plants) to the UEF of 73.1 g/t would correspond to an abated EF of around 1–7 g/t; however under the current work this assumption is not applied to all production in all countries because some countries still have artisanal production where abatement factors are considerably lower.

Gaps/needs to improve factors and profiles: (1) Information on the Hg and metal content of concentrates processed in different countries, including details of co-production of non-ferrous metals. (2) Information base for assumptions regarding technology profiles, especially detailed information on the amount of production in different countries that is associated with facilities with integrated acid plants as opposed to artisanal production or production at larger facilities with no integrated acid plant.

Table A3.6.25 Unabated emission factors applied for non-ferrous metal production: lead.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default	2.7	73.1	216	g/t Pb produced (primary production)	Hylander and Herbert (2008), BREF (2009), UN Environment (2017b), OUTOTEC; country-specific data	Expert evaluation; intermediate based on 30 g/t in concentrate (low/high based on 2 and 62 g/t in concentrate, respectively)
Bulgaria, Dem. Rep. Korea, Romania, Morocco, Myanmar, Russia, Serbia and Montenegro	10.1	18.3	26.1			Based on 7.5 g/t in concentrate
Argentina, Bolivia, Iran, Mexico, Peru	8.4	15.1	21.6			Based on 6.2 g/t in concentrate
Belgium, Italy, France, Germany, Japan, Republic of Korea, Poland, Sweden, United Kingdom, United States	6.8	12.2	17.4			Based on 5 g/t in concentrate
Country-specific						
Australia	4.3	7.7	11.0		BREF (2009), Wu et al. (2012), OUTOTEC	National data: 3.2 Hg/t concentrate
Canada	3.7	6.6	9.4		BREF (2009), UN Environment (2017b), OUTOTEC	National data: 2.7 Hg/t concentrate
China	8.3	44.3	102		Wu et al. (2012, 2016a), Zhang et al. (2012a)	National data: 27.1 Hg/t concentrate, concentrate/lead ratio of 1.7
India	2.7	10.8	21.6		BREF (2009), Kumari (2011), OUTOTEC	National data: 4.5 Hg/t concentrate
Kazakhstan	4.3	7.7	11.0		BREF (2009), Wu et al. (2012), OUTOTEC	National data: 3.2 Hg/t concentrate

Table A3.6.26 Comparative emission factors for non-ferrous metal production: lead.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
UNEP Toolkit-based unabated input to air	2	30	60	g/t concentrate used	UN Environment (2017b)	Default input factor (Hg content of concentrate) 2–60 g/t; DF=1
	2.8	75	214.3	g/t Pb produced	UN Environment (2017b)	Default input factor (Hg content of concentrate) 2–60 g/t; DF=1.
2010 inventory	3	75	214	g/t Pb produced	AMAP/UNEP (2013)	Default input factor (Hg content of concentrate) 2–60 g/t; concentrate/Pb ratio 2.5–3.3; DF=1.
EMEP/EEA	0.8	1	1.2	g/t Pb produced	EMEP/EEA (2016)	
Abated EF						
EMEP/EEA	0.2	0.3	0.4	g/t Pb produced	EMEP/EEA (2016)	2015 technology level
UNEP Toolkit abated input to air	2.52	67.5	192.9	g/t Pb produced	UN Environment (2017b)	Default input factor 2.8–214.3 g/t. No filters or only coarse, dry PM retention. DF= 0.9
	1.37	36.8	105	g/t Pb produced	UN Environment (2017b)	Default input factor 2.8–214.3 g/t. Wet gas cleaning. DF= 0.49
	0.28	7.5	21.4	g/t Pb produced	UN Environment (2017b)	Default input factor 2.8–214.3 g/t. Wet gas cleaning and acid plant. DF=0.1
	0.06	1.5	4.3	g/t Pb produced	UN Environment (2017b)	Default input factor 2.8–214.3 g/t. Wet gas cleaning, acid plant and Hg specific filter. DF=0.02

Table A3.6.27 Technology profile applied for non-ferrous metal production: lead.

Abbreviations. AP: acid plant; DC: dust collector; DCDA: double contact and double absorption tower; DOWA filter: lead^{II} sulfide process, a dry media technique; ESD: electrostatic demister; ESP: electrostatic precipitator; FGS: flue gas scrubber; HgX: Hg-specific abatement technologies; SCSA: single contact and single absorption tower; WGC: wet gas cleaning.

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
Level 0: None or simple particle filters		0				2.5	5	10	Hylander and Herbert (2008), BREF (2009), Kim et al. (2010a), Li et al. (2010), UNEP, (2015)
Level 1: Simple APC: particle control[a] only		10							
Level 2: Basic APC: particle control + WGC		50				2.5	5		
Level 3: Efficient APC: particle control + WGC + AP[b]		95			20	95	90	90	
Level 4: Very efficient APC: particle control + WGC + HgX[c] + AP		99.8		100	80				
Country-specific									
China									
None		0				5.7			Wu et al. (2016a), Wang, pers. comm.
DC		12				6.2			
DC+FGS		41				12.6			
DC+FGS+ESD+SCSA		87				16.1			
DC+FGS+ESD+DCDA		97				59.4			
Republic of Korea									
ESP-Venturi Scrubber-ESP-Boliden Norzink-DCDA		99.9		100					Seo, pers. comm.
Sweden									
ESP + DOWA filter + DCDA		99.7		100					Boliden (2015), BAT/BEP (2017)

[a] Particle control = cyclones and ESP, [b] integrated acid plant (AP) downstream of APCDs is assumed to remove 90% of the remaining Hg from gas flow; [c] Hg-specific abatement technologies (HgX) can be the following processes and equipment types: Boliden/Norzink process, Outokumpu process, Bolchem, sodium thiocyanate process, activated carbon filter/Lurgi process, Tinfos/Miltec process, selenium scrubber or filter, lead sulfide process, Hg reclaiming tower. Average removal efficiency of Hg-specific abatement technologies is assumed to be 98%.

A3.6.10 Non-ferrous metal production: zinc (Zn)

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning primary zinc production (and in some cases total production where primary production is not separately distinguished).

Applied UEFs: These are shown in Table A3.6.28.

Comparative EFs: These are shown in Table A3.6.29.

Discussion of EFs: Information on mass balances for non-ferrous metal production and Hg content of ores and concentrates produced and used in different countries is sparse. National data on consumption of raw materials and/or Hg content was used instead of generic values where available.

The following literature sources were studied: Hylander and Herbert (2008), BREF (2009), Kim et al. (2010a), Li et al. (2010), Wang et al. (2010a), Kumari (2011), Wu et al. (2012, 2016a), Zhang et al. (2012a), Joint Research Centre (2014), EMEP/EEA (2016), Hui et al. (2017), UN Environment, 2017b, OUTOTEC, Paragraph 29 study (UNEP, 2010a) answer from Brazil, Hylander, pers. comm.; Maag, pers. comm.

Basic assumptions during calculations of UEF: (1) Initial oxidation stage (roasting or sintering of concentrate) is considered to be a major source of Hg emissions. (2) Mining and concentrating processes are not considered due to lack of data. Inputs from these processes are considered as insignificant because they do not involve thermal processes. (3) Fuels can be a source of minor Hg inputs (UN Environment, 2017b) but these inputs are considered insignificant compared to inputs from metal ores. Eventual Hg emissions from fuels in non-ferrous metals production are allocated to a separate activity under 'industrial stationary combustion emissions'. (4) An integrated acid plant is considered as a part of the applied technology profile.

Metal contents, recovery rates, concentrate/metal ratios:

- Zinc content of concentrates: 33–60%, intermediate value 46% (Paragraph 29 study (UNEP, 2010a) answer from Brazil; BREF, 2009; Li et al., 2010)
- Mercury content of concentrates: 1–147 g/t, intermediate value 64 g/t (Hylander and Herbert, 2008; Kumari, 2011; Wu et al., 2012, 2016a; Zhang et al., 2012a; UN Environment, 2017b)
- Rate of Zn recovery from concentrates: 95–97% (Li et al., 2010)
- Concentrate/zinc ratios: 1.7–3.2, intermediate value 2.3 (Wang et al., 2010a; Zhang et al., 2012a; OUTOTEC).

For all UEFs, distribution factor = 0.9. 1–17% of the total Hg input is assumed to be bound in smelting slag (Hui et al., 2017) – the current work uses 10% as a weighted average over the two main processes – hydrometallurgical (more widely used, with an estimated share of Hg input bound in slag of 17%) and pyrometallurgical (share of Hg input bound in slag of 0.5–2.3%). Other pathways are assumed to refer to treatment of residues from abatement equipment (UN Environment, 2017b; Maag, pers. comm.).

Applied technology profile: This is shown in Table A3.6.30.

Discussion of technology profile: Particular attention should be given to the comments in table note 'b'. When considering Hg reduction efficiencies for combinations of acid plant removal (assumed 90%) and APCDs, the AP reduction efficiency applies to the remaining Hg that is not removed by the APCDs. Therefore the removal efficiency of an efficient basic particle matter + wet gas control configuration in combination with an acid plant is 50% plus 90% of the remaining 50% = effective 95% reduction; similarly the removal efficiency of an efficient particle matter + wet gas control + Hg-specific control configuration in combination with an acid plant is 98% plus 90% of the remaining 2% = effective 99.8% reduction.

The following literature sources were studied: Hylander and Herbert (2008), BREF (2009), Kim et al. (2010a), Li et al. (2010), UNEP (2015), UN Environment (2017b), Wu et al. (2016a), Maag, pers. comm.; Wang, pers. comm.; Euripidou, pers. comm.

Comparison with UNEP Toolkit factors: The default factor used (130.8 g/t Zn produced) is 6% higher than the default factor in the UNEP Toolkit (123.3 g/t Zn produced).

Potential for double counting: The UNEP Toolkit EFs are derived based on analysis of Hg concentrations in ores, metal concentrates and reject materials. Country-specific EFs are derived based on the same principle. Fuels are not included so there should be no double counting.

Emissions estimates are calculated separately for each (non-ferrous) metal. In cases where large parts of the production are associated with co-production of several metals from the same concentrate/ore, there may be an over-estimation of the summed emissions for the non-ferrous metal sector.

Comparison with 2010 inventory factors: The default unabated EF applied in calculations for 2010 (123 g/t Zn produced) is lower than the default unabated EF used in the current inventory (130.8 g/t Zn produced). This is due to the updated metal content of the concentrates which is lower in this inventory than in calculations for 2010 (46% and 55%, respectively).

Acid plants decrease Hg emissions significantly, and are often combined with Hg-specific abatement measures that decrease Hg emissions even more. Applying abatement technology (especially acid plants) to the UEF of 130.8 g/t would correspond to an abated EF of around 1–13 g/t; however, under the current work this assumption is not applied to all production in all countries because some countries still have artisanal production where abatement factors are considerably lower.

Gaps/needs to improve factors and profiles: (1) Information on the Hg and metal content of concentrates processed in different countries, including details of co-production of non-ferrous metals. (2) Information base for assumptions regarding technology profiles, especially detailed information on the amount of production in different countries that is associated with facilities with integrated acid plants as opposed to artisanal production or production at larger facilities with no integrated acid plant.

Table A3.6.28 Unabated emission factors applied for non-ferrous metal production: zinc.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default	1.6	130.8	422	g/t Zn produced (primary production)	Hylander and Herbert (2008), BREF (2009), UN Environment (2017b), OUTOTEC; country-specific data	Expert evaluation; intermediate based on 64 g/t in concentrate (low/high based on 1 and 147 g/t in concentrate, respectively)
Country-specific						
Australia	74.5	127.3	256		BREF (2009), UN Environment (2017b), OUTOTEC	National data: 62.3 Hg/t concentrate
Brazil	2.3	146.6	340		BREF (2009), Paragraph 29 study (UNEP, 2010a) answer from Brazil, UN Environment (2017b)	National data: 41% zinc in concentrate
Canada	17.1	27.6	353		BREF (2009), UN Environment (2017b), OUTOTEC	National data: 13.5 Hg/t concentrate
China	1.8	159.7	737		Wang et al. (2010a), Wu et al. (2012, 2016a), Zhang et al. (2012a), Hui et al. (2017)	National data: 77.5 Hg/t concentrate, concentrate/zinc ratio of 2.4, DF=0.86
Germany	9.3	299.1	422		BREF (2009), UN Environment (2017b), OUTOTEC	National data: 146.4 Hg/t concentrate
India	17.1	51.2	422		BREF (2009), Kumari (2011), OUTOTEC	National data: 25 Hg/t concentrate
Namibia	1.7	110.2	253		BREF (2009), UN Environment (2017b), NAM Zn,	National data: 55% zinc in concentrate; 95% recovery rate
Norway	1.6	122.6	422		BREF (2009), UN Environment (2017b), OUTOTEC	National data: 60 Hg/t concentrate
Peru	1.6	74.8	422		BREF (2009), UN Environment (2017b), OUTOTEC	National data: 37 Hg/t concentrate
Russia	1.6	155.3	353		BREF (2009), UN Environment (2017b), OUTOTEC	National data: 76 Hg/t concentrate
Spain	66.7	162.4	422		BREF (2009), UN Environment (2017b), OUTOTEC	National data: 79.5 Hg/t concentrate
USA	1.6	33.9	60.3		BREF (2009), UN Environment (2017b), OUTOTEC	National data: 17 Hg/t concentrate

Table A3.6.29 Comparative emission factors for non-ferrous metal production: zinc.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
UNEP Toolkit-based unabated input to air	5	65	130	g/t concentrate used	UN Environment (2017b)	Default input factor (Hg content of concentrate) 5–130 g/t; DF=1.
	8.6	123.3	342.1	g/t Zn produced	UN Environment (2017b)	Default input factor (Hg content of concentrate) 5–130 g/t; DF=1.
2010 inventory	9	123	342	g/t Zn produced	AMAP/UNEP (2013)	Default input factor (Hg content of concentrate) 5–130 g/t; concentrate/Zn ratio 2.0–2.2; DF=1.
EMEP/EEA	2	5	8	g/t Zn produced	EMEP/EEA (2016)	
Abated EF						
EMEP/EEA	20.1	50.6	81.5	g/t Zn produced	EMEP/EEA (2016)	Abatement not specified
UNEP Toolkit abated input to air	7.7	111.0	307.9	g/t Zn produced	UN Environment (2017b)	Default input factor 8.6–342.1 g/t. No filters or only coarse, dry PM retention. DF=0.9
	4.2	60.4	167.6	g/t Zn produced	UN Environment (2017b)	Default input factor 8.6–342.1 g/t. Wet gas cleaning. DF=0.49
	0.9	12.3	34.2	g/t Zn produced	UN Environment (2017b)	Default input factor 8.6–342.1 g/t. Wet gas cleaning and acid plant. DF=0.1
	0.2	2.5	6.8	g/t Zn produced	UN Environment (2017b)	Default input 8.6–342.1 g/t. Wet gas cleaning, acid plant and Hg specific filter. DF=0.02

Table A3.6.30 Technology profile applied for non-ferrous metal production: zinc.

Abbreviations. AP: acid plant; DC: dust collector; DCDA: double contact and double absorption tower; ESD: electrostatic demister; ESP: electrostatic precipitator; (D/W) FGD: (dry/wet) flue gas desulfurization; FGS: flue gas scrubber; HgX: Hg-specific abatement technologies; SCSA: single contact and single absorption tower; WGC: wet gas cleaning.

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
Level 0: None or simple particle filters		0				2.5	5	10	Hylander and Herbert (2008), BREF (2009), Kim et al. (2010a), Li et al. (2010), UNEP (2015)
Level 1: Simple APC: particle control[a] only		10							
Level 2: Basic APC: particle control + WGC		50				2.5	5		
Level 3: Efficient APC: particle control + WGC + AP[b]		95			20	95	90	90	
Level 4: Very efficient APC: particle control + WGC + HgX[c] + AP		99.8		100	80				
Country-specific									
Algeria									
Level 1: Simple APC: particle control only		10						15	Euripidou, pers. comm.
Level 2: Basic APC: particle control + WGC		50						25	
Level 3: Efficient APC: particle control + WGC + AP[b]		95						60	
China									
DC+FGS		41				0.2			Wu et al. (2016a), Wang, pers. comm.
DC+FGS+ESD+SCSA		87				0.2			
DC+FGS+ESD+DCDA		97.4				49.5			
DC+FGS+ESD+DCDA+DFGD		98.5				20			
DC+FGS+ESD+DCDA+WFGD		99.0				20			
DC+FGS+ESD+SMR+DCDA		99.2				10.1			
Namibia									
Level 1: Simple APC: particle control only		10				15			Euripidou, pers. comm.
Level 2: Basic APC: particle control + WGC		50				25			
Level 3: Efficient APC: particle control + WGC + AP[b]		95				60			
Republic of Korea									
ESP-Venturi Scrubber-ESP-Boliden/ Norzink-DCDA		99.9		100					Kim et al. (2010a), national information

[a] Particle control = cyclones and ESP, [b] integrated acid plant (AP) downstream of APCDs is assumed to remove 90% of the remaining Hg from gas flow; [c] Hg-specific abatement technologies (HgX) can be the following processes and equipment types: Boliden/Norzink process, Outokumpu process, Bolchem, sodium thiocyanate process, activated carbon filter/Lurgi process, Tinfos/Miltec process, selenium scrubber or filter, lead sulfide process, Hg reclaiming tower. Average removal efficiency of Hg-specific abatement technologies is assumed to be 98%.

A3.6.11 Non-ferrous metal production: mercury (Hg) dedicated production from cinnabar ore

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning primary Hg production from cinnabar ore; restricted to countries with primary mine production.

Applied UEFs: These are shown in Table A3.6.31.

Comparative EFs: These are shown in Table A3.6.32.

Discussion of EFs: In the absence of any additional/new national information, the UNEP Toolkit factors were adopted in this work.

The following literature sources were studied: BREF (2009) Joint Research Centre (2014), UN Environment (2017b), national information provided by Mexico.

Basic assumptions during calculations of UEF: (1) Mining and concentrating processes are not considered due to lack of data. (2) Eventual Hg emissions from fuels in the non-ferrous metals production are allocated to a separate activity under 'industrial stationary combustion emissions' (see E-Annex, Section A3.5.6).

For all EFs, distribution factor = 0.25 (as in the UNEP Toolkit, applied to total Hg release during the process).

Applied technology profile: This is shown in Table A3.6.33.

Discussion of technology profile: Minimal abatement in the form of basic particle matter control was assumed; production occurs in Group 3, 4 and 5 countries only.

Comparison with UNEP Toolkit factors: The default factor used (7500 g/t Hg produced) is the same as the factor in the UNEP Toolkit.

Potential for double counting: The UNEP Toolkit EF, used as a generic value also in this work, is derived based on analysis of Hg concentrations in ore, concentrates and reject materials. The same principle was applied to country-specific EFs. Fuels are not included so there is no risk of double counting.

Comparison with 2010 inventory factors: The same unabated emission factor is used as in the calculations for 2010.

Gaps/needs to improve factors and profiles: Information base for assumptions regarding technology profiles.

Table A3.6.31 Unabated emission factors applied for non-ferrous metal production: mercury (dedicated production from cinnabar ore).

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default		7500		g/t Hg produced	UN Environment (2017b)	The UNEP Toolkit factor has been adopted

Table A3.6.32 Comparative emission factors for non-ferrous metal production: mercury (dedicated production from cinnabar ore).

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
UNEP Toolkit unabated input to air	5000	7500	10000	g/t Hg produced	UN Environment (2017b)	DF=0.25, total Hg released = 20–40 kg/t Hg produced. DF applies here to Hg releases, not total Hg input (1020–1040 kg/t Hg produced). Since no information on control systems is found, the UNEP Toolkit EF is considered as unabated.
2010 inventory		7500		g/t Hg produced	AMAP/UNEP (2013)	The UNEP Toolkit factor has been adopted

Table A3.6.33 Technology profile applied for non-ferrous metal production: mercury (dedicated production from cinnabar ore).

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
Level 1: None or simple particle filters	10	10				100	100	100	Expert estimate
Country-specific									
Mexico									
Particle control only		40				100			National information

A3.6.12 Non-ferrous metal production: aluminum (Al) and alumina production from bauxite ore

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning primary Al and alumina production from bauxite.

Applied EFs: These are shown in Table A3.6.34.

Comparative EFs: These are shown in Table A3.6.35.

Discussion of EFs: National data on material consumption and/or Hg contents was used instead of generic values wherever possible.

The following literature sources were studied: BREF (2009), Joint Research Centre (2014), Nelson et al. (2009), UN Environment (2017b), national comments from China.

Basic assumptions during calculations of UEF:

- Emissions from Al production assume: (1) production of alumina from bauxite, (2) production of aluminum from locally produced alumina, and (3) production of aluminum from imported alumina
- Digestion of bauxite is considered to be a major source of Hg emissions
- Fuels can be a source of significant Hg inputs but these inputs are not included in the EFs. Eventual Hg emissions from fuels in the non-ferrous metals production are allocated to a separate activity under 'industrial stationary combustion emissions'.
- Metal contents and ratios: Bauxite/alumina ratio – 2.0–2.5, intermediate value 2.3 (Nelson et al., 2009; BREF, 2009); Alumina/aluminum ratio – 1.6–2.5, intermediate value 1.9 (BREF, 2009); Mercury content of bauxite – 0.07–1.00 g/t, intermediate value 0.49 g/t (UN Environment, 2017b).

Distribution factor = 0.15 (as in the UNEP Toolkit, applied to total Hg release during the process).

Since Al is produced from alumina, which is traded internationally, three different emission factors have been developed:

- The EF for production of Al from bauxite – applied to major bauxite-producing countries that also produce aluminum
- The EF for production of Al from alumina – applied to major aluminum-producing countries that are not bauxite-producers (production from imported alumina)
- The EF for production of alumina for export – applied to major bauxite-producing countries that also produce alumina but not aluminum.

Applied technology profile. This is shown in Table A3.6.36.

Discussion of technology profile: The following literature sources were studied: BREF (2009), Nelson et al. (2009), UNEP (2011b, 2015), national information provided by China.

Comparison with UNEP Toolkit factors: The default factor used (0.31 g/t Al produced) is a (rounded) equivalent to the default factors from the UNEP Toolkit (with adjustment for the application to Al production activity data rather than bauxite ore used).

Potential for double counting: The UNEP Toolkit EFs are derived based on analysis of Hg concentrations in bauxite ore. Country-specific EFs are derived based on the same principle. Fuels are not included so there should be no potential for double counting.

Comparison with 2010 inventory factors: The default unabated EF applied in calculations for 2010 (0.32 g Hg/t Al produced) is slightly higher than the default unabated EF used in the current inventory (0.31 g/t Cu produced). This is due to the update in bauxite/alumina ratio, based on the latest available information in the literature.

Gaps/needs to improve factors and profiles: (1) Information on the basis for national production of Al (alumina vs. bauxite). (2) Information base for assumptions regarding technology profiles.

Table A3.6.34 Unabated emission factors applied for non-ferrous metal production: aluminum and alumina production from bauxite ore.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default						
Applied to major bauxite-producing countries	0.03	0.31	0.9	g/t Al produced		Expert evaluation based on BREF (2009), Nelson et al. (2009), UNEP (2015), and country-specific data
Applied to Al-producing countries without major bauxite production		0.05				
Applied to major bauxite-producing countries without Al-production (alumina for export)		0.26		g/t Al produced		
		0.14		g/t alumina produced		
Country-specific						
Australia	0.04	0.05	0.06		BREF (2009), Nelson (2009), UN Environment (2017b)	National data: 0.07 g Hg/t bauxite, 2.5 t bauxite/ t alumina
China	0.03	0.28	0.8		UN Environment (2017b), national information	National data: 2.0 t bauxite/ t alumina
Sub-Saharan African countries	0.10	0.13	0.2		BREF (2009), UN Environment (2017b)	National data: 0.2 g Hg/t bauxite

Table A3.6.35 Comparative emission factors for non-ferrous metal production: aluminum and alumina production from bauxite ore.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
	0.01	0.08	0.15	g/t bauxite used	UN Environment (2017b)	Default input factor (Hg content of bauxite) 0.07–1 g/t; DF to air = 0.15.
	0.04	0.32	0.70	g/t Al produced	BREF (2009), Nelson et al. (2009), UN Environment (2017b), and country-specific data	UNEP TK numbers are adjusted using bauxite/aluminum ratio ~3.8–4.7 (2–2.46 t bauxite/t alumina) × 1.9 t alumina/t Al

Table A3.6.36 Technology profile applied for non-ferrous metal production: aluminum and alumina production from bauxite ore.

Abbreviations. ESP: electrostatic precipitator; FF: fabric filter; WS: wet scrubber.

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
Level 0: None		0					100	100	Nelson et al. (2009), UNEP (2011b)
Level 1: Particle control (cyclones+ ESP/FF) + WS		50			100	100			
Level 2: particle control (cyclones+ ESP/FF) + WS + Hg collection/reduction		75		100					
Country-specific									
China									
Cyclone + ESP/FF		60				10			Wang, pers. comm.
Particle control + Desulfurization towers		65				90			

A3.6.13 Large-scale gold production

Basis for 2015 emission estimates: UEFs applied to activity data concerning mine production of gold in tonnes. Activity is the production of gold from large-scale mine production (and does not include ASGM production).

Applied EFs: These are shown in Table A3.6.37.

Comparative EFs: These are shown in Table A3.6.38.

Discussion of EFs: -

The following literature sources were studied: Hui et al. (2017), Yang et al. (2016), UNEP (2010a), BAT/BEP (2017), UN Environment (2017b), Nelson, pers. comm.

Basic assumptions during calculations of UEF:

The UEF depends on:

- Amount of Au in ore (which determines the ratio of tonnes of ore needed to produce a tonne of gold)
- Mercury content of ores
- Distribution factor to air (proportion of Hg that is released to air).

The first two at least are likely to vary considerably from mine to mine; however, as it was not possible in this work to consider emissions estimates on a mine-by-mine basis, a generic average UEF was applied with the following assumptions:

Amount of gold in ore = a (generic) value of 4 g Au/t ore was assumed, yielding a ratio of 250,000 tonnes ore for one tonne of gold. Figure A3.6.1 illustrates the development of exploited Au-ore grade in previous years, which in itself can be expected to have resulted in considerable changes in factors applicable to Hg releases from large-scale gold production. Generally, Hg releases would be expected to increase if the Au-content decreases and the Hg-content of the ore remains the same – which is not necessarily the case – due to the increased amount of ore mined for a given production of gold.

Mercury content of ore: 5.5 g Hg/t Au ore was used in the current global inventory calculations. For comparison, the UNEP Toolkit quotes a range of 10–100 g/t ore; UNEP Paragraph-29 (UNEP, 2010a) reported values of 0.1–100 g/t ore, and US Paragraph-29 sources (UNEP, 2010a) reported values of 0.1–30 g/t ore.

Distribution factor to air = 0.04 was used, adopted from the UNEP Toolkit (UN Environment, 2017b). A major part of the total Hg input (over 90%) is often released to land on-site, presumably without entering the roasting stage. On this basis, the (unabated) EF is = 5.5 × 250,000 × 0.04 = 55,000 g Hg emitted/tonne gold produced.

Applied technology profile: This is shown in Table A3.6.39.

Discussion of technology profile: According to BAT/BEP (2017) and information obtained from Australia (Nelson, pers. comm.) and China (Hui et al., 2017; Yang et al., 2016), it is not unusual to use highly efficient APCDs in large-scale gold production. BAT/BEP (2017) reports that removal efficiency of APCDs on roasters – including acid plants and upstream abatement such as a sulfur-impregnated activate carbon filter (the most common and proven technology in this sector) – can be higher than 99%. The Jerritt process used at some facilities in North America has a removal efficiency of 99.97% (BAT/BEP, 2017). According to Hui et al. (2017), all large-scale gold production in China is covered by APCDs that remove 97–99% of Hg from the flue gas. In Australia, the new production technology launched in 2015 is claimed to reduce Hg emissions from large-scale gold production by 90% (Nelson, pers. comm.) In the current inventory, it has been assumed that the most efficient APCDs, applied mainly in technology Group 1 countries, remove 99% of Hg. These can include a sulfur-impregnated activated carbon filter, Boliden/Norzink process or Jerritt process with an acid plant downstream. Australia and China are assigned country-specific technology profiles.

Comparison with UNEP Toolkit factors: The UEF used in this work is about three-fold lower than the UNEP Toolkit default factor – 150 kg Hg/t gold (assuming 3750 kg/gold produced and DF = 0.04). In the current inventory, the Hg content of ore is assumed to be 5.5 g/t while in the UNEP Toolkit a value of 15 g Hg/t ore is used.

Potential for double counting: UEFs are derived from the Hg and gold content of ores. Fuels consumed at gold production plants are not included so there is no risk of double counting.

Comparison with 2010 inventory factors: The default factor used in the current inventory is the same as used in calculations for 2010.

Gaps/needs to improve factors and profiles: (1) Relevant information on Hg and Au content of ores and concentrates processed in different countries, including the distribution of these factors for individual mines/processing facilities. (2) Information on APCDs employed at large-scale gold production facilities.

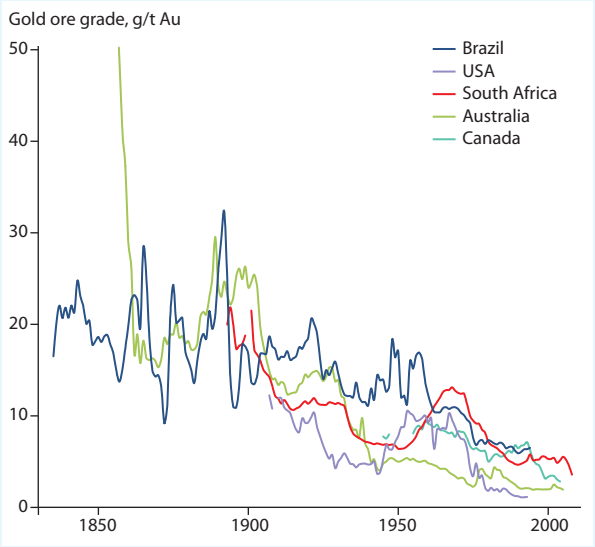

Figure A3.6.1. Changes in gold ore grade over time in different countries. Source: after Giurco et al., 2010.

Table A3.6.37 Emission factors applied for large-scale gold production.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default		55,000		g/t (mine) Au produced	UN Environment (2017b)	4 g Au/t ore; 5.5 g Hg/tonne Au ore; DF=0.04 (applied to Hg in ores)
Country-specific						
Australia		12,000		g/t (mine) Au produced	Nelson, pers. comm.	Expert estimate based on national data: 1.24 g Hg/t Au ore
China		26,000		g/t (mine) Au produced	Yang et al. (2016)	National data: 0.73 g Hg/t Au concentrate, 0.004% Au in Au concentrate, 70% recovery rate, DF=0.89 (applied to Hg in concentrated Au, including roasting and cyanidation stages)

Table A3.6.38 Comparative emission factors (EFs) for large-scale gold production.

	Emission factor				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
UNEP Toolkit input to air	10	150	300	g/t ore used (extracted)	UN Environment (2017b)	Default input factor 15 (1–30) g/t ore used, or 3750 (250–7500) kg/t gold produced; DF to air = 0.04.
2010 inventory		55000		g/t (mine) Au produced	AMAP/UNEP (2013)	

Table A3.6.39 Technology profile applied for large-scale gold production.

Abbreviations. AP: acid plant; HgX: Hg-specific abatement technologies; WGC: wet gas cleaning.

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
Level 0: None or simple particle filters		0						100	Expert estimate based on Hui et al. (2017), Yang et al. (2016), BAT/BEP (2017), Nelson, pers. comm.
Level 1: Simple APC: particle control[a] only		10					100		
Level 2: Basic APC: simple particle control + WGC		25				80			
Level 3: Medium-efficiency APC: more efficient particle control + WGC		40			80	20			
Level 4: Efficient APC: particle control + WGC + less efficient HgX + AP[b]		95		80	20				
Level 5: Very efficient APC: particle control + WGC + more efficient HgX + AP		99		20					
Country-specific									
Australia									
No control		0			50				Nelson, pers. comm.
Ultra-fine grinding mill		90			50				
China									
Single-phase roasting +APC		97				30			Hui et al. (2017), Yang et al. (2016)
Dual-phase roasting +APC		98				13			
Production with cyanidation+ APC		99				57			

[a] Particle control = cyclones and ESP; [b] Hg-specific abatement technologies (HgX) can be the following processes and equipment types: Boliden/Norzink process, sulfur-impregnated active carbon filter, Jerritt process. Average removal efficiency of Hg-specific abatement technologies combined with an integrated acid plant (AP) downstream of APCDs is assumed to be 95% for less efficient technologies and 99% for more efficient technologies.

A3.6.14 Cement production

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning production of cement.

Applied UEFs: These are shown in Table A3.6.40.

Comparative EFs: These are shown in Table A3.6.41.

Discussion of EFs: During compilation of unabated country-specific EFs, an effort was made to use as much national data as possible. Most of the countries do not have complete mass balances but national data on material consumption and/or Hg contents was used instead of generic values wherever possible.

The following literature sources were studied: CSI (2005), CEMBUREAU (2010), Mlakar et al. (2010), UNEP (2010a: report and answers to the questionnaire by Barbados, Brazil, Cyprus, Iceland, USA; 2017), Fukuda et al. (2011), Won and Lee (2012), Burger Chakraborty et al. (2013), Schorcht et al. (2013), GNR (2014), Wang et al. (2014a, 2016d), Cementa (2015), VDZ (2015), Zhang et al. (2015b), BAT/BEP (2017), national comments and personal communication (Maioli, Seo, Solórzano, Suzuki).

Basic assumptions during calculations of UEF: (1) Only the clinker formation stage is considered; subsequent mixing stage is assumed to make insignificant input to Hg emissions compared to the thermal processes according to UN Environment (2017b), with the exception of fly ash addition during mixing which is not accounted for. (2) Clinker is assumed to be produced within a country; eventual import-export of clinker is not accounted for, which might result in over- or underestimations of country-specific emissions from cement production. (3) Recycling of filter materials on-site is not considered for the UEF since recycling is only possible if abatement is present.

Raw materials – input to the raw mill – are assumed to be a mixture of limestone with other, often more Hg-rich materials (clay, shale, fly ash, iron oxide). Significant amount of raw materials other than limestone can result in different input and emission factors. For countries that provided data on country-specific raw material consumption, these data were used in calculations.

Range of Hg content of raw materials:

- Total raw mix: 001–0.46 g/t, intermediate value – 0.09 g/t (CSI, 2005; Mlakar et al., 2010; UNEP, 2010a 2017; Fukuda et al., 2011; Won and Lee, 2012; Burger Chakraborty et al., 2013; Schorcht et al., 2013; Wang et al., 2014a, 2016d; Cementa, 2015; Zhang et al., 2015b, Seo, pers. comm., Suzuki, pers. comm.)
- Limestone: 0.001–0.46 g/t, intermediate value – 0.04 g/t (CSI, 2005; Mlakar et al., 2010; UNEP, 2010a, 2017; Fukuda et al., 2011; Won and Lee, 2012; Burger Chakraborty et al., 2013; Schorcht et al., 2013; Wang et al., 2014a, 2016d; Zhang et al., 2015b; Seo, pers. comm., Suzuki, pers. comm.)
- Clay: 0.001–0.45 g/t, intermediate value 0.08 g/t (CEMBUREAU, 2010; Won and Lee, 2012; Schorcht et al., 2013; Wang et al. 2014a; UN Environment, 2017b; Suzuki, pers. comm.)
- Shale: 0.002–0.44 g/t, intermediate value 0.05 g/t (CEMBUREAU, 2010; Wang et al., 2014a; UN Environment, 2017b)
- Iron oxide: 0–0.68 g/t, intermediate value 0.24 g/t (CEMBUREAU, 2010; Wang et al., 2014a)
- Fly ash: 0.03–0.39 g/t, intermediate value 0.14 g/t (Won and Lee, 2012).

Fuel combustion in the cement industry is accounted for in Section A3.6.14a, except for co-incinerated waste. Fossil fuels are therefore excluded from the UEF. Characteristics of co-incinerated waste (also called alternative fuels when referring to co-incineration in cement kilns):

- Calorific value – 22.9 MJ/kg, which is calculated as a weighted average over most widespread alternative fuels in Europe (according to Schorcht et al., 2013).
- Mercury content: 0.006–0.57 g/t, intermediate value – 0.24 g/t (CEMBUREAU, 2010; Mlakar et al., 2010; Won and Lee, 2012; Schorcht et al., 2013; Cementa, 2015).

Instead of using one world-wide UEF default, in this work either country-specific UEFs or regional UEF defaults were applied based on specific values of parameters as summarized in Table A3.6.42.

For all EFs, distribution factor = 0.95 (BAT/BEP, 2017); 5% of the Hg input is assumed to be bound in clinker.

Applied technology profile: This is shown in Table A3.6.43.

Discussion of technology profile: For countries with data on dust recycling back to the cement kiln, removal efficiencies are assumed to be 50% lower than generic or country-specific values for the same types of technologies based on APC outlet/inlet ratios of Hg concentrations or flows. This is because dust recycling results in an increased part of the Hg ultimately emitted to the air (BAT/BEP, 2017; UN Environment, 2017b) even though in this case removal efficiency cannot be defined as outlet to inlet ratio. The value 50% is based on distribution factors presented in the UNEP Toolkit for cases with and without dust recycling (particle control only).

The following literature sources were studied: Theloke et al. (2008), US EPA (2008), Nelson et al. (2009), Pudasainee et al. (2009a), BREF (2010), CEMBUREAU (2010), NESHAP (2010), Senior (2010), UNEP (2010a: report and answers to the questionnaire, 2011b), Schorcht et al. (2013); UN Environment (2017b), national comments and pers. comms. (Hagström, Maioli, Solórzano, Suzuki, Seo, Hoenig, Euripidou).

Comparison with UNEP Toolkit factors: The range of (central) regional default factors used in this inventory is 0.092–0.113 g Hg/t cement. This is higher than the UNEP Toolkit default unabated factor for cement production without waste co-incineration (0.088 g Hg/t cement) and lower than the UNEP Toolkit default unabated factor for production facilities with waste co-incineration (0.120 g Hg/t cement).

Potential for double counting: Generic EFs for cement production include waste co-incineration but not coal, petroleum coke or oil, which are accounted for in a separate sector, such that there should be no double counting. Country-specific EFs are derived using the same principle. However, in cases when the reported data are used, these can include use of coal and oil so there is a possibility of double counting for these countries.

Comparison with 2010 inventory factors: The default unabated factors applied when calculating emissions in 2010 are 0.087 g Hg/t cement without waste co-incineration and 0.118 g/t cement with waste co-incineration (assuming 12% thermal substitution by waste). In the current inventory, no single world-average emission factor was derived but several regional emission factors were derived instead, varying from 0.092 g Hg/t cement to 0.113 g Hg/t cement. All such emission factors include waste co-incineration – from 1% in CIS countries to 27% in the EU-27. The default values are lower than those used for 2010 mainly due to the revised Hg contents of raw materials and especially waste (0.32 g Hg/t waste is used for 2010, which is 33% higher than 0.24 g/t waste used now), calorific value of waste, and clinker/cement ratios.

Gaps/needs to improve factors and profiles: Information base for assumptions regarding technology profiles.

Table A3.6.40 Unabated emission factors applied for cement production.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default						
North America	0.001	0.111	0.855	g/t cement		Based on Schorcht et al. 2013, GNR 2014, UN Environment (2017b), and country-specific data. Waste co-incineration is included
Central America	0.001	0.106	0.789			
South America	0.001	0.092	0.659			
Oceania	0.001	0.109	0.775			
Middle East	0.001	0.113	0.788			
CIS	0.001	0.112	0.762			
Asia	0.001	0.109	0.775			
Africa	0.001	0.105	0.733			
EU-27	0.001	0.110	0.921			
Country-specific						
Algeria	0.001	0.099	0.688	g/t cement	Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.52 MJ/kg clinker, 3% waste, CC ratio = 0.70
Australia	0.001	0.110	0.783		CSI (2005), Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 6% waste
Austria	0.001	0.114	1.178		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.72 MJ/kg clinker, 63% waste, CC ratio = 0.70
Barbados	0.002	0.071	0.813		UNEP (2010a) Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	1.81 t limestone + 0.43 t shale /t clinker
Belarus	0.006	0.109	0.285		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 0.088 g Hg/t raw mix
Belgium	0.001	0.112	0.989		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 35% waste
Brazil	0.027	0.029	0.105		UNEP (2010a), Schorcht et al. (2013), GNR (2014), UN Environment (2017b), Maioli, pers. comm.	2.09 t raw mix (0.02 g Hg/t) /t clinker
Canada	0.001	0.023	0.700		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.81 MJ/kg clinker, 10% waste, CC ratio = 0.77, 0.02 g Hg/t raw mix
China	0.013	0.071	0.885		Schorcht et al. (2013), GNR (2014), Wang et al. (2014a), Zhang et al. (2015b), UN Environment (2017b)	1.5 t limestone + 1.2 t iron oxide/t clinker
Cyprus	0.001	0.071	0.602		UNEP (2010a), Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	1.4 t limestone + 0.44 t clay + 0.01 t iron oxide + 0.02 t waste/t clinker
Czech Republic	0.001	0.117	1.061		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.72 MJ/kg clinker, 39% waste, CC ratio = 0.76
Denmark	0.011	0.024	0.419		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 47% waste, 0.01 g Hg/t raw mix
Egypt	0.001	0.122	0.848		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 4.00 MJ/kg clinker, 3% waste, CC ratio = 0.87

Table A3.6.40 continued

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Estonia	0.001	0.111	0.955		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 31% waste
Finland	0.001	0.115	1.093		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 47% waste
France	0.001	0.109	0.890		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.95 MJ/kg clinker, 24% waste, CC ratio = 0.73
Germany	0.006	0.052	0.222		Schorcht et al. (2013), GNR (2014), VDZ (2015), UN Environment (2017b)	3.78 MJ/kg clinker, 45% waste, CC ratio = 0.70; 1.59 t limestone (0.03 g Hg/t) + 0.05 t clay (0.08 g Hg/t) + 0.05 t fly ash (0.08 g Hg/t) + 0.01 t iron ore (0.04 g Hg/t) /t clinker
Greece	0.001	0.103	0.714		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3% waste
Greenland	0.001	0.111	0.855		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.81 MJ/kg clinker, 15% waste, CC ratio = 0.77
Hungary	0.001	0.111	0.955		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 31% waste
Iceland	0.001	0.114	0.778		UNEP (2010a), Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.75 MJ/kg clinker, 27% waste, CC ratio = 0.73, 1.7 t raw mix/ t clinker
India	0.048	0.124	0.200		Burger Chakraborty et al. (2013), GNR (2014), UN Environment (2017b)	National data: total input 0.187 g Hg/t clinker, CC ratio = 0.70
Ireland	0.001	0.115	1.093		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 47% waste
Italy	0.001	0.108	0.817		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.58 MJ/kg clinker, 12% waste, CC ratio = 0.75
Japan	0.088	0.088	0.088		GNR (2014), Suzuki, pers. comm.	Country-specific mix and Hg content. Fossil fuels excluded. CC ratio = 0.76
Latvia	0.001	0.111	0.955		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.75 MJ/kg clinker, 31% waste, CC ratio = 0.73
Luxemburg	0.001	0.112	0.989		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 35% waste
Mexico	0.001	0.040	0.440		Schorcht et al. (2013), GNR (2014), UN Environment (2017b), Solórzano, pers. comm.	1.29 t limestone + 0.002 t waste/t clinker
Morocco	0.001	0.099	0.688		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.52 MJ/kg clinker, 3% waste, CC ratio = 0.70
Netherlands	0.001	0.112	0.989		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 35% waste
Norway	0.001	0.115	1.093		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 47% waste
Philippines	0.001	0.112	0.834		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.53 MJ/kg clinker, 10% waste, CC ratio = 0.79
Poland	0.001	0.114	1.003		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.82 MJ/kg clinker, 35% waste, CC ratio = 0.74
Portugal	0.001	0.103	0.714		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3% waste
Republic of Korea	0.006	0.071	0.108		Won and Lee (2012); GNR (2014), Seo, pers. comm.	1.43 t limestone (0.06 g Hg/t) + 0.08 t clay (0.01 g Hg/t) + 0.04 t fly ash (0.14 g Hg/t) + 0.04 t silica stone (0.01 g Hg/t) /t clinker; CC ratio = 0.76
Romania	0.001	0.103	0.714		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3% waste
Russia	0.038	0.039	0.057		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 4.59 MJ/kg clinker, 1% waste, CC ratio = 0.81, 0.03 g Hg/t raw mix
Slovenia	0.018	0.022	0.043		Mlakar et al. (2010), Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 0.02 g Hg/t raw mix, 0.13 g Hg/t waste, 3% waste
Spain	0.001	0.110	0.852		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.70 MJ/kg clinker, 15% waste, CC ratio = 0.76
Sweden	0.002	0.052	0.096		Schorcht et al. (2013), GNR (2014), Cementa (2015), UN Environment (2017b)	National data: 3.75 MJ/kg clinker, CC ratio = 0.92; 1.64 t raw mix (0.03 g Hg/t) + 0.09 t waste (0.12 g Hg/t) /t clinker

Table A3.6.40 continued

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Switzerland	0.023	0.041	0.456		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 48% waste, 0.03 g Hg/t raw mix
Thailand	0.001	0.115	0.810		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.30 MJ/kg clinker, 5% waste, CC ratio = 0.81
Tunisia	0.001	0.099	0.688		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.52 MJ/kg clinker, 3% waste, CC ratio = 0.70
Turkey	0.001	0.119	0.829		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.43 MJ/kg clinker, 3% waste, CC ratio = 0.85
UK	0.001	0.105	0.878		Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	National data: 3.83 MJ/kg clinker, 26% waste, CC ratio = 0.70
USA	0.001	0.055	0.564		UNEP (2010a), Schorcht et al. (2013), GNR (2014), UN Environment (2017b)	3.87 MJ/kg clinker, 12% waste, CC ratio = 0.84, 1.42 t limestone (0.04 g Hg/t) /t clinker

Table A3.6.41 Comparative emission factors for cement production.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
UNEP Toolkit unabated input to air, no waste co-incineration	0.003	0.088	0.4	g/t cement	UN Environment (2017b)	Default input factor 0.004–0.5 g/t; DF to air = 0.8
UNEP Toolkit unabated input to air, waste co-incineration	0.048	0.12	0.8		UN Environment (2017b)	Default input factor 0.06–1 g/t; DF to air = 0.8. Percentage of co-incinerated waste not specified
2010 inventory, no waste co-incineration	0.003	0.087	0.4		AMAP/UNEP (2013)	BREF-based mass-balance and expert evaluations with consideration to national data; DF to air = 0.8
2010 inventory, waste co-incineration	0.05	0.118	0.8		AMAP/UNEP (2013)	BREF-based mass-balance and expert evaluations with consideration to national data; DF to air = 0.8. Percentage of co-incinerated waste – 12%
Abated EF						
UNEP Toolkit abated input to air, with waste co-incineration and no filter dust recycling	0.029	0.072	0.48	g/t cement	UN Environment (2017b)	Default input factor 0.08–0.8 g/t. Simple particle control (ESP/PS/FF). DF=0.6
	0.019	0.048	0.32			Default input factor 0.08–0.8 g/t. Optimized particle control (FF-SNCR /FF+WS /ESP+GFD /optimized FF). DF=0.4
	0.010	0.024	0.16			Default input factor 0.08–0.8 g/t. Efficient Hg pollution control (FF+DS / ESP+DS / ESP+WS / ESP+SNCR). DF=0.2
	0.002	0.005	0.03			Default input factor 0.08–0.8 g/t. Very efficient Hg pollution control (wet FGD +ACI / FF +scrubber +SNCR). DF=0.04
UNEP Toolkit abated input to air, with waste co-incineration and filter dust recycling	0.034	0.084	0.56		UN Environment (2017b)	Default input factor 0.08–0.8 g/t. Simple particle control (ESP/PS/FF). DF=0.7
	0.029	0.072	0.48			Default input factor 0.08–0.8 g/t. Optimized particle control (FF-SNCR /FF+WS /ESP+GFD /optimized FF). DF=0.6
	0.024	0.060	0.40			Default input factor 0.08–0.8 g/t. Efficient Hg pollution control (FF+DS / ESP+DS / ESP+WS / ESP+SNCR). DF=0.5
	0.002	0.005	0.03			Default input factor 0.08–0.8 g/t. Very efficient Hg pollution control (wet FGD +ACI / FF +scrubber +SNCR). DF=0.04
CEMBUREAU		0.035			CEMBUREAU (2010)	

Table A3.6.42 Parameters for calculation of regional UEF for cement production (GNR, 2014).

Region	Thermal energy demand, MJ/kg clinker	Fuel substitution by waste, % of thermal energy	Clinker/cement ratio (CC ratio), t/t
North America	3.81	15	0.77
Central America	3.67	11	0.74
South America	3.65	6	0.65
Oceania	3.36	5	0.78
Middle East	3.43	3	0.81
CIS	4.59	1	0.81
Asia	3.36	5	0.78
Africa	3.78	3	0.75
EU-27	3.75	27	0.73

Table A3.6.43 Technology profile applied for cement production.

Abbreviations. ACI: activated carbon injection; DS: dry scrubber; ESP: electrostatic precipitator; (D/W) FGD: (dry/wet) flue gas desulfurization; FF: fabric filter; PS: particle scrubber; SNCR: selective non-catalytic reduction; WS: wet scrubber.

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
Level 0: None		0				20	50	100	US EPA (2008), Theloke et al. (2008), Pudasainee et al. (2009a), BREF (2010), CEMBUREAU (2010), NESHAP (2010); Senior (2010), UNEP (2010a, 2011b)
Level 1: Particulate matter simple APC: FF/ESP/PS		25		80	80	80	50		
Level 2: Particulate matter optimized/ combination APC: FF+SNCR/FF+WS/ ESP+FGD/optimized FF		55		15	20				
Level 3: Efficient APC: FF+DS/ESP+DS/ESP+WS/ESP+SNCR		75		4					
Level 4: Very efficient APC: WFGD + /ACI / FF + scrubber+ SNCR		95		1					
Country-specific									
Australia									
ESP		5			50				Nelson et al. (2009)
FF		78			50				
Brazil									
PM: ESP or PS		25				50			Maioli, pers. comm.
PM: FF or other efficient particle control		25				50			
Canada									
Level 1: Particulate matter simple APC: FF/ESP/PS		25		10					UNEP (2010a)
Level 2: Particulate matter optimized/ combination APC: FF+SNCR/FF+WS/ ESP+FGD/optimized FF		55		70					
Level 3: Efficient APC: FF+DS/ESP+DS/ESP+WS/ESP+SNCR		75		20					
China, Hong Kong									
Dust removal – FF/ESP		40				100			UNEP (2010a)

Table A3.6.43 continued

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
EU28 (if not separately listed) + Norway, Iceland and Switzerland									
Level 1: Particulate matter simple APC: FF/ESP/PS		25		39					Group 1 default adjusted to reflect increased controls due to regulation associated with increased use of co-incineration of waste
Level 2: Particulate matter optimized/ combination APC: FF+SNCR/FF+WS/ ESP+FGD/optimized FF		55		30					
Level 3: Efficient APC: FF+DS/ESP+DS/ ESP+WS/ESP+SNCR		75		30					
Level 4: Very efficient APC: WFGD + /ACI / FF + scrubber+ SNCR		95		1					
Germany									
Level 2: Particulate matter optimized/ combination APC: FF+SNCR/FF+WS/ ESP+FGD/optimized FF		55		75					Hoenig, pers. comm.
Level 3: Efficient APC: FF+DS/ESP+DS/ ESP+WS/ESP+SNCR		75		25					
India									
Uncontrolled		0						1	UNEP (2010a)
ESP		25						99	
Japan									
Particulate matter simple APC: FF/ESP/PS		25		80					Suzuki, pers. comm.
Particulate matter optimized/ combination APC: FF+SNCR/FF+WS/ESP+FGD/ optimized FF		55		15					
Efficient APC: FF+DS/ESP+DS/ESP+WS/ ESP+SNCR		75		4					
Very efficient APC: WFGD + /ACI / FF + scrubber+ SNCR		95		1					
Republic of Korea									
Spray tower + particle control (FF)		60.5		100					Seo, pers comm.
Mexico									
Particle control: FF, ESP, cyclones		25				100			Solórzano, pers. comm.
South Africa									
FF + ESP		30				100			Euripidou, pers. comm.
Sweden									
FF + SNCR		55		28					Hagström, pers. comm.
FF + scrubber+ SNCR		75		72					
UK									
Particulate matter control		25		26					UNEP (2010a)
FF + SNCR		50		27					
ESP + WS		55		8					
ESP + DS		73		39					

A3.6.14a Fossil fuel combustion in cement production

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning amount of hard coal, brown coal and petroleum coke combustion in the cement sector.

Applied EFs: EFs for petroleum coke are shown in Table A3.6.44. EFs for hard coal are shown in Table A3.6.1 and for brown coal in Table A3.6.4.

Comparative EFs: For hard coal and brown coal, the same emission factors are used as in the more general coal combustion sector (see Sections A3.6.1 and A3.6.2). For petroleum coke combustion, comparative EFs are shown in Table A3.6.45. DF to air is assumed to be 1 for unabated emissions.

Discussion of EFs: During the compilation of unabated country-specific EFs, an effort was made to use as much national data as possible.

The following literature sources were studied: CEMBUREAU (2010), Mlakar et al. (2010), Fukuda et al. (2011), Schorcht et al. (2013), Cementa (2015), UN Environment (2017b).

Basic assumptions during calculations of UEF: Same as for UEF in the more general coal combustion sector (see Sections A3.6.1 and A3.6.2).

Applied technology profile: Default and country-specific technology profiles are harmonized with the technology profiles in the cement production sector (Section A3.6.14).

Discussion of technology profile: Process-related emissions (originating in raw materials) and energy-related emissions (originating in fuels) are usually treated in the same abatement system at cement facilities.

Comparison with UNEP Toolkit factors: The default input factor for unspecified petroleum coke combustion in the UNEP Toolkit (0.02 g Hg/t oil product) is about half the emission factors used in this work.

Potential for double counting: UEFs are derived from analysis of Hg concentration of coal and petroleum coke combusted at cement producing facilities. Combustion in cement production is intentionally separated from other fuel combustion and is not accounted for in other sectors so there is no risk of double counting.

Comparison with 2010 inventory factors: Emissions from coal combustion in cement production were allocated to the coal combustion sector in the 2010 inventory. Emissions from petroleum coke combustion were included in the emission factors for cement production in the 2010 inventory.

Gaps/needs to improve factors and profiles: Additional information on Hg content of hard coal, brown coal and petroleum coke in different countries.

Table A3.6.44 Unabated emission factors applied for petroleum coke combustion in cement production.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default	0.010	0.040	0.370	g/t petroleum coke	CEMBUREAU (2010), Fukuda et al. (2011), Schorcht et al. (2013), Cementa (2015), UN Environment (2017b)	Expert estimate based on available data. Default input factor 0.01–0.37 g/t. DF=1
Country-specific						
Slovenia	0.058	0.214	0.370		CEMBUREAU (2010), Mlakar et al. (2010), Schorcht et al. (2013), UN Environment (2017b)	National data: 0.214 g Hg/t petroleum coke
USA	0.010	0.050	0.250		CEMBUREAU (2010), Schorcht et al. (2013), UN Environment (2017b)	National data: 0.05 g Hg/t petroleum coke

Table A3.6.45 Comparative emission factors for petroleum coke combustion.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
UNEP Toolkit-based unabated input to air	0.01	0.02	0.1	g/t petroleum coke	UN Environment (2017b)	Default input factor (Hg content of petroleum coke) 0.01–0.1 g/t; DF=1
Abated EF						
EMEP/EEA	0.01	0.049	0.24	g/t clinker	EMEP/EEA (2016)	Industrial combustion. Abatement not specified

A3.6.15 Oil refining

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning amount of crude oil refined.

Applied EFs: These are shown in Table A3.6.46.

Comparative EFs. These are shown in Table A3.6.47.

Discussion of EFs: Regional and global UEFs are based on weighted averages derived from national UEFs. The values used for regional/global Hg content of crude oils are generally similar to those suggested by IPIECA (2012). The 2015 inventory continues to use a value of 25% as the factor for emissions to air is higher than that suggested by IPIECA (8%, based on studies at five San Francisco Bay refineries, McGuire et al., 2009) but consistent with values given by UNEP (2011b; provided by Petroleum Association of Japan for Japanese refineries, and reported by US-EPA (Wilhelm, 2001) cited by IKIMP (2012)).

The application of the 25% value is one of the main factors in discrepancies between current GMA estimates and estimates made by IPIECA in comments to the GMA 2013 and information conveyed by R. Cox (pers. comm.) during preparation of the 2015 inventory. Lack of new measurement data from a more representative range of refineries continues to be an obstacle to resolving this question.

The following literature sources were studied: Wilhelm et al. (2007), EMEP/EEA (2009), UNEP (2011b), BREF (2012), IKIMP (2012), IPIECA (2012), Petroleum Association of Japan, pers. comm.

Basic assumptions during calculations of UEF: (1) UEFs are based on information concerning Hg content of crude oils produced in different countries (mainly from Wilhelm et al., 2007 and Petroleum Association of Japan, pers. comm.; and assume that 25% of the Hg in refined oil is emitted to air (UNEP, 20011b; IKIMP, 2012) (2) Where a country's production exceeds its consumption, it is assumed that the refined oil is from national sources. Where national consumption exceeds production (or there is no national production) assumptions are made regarding the proportions of the refined oil that are obtained from different (national, regional and global) sources, and use is made of national, regional and global UEFs accordingly (3) The oil extraction stage and transport prior to refining is not included although these activities can potentially give rise to significant releases of Hg (UNEP, 2011b) (4) Combustion of fuels in oil refineries is accounted for separately as stationary combustion.

Applied technology profile: This is shown in Table A3.6.48.

Discussion of technology profile: It was assumed that APCDs are either absent at oil refineries, or are inefficient at reducing Hg emissions to air from this source.

Comparison with UNEP Toolkit factors: The default factor used (0.0034 g/t crude oil refined) is significantly lower than the UNEP Toolkit default factor of 0.038 g/t crude oil refined.

Potential for double counting: UEFs are derived from analysis of Hg concentration of (refined) crude oil. Fuels consumed at oil refineries are not included so there is no risk of double counting.

Comparison with 2005 inventory factors: Emissions from oil refining were not included in the 2005 inventory.

Gaps/needs to improve factors and profiles: Additional information on Hg content of oil from different sources (countries and fields), and on the volumes, sources and Hg content of the oil refined in different countries/refineries.

Table A3.6.46 Unabated emission factors (UEFs) applied for oil refining.

	Unabated emission factor				Source/Notes (adjustments to reported data)
	Low	Intermediate	High	Units	
Generic default factor		Not used		g/t crude oil refined	Weighted average of national estimates and their proportional contribution to global supply.
Algeria		0.003325		g/t crude oil refined	Wilhelm et al., 2007; Petroleum Association of Japan, pers. comm., UNEP, 2011b; IKIMP, 2012; Cox, pers. comm.
Angola		0.0004			
Argentina		0.004025			
Australia		0.001191			
Austria		0.001806			
Azerbaijan		0.00025			
Bahrain		0.000368			
Bangladesh		0.001806			
Belarus		0.001131			
Belgium		0.001806			
Brazil		0.000966			
Brunei Darussalam		0.00065			
Bulgaria		0.001806			
Canada		0.001081			
Chile		0.000966			
China		0.005066			
Columbia		0.00085			

Table A3.6.46 continued

	Unabated emission factor				Source/Notes (adjustments to reported data)
	Low	Intermediate	High	Units	
Congo		0.000843			
Croatia		0.001131			
Cuba		0.000835		g/t crude oil refined	
Czech Republic		0.001806			
Denmark		0.000437			
Dominican Republic		0.000835			
Ecuador		0.000966			
Egypt		0.001928			
Finland		0.001806			
France		0.001806			
Gabon		0.00025			
Germany		0.001806			
Ghana		0.000843			
Greece		0.001806			
Hungary		0.001806			
India		0.014716			
Indonesia		0.012973			
Iran		0.000525			
Iraq		0.000175			
Ireland		0.001806			
Israel		0.000368			
Italy		0.001806			
Ivory Coast		0.000075			
Jamaica		0.000835			
Japan		0.00739			
Jordan		0.000368			
Kazakhstan		0.001131			
Kenya		0.000843			
Korea- Rep. of		0.00739			
Kuwait		0.00025			
Kyrgystan		0.001131			
Libya		0.001928			
Malaysia		0.009425			
Mexico		0.0009			
Morocco		0.001928			
Myanmar		0.012973			
Netherlands		0.001806			
New Zealand		0.000521			
Nicaragua		0.000835			
Nigeria		0.00075			
Norway		0.004875			
Oman		0.000375			
Pakistan		0.001806			
Peru		0.000966			
Philippines		0.012973			
Poland		0.001806			
Portugal		0.001806			
Qatar		0.0005			
Romania		0.001806			
Russia		0.000775			
Saudi Arabia		0.000375			
Senegal		0.000843			

Table A3.6.46 continued

	Unabated emission factor				Source/Notes (adjustments to reported data)
	Low	Intermediate	High	Units	
Singapore		0.012973			
Slovakia		0.001806			
South Korea		0.012973		g/t crude oil refined	
Spain		0.001806			
Sri Lanka		0.001806			
Sudan		0.0085			
Sweden		0.001806			
Switzerland		0.001131			
Syrian Arab Rep.		0.000368			
Taiwan		0.012973			
Tajikistan		0.001131			
Thailand		0.012973			
Trinidad and Tobago		0.000835			
Tunisia		0.001928			
Turkey		0.000368			
Turkmenistan		0.001131			
Ukraine		0.001131			
United Arab Emirates		0.000425			
United Kingdom		0.001806			
United States		0.001294			
Uruguay		0.000966			
Uzbekistan		0.001131			
Venezuela		0.00105			
Vietnam		0.016625			
Yemen		0.000368			
Central America and the Caribbean		0.000845		g/t crude oil refined	Weighted average based on national estimates and their proportional contribution to global supply for countries within region.
East and Southeast Asia		0.013			
Europe		0.00113			
South America		0.000966			
South Asia		0.0276			
Sub-Saharan Africa		0.000843			

Table A3.6.47 Comparative emission factors for oil refining.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
UNEP Toolkit input to air	0.001	0.038	0.075	g/t crude oil refined	UNEP (2011b)	Default input factor (Hg content of crude oil) 5–300 mg/t (mean value 55 mg/t); DF to air = 0.25
UEF based on BREF Hg concentrations	0.008	0.016	0.025	g/t crude oil refined	UNEP (2011b), BREF (2012b)	Input factor (Hg content of crude oil) 30–100 mg/t (BREF, range); DF to air = 0.25 (UNEP, 2011b)
Abated EF						
EMEP/EEA	0.002	0.0051	0.015	g/t crude oil refined	EMEP/EEA (2009)	Abatement not specified

Table A3.6.48 Technology profile applied for oil refining.

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
None		0		100	100	100	100	100	

A3.6.16 Chlor-alkali industry

Basis for 2015 emission estimates: UEFs and technology employed to reduce emissions from this sector, applied to activity data concerning chlorine (Cl_2) production capacity (or production where available) using Hg-cell technology are the same as in the GMA 2013 (AMAP/UNEP, 2013).

Activity data have been updated where available, in particular for European countries based on 2015 data from OSPAR (2015, 2016) and Euro Chlor (2017) sources, and for some other countries including India from national reports on the closure or conversion of production plants using mercury-cell technology. For a number of other countries, however, updated activity data are lacking and older data were applied.

Applied UEFs: These are shown in Table A3.6.49.

Comparative EFs: These are shown in Table A3.6.50.

Discussion of EFs: The following sources were studied: OSPAR (2011), UNEP (2011b), national information received from: Argentina, Brazil, India (Corporate Responsibility for Environmental Protection (CREP) Charter); Romania, and LRTAP sources.

OSPAR (2015) reported ranges of Hg emissions in 2014 of 0.125–1.15 g/t Cl_2. Approximately 10 plants reporting emissions to OSPAR in 2010 were shut-down or converted (or partially converted) to membrane technology production. Of the 19 plants still reporting mercury emissions, only two still report emissions >1 g/t (compared to five plants in 2007 and 17 plants in 2005) and most plants emitting around 0.5 g/t.

Applied technology profile: This is shown in Table A3.6.51.

Discussion of technology profile: The EC Reference Document on Best Available Techniques in the Chlor-alkali Industry identifies the Hg-free membrane process as BAT. In as far as chlor-alkali production based on Hg-cell technology is concerned; much of the abatement potential lies in applying best practices and good management of operations. As such, technological abatement is represented as BAP in the technology profile, with reduction effectiveness based on reported national data largely for the OSPAR region. For India, information was used describing application within the chlor-alkali industry in India of the CREP Charter which incorporates: complete recycling of Hg-bearing effluent; treatment of cell-room ventilation gas; reduction of Hg in hydrogen gas; installation of a salt washery unit; installation of Hg distillation units; brine sludge treatment and disposal in secured landfill.

Comparison with UNEP Toolkit factors: In this work, the applied UEFs were based on the low-intermediate ranges of the UNEP Toolkit (UNEP, 2011b) default factors reflecting trends in reductions in Hg consumption in the chlor-alkali industry in recent years; this also converged estimates towards recently reported national emissions estimates for some countries. Recent research, however, indicates that commonly applied emission estimation approaches do not always include (potentially significant) fugitive emissions.

Potential for double counting: There is no identified potential double counting associated with estimates for the chlor-alkali sector.

Gaps/needs to improve factors and profiles: Information on potential Hg releases associated with non-standard operating conditions (accidental releases) in developed countries, and improvements in applied technology and BAP in other countries.

Table A3.6.49 Unabated emission factors applied for the chlor-alkali industry.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Generic default		20		g/t Cl_2 capacity	UNEP (2011b)	UNEP Toolkit low–intermediate (unaccounted consumption considered released)
Country-specific						
Argentina	3.75	10	21.6	g/t Cl_2 production		National comments (5.8 g/t): Intermediate: 57.88 g/t Cl_2 produced (DF=0.1); 15% of production High: 215.97 g/t Cl_2 produced (DF=0.1); 3.3 % of production; Low: 15.34 g/t Cl_2 produced (DF=0.245); 82% of production
Brazil		10				
Italy		20		g/t Cl_2 capacity	OSPAR (2011)	Based on OSPAR (2011)
Sweden		0.5			OSPAR (2011)	Based on OSPAR (2011)
OSPAR countries (Belgium, Finland, France, Germany, Spain, Switzerland) excluding the UK		2.5			OSPAR (2011)	Based on OSPAR (2011) and UNEP Toolkit (with assumed on-/off-site storage/recycling/ dumping)
Other Group 1 and 2 countries		5			UNEP (2011b)	UNEP Toolkit low (with assumed on-/off-site storage/recycling/ dumping)
Group 3 countries		10			UNEP (2011b)	UNEP Toolkit low–intermediate (with assumed on-/off-site storage/recycling/ dumping)

Table A3.6.50 Comparative emission factors for the chlor-alkali industry.

	Emission factor (EF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
Unabated EF						
	5	42	80	g/t Cl_2 produced	UNEP (2011b)	For production using Hg-cell technology; 0.2 of total release is to air (unaccounted consumption considered released)
	2.5	21	40	g/t Cl_2 produced	UNEP (2011b)	For production using Hg-cell technology; 0.1 of total release is to air (with assumed on-/off-site storage/recycling/ dumping)
	2.2	18.6	35.5	g/t NaOH produced	UNEP (2011b)	For production using Hg-cell technology (with assumed on-/off-site storage/recycling/ dumping). For conversion between a Cl_2-basis and an NaOH basis, the following factor can be used: g/t NaOH = g/t Cl_2/1.128 (based on European Commission, 2001b cited in UNEP, 2011b)

Table A3.6.51 Technology profile applied for the chlor-alkali industry.

Abbreviation. BEP: best environmental practices.

Technology profile	Reduction efficiency, %			Degree of application, % Country group					Source
	Low	Intermediate	High	1	2	3	4	5	
Default									
Level 0: None		0					100	100	
Level 1: advanced BEP		50		100	100	100			
Country-specific									
India		50						100	

A3.6.17 Vinyl chloride monomer (VCM) production and recycling of mercury catalyst

Basis for 2015 emission estimates: National information and information from literature, in combination with Hg consumption data for vinyl chloride monomer (VCM) production by world region from UN Environment (2017b).

Applied UEFs: These are shown in Table A3.6.52.

Comparative EFs: These are shown in Table A3.6.53.

Discussion of EFs: The EFs used are country-specific.

Applied output distribution factors: These are shown in Table A3.6.54.

Discussion of output distribution factors: The distribution factors to air from VCM production as well as the fractions of catalyst Hg that goes to recycling are based on country-specific data. The distribution factor for Hg to air from recycling of spent catalyst is based on Lin et al. (2016), and applied to all countries.

Comparison with UNEP Toolkit factors: In the UNEP Toolkit (UN Environment, 2017b) the default factor is 120 (100–140) g Hg/t VCM produced. The default output distribution factor to air is 0.02 from VCM production and 0.6 to 'sector specific treatment'.

Gaps/needs to improve factors and profiles: Up to date national information in general, but especially regarding recycling practices, and the extent of the use of low-Hg catalyst in Chinese industry. According to current estimates recycling of the Hg chloride catalyst contributes more to air emissions than the actual VCM production.

Table A3.6.52 Unabated emission factors applied for VCM production

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Average	High	Unit		
VCM production						
Country-specific						
China	49	86.9	97	g Hg/t VCM produced	Lin et al. (2016), UNIDO (2016)	Average from UNIDO (2016), low and high values from Lin et al. (2016)
India*		n.a.				
Russian Federation		96.07			National information	

*Emission estimate for India based on estimated consumption of Hg in catalyst in South Asia region from UN Environment (2017a).

Table A3.6.53 Comparative emission factors for VCM production.

	Unabated emission factor (UEF)				Source	Notes/adjustments to reported data
	Low	Intermediate	High	Units		
VCM production	100	120	140	g Hg/t VCM produced	UN Environment (2017b)	UN Environment (2017b) Toolkit default input factor

Table A3.6.54 Applied output distribution factors.

	Hg output distribution factors		Source	Notes/adjustments to reported data
		Units		
Factor to air from VCM production				
China	0.01	Fraction of catalyst Hg	Wang[a], pers. comm.	
India	0.005		Burger Chakraborty et al. (2013)	
Russian Federation	0.02		National information	
To recycling of catalyst				
China	0.75	Fraction of catalyst Hg to recycling	Lin et al. (2016)	Russia: assumption that amount to sector specific treatment = recycling
India	0.5		Burger Chakraborty et al. (2013)	
Russian Federation	0.6		National information	
Factor to air from recycling				
Default	0.05		Lin et al. (2016)	

* Information based on: Mercury Emission and Release Inventory of Chinese Key Mercury-Involved Industries in 2014 from the preliminary assessment project of the Minamata Convention in China (unpublished).

A3.7 Methodology for calculating uncertainty ranges

For the majority of the estimates presented in this report, country-sector emission estimates were derived using the general equation:

$$Emission = Activity \times UEF \times (1 - Abatement)$$

where *Activity* represents the amount of, for example, product produced or fuel/raw material consumed, *UEF* is the associated (unabated) emission factor, and *Abatement* represents the proportion of the emission that is avoided, for example by the application of air pollution control devices.

Each of the three terms *Activity*, *UEF* and *Abatement* have associated uncertainties (represented in the current work by high and low bound values for the factor concerned), which combine to generate an overall (uncertainty) range for the estimated emission value.

In general, uncertainties associated with *UEFs* and *Abatement* are likely to contribute more to uncertainty in the overall emission estimates than those associated with *Activity* data. This is particularly the case for sectors such as non-ferrous metal production where the metal and mercury (Hg) content of ores can vary widely but information on these values for different countries and regions is very limited compared with production statistics. The EMEP/EEA (2009) air pollutant emission inventory guidebook assigns uncertainties associated with activity data (not specific to Hg) of the order of ±5–10%.

Evaluation of uncertainties associated with (emission factor-based) estimates depends on the procedures involved. For estimates based on a small number of measurements at representative facilities or engineering calculations based on assumptions alone – which between them cover most Hg emissions estimates – the uncertainties are typically considered to be of the order of ±50% to ± an order of magnitude.

Three approaches to calculating, and combining, the uncertainties associated with country-sector based emission estimates were compared:

(i) Approach applied in the GMA 2013

A relatively crude (and intentionally conservative) approach was adopted to provide some quantification of the scale of uncertainties in the estimates presented in the GMA 2013 (see Table A3.7.1).

Of the three major components contributing to the uncertainties associated with the emission estimates, only those associated with *Activity* data and *UEFs* were addressed, by introducing into the emission calculations, respectively, the 'high' and 'low' bound values for each of these factors. The high and low bound values were established as described in Table A3.7.1. Uncertainties associated with *Abatement* were not considered.

For emissions based on Hg consumption in intentional use sectors, and associated waste handling, upper and lower range estimates were produced using the respective upper and lower ranges of the Hg consumption data. These however do not reflect the considerable uncertainties associated with the assumptions made regarding Hg flow in waste streams and associated emission factors. Consequently, uncertainties in estimates associated with these sectors were assigned at ± a factor of 3. Uncertainties associated with the assumptions regarding assignment of countries to particular 'country groupings' for applied technology or waste handling procedures were not taken into account.

Uncertainty ranges for combined country-sector estimates (e.g., global, regional or sectoral totals) were established by simply summing high/low range values to obtain a maximum and minimum range value for the aggregated emissions.

(ii) Introducing uncertainty associated with air pollution control technology assumptions

In a modified version of the GMA 2013 approach, an attempt was made to introduce uncertainties associated with *Abatement*. High range emissions estimates were established using the high *Activity* and *UEF* bounds (as described in '(i)') together with a low bound for *Abatement*; and conversely for the low bound emission estimate.

The high and low bounds for *Abatement* were established by considering 'average reduction efficiency' under various technology profiles, defined as the sum of the (weighted) abatement. The calculation of the average reduction efficiency for iron and steel production in country group 1 (48.7%) is illustrated in Table A3.7.2. The average reduction efficiency may also be derived by dividing the emission estimate by the activity data set and the unabated emission factor.

Uncertainty associated with the removal efficiency was then categorized into four different profiles, based on the average removal efficiency for that particular activity, see Table A3.7.3. It should be noted that this approach was only applied for 'by-product' sectors; no uncertainty on the removal efficiency was applied in the case of estimated emissions from ASGM or intentional-use waste streams.

As with approach '(i)', uncertainty ranges for combined country-sector estimates (e.g., global, regional or sectoral totals) were established by summing high/low range values to obtain a maximum and minimum range value for the aggregated emissions.

(iii) Employing the propagation of errors method to evaluate uncertainties associated with aggregated estimates

Error propagation is a method for combining uncertainties associated with individual estimates when these are aggregated. In the current assessment, an approach based on the procedure recommended in the IPCC guidelines for calculating the uncertainty for greenhouse gas emissions (Frey et al., 2006) was used to determine uncertainty ranges associated with aggregated inventory emissions estimates (i.e., regional, sectoral and global emission totals).

The combined uncertainty for one activity (i.e., a national-sector/activity emission estimate) is calculated according the following equation:

$$U_{combined} = \sqrt{U_{AD}^2 + U_{TF}^2 + U_{UEF}^2}$$

where:

- U_{AD}: Uncertainty associated with the activity data, see Table A3.7.1
- U_{UEF}: Uncertainty associated with the unabated emissions factor, see Table A3.7.1
- U_{TF}: Uncertainty associated with the average reduction efficiency, see Table A3.7.3

Table A3.7.1 Procedures adopted for calculating low/high range emissions estimates.

		Lower range estimate	Upper range estimate	Source
Activity data derived from IEA/official national sources	OECD countries	0.95 × Activity data	1.05 × Activity data	Modified after EMEP/EEA, 2009
	Non-OECD countries	0.90 × Activity data	1.10 × Activity data	Modified after EMEP/EEA, 2009
Activity data derived from other sources		0.70 × Activity data	1.30 × Activity data	Based on AMAP/UNEP 2008
Unabated EFs	All countries	0.7 × UEF[a] for coal sectors; 0.5 × UEF[a] or 0.25 × UEF for all other sectors	1.3 × UEF[a] for coal sectors; 1.5 × UEF[a] or 1.75 × UEF for all other sectors	Assumptions applied in the GMA 2013
Emissions estimates for intentional-use waste stream emissions and emissions from cremations		0.3 × mid-range estimate	3 × mid-range estimate	
Emissions estimates for ASGM		Mid-range estimate minus 15–100% depending on country	Mid-range estimate plus 15–100% depending on country	

[a] UEF – as tabulated in this E-Annex, Section A3.6.

Table A3.7.2 Default technology profile applied for pig iron and steel production for country group 1.

Technology	Emission reduction efficiency, %	Degree of application, %	Weighted reduction efficiency, %
Standard APC: ESP/CYC/FGD (sinter plant)	20	30	6
Efficient APC: ESP+FGD/ACT/ESP+ACT (sinter plant)	55	60	33
Very efficient APC: ESP+ACT/RAC (sinter plant)	97	10	9.7
		Average reduction efficiency	48.7

Abbreviations. ACP: air pollution control; ACT: activated carbon tower; CYC: cyclone; ESP: electrostatic precipitator; FGD: flue gas desulfurization; RAC: regenerative activated carbon process.

Table A3.7.3 Procedures adopted for calculating low/high range technology profiles.

Abatement profile	Average reduction efficiency range, %	Upper range estimate	Lower range estimate	Source
Low	0–30	0 reduction	1.4 × Average reduction efficiency	Assumptions applied in this work
Medium	30–50	0.8 × Average reduction efficiency	1.2 × Average reduction efficiency	Assumptions applied in this work
High	50–85	0.9 × Average reduction efficiency	1.1 × Average reduction efficiency	Assumptions applied in this work
Very high	85–100	0.95 × Average reduction efficiency	1.05 × Average reduction efficiency (with a maximum bound of 99.99%)	Assumptions applied in this work

The maximum (i.e., quantitatively largest) uncertainty derived using the assumptions quantified in Tables A3.7.2 and A3.7.3 were employed. Uncertainties associated with *Activity* data and *Abatement* (technology profiles) were assumed to be symmetrically distributed around the mean. However, this was not always the case for *Abatement,* as cut-offs were applied to the bound values for technology profiles to eliminate cases where the (average) Hg removal efficiency would exceed 100% or be lower than 0%.

Since the unabated emission factor is dependent on the Hg content of the fuel/raw material, *UEFs* were assumed to be log-normally distributed. This reflects common properties of such materials; see for example Wu et al. (2010) for the Hg content of coal, Hylander and Herbert (2008) for the Hg content of non-ferrous metal ores, and Section A3.6.15 for the Hg content of crude oils. The uncertainty around the *UEF* was thus assigned to a high and a low range uncertainty using the geometric mean and geometric standard deviation. Although this is different

to the assumptions made in approaches '(i)' and '(ii)', the low and high bounds in Table A3.7.1 are still used to derive an asymmetric distribution with 'comparable spread'.

The geometric mean is calculated by the following equation:

$$\mu_g = e^{\ln(\mu) - \frac{\ln\left(1+\left(\frac{U_{UEF}}{200}\right)^2\right)}{2}}$$

where:

μ_g: Geometric mean
μ: Arithmetic mean, the unabated emission factor used in this study
U_{UEF}: The maximal uncertainty for the unabated emission factor

The geometric standard deviation is calculated by the following equation:

$$\sigma_g = e^{\sqrt{\ln\ (1+\left(\frac{U_{UEF}}{200}\right)^2}}$$

where:

σ_g Geometric standard deviation

The high and low uncertainty for the unabated emission factor is derived using two logarithmic transformations:

$$U_{UEF,low} = \frac{e^{\ln(\mu_g) - 1.96 \cdot \ln(\sigma_g)} - \mu}{\mu} \cdot 100$$

$$U_{UEF,high} = \frac{e^{\ln(\mu_g) + 1.96 \cdot \ln(\sigma_g)} - \mu}{\mu} \cdot 100$$

The following equation is used for combining the uncertainty:

$$U_{total} = \sqrt{\left(\frac{ee_1 \cdot U_{combined,1}}{EE}\right)^2 + \left(\frac{ee_2 \cdot U_{combined,2}}{EE}\right)^2 + \cdots + \left(\frac{ee_n \cdot U_{combined,n}}{EE}\right)^2}$$

where:

ee: Emission estimate for one activity in one country
EE: Emission estimate for the combined inventory. In this study the combined inventory is calculated at a global, sector and subcontinent level

The IPCC guidelines are primarily developed for calculating uncertainties associated with greenhouse gas emission estimates. Uncertainties associated with, for example, anthropogenic carbon dioxide emission factors are relatively small compared with those for Hg. The results of applying the error propagation method to Hg emissions may therefore be weak in some cases. Underestimation or overestimation of the uncertainties may also be a consequence where: (1) distributions are not distributed symmetrically around the mean or (2) correlations exist between the activity data, the technology profiles and the unabated emission factor.

Notwithstanding these limitations, the uncertainty estimates obtained using the propagation of errors approach are considered to better represent the scale of the uncertainties for aggregated inventory estimates than those achieved by simply summing uncertainties for individual (country-sector) emission estimates.

A3.8 Activity data and sources used to prepare estimates of 2015 mercury emissions to air

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
AFG	Afghanistan	BIO	PSB – DR	106086.7325	TJ	2015	IEA (2017)#
		BIO	PSB – IND	4618.211542	TJ	2015	IEA (2017)#
		CEM	CEM	102	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	40	kg	2015	USGS (2017b)
		OR	CO-OR	468.7363233	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	2356.390576	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	29.15584786	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	746.4644638	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	8.971030111	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	630.5886582	kt	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	63.91858954	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	69.89927628	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	165.964057	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	2572.442884	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	329.3115636	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	430.6094453	kt	2015	IEA (2017)#
ALB	Albania	BIO	PSB – DR	8136	TJ	2015	IEA (2017)
		BIO	PSB – IND	419	TJ	2015	IEA (2017)
		CEM	CEM	2200	kt	2014	USGS (2017a)
		CEM	PC-CEM	47	kt	2015	IEA (2017)
		OR	CO-OR	276	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	5	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	737	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	196	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	519	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	1	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	7	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	754	TJ	2015	IEA (2017)
		SSC	SP-S	560	kt	2014	World Steel Association (2015)
DZA	Algeria	BIO	PSB – DR	84	TJ	2015	IEA (2017)
		BIO	PSB – IND	167	TJ	2015	IEA (2017)
		CEM	CEM	21000	kt	2014	USGS (2017a)
		CSP	CSP-C	14	kt	2010	UNEP (2011e)
		NFMP	ZN-P	15000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	200	kg	2015	USGS (2017b)
		OR	CO-OR	25106	kt	2015	IEA (2017)
		PISP	PIP	360	kt	2014	USGS (2017a)
		SC-DR-gas	NG-DR	380873	TJ	2015	IEA (2017)
		SC-DR-oil	CO-DR	6	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	9525	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	159685	TJ	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	672	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	897524	TJ	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	421	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	608	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
AGO	Angola	BIO	PSB – DR	185757	TJ	2015	IEA (2017)
		BIO	PSB – IND	5395	TJ	2015	IEA (2017)
		CEM	CEM	2500	kt	2014	USGS (2017a)
		CSP	CSP-C	10	kt	2010	UNEP (2011e)
		OR	CO-OR	2647	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	2825	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	29260	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	39	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	136	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	42	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	1136	kt	2015	IEA (2017)
ATG	Antigua	BIO	PSB – DR	96.11011345	TJ	2015	IEA (2017)#
		BIO	PSB – IND	386.7109149	TJ	2015	IEA (2017)#
		BIO	PSB – PP	126.9070198	TJ	2015	IEA (2017)#
		OR	CO-OR	47.13967581	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	9.885696476	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	23.47244188	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	2.094014525	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	50.20765058	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	1.071356268	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	6.330741586	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	3.603652903	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	1498.778721	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	76.50457717	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	56.2949021	kt	2015	IEA (2017)#
ARG	Argentina	BIO	PSB – DR	10561	TJ	2015	IEA (2017)
		BIO	PSB – IND	34928	TJ	2015	IEA (2017)
		BIO	PSB – PP	30121	TJ	2015	IEA (2017)
		CEM	CEM	11408	kt	2014	USGS (2017a)
		CSP	CSP-P	100	kt	2015	UNEP (2013)
		NFMP	AL-P	440	kt	2015	USGS (2017b)
		NFMP	PB-P	8000	t	2015	USGS (2017b)
		NFMP	ZN-P	30000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	64000	kg	2015	USGS (2017b)
		NFMP-HG	HG-P	25	t	2015	USGS (2017b)
		OR	CO-OR	26695	kt	2015	IEA (2017)
		PISP	PIP	2766	kt	2014	USGS (2017a)
		SC-DR-gas	NG-DR	615023	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	241	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	10009	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	7	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	336216	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	177	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	111	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	908	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	986403	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	3435	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	1952	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	91	kt	2015	IEA (2017)
		SSC	SP-S	2740	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
ARM	Armenia	BIO	PSB – DR	7965	TJ	2015	IEA (2017)
		BIO	PSB – IND	1	TJ	2015	IEA (2017)
		CEM	CEM	427	kt	2014	USGS (2017a)
		NFMP	CU-P	11600	t	2015	USGS (2017b)
		NFMP-AU	GP-L	5500	kg	2015	USGS (2017b)
		SC-DR-gas	NG-DR	43451	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	128	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	7995	TJ	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	25295	TJ	2015	IEA (2017)
ABW	Aruba	BIO	PSB – DR	116.6201755	TJ	2015	IEA (2017)#
		BIO	PSB – IND	503.0365589	TJ	2015	IEA (2017)#
		BIO	PSB – PP	165.0816361	TJ	2015	IEA (2017)#
		OR	CO-OR	61.3196561	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	12.85939069	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	30.53313454	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	2.723910343	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	65.31050148	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	1.393628548	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	8.235077781	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	4.68765966	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	1949.622991	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	99.51774765	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	73.2288455	kt	2015	IEA (2017)#
AUS	Australia (and Christmas Is.)	BIO	PSB – DR	50117	TJ	2015	IEA (2017)
		BIO	PSB – IND	115318	TJ	2015	IEA (2017)
		BIO	PSB – PP	20555	TJ	2015	IEA (2017)
		CEM	CEM	9000	kt	2014	USGS (2017a)
		NFMP	AL-P	1645	kt	2015	USGS (2017b)
		NFMP	CU-P	442000	t	2015	USGS (2017b)
		NFMP	PB-P	182000	t	2015	USGS (2017b)
		NFMP	ZN-P	489594	t	2015	USGS (2017b)
		NFMP-AU	GP-L	277800	kg	2015	USGS (2017b)
		OR	CO-OR	22850	kt	2015	IEA (2017)
		PISP	PIP	3282	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	14	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	5	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	232516	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	58	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	15378	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	414	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-NFM	1615	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	202	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	337	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	432	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	595	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	51	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	358622	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	242	kt	2015	IEA (2017)
		SC-IND-oil	CO-IND	15	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	2945	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-PP-coal	BC-L-PP	64847	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	20531	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	23625	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	887922	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	224	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	3387	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	53	kt	2015	IEA (2017)
		SSC	SP-S	1034	kt	2014	World Steel Association (2015)
AUT	Austria	BIO	PSB – DR	76425	TJ	2015	IEA (2017)
		BIO	PSB – IND	45057	TJ	2015	IEA (2017)
		BIO	PSB – PP	69890	TJ	2015	IEA (2017)
		CEM	CEM	4400	kt	2014	USGS (2017a)
		CEM	PC-CEM	48	kt	2015	IEA (2017)
		OR	CO-OR	8881	kt	2015	IEA (2017)
		PISP	PIP	6029	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	2	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	7	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	85850	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	30	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	6797	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	91	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	29	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	130	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	116443	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	123	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	358	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	966	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	100856	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	288	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	4	kt	2015	IEA (2017)
		SSC	SP-S	691	kt	2014	World Steel Association (2015)
AZE	Azerbaijan	BIO	PSB – DR	3020	TJ	2015	IEA (2017)
		BIO	PSB – IND	11	TJ	2015	IEA (2017)
		CEM	CEM	2867	kt	2014	USGS (2017a)
		CSP	CSP-C	145	kt	2010	UNEP (2011e)
		NFMP	AL-P	50	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	2229	kg	2015	USGS (2017b)
		OR	CO-OR	6215	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	118375	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	3	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1082	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	42204	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	13	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	50	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	239641	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	389	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	5	kt	2015	IEA (2017)
		SSC	SP-S	180	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
BHS	Bahamas	BIO	PSB – DR	337.4989668	TJ	2015	IEA (2017)#
		BIO	PSB – IND	1450.034468	TJ	2015	IEA (2017)#
		BIO	PSB – PP	475.858182	TJ	2015	IEA (2017)#
		OR	CO-OR	176.7577591	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	37.06800113	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	88.01367757	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	7.851842604	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	188.2616215	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	4.017221798	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	23.7381288	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	13.51247332	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	5619.910694	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	286.8661565	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	211.0867454	kt	2015	IEA (2017)#
BHR	Bahrain	CEM	CEM	1500	kt	2014	USGS (2017a)
		NFMP	AL-P	960.643	kt	2015	USGS (2017b)
		OR	CO-OR	13356	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	322	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	41447	TJ	2015	IEA (2017)
		SC-PP-gas	NG-PP	467228	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	4	kt	2015	IEA (2017)
BGD	Bangladesh	BIO	PSB – DR	380136	TJ	2015	IEA (2017)
		CEM	CEM	17000	kt	2014	USGS (2017a)
		OR	CO-OR	1209	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	187182	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	2759	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	32	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	3978	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	162597	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	13	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	199	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	546	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	556783	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	923	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	470	kt	2015	IEA (2017)
		SSC	SP-S	90	kt	2014	World Steel Association (2015)
BRB	Barbados	BIO	PSB – DR	302.1548251	TJ	2015	IEA (2017)#
		BIO	PSB – IND	855.1512978	TJ	2015	IEA (2017)#
		BIO	PSB – PP	280.63522	TJ	2015	IEA (2017)#
		CEM	CEM	160	kt	2014	USGS (2017a)
		OR	CO-OR	104.2420925	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	21.86068675	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	51.90567001	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	4.630588818	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	111.0264435	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	2.369138465	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	13.99945457	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	7.968920292	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	3314.317025	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	169.178024	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	124.4874575	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
BLR	Belarus	BIO	PSB – DR	23529	TJ	2015	IEA (2017)
		BIO	PSB – IND	2136	TJ	2015	IEA (2017)
		BIO	PSB – PP	29984	TJ	2015	IEA (2017)
		CEM	CEM	5618	kt	2014	USGS (2017a)
		OR	CO-OR	23003	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	11	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	95481	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	10	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	2584	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	633	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	43299	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	22	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	118	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	2	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	530949	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	490	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	17	kt	2015	IEA (2017)
		SSC	SP-S	2513	kt	2014	World Steel Association (2015)
BEL	Belgium	BIO	PSB – DR	22916	TJ	2015	IEA (2017)
		BIO	PSB – IND	26672	TJ	2015	IEA (2017)
		BIO	PSB – PP	31708	TJ	2015	IEA (2017)
		CEM	CEM	6100	kt	2014	USGS (2017a)
		CEM	PC-CEM	25	kt	2015	IEA (2017)
		CSP	CSP-C	315	kt	2015	OSPAR (2016)
		NFMP	ZN-P	260000	t	2015	USGS (2017b)
		OR	CO-OR	32051	kt	2015	IEA (2017)
		PISP	PIP	4388	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	120	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	239014	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	1	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	10638	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	235	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	70	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	77	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	173874	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	56	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	241	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	775	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	186523	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	32	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	6	kt	2015	IEA (2017)
		SSC	SP-S	2379	kt	2014	World Steel Association (2015)
BLZ	Belize	BIO	PSB – DR	361.1761002	TJ	2015	IEA (2017)#
		BIO	PSB – IND	517.253726	TJ	2015	IEA (2017)#
		BIO	PSB – PP	169.7472875	TJ	2015	IEA (2017)#
		OR	CO-OR	63.05271462	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	13.22283168	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	31.3960831	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	2.800895381	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	67.15635203	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	1.433016241	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	8.467823244	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	4.820145539	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	2004.724584	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	102.330387	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	75.29848977	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
BEN	Benin	BIO	PSB – DR	60207	TJ	2015	IEA (2017)
		BIO	PSB – IND	377	TJ	2015	IEA (2017)
		CEM	CEM	1396	kt	2014	USGS (2017a)
		SC-DR-oil	CO-LF-DR	669	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	41	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	25	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	41	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	72	kt	2015	IEA (2017)
BMU	Bermuda	BIO	PSB – DR	72.98612579	TJ	2015	IEA (2017)#
		BIO	PSB – IND	1066.415553	TJ	2015	IEA (2017)#
		BIO	PSB – PP	349.9658648	TJ	2015	IEA (2017)#
		OR	CO-OR	129.994995	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	27.2613471	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	64.72891282	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	5.774571061	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	138.4554131	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	2.954431706	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	17.45800553	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	9.937633919	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	4133.115664	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	210.9732822	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	155.2419569	kt	2015	IEA (2017)#
BTN	Bhutan	BIO	PSB – DR	2416.992257	TJ	2015	IEA (2017)#
		BIO	PSB – IND	454.0966101	TJ	2015	IEA (2017)#
		CEM	CEM	690	kt	2014	USGS (2017a)
		OR	CO-OR	46.08961142	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	231.6976957	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	2.866817935	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	73.39788995	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	0.882097826	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	62.00412636	kt	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	6.284947011	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	6.873012229	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	16.31880978	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	252.9415516	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	32.38034103	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	42.34069566	kt	2015	IEA (2017)#
BOL	Bolivia	BIO	PSB – DR	18647	TJ	2015	IEA (2017)
		BIO	PSB – IND	20567	TJ	2015	IEA (2017)
		BIO	PSB – PP	4611	TJ	2015	IEA (2017)
		CEM	CEM	3500	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	12170	kg	2015	USGS (2017b)
		OR	CO-OR	2943	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	30086	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1425	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	31751	TJ	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	88	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	74155	TJ	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	57	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
BIH	Bosnia-Herzegovina	BIO	PSB – DR	56406	TJ	2015	IEA (2017)
		BIO	PSB – IND	1532	TJ	2015	IEA (2017)
		BIO	PSB – PP	128	TJ	2015	IEA (2017)
		CEM	CEM	840	kt	2014	USGS (2017a)
		CEM	PC-CEM	3	kt	2015	IEA (2017)
		NFMP	AL-P	100	kt	2015	USGS (2017b)
		OR	CO-OR	926	kt	2015	IEA (2017)
		PISP	PIP	860	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	641	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	2754	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	3	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	873	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	68	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-NFM	163	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	36	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	3378	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	20	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	65	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	5151	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	5759	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	2056	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	114	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	48	kt	2015	IEA (2017)
BWA	Botswana	BIO	PSB – DR	23156	TJ	2015	IEA (2017)
		CEM	CEM	370	kt	2014	USGS (2017a)
		NFMP	CU-P	13900	t	2015	USGS (2017b)
		NFMP-AU	GP-L	756	kg	2015	USGS (2017b)
		SC-DR-coal	HC-DR	7	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	367	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	75	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	11	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	158	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	1657	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	36	kt	2015	IEA (2017)
BRA	Brazil	BIO	PSB – DR	386923	TJ	2015	IEA (2017)
		BIO	PSB – IND	1242148	TJ	2015	IEA (2017)
		BIO	PSB – PP	913298	TJ	2015	IEA (2017)
		CEM	CEM	71254	kt	2015	National information
		CEM	PC-CEM	4366	kt	2015	IEA (2017)
		CSP	CSP-P	221.3	kt	2015	National information
		NFMP	AL-P	772.2	kt	2015	USGS (2017b)
		NFMP	CU-P	156000	t	2015	USGS (2017b)
		NFMP	ZN-P	230000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	73.09	t	2015	National information
		OR	CO-OR	98480.796	kt	2015	National information
		PISP	PIP	27803.302	kt	2015	National information
		SC-DR-gas	NG-DR	123097	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	809	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	41833	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	156	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	1483	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-IND-coal	HC-IND-CEM	114	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	1209	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	398	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	3727	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	438042	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	2304	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1108	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	2700	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	3081	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	4131	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	957940	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	3716	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	3733	kt	2015	IEA (2017)
		SSC	SP-S	7877	kt	2014	World Steel Association (2015)
VGB	British Virgin Islands	BIO	PSB – DR	34.78371776	TJ	2015	IEA (2017)#
		BIO	PSB – IND	250.8543886	TJ	2015	IEA (2017)#
		BIO	PSB – PP	82.32294883	TJ	2015	IEA (2017)#
		OR	CO-OR	30.57890041	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	6.41272395	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	15.22627066	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	1.358360245	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	32.56905612	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.694975009	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	4.10667051	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	2.337643213	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	972.2384483	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	49.62753362	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	36.51777776	kt	2015	IEA (2017)#
BRN	Brunei Darussalam	CEM	CEM	350	kt	2014	USGS (2017a)
		OR	CO-OR	348	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	736	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	164	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	119	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	79669	TJ	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	11	kt	2015	IEA (2017)
BGR	Bulgaria	BIO	PSB – DR	30961	TJ	2015	IEA (2017)
		BIO	PSB – IND	10572	TJ	2015	IEA (2017)
		BIO	PSB – PP	1603	TJ	2015	IEA (2017)
		CEM	CEM	1850	kt	2014	USGS (2017a)
		CEM	PC-CEM	112	kt	2015	IEA (2017)
		NFMP	CU-P	302000	t	2015	USGS (2017b)
		NFMP	PB-T	90000	t	2015	USGS (2017b)
		NFMP	ZN-P	75100	t	2015	USGS (2017b)
		NFMP-AU	GP-L	7300	kg	2015	USGS (2017b)
		OR	CO-OR	6037	kt	2015	IEA (2017)
		SC-DR-coal	BC-DR	93	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	155	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	18365	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	20	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1937	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	12	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-IND-coal	BC-IND-OTH	3	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	103	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	150	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	42746	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	29	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	45	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	33410	kt	2015	IEA (2017)
		SC-PP-coal	HC-A-PP	50	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	595	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	40675	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	39	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	2	kt	2015	IEA (2017)
		SSC	SP-S	612	kt	2014	World Steel Association (2015)
BFA	Burkina Faso	BIO	PSB – DR	172942.8463	TJ	2015	IEA (2017)#
		BIO	PSB – IND	4460.436244	TJ	2015	IEA (2017)#
		BIO	PSB – PP	1595.745004	TJ	2015	IEA (2017)#
		CEM	CEM	403	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	36210	kg	2015	USGS (2017b)
		SC-DR-coal	HC-DR	7.252601469	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	243.3075112	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	7.51162295	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	2.417533823	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	44.29267325	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	12.17400961	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	42.39318239	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	63.54660334	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	1672.847065	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	57.58910928	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	119.1498813	kt	2015	IEA (2017)#
BDI	Burundi	BIO	PSB – DR	98131.76638	TJ	2015	IEA (2017)#
		BIO	PSB – IND	1191.037445	TJ	2015	IEA (2017)#
		BIO	PSB – PP	426.1000379	TJ	2015	IEA (2017)#
		CEM	CEM	70	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	500	kg	2015	USGS (2017b)
		SC-DR-coal	HC-DR	1.936608764	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	64.96861307	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	2.005773363	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.645536255	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	11.82714638	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	3.25073614	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	11.31993933	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	16.96838155	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	446.6880335	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	15.37759578	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	31.81571541	kt	2015	IEA (2017)#
KHM	Cambodia	BIO	PSB – DR	88123	TJ	2015	IEA (2017)
		BIO	PSB – IND	37089	TJ	2015	IEA (2017)
		BIO	PSB – PP	545	TJ	2015	IEA (2017)
		CEM	CEM	1400	kt	2014	USGS (2017a)
		SC-DR-oil	CO-LF-DR	1029	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-IND-coal	BC-IND-CEM	27	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	26	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	29	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	1208	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	45	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	15	kt	2015	IEA (2017)
CMR	Cameroon	BIO	PSB – DR	197640	TJ	2015	IEA (2017)
		BIO	PSB – PP	717	TJ	2015	IEA (2017)
		CEM	CEM	1300	kt	2014	USGS (2017a)
		NFMP	AL-P	90	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	1500	kg	2015	USGS (2017b)
		OR	CO-OR	1793	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	630	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	113	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	8	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	10984	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	94	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	210	kt	2015	IEA (2017)
CAN	Canada	BIO	PSB – DR	125680	TJ	2015	IEA (2017)
		BIO	PSB – IND	236905	TJ	2015	IEA (2017)
		BIO	PSB – PP	110778	TJ	2015	IEA (2017)
		CEM	CEM	11879	kt	2014	USGS (2017a)
		CEM	PC-CEM	452	kt	2015	IEA (2017)
		NFMP	AL-P	2880.035	kt	2015	USGS (2017b)
		NFMP	CU-P	280000	t	2015	USGS (2017b)
		NFMP	PB-P	128000	t	2015	USGS (2017b)
		NFMP	ZN-P	683118	t	2015	USGS (2017b)
		NFMP-AU	GP-L	152747	kg	2015	USGS (2017b)
		OR	CO-OR	65871	kt	2015	IEA (2017)
		PISP	PIP	6728	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	19	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	1403184	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	1001	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	23337	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	413	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	217	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	413	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	298	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	279	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	661611	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	614	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	2811	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	8847	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	24479	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	2899	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	2136026	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	800	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	1948	kt	2015	IEA (2017)
		SSC	SP-S	5007	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
CPV	Cape Verde	BIO	PSB – DR	4987.7007	TJ	2015	IEA (2017)#
		BIO	PSB – IND	491.8577893	TJ	2015	IEA (2017)#
		BIO	PSB – PP	175.9647638	TJ	2015	IEA (2017)#
		SC-DR-coal	HC-DR	0.799753282	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	26.82981843	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	0.828315899	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.266584427	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	4.884207543	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	1.342443009	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	4.67474835	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	7.007362089	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	184.4669028	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	6.350421893	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	13.13880392	kt	2015	IEA (2017)#
CYM	Cayman Islands	BIO	PSB – DR	58.32152499	TJ	2015	IEA (2017)#
		BIO	PSB – IND	435.5202162	TJ	2015	IEA (2017)#
		BIO	PSB – PP	142.9247807	TJ	2015	IEA (2017)#
		OR	CO-OR	53.08948109	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	11.13343457	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	26.43505153	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	2.358313726	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	56.54468492	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	1.206579116	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	7.129785683	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	4.058493389	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	1687.949338	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	86.16071776	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	63.40024808	kt	2015	IEA (2017)#
CAF	Central African Republic	BIO	PSB – DR	49252.24837	TJ	2015	IEA (2017)#
		BIO	PSB – IND	448.3354948	TJ	2015	IEA (2017)#
		BIO	PSB – PP	160.3944294	TJ	2015	IEA (2017)#
		SC-DR-coal	HC-DR	0.728986693	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	24.45576788	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	0.755021932	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.242995564	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	4.452025877	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	1.223656235	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	4.261100791	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	6.38731198	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	168.1442522	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	5.788501482	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	11.97620996	kt	2015	IEA (2017)#
TCD	Chad	BIO	PSB – DR	106254.5147	TJ	2015	IEA (2017)#
		BIO	PSB – IND	4191.278814	TJ	2015	IEA (2017)#
		BIO	PSB – PP	1499.452489	TJ	2015	IEA (2017)#
		CEM	CEM	200	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	6.814955583	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	228.6255337	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	7.058346854	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	2.271651861	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	41.61990731	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	11.43938973	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-IND-oil	CO-LF-IND	39.83503799	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	59.71199178	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	1571.901957	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	54.11399255	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	111.9599846	kt	2015	IEA (2017)#
CHL	Chile	BIO	PSB – DR	69396	TJ	2015	IEA (2017)
		BIO	PSB – IND	81345	TJ	2015	IEA (2017)
		BIO	PSB – PP	149448	TJ	2015	IEA (2017)
		CEM	CEM	5000	kt	2014	USGS (2017a)
		CEM	PC-CEM	288	kt	2015	IEA (2017)
		NFMP	CU-P	1496200	t	2015	USGS (2017b)
		NFMP-AU	GP-L	42501	kg	2015	USGS (2017b)
		OR	CO-OR	8502	kt	2015	IEA (2017)
		PISP	PIP	584	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	5	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	28187	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	275	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	4536	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	1	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	393	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	35858	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	486	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	2772	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	11179	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	100203	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	153	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	502	kt	2015	IEA (2017)
		SSC	SP-S	382	kt	2014	World Steel Association (2015)
CHN	China (and Hong Kong if not separately reported)	BIO	PSB – DR	3377056	TJ	2015	IEA (2017)
		BIO	PSB – PP	777971	TJ	2015	IEA (2017)
		CEM	CEM	2492000	kt	2014	USGS (2017a)
		CSP	CSP-C	81	kt	2010	UNEP (2011e)
		NFMP	AL-P	31400	kt	2015	USGS (2017b)
		NFMP	CU-P	5500000	t	2015	USGS (2017b)
		NFMP	PB-P	2850000	t	2015	USGS (2017b)
		NFMP	ZN-T	6100000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	450000	kg	2015	USGS (2017b)
		NFMP-HG	HG-P	1200	t	2015	National information
		OR	CO-OR	531992	kt	2015	IEA (2017)
		PISP	PIP	711600	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	198964	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	2649321	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	5978	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	152155	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	297537	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	19701	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	262489	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	102091	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	1791798	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	3808	kt	2015	IEA (2017)
		SC-IND-oil	CO-IND	2066	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	17239	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-PP-coal	HC-B-PP	2118802	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	2468684	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	3318	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	2967	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	4596	kt	2015	IEA (2017)
		SSC	SP-S	49938	kt	2014	World Steel Association (2015)
		VCM	VCM-P	1217000	kg	2015	National information
		VCM	VCM-R	912750	kg	2015	Lin et al. (2016)
COL	Colombia	BIO	PSB – DR	84450	TJ	2015	IEA (2017)
		BIO	PSB – IND	30874	TJ	2015	IEA (2017)
		BIO	PSB – PP	23179	TJ	2015	IEA (2017)
		CEM	CEM	12384	kt	2014	USGS (2017a)
		CSP	CSP-C	22	kt	2010	UNEP (2011e)
		NFMP-AU	GP-L	59202	kg	2015	USGS (2017b)
		OR	CO-OR	14038	kt	2015	IEA (2017)
		PISP	PIP	234	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	114	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	86364	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	18	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	5967	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	563	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	608	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	259	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	113481	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	63	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	226	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	2994	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	180586	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	44	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	67	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	228	kt	2015	IEA (2017)
		SSC	SP-S	910	kt	2014	World Steel Association (2015)
COM	Comoros	BIO	PSB – DR	7134.248247	TJ	2015	IEA (2017)#
		BIO	PSB – IND	162.3548581	TJ	2015	IEA (2017)#
		BIO	PSB – PP	58.0833218	TJ	2015	IEA (2017)#
		SC-DR-coal	HC-DR	0.263986529	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	8.856119513	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	0.273414619	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	8.80E-02	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	1.612203446	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	0.443120245	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	1.543064117	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	2.313024827	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	60.88975002	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	2.096178749	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	4.33692155	kt	2015	IEA (2017)#
COG	Congo	BIO	PSB – DR	45126	TJ	2015	IEA (2017)
		CEM	CEM	460	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	150	kg	2015	USGS (2017b)
		OR	CO-OR	804	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	454	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	24	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	9410	TJ	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
COK	Cook Islands	BIO	PSB – DR	32.04981922	TJ	2015	IEA (2017)
		BIO	PSB – IND	9.032123015	TJ	2015	IEA (2017)
		OR	CO-OR	0.916736727	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	4.608539335	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	5.70E-02	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1.459906893	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	0.017545201	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	1.233281386	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	0.125009554	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	0.136706354	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	0.32458621	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	5.031086248	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	0.644055069	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	0.842169625	kt	2015	IEA (2017)
CRI	Costa Rica	BIO	PSB – DR	6233	TJ	2015	IEA (2017)
		BIO	PSB – IND	18870	TJ	2015	IEA (2017)
		BIO	PSB – PP	1314	TJ	2015	IEA (2017)
		CEM	CEM	1500	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	400	kg	2015	USGS (2017b)
		SC-DR-oil	CO-HF-DR	5	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	896	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	1	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	99	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	59	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	32	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	1	kt	2015	IEA (2017)
HRV	Croatia	BIO	PSB – DR	48644	TJ	2015	IEA (2017)
		BIO	PSB – IND	1272	TJ	2015	IEA (2017)
		BIO	PSB – PP	2189	TJ	2015	IEA (2017)
		CEM	CEM	2345	kt	2014	USGS (2017a)
		CEM	PC-CEM	167	kt	2015	IEA (2017)
		OR	CO-OR	2863	kt	2015	IEA (2017)
		SC-DR-coal	BC-DR	8	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	29610	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	9	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1590	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	3	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	26	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	75	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	3	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	15851	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	23	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	113	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	8	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	873	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	27706	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	185	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	6	kt	2015	IEA (2017)
		SSC	SP-S	167	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
CUB	Cuba	BIO	PSB – DR	2426	TJ	2015	IEA (2017)
		BIO	PSB – IND	42083	TJ	2015	IEA (2017)
		BIO	PSB – PP	13051	TJ	2015	IEA (2017)
		CEM	CEM	1580	kt	2014	USGS (2017a)
		CSP	CSP-C	7	kt	2010	UNEP (2011e)
		OR	CO-OR	5239	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	2437	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	562	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	632	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	3	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	14730	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	1199	kt	2015	IEA (2017)
		SC-IND-oil	CO-IND	851	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	401	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	29500	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1608	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	463	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	2440	kt	2015	IEA (2017)
		SSC	SP-S	256	kt	2014	World Steel Association (2015)
CUW	Curaçao	OR	CO-OR	9232	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	272	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	127	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	277	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	16	kt	2015	IEA (2017)
CYP	Cyprus	BIO	PSB – DR	161	TJ	2015	IEA (2017)
		BIO	PSB – IND	154	TJ	2015	IEA (2017)
		CEM	CEM	735	kt	2014	USGS (2017a)
		CEM	PC-CEM	128	kt	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	3	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	355	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	6	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	22	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	10	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	858	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	91	kt	2015	IEA (2017)
CZE	Czech Republic	BIO	PSB – DR	74423	TJ	2015	IEA (2017)
		BIO	PSB – IND	19831	TJ	2015	IEA (2017)
		BIO	PSB – PP	26065	TJ	2015	IEA (2017)
		CEM	CEM	3691	kt	2014	USGS (2017a)
		OR	CO-OR	7223	kt	2015	IEA (2017)
		PISP	PIP	4152	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	1483	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	349	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	137047	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	12	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	4222	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	14	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	746	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-PIP	16	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	164	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	69	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	60	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	96678	TJ	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-IND-oil	CO-HF-IND	17	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	58	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	34218	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	3612	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	58020	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	23	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	20	kt	2015	IEA (2017)
		SSC	SP-S	354	kt	2014	World Steel Association (2015)
COD	Dem. Rep. of Congo (Zaire)	BIO	PSB – DR	587094	TJ	2015	IEA (2017)
		BIO	PSB – IND	128213	TJ	2015	IEA (2017)
		BIO	PSB – PP	3014	TJ	2015	IEA (2017)
		CEM	CEM	330	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	37000	kg	2015	USGS (2017b)
		SC-DR-oil	CO-LF-DR	538	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	16	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	46	TJ	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	3	kt	2015	IEA (2017)
		SSC	SP-S	30	kt	2014	World Steel Association (2015)
DNK	Denmark	BIO	PSB – DR	43549	TJ	2015	IEA (2017)
		BIO	PSB – IND	4553	TJ	2015	IEA (2017)
		BIO	PSB – PP	57903	TJ	2015	IEA (2017)
		CEM	CEM	1876	kt	2014	USGS (2017a)
		CEM	PC-CEM	209	kt	2015	IEA (2017)
		OR	CO-OR	7336	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	31	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	37308	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	5	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	3076	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	81	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	69	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	30298	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	43	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	169	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	2966	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	65015	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	56	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	23	kt	2015	IEA (2017)
DJI	Djibouti	BIO	PSB – DR	7566.822641	TJ	2015	IEA (2017)#
		BIO	PSB – IND	367.3578674	TJ	2015	IEA (2017)#
		BIO	PSB – PP	131.4242486	TJ	2015	IEA (2017)#
		CEM	CEM	350	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	0.597318303	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	20.03860689	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	0.6186511	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.199106101	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	3.647908209	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	1.002641437	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	3.491467701	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	5.233646085	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	137.774311	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	4.742991765	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	9.813086409	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
DMA	Dominica	BIO	PSB – DR	76.53270501	TJ	2015	IEA (2017)#
		BIO	PSB – IND	139.6163174	TJ	2015	IEA (2017)#
		BIO	PSB – PP	45.81792256	TJ	2015	IEA (2017)#
		OR	CO-OR	17.01909019	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	3.569086063	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	8.474381686	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	0.756013304	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	18.12673759	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.386797504	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	2.285621617	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	1.301046151	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	541.1121269	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	27.62085815	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	20.32445068	kt	2015	IEA (2017)#
DOM	Dominican Republic	BIO	PSB – DR	17567	TJ	2015	IEA (2017)
		BIO	PSB – IND	9727	TJ	2015	IEA (2017)
		BIO	PSB – PP	650	TJ	2015	IEA (2017)
		CEM	CEM	4800	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	30816	kg	2015	USGS (2017b)
		OR	CO-OR	841	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	933	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	627	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	108	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	3	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	3819	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	107	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	99	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	946	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	36589	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1585	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	624	kt	2015	IEA (2017)
ECU	Ecuador	BIO	PSB – DR	8913	TJ	2015	IEA (2017)
		BIO	PSB – IND	15300	TJ	2015	IEA (2017)
		BIO	PSB – PP	11464	TJ	2015	IEA (2017)
		CEM	CEM	6600	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	7112	kg	2015	USGS (2017b)
		OR	CO-OR	6742	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	13	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	30	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	3147	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	575	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	267	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	917	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	25310	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1579	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	826	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	353	kt	2015	IEA (2017)
		SSC	SP-S	667	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
EGY	Egypt	BIO	PSB – DR	73259	TJ	2015	IEA (2017)
		CEM	CEM	49000	kt	2014	USGS (2017a)
		NFMP	AL-P	300	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	13700	kg	2015	USGS (2017b)
		OR	CO-OR	26087	kt	2015	IEA (2017)
		PISP	PIP	550	kt	2014	USGS (2017a)
		SC-DR-gas	NG-DR	86491	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	340	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	9939	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	198522	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	2100	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	2584	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	1243874	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	9079	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	1818	kt	2015	IEA (2017)
		SSC	SP-S	5970	kt	2014	World Steel Association (2015)
SLV	El Salvador	BIO	PSB – DR	11133	TJ	2015	IEA (2017)
		BIO	PSB – IND	933	TJ	2015	IEA (2017)
		BIO	PSB – PP	11522	TJ	2015	IEA (2017)
		CEM	CEM	1000	kt	2014	USGS (2017a)
		SC-DR-oil	CO-HF-DR	28	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	508	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	22	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	156	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	511	kt	2015	IEA (2017)
		SSC	SP-S	121	kt	2014	World Steel Association (2015)
GNQ	Equatorial Guinea	BIO	PSB – DR	6766.761441	TJ	2015	IEA (2017)#
		BIO	PSB – IND	3264.628729	TJ	2015	IEA (2017)#
		BIO	PSB – PP	1167.938448	TJ	2015	IEA (2017)#
		SC-DR-coal	HC-DR	5.308236643	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	178.0787007	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	5.497816523	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	1.769412214	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	32.4181595	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	8.910254365	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	31.02790704	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	46.51026392	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	1224.370059	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	42.14992668	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	87.20674485	kt	2015	IEA (2017)#
ERI	Eritrea	BIO	PSB – DR	14091	TJ	2015	IEA (2017)
		CEM	CEM	300	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	1390	kg	2015	USGS (2017b)
		SC-DR-oil	CO-HF-DR	1	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	47	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	5	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	73	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	38	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
EST	Estonia	BIO	PSB – DR	15703	TJ	2015	IEA (2017)
		BIO	PSB – IND	4260	TJ	2015	IEA (2017)
		BIO	PSB – PP	14594	TJ	2015	IEA (2017)
		CEM	CEM	447	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	4	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	5960	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	7	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	632	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	22	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	4387	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	13	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	50	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	3	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	7817	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	41	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	15	kt	2015	IEA (2017)
ETH	Ethiopia	BIO	PSB – DR	1351776	TJ	2015	IEA (2017)
		CEM	CEM	5400	kt	2014	USGS (2017a)
		CEM	PC-CEM	211	kt	2015	IEA (2017)
		NFMP-AU	GP-L	9200	kg	2015	USGS (2017b)
		SC-DR-oil	CO-LF-DR	1466	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	411	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	67	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	454	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	1	kt	2015	IEA (2017)
FLK	Falkland Is. (Malvinas)	BIO	PSB – DR	3.49459184	TJ	2015	IEA (2017)#
		BIO	PSB – IND	33.00741857	TJ	2015	IEA (2017)#
		BIO	PSB – PP	10.83205299	TJ	2015	IEA (2017)#
		OR	CO-OR	4.023571486	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	0.843786169	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	2.003472579	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	0.178733031	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	4.285436159	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	9.14E-02	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	0.540355675	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	0.307587076	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	127.9271277	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	6.529990501	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	4.805008923	kt	2015	IEA (2017)#
FJI	Fiji	BIO	PSB – DR	2962.568922	TJ	2015	IEA (2017)#
		BIO	PSB – IND	610.8999933	TJ	2015	IEA (2017)#
		CEM	CEM	190	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	1360	kg	2015	USGS (2017b)
		OR	CO-OR	62.00474234	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	311.704861	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	3.856754308	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	98.7427994	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	1.186693633	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	83.4146733	kt	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	8.455192137	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	9.246321226	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	21.95383222	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	340.2843993	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	43.56154545	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	56.9612944	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
FIN	Finland	BIO	PSB – DR	59248	TJ	2015	IEA (2017)
		BIO	PSB – IND	142825	TJ	2015	IEA (2017)
		BIO	PSB – PP	129806	TJ	2015	IEA (2017)
		CEM	CEM	1250	kt	2014	USGS (2017a)
		CEM	PC-CEM	52	kt	2015	IEA (2017)
		NFMP	CU-P	175000	t	2015	USGS (2017b)
		NFMP	ZN-P	305717	t	2015	USGS (2017b)
		NFMP-AU	GP-L	9300	kg	2015	USGS (2017b)
		OR	CO-OR	9809	kt	2015	IEA (2017)
		PISP	PIP	12000	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	4	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	2877	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	60	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	3058	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	52	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	68	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	6	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	25726	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	183	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	461	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	2394	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	63193	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	254	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	23	kt	2015	IEA (2017)
		SSC	SP-S	1265	kt	2014	World Steel Association (2015)
FRA	France	BIO	PSB – DR	289123	TJ	2015	IEA (2017)
		BIO	PSB – IND	54784	TJ	2015	IEA (2017)
		BIO	PSB – PP	60585	TJ	2015	IEA (2017)
		CEM	CEM	17000	kt	2014	USGS (2017a)
		CEM	PC-CEM	599	kt	2015	IEA (2017)
		CSP	CSP-C	278.54	kt	2015	OSPAR (2016)
		NFMP	AL-P	420	kt	2015	USGS (2017b)
		NFMP	ZN-P	169000	t	2015	USGS (2017b)
		OR	CO-OR	57342	kt	2015	IEA (2017)
		PISP	PIP	10866	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	92	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	773999	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	80	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	41923	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	26	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	95	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-PIP	2	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	336	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	886	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	889	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	478575	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	514	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	918	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	3946	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	288458	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	390	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	90	kt	2015	IEA (2017)
		SSC	SP-S	5498	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
GUF	French Guiana	BIO	PSB – DR	260.0502441	TJ	2015	IEA (2017)#
		CEM	CEM	86	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	1200	kg	2015	USGS (2017b)
PYF	French Polynesia	BIO	PSB – DR	920.9778454	TJ	2015	IEA (2017)#
		BIO	PSB – IND	550.7428134	TJ	2015	IEA (2017)#
		OR	CO-OR	55.89894682	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	281.0103355	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	3.476967984	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	89.0192957	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	1.069836303	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	75.20057679	kt	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	7.622583658	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	8.335807859	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	19.7919716	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	306.7755598	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	39.27190762	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	51.35214254	kt	2015	IEA (2017)#
GAB	Gabon	BIO	PSB – DR	43468	TJ	2015	IEA (2017)
		BIO	PSB – IND	115821	TJ	2015	IEA (2017)
		BIO	PSB – PP	306	TJ	2015	IEA (2017)
		CEM	CEM	170	kt	2014	USGS (2017a)
		OR	CO-OR	802	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	228	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	114	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	67	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	284	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	14154	TJ	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	64	kt	2015	IEA (2017)
GMB	Gambia	BIO	PSB – DR	17975.21865	TJ	2015	IEA (2017)#
		BIO	PSB – IND	436.3349256	TJ	2015	IEA (2017)#
		BIO	PSB – PP	156.1011613	TJ	2015	IEA (2017)#
		SC-DR-coal	HC-DR	0.70947395	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	23.80116181	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	0.734812306	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.236491317	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	4.332858769	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	1.190902703	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	4.147044163	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	6.216343185	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	163.6435451	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	5.633561011	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	11.65564347	kt	2015	IEA (2017)#
GEO	Georgia	BIO	PSB – DR	16637	TJ	2015	IEA (2017)
		BIO	PSB – IND	35	TJ	2015	IEA (2017)
		CEM	CEM	1626	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	3600	kg	2015	USGS (2017b)
		OR	CO-OR	14	kt	2015	IEA (2017)
		SC-DR-coal	BC-DR	3	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	1	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	48414	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	1	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-DR-oil	CO-LF-DR	526	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	300	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	117	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	3	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	4464	TJ	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	79	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	1	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	25252	TJ	2015	IEA (2017)
DEU	Germany	BIO	PSB – DR	272666	TJ	2015	IEA (2017)
		BIO	PSB – IND	90388	TJ	2015	IEA (2017)
		BIO	PSB – PP	141939	TJ	2015	IEA (2017)
		CEM	CEM	32099	kt	2014	USGS (2017a)
		CEM	PC-CEM	102	kt	2015	IEA (2017)
		CSP	CSP-C	484.543	kt	2015	OSPAR (2016)
		NFMP	AL-P	530	kt	2015	USGS (2017b)
		NFMP	CU-P	338300	t	2015	USGS (2017b)
		NFMP	PB-P	130000	t	2015	USGS (2017b)
		NFMP	ZN-T	169000	t	2015	USGS (2017b)
		OR	CO-OR	93344	kt	2015	IEA (2017)
		PISP	PIP	27379	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	472	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	1423599	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	49464	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	526	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	437	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	27	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	1451	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	1083	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	869941	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	1471	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	734	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	162623	kt	2015	IEA (2017)
		SC-PP-coal	HC-A-PP	2287	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	39167	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	720716	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1020	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	307	kt	2015	IEA (2017)
		SSC	SP-S	13062	kt	2014	World Steel Association (2015)
GHA	Ghana	BIO	PSB – DR	48995	TJ	2015	IEA (2017)
		BIO	PSB – IND	16947	TJ	2015	IEA (2017)
		CEM	CEM	3000	kt	2014	USGS (2017a)
		NFMP	AL-P	40	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	88000	kg	2015	USGS (2017b)
		OR	CO-OR	110	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1397	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	13	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	506	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	49495	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	2	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	249	kt	2015	IEA (2017)
		SSC	SP-S	25	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
GIB	Gibraltar	SC-DR-oil	CO-LF-DR	99	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	51	kt	2015	IEA (2017)
GRC	Greece	BIO	PSB – DR	34751	TJ	2015	IEA (2017)
		BIO	PSB – IND	7551	TJ	2015	IEA (2017)
		BIO	PSB – PP	4	TJ	2015	IEA (2017)
		CEM	CEM	5128	kt	2014	USGS (2017a)
		CEM	PC-CEM	731	kt	2015	IEA (2017)
		NFMP	AL-P	170	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	500	kg	2015	USGS (2017b)
		OR	CO-OR	21695	kt	2015	IEA (2017)
		SC-DR-coal	BC-DR	51	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	25003	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	331	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	3745	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-NFM	193	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	81	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	200	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	20068	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	193	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	207	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	44023	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	61818	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1405	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	259	kt	2015	IEA (2017)
		SSC	SP-S	1022	kt	2014	World Steel Association (2015)
GRD	Grenada	BIO	PSB – DR	115.093826	TJ	2015	IEA (2017)#
		BIO	PSB – IND	257.0565415	TJ	2015	IEA (2017)#
		BIO	PSB – PP	84.35831094	TJ	2015	IEA (2017)#
		OR	CO-OR	31.33493668	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	6.571272879	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	15.60272674	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	1.391944501	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	33.37429723	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.712157652	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	4.208204307	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	2.395439374	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	996.2761842	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	50.8545305	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	37.42064753	kt	2015	IEA (2017)#
GLP	Guadeloupe	BIO	PSB – DR	418.1022838	TJ	2015	IEA (2017)#
		CEM	CEM	300	kt	2014	USGS (2017a)
GTM	Guatemala	BIO	PSB – DR	251501	TJ	2015	IEA (2017)
		BIO	PSB – PP	55237	TJ	2015	IEA (2017)
		CEM	CEM	3500	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	5600	kg	2015	USGS (2017b)
		OR	CO-OR	63	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1056	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	228	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	121	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	1528	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	311	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	41	kt	2015	IEA (2017)
		SSC	SP-S	395	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
GIN	Guinea	BIO	PSB – DR	107612.9589	TJ	2015	IEA (2017)#
		BIO	PSB – IND	1959.167785	TJ	2015	IEA (2017)#
		BIO	PSB – PP	700.9027893	TJ	2015	IEA (2017)#
		CEM	CEM	500	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	17000	kg	2015	USGS (2017b)
		SC-DR-coal	HC-DR	3.18557701	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	106.868524	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	3.299347618	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	1.061859003	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	19.45477388	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	5.347218553	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	18.6204561	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	27.91172237	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	734.7685068	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	25.2949984	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	52.33447945	kt	2015	IEA (2017)#
GNB	Guinea-Bissau	BIO	PSB – DR	15768.73571	TJ	2015	IEA (2017)#
		BIO	PSB – IND	358.8508222	TJ	2015	IEA (2017)#
		BIO	PSB – PP	128.3808075	TJ	2015	IEA (2017)#
		SC-DR-coal	HC-DR	0.583485977	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	19.57456528	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	0.604324762	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.194495326	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	3.563432217	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	0.97942289	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	3.410614461	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	5.112448561	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	134.5838191	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	4.633156508	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	9.585841052	kt	2015	IEA (2017)#
GUY	Guyana	BIO	PSB – DR	764.4453441	TJ	2015	IEA (2017)#
		BIO	PSB – IND	977.4916149	TJ	2015	IEA (2017)#
		BIO	PSB – PP	320.7836731	TJ	2015	IEA (2017)#
		CEM	CEM	2	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	14029	kg	2015	USGS (2017b)
		OR	CO-OR	119.1552554	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	24.98813724	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	59.33143916	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	5.293053701	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	126.9101946	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	2.708073987	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	16.00225537	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	9.108976137	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	3788.472413	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	193.3811015	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	142.2969786	kt	2015	IEA (2017)#
HTI	Haiti	BIO	PSB – DR	61824	TJ	2015	IEA (2017)
		BIO	PSB – IND	3369	TJ	2015	IEA (2017)
		CEM	CEM	300	kt	2014	USGS (2017a)
		SC-DR-oil	CO-LF-DR	232	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	10	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	175	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	109	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	189	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
HND	Honduras	BIO	PSB – DR	84987	TJ	2015	IEA (2017)
		BIO	PSB – IND	5383	TJ	2015	IEA (2017)
		BIO	PSB – PP	11304	TJ	2015	IEA (2017)
		CEM	CEM	1700	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	2598	kg	2015	USGS (2017b)
		SC-DR-oil	CO-HF-DR	37	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	617	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	77	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	86	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	259	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	36	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1048	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	35	kt	2015	IEA (2017)
HKG	Hong Kong (if separately reported)	BIO	PSB – DR	2284	TJ	2015	IEA (2017)
		CEM	CEM	1900	kt	2014	USGS (2017a)
		SC-DR-gas	NG-DR	26754	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1552	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	2042	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	1649	TJ	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	623	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	9142	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	107828	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	43	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	12	kt	2015	IEA (2017)
HUN	Hungary	BIO	PSB – DR	75550	TJ	2015	IEA (2017)
		BIO	PSB – IND	4826	TJ	2015	IEA (2017)
		BIO	PSB – PP	23494	TJ	2015	IEA (2017)
		CEM	CEM	2100	kt	2014	USGS (2017a)
		CEM	PC-CEM	94	kt	2015	IEA (2017)
		CSP	CSP-C	131	kt	2015	UNEP (2013)
		NFMP	AL-P	50	kt	2015	USGS (2017b)
		OR	CO-OR	6477	kt	2015	IEA (2017)
		PISP	PIP	801	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	380	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	24	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	187417	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	6	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	2892	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	40	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	12	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	18	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	58161	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	3	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	159	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	8822	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	69	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	14	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	80319	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	38	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	12	kt	2015	IEA (2017)
		SSC	SP-S	178	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
ISL	Iceland	NFMP	AL-P	800	kt	2015	USGS (2017b)
		SC-DR-oil	CO-HF-DR	61	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	289	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	116	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	3	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	30	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	1	kt	2015	IEA (2017)
IND	India	BIO	PSB – DR	5993873	TJ	2015	IEA (2017)
		BIO	PSB – IND	1309246	TJ	2015	IEA (2017)
		BIO	PSB – PP	573072	TJ	2015	IEA (2017)
		CEM	CEM	275000	kt	2014	USGS (2017a)
		CEM	PC-CEM	19297	kt	2015	IEA (2017)
		NFMP	AL-P	2355	kt	2015	USGS (2017b)
		NFMP	CU-P	790000	t	2015	USGS (2017b)
		NFMP	PB-P	143000	t	2015	USGS (2017b)
		NFMP	ZN-T	821617	t	2015	USGS (2017b)
		NFMP-AU	GP-L	1400	kg	2015	USGS (2017b)
		OR	CO-OR	232865	kt	2015	IEA (2017)
		PISP	PIP	55166	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	28528	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	181509	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	2068	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	63375	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	617	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-NFM	1020	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	2385	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-PIP	12	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	33953	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	440	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	44358	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	67204	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	216952	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	3604	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	3968	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	37574	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	79441	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	489196	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	664259	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	481	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	7079	kt	2015	IEA (2017)
		SSC	SP-S	50211	kt	2014	World Steel Association (2015)
		VCM	VCM-P	5000	kg	2015	National information
		VCM	VCM-R	2500	kg	2015	Lin et al. (2016)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
IDN	Indonesia	BIO	PSB – DR	1996913	TJ	2015	IEA (2017)
		BIO	PSB – IND	274252	TJ	2015	IEA (2017)
		BIO	PSB – PP	8298	TJ	2015	IEA (2017)
		CEM	CEM	58000	kt	2014	USGS (2017a)
		CSP	CSP-C	25	kt	2010	UNEP (2011e)
		NFMP	AL-P	250	kt	2015	USGS (2017b)
		NFMP	CU-P	199700	t	2015	USGS (2017b)
		NFMP-AU	GP-L	61500	kg	2015	USGS (2017b)
		NFMP-HG	HG-P	450	t	2015	UN Environment (2017a)
		OR	CO-OR	40551	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	11504	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	104	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	16840	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	7180	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	9142	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	399	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	589875	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	576	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	2897	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	70080	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	940498	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	2277	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	3883	kt	2015	IEA (2017)
		SSC	SP-S	4428	kt	2014	World Steel Association (2015)
IRN	Iran	BIO	PSB – DR	20933	TJ	2015	IEA (2017)
		CEM	CEM	66000	kt	2014	USGS (2017a)
		CSP	CSP-C	332	kt	2010	UNEP (2011e)
		NFMP	AL-P	350	kt	2015	USGS (2017b)
		NFMP	CU-P	155000	t	2015	USGS (2017b)
		NFMP	PB-P	16000	t	2015	USGS (2017b)
		NFMP	ZN-P	140000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	3000	kg	2015	USGS (2017b)
		OR	CO-OR	83034	kt	2015	IEA (2017)
		PISP	PIP	2782	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	14	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	2480773	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	4679	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	18753	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	242	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	1493841	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	1409	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1992	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	2809650	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	6837	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	5252	kt	2015	IEA (2017)
		SSC	SP-S	13607	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
IRQ	Iraq	BIO	PSB – DR	285	TJ	2015	IEA (2017)
		CEM	CEM	13000	kt	2014	USGS (2017a)
		CSP	CSP-C	68	kt	2010	UNEP (2011e)
		OR	CO-OR	20330	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	3543	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	46348	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	212	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1771	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	207313	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	5861	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	8366	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	10797	kt	2015	IEA (2017)
IRL	Ireland	BIO	PSB – DR	2054	TJ	2015	IEA (2017)
		BIO	PSB – IND	6031	TJ	2015	IEA (2017)
		BIO	PSB – PP	1804	TJ	2015	IEA (2017)
		CEM	CEM	2000	kt	2014	USGS (2017a)
		CEM	PC-CEM	163	kt	2015	IEA (2017)
		NFMP	AL-P	1983	kt	2015	USGS (2017b)
		OR	CO-OR	3366	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	267	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	44305	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	3138	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	126	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	33	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	35622	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	50	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	139	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	1886	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	88178	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	60	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	18	kt	2015	IEA (2017)
ISR	Israel	BIO	PSB – DR	183	TJ	2015	IEA (2017)
		CEM	CEM	6603	kt	2014	USGS (2017a)
		CSP	CSP-C	33	kt	2010	UNEP (2011e)
		OR	CO-OR	11546	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	3112	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	9	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	2528	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	23105	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	261	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	10665	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	306331	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	20	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	94	kt	2015	IEA (2017)
		SSC	SP-S	300	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
ITA	Italy	BIO	PSB – DR	269476	TJ	2015	IEA (2017)
		BIO	PSB – IND	15235	TJ	2015	IEA (2017)
		BIO	PSB – PP	73818	TJ	2015	IEA (2017)
		CEM	CEM	21400	kt	2014	USGS (2017a)
		CEM	PC-CEM	1808	kt	2015	IEA (2017)
		NFMP	PB-P	50000	t	2015	USGS (2017b)
		NFMP	ZN-P	139200	t	2015	USGS (2017b)
		OR	CO-OR	67092	kt	2015	IEA (2017)
		PISP	PIP	6371	kt	2014	USGS (2017a)
		SC-DR-gas	NG-DR	1149535	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	410	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	25166	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	3	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	224	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	159	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	384873	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	796	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	401	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	445	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	15869	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	999353	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1154	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	105	kt	2015	IEA (2017)
		SSC	SP-S	17200	kt	2014	World Steel Association (2015)
CIV	Ivory Coast	BIO	PSB – DR	132382	TJ	2015	IEA (2017)
		BIO	PSB – PP	1885	TJ	2015	IEA (2017)
		CEM	CEM	2600	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	26000	kg	2015	USGS (2017b)
		OR	CO-OR	3186	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	787	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	11633	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	29	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	196	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	67526	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	152	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	3	kt	2015	IEA (2017)
JAM	Jamaica	BIO	PSB – DR	1849	TJ	2015	IEA (2017)
		BIO	PSB – IND	3608	TJ	2015	IEA (2017)
		BIO	PSB – PP	3377	TJ	2015	IEA (2017)
		CEM	CEM	830	kt	2014	USGS (2017a)
		NFMP	AL-P	1865	kt	2015	USGS (2017b)
		OR	CO-OR	1218	kt	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	7	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	172	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	97	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	586	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	33	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	667	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	181	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
JPN	Japan	BIO	PSB – DR	472	TJ	2015	IEA (2017)
		BIO	PSB – IND	96748	TJ	2015	IEA (2017)
		BIO	PSB – PP	276103	TJ	2015	IEA (2017)
		CEM	CEM	57913	kt	2014	USGS (2017a)
		CEM	PC-CEM	700	kt	2015	IEA (2017)
		NFMP	AL-P	30	kt	2015	USGS (2017b)
		NFMP	CU-P	1176600	t	2015	USGS (2017b)
		NFMP	PB-P	85000	t	2015	USGS (2017b)
		NFMP	ZN-T	566619	t	2015	USGS (2017b)
		NFMP-AU	GP-L	7700	kg	2015	USGS (2017b)
		OR	CO-OR	154011	kt	2015	IEA (2017)
		PISP	PIP	83872	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	2	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	838834	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	2188	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	29456	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	5904	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	57	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	6810	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	3037	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	517970	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	2016	kt	2015	IEA (2017)
		SC-IND-oil	CO-IND	23	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	6695	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	105420	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	3540529	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	10744	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	1371	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	4875	kt	2015	IEA (2017)
		SSC	SP-S	25679	kt	2014	World Steel Association (2015)
JOR	Jordan	BIO	PSB – DR	154	TJ	2015	IEA (2017)
		CEM	CEM	4500	kt	2014	USGS (2017a)
		CEM	PC-CEM	199	kt	2015	IEA (2017)
		OR	CO-OR	3314	kt	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	1	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1465	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	253	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	148	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	90441	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1735	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	564	kt	2015	IEA (2017)
		SSC	SP-S	150	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
KAZ	Kazakhstan	BIO	PSB – DR	2935	TJ	2015	IEA (2017)
		CEM	CEM	7977	kt	2014	USGS (2017a)
		NFMP	AL-P	200	kt	2015	USGS (2017b)
		NFMP	CU-P	307400	t	2015	USGS (2017b)
		NFMP	PB-T	126000	t	2015	USGS (2017b)
		NFMP	ZN-T	324340	t	2015	USGS (2017b)
		NFMP-AU	GP-L	63614	kg	2015	USGS (2017b)
		OR	CO-OR	14610	kt	2015	IEA (2017)
		PISP	PIP	3185	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	506	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	6003	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	51397	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	490	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	2774	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	36	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	2089	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	2258	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	1306	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	2317	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	83101	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	1085	kt	2015	IEA (2017)
		SC-IND-oil	CO-IND	488	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1737	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	42	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	42421	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	1092543	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	457	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	225	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	888	kt	2015	IEA (2017)
		SSC	SP-S	155	kt	2014	World Steel Association (2015)
KEN	Kenya	BIO	PSB – DR	339597	TJ	2015	IEA (2017)
		BIO	PSB – PP	1464	TJ	2015	IEA (2017)
		CEM	CEM	5583	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	300	kg	2015	USGS (2017b)
		OR	CO-OR	698	kt	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	14	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1467	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	566	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	75	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	448	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	186	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	167	kt	2015	IEA (2017)
		SSC	SP-S	20	kt	2014	World Steel Association (2015)
KIR	Kiribati	BIO	PSB – DR	344.3808131	TJ	2015	IEA (2017)#
		BIO	PSB – IND	14.20268976	TJ	2015	IEA (2017)#
		OR	CO-OR	1.44153565	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	7.24676295	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	8.97E-02	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	2.295651271	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	2.76E-02	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	1.939290783	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-IND-oil	CO-HF-IND	0.196573043	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	0.214965843	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	0.510400182	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	7.911202827	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	1.012753515	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	1.324281554	kt	2015	IEA (2017)#
PRK	Korea – Dem. Rep.	BIO	PSB – DR	32670	TJ	2015	IEA (2017)
		CEM	CEM	7200	kt	2014	USGS (2017a)
		CSP	CSP-C	25	kt	2010	UNEP (2011e)
		NFMP	CU-T	12000	t	2015	USGS (2017b)
		NFMP	PB-T	3000	t	2015	USGS (2017b)
		NFMP	ZN-T	20000	t	2015	USGS (2017b)
		OR	CO-OR	532	kt	2015	IEA (2017)
		PISP	PIP	900	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	851	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	1068	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	252	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	1442	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	4132	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	93	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	237	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	850	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	380	kt	2015	IEA (2017)
KOR	Korea – Rep. of	BIO	PSB – DR	43038	TJ	2015	IEA (2017)
		BIO	PSB – IND	24414	TJ	2015	IEA (2017)
		BIO	PSB – PP	11243	TJ	2015	IEA (2017)
		CEM	CEM	44815934	t	2015	National information
		CEM	PC-CEM	57	kt	2015	IEA (2017)
		NFMP	CU-P	510000	t	2015	USGS (2017b)
		NFMP	PB-P	291000	t	2015	USGS (2017b)
		NFMP	ZN-P	930180	t	2015	National information
		NFMP-AU	GP-L	300	kg	2015	USGS (2017b)
		OR	CO-OR	130945	kt	2015	National information
		PISP	PIP	47345000	t	2015	National information
		SC-DR-gas	NG-DR	608957	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	459	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	20050	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	4650	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	955	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	1431	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	344869	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	1261	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1264	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	6824	kt	2015	IEA (2017)
		SC-PP-coal	HC-A-PP	2273	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	80653	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	895074	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	3299	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	111	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	1	kt	2015	IEA (2017)
		SSC	SP-S	24197	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
XKX	Kosovo	BIO	PSB – DR	10527	TJ	2015	IEA (2017)
		BIO	PSB – IND	502	TJ	2015	IEA (2017)
		CEM	CEM	630	kt	2014	USGS (2017a)
		CEM	PC-CEM	79	kt	2015	IEA (2017)
		SC-DR-coal	BC-DR	156	kt	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	9	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	344	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	12	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-PIP	54	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	12	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	20	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	39	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	8143	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	4	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	2	kt	2015	IEA (2017)
KWT	Kuwait	CEM	CEM	3800	kt	2014	USGS (2017a)
		OR	CO-OR	43661	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1256	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	261902	TJ	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	837	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	532640	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	5862	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	1450	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	1693	kt	2015	IEA (2017)
KGZ	Kyrgystan	BIO	PSB – DR	121	TJ	2015	IEA (2017)
		CEM	CEM	1727	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	17000	kg	2015	USGS (2017b)
		NFMP-HG	HG-P	40	t	2015	USGS (2017b)
		OR	CO-OR	323	kt	2015	IEA (2017)
		SC-DR-coal	BC-DR	543	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	167	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	4579	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	13	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	481	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	99	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	4	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	364	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	8	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	909	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	242	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	39	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	452	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	973	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	4510	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	28	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	16	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
LAO	Lao Peoples Dem. Rep.	BIO	PSB – DR	22516.13496	TJ	2015	IEA (2017)
		BIO	PSB – IND	2734.191073	TJ	2015	IEA (2017)
		CEM	CEM	2400	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	6893	kg	2015	USGS (2017b)
		OR	CO-OR	277.5132016	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	1395.090289	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	17.2615867	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	441.94088	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	5.311257446	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	373.337138	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	37.84270931	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	41.3835476	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	98.25826276	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	1523.003073	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	194.9674088	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	254.9403574	kt	2015	IEA (2017)
LVA	Latvia	BIO	PSB – DR	22947	TJ	2015	IEA (2017)
		BIO	PSB – IND	14992	TJ	2015	IEA (2017)
		BIO	PSB – PP	14053	TJ	2015	IEA (2017)
		CEM	CEM	1200	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	32	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	9115	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	904	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	40	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	2	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	5610	TJ	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	36	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	7	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	35997	TJ	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	7	kt	2015	IEA (2017)
LBN	Lebanon	BIO	PSB – DR	4091	TJ	2015	IEA (2017)
		CEM	CEM	5517	kt	2014	USGS (2017a)
		SC-DR-oil	CO-LF-DR	748	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	253	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	141	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1334	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	2617	kt	2015	IEA (2017)
LSO	Lesotho	BIO	PSB – DR	17792.44357	TJ	2015	IEA (2017)
		BIO	PSB – IND	809.809121	TJ	2015	IEA (2017)
		BIO	PSB – PP	289.713559	TJ	2015	IEA (2017)
		SC-DR-coal	HC-DR	1.31673731	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	44.17340165	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	1.363763642	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	0.438912437	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	8.041502856	kt	2015	IEA (2017)
		SC-IND-oil	CO-IND	2.210237627	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	7.696643085	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	11.5371269	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	303.7117307	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	10.45552126	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	21.63211295	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
LBR	Liberia	BIO	PSB – DR	38327.82882	TJ	2015	IEA (2017)
		BIO	PSB – IND	523.3383248	TJ	2015	IEA (2017)
		BIO	PSB – PP	187.2270943	TJ	2015	IEA (2017)
		CEM	CEM	295	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	883	kg	2015	USGS (2017b)
		SC-DR-coal	HC-DR	0.850940154	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	28.54701611	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	0.881330874	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	0.283646718	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	5.196813082	kt	2015	IEA (2017)
		SC-IND-oil	CO-IND	1.42836383	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	4.973947804	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	7.455856586	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	196.2733986	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	6.756870031	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	13.9797311	kt	2015	IEA (2017)
LBY	Libyan Arab Jamah	BIO	PSB – DR	6352	TJ	2015	IEA (2017)
		CEM	CEM	2000	kt	2014	USGS (2017a)
		CSP	CSP-C	45	kt	2010	UNEP (2011e)
		OR	CO-OR	4368	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1947	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	2130	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	253	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	218638	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1113	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	3327	kt	2015	IEA (2017)
		SSC	SP-S	712	kt	2014	World Steel Association (2015)
LTU	Lithuania	BIO	PSB – DR	22351	TJ	2015	IEA (2017)
		BIO	PSB – IND	3598	TJ	2015	IEA (2017)
		BIO	PSB – PP	24402	TJ	2015	IEA (2017)
		CEM	CEM	903	kt	2014	USGS (2017a)
		OR	CO-OR	8486	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	104	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	10926	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1336	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	141	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	3	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	13215	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	10	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	20	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	4	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	28225	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	116	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	5	kt	2015	IEA (2017)
LUX	Luxembourg	BIO	PSB – DR	866	TJ	2015	IEA (2017)
		BIO	PSB – IND	1025	TJ	2015	IEA (2017)
		BIO	PSB – PP	785	TJ	2015	IEA (2017)
		CEM	CEM	1100	kt	2014	USGS (2017a)
		SC-DR-gas	NG-DR	15034	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1803	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	62	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	11	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	13024	TJ	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	13	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	7936	TJ	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-PP-oil	CO-LF-PP	1	kt	2015	IEA (2017)
		SSC	SP-S	2193	kt	2014	World Steel Association (2015)
MKD	Macedonia	BIO	PSB – DR	9762	TJ	2015	IEA (2017)
		BIO	PSB – IND	241	TJ	2015	IEA (2017)
		BIO	PSB – PP	2	TJ	2015	IEA (2017)
		CEM	CEM	687	kt	2014	USGS (2017a)
		CEM	PC-CEM	57	kt	2015	IEA (2017)
		SC-DR-coal	BC-DR	10	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	261	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	13	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	498	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	1	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	7	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-PIP	190	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	12	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	1195	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	53	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	44	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	5833	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	3720	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	39	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	2	kt	2015	IEA (2017)
		SSC	SP-S	188	kt	2014	World Steel Association (2015)
MDG	Madagascar	BIO	PSB – DR	217531.2242	TJ	2015	IEA (2017)#
		BIO	PSB – IND	4950.38157	TJ	2015	IEA (2017)#
		BIO	PSB – PP	1771.025574	TJ	2015	IEA (2017)#
		CEM	CEM	240	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	8.049245115	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	270.0330087	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	8.336718155	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	2.683081705	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	49.15788981	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	13.51123287	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	47.04975418	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	70.5267191	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	1856.596715	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	63.91483919	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	132.2375983	kt	2015	IEA (2017)#
MWI	Malawi	BIO	PSB – DR	164109.3051	TJ	2015	IEA (2017)#
		BIO	PSB – IND	2738.745669	TJ	2015	IEA (2017)#
		BIO	PSB – PP	979.8009611	TJ	2015	IEA (2017)#
		CEM	CEM	450	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	4.453158789	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	149.3928746	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	4.612200174	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	1.484386263	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	27.19607689	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	7.47494511	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	26.0297734	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	39.0181532	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	1027.14228	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	35.36020134	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	73.15903725	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
MYS	Malaysia	BIO	PSB – DR	25374	TJ	2015	IEA (2017)
		BIO	PSB – PP	9878	TJ	2015	IEA (2017)
		CEM	CEM	22000	kt	2014	USGS (2017a)
		NFMP	AL-P	440	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	4732	kg	2015	USGS (2017b)
		OR	CO-OR	23745	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	13398	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	208	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	7873	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	2821	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	223653	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	495	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1366	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	24789	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	1160350	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	119	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	325	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	383	kt	2015	IEA (2017)
		SSC	SP-S	4316	kt	2014	World Steel Association (2015)
MDV	Maldives	BIO	PSB – DR	1281.122948	TJ	2015	IEA (2017)#
		BIO	PSB – IND	437.3571462	TJ	2015	IEA (2017)#
		OR	CO-OR	44.39059986	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	223.1565722	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	2.761137791	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	70.69220728	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	0.849580859	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	59.71845452	kt	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	6.053263618	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	6.619650857	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	15.71724589	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	243.6173112	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	31.18669735	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	40.77988122	kt	2015	IEA (2017)#
MLI	Mali	BIO	PSB – DR	154890.5183	TJ	2015	IEA (2017)#
		BIO	PSB – IND	5169.795047	TJ	2015	IEA (2017)#
		BIO	PSB – PP	1849.521923	TJ	2015	IEA (2017)#
		NFMP-AU	GP-L	41186	kg	2015	USGS (2017b)
		SC-DR-coal	HC-DR	8.40600809	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	282.0015571	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	8.706222665	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	2.802002697	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	51.33669226	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	14.11008501	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	49.13511872	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	73.65264231	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	1938.885795	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	66.7477071	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	138.0987043	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
MLT	Malta	BIO	PSB – DR	48	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	6	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	142	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	4	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	4	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	254	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	20	kt	2015	IEA (2017)
MTQ	Martinique	BIO	PSB – DR	400.8757448	TJ	2015	IEA (2017)#
		CEM	CEM	150	kt	2014	USGS (2017a)
MRT	Mauritania	BIO	PSB – DR	32856.23274	TJ	2015	IEA (2017)#
		BIO	PSB – IND	2193.290992	TJ	2015	IEA (2017)#
		BIO	PSB – PP	784.6616231	TJ	2015	IEA (2017)#
		CEM	CEM	770	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	8800	kg	2015	USGS (2017b)
		SC-DR-coal	HC-DR	3.566257783	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	119.6394575	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	3.693624132	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	1.188752594	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	21.77964574	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	5.986218421	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	20.84562585	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	31.24721105	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	822.5743397	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	28.31778501	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	58.58852071	kt	2015	IEA (2017)#
MUS	Mauritius	BIO	PSB – DR	217	TJ	2015	IEA (2017)
		BIO	PSB – IND	1345	TJ	2015	IEA (2017)
		BIO	PSB – PP	8309	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	3	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	171	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	36	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	37	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	37	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	684	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	230	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	1	kt	2015	IEA (2017)
MEX	Mexico	BIO	PSB – DR	252840	TJ	2015	IEA (2017)
		BIO	PSB – IND	37150	TJ	2015	IEA (2017)
		BIO	PSB – PP	68740	TJ	2015	IEA (2017)
		CEM	CEM	35000	kt	2014	USGS (2017a)
		CEM	PC-CEM	3789	kt	2015	IEA (2017)
		CSP	CSP-C	120	kt	2015	UNEP (2013)
		NFMP	CU-P	256000	t	2015	USGS (2017b)
		NFMP	PB-P	116000	t	2015	USGS (2017b)
		NFMP	ZN-P	326642	t	2015	USGS (2017b)
		NFMP-AU	GP-L	134759	kg	2015	USGS (2017b)
		NFMP-HG	HG-P	300	t	2015	USGS (2017b)
		OR	CO-OR	59485	kt	2015	IEA (2017)
		PISP	PIP	5116	kt	2014	USGS (2017a)
		SC-DR-gas	NG-DR	49021	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	25	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-DR-oil	CO-LF-DR	17054	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	330	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	2535	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	89	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	576685	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	536	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1601	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	10386	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	5328	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	2231293	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	7572	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	1219	kt	2015	IEA (2017)
		SSC	SP-S	13311	kt	2014	World Steel Association (2015)
MNG	Mongolia	BIO	PSB – DR	3169	TJ	2015	IEA (2017)
		CEM	CEM	411	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	14556	kg	2015	USGS (2017b)
		SC-DR-coal	BC-DR	493	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	409	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	232	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	35	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	23	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	349	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	5259	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	1429	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	3	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	74	kt	2015	IEA (2017)
		SSC	SP-S	45	kt	2014	World Steel Association (2015)
MSR	Monserrat	BIO	PSB – DR	5.449317415	TJ	2015	IEA (2017)#
		BIO	PSB – IND	7.897076929	TJ	2015	IEA (2017)#
		BIO	PSB – PP	2.591585755	TJ	2015	IEA (2017)#
		OR	CO-OR	0.962645821	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	0.201877171	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	0.479333973	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	4.28E-02	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	1.025297357	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	2.19E-02	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	0.129280947	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	7.36E-02	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	30.60676699	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	1.562310522	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	1.14960596	kt	2015	IEA (2017)#
MNE	Montenegro	BIO	PSB – DR	6688	TJ	2015	IEA (2017)
		BIO	PSB – IND	396	TJ	2015	IEA (2017)
		NFMP	AL-P	40	kt	2015	USGS (2017b)
		SC-DR-coal	BC-DR	22	kt	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	2	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	148	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	6	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-PIP	24	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	3	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	36	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	1668	kt	2015	IEA (2017)
		SSC	SP-S	140	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
MAR	Morocco	BIO	PSB – DR	51091	TJ	2015	IEA (2017)
		BIO	PSB – IND	1269	TJ	2015	IEA (2017)
		CEM	CEM	15710	kt	2014	USGS (2017a)
		CEM	PC-CEM	1222	kt	2015	IEA (2017)
		CSP	CSP-C	8	kt	2010	UNEP (2011e)
		NFMP-AU	GP-L	500	kg	2015	USGS (2017b)
		NFMP-HG	HG-P	5	t	2015	USGS (2017b)
		OR	CO-OR	2623	kt	2015	IEA (2017)
		PISP	PIP	15	kt	2014	USGS (2017a)
		SC-DR-oil	CO-HF-DR	1	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	5054	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	2	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	15	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	10	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	3097	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	693	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	222	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	6707	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	43985	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	714	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	10	kt	2015	IEA (2017)
		SSC	SP-S	501	kt	2014	World Steel Association (2015)
MOZ	Mozambique	BIO	PSB – DR	268809	TJ	2015	IEA (2017)
		BIO	PSB – IND	37888	TJ	2015	IEA (2017)
		CEM	CEM	1502	kt	2014	USGS (2017a)
		NFMP	AL-P	558	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	250	kg	2015	USGS (2017b)
		SC-DR-gas	NG-DR	146	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	599	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	6252	TJ	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	136	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	14	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	23936	TJ	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	25	kt	2015	IEA (2017)
MMR	Myanmar	BIO	PSB – DR	407625	TJ	2015	IEA (2017)
		BIO	PSB – IND	13197	TJ	2015	IEA (2017)
		CEM	CEM	1317	kt	2014	USGS (2017a)
		CSP	CSP-C	7	kt	2010	UNEP (2011e)
		NFMP	PB-P	2000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	1692	kg	2015	USGS (2017b)
		OR	CO-OR	637	kt	2015	IEA (2017)
		PISP	PIP	1.5	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	54	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	9028	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	34	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1337	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	517	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	67	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	17584	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	31	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	775	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	113	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	103754	TJ	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	34	kt	2015	IEA (2017)
		SSC	SP-S	35	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
NAM	Namibia	BIO	PSB – DR	4030	TJ	2015	IEA (2017)
		BIO	PSB – IND	1173	TJ	2015	IEA (2017)
		CEM	CEM	731	kt	2014	USGS (2017a)
		NFMP	CU-P	49000	t	2015	USGS (2017b)
		NFMP	ZN-P	72000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	6105	kg	2015	USGS (2017b)
		SC-DR-oil	CO-HF-DR	16	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	676	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	2	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	88	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	4	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	9	kt	2015	IEA (2017)
NPL	Nepal	BIO	PSB – DR	383914	TJ	2015	IEA (2017)
		BIO	PSB – IND	2447	TJ	2015	IEA (2017)
		CEM	CEM	3100	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	4	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	610	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	925	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	9	kt	2015	IEA (2017)
NLD	Netherlands	BIO	PSB – DR	21963	TJ	2015	IEA (2017)
		BIO	PSB – IND	5384	TJ	2015	IEA (2017)
		BIO	PSB – PP	22006	TJ	2015	IEA (2017)
		CEM	CEM	2000	kt	2014	USGS (2017a)
		NFMP	AL-P	75	kt	2015	USGS (2017b)
		NFMP	ZN-P	291000	t	2015	USGS (2017b)
		OR	CO-OR	52787	kt	2015	IEA (2017)
		PISP	PIP	5868	kt	2014	USGS (2017a)
		SC-DR-gas	NG-DR	560230	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	24	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	6455	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	27	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	14	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	33	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	217366	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	5	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	414	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	13476	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	454342	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	7	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	22	kt	2015	IEA (2017)
		SSC	SP-S	125	kt	2014	World Steel Association (2015)
NCL	New Caledonia	BIO	PSB – DR	884.8558292	TJ	2015	IEA (2017)#
		BIO	PSB – IND	786.6171126	TJ	2015	IEA (2017)#
		CEM	CEM	106	kt	2014	USGS (2017a)
		OR	CO-OR	79.83956773	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	401.3625478	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	4.966097514	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	127.1448299	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	1.528030004	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	107.4077757	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-IND-oil	CO-HF-IND	10.88721378	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	11.90590045	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	28.26855508	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	438.1626037	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	56.09143474	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	73.34544021	kt	2015	IEA (2017)#
NZL	New Zealand	BIO	PSB – DR	6517	TJ	2015	IEA (2017)
		BIO	PSB – IND	35973	TJ	2015	IEA (2017)
		BIO	PSB – PP	3787	TJ	2015	IEA (2017)
		CEM	CEM	1100	kt	2014	USGS (2017a)
		NFMP	AL-P	333	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	11600	kg	2015	USGS (2017b)
		OR	CO-OR	5428	kt	2015	IEA (2017)
		PISP	PIP	670	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	169	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	17295	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	67	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	2480	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-NFM	3	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	895	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	116	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	9	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	57745	TJ	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	332	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	16	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	600	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	66138	TJ	2015	IEA (2017)
		SSC	SP-S	264	kt	2014	World Steel Association (2015)
NIC	Nicaragua	BIO	PSB – DR	40531	TJ	2015	IEA (2017)
		BIO	PSB – IND	2781	TJ	2015	IEA (2017)
		BIO	PSB – PP	19779	TJ	2015	IEA (2017)
		CEM	CEM	700	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	8200	kg	2015	USGS (2017b)
		OR	CO-OR	729	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	481	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	27	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	91	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	498	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	15	kt	2015	IEA (2017)
NER	Niger	BIO	PSB – DR	88279	TJ	2015	IEA (2017)
		CEM	CEM	21	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	1209	kg	2015	USGS (2017b)
		OR	CO-OR	742	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	168	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	2	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	61	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	221	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	16	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	53	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
NGA	Nigeria	BIO	PSB – DR	4009489	TJ	2015	IEA (2017)
		BIO	PSB – IND	173369	TJ	2015	IEA (2017)
		CEM	CEM	20000	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	7700	kg	2015	USGS (2017b)
		OR	CO-OR	1335	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	527	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	47	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	119044	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	451	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	469517	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	123	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	14	kt	2015	IEA (2017)
		SSC	SP-S	100	kt	2014	World Steel Association (2015)
NOR	Norway	BIO	PSB – DR	22158	TJ	2015	IEA (2017)
		BIO	PSB – IND	10315	TJ	2015	IEA (2017)
		BIO	PSB – PP	6364	TJ	2015	IEA (2017)
		CEM	CEM	1700	kt	2014	USGS (2017a)
		CEM	PC-CEM	13	kt	2015	IEA (2017)
		NFMP	AL-P	1225	kt	2015	USGS (2017b)
		NFMP	ZN-P	162878	t	2015	USGS (2017b)
		OR	CO-OR	13430	kt	2015	IEA (2017)
		PISP	PIP	102	kt	2014	USGS (2017a)
		SC-DR-gas	NG-DR	7444	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	9	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	3909	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	93	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	262	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	212	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	11965	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	6	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	306	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	26	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	202999	TJ	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	213	kt	2015	IEA (2017)
		SSC	SP-S	600	kt	2014	World Steel Association (2015)
OMN	Oman	CEM	CEM	5000	kt	2014	USGS (2017a)
		NFMP	AL-P	377	kt	2015	USGS (2017b)
		NFMP	CU-P	12000	t	2015	USGS (2017b)
		OR	CO-OR	9212	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	7492	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1908	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	447010	TJ	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	417	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	454854	TJ	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	202	kt	2015	IEA (2017)
		SSC	SP-S	1500	kt	2014	World Steel Association (2015)
PAK	Pakistan	BIO	PSB – DR	1187378	TJ	2015	IEA (2017)
		BIO	PSB – IND	149375	TJ	2015	IEA (2017)
		CEM	CEM	32000	kt	2014	USGS (2017a)
		CSP	CSP-C	33	kt	2010	UNEP (2011e)
		NFMP	CU-P	13000	t	2015	USGS (2017b)
		OR	CO-OR	12999	kt	2015	IEA (2017)
		PISP	PIP	216.5	kt	2014	USGS (2017a)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-DR-gas	NG-DR	395135	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	7	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	6769	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	1082	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	7390	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	305417	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	773	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	471	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	158	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	310856	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	9045	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	563	kt	2015	IEA (2017)
		SSC	SP-S	2280	kt	2014	World Steel Association (2015)
PLW	Palau	BIO	PSB – DR	69.27621526	TJ	2015	IEA (2017)#
		BIO	PSB – IND	23.96736273	TJ	2015	IEA (2017)#
		OR	CO-OR	2.43262427	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	12.22907767	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	0.151311557	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	3.87396385	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	4.66E-02	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	3.272597403	kt	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	0.331721491	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	0.36275976	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	0.861311943	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	13.35033511	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	1.709044643	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	2.23475531	kt	2015	IEA (2017)#
PAN	Panama	BIO	PSB – DR	7053	TJ	2015	IEA (2017)
		BIO	PSB – IND	3557	TJ	2015	IEA (2017)
		BIO	PSB – PP	2862	TJ	2015	IEA (2017)
		CEM	CEM	2188	kt	2014	USGS (2017a)
		SC-DR-oil	CO-LF-DR	670	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	31	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	433	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	339	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	708	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	60	kt	2015	IEA (2017)
PNG	Papua New Guinea	BIO	PSB – DR	21737.15625	TJ	2015	IEA (2017)#
		BIO	PSB – IND	1344.700727	TJ	2015	IEA (2017)#
		CEM	CEM	200	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	60046	kg	2015	USGS (2017b)
		OR	CO-OR	136.4835865	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	686.1184446	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	8.489409689	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	217.3506557	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	2.612126058	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	183.6106942	kt	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	18.61139816	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	20.35281554	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	48.32433207	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	749.0271471	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	95.88679405	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	125.3820508	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
PRY	Paraguay	BIO	PSB – DR	28526	TJ	2015	IEA (2017)
		BIO	PSB – IND	45055	TJ	2015	IEA (2017)
		CEM	CEM	1000	kt	2014	USGS (2017a)
		PISP	PIP	71	kt	2014	USGS (2017a)
		SC-DR-oil	CO-LF-DR	1202	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	46	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	1	kt	2015	IEA (2017)
PER	Peru	BIO	PSB – DR	88672	TJ	2015	IEA (2017)
		BIO	PSB – IND	3	TJ	2015	IEA (2017)
		BIO	PSB – PP	11677	TJ	2015	IEA (2017)
		CEM	CEM	10676	kt	2014	USGS (2017a)
		CSP	CSP-C	76	kt	2010	UNEP (2011e)
		NFMP	CU-P	327900	t	2015	USGS (2017b)
		NFMP	ZN-P	335422	t	2015	USGS (2017b)
		NFMP-AU	GP-L	121431	kg	2015	USGS (2017b)
		OR	CO-OR	8802	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	4	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	39546	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	177	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	4164	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	857	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	138	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	49901	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	65	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	720	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	236	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	266090	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	236	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	120	kt	2015	IEA (2017)
		SSC	SP-S	1078	kt	2014	World Steel Association (2015)
PHL	Philippines	BIO	PSB – DR	126895	TJ	2015	IEA (2017)
		BIO	PSB – IND	73847	TJ	2015	IEA (2017)
		BIO	PSB – PP	5390	TJ	2015	IEA (2017)
		CEM	CEM	22000	kt	2014	USGS (2017a)
		CSP	CSP-C	14	kt	2010	UNEP (2011e)
		NFMP	CU-P	189000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	20643	kg	2015	USGS (2017b)
		OR	CO-OR	10278	kt	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	330	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	6833	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	3356	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	447	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-PIP	412	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	2334	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	648	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	585	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	3961	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	13593	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	131431	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1146	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	286	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	234	kt	2015	IEA (2017)
		SSC	SP-S	1196	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
POL	Poland	BIO	PSB – DR	131096	TJ	2015	IEA (2017)
		BIO	PSB – IND	56853	TJ	2015	IEA (2017)
		BIO	PSB – PP	95657	TJ	2015	IEA (2017)
		CEM	CEM	15358	kt	2014	USGS (2017a)
		NFMP	CU-P	515000	t	2015	USGS (2017b)
		NFMP	PB-P	39000	t	2015	USGS (2017b)
		NFMP	ZN-P	140000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	2703	kg	2015	USGS (2017b)
		OR	CO-OR	26140	kt	2015	IEA (2017)
		PISP	PIP	4637	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	560	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	12151	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	244684	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	10	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	11589	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	48	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	16	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	897	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	1	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	3629	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	32	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	150250	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	81	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	265	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	62421	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	42465	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	122747	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	962	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	76	kt	2015	IEA (2017)
		SSC	SP-S	3492	kt	2014	World Steel Association (2015)
PRT	Portugal	BIO	PSB – DR	32212	TJ	2015	IEA (2017)
		BIO	PSB – IND	39761	TJ	2015	IEA (2017)
		BIO	PSB – PP	25376	TJ	2015	IEA (2017)
		CEM	CEM	5500	kt	2014	USGS (2017a)
		CEM	PC-CEM	456	kt	2015	IEA (2017)
		OR	CO-OR	13847	kt	2015	IEA (2017)
		PISP	PIP	100	kt	2014	USGS (2017a)
		SC-DR-gas	NG-DR	23514	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	86	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	4221	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	5	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	5	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	52913	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	123	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	188	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	5494	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	103112	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	365	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	21	kt	2015	IEA (2017)
		SSC	SP-S	2070	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
QAT	Qatar	CEM	CEM	6000	kt	2014	USGS (2017a)
		NFMP	AL-P	610	kt	2015	USGS (2017b)
		OR	CO-OR	3699	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	3294	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	239306	TJ	2015	IEA (2017)
		SC-PP-gas	NG-PP	1004423	TJ	2015	IEA (2017)
		SSC	SP-S	3019	kt	2014	World Steel Association (2015)
MDA	Republic of Moldova	BIO	PSB – DR	12510	TJ	2015	IEA (2017)
		BIO	PSB – IND	62	TJ	2015	IEA (2017)
		BIO	PSB – PP	389	TJ	2015	IEA (2017)
		CEM	CEM	1300	kt	2014	USGS (2017a)
		OR	CO-OR	7	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	96	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	13947	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	487	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	70	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	2	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	11497	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	2	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	9	kt	2015	IEA (2017)
		SC-PP-coal	HC-A-PP	3	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	71214	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	7	kt	2015	IEA (2017)
		SSC	SP-S	351	kt	2014	World Steel Association (2015)
REU	Reunion	BIO	PSB – DR	6796.340895	TJ	2015	IEA (2017)#
		BIO	PSB – IND	494.9282048	TJ	2015	IEA (2017)#
		BIO	PSB – PP	177.0632214	TJ	2015	IEA (2017)#
		CEM	CEM	400	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	0.804745731	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	26.99730321	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	0.83348665	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.268248577	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	4.914697142	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	1.350823191	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	4.703930403	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	7.051105451	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	185.6184349	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	6.390064315	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	13.22082272	kt	2015	IEA (2017)#
ROU	Romania	BIO	PSB – DR	128301	TJ	2015	IEA (2017)
		BIO	PSB – IND	10172	TJ	2015	IEA (2017)
		BIO	PSB – PP	7862	TJ	2015	IEA (2017)
		CEM	CEM	7900	kt	2014	USGS (2017a)
		CEM	PC-CEM	376	kt	2015	IEA (2017)
		NFMP	AL-P	271	kt	2015	USGS (2017b)
		OR	CO-OR	10352	kt	2015	IEA (2017)
		PISP	PIP	1631	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	286	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	142444	TJ	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-DR-oil	CO-LF-DR	4045	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	239	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	248	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-PIP	364	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	2	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	108	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	104079	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	7	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	311	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	26065	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	197	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	146307	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	49	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	72	kt	2015	IEA (2017)
		SSC	SP-S	1314	kt	2014	World Steel Association (2015)
RUS	Russia	BIO	PSB – DR	82843	TJ	2015	IEA (2017)
		BIO	PSB – IND	2877	TJ	2015	IEA (2017)
		BIO	PSB – PP	30719	TJ	2015	IEA (2017)
		CEM	CEM	68545	kt	2014	USGS (2017a)
		CSP	CSP-C	379	kt	2015	UNEP (2013)
		NFMP	AL-P	3530	kt	2015	USGS (2017b)
		NFMP	CU-P	660000	t	2015	USGS (2017b)
		NFMP	PB-T	114000	t	2015	USGS (2017b)
		NFMP	ZN-T	229602	t	2015	USGS (2017b)
		NFMP-AU	GP-L	252000	kg	2015	USGS (2017b)
		OR	CO-OR	259786	kt	2015	IEA (2017)
		PISP	PIP	51474	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	1126	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	5482	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	3387745	TJ	2015	IEA (2017)
		SC-DR-oil	CO-DR	68	kt	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	613	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	23591	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	14	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	114	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	1562	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	494	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	1651484	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	397	kt	2015	IEA (2017)
		SC-IND-oil	CO-IND	23	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	3437	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	70970	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	72817	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	10120992	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	7718	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	5190	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	674	kt	2015	IEA (2017)
		SSC	SP-S	21852	kt	2014	World Steel Association (2015)
		VCM	VCM-P	6196.515	kg	2016	National information
		VCM	VCM-R	3717.909	kg	2016	Lin et al. (2016)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
RWA	Rwanda	BIO	PSB – DR	115666.1982	TJ	2015	IEA (2017)#
		BIO	PSB – IND	3158.673802	TJ	2015	IEA (2017)#
		BIO	PSB – PP	1130.032504	TJ	2015	IEA (2017)#
		CEM	CEM	140	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	319	kg	2015	USGS (2017b)
		SC-DR-coal	HC-DR	5.135955544	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	172.29908	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	5.319382527	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	1.711985181	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	31.36601421	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	8.621068234	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	30.020883	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	45.00075334	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	1184.632603	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	40.78193271	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	84.37641251	kt	2015	IEA (2017)#
KNA	Saint Kitts	BIO	PSB – DR	54.00033377	TJ	2015	IEA (2017)#
		BIO	PSB – IND	226.4836672	TJ	2015	IEA (2017)#
		BIO	PSB – PP	74.32520297	TJ	2015	IEA (2017)#
		OR	CO-OR	27.60813372	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	5.789722258	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	13.74702526	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	1.22639437	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	29.40494408	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.627457585	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	3.707703909	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	2.110539148	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	877.78464	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	44.8061757	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	32.97004399	kt	2015	IEA (2017)#
LCA	Saint Lucia	BIO	PSB – DR	170.4375137	TJ	2015	IEA (2017)#
		BIO	PSB – IND	339.9823639	TJ	2015	IEA (2017)#
		BIO	PSB – PP	111.5720993	TJ	2015	IEA (2017)#
		OR	CO-OR	41.44351194	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	8.691149714	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	20.63612888	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	1.840982452	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	44.14076529	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.941897999	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	5.5657609	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	3.168202359	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	1317.672486	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	67.2600798	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	49.49245847	kt	2015	IEA (2017)#
VCT	Saint Vincent and the Grenadines	BIO	PSB – DR	106.7061817	TJ	2015	IEA (2017)#
		BIO	PSB – IND	200.1186674	TJ	2015	IEA (2017)#
		BIO	PSB – PP	65.67299423	TJ	2015	IEA (2017)#
		OR	CO-OR	24.39426647	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	5.115739766	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	12.14673186	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	1.083629606	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-DR-oil	CO-LF-DR	25.98190984	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.554415147	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	3.276089505	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	1.864850949	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	775.60159	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	39.59028164	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	29.13199591	kt	2015	IEA (2017)#
WSM	Samoa	BIO	PSB – DR	644.2964929	TJ	2015	IEA (2017)#
		BIO	PSB – IND	76.76234956	TJ	2015	IEA (2017)#
		OR	CO-OR	7.791176556	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	39.1671268	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	0.484618637	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	12.40747973	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	0.149113427	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	10.4814313	kt	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	1.062433167	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	1.161842118	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	2.758598398	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	42.75827517	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	5.473705379	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	7.157444491	kt	2015	IEA (2017)#
STP	Sao Tome and Principe	BIO	PSB – DR	1772.264227	TJ	2015	IEA (2017)#
		BIO	PSB – IND	86.04076475	TJ	2015	IEA (2017)#
		BIO	PSB – PP	30.78154535	TJ	2015	IEA (2017)#
		SC-DR-coal	HC-DR	0.139900974	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	4.693344594	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	0.144897438	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	4.66E-02	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	0.854395237	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	0.234833778	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	0.817754505	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	1.225799014	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	32.26882594	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	1.110880356	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	2.298373151	kt	2015	IEA (2017)#
SAU	Saudi Arabia	BIO	PSB – DR	5	TJ	2015	IEA (2017)
		CEM	CEM	57223	kt	2014	USGS (2017a)
		NFMP	AL-P	682	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	5100	kg	2015	USGS (2017b)
		OR	CO-OR	112225	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	20294	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	770165	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	13907	kt	2015	IEA (2017)
		SC-IND-oil	CO-IND	5345	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	4160	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	2327141	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	7900	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	13631	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	23260	kt	2015	IEA (2017)
		SSC	SP-S	6291	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
SEN	Senegal	BIO	PSB – DR	30980	TJ	2015	IEA (2017)
		BIO	PSB – IND	1749	TJ	2015	IEA (2017)
		BIO	PSB – PP	1522	TJ	2015	IEA (2017)
		CEM	CEM	4899	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	5670	kg	2015	USGS (2017b)
		OR	CO-OR	894	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	666	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	389	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	59	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	22	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	1688	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	599	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	152	kt	2015	IEA (2017)
SRB	Serbia	BIO	PSB – DR	37651	TJ	2015	IEA (2017)
		BIO	PSB – IND	5484	TJ	2015	IEA (2017)
		BIO	PSB – PP	191	TJ	2015	IEA (2017)
		CEM	CEM	1605	kt	2014	USGS (2017a)
		CEM	PC-CEM	104	kt	2015	IEA (2017)
		NFMP	CU-P	43000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	628	kg	2015	USGS (2017b)
		OR	CO-OR	2933	kt	2015	IEA (2017)
		PISP	PIP	550	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	556	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	14489	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	44	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1416	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	103	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-NFM	6	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	203	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	84	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	11	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	11	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	14	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	20117	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	82	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	131	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	36969	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	35494	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	202	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	29	kt	2015	IEA (2017)
SCG	Serbia and Montenegro	CSP	CSP-C	10	kt	2010	UNEP (2011e)
SYC	Seychelles	BIO	PSB – DR	844.3573007	TJ	2015	IEA (2017)#
		BIO	PSB – IND	336.9052848	TJ	2015	IEA (2017)#
		BIO	PSB – PP	120.5296737	TJ	2015	IEA (2017)#
		SC-DR-coal	HC-DR	0.547802867	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	18.3774819	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	0.567367255	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.182600956	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	3.345510368	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	0.919526241	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	3.202038188	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	4.799796551	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	126.3533399	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	4.349815624	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	8.999618533	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
SLE	Sierra Leone	BIO	PSB – DR	53706.14863	TJ	2015	IEA (2017)#
		BIO	PSB – IND	1303.676402	TJ	2015	IEA (2017)#
		BIO	PSB – PP	466.3972292	TJ	2015	IEA (2017)#
		CEM	CEM	336	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	40	kg	2015	USGS (2017b)
		SC-DR-coal	HC-DR	2.119757994	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	71.11283366	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	2.195463637	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.706585998	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	12.94566489	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	3.558165205	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	12.39049018	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	18.57311766	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	488.9322754	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	16.83188788	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	34.82459562	kt	2015	IEA (2017)#
SGP	Singapore	BIO	PSB – PP	2654	TJ	2015	IEA (2017)
		OR	CO-OR	38275	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	7092	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1255	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	233	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	50656	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	886	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	216	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	415	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	380065	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	481	kt	2015	IEA (2017)
		SSC	SP-S	540	kt	2014	World Steel Association (2015)
SVK	Slovakia	BIO	PSB – DR	1587	TJ	2015	IEA (2017)
		BIO	PSB – IND	17055	TJ	2015	IEA (2017)
		BIO	PSB – PP	18144	TJ	2015	IEA (2017)
		CEM	CEM	3319	kt	2014	USGS (2017a)
		CEM	PC-CEM	49	kt	2015	IEA (2017)
		NFMP	AL-P	171	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	600	kg	2015	USGS (2017b)
		OR	CO-OR	5930	kt	2015	IEA (2017)
		PISP	PIP	3838	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	89	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	103	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	78693	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1331	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	11	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	45	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	54	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	349	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	36689	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	2	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	12	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	2451	kt	2015	IEA (2017)
		SC-PP-coal	HC-A-PP	40	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	454	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	35237	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	203	kt	2015	IEA (2017)
		SSC	SP-S	362	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
SVN	Slovenia	BIO	PSB – DR	19396	TJ	2015	IEA (2017)
		BIO	PSB – IND	3126	TJ	2015	IEA (2017)
		BIO	PSB – PP	2187	TJ	2015	IEA (2017)
		CEM	CEM	1326	kt	2014	USGS (2017a)
		CEM	PC-CEM	30	kt	2015	IEA (2017)
		NFMP	AL-P	85	kt	2015	USGS (2017b)
		SC-DR-gas	NG-DR	7244	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1510	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	57	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	1	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	2	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	18712	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	3	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	45	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	3190	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	340	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	5	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	4714	TJ	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	8	kt	2015	IEA (2017)
		SSC	SP-S	615	kt	2014	World Steel Association (2015)
SLB	Solomon Islands	BIO	PSB – DR	2027.853112	TJ	2015	IEA (2017)#
		BIO	PSB – IND	88.27734092	TJ	2015	IEA (2017)#
		OR	CO-OR	8.959917889	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	45.04252183	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	0.557315467	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	14.26870496	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	0.171481682	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	12.05373324	kt	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	1.221806985	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	1.336128106	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	3.172411118	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	49.17237234	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	6.294806746	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	8.23112074	kt	2015	IEA (2017)#
SOM	Somalia	BIO	PSB – DR	96981.69382	TJ	2015	IEA (2017)#
		BIO	PSB – IND	588.5394357	TJ	2015	IEA (2017)#
		BIO	PSB – PP	210.5531416	TJ	2015	IEA (2017)#
		SC-DR-coal	HC-DR	0.956956168	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	32.10360097	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	0.991133174	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.318985389	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	5.844268026	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	1.606319282	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	5.593636649	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	8.384758806	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	220.7264971	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	7.598687668	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	15.72142276	kt	2015	IEA (2017)#
ZAF	South Africa	BIO	PSB – DR	355953	TJ	2015	IEA (2017)
		BIO	PSB – IND	83833	TJ	2015	IEA (2017)
		BIO	PSB – PP	4464	TJ	2015	IEA (2017)
		CEM	CEM	12070	kt	2014	USGS (2017a)
		NFMP	AL-P	695	kt	2015	USGS (2017b)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		NFMP	CU-P	71800	t	2015	USGS (2017b)
		NFMP-AU	GP-L	144515	kg	2015	USGS (2017b)
		OR	CO-OR	20577	kt	2015	IEA (2017)
		PISP	PIP	4690	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	8684	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	79	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	34	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	9366	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	1519	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	2290	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	7629	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	2380	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	80993	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	572	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1682	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	147899	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	44	kt	2015	IEA (2017)
		SSC	SP-S	2819	kt	2014	World Steel Association (2015)
SSD	South Sudan	BIO	PSB – DR	6682	TJ	2015	IEA (2017)
		BIO	PSB – PP	16	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	180	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	2	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	88	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	23	kt	2015	IEA (2017)
ESP	Spain	BIO	PSB – DR	110460	TJ	2015	IEA (2017)
		BIO	PSB – IND	53916	TJ	2015	IEA (2017)
		BIO	PSB – PP	50350	TJ	2015	IEA (2017)
		CEM	CEM	14587	kt	2014	USGS (2017a)
		CEM	PC-CEM	1440	kt	2015	IEA (2017)
		CSP	CSP-C	574.882	kt	2015	OSPAR (2016)
		NFMP	AL-P	230	kt	2015	USGS (2017b)
		NFMP	CU-P	283000	t	2015	USGS (2017b)
		NFMP	ZN-P	491000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	1800	kg	2015	USGS (2017b)
		OR	CO-OR	64933	kt	2015	IEA (2017)
		PISP	PIP	3958	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	175	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	294115	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	161	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	25301	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	12	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	223	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	80	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	320912	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	373	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1092	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	2298	kt	2015	IEA (2017)
		SC-PP-coal	HC-A-PP	2176	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	18214	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	501668	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1873	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	842	kt	2015	IEA (2017)
		SSC	SP-S	10042	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
LKA	Sri Lanka	BIO	PSB – DR	125215	TJ	2015	IEA (2017)
		BIO	PSB – IND	72725	TJ	2015	IEA (2017)
		BIO	PSB – PP	1574	TJ	2015	IEA (2017)
		CEM	CEM	1885	kt	2014	USGS (2017a)
		OR	CO-OR	1692	kt	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	40	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1812	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	87	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	684	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	109	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	1880	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	290	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	86	kt	2015	IEA (2017)
		SSC	SP-S	30	kt	2014	World Steel Association (2015)
SPM	St. Pierre-Miquelon	BIO	PSB – DR	5.881852436	TJ	2015	IEA (2017)#
		BIO	PSB – IND	34.99813395	TJ	2015	IEA (2017)#
		BIO	PSB – PP	11.48534656	TJ	2015	IEA (2017)#
		OR	CO-OR	4.266237711	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	0.894675884	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	2.124304315	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	0.189512626	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	4.543895744	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	9.70E-02	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	0.572945147	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	0.326138007	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	135.6425599	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	6.923821739	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	5.094804539	kt	2015	IEA (2017)#
SDN	Sudan	BIO	PSB – DR	160650	TJ	2015	IEA (2017)
		BIO	PSB – IND	34217	TJ	2015	IEA (2017)
		CEM	CEM	3478	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	8240	kg	2015	USGS (2017b)
		OR	CO-OR	4273	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1713	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	70	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	113	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	427	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	393	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	472	kt	2015	IEA (2017)
SUR	Suriname	BIO	PSB – DR	1028	TJ	2015	IEA (2017)
		BIO	PSB – IND	192	TJ	2015	IEA (2017)
		CEM	CEM	130	kt	2014	USGS (2017a)
		NFMP	AL-P	748	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	30000	kg	2015	USGS (2017b)
		OR	CO-OR	431	kt	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	17	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	162	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	17	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	274	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	17	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	3	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
SWZ	Swaziland	BIO	PSB – DR	13114.46844	TJ	2015	IEA (2017)#
		BIO	PSB – IND	1691.201792	TJ	2015	IEA (2017)#
		BIO	PSB – PP	605.0365172	TJ	2015	IEA (2017)#
		SC-DR-coal	HC-DR	2.749868383	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	92.25153693	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	2.848077968	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.916622794	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	16.79383905	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	4.615850499	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	16.07363543	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	24.09408488	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	634.2702371	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	21.83526442	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	45.17640914	kt	2015	IEA (2017)#
SWE	Sweden	BIO	PSB – DR	45624	TJ	2015	IEA (2017)
		BIO	PSB – IND	179234	TJ	2015	IEA (2017)
		BIO	PSB – PP	157338	TJ	2015	IEA (2017)
		CEM	CEM	2500	kt	2014	USGS (2017a)
		CSP	CSP-C	120	kt	2015	OSPAR (2016)
		NFMP	AL-P	115	kt	2015	USGS (2017b)
		NFMP	CU-P	150000	t	2015	USGS (2017b)
		NFMP	PB-P	26000	t	2015	USGS (2017b)
		OR	CO-OR	19981	kt	2015	IEA (2017)
		PISP	PIP	3078	kt	2014	USGS (2017a)
		SC-DR-gas	NG-DR	7675	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	43	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	4101	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	250	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	50	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	160	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	61	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	18768	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	220	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	249	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	286	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	8677	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	71	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	49	kt	2015	IEA (2017)
		SSC	SP-S	1443	kt	2014	World Steel Association (2015)
CHE	Switzerland	BIO	PSB – DR	25822	TJ	2015	IEA (2017)
		BIO	PSB – IND	9284	TJ	2015	IEA (2017)
		BIO	PSB – PP	4944	TJ	2015	IEA (2017)
		CEM	CEM	4290	kt	2014	USGS (2017a)
		CEM	PC-CEM	25	kt	2015	IEA (2017)
		CSP	CSP-C	26.5	kt	2015	OSPAR (2016)
		OR	CO-OR	2804	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	16	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	81031	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	1	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	5358	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	130	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-IND-coal	HC-IND-CEM	46	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	1	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	14	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	43367	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	6	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	299	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	8937	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	13	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	11	kt	2015	IEA (2017)
		SSC	SP-S	1475	kt	2014	World Steel Association (2015)
SYR	Syrian Arab Rep.	BIO	PSB – DR	190	TJ	2015	IEA (2017)
		CEM	CEM	3800	kt	2014	USGS (2017a)
		CSP	CSP-C	14	kt	2010	UNEP (2011e)
		OR	CO-OR	5457	kt	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	282	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1773	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	9556	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	642	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	338	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	135089	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	1298	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	209	kt	2015	IEA (2017)
		SSC	SP-S	5	kt	2014	World Steel Association (2015)
TWN	Taiwan (China)	BIO	PSB – IND	4597	TJ	2015	IEA (2017)
		BIO	PSB – PP	12028	TJ	2015	IEA (2017)
		CEM	CEM	14592	kt	2014	USGS (2017a)
		OR	CO-OR	43753	kt	2015	IEA (2017)
		PISP	PIP	14440	kt	2014	USGS (2017a)
		SC-DR-gas	NG-DR	57422	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	418	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	4612	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	2121	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	7220	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	253	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	74130	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	1516	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	97	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	11418	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	31281	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	592732	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	2644	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	143	kt	2015	IEA (2017)
		SSC	SP-S	9677	kt	2014	World Steel Association (2015)
TJK	Tajikistan	CEM	CEM	1150	kt	2014	USGS (2017a)
		NFMP	AL-P	100	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	3500	kg	2015	USGS (2017b)
		NFMP-HG	HG-P	30	t	2015	USGS (2017b)
		OR	CO-OR	25	kt	2015	IEA (2017)
		SC-DR-coal	BC-DR	57	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	834	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-DR-gas	NG-DR	156	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	12	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	229	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	164	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	7	kt	2015	IEA (2017)
THA	Thailand	BIO	PSB – DR	133363	TJ	2015	IEA (2017)
		BIO	PSB – IND	308439	TJ	2015	IEA (2017)
		BIO	PSB – PP	153538	TJ	2015	IEA (2017)
		CEM	CEM	34980	kt	2014	USGS (2017a)
		NFMP	ZN-P	74121	t	2015	USGS (2017b)
		NFMP-AU	GP-L	3305	kg	2015	USGS (2017b)
		OR	CO-OR	61539	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	114394	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	14340	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	814	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	109	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	10304	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	54	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	1864	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	141536	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	603	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	3418	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	14484	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	8209	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	1422743	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	184	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	47	kt	2015	IEA (2017)
		SSC	SP-S	4095	kt	2014	World Steel Association (2015)
TLS	Timor-Leste	BIO	PSB – DR	4010.677499	TJ	2015	IEA (2017)#
		BIO	PSB – IND	514.5942354	TJ	2015	IEA (2017)#
		OR	CO-OR	52.22996125	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	262.5659296	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	3.24875357	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	83.17642154	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	0.999616483	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	70.26470863	kt	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	7.122267443	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	7.788678432	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	18.49290494	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	286.6400266	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	36.69425507	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	47.98159119	kt	2015	IEA (2017)#
TGO	Togo	BIO	PSB – DR	41305	TJ	2015	IEA (2017)
		BIO	PSB – IND	133	TJ	2015	IEA (2017)
		BIO	PSB – PP	83	TJ	2015	IEA (2017)
		CEM	CEM	1677	kt	2014	USGS (2017a)
		SC-DR-oil	CO-LF-DR	293	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	53	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	2	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	4	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
TON	Tonga	BIO	PSB – DR	346.9544416	TJ	2015	IEA (2017)#
		BIO	PSB – IND	40.54168323	TJ	2015	IEA (2017)#
		OR	CO-OR	4.114874202	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	20.68593857	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	0.255949113	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	6.552953574	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	7.88E-02	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	5.53571992	kt	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	0.561119209	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	0.613621592	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	1.456941105	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	22.58258713	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	2.890912418	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	3.780171516	kt	2015	IEA (2017)#
TTO	Trinidad and Tobago	BIO	PSB – DR	427	TJ	2015	IEA (2017)
		CEM	CEM	837	kt	2014	USGS (2017a)
		OR	CO-OR	6464	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	3622	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	422	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	83796	TJ	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	122	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	270001	TJ	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	28	kt	2015	IEA (2017)
		SSC	SP-S	487	kt	2014	World Steel Association (2015)
TUN	Tunisia	BIO	PSB – DR	29903	TJ	2015	IEA (2017)
		CEM	CEM	9127	kt	2014	USGS (2017a)
		CEM	PC-CEM	815	kt	2015	IEA (2017)
		OR	CO-OR	1315	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	22863	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	24	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	1857	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	37099	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	216	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	57	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	174159	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	266	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	21	kt	2015	IEA (2017)
		SSC	SP-S	150	kt	2014	World Steel Association (2015)
TUR	Turkey	BIO	PSB – DR	117640	TJ	2015	IEA (2017)
		BIO	PSB – PP	1545	TJ	2015	IEA (2017)
		CEM	CEM	71329	kt	2014	USGS (2017a)
		NFMP	AL-P	50	kt	2015	USGS (2017b)
		NFMP	CU-T	35000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	25000	kg	2015	USGS (2017b)
		OR	CO-OR	26168	kt	2015	IEA (2017)
		PISP	PIP	9364	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	3136	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	6739	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	563684	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	248	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	19278	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	1406	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	2617	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-IND-coal	HC-IND-CEM	3307	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	9	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	1060	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	406	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	392838	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	259	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	611	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	49987	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	492	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	15774	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	854936	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	601	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	225	kt	2015	IEA (2017)
		SSC	SP-S	23752	kt	2014	World Steel Association (2015)
TKM	Turkmenistan	CEM	CEM	2900	kt	2014	USGS (2017a)
		OR	CO-OR	8600	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	439444	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	931	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	2080	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	46570	TJ	2015	IEA (2017)
		SC-PP-gas	NG-PP	507202	TJ	2015	IEA (2017)
TCA	Turks and Caicos Islands	BIO	PSB – DR	52.27851166	TJ	2015	IEA (2017)#
		BIO	PSB – IND	259.3710746	TJ	2015	IEA (2017)#
		BIO	PSB – PP	85.11787184	TJ	2015	IEA (2017)#
		OR	CO-OR	31.61707596	kt	2015	IEA (2017)#
		SC-DR-coal	HC-DR	6.630440516	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	15.74321344	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	1.404477548	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	33.67479887	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	0.718569908	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	4.246094911	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	2.417007873	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	1005.246639	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	51.31242389	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	37.75758244	kt	2015	IEA (2017)#
UGA	Uganda	BIO	PSB – DR	338928.1538	TJ	2015	IEA (2017)#
		BIO	PSB – IND	10284.03282	TJ	2015	IEA (2017)#
		BIO	PSB – PP	3679.167932	TJ	2015	IEA (2017)#
		CEM	CEM	2141	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	16.72168089	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	560.9725805	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	17.31888378	kt	2015	IEA (2017)#
		SC-IND-gas	NG-IND	5.573893631	TJ	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	102.121694	kt	2015	IEA (2017)#
		SC-IND-oil	CO-IND	28.06853579	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	97.74220618	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	146.5137755	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	3856.935325	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	132.778109	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	274.713329	kt	2015	IEA (2017)#
		SSC	SP-S	30	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
UKR	Ukraine	BIO	PSB – DR	47358	TJ	2015	IEA (2017)
		BIO	PSB – IND	3621	TJ	2015	IEA (2017)
		BIO	PSB – PP	23507	TJ	2015	IEA (2017)
		CEM	CEM	9636	kt	2014	USGS (2017a)
		OR	CO-OR	2104	kt	2015	IEA (2017)
		PISP	PIP	24787	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	596	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	510854	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	15	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	4426	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	931	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	192	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	54	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	1922	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	128539	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	10	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	768	kt	2015	IEA (2017)
		SC-PP-coal	HC-A-PP	1939	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	27535	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	443274	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	358	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	77	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	3	kt	2015	IEA (2017)
		SSC	SP-S	1678	kt	2014	World Steel Association (2015)
ARE	United Arab Emirates	CEM	CEM	16000	kt	2014	USGS (2017a)
		CSP	CSP-C	9	kt	2010	UNEP (2011e)
		NFMP	AL-P	2400	kt	2015	USGS (2017b)
		OR	CO-OR	29062	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	2783	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	405	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	1235488	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	1339	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	1423864	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	50	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	547	kt	2015	IEA (2017)
		SSC	SP-S	2390	kt	2014	World Steel Association (2015)
GBR	United Kingdom	BIO	PSB – DR	74666	TJ	2015	IEA (2017)
		BIO	PSB – IND	33806	TJ	2015	IEA (2017)
		BIO	PSB – PP	146795	TJ	2015	IEA (2017)
		CEM	CEM	8958	kt	2014	USGS (2017a)
		CSP	CSP-C	277	kt	2015	OSPAR (2016)
		NFMP	AL-P	47	kt	2015	USGS (2017b)
		NFMP	PB-P	150000	t	2015	USGS (2017b)
		OR	CO-OR	55376	kt	2015	IEA (2017)
		PISP	PIP	9705	kt	2014	USGS (2017a)
		SC-DR-coal	HC-DR	584	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	1406088	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	106	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	26083	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	1010	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-NFM	21	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	937	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	44	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
		SC-IND-gas	NG-IND	340103	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	160	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1647	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	29410	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	1065975	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	553	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	740	kt	2015	IEA (2017)
		SSC	SP-S	1955	kt	2014	World Steel Association (2015)
TZA	United Republic of Tanzania	BIO	PSB – DR	619657	TJ	2015	IEA (2017)
		BIO	PSB – IND	116991	TJ	2015	IEA (2017)
		BIO	PSB – PP	378	TJ	2015	IEA (2017)
		CEM	CEM	2809	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	45777	kg	2015	USGS (2017b)
		SC-DR-oil	CO-LF-DR	1415	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	257	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	6412	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	158	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	27590	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	236	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	200	kt	2015	IEA (2017)
USA	United States	BIO	PSB – DR	543962	TJ	2015	IEA (2017)
		BIO	PSB – IND	1187436	TJ	2015	IEA (2017)
		BIO	PSB – PP	461853	TJ	2015	IEA (2017)
		CEM	CEM	83188	kt	2014	USGS (2017a)
		CEM	PC-CEM	514	kt	2015	IEA (2017)
		CSP	CSP-C	73	kt	2015	UNEP (2013)
		NFMP	AL-P	1586.512	kt	2015	USGS (2017b)
		NFMP	CU-P	527000	t	2015	USGS (2017b)
		NFMP	ZN-P	124000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	214000	kg	2015	USGS (2017b)
		OR	CO-OR	798452	kt	2015	IEA (2017)
		PISP	PIP	29400	kt	2014	USGS (2017a)
		SC-DR-coal	BC-DR	540	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	676	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	9302671	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	1386	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	169690	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-CEM	445	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	5734	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	8336	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	10361	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	163	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	5485063	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	1047	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	13514	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	60366	kt	2015	IEA (2017)
		SC-PP-coal	BC-S-PP	353114	kt	2015	IEA (2017)
		SC-PP-coal	HC-A-PP	1035	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	258269	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	13937704	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	2550	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	7984	kt	2015	IEA (2017)
		SSC	SP-S	55174	kt	2014	World Steel Association (2015)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
URY	Uruguay	BIO	PSB – DR	14578	TJ	2015	IEA (2017)
		BIO	PSB – IND	55554	TJ	2015	IEA (2017)
		BIO	PSB – PP	12083	TJ	2015	IEA (2017)
		CEM	CEM	820	kt	2014	USGS (2017a)
		CSP	CSP-C	15	kt	2015	UNEP (2013)
		NFMP-AU	GP-L	1664	kg	2015	USGS (2017b)
		OR	CO-OR	1892	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	1488	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	21	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	724	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	544	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	156	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	13	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	93	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	88	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	181	kt	2015	IEA (2017)
		SSC	SP-S	94	kt	2014	World Steel Association (2015)
UZB	Uzbekistan	BIO	PSB – DR	169	TJ	2015	IEA (2017)
		CEM	CEM	7350	kt	2014	USGS (2017a)
		NFMP	CU-P	100000	t	2015	USGS (2017b)
		NFMP	ZN-P	73000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	102000	kg	2015	USGS (2017b)
		OR	CO-OR	2655	kt	2015	IEA (2017)
		SC-DR-coal	BC-DR	429	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	657978	TJ	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	140	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	773	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	173	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	367	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	222272	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	1	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	82	kt	2015	IEA (2017)
		SC-PP-coal	BC-L-PP	2916	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	755004	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	51	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	5	kt	2015	IEA (2017)
		SSC	SP-S	723	kt	2014	World Steel Association (2015)
VUT	Vanuatu	BIO	PSB – DR	886.9701139	TJ	2015	IEA (2017)#
		BIO	PSB – IND	50.80519746	TJ	2015	IEA (2017)#
		OR	CO-OR	5.156593899	kt	2015	IEA (2017)#
		SC-DR-gas	NG-DR	25.92278145	TJ	2015	IEA (2017)#
		SC-DR-oil	CO-HF-DR	0.320745075	kt	2015	IEA (2017)#
		SC-DR-oil	CO-LF-DR	8.211896344	kt	2015	IEA (2017)#
		SC-IND-coal	BC-IND-OTH	0.098690792	kt	2015	IEA (2017)#
		SC-IND-coal	HC-IND-OTH	6.937140277	kt	2015	IEA (2017)#
		SC-IND-oil	CO-HF-IND	0.703171895	kt	2015	IEA (2017)#
		SC-IND-oil	CO-LF-IND	0.768965757	kt	2015	IEA (2017)#
		SC-PP-coal	HC-B-PP	1.825779658	kt	2015	IEA (2017)#
		SC-PP-gas	NG-PP	28.2995847	TJ	2015	IEA (2017)#
		SC-PP-oil	CO-HF-PP	3.622774501	kt	2015	IEA (2017)#
		SC-PP-oil	CO-LF-PP	4.737158031	kt	2015	IEA (2017)#

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
VEN	Venezuela	BIO	PSB – DR	11266	TJ	2015	IEA (2017)
		BIO	PSB – IND	19411	TJ	2015	IEA (2017)
		CEM	CEM	8000	kt	2014	USGS (2017a)
		NFMP	AL-P	110	kt	2015	USGS (2017b)
		NFMP-AU	GP-L	1500	kg	2015	USGS (2017b)
		OR	CO-OR	41053	kt	2015	IEA (2017)
		SC-DR-gas	NG-DR	54769	TJ	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	2750	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	187	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	311889	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	977	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1569	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	548677	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	665	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	5799	kt	2015	IEA (2017)
		SSC	SP-S	1485	kt	2014	World Steel Association (2015)
VNM	Vietnam	BIO	PSB – DR	477483	TJ	2015	IEA (2017)
		BIO	PSB – IND	114125	TJ	2015	IEA (2017)
		BIO	PSB – PP	672	TJ	2015	IEA (2017)
		CEM	CEM	60507	kt	2014	USGS (2017a)
		NFMP	AL-P	484	kt	2015	USGS (2017b)
		NFMP	CU-P	8000	t	2015	USGS (2017b)
		NFMP	ZN-P	10000	t	2015	USGS (2017b)
		OR	CO-OR	7249	kt	2015	IEA (2017)
		SC-DR-coal	HC-DR	2677	kt	2015	IEA (2017)
		SC-DR-oil	CO-HF-DR	41	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	5856	kt	2015	IEA (2017)
		SC-IND-coal	BC-IND-OTH	1160	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	9651	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	6934	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	770	kt	2015	IEA (2017)
		SC-IND-gas	NG-IND	69371	TJ	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	298	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	1128	kt	2015	IEA (2017)
		SC-PP-coal	HC-A-PP	22345	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	1226	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	366899	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	216	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	40	kt	2015	IEA (2017)
		SSC	SP-S	4385	kt	2014	World Steel Association (2015)
YEM	Yemen	CEM	CEM	2800	kt	2014	USGS (2017a)
		OR	CO-OR	942	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	290	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	133	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	138	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	124	kt	2015	IEA (2017)
		SC-PP-gas	NG-PP	38085	TJ	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	426	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	400	kt	2015	IEA (2017)
		SC-PP-oil	CO-PP	41	kt	2015	IEA (2017)

Country code	Country name	Sector code	Activity code	Activity amount	Units	Year	Source
ZMB	Zambia	BIO	PSB – DR	161121	TJ	2015	IEA (2017)
		BIO	PSB – IND	64500	TJ	2015	IEA (2017)
		CEM	CEM	2200	kt	2014	USGS (2017a)
		NFMP	CU-P	649000	t	2015	USGS (2017b)
		NFMP-AU	GP-L	4500	kg	2015	USGS (2017b)
		OR	CO-OR	643	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	143	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	159	kt	2015	IEA (2017)
		SC-IND-oil	CO-HF-IND	48	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	319	kt	2015	IEA (2017)
		SC-PP-oil	CO-HF-PP	81	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	10	kt	2015	IEA (2017)
ZWE	Zimbabwe	BIO	PSB – DR	304237	TJ	2015	IEA (2017)
		BIO	PSB – IND	5762	TJ	2015	IEA (2017)
		BIO	PSB – PP	1841	TJ	2015	IEA (2017)
		CEM	CEM	1300	kt	2014	USGS (2017a)
		NFMP-AU	GP-L	20000	kg	2015	USGS (2017b)
		SC-DR-coal	HC-DR	47	kt	2015	IEA (2017)
		SC-DR-oil	CO-LF-DR	659	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-CEM	82	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-OTH	158	kt	2015	IEA (2017)
		SC-IND-coal	HC-IND-PIP	1	kt	2015	IEA (2017)
		SC-IND-oil	CO-LF-IND	31	kt	2015	IEA (2017)
		SC-PP-coal	HC-B-PP	2751	kt	2015	IEA (2017)
		SC-PP-oil	CO-LF-PP	32	kt	2015	IEA (2017)

[#]activity amount derived from regionally aggregated data for small nations.

A3.9 Estimates of 2015 mercury emissions to air

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
AFG	Afghanistan	South Asia	BIO	PSB – DR	132.608	23.206	301.684	5	
			BIO	PSB – IND	5.701	0.998	12.969	5	
			CEM	CEM	11.118	3.927	58.609	5	
			CREM	CREM	0.136	0.113	0.156		4
			NFMP-AU	GP-L	2.200	0.770	4.290	5	
			OR	CO-OR	12.949	4.532	25.250	5	
			SC-DR-gas	NG-DR	0.012	0.002	0.027	5	
			SC-DR-oil	CO-HF-DR	0.583	0.102	1.327	5	
			SC-DR-oil	CO-LF-DR	1.493	0.261	3.396	5	
			SC-IND-coal	BC-IND-OTH	1.329	0.558	3.743	5	
			SC-IND-coal	HC-IND-OTH	88.677	37.244	249.772	5	
			SC-IND-oil	CO-HF-IND	1.278	0.224	2.908	5	
			SC-IND-oil	CO-LF-IND	0.140	0.024	0.318	5	
			SC-PP-coal	HC-B-PP	18.671	7.842	52.590	5	
			SC-PP-gas	NG-PP	0.013	0.002	0.029	5	
			SC-PP-oil	CO-HF-PP	6.586	1.153	14.984	5	
			SC-PP-oil	CO-LF-PP	0.861	0.151	1.959	5	
			WASOTH	WASOTH	225.101	67.530	675.303		4
			WI	WI	0.704	0.211	2.113		4
ALB	Albania	CIS & other European countries	BIO	PSB – DR	10.170	2.288	19.577	4	
			BIO	PSB – IND	0.511	0.115	0.983	4	
			CEM	CEM	215.600	76.134	1093.593	4	
			CEM	PC-CEM	1.645	0.925	9.274	4	
			CREM	CREM	0.781	0.572	1.041		4
			OR	CO-OR	0.312	0.140	0.515	4	
			SC-DR-coal	HC-DR	0.750	0.405	1.788	4	
			SC-DR-oil	CO-LF-DR	1.474	0.332	2.837	4	
			SC-IND-coal	HC-IND-CEM	25.725	13.892	61.311	4	
			SC-IND-gas	NG-IND	0.003	0.001	0.005	4	
			SC-IND-oil	CO-HF-IND	0.020	0.005	0.039	4	
			SC-IND-oil	CO-LF-IND	0.014	0.003	0.027	4	
			SC-PP-gas	NG-PP	0.004	0.001	0.007	4	
			SSC	SP-S	16.338	6.081	77.960	4	
			WASOTH	WASOTH	94.512	28.354	283.536		4
			WI	WI	0.296	0.089	0.887		4
DZA	Algeria	North Africa	BIO	PSB – DR	0.105	0.024	0.202	5	
			BIO	PSB – IND	0.206	0.046	0.397	5	
			CEM	CEM	2079.000	735.000	10742.550	5	
			CREM	CREM	0.173	0.130	0.216		4
			CSP	CSP-C	280.000	98.000	546.000	5	
			NFMP	ZN-P	568.980	201.579	1563.042	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			NFMP-AU	GP-L	11.000	3.850	21.450	5	
			OR	CO-OR	83.477	37.565	137.738	5	
			PISP	PIP	22.680	7.951	120.042	5	
			SC-DR-gas	NG-DR	1.904	0.428	3.666	5	
			SC-DR-oil	CO-DR	0.060	0.014	0.116	5	
			SC-DR-oil	CO-LF-DR	19.050	4.286	36.671	5	
			SC-IND-gas	NG-IND	0.798	0.180	1.537	5	
			SC-IND-oil	CO-LF-IND	1.344	0.302	2.587	5	
			SC-PP-gas	NG-PP	4.488	1.010	8.639	5	
			SC-PP-oil	CO-LF-PP	0.842	0.189	1.621	5	
			SC-PP-oil	CO-PP	6.080	1.368	11.704	5	
			WASOTH	WASOTH	1600.841	480.252	4802.524		4
			WI	WI	5.009	1.503	15.028		4
AND	Andorra	CIS & other European countries	CREM	CREM	0.051	0.038	0.068		2
			WASOTH	WASOTH	6.248	1.875	18.745		2
			WI	WI	0.182	0.055	0.546		2
AGO	Angola	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	232.196	52.244	446.978	4	
			BIO	PSB – IND	6.575	1.479	12.657	4	
			CEM	CEM	229.688	81.156	1191.531	4	
			CREM	CREM	0.447	0.322	0.644		4
			CSP	CSP-C	100.000	35.000	195.000	4	
			OR	CO-OR	1.059	0.476	1.747	4	
			SC-DR-oil	CO-LF-DR	5.650	1.271	10.876	4	
			SC-IND-gas	NG-IND	0.146	0.033	0.282	4	
			SC-IND-oil	CO-HF-IND	0.780	0.176	1.502	4	
			SC-IND-oil	CO-LF-IND	0.272	0.061	0.524	4	
			SC-PP-oil	CO-HF-PP	0.840	0.189	1.617	4	
			SC-PP-oil	CO-LF-PP	2.272	0.511	4.374	4	
			WASOTH	WASOTH	912.787	394.719	1406.185		4
			WI	WI	0.175	0.076	0.269		4
AIA	Anguilla	Central America and the Caribbean	CREM	CREM	0.003	0.003	0.004		4
			WASOTH	WASOTH	0.461	0.138	1.384		4
			WI	WI	0.001	0.000	0.004		4
ATG	Antigua	Central America and the Caribbean	BIO	PSB – DR	0.120	0.021	0.273	3	
			BIO	PSB – IND	0.411	0.072	0.935	3	
			BIO	PSB – PP	0.146	0.026	0.332	3	
			CREM	CREM	0.018	0.014	0.021		4
			OR	CO-OR	0.039	0.014	0.077	3	
			SC-DR-coal	HC-DR	1.483	0.623	4.177	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.042	0.007	0.095	3	
			SC-DR-oil	CO-LF-DR	0.100	0.018	0.228	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.120	0.021	0.274	3	
			SC-IND-oil	CO-LF-IND	0.007	0.001	0.016	3	
			SC-PP-gas	NG-PP	0.007	0.001	0.017	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-oil	CO-HF-PP	1.148	0.201	2.611	3	
			SC-PP-oil	CO-LF-PP	0.084	0.015	0.192	3	
			WASOTH	WASOTH	5.627	1.688	16.880		4
			WI	WI	0.018	0.005	0.053		4
ARG	Argentina	South America	BIO	PSB – DR	13.201	2.970	25.412	3	
			BIO	PSB – IND	37.111	8.350	71.439	3	
			BIO	PSB – PP	34.639	7.794	66.680	3	
			CEM	CEM	839.629	297.064	4455.052	3	
			CREM	CREM	10.598	7.419	14.838		3
			CSP	CSP-P	500.000	175.000	975.000	3	
			NFMP	AL-P	11.000	3.729	20.773	3	
			NFMP	PB-P	10.268	5.593	16.221	3	
			NFMP	ZN-P	333.540	118.167	916.266	3	
			NFMP-AU	GP-L	2534.400	887.040	4942.080	3	
			NFMP-HG	HG-P	168.750	59.063	329.063	3	
			OR	CO-OR	107.447	48.351	177.288	3	
			PISP	PIP	152.476	53.451	807.032	3	
			SC-DR-gas	NG-DR	3.075	0.692	5.920	3	
			SC-DR-oil	CO-HF-DR	4.820	1.085	9.279	3	
			SC-DR-oil	CO-LF-DR	20.018	4.504	38.535	3	
			SC-IND-coal	HC-IND-OTH	0.788	0.425	1.877	3	
			SC-IND-gas	NG-IND	1.681	0.378	3.236	3	
			SC-IND-oil	CO-HF-IND	3.363	0.757	6.474	3	
			SC-IND-oil	CO-LF-IND	0.211	0.047	0.406	3	
			SC-PP-coal	HC-B-PP	91.935	49.645	219.112	3	
			SC-PP-gas	NG-PP	4.932	1.110	9.494	3	
			SC-PP-oil	CO-HF-PP	51.525	11.593	99.186	3	
			SC-PP-oil	CO-LF-PP	2.928	0.659	5.636	3	
			SC-PP-oil	CO-PP	0.683	0.154	1.314	3	
			SSC	SP-S	69.137	25.732	329.899	3	
			WASOTH	WASOTH	1374.550	412.365	4123.650		3
			WI	WI	8.942	2.682	26.825		3
ARM	Armenia	CIS & other European countries	BIO	PSB – DR	9.956	2.240	19.166	4	
			BIO	PSB – IND	0.001	0.000	0.002	4	
			CEM	CEM	41.846	14.777	212.256	4	
			CREM	CREM	0.261	0.192	0.348		4
			NFMP	CU-P	133.771	47.746	763.742	4	
			NFMP-AU	GP-L	272.250	95.288	530.888	4	
			SC-DR-gas	NG-DR	0.217	0.049	0.418	4	
			SC-DR-oil	CO-LF-DR	0.256	0.058	0.493	4	
			SC-IND-gas	NG-IND	0.040	0.009	0.077	4	
			SC-IND-oil	CO-LF-IND	0.002	0.000	0.004	4	
			SC-PP-gas	NG-PP	0.126	0.028	0.243	4	
			WASOTH	WASOTH	72.450	21.735	217.349		4
			WI	WI	0.227	0.068	0.680		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
ABW	Aruba	Central America and the Caribbean	BIO	PSB – DR	0.146	0.026	0.332	3	
			BIO	PSB – IND	0.534	0.094	1.216	3	
			BIO	PSB – PP	0.190	0.033	0.432	3	
			CREM	CREM	0.021	0.017	0.026		4
			OR	CO-OR	0.051	0.018	0.100	3	
			SC-DR-coal	HC-DR	1.929	0.810	5.433	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.054	0.010	0.124	3	
			SC-DR-oil	CO-LF-DR	0.131	0.023	0.297	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.156	0.027	0.356	3	
			SC-IND-oil	CO-LF-IND	0.009	0.002	0.020	3	
			SC-PP-gas	NG-PP	0.010	0.002	0.022	3	
			SC-PP-oil	CO-HF-PP	1.493	0.261	3.396	3	
			SC-PP-oil	CO-LF-PP	0.110	0.019	0.250	3	
			WASOTH	WASOTH	6.615	1.985	19.846		4
			WI	WI	0.021	0.006	0.062		4
AUS	Australia (and Christmas Is.)	Australia, New Zealand & Oceania	BIO	PSB – DR	61.080	14.507	112.235	2	
			BIO	PSB – IND	95.498	22.681	175.477	2	
			BIO	PSB – PP	21.840	5.187	40.130	2	
			CEM	CEM	795.960	281.119	4200.136	2	
			CREM	CREM	70.336	63.176	84.235		1
			NFMP	AL-P	41.125	25.909	58.809	2	
			NFMP	CU-P	63.294	22.772	299.137	2	
			NFMP	PB-P	16.256	8.867	25.662	2	
			NFMP	ZN-P	722.974	401.128	1414.967	2	
			NFMP-AU	GP-L	1833.480	641.718	3575.286	2	
			OR	CO-OR	27.208	12.924	42.852	2	
			PISP	PIP	5.317	1.964	19.648	2	
			SC-DR-coal	BC-DR	0.437	0.290	0.596	2	
			SC-DR-coal	HC-DR	0.298	0.198	0.406	2	
			SC-DR-gas	NG-DR	1.163	0.276	2.136	2	
			SC-DR-oil	CO-HF-DR	1.160	0.276	2.132	2	
			SC-DR-oil	CO-LF-DR	30.756	7.305	56.514	2	
			SC-IND-coal	BC-IND-CEM	22.634	15.052	30.896	2	
			SC-IND-coal	BC-IND-NFM	72.756	48.383	99.312	2	
			SC-IND-coal	BC-IND-OTH	9.100	6.052	12.422	2	
			SC-IND-coal	HC-IND-CEM	11.380	7.568	15.533	2	
			SC-IND-coal	HC-IND-NFM	10.206	6.787	13.931	2	
			SC-IND-coal	HC-IND-OTH	14.057	9.348	19.188	2	
			SC-IND-coal	HC-IND-PIP	1.205	0.801	1.645	2	
			SC-IND-gas	NG-IND	1.793	0.426	3.295	2	
			SC-IND-oil	CO-HF-IND	4.598	1.092	8.449	2	
			SC-IND-oil	CO-IND	0.143	0.034	0.262	2	
			SC-IND-oil	CO-LF-IND	5.596	1.329	10.282	2	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-coal	BC-L-PP	2002.475	1331.646	2733.379	2	
			SC-PP-coal	BC-S-PP	351.491	233.741	479.785	2	
			SC-PP-coal	HC-B-PP	524.329	348.679	715.710	2	
			SC-PP-gas	NG-PP	4.440	1.054	8.158	2	
			SC-PP-oil	CO-HF-PP	2.240	0.532	4.116	2	
			SC-PP-oil	CO-LF-PP	5.081	1.207	9.335	2	
			SC-PP-oil	CO-PP	0.265	0.063	0.487	2	
			SSC	SP-S	24.134	8.982	115.158	2	
			WASOTH	WASOTH	581.179	174.354	1743.538		1
			WI	WI	235.113	70.534	705.339		1
AUT	Austria	EU28	BIO	PSB – DR	93.143	22.121	171.150	1	
			BIO	PSB – IND	41.537	9.865	76.324	1	
			BIO	PSB – PP	71.637	17.014	131.633	1	
			CEM	CEM	252.305	89.081	1858.645	1	
			CEM	PC-CEM	0.966	0.573	5.197	1	
			CREM	CREM	16.191	12.722	19.372		1
			OR	CO-OR	16.043	7.620	25.267	1	
			PISP	PIP	194.851	68.306	1031.320	1	
			SC-DR-coal	BC-DR	0.293	0.167	0.665	1	
			SC-DR-coal	HC-DR	0.919	0.524	2.090	1	
			SC-DR-gas	NG-DR	0.429	0.102	0.789	1	
			SC-DR-oil	CO-HF-DR	0.600	0.143	1.103	1	
			SC-DR-oil	CO-LF-DR	13.594	3.229	24.979	1	
			SC-IND-coal	BC-IND-CEM	6.866	3.914	15.620	1	
			SC-IND-coal	HC-IND-CEM	2.188	1.247	4.978	1	
			SC-IND-coal	HC-IND-OTH	9.019	5.141	20.518	1	
			SC-IND-gas	NG-IND	0.582	0.138	1.070	1	
			SC-IND-oil	CO-HF-IND	2.337	0.555	4.294	1	
			SC-IND-oil	CO-LF-IND	0.680	0.162	1.250	1	
			SC-PP-coal	HC-B-PP	49.991	28.495	113.728	1	
			SC-PP-gas	NG-PP	0.504	0.120	0.927	1	
			SC-PP-oil	CO-HF-PP	2.880	0.684	5.292	1	
			SC-PP-oil	CO-LF-PP	0.006	0.001	0.011	1	
			SSC	SP-S	16.128	6.003	76.957	1	
			WASOTH	WASOTH	90.475	27.143	271.426		1
			WI	WI	34.581	10.374	103.742		1
AZE	Azerbaijan	CIS & other European countries	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	3.775	0.849	7.267	4	
			BIO	PSB – IND	0.013	0.003	0.026	4	
			CEM	CEM	280.966	99.216	1425.150	4	
			CREM	CREM	0.558	0.409	0.744		4
			CSP	CSP-C	1450.000	507.500	2827.500	4	
			NFMP	AL-P	2.500	0.847	4.721	4	
			NFMP-AU	GP-L	110.336	38.617	215.154	4	
			OR	CO-OR	1.554	0.699	2.564	4	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-DR-gas	NG-DR	0.592	0.133	1.139	4	
			SC-DR-oil	CO-HF-DR	0.060	0.014	0.116	4	
			SC-DR-oil	CO-LF-DR	2.164	0.487	4.166	4	
			SC-IND-gas	NG-IND	0.211	0.047	0.406	4	
			SC-IND-oil	CO-HF-IND	0.260	0.059	0.501	4	
			SC-IND-oil	CO-LF-IND	0.100	0.023	0.193	4	
			SC-PP-gas	NG-PP	1.198	0.270	2.307	4	
			SC-PP-oil	CO-HF-PP	7.780	1.751	14.977	4	
			SC-PP-oil	CO-LF-PP	0.010	0.002	0.019	4	
			SSC	SP-S	5.252	1.955	25.058	4	
			WASOTH	WASOTH	489.255	146.776	1467.764		4
			WI	WI	1.531	0.459	4.593		4
BHS	Bahamas	Central America and the Caribbean	BIO	PSB – DR	0.422	0.074	0.960	3	
			BIO	PSB – IND	1.541	0.270	3.505	3	
			BIO	PSB – PP	0.547	0.096	1.245	3	
			CREM	CREM	0.062	0.049	0.074		4
			OR	CO-OR	0.148	0.052	0.288	3	
			SC-DR-coal	HC-DR	5.560	2.335	15.661	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.001	3	
			SC-DR-oil	CO-HF-DR	0.157	0.027	0.357	3	
			SC-DR-oil	CO-LF-DR	0.377	0.066	0.857	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.451	0.079	1.026	3	
			SC-IND-oil	CO-LF-IND	0.026	0.004	0.058	3	
			SC-PP-gas	NG-PP	0.028	0.005	0.064	3	
			SC-PP-oil	CO-HF-PP	4.303	0.753	9.789	3	
			SC-PP-oil	CO-LF-PP	0.317	0.055	0.720	3	
			WASOTH	WASOTH	23.468	7.040	70.403		4
			WI	WI	0.073	0.022	0.220		4
BHR	Bahrain	Middle Eastern States	CEM	CEM	114.921	40.578	595.606	1	
			CREM	CREM	0.042	0.031	0.049		2
			NFMP	AL-P	12.008	4.070	22.677	1	
			OR	CO-OR	4.917	2.213	8.114	1	
			SC-DR-oil	CO-LF-DR	0.644	0.145	1.240	1	
			SC-IND-gas	NG-IND	0.207	0.047	0.399	1	
			SC-PP-gas	NG-PP	2.336	0.526	4.497	1	
			SC-PP-oil	CO-HF-PP	0.040	0.009	0.077	1	
			WASOTH	WASOTH	72.079	21.624	216.236		2
			WI	WI	2.100	0.630	6.300		2
BGD	Bangladesh	South Asia	BIO	PSB – DR	475.170	106.913	914.702	5	
			CEM	CEM	1853.000	654.500	9768.200	5	
			CREM	CREM	7.030	5.825	8.034		4
			OR	CO-OR	2.184	0.983	3.604	5	
			SC-DR-gas	NG-DR	0.936	0.211	1.802	5	
			SC-DR-oil	CO-LF-DR	5.518	1.242	10.622	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-coal	BC-IND-OTH	4.740	2.560	11.297	5	
			SC-IND-coal	HC-IND-CEM	596.700	322.218	1422.135	5	
			SC-IND-gas	NG-IND	0.813	0.183	1.565	5	
			SC-IND-oil	CO-HF-IND	0.260	0.059	0.501	5	
			SC-IND-oil	CO-LF-IND	0.398	0.090	0.766	5	
			SC-PP-coal	HC-B-PP	61.425	33.170	146.396	5	
			SC-PP-gas	NG-PP	2.784	0.626	5.359	5	
			SC-PP-oil	CO-HF-PP	18.460	4.154	35.536	5	
			SC-PP-oil	CO-LF-PP	0.940	0.212	1.810	5	
			SSC	SP-S	2.697	1.004	12.868	5	
			WASOTH	WASOTH	1927.565	578.270	5782.695		4
			WI	WI	6.032	1.810	18.095		4
BRB	Barbados	Central America and the Caribbean	BIO	PSB – DR	0.378	0.066	0.859	3	
			BIO	PSB – IND	0.909	0.159	2.067	3	
			BIO	PSB – PP	0.323	0.056	0.734	3	
			CEM	CEM	9.088	3.270	73.549	3	
			CREM	CREM	0.055	0.044	0.066		4
			OR	CO-OR	0.087	0.030	0.170	3	
			SC-DR-coal	HC-DR	3.279	1.377	9.236	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.001	3	
			SC-DR-oil	CO-HF-DR	0.093	0.016	0.211	3	
			SC-DR-oil	CO-LF-DR	0.222	0.039	0.505	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.266	0.047	0.605	3	
			SC-IND-oil	CO-LF-IND	0.015	0.003	0.034	3	
			SC-PP-gas	NG-PP	0.017	0.003	0.038	3	
			SC-PP-oil	CO-HF-PP	2.538	0.444	5.773	3	
			SC-PP-oil	CO-LF-PP	0.187	0.033	0.425	3	
			WASOTH	WASOTH	12.246	3.674	36.737		4
			WI	WI	0.038	0.011	0.115		4
BLR	Belarus	CIS & other European countries	BIO	PSB – DR	29.411	6.618	56.617	4	
			BIO	PSB – IND	2.603	0.586	5.011	4	
			BIO	PSB – PP	37.480	8.433	72.149	4	
			CEM	CEM	535.817	197.859	1258.924	4	
			CREM	CREM	4.917	3.606	6.556		2
			OR	CO-OR	26.013	11.706	42.921	4	
			SC-DR-coal	HC-DR	1.650	0.891	3.933	4	
			SC-DR-gas	NG-DR	0.477	0.107	0.919	4	
			SC-DR-oil	CO-HF-DR	0.200	0.045	0.385	4	
			SC-DR-oil	CO-LF-DR	5.168	1.163	9.948	4	
			SC-IND-coal	HC-IND-CEM	83.081	44.864	198.010	4	
			SC-IND-gas	NG-IND	0.216	0.049	0.417	4	
			SC-IND-oil	CO-HF-IND	0.440	0.099	0.847	4	
			SC-IND-oil	CO-LF-IND	0.236	0.053	0.454	4	
			SC-PP-coal	HC-B-PP	0.225	0.122	0.536	4	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-gas	NG-PP	2.655	0.597	5.110	4	
			SC-PP-oil	CO-HF-PP	9.800	2.205	18.865	4	
			SC-PP-oil	CO-LF-PP	0.034	0.008	0.065	4	
			SSC	SP-S	73.317	27.288	349.844	4	
			WASOTH	WASOTH	326.950	98.085	980.849		2
			WI	WI	9.526	2.858	28.578		2
BEL	Belgium	EU28	BIO	PSB – DR	27.929	6.633	51.319	1	
			BIO	PSB – IND	24.588	5.840	45.181	1	
			BIO	PSB – PP	32.501	7.719	59.720	1	
			CEM	CEM	343.650	121.351	2195.829	1	
			CEM	PC-CEM	0.503	0.299	2.707	1	
			CREM	CREM	26.505	20.826	31.712		1
			CSP	CSP-C	138.600	48.510	270.270	1	
			NFMP	ZN-P	68.016	24.097	186.846	1	
			OR	CO-OR	57.898	27.501	91.189	1	
			PISP	PIP	141.816	49.714	750.611	1	
			SC-DR-coal	HC-DR	15.750	8.978	35.831	1	
			SC-DR-gas	NG-DR	1.195	0.284	2.196	1	
			SC-DR-oil	CO-HF-DR	0.020	0.005	0.037	1	
			SC-DR-oil	CO-LF-DR	21.276	5.053	39.095	1	
			SC-IND-coal	HC-IND-CEM	17.731	10.107	40.337	1	
			SC-IND-coal	HC-IND-OTH	4.856	2.768	11.048	1	
			SC-IND-coal	HC-IND-PIP	5.342	3.045	12.153	1	
			SC-IND-gas	NG-IND	0.869	0.206	1.597	1	
			SC-IND-oil	CO-HF-IND	1.064	0.253	1.955	1	
			SC-IND-oil	CO-LF-IND	0.458	0.109	0.841	1	
			SC-PP-coal	HC-B-PP	40.106	22.861	91.242	1	
			SC-PP-gas	NG-PP	0.933	0.221	1.714	1	
			SC-PP-oil	CO-HF-PP	0.320	0.076	0.588	1	
			SC-PP-oil	CO-LF-PP	0.009	0.002	0.017	1	
			SSC	SP-S	55.526	20.666	264.952	1	
			WASOTH	WASOTH	109.042	32.713	327.126		1
			WI	WI	41.677	12.503	125.031		1
BLZ	Belize	Central America and the Caribbean	BIO	PSB – DR	0.451	0.079	1.027	3	
			BIO	PSB – IND	0.550	0.096	1.250	3	
			BIO	PSB – PP	0.195	0.034	0.444	3	
			CREM	CREM	0.067	0.053	0.080		4
			OR	CO-OR	0.053	0.018	0.103	3	
			SC-DR-coal	HC-DR	1.983	0.833	5.587	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.056	0.010	0.127	3	
			SC-DR-oil	CO-LF-DR	0.134	0.024	0.306	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.161	0.028	0.366	3	
			SC-IND-oil	CO-LF-IND	0.009	0.002	0.021	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-gas	NG-PP	0.010	0.002	0.023	3	
			SC-PP-oil	CO-HF-PP	1.535	0.269	3.492	3	
			SC-PP-oil	CO-LF-PP	0.113	0.020	0.257	3	
			WASOTH	WASOTH	8.108	2.432	24.325		4
			WI	WI	0.025	0.008	0.076		4
BEN	Benin	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	75.259	16.933	144.873	5	
			BIO	PSB – IND	0.465	0.105	0.896	5	
			CEM	CEM	146.580	51.792	760.401	5	
			CREM	CREM	0.238	0.171	0.343		4
			SC-DR-oil	CO-LF-DR	1.338	0.301	2.576	5	
			SC-IND-coal	HC-IND-OTH	5.766	3.113	13.741	5	
			SC-IND-oil	CO-HF-IND	0.500	0.113	0.963	5	
			SC-IND-oil	CO-LF-IND	0.082	0.018	0.158	5	
			SC-PP-oil	CO-LF-PP	0.144	0.032	0.277	5	
			WASOTH	WASOTH	110.507	47.787	170.241		4
			WI	WI	0.021	0.009	0.033		4
BMU	Bermuda	Central America and the Caribbean	BIO	PSB – DR	0.091	0.016	0.208	3	
			BIO	PSB – IND	1.133	0.198	2.578	3	
			BIO	PSB – PP	0.402	0.070	0.916	3	
			CREM	CREM	0.013	0.011	0.016		4
			OR	CO-OR	0.109	0.038	0.212	3	
			SC-DR-coal	HC-DR	4.089	1.717	11.518	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.001	3	
			SC-DR-oil	CO-HF-DR	0.115	0.020	0.263	3	
			SC-DR-oil	CO-LF-DR	0.277	0.048	0.630	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.332	0.058	0.755	3	
			SC-IND-oil	CO-LF-IND	0.019	0.003	0.043	3	
			SC-PP-gas	NG-PP	0.021	0.004	0.047	3	
			SC-PP-oil	CO-HF-PP	3.165	0.554	7.199	3	
			SC-PP-oil	CO-LF-PP	0.233	0.041	0.530	3	
			WASOTH	WASOTH	13.667	4.100	41.002		4
			WI	WI	0.043	0.013	0.128		4
BTN	Bhutan	South Asia	BIO	PSB – DR	3.021	0.529	6.873	5	
			BIO	PSB – IND	0.561	0.098	1.275	5	
			CEM	CEM	75.210	26.565	396.474	5	
			CREM	CREM	0.430	0.356	0.491		4
			OR	CO-OR	1.273	0.446	2.483	5	
			SC-DR-gas	NG-DR	0.001	0.000	0.003	5	
			SC-DR-oil	CO-HF-DR	0.057	0.010	0.130	5	
			SC-DR-oil	CO-LF-DR	0.147	0.026	0.334	5	
			SC-IND-coal	BC-IND-OTH	0.131	0.055	0.368	5	
			SC-IND-coal	HC-IND-OTH	8.719	3.662	24.559	5	
			SC-IND-oil	CO-HF-IND	0.126	0.022	0.286	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-oil	CO-LF-IND	0.014	0.002	0.031	5	
			SC-PP-coal	HC-B-PP	1.836	0.771	5.171	5	
			SC-PP-gas	NG-PP	0.001	0.000	0.003	5	
			SC-PP-oil	CO-HF-PP	0.648	0.113	1.473	5	
			SC-PP-oil	CO-LF-PP	0.085	0.015	0.193	5	
			WASOTH	WASOTH	23.250	6.975	69.750		4
			WI	WI	0.073	0.022	0.218		4
BOL	Bolivia	South America	ASGM	GP-A	40500.000	28350.000	52650.000		
			BIO	PSB – DR	23.309	5.244	44.869	3	
			BIO	PSB – IND	21.852	4.917	42.066	3	
			BIO	PSB – PP	5.303	1.193	10.208	3	
			CEM	CEM	257.600	91.140	1366.820	3	
			CREM	CREM	4.239	2.967	5.934		4
			NFMP-AU	GP-L	481.932	168.676	939.767	3	
			OR	CO-OR	2.843	1.279	4.691	3	
			SC-DR-gas	NG-DR	0.150	0.034	0.290	3	
			SC-DR-oil	CO-LF-DR	2.850	0.641	5.486	3	
			SC-IND-gas	NG-IND	0.159	0.036	0.306	3	
			SC-IND-oil	CO-LF-IND	0.167	0.038	0.322	3	
			SC-PP-gas	NG-PP	0.371	0.083	0.714	3	
			SC-PP-oil	CO-LF-PP	0.086	0.019	0.165	3	
			WASOTH	WASOTH	168.370	50.511	505.109		4
			WI	WI	0.566	0.170	1.699		4
BIH	Bosnia-Herzegovina	CIS & other European countries	BIO	PSB – DR	70.508	15.864	135.727	4	
			BIO	PSB – IND	1.867	0.420	3.594	4	
			BIO	PSB – PP	0.160	0.036	0.308	4	
			CEM	CEM	82.320	29.069	417.554	4	
			CEM	PC-CEM	0.105	0.059	0.592	4	
			CREM	CREM	1.984	1.455	2.645		2
			NFMP	AL-P	31.000	10.850	60.450	4	
			OR	CO-OR	1.047	0.471	1.728	4	
			PISP	PIP	52.013	18.233	275.296	4	
			SC-DR-coal	BC-DR	96.150	51.921	229.158	4	
			SC-DR-gas	NG-DR	0.014	0.003	0.027	4	
			SC-DR-oil	CO-HF-DR	0.060	0.014	0.116	4	
			SC-DR-oil	CO-LF-DR	1.746	0.393	3.361	4	
			SC-IND-coal	BC-IND-CEM	8.925	4.820	21.271	4	
			SC-IND-coal	BC-IND-NFM	23.839	12.873	56.816	4	
			SC-IND-coal	BC-IND-OTH	5.265	2.843	12.548	4	
			SC-IND-gas	NG-IND	0.017	0.004	0.033	4	
			SC-IND-oil	CO-HF-IND	0.400	0.090	0.770	4	
			SC-IND-oil	CO-LF-IND	0.130	0.029	0.250	4	
			SC-PP-coal	BC-L-PP	504.798	295.307	1665.833	4	
			SC-PP-coal	BC-S-PP	777.465	419.831	1852.958	4	
			SC-PP-gas	NG-PP	0.010	0.002	0.020	4	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-oil	CO-HF-PP	2.280	0.513	4.389	4	
			SC-PP-oil	CO-LF-PP	0.096	0.022	0.185	4	
			WASOTH	WASOTH	77.613	23.284	232.838		2
			WI	WI	2.261	0.678	6.784		2
BWA	Botswana	Sub-Saharan Africa	ASGM	GP-A	380.000	95.000	665.000		
			BIO	PSB – DR	28.945	6.513	55.719	4	
			CEM	CEM	33.994	12.011	176.347	4	
			CREM	CREM	0.049	0.035	0.071		4
			NFMP	CU-P	1202.211	429.093	6863.799	4	
			NFMP-AU	GP-L	37.422	13.098	72.973	4	
			SC-DR-coal	HC-DR	1.050	0.567	2.503	4	
			SC-DR-oil	CO-LF-DR	0.734	0.165	1.413	4	
			SC-IND-coal	HC-IND-OTH	9.844	5.316	23.461	4	
			SC-IND-oil	CO-HF-IND	0.220	0.050	0.424	4	
			SC-IND-oil	CO-LF-IND	0.316	0.071	0.608	4	
			SC-PP-coal	HC-B-PP	186.413	100.663	444.283	4	
			SC-PP-oil	CO-LF-PP	0.072	0.016	0.139	4	
			WASOTH	WASOTH	178.387	77.140	274.812		4
			WI	WI	0.034	0.015	0.053		4
BRA	Brazil	South America	ASGM	GP-A	49875.000	24937.500	74812.500		
			BIO	PSB – DR	483.654	108.822	931.033	3	
			BIO	PSB – IND	1319.782	296.951	2540.581	3	
			BIO	PSB – PP	1050.293	236.316	2021.813	3	
			CEM	CEM	1549.775	1047.434	4654.668	3	
			CEM	PC-CEM	130.980	73.676	738.400	3	
			CREM	CREM	9.941	6.959	13.917		3
			CSP	CSP-P	1106.500	387.275	2157.675	3	
			NFMP	AL-P	119.691	41.892	233.397	3	
			NFMP	CU-P	1274.286	454.818	7275.298	3	
			NFMP	ZN-P	2866.030	1018.848	6183.469	3	
			NFMP-AU	GP-L	2894.364	1013.027	5644.010	3	
			OR	CO-OR	95.140	33.299	185.523	3	
			PISP	PIP	1275.421	471.197	4713.153	3	
			SC-DR-gas	NG-DR	0.615	0.138	1.185	3	
			SC-DR-oil	CO-HF-DR	16.180	3.641	31.147	3	
			SC-DR-oil	CO-LF-DR	83.666	18.825	161.057	3	
			SC-IND-coal	BC-IND-CEM	17.550	9.477	41.828	3	
			SC-IND-coal	BC-IND-OTH	189.083	102.105	450.647	3	
			SC-IND-coal	HC-IND-CEM	12.825	6.926	30.566	3	
			SC-IND-coal	HC-IND-NFM	136.013	73.447	324.163	3	
			SC-IND-coal	HC-IND-OTH	44.775	24.179	106.714	3	
			SC-IND-coal	HC-IND-PIP	419.288	226.415	999.302	3	
			SC-IND-gas	NG-IND	2.190	0.493	4.216	3	
			SC-IND-oil	CO-HF-IND	43.776	9.850	84.269	3	
			SC-IND-oil	CO-LF-IND	2.105	0.474	4.053	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-coal	BC-L-PP	264.600	154.791	873.180	3	
			SC-PP-coal	BC-S-PP	415.935	224.605	991.312	3	
			SC-PP-coal	HC-B-PP	464.738	250.958	1107.624	3	
			SC-PP-gas	NG-PP	4.790	1.078	9.220	3	
			SC-PP-oil	CO-HF-PP	55.740	12.542	107.300	3	
			SC-PP-oil	CO-LF-PP	5.600	1.260	10.779	3	
			SSC	SP-S	198.757	73.976	948.400	3	
			WASOTH	WASOTH	5006.449	1501.935	15019.346		3
			WI	WI	32.568	9.770	97.703		3
VGB	British Virgin Islands	Central America and the Caribbean	BIO	PSB – DR	0.043	0.008	0.099	3	
			BIO	PSB – IND	0.267	0.047	0.606	3	
			BIO	PSB – PP	0.095	0.017	0.215	3	
			CREM	CREM	0.006	0.005	0.008		4
			OR	CO-OR	0.026	0.009	0.050	3	
			SC-DR-coal	HC-DR	0.962	0.404	2.709	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.027	0.005	0.062	3	
			SC-DR-oil	CO-LF-DR	0.065	0.011	0.148	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.078	0.014	0.178	3	
			SC-IND-oil	CO-LF-IND	0.004	0.001	0.010	3	
			SC-PP-gas	NG-PP	0.005	0.001	0.011	3	
			SC-PP-oil	CO-HF-PP	0.744	0.130	1.694	3	
			SC-PP-oil	CO-LF-PP	0.055	0.010	0.125	3	
			WASOTH	WASOTH	1.315	0.394	3.944		4
			WI	WI	0.004	0.001	0.012		4
BRN	Brunei Darussalam	East and Southeast Asia	CEM	CEM	30.520	10.780	160.888	3	
			CREM	CREM	0.063	0.057	0.070		2
			OR	CO-OR	0.226	0.102	0.373	3	
			SC-DR-gas	NG-DR	0.004	0.001	0.007	3	
			SC-DR-oil	CO-LF-DR	0.328	0.074	0.631	3	
			SC-IND-oil	CO-LF-IND	0.226	0.051	0.435	3	
			SC-PP-gas	NG-PP	0.398	0.090	0.767	3	
			SC-PP-oil	CO-LF-PP	0.017	0.004	0.032	3	
			WASOTH	WASOTH	68.715	20.614	206.145		2
			WI	WI	2.002	0.601	6.006		2
BGR	Bulgaria	EU28	BIO	PSB – DR	38.701	8.708	74.500	4	
			BIO	PSB – IND	12.885	2.899	24.803	4	
			BIO	PSB – PP	2.004	0.451	3.857	4	
			CEM	CEM	178.063	62.888	1084.805	4	
			CEM	PC-CEM	3.920	2.205	22.099	4	
			CREM	CREM	1.224	0.897	1.631		2
			NFMP	CU-P	3482.664	1243.032	19883.620	4	
			NFMP	PB-T	789.480	286.524	2029.482	4	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			NFMP	ZN-P	1178.770	417.616	3238.192	4	
			NFMP-AU	GP-L	361.350	126.473	704.633	4	
			OR	CO-OR	10.905	4.907	17.994	4	
			SC-DR-coal	BC-DR	13.950	7.533	33.248	4	
			SC-DR-coal	HC-DR	23.250	12.555	55.413	4	
			SC-DR-gas	NG-DR	0.092	0.021	0.177	4	
			SC-DR-oil	CO-HF-DR	0.400	0.090	0.770	4	
			SC-DR-oil	CO-LF-DR	3.874	0.872	7.457	4	
			SC-IND-coal	BC-IND-CEM	1.575	0.851	3.754	4	
			SC-IND-coal	BC-IND-OTH	0.439	0.237	1.046	4	
			SC-IND-coal	HC-IND-CEM	13.519	7.300	32.220	4	
			SC-IND-coal	HC-IND-OTH	19.688	10.631	46.922	4	
			SC-IND-gas	NG-IND	0.214	0.048	0.411	4	
			SC-IND-oil	CO-HF-IND	0.580	0.131	1.117	4	
			SC-IND-oil	CO-LF-IND	0.090	0.020	0.173	4	
			SC-PP-coal	BC-L-PP	3274.180	1915.395	10804.794	4	
			SC-PP-coal	HC-A-PP	5.625	3.038	23.719	4	
			SC-PP-coal	HC-B-PP	66.938	36.146	159.534	4	
			SC-PP-gas	NG-PP	0.203	0.046	0.391	4	
			SC-PP-oil	CO-HF-PP	0.780	0.176	1.502	4	
			SC-PP-oil	CO-LF-PP	0.004	0.001	0.008	4	
			SSC	SP-S	17.855	6.646	85.199	4	
			WASOTH	WASOTH	109.095	32.729	327.286		2
			WI	WI	3.179	0.954	9.536		2
BFA	Burkina Faso	Sub-Saharan Africa	ASGM	GP-A	26325.000	13162.500	39487.500		
			BIO	PSB – DR	216.179	37.831	491.806	5	
			BIO	PSB – IND	5.506	0.964	12.526	5	
			BIO	PSB – PP	1.995	0.349	4.538	5	
			CEM	CEM	42.315	14.951	219.514	5	
			CREM	CREM	0.432	0.312	0.623		4
			NFMP-AU	GP-L	1991.550	697.043	3883.523	5	
			SC-DR-coal	HC-DR	1.088	0.457	3.064	5	
			SC-DR-oil	CO-LF-DR	0.487	0.085	1.107	5	
			SC-IND-coal	HC-IND-OTH	1.056	0.444	2.975	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.886	0.155	2.015	5	
			SC-IND-oil	CO-IND	0.122	0.021	0.277	5	
			SC-IND-oil	CO-LF-IND	0.085	0.015	0.193	5	
			SC-PP-coal	HC-B-PP	7.149	3.003	20.136	5	
			SC-PP-gas	NG-PP	0.008	0.001	0.019	5	
			SC-PP-oil	CO-HF-PP	1.152	0.202	2.620	5	
			SC-PP-oil	CO-LF-PP	0.238	0.042	0.542	5	
			WASOTH	WASOTH	147.686	63.864	227.516		4
			WI	WI	0.028	0.012	0.044		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
BDI	Burundi	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	122.665	21.466	279.062	5	
			BIO	PSB – IND	1.470	0.257	3.345	5	
			BIO	PSB – PP	0.533	0.093	1.212	5	
			CEM	CEM	7.350	2.597	38.129	5	
			CREM	CREM	0.246	0.177	0.354		4
			NFMP-AU	GP-L	27.500	9.625	53.625	5	
			SC-DR-coal	HC-DR	0.290	0.122	0.818	5	
			SC-DR-oil	CO-LF-DR	0.130	0.023	0.296	5	
			SC-IND-coal	HC-IND-OTH	0.282	0.118	0.794	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.237	0.041	0.538	5	
			SC-IND-oil	CO-IND	0.033	0.006	0.074	5	
			SC-IND-oil	CO-LF-IND	0.023	0.004	0.052	5	
			SC-PP-coal	HC-B-PP	1.909	0.802	5.377	5	
			SC-PP-gas	NG-PP	0.002	0.000	0.005	5	
			SC-PP-oil	CO-HF-PP	0.308	0.054	0.700	5	
			SC-PP-oil	CO-LF-PP	0.064	0.011	0.145	5	
			WASOTH	WASOTH	40.144	17.360	61.844		4
			WI	WI	0.008	0.003	0.012		4
KHM	Cambodia	East and Southeast Asia	ASGM	GP-A	3562.500	1781.250	5343.750		
			BIO	PSB – DR	110.154	24.785	212.046	4	
			BIO	PSB – IND	45.202	10.170	87.014	4	
			BIO	PSB – PP	0.681	0.153	1.311	4	
			CEM	CEM	133.525	47.163	703.885	4	
			CREM	CREM	10.180	9.264	11.297		4
			SC-DR-oil	CO-LF-DR	2.058	0.463	3.962	4	
			SC-IND-coal	BC-IND-CEM	3.544	1.914	8.446	4	
			SC-IND-oil	CO-HF-IND	0.520	0.117	1.001	4	
			SC-IND-oil	CO-LF-IND	0.058	0.013	0.112	4	
			SC-PP-coal	BC-S-PP	163.080	88.063	388.674	4	
			SC-PP-oil	CO-HF-PP	0.900	0.203	1.733	4	
			SC-PP-oil	CO-LF-PP	0.030	0.007	0.058	4	
			WASOTH	WASOTH	171.061	51.318	513.183		4
			WI	WI	0.535	0.161	1.606		4
CMR	Cameroon	Sub-Saharan Africa	ASGM	GP-A	1125.000	281.250	1968.750		
			BIO	PSB – DR	247.050	55.586	475.571	5	
			BIO	PSB – PP	0.896	0.202	1.725	5	
			CEM	CEM	136.500	48.230	708.110	5	
			CREM	CREM	0.540	0.389	0.778		4
			NFMP	AL-P	11.700	7.245	19.305	5	
			NFMP-AU	GP-L	82.500	28.875	160.875	5	
			OR	CO-OR	1.511	0.680	2.494	5	
			SC-DR-oil	CO-LF-DR	1.260	0.284	2.426	5	
			SC-IND-oil	CO-HF-IND	2.260	0.509	4.351	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-oil	CO-LF-IND	0.016	0.004	0.031	5	
			SC-PP-gas	NG-PP	0.055	0.012	0.106	5	
			SC-PP-oil	CO-HF-PP	1.880	0.423	3.619	5	
			SC-PP-oil	CO-LF-PP	0.420	0.095	0.809	5	
			WASOTH	WASOTH	359.147	155.307	553.281		4
			WI	WI	0.069	0.030	0.106		4
CAN	Canada	North America	BIO	PSB – DR	153.173	36.378	281.454	1	
			BIO	PSB – IND	218.397	51.869	401.304	1	
			BIO	PSB – PP	113.547	26.968	208.643	1	
			CEM	CEM	120.215	43.905	2456.316	1	
			CEM	PC-CEM	7.955	4.723	42.809	1	
			CREM	CREM	88.810	74.383	101.932		1
			NFMP	AL-P	36.000	12.203	67.986	1	
			NFMP	CU-P	4.760	2.548	9.355	1	
			NFMP	PB-P	1.690	0.923	2.662	1	
			NFMP	ZN-P	37.708	21.375	337.993	1	
			NFMP-AU	GP-L	352.846	123.496	688.049	1	
			OR	CO-OR	71.225	33.832	112.180	1	
			PISP	PIP	200.185	70.186	1139.673	1	
			SC-DR-coal	BC-DR	2.779	1.584	6.322	1	
			SC-DR-gas	NG-DR	7.016	1.666	12.892	1	
			SC-DR-oil	CO-HF-DR	20.020	4.755	36.787	1	
			SC-DR-oil	CO-LF-DR	46.674	11.085	85.763	1	
			SC-IND-coal	BC-IND-CEM	27.258	15.537	62.012	1	
			SC-IND-coal	BC-IND-OTH	24.006	13.683	54.613	1	
			SC-IND-coal	HC-IND-CEM	27.258	15.537	62.012	1	
			SC-IND-coal	HC-IND-NFM	20.674	11.784	47.033	1	
			SC-IND-coal	HC-IND-OTH	19.356	11.033	44.034	1	
			SC-IND-gas	NG-IND	3.308	0.786	6.079	1	
			SC-IND-oil	CO-HF-IND	11.666	2.771	21.436	1	
			SC-IND-oil	CO-LF-IND	5.341	1.268	9.814	1	
			SC-PP-coal	BC-L-PP	516.488	343.464	705.006	1	
			SC-PP-coal	BC-S-PP	1246.593	828.984	1701.600	1	
			SC-PP-coal	HC-B-PP	73.359	48.784	100.135	1	
			SC-PP-gas	NG-PP	10.680	2.537	19.625	1	
			SC-PP-oil	CO-HF-PP	8.000	1.900	14.700	1	
			SC-PP-oil	CO-LF-PP	2.922	0.694	5.369	1	
			SSC	SP-S	116.864	43.496	557.635	1	
			WASOTH	WASOTH	306.852	92.056	920.557		1
			WI	WI	117.282	35.185	351.846		1
CPV	Cape Verde	Sub-Saharan Africa	BIO	PSB – DR	6.235	1.091	14.184	5	
			BIO	PSB – IND	0.607	0.106	1.381	5	
			BIO	PSB – PP	0.220	0.038	0.500	5	
			CREM	CREM	0.012	0.009	0.018		4
			SC-DR-coal	HC-DR	0.120	0.050	0.338	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-DR-oil	CO-LF-DR	0.054	0.009	0.122	5	
			SC-IND-coal	HC-IND-OTH	0.116	0.049	0.328	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.098	0.017	0.222	5	
			SC-IND-oil	CO-IND	0.013	0.002	0.031	5	
			SC-IND-oil	CO-LF-IND	0.009	0.002	0.021	5	
			SC-PP-coal	HC-B-PP	0.788	0.331	2.220	5	
			SC-PP-gas	NG-PP	0.001	0.000	0.002	5	
			SC-PP-oil	CO-HF-PP	0.127	0.022	0.289	5	
			SC-PP-oil	CO-LF-PP	0.026	0.005	0.060	5	
			WASOTH	WASOTH	16.585	7.172	25.550		4
			WI	WI	0.003	0.001	0.005		4
CYM	Cayman Islands	Central America and the Caribbean	BIO	PSB – DR	0.073	0.013	0.166	3	
			BIO	PSB – IND	0.463	0.081	1.053	3	
			BIO	PSB – PP	0.164	0.029	0.374	3	
			CREM	CREM	0.011	0.009	0.013		4
			OR	CO-OR	0.044	0.016	0.086	3	
			SC-DR-coal	HC-DR	1.670	0.701	4.704	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.047	0.008	0.107	3	
			SC-DR-oil	CO-LF-DR	0.113	0.020	0.257	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.135	0.024	0.308	3	
			SC-IND-oil	CO-LF-IND	0.008	0.001	0.018	3	
			SC-PP-gas	NG-PP	0.008	0.001	0.019	3	
			SC-PP-oil	CO-HF-PP	1.292	0.226	2.940	3	
			SC-PP-oil	CO-LF-PP	0.095	0.017	0.216	3	
			WASOTH	WASOTH	6.592	1.978	19.775		4
			WI	WI	0.021	0.006	0.062		4
CAF	Central African Republic	Sub-Saharan Africa	ASGM	GP-A	6000.000	1500.000	10500.000		
			BIO	PSB – DR	61.565	10.774	140.061	5	
			BIO	PSB – IND	0.553	0.097	1.259	5	
			BIO	PSB – PP	0.200	0.035	0.456	5	
			CREM	CREM	0.122	0.088	0.176		4
			SC-DR-coal	HC-DR	0.109	0.046	0.308	5	
			SC-DR-oil	CO-LF-DR	0.049	0.009	0.111	5	
			SC-IND-coal	HC-IND-OTH	0.106	0.045	0.299	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.089	0.016	0.203	5	
			SC-IND-oil	CO-IND	0.012	0.002	0.028	5	
			SC-IND-oil	CO-LF-IND	0.009	0.001	0.019	5	
			SC-PP-coal	HC-B-PP	0.719	0.302	2.024	5	
			SC-PP-gas	NG-PP	0.001	0.000	0.002	5	
			SC-PP-oil	CO-HF-PP	0.116	0.020	0.263	5	
			SC-PP-oil	CO-LF-PP	0.024	0.004	0.054	5	
			WASOTH	WASOTH	14.974	6.475	23.068		4
			WI	WI	0.003	0.001	0.004		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
TCD	Chad	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	132.818	23.243	302.161	5	
			BIO	PSB – IND	5.174	0.905	11.770	5	
			BIO	PSB – PP	1.874	0.328	4.264	5	
			CEM	CEM	21.000	7.420	108.940	5	
			CREM	CREM	0.263	0.189	0.378		4
			SC-DR-coal	HC-DR	1.022	0.429	2.879	5	
			SC-DR-oil	CO-LF-DR	0.457	0.080	1.040	5	
			SC-IND-coal	HC-IND-OTH	0.993	0.417	2.796	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.832	0.146	1.894	5	
			SC-IND-oil	CO-IND	0.114	0.020	0.260	5	
			SC-IND-oil	CO-LF-IND	0.080	0.014	0.181	5	
			SC-PP-coal	HC-B-PP	6.718	2.821	18.921	5	
			SC-PP-gas	NG-PP	0.008	0.001	0.018	5	
			SC-PP-oil	CO-HF-PP	1.082	0.189	2.462	5	
			SC-PP-oil	CO-LF-PP	0.224	0.039	0.509	5	
			WASOTH	WASOTH	150.838	65.227	232.371		4
			WI	WI	0.029	0.012	0.045		4
CHL	Chile	South America	ASGM	GP-A	1900.000	475.000	3325.000		
			BIO	PSB – DR	86.745	20.602	159.394	3	
			BIO	PSB – IND	86.429	20.527	158.813	3	
			BIO	PSB – PP	171.865	40.818	315.802	3	
			CEM	CEM	368.000	130.200	1952.600	3	
			CEM	PC-CEM	9.216	5.472	49.594	3	
			CREM	CREM	6.820	4.774	9.548		4
			NFMP	CU-P	12221.710	4362.171	69777.569	3	
			NFMP-AU	GP-L	1683.040	589.064	3281.927	3	
			OR	CO-OR	8.214	3.901	12.936	3	
			PISP	PIP	268.275	102.839	506.529	3	
			SC-DR-coal	HC-DR	0.750	0.428	1.706	3	
			SC-DR-gas	NG-DR	0.141	0.033	0.259	3	
			SC-DR-oil	CO-HF-DR	5.500	1.306	10.106	3	
			SC-DR-oil	CO-LF-DR	9.072	2.155	16.670	3	
			SC-IND-coal	HC-IND-CEM	0.120	0.068	0.273	3	
			SC-IND-coal	HC-IND-OTH	44.213	25.201	100.583	3	
			SC-IND-gas	NG-IND	0.179	0.043	0.329	3	
			SC-IND-oil	CO-HF-IND	9.234	2.193	16.967	3	
			SC-IND-oil	CO-LF-IND	5.267	1.251	9.678	3	
			SC-PP-coal	HC-B-PP	1131.874	645.168	2575.013	3	
			SC-PP-gas	NG-PP	0.501	0.119	0.921	3	
			SC-PP-oil	CO-HF-PP	2.295	0.545	4.217	3	
			SC-PP-oil	CO-LF-PP	0.753	0.179	1.384	3	
			SSC	SP-S	9.639	3.588	45.993	3	
			WASOTH	WASOTH	945.512	283.654	2836.537		4
			WI	WI	3.181	0.954	9.543		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
CHN	China (and Hong Kong if not separately estimated)	East and Southeast Asia	ASGM	GP-A	33750.000	8437.500	59062.500		
			BIO	PSB – DR	4221.320	949.797	8126.041	3	
			BIO	PSB – PP	894.667	201.300	1722.233	3	
			CEM	CEM	106159.200	43958.880	929117.280	3	
			CREM	CREM	547.921	498.574	608.017		2
			CSP	CSP-C	405.000	141.750	789.750	3	
			NFMP	AL-P	3121.160	1209.450	7825.194	3	
			NFMP	CU-P	1755.504	858.670	18505.299	3	
			NFMP	PB-P	28164.839	11704.621	60459.038	3	
			NFMP	ZN-T	96299.627	33704.869	187784.273	3	
			NFMP-AU	GP-L	202.410	70.843	394.700	3	
			NFMP-HG	HG-P	8100.000	2835.000	15795.000	3	
			OR	CO-OR	2694.977	1212.740	4446.712	3	
			PISP	PIP	8565.677	3007.349	387020.955	3	
			SC-DR-coal	HC-DR	37803.160	23815.991	54058.519	3	
			SC-DR-gas	NG-DR	13.247	2.980	25.500	3	
			SC-DR-oil	CO-HF-DR	119.560	26.901	230.153	3	
			SC-DR-oil	CO-LF-DR	304.310	68.470	585.797	3	
			SC-IND-coal	HC-IND-CEM	26599.808	16757.879	38037.725	3	
			SC-IND-coal	HC-IND-NFM	2201.587	1387.000	3148.269	3	
			SC-IND-coal	HC-IND-OTH	24718.064	15572.380	35346.832	3	
			SC-IND-coal	HC-IND-PIP	9613.705	6056.634	13747.599	3	
			SC-IND-gas	NG-IND	8.959	2.016	17.246	3	
			SC-IND-oil	CO-HF-IND	72.352	16.279	139.278	3	
			SC-IND-oil	CO-IND	19.627	4.416	37.782	3	
			SC-IND-oil	CO-LF-IND	32.754	7.370	63.052	3	
			SC-PP-coal	HC-B-PP	81280.508	51206.720	116231.126	3	
			SC-PP-gas	NG-PP	12.343	2.777	23.761	3	
			SC-PP-oil	CO-HF-PP	49.770	11.198	95.807	3	
			SC-PP-oil	CO-LF-PP	4.451	1.001	8.567	3	
			SC-PP-oil	CO-PP	34.470	7.756	66.355	3	
			SSC	SP-S	1022.730	357.956	1994.324	3	
			VCM	VCM-P	12170.000	4259.500	23731.500	3	
			VCM	VCM-R	45637.500	15973.125	88993.125	3	
			WASOTH	WASOTH	18708.389	5612.517	56125.167		2
			WI	WI	8471.520	2541.456	25414.559		2
CCK	Cocos Islands	Australia, New Zealand & Oceania	CREM	CREM	0.000	0.000	0.000		4
			WASOTH	WASOTH	0.000	0.000	0.000		4
			WI	WI	0.000	0.000	0.000		4
COL	Colombia	South America	ASGM	GP-A	51041.667	25520.833	76562.500		
			BIO	PSB – DR	105.563	23.752	203.208	3	
			BIO	PSB – IND	32.804	7.381	63.147	3	
			BIO	PSB – PP	26.656	5.998	51.313	3	
			CEM	CEM	911.462	322.479	4836.200	3	
			CREM	CREM	13.684	9.579	19.158		3
			CSP	CSP-C	110.000	38.500	214.500	3	
			NFMP-AU	GP-L	2344.399	820.540	4571.578	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			OR	CO-OR	11.932	5.370	19.688	3	
			PISP	PIP	12.899	4.522	68.274	3	
			SC-DR-coal	HC-DR	17.100	9.234	40.755	3	
			SC-DR-gas	NG-DR	0.432	0.097	0.831	3	
			SC-DR-oil	CO-HF-DR	0.360	0.081	0.693	3	
			SC-DR-oil	CO-LF-DR	11.934	2.685	22.973	3	
			SC-IND-coal	HC-IND-CEM	67.560	36.482	161.018	3	
			SC-IND-coal	HC-IND-OTH	68.400	36.936	163.020	3	
			SC-IND-coal	HC-IND-PIP	29.138	15.734	69.444	3	
			SC-IND-gas	NG-IND	0.567	0.128	1.092	3	
			SC-IND-oil	CO-HF-IND	1.197	0.269	2.304	3	
			SC-IND-oil	CO-LF-IND	0.429	0.097	0.827	3	
			SC-PP-coal	HC-B-PP	303.143	163.697	722.490	3	
			SC-PP-gas	NG-PP	0.903	0.203	1.738	3	
			SC-PP-oil	CO-HF-PP	0.660	0.149	1.271	3	
			SC-PP-oil	CO-LF-PP	0.101	0.023	0.193	3	
			SC-PP-oil	CO-PP	1.710	0.385	3.292	3	
			SSC	SP-S	22.962	8.546	109.565	3	
			WASOTH	WASOTH	1037.984	311.395	3113.951		3
			WI	WI	6.752	2.026	20.257		3
COM	Comoros	Sub-Saharan Africa	BIO	PSB – DR	8.918	1.561	20.288	5	
			BIO	PSB – IND	0.200	0.035	0.456	5	
			BIO	PSB – PP	0.073	0.013	0.165	5	
			CREM	CREM	0.001	0.001	0.001		4
			SC-DR-coal	HC-DR	0.040	0.017	0.112	5	
			SC-DR-oil	CO-LF-DR	0.018	0.003	0.040	5	
			SC-IND-coal	HC-IND-OTH	0.038	0.016	0.108	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.032	0.006	0.073	5	
			SC-IND-oil	CO-IND	0.004	0.001	0.010	5	
			SC-IND-oil	CO-LF-IND	0.003	0.001	0.007	5	
			SC-PP-coal	HC-B-PP	0.260	0.109	0.733	5	
			SC-PP-gas	NG-PP	0.000	0.000	0.001	5	
			SC-PP-oil	CO-HF-PP	0.042	0.007	0.095	5	
			SC-PP-oil	CO-LF-PP	0.009	0.002	0.020	5	
			WASOTH	WASOTH	5.776	2.498	8.899		4
			WI	WI	0.001	0.000	0.002		4
COG	Congo	Sub-Saharan Africa	ASGM	GP-A	1125.000	281.250	1968.750		
			BIO	PSB – DR	56.408	12.692	108.584	5	
			CEM	CEM	48.300	17.066	250.562	5	
			CREM	CREM	0.107	0.077	0.155		4
			NFMP-AU	GP-L	8.250	2.888	16.088	5	
			OR	CO-OR	0.678	0.305	1.118	5	
			SC-DR-oil	CO-LF-DR	0.908	0.204	1.748	5	
			SC-IND-oil	CO-LF-IND	0.048	0.011	0.092	5	
			SC-PP-gas	NG-PP	0.047	0.011	0.091	5	
			WASOTH	WASOTH	145.601	62.963	224.305		4
			WI	WI	0.028	0.012	0.043		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
COK	Cook Islands	Australia, New Zealand & Oceania	BIO	PSB – DR	0.040	0.007	0.091	4	
			BIO	PSB – IND	0.011	0.002	0.025	4	
			CREM	CREM	0.029	0.026	0.035		4
			OR	CO-OR	0.000	0.000	0.001	4	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	4	
			SC-DR-oil	CO-HF-DR	0.001	0.000	0.003	4	
			SC-DR-oil	CO-LF-DR	0.003	0.001	0.007	4	
			SC-IND-coal	BC-IND-OTH	0.003	0.001	0.007	4	
			SC-IND-coal	HC-IND-OTH	0.162	0.068	0.456	4	
			SC-IND-oil	CO-HF-IND	0.003	0.000	0.006	4	
			SC-IND-oil	CO-LF-IND	0.000	0.000	0.001	4	
			SC-PP-coal	HC-B-PP	0.037	0.015	0.103	4	
			SC-PP-gas	NG-PP	0.000	0.000	0.000	4	
			SC-PP-oil	CO-HF-PP	0.013	0.002	0.029	4	
			SC-PP-oil	CO-LF-PP	0.002	0.000	0.004	4	
			WASOTH	WASOTH	0.810	0.243	2.430		4
			WI	WI	0.003	0.001	0.008		4
CRI	Costa Rica	Central America and the Caribbean	ASGM	GP-A	142.500	35.625	249.375		
			BIO	PSB – DR	7.791	1.753	14.998	3	
			BIO	PSB – IND	20.049	4.511	38.595	3	
			BIO	PSB – PP	1.511	0.340	2.909	3	
			CEM	CEM	127.200	44.940	698.100	3	
			CREM	CREM	0.919	0.736	1.103		4
			NFMP-AU	GP-L	15.840	5.544	30.888	3	
			SC-DR-oil	CO-HF-DR	0.100	0.023	0.193	3	
			SC-DR-oil	CO-LF-DR	1.792	0.403	3.450	3	
			SC-IND-coal	HC-IND-CEM	0.120	0.065	0.286	3	
			SC-IND-oil	CO-HF-IND	1.881	0.423	3.621	3	
			SC-IND-oil	CO-LF-IND	0.112	0.025	0.216	3	
			SC-PP-oil	CO-HF-PP	0.480	0.108	0.924	3	
			SC-PP-oil	CO-LF-PP	0.002	0.000	0.003	3	
			WASOTH	WASOTH	200.740	60.222	602.219		4
			WI	WI	0.628	0.188	1.884		4
HRV	Croatia	EU28	BIO	PSB – DR	60.805	13.681	117.050	4	
			BIO	PSB – IND	1.550	0.349	2.984	4	
			BIO	PSB – PP	2.736	0.616	5.267	4	
			CEM	CEM	225.706	79.715	1375.064	4	
			CEM	PC-CEM	5.845	3.288	32.951	4	
			CREM	CREM	2.216	1.625	2.955		2
			OR	CO-OR	3.238	1.457	5.342	4	
			SC-DR-coal	BC-DR	1.200	0.648	2.860	4	
			SC-DR-gas	NG-DR	0.148	0.033	0.285	4	
			SC-DR-oil	CO-HF-DR	0.180	0.041	0.347	4	
			SC-DR-oil	CO-LF-DR	3.180	0.716	6.122	4	
			SC-IND-coal	BC-IND-CEM	0.394	0.213	0.938	4	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-coal	BC-IND-OTH	3.803	2.053	9.063	4	
			SC-IND-coal	HC-IND-CEM	9.844	5.316	23.461	4	
			SC-IND-coal	HC-IND-PIP	0.394	0.213	0.938	4	
			SC-IND-gas	NG-IND	0.079	0.018	0.153	4	
			SC-IND-oil	CO-HF-IND	0.460	0.104	0.886	4	
			SC-IND-oil	CO-LF-IND	0.226	0.051	0.435	4	
			SC-PP-coal	BC-L-PP	0.784	0.459	2.587	4	
			SC-PP-coal	HC-B-PP	98.213	53.035	234.073	4	
			SC-PP-gas	NG-PP	0.139	0.031	0.267	4	
			SC-PP-oil	CO-HF-PP	3.700	0.833	7.123	4	
			SC-PP-oil	CO-LF-PP	0.012	0.003	0.023	4	
			SSC	SP-S	4.872	1.813	23.249	4	
			WASOTH	WASOTH	78.733	23.620	236.198		2
			WI	WI	2.294	0.688	6.882		2
CUB	Cuba	Central America and the Caribbean	BIO	PSB – DR	3.033	0.682	5.838	3	
			BIO	PSB – IND	44.713	10.060	86.073	3	
			BIO	PSB – PP	15.009	3.377	28.892	3	
			CEM	CEM	133.984	47.337	735.332	3	
			CREM	CREM	1.055	0.844	1.266		4
			CSP	CSP-C	35.000	12.250	68.250	3	
			OR	CO-OR	4.376	1.969	7.220	3	
			SC-DR-gas	NG-DR	0.012	0.003	0.023	3	
			SC-DR-oil	CO-HF-DR	11.240	2.529	21.637	3	
			SC-DR-oil	CO-LF-DR	1.264	0.284	2.433	3	
			SC-IND-coal	HC-IND-OTH	0.338	0.182	0.804	3	
			SC-IND-gas	NG-IND	0.074	0.017	0.142	3	
			SC-IND-oil	CO-HF-IND	22.781	5.126	43.853	3	
			SC-IND-oil	CO-IND	8.085	1.819	15.563	3	
			SC-IND-oil	CO-LF-IND	0.762	0.171	1.467	3	
			SC-PP-gas	NG-PP	0.148	0.033	0.284	3	
			SC-PP-oil	CO-HF-PP	24.120	5.427	46.431	3	
			SC-PP-oil	CO-LF-PP	0.695	0.156	1.337	3	
			SC-PP-oil	CO-PP	18.300	4.118	35.228	3	
			SSC	SP-S	6.460	2.404	30.823	3	
			WASOTH	WASOTH	349.436	104.831	1048.308		4
			WI	WI	1.093	0.328	3.280		4
CUW	Curaçao	Central America and the Caribbean	CREM	CREM	0.036	0.029	0.043		
			OR	CO-OR	7.709	3.469	12.719	3	
			SC-DR-oil	CO-LF-DR	0.544	0.122	1.047	3	
			SC-IND-oil	CO-HF-IND	2.413	0.543	4.645	3	
			SC-PP-oil	CO-HF-PP	4.155	0.935	7.998	3	
			SC-PP-oil	CO-LF-PP	0.024	0.005	0.046	3	
			WASOTH	WASOTH	8.225	2.467	24.674		
			WI	WI	0.026	0.008	0.077		

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
CYP	Cyprus	EU28	BIO	PSB – DR	0.196	0.044	0.378	1	
			BIO	PSB – IND	0.142	0.032	0.273	1	
			CEM	CEM	35.381	12.558	217.994	1	
			CEM	PC-CEM	3.471	1.953	19.570	1	
			CREM	CREM	2.801	2.201	3.351		1
			SC-DR-oil	CO-HF-DR	0.060	0.014	0.116	1	
			SC-DR-oil	CO-LF-DR	0.710	0.160	1.367	1	
			SC-IND-coal	HC-IND-CEM	0.610	0.330	1.454	1	
			SC-IND-oil	CO-HF-IND	0.418	0.094	0.805	1	
			SC-IND-oil	CO-LF-IND	0.019	0.004	0.037	1	
			SC-PP-oil	CO-HF-PP	8.580	1.931	16.517	1	
			SC-PP-oil	CO-LF-PP	0.137	0.031	0.263	1	
			WASOTH	WASOTH	5.669	1.701	17.008		1
			WI	WI	2.167	0.650	6.501		1
CZE	Czech Republic	EU28	BIO	PSB – DR	90.703	21.542	166.667	1	
			BIO	PSB – IND	18.282	4.342	33.593	1	
			BIO	PSB – PP	26.717	6.345	49.092	1	
			CEM	CEM	217.219	76.676	1421.578	1	
			CREM	CREM	39.568	31.089	47.340		1
			OR	CO-OR	13.048	6.198	20.550	1	
			PISP	PIP	134.188	47.041	710.240	1	
			SC-DR-coal	BC-DR	216.889	123.627	493.422	1	
			SC-DR-coal	HC-DR	45.806	26.110	104.209	1	
			SC-DR-gas	NG-DR	0.685	0.163	1.259	1	
			SC-DR-oil	CO-HF-DR	0.240	0.057	0.441	1	
			SC-DR-oil	CO-LF-DR	8.444	2.005	15.516	1	
			SC-IND-coal	BC-IND-CEM	1.056	0.602	2.403	1	
			SC-IND-coal	BC-IND-OTH	82.526	47.040	187.747	1	
			SC-IND-coal	BC-IND-PIP	1.770	1.009	4.027	1	
			SC-IND-coal	HC-IND-CEM	12.374	7.053	28.150	1	
			SC-IND-coal	HC-IND-OTH	4.787	2.729	10.890	1	
			SC-IND-coal	HC-IND-PIP	4.163	2.373	9.470	1	
			SC-IND-gas	NG-IND	0.483	0.115	0.888	1	
			SC-IND-oil	CO-HF-IND	0.323	0.077	0.594	1	
			SC-IND-oil	CO-LF-IND	0.110	0.026	0.202	1	
			SC-PP-coal	BC-L-PP	2853.781	1762.210	8989.411	1	
			SC-PP-coal	HC-B-PP	186.921	106.545	425.245	1	
			SC-PP-gas	NG-PP	0.290	0.069	0.533	1	
			SC-PP-oil	CO-HF-PP	0.230	0.055	0.423	1	
			SC-PP-oil	CO-LF-PP	0.030	0.007	0.055	1	
			SSC	SP-S	8.262	3.075	39.425	1	
			WASOTH	WASOTH	75.464	22.639	226.392		1
			WI	WI	28.843	8.653	86.529		1

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
COD	Dem. Rep. of Congo (Zaire)	Sub-Saharan Africa	ASGM	GP-A	11250.000	2812.500	19687.500		
			BIO	PSB – DR	733.868	165.120	1412.695	5	
			BIO	PSB – IND	158.263	35.609	304.656	5	
			BIO	PSB – PP	3.768	0.848	7.252	5	
			CEM	CEM	34.650	12.243	179.751	5	
			CREM	CREM	1.802	1.298	2.597		4
			NFMP-AU	GP-L	2035.000	712.250	3968.250	5	
			SC-DR-oil	CO-LF-DR	1.076	0.242	2.071	5	
			SC-IND-oil	CO-HF-IND	0.320	0.072	0.616	5	
			SC-PP-gas	NG-PP	0.000	0.000	0.000	5	
			SC-PP-oil	CO-LF-PP	0.006	0.001	0.012	5	
			SSC	SP-S	0.899	0.335	4.289	5	
			WASOTH	WASOTH	300.692	130.029	463.228		4
			WI	WI	0.058	0.025	0.089		4
DNK	Denmark	EU28	BIO	PSB – DR	53.075	12.605	97.526	1	
			BIO	PSB – IND	4.197	0.997	7.713	1	
			BIO	PSB – PP	59.351	14.096	109.057	1	
			CEM	CEM	22.647	11.559	271.718	1	
			CEM	PC-CEM	4.205	2.497	22.629	1	
			CREM	CREM	20.793	16.337	24.877		1
			OR	CO-OR	3.208	1.524	5.053	1	
			SC-DR-coal	HC-DR	4.069	2.319	9.256	1	
			SC-DR-gas	NG-DR	0.187	0.044	0.343	1	
			SC-DR-oil	CO-HF-DR	0.100	0.024	0.184	1	
			SC-DR-oil	CO-LF-DR	6.152	1.461	11.304	1	
			SC-IND-coal	HC-IND-CEM	6.111	3.484	13.904	1	
			SC-IND-coal	HC-IND-OTH	4.787	2.729	10.890	1	
			SC-IND-gas	NG-IND	0.151	0.036	0.278	1	
			SC-IND-oil	CO-HF-IND	0.817	0.194	1.501	1	
			SC-IND-oil	CO-LF-IND	0.321	0.076	0.590	1	
			SC-PP-coal	HC-B-PP	153.491	87.490	349.191	1	
			SC-PP-gas	NG-PP	0.325	0.077	0.597	1	
			SC-PP-oil	CO-HF-PP	0.560	0.133	1.029	1	
			SC-PP-oil	CO-LF-PP	0.035	0.008	0.063	1	
			WASOTH	WASOTH	59.034	17.710	177.102		1
			WI	WI	22.563	6.769	67.690		1
DJI	Djibouti	Sub-Saharan Africa	BIO	PSB – DR	9.459	1.655	21.518	5	
			BIO	PSB – IND	0.453	0.079	1.032	5	
			BIO	PSB – PP	0.164	0.029	0.374	5	
			CEM	CEM	36.750	12.985	190.645	5	
			CREM	CREM	0.019	0.014	0.027		4
			SC-DR-coal	HC-DR	0.090	0.038	0.252	5	
			SC-DR-oil	CO-LF-DR	0.040	0.007	0.091	5	
			SC-IND-coal	HC-IND-OTH	0.087	0.037	0.245	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.073	0.013	0.166	5	

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			SC-IND-oil	CO-IND	0.010	0.002	0.023	5	
			SC-IND-oil	CO-LF-IND	0.007	0.001	0.016	5	
			SC-PP-coal	HC-B-PP	0.589	0.247	1.658	5	
			SC-PP-gas	NG-PP	0.001	0.000	0.002	5	
			SC-PP-oil	CO-HF-PP	0.095	0.017	0.216	5	
			SC-PP-oil	CO-LF-PP	0.020	0.003	0.045	5	
			WASOTH	WASOTH	15.309	6.620	23.584		4
			WI	WI	0.003	0.001	0.005		4
DMA	Dominica	Central America and the Caribbean	BIO	PSB – DR	0.096	0.017	0.218	3	
			BIO	PSB – IND	0.148	0.026	0.337	3	
			BIO	PSB – PP	0.053	0.009	0.120	3	
			CREM	CREM	0.014	0.011	0.017		4
			OR	CO-OR	0.014	0.005	0.028	3	
			SC-DR-coal	HC-DR	0.535	0.225	1.508	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.015	0.003	0.034	3	
			SC-DR-oil	CO-LF-DR	0.036	0.006	0.082	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.043	0.008	0.099	3	
			SC-IND-oil	CO-LF-IND	0.002	0.000	0.006	3	
			SC-PP-gas	NG-PP	0.003	0.000	0.006	3	
			SC-PP-oil	CO-HF-PP	0.414	0.073	0.943	3	
			SC-PP-oil	CO-LF-PP	0.030	0.005	0.069	3	
			WASOTH	WASOTH	2.076	0.623	6.229		4
			WI	WI	0.006	0.002	0.019		4
DOM	Dominican Republic	Central America and the Caribbean	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	21.959	4.941	42.271	3	
			BIO	PSB – IND	10.335	2.325	19.895	3	
			BIO	PSB – PP	0.748	0.168	1.439	3	
			CEM	CEM	407.040	143.808	2233.920	3	
			CREM	CREM	2.001	1.601	2.402		4
			NFMP-AU	GP-L	1220.314	427.110	2379.612	3	
			OR	CO-OR	0.702	0.316	1.159	3	
			SC-DR-gas	NG-DR	0.005	0.001	0.009	3	
			SC-DR-oil	CO-LF-DR	1.254	0.282	2.414	3	
			SC-IND-coal	HC-IND-CEM	12.960	6.998	30.888	3	
			SC-IND-coal	HC-IND-OTH	0.338	0.182	0.804	3	
			SC-IND-gas	NG-IND	0.019	0.004	0.037	3	
			SC-IND-oil	CO-HF-IND	2.033	0.457	3.914	3	
			SC-IND-oil	CO-LF-IND	0.188	0.042	0.362	3	
			SC-PP-coal	HC-B-PP	95.783	51.723	228.282	3	
			SC-PP-gas	NG-PP	0.183	0.041	0.352	3	
			SC-PP-oil	CO-HF-PP	23.775	5.349	45.767	3	
			SC-PP-oil	CO-LF-PP	0.936	0.211	1.802	3	
			WASOTH	WASOTH	394.117	118.235	1182.351		4
			WI	WI	1.233	0.370	3.700		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
ECU	Ecuador	South America	ASGM	GP-A	26350.000	13175.000	39525.000		
			BIO	PSB – DR	11.141	2.507	21.447	3	
			BIO	PSB – IND	16.256	3.658	31.293	3	
			BIO	PSB – PP	13.184	2.966	25.378	3	
			CEM	CEM	485.760	171.864	2577.432	3	
			CREM	CREM	6.213	4.349	8.699		4
			NFMP-AU	GP-L	281.635	98.572	549.189	3	
			OR	CO-OR	6.513	2.931	10.747	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.600	0.135	1.155	3	
			SC-DR-oil	CO-LF-DR	6.294	1.416	12.116	3	
			SC-IND-gas	NG-IND	0.003	0.001	0.006	3	
			SC-IND-oil	CO-HF-IND	5.073	1.141	9.766	3	
			SC-IND-oil	CO-LF-IND	1.742	0.392	3.354	3	
			SC-PP-gas	NG-PP	0.127	0.028	0.244	3	
			SC-PP-oil	CO-HF-PP	23.685	5.329	45.594	3	
			SC-PP-oil	CO-LF-PP	1.239	0.279	2.385	3	
			SC-PP-oil	CO-PP	2.648	0.596	5.096	3	
			SSC	SP-S	16.830	6.264	80.308	3	
			WASOTH	WASOTH	418.182	125.455	1254.547		4
			WI	WI	1.407	0.422	4.221		4
EGY	Egypt	North Africa	BIO	PSB – DR	91.574	20.604	176.279	5	
			CEM	CEM	5978.000	2109.450	30894.500	5	
			CREM	CREM	1.626	1.220	2.033		4
			NFMP	AL-P	15.000	5.084	28.327	5	
			NFMP-AU	GP-L	753.500	263.725	1469.325	5	
			OR	CO-OR	50.294	22.632	82.985	5	
			PISP	PIP	34.650	12.147	183.398	5	
			SC-DR-gas	NG-DR	0.432	0.097	0.832	5	
			SC-DR-oil	CO-HF-DR	6.800	1.530	13.090	5	
			SC-DR-oil	CO-LF-DR	19.878	4.473	38.265	5	
			SC-IND-gas	NG-IND	0.993	0.223	1.911	5	
			SC-IND-oil	CO-HF-IND	42.000	9.450	80.850	5	
			SC-IND-oil	CO-LF-IND	5.168	1.163	9.948	5	
			SC-PP-gas	NG-PP	6.219	1.399	11.972	5	
			SC-PP-oil	CO-HF-PP	181.580	40.856	349.542	5	
			SC-PP-oil	CO-LF-PP	3.636	0.818	6.999	5	
			SSC	SP-S	178.883	66.579	853.569	5	
			WASOTH	WASOTH	2576.230	772.869	7728.691		4
			WI	WI	8.667	2.600	26.001		4
SLV	El Salvador	Central America and the Caribbean	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	13.916	3.131	26.789	3	
			BIO	PSB – IND	0.991	0.223	1.908	3	
			BIO	PSB – PP	13.250	2.981	25.507	3	
			CEM	CEM	84.800	29.960	465.400	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			CREM	CREM	1.162	0.929	1.394		4
			SC-DR-oil	CO-HF-DR	0.560	0.126	1.078	3	
			SC-DR-oil	CO-LF-DR	1.016	0.229	1.956	3	
			SC-IND-oil	CO-HF-IND	0.418	0.094	0.805	3	
			SC-IND-oil	CO-LF-IND	0.296	0.067	0.571	3	
			SC-PP-oil	CO-HF-PP	7.665	1.725	14.755	3	
			SSC	SP-S	3.053	1.136	14.569	3	
			WASOTH	WASOTH	138.638	41.592	415.915		4
			WI	WI	0.434	0.130	1.301		4
GNQ	Equatorial Guinea	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	8.458	1.480	19.243	5	
			BIO	PSB – IND	4.030	0.705	9.168	5	
			BIO	PSB – PP	1.460	0.255	3.321	5	
			CREM	CREM	0.017	0.012	0.024		4
			SC-DR-coal	HC-DR	0.796	0.334	2.243	5	
			SC-DR-oil	CO-LF-DR	0.356	0.062	0.810	5	
			SC-IND-coal	HC-IND-OTH	0.773	0.325	2.178	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.648	0.113	1.475	5	
			SC-IND-oil	CO-IND	0.089	0.016	0.203	5	
			SC-IND-oil	CO-LF-IND	0.062	0.011	0.141	5	
			SC-PP-coal	HC-B-PP	5.232	2.198	14.738	5	
			SC-PP-gas	NG-PP	0.006	0.001	0.014	5	
			SC-PP-oil	CO-HF-PP	0.843	0.148	1.918	5	
			SC-PP-oil	CO-LF-PP	0.174	0.031	0.397	5	
			WASOTH	WASOTH	168.341	72.796	259.337		4
			WI	WI	0.032	0.014	0.050		4
ERI	Eritrea	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	17.614	3.963	33.906	5	
			CEM	CEM	31.500	11.130	163.410	5	
			CREM	CREM	0.130	0.094	0.187		4
			NFMP-AU	GP-L	76.450	26.758	149.078	5	
			SC-DR-oil	CO-HF-DR	0.020	0.005	0.039	5	
			SC-DR-oil	CO-LF-DR	0.094	0.021	0.181	5	
			SC-IND-oil	CO-HF-IND	0.100	0.023	0.193	5	
			SC-IND-oil	CO-LF-IND	0.002	0.000	0.004	5	
			SC-PP-oil	CO-HF-PP	1.460	0.329	2.811	5	
			SC-PP-oil	CO-LF-PP	0.076	0.017	0.146	5	
			WASOTH	WASOTH	45.281	19.581	69.758		4
			WI	WI	0.009	0.004	0.013		4
EST	Estonia	EU28	BIO	PSB – DR	19.138	4.545	35.166	1	
			BIO	PSB – IND	3.927	0.933	7.216	1	
			BIO	PSB – PP	14.959	3.553	27.487	1	
			CEM	CEM	24.957	8.814	155.792	1	
			CREM	CREM	2.924	2.297	3.498		1
			SC-DR-coal	HC-DR	0.525	0.299	1.194	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-DR-gas	NG-DR	0.030	0.007	0.055	1	
			SC-DR-oil	CO-HF-DR	0.140	0.033	0.257	1	
			SC-DR-oil	CO-LF-DR	1.264	0.300	2.323	1	
			SC-IND-coal	HC-IND-CEM	1.660	0.946	3.776	1	
			SC-IND-gas	NG-IND	0.022	0.005	0.040	1	
			SC-IND-oil	CO-HF-IND	0.247	0.059	0.454	1	
			SC-IND-oil	CO-LF-IND	0.095	0.023	0.175	1	
			SC-PP-coal	HC-B-PP	0.155	0.088	0.353	1	
			SC-PP-gas	NG-PP	0.039	0.009	0.072	1	
			SC-PP-oil	CO-HF-PP	0.410	0.097	0.753	1	
			SC-PP-oil	CO-LF-PP	0.023	0.005	0.041	1	
			WASOTH	WASOTH	8.075	2.422	24.224		1
			WI	WI	3.086	0.926	9.259		1
ETH	Ethiopia	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	1689.720	380.187	3252.711	5	
			CEM	CEM	567.000	200.340	2941.380	5	
			CEM	PC-CEM	8.440	4.748	47.581	5	
			CREM	CREM	2.268	1.634	3.269		4
			NFMP-AU	GP-L	506.000	177.100	986.700	5	
			SC-DR-oil	CO-LF-DR	2.932	0.660	5.644	5	
			SC-IND-coal	HC-IND-CEM	61.650	33.291	146.933	5	
			SC-IND-oil	CO-HF-IND	1.340	0.302	2.580	5	
			SC-IND-oil	CO-LF-IND	0.908	0.204	1.748	5	
			SC-PP-oil	CO-LF-PP	0.002	0.000	0.004	5	
			WASOTH	WASOTH	805.114	348.157	1240.311		4
			WI	WI	0.154	0.067	0.238		4
FRO	Faeroe Islands	CIS & other European countries	CREM	CREM	0.022	0.016	0.029		1
			WASOTH	WASOTH	0.957	0.287	2.871		1
			WI	WI	0.366	0.110	1.097		1
FLK	Falkland Is. (Malvinas)	South America	BIO	PSB – DR	0.004	0.001	0.010	3	
			BIO	PSB – IND	0.035	0.006	0.080	3	
			BIO	PSB – PP	0.012	0.002	0.028	3	
			CREM	CREM	0.001	0.001	0.002		4
			OR	CO-OR	0.004	0.001	0.008	3	
			SC-DR-coal	HC-DR	0.127	0.053	0.356	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.004	0.001	0.008	3	
			SC-DR-oil	CO-LF-DR	0.009	0.001	0.019	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.010	0.002	0.023	3	
			SC-IND-oil	CO-LF-IND	0.001	0.000	0.001	3	
			SC-PP-gas	NG-PP	0.001	0.000	0.001	3	
			SC-PP-oil	CO-HF-PP	0.098	0.017	0.223	3	
			SC-PP-oil	CO-LF-PP	0.007	0.001	0.016	3	
			WASOTH	WASOTH	0.636	0.191	1.908		4
			WI	WI	0.002	0.001	0.006		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
FSM	Federated States of Micronesia	Australia, New Zealand & Oceania	CREM	CREM	0.320	0.288	0.384		4
			WASOTH	WASOTH	1.212	0.364	3.636		4
			WI	WI	0.004	0.001	0.011		4
FJI	Fiji	Australia, New Zealand & Oceania	BIO	PSB – DR	3.703	0.648	8.425	4	
			BIO	PSB – IND	0.745	0.130	1.694	4	
			CEM	CEM	18.121	6.401	95.527	4	
			CREM	CREM	2.800	2.515	3.353		4
			NFMP-AU	GP-L	67.320	23.562	131.274	4	
			OR	CO-OR	0.032	0.011	0.063	4	
			SC-DR-gas	NG-DR	0.002	0.000	0.004	4	
			SC-DR-oil	CO-HF-DR	0.077	0.013	0.175	4	
			SC-DR-oil	CO-LF-DR	0.197	0.035	0.449	4	
			SC-IND-coal	BC-IND-OTH	0.174	0.073	0.489	4	
			SC-IND-coal	HC-IND-OTH	10.948	4.598	30.837	4	
			SC-IND-oil	CO-HF-IND	0.169	0.030	0.385	4	
			SC-IND-oil	CO-LF-IND	0.018	0.003	0.042	4	
			SC-PP-coal	HC-B-PP	2.470	1.037	6.957	4	
			SC-PP-gas	NG-PP	0.002	0.000	0.004	4	
			SC-PP-oil	CO-HF-PP	0.871	0.152	1.982	4	
			SC-PP-oil	CO-LF-PP	0.114	0.020	0.259	4	
			WASOTH	WASOTH	27.597	8.279	82.791		4
			WI	WI	0.086	0.026	0.259		4
FIN	Finland	EU28	BIO	PSB – DR	72.209	17.150	132.683	1	
			BIO	PSB – IND	131.667	31.271	241.938	1	
			BIO	PSB – PP	133.051	31.600	244.481	1	
			CEM	CEM	72.306	25.527	493.695	1	
			CEM	PC-CEM	1.046	0.621	5.630	1	
			CREM	CREM	12.773	10.036	15.282		1
			NFMP	CU-P	33.635	12.005	192.033	1	
			NFMP	ZN-P	79.976	28.334	219.700	1	
			NFMP-AU	GP-L	21.483	7.519	41.892	1	
			OR	CO-OR	17.719	8.417	27.908	1	
			PISP	PIP	387.828	135.955	2052.718	1	
			SC-DR-coal	HC-DR	0.525	0.299	1.194	1	
			SC-DR-gas	NG-DR	0.014	0.003	0.026	1	
			SC-DR-oil	CO-HF-DR	1.200	0.285	2.205	1	
			SC-DR-oil	CO-LF-DR	6.116	1.453	11.238	1	
			SC-IND-coal	HC-IND-CEM	3.923	2.236	8.926	1	
			SC-IND-coal	HC-IND-OTH	4.718	2.689	10.732	1	
			SC-IND-coal	HC-IND-PIP	0.416	0.237	0.947	1	
			SC-IND-gas	NG-IND	0.129	0.031	0.236	1	
			SC-IND-oil	CO-HF-IND	3.477	0.826	6.389	1	
			SC-IND-oil	CO-LF-IND	0.876	0.208	1.609	1	
			SC-PP-coal	HC-B-PP	123.890	70.617	281.849	1	
			SC-PP-gas	NG-PP	0.316	0.075	0.581	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-oil	CO-HF-PP	2.540	0.603	4.667	1	
			SC-PP-oil	CO-LF-PP	0.035	0.008	0.063	1	
			SSC	SP-S	29.525	10.989	140.884	1	
			WASOTH	WASOTH	49.124	14.737	147.371		1
			WI	WI	18.776	5.633	56.327		1
FRA	France	EU28	BIO	PSB – DR	352.369	83.688	647.477	1	
			BIO	PSB – IND	50.504	11.995	92.801	1	
			BIO	PSB – PP	62.100	14.749	114.108	1	
			CEM	CEM	932.059	329.214	5552.592	1	
			CEM	PC-CEM	12.052	7.156	64.854	1	
			CREM	CREM	108.691	85.400	130.041		1
			CSP	CSP-C	350.960	122.836	684.373	1	
			NFMP	AL-P	5.250	1.780	9.915	1	
			NFMP	ZN-P	44.210	15.663	121.450	1	
			OR	CO-OR	103.584	49.202	163.144	1	
			PISP	PIP	351.178	123.107	1858.736	1	
			SC-DR-coal	HC-DR	12.075	6.883	27.471	1	
			SC-DR-gas	NG-DR	3.870	0.919	7.111	1	
			SC-DR-oil	CO-HF-DR	1.600	0.380	2.940	1	
			SC-DR-oil	CO-LF-DR	83.846	19.913	154.067	1	
			SC-IND-coal	BC-IND-CEM	1.962	1.118	4.463	1	
			SC-IND-coal	BC-IND-OTH	10.509	5.990	23.909	1	
			SC-IND-coal	BC-IND-PIP	0.221	0.126	0.503	1	
			SC-IND-coal	HC-IND-CEM	25.351	14.450	57.674	1	
			SC-IND-coal	HC-IND-OTH	61.466	35.036	139.836	1	
			SC-IND-coal	HC-IND-PIP	61.674	35.154	140.309	1	
			SC-IND-gas	NG-IND	2.393	0.568	4.397	1	
			SC-IND-oil	CO-HF-IND	9.766	2.319	17.945	1	
			SC-IND-oil	CO-LF-IND	1.744	0.414	3.205	1	
			SC-PP-coal	HC-B-PP	204.206	116.397	464.568	1	
			SC-PP-gas	NG-PP	1.442	0.343	2.650	1	
			SC-PP-oil	CO-HF-PP	3.900	0.926	7.166	1	
			SC-PP-oil	CO-LF-PP	0.135	0.032	0.248	1	
			SSC	SP-S	128.324	47.761	612.318	1	
			WASOTH	WASOTH	581.782	174.535	1745.347		1
			WI	WI	222.363	66.709	667.090		1
GUF	French Guiana	Central America and the Caribbean	ASGM	GP-A	5625.000	2812.500	8437.500		
			BIO	PSB – DR	0.325	0.057	0.740	3	
			CEM	CEM	7.293	2.577	40.024	3	
			CREM	CREM	0.047	0.038	0.057		4
			NFMP-AU	GP-L	47.520	16.632	92.664	3	
			WASOTH	WASOTH	0.000	0.000	0.000		4
			WI	WI	0.000	0.000	0.000		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
PYF	French Polynesia	Australia, New Zealand & Oceania	BIO	PSB – DR	1.151	0.201	2.619	4	
			BIO	PSB – IND	0.671	0.117	1.527	4	
			CREM	CREM	0.873	0.784	1.045		4
			OR	CO-OR	0.029	0.010	0.057	4	
			SC-DR-gas	NG-DR	0.001	0.000	0.003	4	
			SC-DR-oil	CO-HF-DR	0.070	0.012	0.158	4	
			SC-DR-oil	CO-LF-DR	0.178	0.031	0.405	4	
			SC-IND-coal	BC-IND-OTH	0.156	0.066	0.441	4	
			SC-IND-coal	HC-IND-OTH	9.870	4.145	27.801	4	
			SC-IND-oil	CO-HF-IND	0.152	0.027	0.347	4	
			SC-IND-oil	CO-LF-IND	0.017	0.003	0.038	4	
			SC-PP-coal	HC-B-PP	2.227	0.935	6.272	4	
			SC-PP-gas	NG-PP	0.002	0.000	0.003	4	
			SC-PP-oil	CO-HF-PP	0.785	0.137	1.787	4	
			SC-PP-oil	CO-LF-PP	0.103	0.018	0.234	4	
			WASOTH	WASOTH	18.215	5.465	54.646		4
			WI	WI	0.057	0.017	0.171		4
GAB	Gabon	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	54.335	12.225	104.595	5	
			BIO	PSB – IND	142.967	32.167	275.211	5	
			BIO	PSB – PP	0.383	0.086	0.736	5	
			CEM	CEM	17.850	6.307	92.599	5	
			CREM	CREM	0.039	0.028	0.056		4
			OR	CO-OR	0.201	0.090	0.331	5	
			SC-DR-oil	CO-LF-DR	0.456	0.103	0.878	5	
			SC-IND-gas	NG-IND	0.001	0.000	0.001	5	
			SC-IND-oil	CO-HF-IND	1.340	0.302	2.580	5	
			SC-IND-oil	CO-LF-IND	0.568	0.128	1.093	5	
			SC-PP-gas	NG-PP	0.071	0.016	0.136	5	
			SC-PP-oil	CO-LF-PP	0.128	0.029	0.246	5	
			WASOTH	WASOTH	170.879	73.893	263.245		4
			WI	WI	0.033	0.014	0.050		4
GMB	Gambia	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	22.469	3.932	51.117	5	
			BIO	PSB – IND	0.539	0.094	1.225	5	
			BIO	PSB – PP	0.195	0.034	0.444	5	
			CREM	CREM	0.011	0.008	0.016		4
			SC-DR-coal	HC-DR	0.106	0.045	0.300	5	
			SC-DR-oil	CO-LF-DR	0.048	0.008	0.108	5	
			SC-IND-coal	HC-IND-OTH	0.103	0.043	0.291	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.087	0.015	0.197	5	
			SC-IND-oil	CO-IND	0.012	0.002	0.027	5	
			SC-IND-oil	CO-LF-IND	0.008	0.001	0.019	5	
			SC-PP-coal	HC-B-PP	0.699	0.294	1.970	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-gas	NG-PP	0.001	0.000	0.002	5	
			SC-PP-oil	CO-HF-PP	0.113	0.020	0.256	5	
			SC-PP-oil	CO-LF-PP	0.023	0.004	0.053	5	
			WASOTH	WASOTH	16.515	7.142	25.442		4
			WI	WI	0.003	0.001	0.005		4
GEO	Georgia	CIS & other European countries	BIO	PSB – DR	20.796	4.679	40.033	4	
			BIO	PSB – IND	0.043	0.010	0.082	4	
			CEM	CEM	159.348	56.270	808.264	4	
			CREM	CREM	1.688	1.238	2.251		4
			NFMP-AU	GP-L	178.200	62.370	347.490	4	
			OR	CO-OR	0.016	0.007	0.026	4	
			SC-DR-coal	BC-DR	0.450	0.243	1.073	4	
			SC-DR-coal	HC-DR	0.150	0.081	0.358	4	
			SC-DR-gas	NG-DR	0.242	0.054	0.466	4	
			SC-DR-oil	CO-HF-DR	0.020	0.005	0.039	4	
			SC-DR-oil	CO-LF-DR	1.052	0.237	2.025	4	
			SC-IND-coal	BC-IND-CEM	39.375	21.263	93.844	4	
			SC-IND-coal	HC-IND-CEM	15.356	8.292	36.599	4	
			SC-IND-coal	HC-IND-OTH	0.394	0.213	0.938	4	
			SC-IND-gas	NG-IND	0.022	0.005	0.043	4	
			SC-IND-oil	CO-LF-IND	0.158	0.036	0.304	4	
			SC-PP-coal	BC-L-PP	0.098	0.057	0.323	4	
			SC-PP-gas	NG-PP	0.126	0.028	0.243	4	
			WASOTH	WASOTH	101.861	30.558	305.583		4
			WI	WI	0.319	0.096	0.956		4
DEU	Germany	EU28	BIO	PSB – DR	332.312	78.924	610.623	1	
			BIO	PSB – IND	83.326	19.790	153.112	1	
			BIO	PSB – PP	145.487	34.553	267.333	1	
			CEM	CEM	625.931	244.354	2143.812	1	
			CEM	PC-CEM	1.530	0.908	8.233	1	
			CREM	CREM	206.287	162.083	246.808		1
			CSP	CSP-C	225.312	78.859	439.359	1	
			NFMP	AL-P	6.625	2.246	12.511	1	
			NFMP	CU-P	65.021	23.207	371.227	1	
			NFMP	PB-P	3.172	1.729	5.002	1	
			NFMP	ZN-T	909.862	328.353	1425.831	1	
			OR	CO-OR	168.618	80.094	265.574	1	
			PISP	PIP	856.771	300.853	3697.459	1	
			SC-DR-coal	HC-DR	61.950	35.312	140.936	1	
			SC-DR-gas	NG-DR	7.118	1.691	13.079	1	
			SC-DR-oil	CO-LF-DR	98.928	23.495	181.780	1	
			SC-IND-coal	BC-IND-OTH	58.189	33.168	132.379	1	
			SC-IND-coal	HC-IND-CEM	24.581	14.011	55.922	1	
			SC-IND-coal	HC-IND-NFM	1.873	1.068	4.261	1	
			SC-IND-coal	HC-IND-OTH	100.663	57.378	229.009	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-coal	HC-IND-PIP	75.133	42.826	170.928	1	
			SC-IND-gas	NG-IND	4.350	1.033	7.993	1	
			SC-IND-oil	CO-HF-IND	27.949	6.638	51.356	1	
			SC-IND-oil	CO-LF-IND	1.395	0.331	2.563	1	
			SC-PP-coal	BC-L-PP	8544.538	5682.118	11663.294	1	
			SC-PP-coal	HC-A-PP	151.457	86.330	609.613	1	
			SC-PP-coal	HC-B-PP	2026.892	1155.329	4611.180	1	
			SC-PP-gas	NG-PP	3.604	0.856	6.622	1	
			SC-PP-oil	CO-HF-PP	10.200	2.423	18.743	1	
			SC-PP-oil	CO-LF-PP	0.461	0.109	0.846	1	
			SSC	SP-S	304.869	113.470	1454.729	1	
			WASOTH	WASOTH	831.466	249.440	2494.398		1
			WI	WI	317.795	95.338	953.385		1
GHA	Ghana	Sub-Saharan Africa	ASGM	GP-A	41250.000	20625.000	61875.000		
			BIO	PSB – DR	61.244	13.780	117.894	5	
			BIO	PSB – IND	20.919	4.707	40.269	5	
			CEM	CEM	315.000	111.300	1634.100	5	
			CREM	CREM	0.596	0.430	0.859		4
			NFMP	AL-P	12.400	4.340	24.180	5	
			NFMP-AU	GP-L	4840.000	1694.000	9438.000	5	
			OR	CO-OR	0.093	0.042	0.153	5	
			SC-DR-oil	CO-LF-DR	2.794	0.629	5.378	5	
			SC-IND-oil	CO-HF-IND	0.260	0.059	0.501	5	
			SC-IND-oil	CO-LF-IND	1.012	0.228	1.948	5	
			SC-PP-gas	NG-PP	0.247	0.056	0.476	5	
			SC-PP-oil	CO-HF-PP	0.040	0.009	0.077	5	
			SC-PP-oil	CO-PP	2.490	0.560	4.793	5	
			SSC	SP-S	0.749	0.279	3.574	5	
			WASOTH	WASOTH	569.944	246.462	878.023		4
			WI	WI	0.109	0.047	0.168		4
GIB	Gibraltar	CIS & other European countries	CREM	CREM	0.035	0.026	0.047		1
			SC-DR-oil	CO-LF-DR	0.198	0.045	0.381	1	
			SC-PP-oil	CO-HF-PP	0.510	0.115	0.982	1	
			WASOTH	WASOTH	0.977	0.293	2.932		1
			WI	WI	0.374	0.112	1.121		1
GRC	Greece	EU28	BIO	PSB – DR	42.353	10.059	77.823	1	
			BIO	PSB – IND	6.961	1.653	12.791	1	
			BIO	PSB – PP	0.004	0.001	0.008	1	
			CEM	CEM	265.677	93.890	1369.782	1	
			CEM	PC-CEM	14.708	8.733	79.146	1	
			CREM	CREM	0.000	0.000	0.000		1
			NFMP	AL-P	13.175	4.611	25.691	1	
			NFMP-AU	GP-L	1.155	0.404	2.252	1	
			OR	CO-OR	39.190	18.615	61.725	1	
			SC-DR-coal	BC-DR	7.459	4.251	16.969	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-DR-gas	NG-DR	0.125	0.030	0.230	1	
			SC-DR-oil	CO-HF-DR	6.620	1.572	12.164	1	
			SC-DR-oil	CO-LF-DR	7.490	1.779	13.763	1	
			SC-IND-coal	BC-IND-NFM	21.351	12.170	48.573	1	
			SC-IND-coal	HC-IND-CEM	6.111	3.484	13.904	1	
			SC-IND-coal	HC-IND-NFM	13.875	7.909	31.566	1	
			SC-IND-gas	NG-IND	0.100	0.024	0.184	1	
			SC-IND-oil	CO-HF-IND	3.667	0.871	6.738	1	
			SC-IND-oil	CO-LF-IND	0.393	0.093	0.723	1	
			SC-PP-coal	BC-L-PP	3671.518	2267.162	11565.282	1	
			SC-PP-gas	NG-PP	0.309	0.073	0.568	1	
			SC-PP-oil	CO-HF-PP	14.050	3.337	25.817	1	
			SC-PP-oil	CO-LF-PP	0.389	0.092	0.714	1	
			SSC	SP-S	23.854	8.878	113.821	1	
			WASOTH	WASOTH	60.483	18.145	181.450		1
			WI	WI	23.117	6.935	69.352		1
GRL	Greenland	North America	CREM	CREM	0.145	0.121	0.166		4
			WASOTH	WASOTH	2.509	0.753	7.528		4
			WI	WI	0.008	0.002	0.024		4
GRD	Grenada	Central America and the Caribbean	BIO	PSB – DR	0.144	0.025	0.327	3	
			BIO	PSB – IND	0.273	0.048	0.621	3	
			BIO	PSB – PP	0.097	0.017	0.221	3	
			CREM	CREM	0.021	0.017	0.025		4
			OR	CO-OR	0.026	0.009	0.051	3	
			SC-DR-coal	HC-DR	0.986	0.414	2.776	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.028	0.005	0.063	3	
			SC-DR-oil	CO-LF-DR	0.067	0.012	0.152	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.080	0.014	0.182	3	
			SC-IND-oil	CO-LF-IND	0.005	0.001	0.010	3	
			SC-PP-gas	NG-PP	0.005	0.001	0.011	3	
			SC-PP-oil	CO-HF-PP	0.763	0.133	1.735	3	
			SC-PP-oil	CO-LF-PP	0.056	0.010	0.128	3	
			WASOTH	WASOTH	3.808	1.142	11.425		4
			WI	WI	0.012	0.004	0.036		4
GLP	Guadeloupe	Central America and the Caribbean	BIO	PSB – DR	0.523	0.091	1.189	3	
			CEM	CEM	25.440	8.988	139.620	3	
			CREM	CREM	0.076	0.061	0.091		4
			WASOTH	WASOTH	0.000	0.000	0.000		4
			WI	WI	0.000	0.000	0.000		4
GTM	Guatemala	Central America and the Caribbean	ASGM	GP-A	712.500	178.125	1246.875		
			BIO	PSB – DR	314.376	70.735	605.174	3	
			BIO	PSB – PP	63.523	14.293	122.281	3	
			CEM	CEM	296.800	104.860	1628.900	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			CREM	CREM	2.866	2.293	3.439		4
			NFMP-AU	GP-L	221.760	77.616	432.432	3	
			OR	CO-OR	0.053	0.024	0.087	3	
			SC-DR-oil	CO-LF-DR	2.112	0.475	4.066	3	
			SC-IND-oil	CO-HF-IND	4.332	0.975	8.339	3	
			SC-IND-oil	CO-LF-IND	0.230	0.052	0.443	3	
			SC-PP-coal	HC-B-PP	154.710	83.543	368.726	3	
			SC-PP-oil	CO-HF-PP	4.665	1.050	8.980	3	
			SC-PP-oil	CO-LF-PP	0.062	0.014	0.118	3	
			SSC	SP-S	9.967	3.710	47.558	3	
			WASOTH	WASOTH	331.810	99.543	995.431		4
			WI	WI	1.038	0.311	3.115		4
GIN	Guinea	Sub-Saharan Africa	ASGM	GP-A	14325.000	10027.500	18622.500		
			BIO	PSB – DR	134.516	23.540	306.024	5	
			BIO	PSB – IND	2.418	0.423	5.502	5	
			BIO	PSB – PP	0.876	0.153	1.993	5	
			CEM	CEM	52.500	18.550	272.350	5	
			CREM	CREM	0.201	0.145	0.290		4
			NFMP-AU	GP-L	935.000	327.250	1823.250	5	
			SC-DR-coal	HC-DR	0.478	0.201	1.346	5	
			SC-DR-oil	CO-LF-DR	0.214	0.037	0.486	5	
			SC-IND-coal	HC-IND-OTH	0.464	0.195	1.307	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.389	0.068	0.885	5	
			SC-IND-oil	CO-IND	0.053	0.009	0.122	5	
			SC-IND-oil	CO-LF-IND	0.037	0.007	0.085	5	
			SC-PP-coal	HC-B-PP	3.140	1.319	8.845	5	
			SC-PP-gas	NG-PP	0.004	0.001	0.008	5	
			SC-PP-oil	CO-HF-PP	0.506	0.089	1.151	5	
			SC-PP-oil	CO-LF-PP	0.105	0.018	0.238	5	
			WASOTH	WASOTH	75.281	32.554	115.973		4
			WI	WI	0.014	0.006	0.022		4
GNB	Guinea-Bissau	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	19.711	3.449	44.842	5	
			BIO	PSB – IND	0.443	0.078	1.008	5	
			BIO	PSB – PP	0.160	0.028	0.365	5	
			CREM	CREM	0.039	0.028	0.056		4
			SC-DR-coal	HC-DR	0.088	0.037	0.247	5	
			SC-DR-oil	CO-LF-DR	0.039	0.007	0.089	5	
			SC-IND-coal	HC-IND-OTH	0.085	0.036	0.239	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.071	0.012	0.162	5	
			SC-IND-oil	CO-IND	0.010	0.002	0.022	5	
			SC-IND-oil	CO-LF-IND	0.007	0.001	0.016	5	
			SC-PP-coal	HC-B-PP	0.575	0.242	1.620	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-gas	NG-PP	0.001	0.000	0.002	5	
			SC-PP-oil	CO-HF-PP	0.093	0.016	0.211	5	
			SC-PP-oil	CO-LF-PP	0.019	0.003	0.044	5	
			WASOTH	WASOTH	13.260	5.734	20.427		4
			WI	WI	0.003	0.001	0.004		4
GUY	Guyana	South America	ASGM	GP-A	11250.000	5625.000	16875.000		
			BIO	PSB – DR	0.956	0.167	2.174	3	
			BIO	PSB – IND	1.039	0.182	2.363	3	
			BIO	PSB – PP	0.369	0.065	0.839	3	
			CEM	CEM	0.147	0.052	0.781	3	
			CREM	CREM	0.139	0.111	0.167		4
			NFMP-AU	GP-L	555.548	194.442	1083.319	3	
			OR	CO-OR	0.115	0.040	0.224	3	
			SC-DR-coal	HC-DR	3.748	1.574	10.557	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.001	3	
			SC-DR-oil	CO-HF-DR	0.106	0.019	0.241	3	
			SC-DR-oil	CO-LF-DR	0.254	0.044	0.577	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.304	0.053	0.692	3	
			SC-IND-oil	CO-LF-IND	0.017	0.003	0.039	3	
			SC-PP-gas	NG-PP	0.019	0.003	0.043	3	
			SC-PP-oil	CO-HF-PP	2.901	0.508	6.599	3	
			SC-PP-oil	CO-LF-PP	0.213	0.037	0.486	3	
			WASOTH	WASOTH	13.047	3.914	39.140		4
			WI	WI	0.044	0.013	0.132		4
HTI	Haiti	Central America and the Caribbean	BIO	PSB – DR	77.280	17.388	148.764	4	
			BIO	PSB – IND	4.106	0.924	7.904	4	
			CEM	CEM	27.825	9.831	152.709	4	
			CREM	CREM	1.979	1.583	2.374		4
			SC-DR-oil	CO-LF-DR	0.464	0.104	0.893	4	
			SC-IND-oil	CO-HF-IND	0.200	0.045	0.385	4	
			SC-IND-oil	CO-LF-IND	0.350	0.079	0.674	4	
			SC-PP-oil	CO-HF-PP	2.180	0.491	4.197	4	
			SC-PP-oil	CO-LF-PP	0.378	0.085	0.728	4	
			WASOTH	WASOTH	49.513	14.854	148.540		4
			WI	WI	0.155	0.046	0.465		4
HND	Honduras	Central America and the Caribbean	ASGM	GP-A	2375.000	1187.500	3562.500		
			BIO	PSB – DR	106.234	23.903	204.500	3	
			BIO	PSB – IND	5.719	1.287	11.010	3	
			BIO	PSB – PP	13.000	2.925	25.024	3	
			CEM	CEM	144.160	50.932	791.180	3	
			CREM	CREM	1.678	1.342	2.014		4
			NFMP-AU	GP-L	102.881	36.008	200.618	3	
			SC-DR-oil	CO-HF-DR	0.740	0.167	1.425	3	
			SC-DR-oil	CO-LF-DR	1.234	0.278	2.375	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-coal	HC-IND-OTH	8.663	4.678	20.646	3	
			SC-IND-oil	CO-HF-IND	1.634	0.368	3.145	3	
			SC-IND-oil	CO-LF-IND	0.492	0.111	0.947	3	
			SC-PP-coal	HC-B-PP	3.645	1.968	8.687	3	
			SC-PP-oil	CO-HF-PP	15.720	3.537	30.261	3	
			SC-PP-oil	CO-LF-PP	0.053	0.012	0.101	3	
			WASOTH	WASOTH	108.150	32.445	324.450		4
			WI	WI	0.338	0.102	1.015		4
HKG	Hong Kong (if separately estimated)	East and Southeast Asia	BIO	PSB – DR	2.855	0.642	5.496	3	
			CEM	CEM	124.260	43.890	655.044	3	
			CREM	CREM	5.144	4.681	5.708		2
			SC-DR-gas	NG-DR	0.134	0.030	0.258	3	
			SC-DR-oil	CO-LF-DR	3.104	0.698	5.975	3	
			SC-IND-coal	HC-IND-OTH	229.725	124.052	547.511	3	
			SC-IND-gas	NG-IND	0.008	0.002	0.016	3	
			SC-IND-oil	CO-LF-IND	1.184	0.266	2.279	3	
			SC-PP-coal	HC-B-PP	524.111	283.020	1249.131	3	
			SC-PP-gas	NG-PP	0.539	0.121	1.038	3	
			SC-PP-oil	CO-HF-PP	0.645	0.145	1.242	3	
			SC-PP-oil	CO-LF-PP	0.018	0.004	0.035	3	
			WASOTH	WASOTH	392.902	117.871	1178.706		2
			WI	WI	177.914	53.374	533.741		2
HUN	Hungary	EU28	BIO	PSB – DR	92.077	21.868	169.191	1	
			BIO	PSB – IND	4.449	1.057	8.175	1	
			BIO	PSB – PP	24.081	5.719	44.249	1	
			CEM	CEM	117.249	41.407	731.910	1	
			CEM	PC-CEM	1.891	1.123	10.177	1	
			CREM	CREM	22.941	18.025	27.447		1
			CSP	CSP-C	327.500	114.625	638.625	1	
			NFMP	AL-P	3.875	1.356	7.556	1	
			OR	CO-OR	11.700	5.558	18.428	1	
			PISP	PIP	25.888	9.075	137.019	1	
			SC-DR-coal	BC-DR	55.575	31.678	126.433	1	
			SC-DR-coal	HC-DR	3.150	1.796	7.166	1	
			SC-DR-gas	NG-DR	0.937	0.223	1.722	1	
			SC-DR-oil	CO-HF-DR	0.120	0.029	0.221	1	
			SC-DR-oil	CO-LF-DR	5.784	1.374	10.628	1	
			SC-IND-coal	BC-IND-CEM	3.018	1.720	6.866	1	
			SC-IND-coal	BC-IND-OTH	1.328	0.757	3.020	1	
			SC-IND-coal	HC-IND-CEM	1.358	0.774	3.090	1	
			SC-IND-gas	NG-IND	0.291	0.069	0.534	1	
			SC-IND-oil	CO-HF-IND	0.057	0.014	0.105	1	
			SC-IND-oil	CO-LF-IND	0.302	0.072	0.555	1	
			SC-PP-coal	BC-L-PP	735.755	454.329	2317.628	1	
			SC-PP-coal	BC-S-PP	7.530	4.292	17.130	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-coal	HC-B-PP	0.725	0.413	1.648	1	
			SC-PP-gas	NG-PP	0.402	0.095	0.738	1	
			SC-PP-oil	CO-HF-PP	0.380	0.090	0.698	1	
			SC-PP-oil	CO-LF-PP	0.018	0.004	0.033	1	
			SSC	SP-S	4.155	1.546	19.824	1	
			WASOTH	WASOTH	55.181	16.554	165.543		1
			WI	WI	21.091	6.327	63.272		1
ISL	Iceland	CIS & other European countries	CREM	CREM	0.144	0.105	0.192		1
			NFMP	AL-P	10.000	3.390	18.885	1	
			SC-DR-oil	CO-HF-DR	1.220	0.290	2.242	1	
			SC-DR-oil	CO-LF-DR	0.578	0.137	1.062	1	
			SC-IND-coal	HC-IND-PIP	8.048	4.587	18.308	1	
			SC-IND-oil	CO-HF-IND	0.057	0.014	0.105	1	
			SC-IND-oil	CO-LF-IND	0.057	0.014	0.105	1	
			SC-PP-oil	CO-LF-PP	0.002	0.000	0.003	1	
			WASOTH	WASOTH	7.544	2.263	22.633		1
			WI	WI	2.884	0.865	8.651		1
IND	India	South Asia	ASGM	GP-A	4500.000	2250.000	6750.000		
			BIO	PSB – DR	7492.341	1685.777	14422.757	5	
			BIO	PSB – IND	1616.101	363.623	3110.994	5	
			BIO	PSB – PP	716.340	161.177	1378.955	5	
			CEM	CEM	25660.250	12457.638	43581.038	5	
			CEM	PC-CEM	580.840	326.722	3274.484	5	
			CREM	CREM	725.706	601.300	829.379		4
			NFMP	AL-P	730.050	255.518	1423.598	5	
			NFMP	CU-P	973.675	521.203	1913.558	5	
			NFMP	PB-P	223.938	97.973	436.679	5	
			NFMP	ZN-T	15582.788	5520.691	42807.396	5	
			NFMP-AU	GP-L	77.000	26.950	150.150	5	
			OR	CO-OR	3426.774	1542.048	5654.177	5	
			PISP	PIP	4011.341	1481.202	9312.799	5	
			SC-DR-coal	HC-DR	8330.176	5248.011	11912.152	5	
			SC-DR-gas	NG-DR	0.908	0.204	1.747	5	
			SC-DR-oil	CO-HF-DR	41.360	9.306	79.618	5	
			SC-DR-oil	CO-LF-DR	126.750	28.519	243.994	5	
			SC-IND-coal	BC-IND-CEM	135.573	85.411	193.870	5	
			SC-IND-coal	BC-IND-NFM	294.117	185.294	420.587	5	
			SC-IND-coal	BC-IND-OTH	687.715	433.260	983.432	5	
			SC-IND-coal	BC-IND-PIP	3.460	2.180	4.948	5	
			SC-IND-coal	HC-IND-CEM	7460.493	4700.110	10668.505	5	
			SC-IND-coal	HC-IND-NFM	120.450	75.884	172.244	5	
			SC-IND-coal	HC-IND-OTH	12143.003	7650.092	17364.494	5	
			SC-IND-coal	HC-IND-PIP	18397.095	11590.170	26307.846	5	
			SC-IND-gas	NG-IND	1.085	0.244	2.088	5	
			SC-IND-oil	CO-HF-IND	72.080	16.218	138.754	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-oil	CO-LF-IND	7.936	1.786	15.277	5	
			SC-PP-coal	BC-L-PP	10752.176	6773.871	15375.611	5	
			SC-PP-coal	BC-S-PP	10724.535	5791.249	25560.142	5	
			SC-PP-coal	HC-B-PP	39722.715	25025.311	56803.483	5	
			SC-PP-gas	NG-PP	3.321	0.747	6.393	5	
			SC-PP-oil	CO-HF-PP	9.620	2.165	18.519	5	
			SC-PP-oil	CO-LF-PP	14.158	3.186	27.254	5	
			SSC	SP-S	1504.506	559.968	7178.988	5	
			VCM	VCM-P	25.000	8.750	48.750	5	
			VCM	VCM-R	125.000	43.750	243.750	5	
			WASOTH	WASOTH	28752.358	8625.707	86257.073		4
			WI	WI	89.973	26.992	269.919		4
IDN	Indonesia	East and Southeast Asia	ASGM	GP-A	124541.667	62270.833	186812.500		
			BIO	PSB – DR	2496.141	561.632	4805.072	3	
			BIO	PSB – IND	291.393	65.563	560.931	3	
			BIO	PSB – PP	9.543	2.147	18.370	3	
			CEM	CEM	5057.600	1786.400	26661.440	3	
			CREM	CREM	13.184	11.997	14.630		2
			CSP	CSP-C	125.000	43.750	243.750	3	
			NFMP	AL-P	38.750	13.563	75.563	3	
			NFMP	CU-P	1631.249	582.225	9313.314	3	
			NFMP-AU	GP-L	2435.400	852.390	4749.030	3	
			NFMP-HG	HG-P	3037.500	1063.125	5923.125	3	
			OR	CO-OR	526.087	236.739	868.043	3	
			SC-DR-gas	NG-DR	0.058	0.013	0.111	3	
			SC-DR-oil	CO-HF-DR	2.080	0.468	4.004	3	
			SC-DR-oil	CO-LF-DR	33.680	7.578	64.834	3	
			SC-IND-coal	BC-IND-CEM	861.600	465.264	2053.480	3	
			SC-IND-coal	BC-IND-OTH	1165.605	629.427	2778.025	3	
			SC-IND-coal	HC-IND-PIP	44.888	24.239	106.982	3	
			SC-IND-gas	NG-IND	2.949	0.664	5.678	3	
			SC-IND-oil	CO-HF-IND	10.944	2.462	21.067	3	
			SC-IND-oil	CO-LF-IND	5.504	1.238	10.596	3	
			SC-PP-coal	BC-S-PP	8199.360	4427.654	19541.808	3	
			SC-PP-gas	NG-PP	4.702	1.058	9.052	3	
			SC-PP-oil	CO-HF-PP	34.155	7.685	65.748	3	
			SC-PP-oil	CO-LF-PP	5.825	1.311	11.212	3	
			SSC	SP-S	111.730	41.585	533.136	3	
			WASOTH	WASOTH	5904.542	1771.363	17713.625		2
			WI	WI	172.034	51.610	516.103		2
IRN	Iran	Middle Eastern States	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	26.166	5.887	50.370	3	
			CEM	CEM	5966.400	2106.720	30922.320	3	
			CREM	CREM	1.255	0.941	1.464		4
			CSP	CSP-C	1660.000	581.000	3237.000	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			NFMP	AL-P	54.250	18.988	105.788	3	
			NFMP	CU-P	1266.118	451.903	7228.661	3	
			NFMP	PB-P	20.536	11.186	32.443	3	
			NFMP	ZN-P	1556.520	551.446	4275.908	3	
			NFMP-AU	GP-L	118.800	41.580	231.660	3	
			OR	CO-OR	43.593	19.617	71.928	3	
			PISP	PIP	153.358	53.760	811.701	3	
			SC-DR-coal	HC-DR	2.100	1.134	5.005	3	
			SC-DR-gas	NG-DR	12.404	2.791	23.877	3	
			SC-DR-oil	CO-HF-DR	93.580	21.056	180.142	3	
			SC-DR-oil	CO-LF-DR	37.506	8.439	72.199	3	
			SC-IND-coal	HC-IND-OTH	27.225	14.702	64.886	3	
			SC-IND-gas	NG-IND	7.469	1.681	14.378	3	
			SC-IND-oil	CO-HF-IND	26.771	6.023	51.534	3	
			SC-IND-oil	CO-LF-IND	3.785	0.852	7.286	3	
			SC-PP-gas	NG-PP	14.048	3.161	27.043	3	
			SC-PP-oil	CO-HF-PP	102.555	23.075	197.418	3	
			SC-PP-oil	CO-LF-PP	7.878	1.773	15.165	3	
			SSC	SP-S	343.340	127.789	1638.299	3	
			WASOTH	WASOTH	2280.120	684.036	6840.359		4
			WI	WI	7.135	2.141	21.405		4
IRQ	Iraq	Middle Eastern States	BIO	PSB – DR	0.356	0.080	0.686	3	
			CEM	CEM	1175.200	414.960	6090.760	3	
			CREM	CREM	0.867	0.650	1.012		4
			CSP	CSP-C	340.000	119.000	663.000	3	
			OR	CO-OR	3.558	1.601	5.870	3	
			SC-DR-oil	CO-LF-DR	7.086	1.594	13.641	3	
			SC-IND-gas	NG-IND	0.232	0.052	0.446	3	
			SC-IND-oil	CO-HF-IND	4.028	0.906	7.754	3	
			SC-IND-oil	CO-LF-IND	3.365	0.757	6.477	3	
			SC-PP-gas	NG-PP	1.037	0.233	1.995	3	
			SC-PP-oil	CO-HF-PP	87.915	19.781	169.236	3	
			SC-PP-oil	CO-LF-PP	12.549	2.824	24.157	3	
			SC-PP-oil	CO-PP	80.978	18.220	155.882	3	
			WASOTH	WASOTH	967.569	290.271	2902.706		4
			WI	WI	3.028	0.908	9.083		4
IRL	Ireland	EU28	BIO	PSB – DR	2.503	0.595	4.600	1	
			BIO	PSB – IND	5.560	1.320	10.216	1	
			BIO	PSB – PP	1.849	0.439	3.398	1	
			CEM	CEM	115.690	40.844	789.911	1	
			CEM	PC-CEM	3.280	1.947	17.648	1	
			CREM	CREM	3.452	2.712	4.130		1
			NFMP	AL-P	24.788	8.402	46.811	1	
			OR	CO-OR	6.080	2.888	9.577	1	
			SC-DR-coal	HC-DR	35.044	19.975	79.725	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-DR-gas	NG-DR	0.222	0.053	0.407	1	
			SC-DR-oil	CO-LF-DR	6.276	1.491	11.532	1	
			SC-IND-coal	HC-IND-CEM	9.507	5.419	21.628	1	
			SC-IND-coal	HC-IND-OTH	2.289	1.305	5.208	1	
			SC-IND-gas	NG-IND	0.178	0.042	0.327	1	
			SC-IND-oil	CO-HF-IND	0.950	0.226	1.746	1	
			SC-IND-oil	CO-LF-IND	0.264	0.063	0.485	1	
			SC-PP-coal	HC-B-PP	97.601	55.632	222.041	1	
			SC-PP-gas	NG-PP	0.441	0.105	0.810	1	
			SC-PP-oil	CO-HF-PP	0.600	0.143	1.103	1	
			SC-PP-oil	CO-LF-PP	0.027	0.006	0.050	1	
			WASOTH	WASOTH	67.415	20.225	202.246		1
			WI	WI	25.767	7.730	77.301		1
ISR	Israel	Middle Eastern States	BIO	PSB – DR	0.223	0.053	0.410	1	
			CEM	CEM	505.882	178.626	2621.858	1	
			CREM	CREM	0.000	0.000	0.000		2
			CSP	CSP-C	82.500	28.875	160.875	1	
			OR	CO-OR	4.251	2.019	6.695	1	
			SC-DR-gas	NG-DR	0.016	0.004	0.029	1	
			SC-DR-oil	CO-HF-DR	0.180	0.043	0.331	1	
			SC-DR-oil	CO-LF-DR	5.056	1.201	9.290	1	
			SC-IND-gas	NG-IND	0.116	0.027	0.212	1	
			SC-IND-oil	CO-HF-IND	4.959	1.178	9.112	1	
			SC-PP-coal	HC-B-PP	578.310	329.636	1315.654	1	
			SC-PP-gas	NG-PP	1.532	0.364	2.814	1	
			SC-PP-oil	CO-HF-PP	0.200	0.048	0.368	1	
			SC-PP-oil	CO-LF-PP	0.141	0.033	0.259	1	
			SSC	SP-S	7.002	2.606	33.411	1	
			WASOTH	WASOTH	339.948	101.984	1019.845		2
			WI	WI	9.905	2.971	29.714		2
ITA	Italy	EU28	BIO	PSB – DR	328.424	78.001	603.479	1	
			BIO	PSB – IND	14.045	3.336	25.807	1	
			BIO	PSB – PP	75.663	17.970	139.032	1	
			CEM	CEM	1162.534	410.654	6471.975	1	
			CEM	PC-CEM	36.377	21.599	195.754	1	
			CREM	CREM	43.216	33.956	51.705		1
			NFMP	PB-P	1.220	0.665	1.924	1	
			NFMP	ZN-P	36.415	12.901	100.035	1	
			OR	CO-OR	121.196	57.568	190.884	1	
			PISP	PIP	205.904	72.181	1089.822	1	
			SC-DR-gas	NG-DR	5.748	1.365	10.561	1	
			SC-DR-oil	CO-HF-DR	8.200	1.948	15.068	1	
			SC-DR-oil	CO-LF-DR	50.332	11.954	92.485	1	
			SC-IND-coal	BC-IND-CEM	0.226	0.129	0.515	1	
			SC-IND-coal	HC-IND-CEM	16.901	9.633	38.449	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-coal	HC-IND-PIP	11.031	6.287	25.095	1	
			SC-IND-gas	NG-IND	1.924	0.457	3.536	1	
			SC-IND-oil	CO-HF-IND	15.124	3.592	27.790	1	
			SC-IND-oil	CO-LF-IND	0.762	0.181	1.400	1	
			SC-PP-coal	BC-S-PP	48.561	27.680	110.475	1	
			SC-PP-coal	HC-B-PP	821.221	468.096	1868.277	1	
			SC-PP-gas	NG-PP	4.997	1.187	9.182	1	
			SC-PP-oil	CO-HF-PP	11.540	2.741	21.205	1	
			SC-PP-oil	CO-LF-PP	0.158	0.037	0.289	1	
			SSC	SP-S	401.450	149.417	1915.583	1	
			WASOTH	WASOTH	479.796	143.939	1439.388		1
			WI	WI	183.383	55.015	550.149		1
CIV	Ivory Coast	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	165.478	37.232	318.544	5	
			BIO	PSB – PP	2.356	0.530	4.536	5	
			CEM	CEM	273.000	96.460	1416.220	5	
			CREM	CREM	0.526	0.379	0.758		4
			NFMP-AU	GP-L	1430.000	500.500	2788.500	5	
			OR	CO-OR	0.239	0.108	0.394	5	
			SC-DR-oil	CO-LF-DR	1.574	0.354	3.030	5	
			SC-IND-gas	NG-IND	0.058	0.013	0.112	5	
			SC-IND-oil	CO-HF-IND	0.580	0.131	1.117	5	
			SC-IND-oil	CO-LF-IND	0.392	0.088	0.755	5	
			SC-PP-gas	NG-PP	0.338	0.076	0.650	5	
			SC-PP-oil	CO-HF-PP	3.040	0.684	5.852	5	
			SC-PP-oil	CO-LF-PP	0.006	0.001	0.012	5	
			WASOTH	WASOTH	395.044	170.830	608.582		4
			WI	WI	0.076	0.033	0.117		4
JAM	Jamaica	Central America and the Caribbean	BIO	PSB – DR	2.311	0.520	4.449	3	
			BIO	PSB – IND	3.834	0.863	7.379	3	
			BIO	PSB – PP	3.884	0.874	7.476	3	
			CEM	CEM	70.384	24.867	386.282	3	
			CREM	CREM	0.560	0.448	0.673		4
			NFMP	AL-P	289.075	101.176	563.696	3	
			OR	CO-OR	1.017	0.458	1.678	3	
			SC-DR-oil	CO-HF-DR	0.140	0.032	0.270	3	
			SC-DR-oil	CO-LF-DR	0.344	0.077	0.662	3	
			SC-IND-coal	HC-IND-CEM	11.640	6.286	27.742	3	
			SC-IND-oil	CO-HF-IND	11.134	2.505	21.433	3	
			SC-IND-oil	CO-LF-IND	0.063	0.014	0.121	3	
			SC-PP-oil	CO-HF-PP	10.005	2.251	19.260	3	
			SC-PP-oil	CO-LF-PP	0.272	0.061	0.523	3	
			WASOTH	WASOTH	65.168	19.550	195.503		4
			WI	WI	0.204	0.061	0.612		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
JPN	Japan	East and Southeast Asia	BIO	PSB – DR	0.575	0.137	1.057	1	
			BIO	PSB – IND	89.190	21.183	163.886	1	
			BIO	PSB – PP	283.006	67.214	520.023	1	
			CEM	CEM	3455.321	1209.362	6737.876	1	
			CEM	PC-CEM	18.984	11.272	102.158	1	
			CREM	CREM	100.941	91.850	112.012		1
			NFMP	AL-P	0.375	0.127	0.708	1	
			NFMP	CU-P	226.143	80.715	1291.118	1	
			NFMP	PB-P	2.074	1.130	3.271	1	
			NFMP	ZN-T	1334.048	472.628	3664.756	1	
			NFMP-AU	GP-L	17.787	6.225	34.685	1	
			OR	CO-OR	1138.132	540.613	1792.558	1	
			PISP	PIP	2218.834	1510.824	4405.394	1	
			SC-DR-coal	HC-DR	0.079	0.053	0.108	1	
			SC-DR-gas	NG-DR	4.194	0.996	7.707	1	
			SC-DR-oil	CO-HF-DR	43.760	10.393	80.409	1	
			SC-DR-oil	CO-LF-DR	58.912	13.992	108.251	1	
			SC-IND-coal	HC-IND-CEM	181.732	120.852	248.064	1	
			SC-IND-coal	HC-IND-NFM	1.197	0.796	1.634	1	
			SC-IND-coal	HC-IND-OTH	83.786	55.718	114.368	1	
			SC-IND-coal	HC-IND-PIP	37.365	24.848	51.004	1	
			SC-IND-gas	NG-IND	2.590	0.615	4.759	1	
			SC-IND-oil	CO-HF-IND	38.304	9.097	70.384	1	
			SC-IND-oil	CO-IND	0.219	0.052	0.401	1	
			SC-IND-oil	CO-LF-IND	12.721	3.021	23.374	1	
			SC-PP-coal	HC-B-PP	1297.024	862.521	1770.438	1	
			SC-PP-gas	NG-PP	17.703	4.204	32.529	1	
			SC-PP-oil	CO-HF-PP	107.440	25.517	197.421	1	
			SC-PP-oil	CO-LF-PP	2.057	0.488	3.779	1	
			SC-PP-oil	CO-PP	24.375	5.789	44.789	1	
			SSC	SP-S	599.351	223.075	2859.898	1	
			WASOTH	WASOTH	2398.913	719.674	7196.738		1
			WI	WI	1209.410	362.823	3628.231		1
JOR	Jordan	Middle Eastern States	BIO	PSB – DR	0.193	0.043	0.371	3	
			CEM	CEM	406.800	143.640	2108.340	3	
			CEM	PC-CEM	6.368	3.582	35.900	3	
			CREM	CREM	0.248	0.186	0.289		4
			OR	CO-OR	1.220	0.549	2.013	3	
			SC-DR-oil	CO-HF-DR	0.020	0.005	0.039	3	
			SC-DR-oil	CO-LF-DR	2.930	0.659	5.640	3	
			SC-IND-coal	HC-IND-CEM	30.360	16.394	72.358	3	
			SC-IND-oil	CO-LF-IND	0.281	0.063	0.541	3	
			SC-PP-gas	NG-PP	0.452	0.102	0.870	3	
			SC-PP-oil	CO-HF-PP	26.025	5.856	50.098	3	
			SC-PP-oil	CO-LF-PP	0.846	0.190	1.629	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SSC	SP-S	3.785	1.409	18.060	3	
			WASOTH	WASOTH	139.567	41.870	418.700		4
			WI	WI	0.437	0.131	1.310		4
KAZ	Kazakhstan	CIS & other European countries	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	3.669	0.825	7.062	4	
			CEM	CEM	781.746	276.054	3965.267	4	
			CREM	CREM	8.332	6.110	11.110		4
			NFMP	AL-P	62.000	21.700	120.900	4	
			NFMP	CU-P	3544.937	1265.258	20239.155	4	
			NFMP	PB-T	1105.272	401.134	2841.275	4	
			NFMP	ZN-T	5090.841	1803.590	13985.022	4	
			NFMP-AU	GP-L	3148.893	1102.113	6140.341	4	
			OR	CO-OR	16.522	7.435	27.261	4	
			PISP	PIP	192.629	67.527	1019.557	4	
			SC-DR-coal	BC-DR	75.900	40.986	180.895	4	
			SC-DR-coal	HC-DR	900.450	486.243	2146.073	4	
			SC-DR-gas	NG-DR	0.257	0.058	0.495	4	
			SC-DR-oil	CO-HF-DR	9.800	2.205	18.865	4	
			SC-DR-oil	CO-LF-DR	5.548	1.248	10.680	4	
			SC-IND-coal	BC-IND-CEM	4.725	2.552	11.261	4	
			SC-IND-coal	BC-IND-OTH	305.516	164.979	728.147	4	
			SC-IND-coal	HC-IND-NFM	296.363	160.036	706.331	4	
			SC-IND-coal	HC-IND-OTH	171.413	92.563	408.533	4	
			SC-IND-coal	HC-IND-PIP	304.106	164.217	724.787	4	
			SC-IND-gas	NG-IND	0.416	0.093	0.800	4	
			SC-IND-oil	CO-HF-IND	21.700	4.883	41.773	4	
			SC-IND-oil	CO-IND	4.880	1.098	9.394	4	
			SC-IND-oil	CO-LF-IND	3.474	0.782	6.687	4	
			SC-PP-coal	BC-L-PP	4.116	2.408	13.583	4	
			SC-PP-coal	HC-B-PP	4772.363	2577.076	11374.131	4	
			SC-PP-gas	NG-PP	5.463	1.229	10.516	4	
			SC-PP-oil	CO-HF-PP	9.140	2.057	17.595	4	
			SC-PP-oil	CO-LF-PP	0.450	0.101	0.866	4	
			SC-PP-oil	CO-PP	8.880	1.998	17.094	4	
			SSC	SP-S	4.522	1.683	21.578	4	
			WASOTH	WASOTH	1253.031	375.909	3759.093		4
			WI	WI	3.921	1.176	11.763		4
KEN	Kenya	Sub-Saharan Africa	ASGM	GP-A	2625.000	656.250	4593.750		
			BIO	PSB – DR	424.496	95.512	817.155	5	
			BIO	PSB – PP	1.830	0.412	3.523	5	
			CEM	CEM	586.215	207.129	3041.060	5	
			CREM	CREM	1.036	0.747	1.494		4
			NFMP-AU	GP-L	16.500	5.775	32.175	5	
			OR	CO-OR	0.588	0.265	0.971	5	
			SC-DR-oil	CO-HF-DR	0.280	0.063	0.539	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-DR-oil	CO-LF-DR	2.934	0.660	5.648	5	
			SC-IND-coal	HC-IND-CEM	84.900	45.846	202.345	5	
			SC-IND-oil	CO-HF-IND	1.500	0.338	2.888	5	
			SC-IND-oil	CO-LF-IND	0.896	0.202	1.725	5	
			SC-PP-oil	CO-HF-PP	3.720	0.837	7.161	5	
			SC-PP-oil	CO-LF-PP	0.334	0.075	0.643	5	
			SSC	SP-S	0.599	0.223	2.860	5	
			WASOTH	WASOTH	704.310	304.566	1085.018		4
			WI	WI	0.135	0.058	0.208		4
KIR	Kiribati	Australia, New Zealand & Oceania	BIO	PSB – DR	0.430	0.075	0.979	4	
			BIO	PSB – IND	0.017	0.003	0.039	4	
			CREM	CREM	0.327	0.294	0.392		4
			OR	CO-OR	0.001	0.000	0.001	4	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	4	
			SC-DR-oil	CO-HF-DR	0.002	0.000	0.004	4	
			SC-DR-oil	CO-LF-DR	0.005	0.001	0.010	4	
			SC-IND-coal	BC-IND-OTH	0.004	0.002	0.011	4	
			SC-IND-coal	HC-IND-OTH	0.255	0.107	0.717	4	
			SC-IND-oil	CO-HF-IND	0.004	0.001	0.009	4	
			SC-IND-oil	CO-LF-IND	0.000	0.000	0.001	4	
			SC-PP-coal	HC-B-PP	0.057	0.024	0.162	4	
			SC-PP-gas	NG-PP	0.000	0.000	0.000	4	
			SC-PP-oil	CO-HF-PP	0.020	0.004	0.046	4	
			SC-PP-oil	CO-LF-PP	0.003	0.000	0.006	4	
			WASOTH	WASOTH	0.744	0.223	2.232		4
			WI	WI	0.002	0.001	0.007		4
PRK	Korea – Dem. Rep.	East and Southeast Asia	BIO	PSB – DR	40.838	9.188	78.612	4	
			CEM	CEM	686.700	242.550	3619.980	4	
			CREM	CREM	16.023	14.580	17.780		4
			CSP	CSP-C	250.000	87.500	487.500	4	
			NFMP	CU-T	138.384	49.392	790.078	4	
			NFMP	PB-T	26.316	9.551	67.649	4	
			NFMP	ZN-T	313.920	111.216	862.368	4	
			OR	CO-OR	6.902	3.106	11.388	4	
			PISP	PIP	54.432	19.081	288.101	4	
			SC-DR-coal	BC-DR	127.650	68.931	304.233	4	
			SC-DR-coal	HC-DR	160.200	86.508	381.810	4	
			SC-DR-oil	CO-LF-DR	0.504	0.113	0.970	4	
			SC-IND-coal	BC-IND-OTH	210.893	113.882	502.627	4	
			SC-IND-coal	HC-IND-OTH	542.325	292.856	1292.541	4	
			SC-IND-oil	CO-HF-IND	1.860	0.419	3.581	4	
			SC-PP-coal	BC-S-PP	31.995	17.277	76.255	4	
			SC-PP-coal	HC-B-PP	95.625	51.638	227.906	4	
			SC-PP-oil	CO-HF-PP	7.600	1.710	14.630	4	
			WASOTH	WASOTH	141.477	42.443	424.430		4
			WI	WI	0.443	0.133	1.328		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
KOR	Korea – Rep. of	East and Southeast Asia	BIO	PSB – DR	52.453	12.457	96.382	1	
			BIO	PSB – IND	22.507	5.345	41.356	1	
			BIO	PSB – PP	11.524	2.737	21.175	1	
			CEM	CEM	1256.863	477.077	2059.662	1	
			CEM	PC-CEM	0.901	0.535	4.846	1	
			CREM	CREM	40.570	36.916	45.020		1
			NFMP	CU-P	49.011	17.493	279.819	1	
			NFMP	PB-P	3.550	1.935	5.599	1	
			NFMP	ZN-P	243.335	86.209	668.465	1	
			NFMP-AU	GP-L	0.693	0.243	1.351	1	
			OR	CO-OR	967.676	338.686	1886.968	1	
			PISP	PIP	686.503	472.266	907.840	1	
			SC-DR-gas	NG-DR	3.045	0.723	5.595	1	
			SC-DR-oil	CO-HF-DR	9.180	2.180	16.868	1	
			SC-DR-oil	CO-LF-DR	40.100	9.524	73.684	1	
			SC-IND-coal	HC-IND-CEM	126.736	84.279	172.994	1	
			SC-IND-coal	HC-IND-OTH	30.476	20.267	41.600	1	
			SC-IND-coal	HC-IND-PIP	45.667	30.368	62.335	1	
			SC-IND-gas	NG-IND	1.724	0.410	3.168	1	
			SC-IND-oil	CO-HF-IND	23.959	5.690	44.025	1	
			SC-IND-oil	CO-LF-IND	2.402	0.570	4.413	1	
			SC-PP-coal	BC-S-PP	744.669	424.461	1694.122	1	
			SC-PP-coal	HC-A-PP	38.097	25.335	52.003	1	
			SC-PP-coal	HC-B-PP	927.510	616.794	1266.050	1	
			SC-PP-gas	NG-PP	4.475	1.063	8.223	1	
			SC-PP-oil	CO-HF-PP	32.990	7.835	60.619	1	
			SC-PP-oil	CO-LF-PP	0.167	0.040	0.306	1	
			SC-PP-oil	CO-PP	0.014	0.003	0.025	1	
			SSC	SP-S	340.210	128.161	509.428	1	
			WASOTH	WASOTH	670.657	201.197	2011.971		1
			WI	WI	570.215	171.064	1710.645		1
XKX	Kosovo	CIS & other European countries	BIO	PSB – DR	13.159	2.961	25.331	5	
			BIO	PSB – IND	0.620	0.139	1.193	5	
			CEM	CEM	70.560	24.917	357.903	5	
			CEM	PC-CEM	3.160	1.778	17.815	5	
			CREM	CREM	0.464	0.340	0.618		
			SC-DR-coal	BC-DR	23.400	12.636	55.770	5	
			SC-DR-oil	CO-HF-DR	0.180	0.041	0.347	5	
			SC-DR-oil	CO-LF-DR	0.688	0.155	1.324	5	
			SC-IND-coal	BC-IND-OTH	1.778	0.960	4.236	5	
			SC-IND-coal	BC-IND-PIP	7.999	4.319	19.064	5	
			SC-IND-coal	HC-IND-PIP	1.688	0.911	4.022	5	
			SC-IND-oil	CO-HF-IND	0.400	0.090	0.770	5	
			SC-IND-oil	CO-LF-IND	0.078	0.018	0.150	5	
			SC-PP-coal	BC-L-PP	798.014	466.838	2633.446	5	

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			SC-PP-oil	CO-HF-PP	0.080	0.018	0.154	5	
			SC-PP-oil	CO-LF-PP	0.004	0.001	0.008	5	
			WASOTH	WASOTH	32.777	9.833	98.331		
			WI	WI	0.955	0.286	2.865		
KWT	Kuwait	Middle Eastern States	CEM	CEM	291.133	102.798	1508.869	1	
			CREM	CREM	0.086	0.064	0.100		2
			OR	CO-OR	10.915	4.912	18.010	1	
			SC-DR-oil	CO-LF-DR	2.512	0.565	4.836	1	
			SC-IND-gas	NG-IND	1.310	0.295	2.521	1	
			SC-IND-oil	CO-LF-IND	1.590	0.358	3.061	1	
			SC-PP-gas	NG-PP	2.663	0.599	5.127	1	
			SC-PP-oil	CO-HF-PP	58.620	13.190	112.844	1	
			SC-PP-oil	CO-LF-PP	2.175	0.489	4.187	1	
			SC-PP-oil	CO-PP	8.465	1.905	16.295	1	
			WASOTH	WASOTH	322.490	96.747	967.471		2
			WI	WI	9.396	2.819	28.188		2
KGZ	Kyrgystan	CIS & other European countries	ASGM	GP-A	3562.500	890.625	6234.375		
			BIO	PSB – DR	0.151	0.034	0.291	4	
			CEM	CEM	169.246	59.765	858.470	4	
			CREM	CREM	0.981	0.719	1.308		4
			NFMP-AU	GP-L	841.500	294.525	1640.925	4	
			NFMP-HG	HG-P	270.000	94.500	526.500	4	
			OR	CO-OR	0.365	0.164	0.603	4	
			SC-DR-coal	BC-DR	81.450	43.983	194.123	4	
			SC-DR-coal	HC-DR	25.050	13.527	59.703	4	
			SC-DR-gas	NG-DR	0.023	0.005	0.044	4	
			SC-DR-oil	CO-HF-DR	0.260	0.059	0.501	4	
			SC-DR-oil	CO-LF-DR	0.962	0.216	1.852	4	
			SC-IND-coal	BC-IND-CEM	12.994	7.017	30.968	4	
			SC-IND-coal	BC-IND-OTH	0.585	0.316	1.394	4	
			SC-IND-coal	HC-IND-CEM	47.775	25.799	113.864	4	
			SC-IND-coal	HC-IND-OTH	1.050	0.567	2.503	4	
			SC-IND-gas	NG-IND	0.005	0.001	0.009	4	
			SC-IND-oil	CO-HF-IND	4.840	1.089	9.317	4	
			SC-IND-oil	CO-LF-IND	0.078	0.018	0.150	4	
			SC-PP-coal	BC-L-PP	44.296	25.913	146.177	4	
			SC-PP-coal	HC-B-PP	109.463	59.110	260.886	4	
			SC-PP-gas	NG-PP	0.023	0.005	0.043	4	
			SC-PP-oil	CO-HF-PP	0.560	0.126	1.078	4	
			SC-PP-oil	CO-LF-PP	0.032	0.007	0.062	4	
			WASOTH	WASOTH	58.559	17.568	175.677		4
			WI	WI	0.183	0.055	0.550		4
LAO	Lao Peoples Dem. Rep.	East and Southeast Asia	ASGM	GP-A	2250.000	1125.000	3375.000		
			BIO	PSB – DR	28.145	4.925	64.030	4	
			BIO	PSB – IND	3.332	0.583	7.581	4	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			CEM	CEM	228.900	80.850	1206.660	4	
			CREM	CREM	4.478	4.075	4.969		4
			NFMP-AU	GP-L	341.204	119.421	665.347	4	
			OR	CO-OR	3.600	1.260	7.020	4	
			SC-DR-gas	NG-DR	0.007	0.001	0.016	4	
			SC-DR-oil	CO-HF-DR	0.345	0.060	0.785	4	
			SC-DR-oil	CO-LF-DR	0.884	0.155	2.011	4	
			SC-IND-coal	BC-IND-OTH	0.777	0.326	2.188	4	
			SC-IND-coal	HC-IND-OTH	49.000	20.580	138.018	4	
			SC-IND-oil	CO-HF-IND	0.757	0.132	1.722	4	
			SC-IND-oil	CO-LF-IND	0.083	0.014	0.188	4	
			SC-PP-coal	HC-B-PP	11.054	4.643	31.136	4	
			SC-PP-gas	NG-PP	0.008	0.001	0.017	4	
			SC-PP-oil	CO-HF-PP	3.899	0.682	8.871	4	
			SC-PP-oil	CO-LF-PP	0.510	0.089	1.160	4	
			WASOTH	WASOTH	121.303	36.391	363.908		4
			WI	WI	0.380	0.114	1.139		4
LVA	Latvia	EU28	BIO	PSB – DR	27.967	6.292	53.836	2	
			BIO	PSB – IND	12.415	2.793	23.899	2	
			BIO	PSB – PP	14.931	3.360	28.743	2	
			CEM	CEM	67.000	23.450	130.649	2	
			CREM	CREM	4.567	3.588	5.464		1
			SC-DR-coal	HC-DR	4.200	2.268	10.010	2	
			SC-DR-gas	NG-DR	0.046	0.010	0.088	2	
			SC-DR-oil	CO-LF-DR	1.808	0.407	3.480	2	
			SC-IND-coal	HC-IND-CEM	3.018	1.630	7.193	2	
			SC-IND-coal	HC-IND-OTH	0.169	0.091	0.402	2	
			SC-IND-gas	NG-IND	0.028	0.006	0.054	2	
			SC-IND-oil	CO-LF-IND	0.068	0.015	0.132	2	
			SC-PP-coal	HC-B-PP	0.362	0.196	0.863	2	
			SC-PP-gas	NG-PP	0.180	0.040	0.346	2	
			SC-PP-oil	CO-LF-PP	0.011	0.002	0.020	2	
			WASOTH	WASOTH	10.450	3.135	31.351		1
			WI	WI	3.994	1.198	11.983		1
LBN	Lebanon	Middle Eastern States	BIO	PSB – DR	5.114	1.151	9.844	3	
			CEM	CEM	498.737	176.103	2584.825	3	
			CREM	CREM	1.418	1.063	1.654		4
			SC-DR-oil	CO-LF-DR	1.496	0.337	2.880	3	
			SC-IND-coal	HC-IND-CEM	30.360	16.394	72.358	3	
			SC-IND-oil	CO-HF-IND	2.679	0.603	5.157	3	
			SC-PP-oil	CO-HF-PP	20.010	4.502	38.519	3	
			SC-PP-oil	CO-LF-PP	3.926	0.883	7.557	3	
			WASOTH	WASOTH	137.429	41.229	412.286		4
			WI	WI	0.430	0.129	1.290		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
LSO	Lesotho	Sub-Saharan Africa	ASGM	GP-A	225.000	75.000	375.000		
			BIO	PSB – DR	22.241	3.892	50.597	4	
			BIO	PSB – IND	0.987	0.173	2.245	4	
			BIO	PSB – PP	0.362	0.063	0.824	4	
			CREM	CREM	0.043	0.031	0.062		4
			SC-DR-coal	HC-DR	0.198	0.083	0.556	4	
			SC-DR-oil	CO-LF-DR	0.088	0.015	0.201	4	
			SC-IND-coal	HC-IND-OTH	0.179	0.075	0.504	4	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	4	
			SC-IND-oil	CO-HF-IND	0.161	0.028	0.366	4	
			SC-IND-oil	CO-IND	0.022	0.004	0.050	4	
			SC-IND-oil	CO-LF-IND	0.015	0.003	0.035	4	
			SC-PP-coal	HC-B-PP	1.298	0.545	3.656	4	
			SC-PP-gas	NG-PP	0.002	0.000	0.003	4	
			SC-PP-oil	CO-HF-PP	0.209	0.037	0.476	4	
			SC-PP-oil	CO-LF-PP	0.043	0.008	0.098	4	
			WASOTH	WASOTH	31.748	13.729	48.910		4
			WI	WI	0.006	0.003	0.009		4
LBR	Liberia	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	47.910	8.384	108.995	5	
			BIO	PSB – IND	0.646	0.113	1.470	5	
			BIO	PSB – PP	0.234	0.041	0.532	5	
			CEM	CEM	30.975	10.945	160.687	5	
			CREM	CREM	0.095	0.069	0.137		4
			NFMP-AU	GP-L	48.565	16.998	94.702	5	
			SC-DR-coal	HC-DR	0.128	0.054	0.360	5	
			SC-DR-oil	CO-LF-DR	0.057	0.010	0.130	5	
			SC-IND-coal	HC-IND-OTH	0.124	0.052	0.349	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.104	0.018	0.236	5	
			SC-IND-oil	CO-IND	0.014	0.002	0.032	5	
			SC-IND-oil	CO-LF-IND	0.010	0.002	0.023	5	
			SC-PP-coal	HC-B-PP	0.839	0.352	2.363	5	
			SC-PP-gas	NG-PP	0.001	0.000	0.002	5	
			SC-PP-oil	CO-HF-PP	0.135	0.024	0.307	5	
			SC-PP-oil	CO-LF-PP	0.028	0.005	0.064	5	
			WASOTH	WASOTH	18.579	8.034	28.621		4
			WI	WI	0.004	0.002	0.005		4
LBY	Libyan Arab Jamah	North Africa	BIO	PSB – DR	7.940	1.787	15.285	5	
			CEM	CEM	210.000	74.200	1089.400	5	
			CREM	CREM	0.084	0.063	0.105		4
			CSP	CSP-C	900.000	315.000	1755.000	5	
			OR	CO-OR	8.421	3.790	13.895	5	
			SC-DR-oil	CO-LF-DR	3.894	0.876	7.496	5	
			SC-IND-gas	NG-IND	0.011	0.002	0.021	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-oil	CO-HF-IND	5.060	1.139	9.741	5	
			SC-PP-gas	NG-PP	1.093	0.246	2.104	5	
			SC-PP-oil	CO-HF-PP	22.260	5.009	42.851	5	
			SC-PP-oil	CO-LF-PP	6.654	1.497	12.809	5	
			SSC	SP-S	21.334	7.940	101.799	5	
			WASOTH	WASOTH	265.938	79.781	797.814		4
			WI	WI	0.051	0.015	0.153		4
LTU	Lithuania	EU28	BIO	PSB – DR	27.240	6.129	52.438	2	
			BIO	PSB – IND	2.980	0.670	5.736	2	
			BIO	PSB – PP	25.927	5.834	49.910	2	
			CEM	CEM	49.963	17.646	304.388	2	
			CREM	CREM	6.631	5.210	7.933		1
			OR	CO-OR	15.329	6.898	25.293	2	
			SC-DR-coal	HC-DR	13.650	7.371	32.533	2	
			SC-DR-gas	NG-DR	0.055	0.012	0.105	2	
			SC-DR-oil	CO-LF-DR	2.672	0.601	5.144	2	
			SC-IND-coal	HC-IND-CEM	10.638	5.745	25.355	2	
			SC-IND-coal	HC-IND-OTH	0.253	0.137	0.603	2	
			SC-IND-gas	NG-IND	0.066	0.015	0.127	2	
			SC-IND-oil	CO-HF-IND	0.190	0.043	0.366	2	
			SC-IND-oil	CO-LF-IND	0.038	0.009	0.073	2	
			SC-PP-coal	HC-B-PP	0.207	0.112	0.493	2	
			SC-PP-gas	NG-PP	0.141	0.032	0.272	2	
			SC-PP-oil	CO-HF-PP	1.160	0.261	2.233	2	
			SC-PP-oil	CO-LF-PP	0.008	0.002	0.014	2	
			WASOTH	WASOTH	17.825	5.348	53.476		1
			WI	WI	6.813	2.044	20.439		1
LUX	Luxembourg	EU28	BIO	PSB – DR	1.055	0.251	1.939	1	
			BIO	PSB – IND	0.945	0.224	1.736	1	
			BIO	PSB – PP	0.805	0.191	1.478	1	
			CEM	CEM	61.970	21.883	395.969	1	
			CREM	CREM	1.623	1.275	1.942		1
			SC-DR-gas	NG-DR	0.075	0.018	0.138	1	
			SC-DR-oil	CO-LF-DR	3.606	0.856	6.626	1	
			SC-IND-coal	HC-IND-CEM	4.678	2.666	10.642	1	
			SC-IND-coal	HC-IND-PIP	0.763	0.435	1.736	1	
			SC-IND-gas	NG-IND	0.065	0.015	0.120	1	
			SC-IND-oil	CO-LF-IND	0.025	0.006	0.045	1	
			SC-PP-gas	NG-PP	0.040	0.009	0.073	1	
			SC-PP-oil	CO-LF-PP	0.002	0.000	0.003	1	
			SSC	SP-S	51.185	19.051	244.237	1	
			WASOTH	WASOTH	12.587	3.776	37.762		1
			WI	WI	4.811	1.443	14.433		1

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
MKD	Macedonia	CIS & other European countries	BIO	PSB – DR	12.203	2.746	23.490	4	
			BIO	PSB – IND	0.294	0.066	0.565	4	
			BIO	PSB – PP	0.003	0.001	0.005	4	
			CEM	CEM	67.326	23.774	341.499	4	
			CEM	PC-CEM	1.995	1.122	11.247	4	
			CREM	CREM	0.000	0.000	0.000		2
			SC-DR-coal	BC-DR	1.500	0.810	3.575	4	
			SC-DR-gas	NG-DR	0.001	0.000	0.003	4	
			SC-DR-oil	CO-HF-DR	0.260	0.059	0.501	4	
			SC-DR-oil	CO-LF-DR	0.996	0.224	1.917	4	
			SC-IND-coal	BC-IND-CEM	0.131	0.071	0.313	4	
			SC-IND-coal	BC-IND-OTH	1.024	0.553	2.440	4	
			SC-IND-coal	BC-IND-PIP	27.788	15.005	66.227	4	
			SC-IND-coal	HC-IND-PIP	1.575	0.851	3.754	4	
			SC-IND-gas	NG-IND	0.006	0.001	0.012	4	
			SC-IND-oil	CO-HF-IND	1.060	0.239	2.041	4	
			SC-IND-oil	CO-LF-IND	0.088	0.020	0.169	4	
			SC-PP-coal	BC-L-PP	571.634	334.406	1886.392	4	
			SC-PP-gas	NG-PP	0.019	0.004	0.036	4	
			SC-PP-oil	CO-HF-PP	0.780	0.176	1.502	4	
			SC-PP-oil	CO-LF-PP	0.004	0.001	0.008	4	
			SSC	SP-S	5.485	2.041	26.172	4	
			WASOTH	WASOTH	54.761	16.428	164.283		2
			WI	WI	1.596	0.479	4.787		2
MDG	Madagascar	Sub-Saharan Africa	ASGM	GP-A	1125.000	281.250	1968.750		
			BIO	PSB – DR	271.914	47.585	618.604	5	
			BIO	PSB – IND	6.111	1.069	13.902	5	
			BIO	PSB – PP	2.214	0.387	5.036	5	
			CEM	CEM	25.200	8.904	130.728	5	
			CREM	CREM	0.541	0.390	0.780		4
			SC-DR-coal	HC-DR	1.207	0.507	3.401	5	
			SC-DR-oil	CO-LF-DR	0.540	0.095	1.229	5	
			SC-IND-coal	HC-IND-OTH	1.172	0.492	3.302	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.983	0.172	2.237	5	
			SC-IND-oil	CO-IND	0.135	0.024	0.307	5	
			SC-IND-oil	CO-LF-IND	0.094	0.016	0.214	5	
			SC-PP-coal	HC-B-PP	7.934	3.332	22.348	5	
			SC-PP-gas	NG-PP	0.009	0.002	0.021	5	
			SC-PP-oil	CO-HF-PP	1.278	0.224	2.908	5	
			SC-PP-oil	CO-LF-PP	0.264	0.046	0.602	5	
			WASOTH	WASOTH	175.383	75.841	270.184		4
			WI	WI	0.034	0.015	0.052		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
MWI	Malawi	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	205.137	35.899	466.686	4	
			BIO	PSB – IND	3.338	0.584	7.594	4	
			BIO	PSB – PP	1.225	0.214	2.786	4	
			CEM	CEM	41.344	14.608	214.476	4	
			CREM	CREM	0.411	0.296	0.593		4
			SC-DR-coal	HC-DR	0.668	0.281	1.881	4	
			SC-DR-oil	CO-LF-DR	0.299	0.052	0.680	4	
			SC-IND-coal	HC-IND-OTH	0.605	0.254	1.705	4	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	4	
			SC-IND-oil	CO-HF-IND	0.544	0.095	1.237	4	
			SC-IND-oil	CO-IND	0.075	0.013	0.170	4	
			SC-IND-oil	CO-LF-IND	0.052	0.009	0.118	4	
			SC-PP-coal	HC-B-PP	4.390	1.844	12.364	4	
			SC-PP-gas	NG-PP	0.005	0.001	0.012	4	
			SC-PP-oil	CO-HF-PP	0.707	0.124	1.609	4	
			SC-PP-oil	CO-LF-PP	0.146	0.026	0.333	4	
			WASOTH	WASOTH	100.602	43.504	154.981		4
			WI	WI	0.019	0.008	0.030		4
MYS	Malaysia	East and Southeast Asia	ASGM	GP-A	1662.500	415.625	2909.375		
			BIO	PSB – DR	30.925	6.958	59.530	2	
			BIO	PSB – PP	10.495	2.361	20.204	2	
			CEM	CEM	1654.620	584.430	8722.428	2	
			CREM	CREM	4.936	4.492	5.478		2
			NFMP	AL-P	68.200	23.870	132.990	2	
			NFMP-AU	GP-L	127.527	44.635	248.678	2	
			OR	CO-OR	223.797	100.708	369.264	2	
			SC-DR-gas	NG-DR	0.067	0.015	0.129	2	
			SC-DR-oil	CO-HF-DR	4.160	0.936	8.008	2	
			SC-DR-oil	CO-LF-DR	15.746	3.543	30.311	2	
			SC-IND-coal	HC-IND-OTH	238.022	128.532	567.285	2	
			SC-IND-gas	NG-IND	1.118	0.252	2.153	2	
			SC-IND-oil	CO-HF-IND	9.405	2.116	18.105	2	
			SC-IND-oil	CO-LF-IND	2.595	0.584	4.996	2	
			SC-PP-coal	HC-B-PP	2389.040	1290.082	5693.878	2	
			SC-PP-gas	NG-PP	5.802	1.305	11.168	2	
			SC-PP-oil	CO-HF-PP	1.190	0.268	2.291	2	
			SC-PP-oil	CO-LF-PP	0.488	0.110	0.938	2	
			SC-PP-oil	CO-PP	1.915	0.431	3.686	2	
			SSC	SP-S	100.736	37.493	480.678	2	
			WASOTH	WASOTH	1693.648	508.094	5080.944		2
			WI	WI	49.346	14.804	148.038		2

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
MDV	Maldives	South Asia	BIO	PSB – DR	1.601	0.280	3.643	5	
			BIO	PSB – IND	0.540	0.094	1.228	5	
			CREM	CREM	0.001	0.001	0.001		4
			OR	CO-OR	1.226	0.429	2.391	5	
			SC-DR-gas	NG-DR	0.001	0.000	0.003	5	
			SC-DR-oil	CO-HF-DR	0.055	0.010	0.126	5	
			SC-DR-oil	CO-LF-DR	0.141	0.025	0.322	5	
			SC-IND-coal	BC-IND-OTH	0.126	0.053	0.354	5	
			SC-IND-coal	HC-IND-OTH	8.398	3.527	23.654	5	
			SC-IND-oil	CO-HF-IND	0.121	0.021	0.275	5	
			SC-IND-oil	CO-LF-IND	0.013	0.002	0.030	5	
			SC-PP-coal	HC-B-PP	1.768	0.743	4.980	5	
			SC-PP-gas	NG-PP	0.001	0.000	0.003	5	
			SC-PP-oil	CO-HF-PP	0.624	0.109	1.419	5	
			SC-PP-oil	CO-LF-PP	0.082	0.014	0.186	5	
			WASOTH	WASOTH	18.733	5.620	56.198		4
			WI	WI	0.059	0.018	0.176		4
MLI	Mali	Sub-Saharan Africa	ASGM	GP-A	9375.000	4687.500	14062.500		
			BIO	PSB – DR	193.613	33.882	440.470	5	
			BIO	PSB – IND	6.381	1.117	14.518	5	
			BIO	PSB – PP	2.312	0.405	5.260	5	
			CREM	CREM	0.193	0.139	0.279		4
			NFMP-AU	GP-L	2265.230	792.831	4417.199	5	
			SC-DR-coal	HC-DR	1.261	0.530	3.552	5	
			SC-DR-oil	CO-LF-DR	0.564	0.099	1.283	5	
			SC-IND-coal	HC-IND-OTH	1.224	0.514	3.448	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	1.027	0.180	2.336	5	
			SC-IND-oil	CO-IND	0.141	0.025	0.321	5	
			SC-IND-oil	CO-LF-IND	0.098	0.017	0.224	5	
			SC-PP-coal	HC-B-PP	8.286	3.480	23.339	5	
			SC-PP-gas	NG-PP	0.010	0.002	0.022	5	
			SC-PP-oil	CO-HF-PP	1.335	0.234	3.037	5	
			SC-PP-oil	CO-LF-PP	0.276	0.048	0.628	5	
			WASOTH	WASOTH	176.280	76.229	271.567		4
			WI	WI	0.034	0.015	0.052		4
MLT	Malta	EU28	BIO	PSB – DR	0.059	0.013	0.113	1	
			CREM	CREM	0.965	0.758	1.154		1
			SC-DR-oil	CO-HF-DR	0.120	0.027	0.231	1	
			SC-DR-oil	CO-LF-DR	0.284	0.064	0.547	1	
			SC-IND-oil	CO-HF-IND	0.076	0.017	0.146	1	
			SC-IND-oil	CO-LF-IND	0.008	0.002	0.015	1	
			SC-PP-oil	CO-HF-PP	2.540	0.572	4.890	1	
			SC-PP-oil	CO-LF-PP	0.030	0.007	0.058	1	
			WASOTH	WASOTH	3.286	0.986	9.858		1
			WI	WI	1.256	0.377	3.768		1

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
MHL	Marshall Islands	Australia, New Zealand & Oceania	CREM	CREM	0.224	0.202	0.269		4
			WASOTH	WASOTH	0.688	0.206	2.063		4
			WI	WI	0.002	0.001	0.006		4
MTQ	Martinique	Central America and the Caribbean	BIO	PSB – DR	0.501	0.088	1.140	3	
			CEM	CEM	12.720	4.494	69.810	3	
			CREM	CREM	0.073	0.058	0.088		4
			WASOTH	WASOTH	0.000	0.000	0.000		4
			WI	WI	0.000	0.000	0.000		4
MRT	Mauritania	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	41.070	7.187	93.435	5	
			BIO	PSB – IND	2.707	0.474	6.159	5	
			BIO	PSB – PP	0.981	0.172	2.231	5	
			CEM	CEM	80.850	28.567	419.419	5	
			CREM	CREM	0.000	0.000	0.001		4
			NFMP-AU	GP-L	484.000	169.400	943.800	5	
			SC-DR-coal	HC-DR	0.535	0.225	1.507	5	
			SC-DR-oil	CO-LF-DR	0.239	0.042	0.544	5	
			SC-IND-coal	HC-IND-OTH	0.519	0.218	1.463	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.436	0.076	0.991	5	
			SC-IND-oil	CO-IND	0.060	0.010	0.136	5	
			SC-IND-oil	CO-LF-IND	0.042	0.007	0.095	5	
			SC-PP-coal	HC-B-PP	3.515	1.476	9.901	5	
			SC-PP-gas	NG-PP	0.004	0.001	0.009	5	
			SC-PP-oil	CO-HF-PP	0.566	0.099	1.288	5	
			SC-PP-oil	CO-LF-PP	0.117	0.021	0.267	5	
			WASOTH	WASOTH	79.205	34.251	122.019		4
			WI	WI	0.015	0.007	0.023		4
MUS	Mauritius	Sub-Saharan Africa	BIO	PSB – DR	0.271	0.061	0.522	5	
			BIO	PSB – IND	1.660	0.374	3.196	5	
			BIO	PSB – PP	10.386	2.337	19.994	5	
			CREM	CREM	0.030	0.022	0.043		4
			SC-DR-oil	CO-HF-DR	0.060	0.014	0.116	5	
			SC-DR-oil	CO-LF-DR	0.342	0.077	0.658	5	
			SC-IND-coal	HC-IND-OTH	5.063	2.734	12.066	5	
			SC-IND-oil	CO-HF-IND	0.740	0.167	1.425	5	
			SC-IND-oil	CO-LF-IND	0.074	0.017	0.142	5	
			SC-PP-coal	HC-B-PP	76.950	41.553	183.398	5	
			SC-PP-oil	CO-HF-PP	4.600	1.035	8.855	5	
			SC-PP-oil	CO-LF-PP	0.002	0.000	0.004	5	
			WASOTH	WASOTH	75.729	32.748	116.664		4
			WI	WI	2.206	0.954	3.399		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
MEX	Mexico	Central America and the Caribbean	ASGM	GP-A	3562.500	890.625	6234.375		
			BIO	PSB – DR	316.050	75.062	580.742	3	
			BIO	PSB – IND	39.472	9.375	72.530	3	
			BIO	PSB – PP	79.051	18.775	145.256	3	
			CEM	CEM	1120.000	401.800	8736.000	3	
			CEM	PC-CEM	121.248	71.991	652.466	3	
			CREM	CREM	34.861	27.889	41.833		3
			CSP	CSP-C	600.000	210.000	1170.000	3	
			NFMP	CU-P	2091.136	746.368	11938.950	3	
			NFMP	PB-P	148.886	81.099	235.210	3	
			NFMP	ZN-P	3631.606	1286.610	9976.365	3	
			NFMP-AU	GP-L	5336.456	1867.760	10406.090	3	
			NFMP-HG	HG-P	2025.000	708.750	3948.750	3	
			OR	CO-OR	53.537	25.430	84.320	3	
			PISP	PIP	284.598	99.767	1506.336	3	
			SC-DR-gas	NG-DR	0.245	0.058	0.450	3	
			SC-DR-oil	CO-HF-DR	0.500	0.119	0.919	3	
			SC-DR-oil	CO-LF-DR	34.108	8.101	62.673	3	
			SC-IND-coal	BC-IND-CEM	77.352	51.439	105.585	3	
			SC-IND-coal	BC-IND-OTH	631.342	419.842	861.781	3	
			SC-IND-coal	HC-IND-OTH	10.013	5.707	22.778	3	
			SC-IND-gas	NG-IND	2.883	0.685	5.298	3	
			SC-IND-oil	CO-HF-IND	10.184	2.419	18.713	3	
			SC-IND-oil	CO-LF-IND	3.042	0.722	5.589	3	
			SC-PP-coal	BC-S-PP	2373.616	1578.455	3239.986	3	
			SC-PP-coal	HC-B-PP	539.460	307.492	1227.272	3	
			SC-PP-gas	NG-PP	11.156	2.650	20.500	3	
			SC-PP-oil	CO-HF-PP	113.580	26.975	208.703	3	
			SC-PP-oil	CO-LF-PP	1.829	0.434	3.360	3	
			SSC	SP-S	335.871	125.009	1602.660	3	
			WASOTH	WASOTH	3461.718	1038.515	10385.153		3
			WI	WI	23.816	7.145	71.447		3
MCO	Monaco	CIS & other European countries	CREM	CREM	0.071	0.056	0.085		1
			WASOTH	WASOTH	3.669	1.101	11.006		1
			WI	WI	1.402	0.421	4.207		1
MNG	Mongolia	East and Southeast Asia	ASGM	GP-A	5462.500	2731.250	8193.750		
			BIO	PSB – DR	3.961	0.891	7.625	3	
			CEM	CEM	35.839	12.659	188.928	3	
			CREM	CREM	0.725	0.660	0.805		4
			NFMP-AU	GP-L	576.418	201.746	1124.014	3	
			SC-DR-coal	BC-DR	73.950	39.933	176.248	3	
			SC-DR-coal	HC-DR	61.350	33.129	146.218	3	
			SC-DR-oil	CO-LF-DR	0.464	0.104	0.893	3	
			SC-IND-coal	BC-IND-OTH	4.463	2.410	10.636	3	
			SC-IND-coal	HC-IND-OTH	2.588	1.397	6.167	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-oil	CO-LF-IND	0.663	0.149	1.276	3	
			SC-PP-coal	BC-L-PP	510.649	298.730	1685.141	3	
			SC-PP-coal	HC-B-PP	144.686	78.131	344.836	3	
			SC-PP-oil	CO-HF-PP	0.045	0.010	0.087	3	
			SC-PP-oil	CO-LF-PP	0.111	0.025	0.214	3	
			SSC	SP-S	1.135	0.423	5.418	3	
			WASOTH	WASOTH	113.770	34.131	341.310		4
			WI	WI	0.356	0.107	1.068		4
MSR	Monserrat	Central America and the Caribbean	BIO	PSB – DR	0.007	0.001	0.015	3	
			BIO	PSB – IND	0.008	0.001	0.019	3	
			BIO	PSB – PP	0.003	0.001	0.007	3	
			CREM	CREM	0.001	0.001	0.001		4
			OR	CO-OR	0.001	0.000	0.002	3	
			SC-DR-coal	HC-DR	0.030	0.013	0.085	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.001	0.000	0.002	3	
			SC-DR-oil	CO-LF-DR	0.002	0.000	0.005	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.002	0.000	0.006	3	
			SC-IND-oil	CO-LF-IND	0.000	0.000	0.000	3	
			SC-PP-gas	NG-PP	0.000	0.000	0.000	3	
			SC-PP-oil	CO-HF-PP	0.023	0.004	0.053	3	
			SC-PP-oil	CO-LF-PP	0.002	0.000	0.004	3	
			WASOTH	WASOTH	0.115	0.035	0.345		4
			WI	WI	0.000	0.000	0.001		4
MNE	Montenegro	CIS & other European countries	BIO	PSB – DR	8.360	1.881	16.093	4	
			BIO	PSB – IND	0.483	0.109	0.929	4	
			CREM	CREM	0.265	0.194	0.353		
			NFMP	AL-P	12.400	4.340	24.180	4	
			SC-DR-coal	BC-DR	3.300	1.782	7.865	4	
			SC-DR-oil	CO-HF-DR	0.040	0.009	0.077	4	
			SC-DR-oil	CO-LF-DR	0.296	0.067	0.570	4	
			SC-IND-coal	BC-IND-OTH	0.878	0.474	2.091	4	
			SC-IND-coal	BC-IND-PIP	3.510	1.895	8.366	4	
			SC-IND-oil	CO-HF-IND	0.060	0.014	0.116	4	
			SC-IND-oil	CO-LF-IND	0.072	0.016	0.139	4	
			SC-PP-coal	BC-L-PP	163.464	95.626	539.431	4	
			SSC	SP-S	4.085	1.520	19.490	4	
			WASOTH	WASOTH	18.910	5.673	56.729		
			WI	WI	0.551	0.165	1.653		
MAR	Morocco	North Africa	BIO	PSB – DR	63.864	14.369	122.938	5	
			BIO	PSB – IND	1.566	0.352	3.015	5	
			CEM	CEM	1555.290	549.850	8036.451	5	
			CEM	PC-CEM	48.880	27.495	275.561	5	
			CREM	CREM	0.058	0.043	0.072		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			CSP	CSP-C	160.000	56.000	312.000	5	
			NFMP-AU	GP-L	27.500	9.625	53.625	5	
			NFMP-HG	HG-P	33.750	11.813	65.813	5	
			OR	CO-OR	5.057	2.276	8.344	5	
			PISP	PIP	0.945	0.331	5.002	5	
			SC-DR-oil	CO-HF-DR	0.020	0.005	0.039	5	
			SC-DR-oil	CO-LF-DR	10.108	2.274	19.458	5	
			SC-IND-coal	HC-IND-CEM	0.300	0.162	0.715	5	
			SC-IND-coal	HC-IND-NFM	2.109	1.139	5.027	5	
			SC-IND-coal	HC-IND-OTH	1.406	0.759	3.352	5	
			SC-IND-gas	NG-IND	0.015	0.003	0.030	5	
			SC-IND-oil	CO-HF-IND	13.860	3.119	26.681	5	
			SC-IND-oil	CO-LF-IND	0.444	0.100	0.855	5	
			SC-PP-coal	HC-B-PP	754.538	407.450	1798.314	5	
			SC-PP-gas	NG-PP	0.220	0.049	0.423	5	
			SC-PP-oil	CO-HF-PP	14.280	3.213	27.489	5	
			SC-PP-oil	CO-LF-PP	0.020	0.005	0.039	5	
			SSC	SP-S	15.012	5.587	71.631	5	
			WASOTH	WASOTH	753.011	225.903	2259.034		4
			WI	WI	2.356	0.707	7.069		4
MOZ	Mozambique	Sub-Saharan Africa	ASGM	GP-A	3000.000	1500.000	4500.000		
			BIO	PSB – DR	336.011	75.603	646.822	4	
			BIO	PSB – IND	46.176	10.390	88.889	4	
			CEM	CEM	137.996	48.759	715.872	4	
			CREM	CREM	0.574	0.414	0.828		4
			NFMP	AL-P	172.980	60.543	337.311	4	
			NFMP-AU	GP-L	12.375	4.331	24.131	4	
			SC-DR-gas	NG-DR	0.001	0.000	0.001	4	
			SC-DR-oil	CO-LF-DR	1.198	0.270	2.306	4	
			SC-IND-gas	NG-IND	0.031	0.007	0.060	4	
			SC-IND-oil	CO-LF-IND	0.272	0.061	0.524	4	
			SC-PP-coal	HC-B-PP	1.575	0.851	3.754	4	
			SC-PP-gas	NG-PP	0.120	0.027	0.230	4	
			SC-PP-oil	CO-LF-PP	0.050	0.011	0.096	4	
			WASOTH	WASOTH	164.698	71.221	253.723		4
			WI	WI	0.032	0.014	0.049		4
MMR	Myanmar	East and Southeast Asia	ASGM	GP-A	11250.000	2812.500	19687.500		
			BIO	PSB – DR	509.531	114.645	980.848	5	
			BIO	PSB – IND	16.290	3.665	31.358	5	
			CEM	CEM	143.553	50.705	756.748	5	
			CREM	CREM	36.295	33.026	40.276		4
			CSP	CSP-C	140.000	49.000	273.000	5	
			NFMP	PB-P	5.307	2.883	8.369	5	
			NFMP-AU	GP-L	93.060	32.571	181.467	5	
			OR	CO-OR	8.264	3.719	13.636	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			PISP	PIP	0.095	0.033	0.500	5	
			SC-DR-coal	BC-DR	8.100	4.374	19.305	5	
			SC-DR-gas	NG-DR	0.045	0.010	0.087	5	
			SC-DR-oil	CO-HF-DR	0.680	0.153	1.309	5	
			SC-DR-oil	CO-LF-DR	2.674	0.602	5.147	5	
			SC-IND-coal	HC-IND-CEM	77.550	41.877	184.828	5	
			SC-IND-coal	HC-IND-OTH	9.422	5.088	22.455	5	
			SC-IND-gas	NG-IND	0.088	0.020	0.169	5	
			SC-IND-oil	CO-HF-IND	0.620	0.140	1.194	5	
			SC-IND-oil	CO-LF-IND	1.550	0.349	2.984	5	
			SC-PP-coal	HC-B-PP	12.713	6.865	30.298	5	
			SC-PP-gas	NG-PP	0.519	0.117	0.999	5	
			SC-PP-oil	CO-LF-PP	0.068	0.015	0.131	5	
			SSC	SP-S	1.049	0.390	5.004	5	
			WASOTH	WASOTH	890.161	267.048	2670.482		4
			WI	WI	2.786	0.836	8.357		4
NAM	Namibia	Sub-Saharan Africa	BIO	PSB – DR	5.038	1.133	9.697	3	
			BIO	PSB – IND	1.246	0.280	2.399	3	
			CEM	CEM	61.404	21.696	318.541	3	
			CREM	CREM	0.054	0.039	0.078		2
			NFMP	CU-P	1365.581	487.403	7796.530	3	
			NFMP	ZN-P	2300.976	817.765	4929.350	3	
			NFMP-AU	GP-L	241.758	84.615	471.428	3	
			SC-DR-oil	CO-HF-DR	0.320	0.072	0.616	3	
			SC-DR-oil	CO-LF-DR	1.352	0.304	2.603	3	
			SC-IND-oil	CO-HF-IND	0.038	0.009	0.073	3	
			SC-IND-oil	CO-LF-IND	0.167	0.038	0.322	3	
			SC-PP-coal	HC-B-PP	0.405	0.219	0.965	3	
			SC-PP-oil	CO-LF-PP	0.014	0.003	0.026	3	
			WASOTH	WASOTH	126.425	54.670	194.763		2
			WI	WI	0.024	0.010	0.037		2
NRU	Nauru	Australia, New Zealand & Oceania	CREM	CREM	0.029	0.026	0.035		4
			WASOTH	WASOTH	0.541	0.162	1.622		4
			WI	WI	0.002	0.001	0.005		4
NPL	Nepal	South Asia	BIO	PSB – DR	479.893	107.976	923.793	5	
			BIO	PSB – IND	3.021	0.680	5.814	5	
			CEM	CEM	337.900	119.350	1781.260	5	
			CREM	CREM	16.631	13.780	19.007		4
			SC-DR-coal	HC-DR	0.600	0.324	1.430	5	
			SC-DR-oil	CO-LF-DR	1.220	0.275	2.349	5	
			SC-IND-coal	HC-IND-OTH	130.078	70.242	310.020	5	
			SC-IND-oil	CO-LF-IND	0.018	0.004	0.035	5	
			WASOTH	WASOTH	251.685	75.505	755.054		4
			WI	WI	0.788	0.236	2.363		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
NLD	Netherlands	EU28	BIO	PSB – DR	26.767	6.357	49.185	1	
			BIO	PSB – IND	4.963	1.179	9.120	1	
			BIO	PSB – PP	22.556	5.357	41.447	1	
			CEM	CEM	112.672	39.787	719.944	1	
			CREM	CREM	47.440	37.274	56.759		1
			NFMP	AL-P	0.938	0.318	1.770	1	
			NFMP	ZN-P	76.126	26.970	209.124	1	
			OR	CO-OR	95.355	45.294	150.185	1	
			PISP	PIP	189.648	66.482	1003.779	1	
			SC-DR-gas	NG-DR	2.801	0.665	5.147	1	
			SC-DR-oil	CO-HF-DR	0.480	0.114	0.882	1	
			SC-DR-oil	CO-LF-DR	12.910	3.066	23.722	1	
			SC-IND-coal	BC-IND-CEM	2.037	1.161	4.635	1	
			SC-IND-coal	BC-IND-OTH	1.549	0.883	3.523	1	
			SC-IND-coal	HC-IND-OTH	2.289	1.305	5.208	1	
			SC-IND-gas	NG-IND	1.087	0.258	1.997	1	
			SC-IND-oil	CO-HF-IND	0.095	0.023	0.175	1	
			SC-IND-oil	CO-LF-IND	0.787	0.187	1.445	1	
			SC-PP-coal	HC-B-PP	697.383	397.508	1586.546	1	
			SC-PP-gas	NG-PP	2.272	0.540	4.174	1	
			SC-PP-oil	CO-HF-PP	0.070	0.017	0.129	1	
			SC-PP-oil	CO-LF-PP	0.033	0.008	0.061	1	
			SSC	SP-S	2.918	1.086	13.921	1	
			WASOTH	WASOTH	177.988	53.396	533.964		1
			WI	WI	68.029	20.409	204.087		1
NCL	New Caledonia	Australia, New Zealand & Oceania	BIO	PSB – DR	1.106	0.194	2.516	4	
			BIO	PSB – IND	0.959	0.168	2.181	4	
			CEM	CEM	10.110	3.571	53.294	4	
			CREM	CREM	0.842	0.757	1.009		4
			OR	CO-OR	0.042	0.015	0.081	4	
			SC-DR-gas	NG-DR	0.002	0.000	0.005	4	
			SC-DR-oil	CO-HF-DR	0.099	0.017	0.226	4	
			SC-DR-oil	CO-LF-DR	0.254	0.045	0.579	4	
			SC-IND-coal	BC-IND-OTH	0.223	0.094	0.629	4	
			SC-IND-coal	HC-IND-OTH	14.097	5.921	39.707	4	
			SC-IND-oil	CO-HF-IND	0.218	0.038	0.495	4	
			SC-IND-oil	CO-LF-IND	0.024	0.004	0.054	4	
			SC-PP-coal	HC-B-PP	3.180	1.336	8.958	4	
			SC-PP-gas	NG-PP	0.002	0.000	0.005	4	
			SC-PP-oil	CO-HF-PP	1.122	0.196	2.552	4	
			SC-PP-oil	CO-LF-PP	0.147	0.026	0.334	4	
			WASOTH	WASOTH	35.734	10.720	107.201		4
			WI	WI	0.112	0.034	0.335		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
NZL	New Zealand	Australia, New Zealand & Oceania	BIO	PSB – DR	7.943	1.886	14.595	2	
			BIO	PSB – IND	29.790	7.075	54.739	2	
			BIO	PSB – PP	4.024	0.956	7.394	2	
			CEM	CEM	82.731	29.222	436.121	2	
			CREM	CREM	13.687	12.293	16.391		1
			NFMP	AL-P	8.325	2.822	15.722	2	
			NFMP-AU	GP-L	312.620	109.417	609.609	2	
			OR	CO-OR	2.826	1.342	4.450	2	
			PISP	PIP	35.034	12.281	185.432	2	
			SC-DR-coal	BC-DR	24.716	14.088	56.229	2	
			SC-DR-gas	NG-DR	0.086	0.021	0.159	2	
			SC-DR-oil	CO-HF-DR	1.340	0.318	2.462	2	
			SC-DR-oil	CO-LF-DR	4.960	1.178	9.114	2	
			SC-IND-coal	BC-IND-NFM	0.298	0.170	0.678	2	
			SC-IND-coal	BC-IND-OTH	88.941	50.696	202.340	2	
			SC-IND-coal	HC-IND-CEM	12.006	6.843	27.314	2	
			SC-IND-coal	HC-IND-OTH	0.759	0.433	1.728	2	
			SC-IND-gas	NG-IND	0.289	0.069	0.531	2	
			SC-IND-oil	CO-LF-IND	0.631	0.150	1.159	2	
			SC-PP-coal	BC-L-PP	1.539	0.950	4.848	2	
			SC-PP-coal	BC-S-PP	69.525	39.629	158.169	2	
			SC-PP-gas	NG-PP	0.331	0.079	0.608	2	
			SSC	SP-S	6.162	2.293	29.402	2	
			WASOTH	WASOTH	97.032	29.110	291.096		1
			WI	WI	37.087	11.126	111.260		1
NIC	Nicaragua	Central America and the Caribbean	ASGM	GP-A	700.000	490.000	910.000		
			BIO	PSB – DR	50.664	11.399	97.528	3	
			BIO	PSB – IND	2.955	0.665	5.688	3	
			BIO	PSB – PP	22.746	5.118	43.786	3	
			CEM	CEM	59.360	20.972	325.780	3	
			CREM	CREM	1.126	0.901	1.351		4
			NFMP-AU	GP-L	324.720	113.652	633.204	3	
			OR	CO-OR	0.609	0.274	1.005	3	
			SC-DR-oil	CO-LF-DR	0.962	0.216	1.852	3	
			SC-IND-oil	CO-HF-IND	0.513	0.115	0.988	3	
			SC-IND-oil	CO-LF-IND	0.173	0.039	0.333	3	
			SC-PP-oil	CO-HF-PP	7.470	1.681	14.380	3	
			SC-PP-oil	CO-LF-PP	0.023	0.005	0.043	3	
			WASOTH	WASOTH	84.468	25.340	253.404		4
			WI	WI	0.264	0.079	0.793		4
NER	Niger	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	110.349	24.828	212.421	5	
			CEM	CEM	2.205	0.779	11.439	5	
			CREM	CREM	0.103	0.074	0.149		4
			NFMP-AU	GP-L	66.495	23.273	129.665	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			OR	CO-OR	0.626	0.281	1.032	5	
			SC-DR-oil	CO-LF-DR	0.336	0.076	0.647	5	
			SC-IND-oil	CO-HF-IND	0.040	0.009	0.077	5	
			SC-IND-oil	CO-LF-IND	0.122	0.027	0.235	5	
			SC-PP-coal	BC-L-PP	21.658	12.670	71.471	5	
			SC-PP-oil	CO-HF-PP	0.320	0.072	0.616	5	
			SC-PP-oil	CO-LF-PP	0.106	0.024	0.204	5	
			WASOTH	WASOTH	93.898	40.604	144.653		4
			WI	WI	0.018	0.008	0.028		4
NGA	Nigeria	Sub-Saharan Africa	ASGM	GP-A	15000.000	7500.000	22500.000		
			BIO	PSB – DR	5011.861	1127.669	9647.833	5	
			BIO	PSB – IND	214.002	48.151	411.955	5	
			CEM	CEM	2100.000	742.000	10894.000	5	
			CREM	CREM	4.121	2.970	5.941		4
			NFMP-AU	GP-L	423.500	148.225	825.825	5	
			OR	CO-OR	1.001	0.451	1.652	5	
			SC-DR-oil	CO-LF-DR	1.054	0.237	2.029	5	
			SC-IND-coal	HC-IND-CEM	7.050	3.807	16.803	5	
			SC-IND-gas	NG-IND	0.595	0.134	1.146	5	
			SC-IND-oil	CO-HF-IND	9.020	2.030	17.364	5	
			SC-PP-gas	NG-PP	2.348	0.528	4.519	5	
			SC-PP-oil	CO-HF-PP	2.460	0.554	4.736	5	
			SC-PP-oil	CO-LF-PP	0.028	0.006	0.054	5	
			SSC	SP-S	2.996	1.115	14.298	5	
			WASOTH	WASOTH	5402.354	2336.153	8322.545		4
			WI	WI	1.035	0.447	1.594		4
NIU	Niue	Australia, New Zealand & Oceania	CREM	CREM	0.004	0.003	0.004		4
			WASOTH	WASOTH	0.033	0.010	0.100		4
			WI	WI	0.000	0.000	0.000		4
NFK	Norfolk Islands	Australia, New Zealand & Oceania	CREM	CREM	0.007	0.006	0.008		4
			WASOTH	WASOTH	0.000	0.000	0.000		4
			WI	WI	0.000	0.000	0.000		4
MNP	North Mariana Islands	Australia, New Zealand & Oceania	CREM	CREM	0.164	0.147	0.196		4
			WASOTH	WASOTH	2.263	0.679	6.788		4
			WI	WI	0.007	0.002	0.021		4
NOR	Norway	CIS & other European countries	BIO	PSB – DR	27.005	6.414	49.622	1	
			BIO	PSB – IND	9.509	2.258	17.473	1	
			BIO	PSB – PP	6.523	1.549	11.986	1	
			CEM	CEM	98.337	34.717	671.425	1	
			CEM	PC-CEM	0.262	0.155	1.408	1	
			CREM	CREM	3.607	2.645	4.809		1
			NFMP	AL-P	15.313	5.190	28.917	1	
			NFMP	ZN-P	39.938	14.161	115.314	1	
			OR	CO-OR	65.471	31.099	103.117	1	
			PISP	PIP	3.297	1.156	17.448	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-DR-gas	NG-DR	0.037	0.009	0.068	1	
			SC-DR-oil	CO-HF-DR	0.180	0.043	0.331	1	
			SC-DR-oil	CO-LF-DR	7.818	1.857	14.366	1	
			SC-IND-coal	HC-IND-CEM	7.017	4.000	15.963	1	
			SC-IND-coal	HC-IND-OTH	18.176	10.360	41.351	1	
			SC-IND-coal	HC-IND-PIP	14.708	8.383	33.460	1	
			SC-IND-gas	NG-IND	0.060	0.014	0.110	1	
			SC-IND-oil	CO-HF-IND	0.114	0.027	0.209	1	
			SC-IND-oil	CO-LF-IND	0.581	0.138	1.068	1	
			SC-PP-coal	HC-B-PP	1.346	0.767	3.061	1	
			SC-PP-gas	NG-PP	1.015	0.241	1.865	1	
			SC-PP-oil	CO-LF-PP	0.320	0.076	0.587	1	
			SSC	SP-S	14.004	5.212	66.823	1	
			WASOTH	WASOTH	153.967	46.190	461.901		1
			WI	WI	58.848	17.654	176.543		1
PSE	Occupied Palestinian Territories	Middle Eastern States	CREM	CREM	0.135	0.101	0.157		4
			WASOTH	WASOTH	0.000	0.000	0.000		4
			WI	WI	0.000	0.000	0.000		4
OMN	Oman	Middle Eastern States	CEM	CEM	383.070	135.261	1985.354	1	
			CREM	CREM	0.102	0.076	0.119		2
			NFMP	AL-P	4.713	1.597	8.899	1	
			NFMP	CU-P	2.306	0.823	13.168	1	
			OR	CO-OR	3.455	1.555	5.700	1	
			SC-DR-gas	NG-DR	0.037	0.008	0.072	1	
			SC-DR-oil	CO-LF-DR	3.816	0.859	7.346	1	
			SC-IND-gas	NG-IND	2.235	0.503	4.302	1	
			SC-IND-oil	CO-LF-IND	0.792	0.178	1.525	1	
			SC-PP-gas	NG-PP	2.274	0.512	4.378	1	
			SC-PP-oil	CO-LF-PP	0.303	0.068	0.583	1	
			SSC	SP-S	35.010	13.031	167.057	1	
			WASOTH	WASOTH	199.233	59.770	597.700		2
			WI	WI	5.805	1.741	17.415		2
PAK	Pakistan	South Asia	BIO	PSB – DR	1484.223	333.950	2857.128	5	
			BIO	PSB – IND	184.385	41.487	354.941	5	
			CEM	CEM	3488.000	1232.000	18387.200	5	
			CREM	CREM	2.479	2.054	2.834		4
			CSP	CSP-C	660.000	231.000	1287.000	5	
			NFMP	CU-P	181.149	64.656	1034.234	5	
			OR	CO-OR	23.482	10.567	38.745	5	
			PISP	PIP	13.640	4.781	72.192	5	
			SC-DR-gas	NG-DR	1.976	0.445	3.803	5	
			SC-DR-oil	CO-HF-DR	0.140	0.032	0.270	5	
			SC-DR-oil	CO-LF-DR	13.538	3.046	26.061	5	
			SC-IND-coal	BC-IND-CEM	162.300	87.642	386.815	5	
			SC-IND-coal	HC-IND-CEM	1108.500	598.590	2641.925	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-gas	NG-IND	1.527	0.344	2.940	5	
			SC-IND-oil	CO-HF-IND	15.460	3.479	29.761	5	
			SC-IND-oil	CO-LF-IND	0.942	0.212	1.813	5	
			SC-PP-coal	HC-B-PP	17.775	9.599	42.364	5	
			SC-PP-gas	NG-PP	1.554	0.350	2.992	5	
			SC-PP-oil	CO-HF-PP	180.900	40.703	348.233	5	
			SC-PP-oil	CO-LF-PP	1.126	0.253	2.168	5	
			SSC	SP-S	68.317	25.427	325.986	5	
			WASOTH	WASOTH	3393.902	1018.171	10181.706		4
			WI	WI	10.620	3.186	31.861		4
PLW	Palau	Australia, New Zealand & Oceania	BIO	PSB – DR	0.087	0.015	0.197	4	
			BIO	PSB – IND	0.029	0.005	0.066	4	
			CREM	CREM	0.065	0.059	0.078		4
			OR	CO-OR	0.001	0.000	0.002	4	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	4	
			SC-DR-oil	CO-HF-DR	0.003	0.001	0.007	4	
			SC-DR-oil	CO-LF-DR	0.008	0.001	0.018	4	
			SC-IND-coal	BC-IND-OTH	0.007	0.003	0.019	4	
			SC-IND-coal	HC-IND-OTH	0.430	0.180	1.210	4	
			SC-IND-oil	CO-HF-IND	0.007	0.001	0.015	4	
			SC-IND-oil	CO-LF-IND	0.001	0.000	0.002	4	
			SC-PP-coal	HC-B-PP	0.097	0.041	0.273	4	
			SC-PP-gas	NG-PP	0.000	0.000	0.000	4	
			SC-PP-oil	CO-HF-PP	0.034	0.006	0.078	4	
			SC-PP-oil	CO-LF-PP	0.004	0.001	0.010	4	
			WASOTH	WASOTH	1.082	0.325	3.246		4
			WI	WI	0.003	0.001	0.010		4
PAN	Panama	Central America and the Caribbean	ASGM	GP-A	712.500	178.125	1246.875		
			BIO	PSB – DR	8.816	1.984	16.971	3	
			BIO	PSB – IND	3.779	0.850	7.275	3	
			BIO	PSB – PP	3.291	0.741	6.336	3	
			CEM	CEM	185.542	65.552	1018.295	3	
			CREM	CREM	0.699	0.559	0.839		4
			SC-DR-oil	CO-LF-DR	1.340	0.302	2.580	3	
			SC-IND-oil	CO-HF-IND	0.589	0.133	1.134	3	
			SC-IND-oil	CO-LF-IND	0.823	0.185	1.584	3	
			SC-PP-coal	HC-B-PP	34.324	18.535	81.805	3	
			SC-PP-oil	CO-HF-PP	10.620	2.390	20.444	3	
			SC-PP-oil	CO-LF-PP	0.090	0.020	0.173	3	
			WASOTH	WASOTH	229.732	68.920	689.196		4
			WI	WI	0.719	0.216	2.157		4
PNG	Papua New Guinea	East and Southeast Asia	ASGM	GP-A	3325.000	831.250	5818.750		
			BIO	PSB – DR	27.171	4.755	61.815	3	
			BIO	PSB – IND	1.429	0.250	3.250	3	
			CEM	CEM	17.440	6.160	91.936	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			CREM	CREM	4.333	3.943	4.808		4
			NFMP-AU	GP-L	2377.822	832.238	4636.752	3	
			OR	CO-OR	1.771	0.620	3.453	3	
			SC-DR-gas	NG-DR	0.003	0.001	0.008	3	
			SC-DR-oil	CO-HF-DR	0.170	0.030	0.386	3	
			SC-DR-oil	CO-LF-DR	0.435	0.076	0.989	3	
			SC-IND-coal	BC-IND-OTH	0.333	0.140	0.938	3	
			SC-IND-coal	HC-IND-OTH	20.656	8.676	58.182	3	
			SC-IND-oil	CO-HF-IND	0.354	0.062	0.804	3	
			SC-IND-oil	CO-LF-IND	0.039	0.007	0.088	3	
			SC-PP-coal	HC-B-PP	4.893	2.055	13.781	3	
			SC-PP-gas	NG-PP	0.004	0.001	0.009	3	
			SC-PP-oil	CO-HF-PP	1.438	0.252	3.272	3	
			SC-PP-oil	CO-LF-PP	0.188	0.033	0.428	3	
			WASOTH	WASOTH	67.276	20.183	201.829		4
			WI	WI	0.211	0.063	0.632		4
PRY	Paraguay	South America	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	35.658	8.023	68.641	3	
			BIO	PSB – IND	47.871	10.771	92.152	3	
			CEM	CEM	73.600	26.040	390.520	3	
			CREM	CREM	2.652	1.856	3.712		4
			PISP	PIP	3.914	1.372	20.716	3	
			SC-DR-oil	CO-LF-DR	2.404	0.541	4.628	3	
			SC-IND-oil	CO-HF-IND	0.874	0.197	1.682	3	
			SC-PP-oil	CO-LF-PP	0.002	0.000	0.003	3	
			WASOTH	WASOTH	137.864	41.359	413.593		4
			WI	WI	0.464	0.139	1.391		4
PER	Peru	South America	ASGM	GP-A	110362.500	55181.250	165543.750		
			BIO	PSB – DR	110.840	24.939	213.367	3	
			BIO	PSB – IND	0.003	0.001	0.006	3	
			BIO	PSB – PP	13.429	3.021	25.850	3	
			CEM	CEM	785.754	278.003	4169.192	3	
			CREM	CREM	17.817	12.472	24.944		4
			CSP	CSP-C	380.000	133.000	741.000	3	
			NFMP	CU-P	2678.451	955.992	15292.117	3	
			NFMP	ZN-P	2132.613	762.381	9206.730	3	
			NFMP-AU	GP-L	4808.668	1683.034	9376.902	3	
			OR	CO-OR	8.503	3.827	14.031	3	
			SC-DR-coal	HC-DR	0.600	0.324	1.430	3	
			SC-DR-gas	NG-DR	0.198	0.044	0.381	3	
			SC-DR-oil	CO-HF-DR	3.540	0.797	6.815	3	
			SC-DR-oil	CO-LF-DR	8.328	1.874	16.031	3	
			SC-IND-coal	HC-IND-OTH	96.413	52.063	229.783	3	
			SC-IND-coal	HC-IND-PIP	15.525	8.384	37.001	3	
			SC-IND-gas	NG-IND	0.250	0.056	0.480	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-oil	CO-HF-IND	1.235	0.278	2.377	3	
			SC-IND-oil	CO-LF-IND	1.368	0.308	2.633	3	
			SC-PP-coal	HC-B-PP	23.895	12.903	56.950	3	
			SC-PP-gas	NG-PP	1.330	0.299	2.561	3	
			SC-PP-oil	CO-HF-PP	3.540	0.797	6.815	3	
			SC-PP-oil	CO-LF-PP	0.180	0.041	0.347	3	
			SSC	SP-S	27.201	10.124	129.792	3	
			WASOTH	WASOTH	887.475	266.242	2662.424		4
			WI	WI	2.986	0.896	8.957		4
PHL	Philippines	East and Southeast Asia	ASGM	GP-A	23625.000	11812.500	35437.500		
			BIO	PSB – DR	158.619	35.689	305.341	3	
			BIO	PSB – IND	78.462	17.654	151.040	3	
			BIO	PSB – PP	6.199	1.395	11.932	3	
			CEM	CEM	1971.200	696.080	10822.240	3	
			CREM	CREM	65.472	59.576	72.653		2
			CSP	CSP-C	70.000	24.500	136.500	3	
			NFMP	CU-P	1543.847	551.030	8814.303	3	
			NFMP-AU	GP-L	817.463	286.112	1594.052	3	
			OR	CO-OR	133.341	60.004	220.013	3	
			SC-DR-oil	CO-HF-DR	6.600	1.485	12.705	3	
			SC-DR-oil	CO-LF-DR	13.666	3.075	26.307	3	
			SC-IND-coal	BC-IND-CEM	402.720	217.469	959.816	3	
			SC-IND-coal	BC-IND-OTH	56.993	30.776	135.832	3	
			SC-IND-coal	BC-IND-PIP	52.530	28.366	125.197	3	
			SC-IND-gas	NG-IND	0.012	0.003	0.022	3	
			SC-IND-oil	CO-HF-IND	12.312	2.770	23.701	3	
			SC-IND-oil	CO-LF-IND	1.112	0.250	2.140	3	
			SC-PP-coal	BC-S-PP	463.437	250.256	1104.525	3	
			SC-PP-coal	HC-B-PP	1376.291	743.197	3280.161	3	
			SC-PP-gas	NG-PP	0.657	0.148	1.265	3	
			SC-PP-oil	CO-HF-PP	17.190	3.868	33.091	3	
			SC-PP-oil	CO-LF-PP	0.429	0.097	0.826	3	
			SC-PP-oil	CO-PP	1.755	0.395	3.378	3	
			SSC	SP-S	30.178	11.232	144.000	3	
			WASOTH	WASOTH	1542.583	462.775	4627.750		2
			WI	WI	44.945	13.483	134.834		2
PCN	Pitcairn	Australia, New Zealand & Oceania	CREM	CREM	0.000	0.000	0.000		4
			WASOTH	WASOTH	0.000	0.000	0.000		4
			WI	WI	0.000	0.000	0.000		4
POL	Poland	EU28	BIO	PSB – DR	159.773	37.946	293.583	1	
			BIO	PSB – IND	52.411	12.448	96.306	1	
			BIO	PSB – PP	98.048	23.287	180.164	1	
			CEM	CEM	880.658	310.934	5608.790	1	
			CREM	CREM	26.849	21.096	32.123		1
			NFMP	CU-P	98.983	35.329	565.125	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			NFMP	PB-P	0.952	0.519	1.501	1	
			NFMP	ZN-P	36.624	12.975	100.610	1	
			NFMP-AU	GP-L	6.244	2.185	12.176	1	
			OR	CO-OR	47.220	22.429	74.371	1	
			PISP	PIP	149.863	52.535	793.205	1	
			SC-DR-coal	BC-DR	81.900	46.683	186.323	1	
			SC-DR-coal	HC-DR	1594.819	909.047	3628.213	1	
			SC-DR-gas	NG-DR	1.223	0.291	2.248	1	
			SC-DR-oil	CO-HF-DR	0.200	0.048	0.368	1	
			SC-DR-oil	CO-LF-DR	23.178	5.505	42.590	1	
			SC-IND-coal	BC-IND-CEM	3.622	2.064	8.239	1	
			SC-IND-coal	BC-IND-OTH	1.770	1.009	4.027	1	
			SC-IND-coal	HC-IND-CEM	67.679	38.577	153.969	1	
			SC-IND-coal	HC-IND-NFM	0.069	0.040	0.158	1	
			SC-IND-coal	HC-IND-OTH	251.762	143.504	572.758	1	
			SC-IND-coal	HC-IND-PIP	2.220	1.265	5.051	1	
			SC-IND-gas	NG-IND	0.751	0.178	1.380	1	
			SC-IND-oil	CO-HF-IND	1.539	0.366	2.828	1	
			SC-IND-oil	CO-LF-IND	0.504	0.120	0.925	1	
			SC-PP-coal	BC-L-PP	5205.911	3214.650	16398.621	1	
			SC-PP-coal	HC-B-PP	2197.564	1252.611	4999.458	1	
			SC-PP-gas	NG-PP	0.614	0.146	1.128	1	
			SC-PP-oil	CO-HF-PP	9.620	2.285	17.677	1	
			SC-PP-oil	CO-LF-PP	0.114	0.027	0.209	1	
			SSC	SP-S	81.504	30.335	388.908	1	
			WASOTH	WASOTH	216.336	64.901	649.008		1
			WI	WI	82.686	24.806	248.058		1
PRT	Portugal	EU28	BIO	PSB – DR	39.258	9.324	72.137	1	
			BIO	PSB – IND	36.655	8.705	67.353	1	
			BIO	PSB – PP	26.010	6.177	47.794	1	
			CEM	CEM	284.950	100.701	1469.150	1	
			CEM	PC-CEM	9.175	5.447	49.371	1	
			CREM	CREM	25.169	19.776	30.113		1
			OR	CO-OR	25.013	11.881	39.396	1	
			PISP	PIP	3.232	1.133	17.106	1	
			SC-DR-gas	NG-DR	0.118	0.028	0.216	1	
			SC-DR-oil	CO-HF-DR	1.720	0.409	3.161	1	
			SC-DR-oil	CO-LF-DR	8.442	2.005	15.512	1	
			SC-IND-coal	HC-IND-OTH	0.347	0.198	0.789	1	
			SC-IND-coal	HC-IND-PIP	0.347	0.198	0.789	1	
			SC-IND-gas	NG-IND	0.265	0.063	0.486	1	
			SC-IND-oil	CO-HF-IND	2.337	0.555	4.294	1	
			SC-IND-oil	CO-LF-IND	0.357	0.085	0.656	1	
			SC-PP-coal	HC-B-PP	284.315	162.059	646.815	1	
			SC-PP-gas	NG-PP	0.516	0.122	0.947	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-oil	CO-HF-PP	3.650	0.867	6.707	1	
			SC-PP-oil	CO-LF-PP	0.032	0.007	0.058	1	
			SSC	SP-S	48.314	17.982	230.538	1	
			WASOTH	WASOTH	65.211	19.563	195.632		1
			WI	WI	24.924	7.477	74.773		1
PRI	Puerto Rico	Central America and the Caribbean	CREM	CREM	0.675	0.540	0.810		4
			WASOTH	WASOTH	344.440	103.332	1033.321		4
			WI	WI	1.078	0.323	3.234		4
QAT	Qatar	Middle Eastern States	CEM	CEM	459.684	162.313	2382.424	1	
			CREM	CREM	0.068	0.051	0.080		2
			NFMP	AL-P	7.625	2.585	14.400	1	
			OR	CO-OR	1.850	0.832	3.052	1	
			SC-DR-oil	CO-LF-DR	6.588	1.482	12.682	1	
			SC-IND-gas	NG-IND	1.197	0.269	2.303	1	
			SC-PP-gas	NG-PP	5.022	1.130	9.668	1	
			SSC	SP-S	70.464	26.226	336.229	1	
			WASOTH	WASOTH	351.205	105.362	1053.616		2
			WI	WI	10.233	3.070	30.698		2
MDA	Republic of Moldova	CIS & other European countries	BIO	PSB – DR	15.638	3.518	30.102	4	
			BIO	PSB – IND	0.076	0.017	0.145	4	
			BIO	PSB – PP	0.486	0.109	0.936	4	
			CEM	CEM	127.400	44.988	646.214	4	
			CREM	CREM	0.601	0.441	0.802		4
			OR	CO-OR	0.008	0.004	0.013	4	
			SC-DR-coal	HC-DR	14.400	7.776	34.320	4	
			SC-DR-gas	NG-DR	0.070	0.016	0.134	4	
			SC-DR-oil	CO-LF-DR	0.974	0.219	1.875	4	
			SC-IND-coal	HC-IND-CEM	9.188	4.961	21.897	4	
			SC-IND-coal	HC-IND-OTH	0.263	0.142	0.626	4	
			SC-IND-gas	NG-IND	0.057	0.013	0.111	4	
			SC-IND-oil	CO-HF-IND	0.040	0.009	0.077	4	
			SC-IND-oil	CO-LF-IND	0.018	0.004	0.035	4	
			SC-PP-coal	HC-A-PP	0.338	0.182	1.423	4	
			SC-PP-gas	NG-PP	0.356	0.080	0.685	4	
			SC-PP-oil	CO-HF-PP	0.140	0.032	0.270	4	
			SSC	SP-S	10.240	3.811	48.864	4	
			WASOTH	WASOTH	51.225	15.367	153.675		4
			WI	WI	0.160	0.048	0.481		4
REU	Reunion	Sub-Saharan Africa	BIO	PSB – DR	8.495	1.487	19.327	5	
			BIO	PSB – IND	0.611	0.107	1.390	5	
			BIO	PSB – PP	0.221	0.039	0.504	5	
			CEM	CEM	42.000	14.840	217.880	5	
			CREM	CREM	0.019	0.013	0.027		4
			SC-DR-coal	HC-DR	0.121	0.051	0.340	5	
			SC-DR-oil	CO-LF-DR	0.054	0.009	0.123	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-coal	HC-IND-OTH	0.117	0.049	0.330	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.098	0.017	0.224	5	
			SC-IND-oil	CO-IND	0.014	0.002	0.031	5	
			SC-IND-oil	CO-LF-IND	0.009	0.002	0.021	5	
			SC-PP-coal	HC-B-PP	0.793	0.333	2.234	5	
			SC-PP-gas	NG-PP	0.001	0.000	0.002	5	
			SC-PP-oil	CO-HF-PP	0.128	0.022	0.291	5	
			SC-PP-oil	CO-LF-PP	0.026	0.005	0.060	5	
			WASOTH	WASOTH	17.636	7.626	27.169		4
			WI	WI	0.003	0.001	0.005		4
ROU	Romania	EU28	BIO	PSB – DR	160.376	36.085	308.724	4	
			BIO	PSB – IND	12.397	2.789	23.864	4	
			BIO	PSB – PP	9.828	2.211	18.918	4	
			CEM	CEM	711.988	251.615	3670.883	4	
			CEM	PC-CEM	13.160	7.403	74.190	4	
			CREM	CREM	3.699	2.713	4.932		2
			NFMP	AL-P	13.550	4.593	25.589	4	
			OR	CO-OR	18.700	8.415	30.855	4	
			PISP	PIP	98.643	34.580	522.103	4	
			SC-DR-coal	BC-DR	42.900	23.166	102.245	4	
			SC-DR-gas	NG-DR	0.712	0.160	1.371	4	
			SC-DR-oil	CO-LF-DR	8.090	1.820	15.573	4	
			SC-IND-coal	BC-IND-CEM	31.369	16.939	74.762	4	
			SC-IND-coal	BC-IND-OTH	36.270	19.586	86.444	4	
			SC-IND-coal	BC-IND-PIP	53.235	28.747	126.877	4	
			SC-IND-coal	HC-IND-OTH	0.263	0.142	0.626	4	
			SC-IND-coal	HC-IND-PIP	14.175	7.655	33.784	4	
			SC-IND-gas	NG-IND	0.520	0.117	1.002	4	
			SC-IND-oil	CO-HF-IND	0.140	0.032	0.270	4	
			SC-IND-oil	CO-LF-IND	0.622	0.140	1.197	4	
			SC-PP-coal	BC-L-PP	2554.370	1494.306	8429.421	4	
			SC-PP-coal	BC-S-PP	26.595	14.361	63.385	4	
			SC-PP-gas	NG-PP	0.732	0.165	1.408	4	
			SC-PP-oil	CO-HF-PP	0.980	0.221	1.887	4	
			SC-PP-oil	CO-LF-PP	0.144	0.032	0.277	4	
			SSC	SP-S	38.336	14.268	182.927	4	
			WASOTH	WASOTH	364.239	109.272	1092.716		2
			WI	WI	10.612	3.184	31.837		2
RUS	Russia	CIS & other European countries	ASGM	GP-A	5225.000	1306.250	9143.750		
			BIO	PSB – DR	103.554	23.300	199.341	4	
			BIO	PSB – IND	3.506	0.789	6.750	4	
			BIO	PSB – PP	38.399	8.640	73.918	4	
			CEM	CEM	2339.098	1616.377	3742.557	4	
			CREM	CREM	121.894	89.389	162.526		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			CSP	CSP-C	3790.000	1326.500	7390.500	4	
			NFMP	AL-P	1094.300	383.005	2133.885	4	
			NFMP	CU-P	7611.120	2716.560	43454.268	4	
			NFMP	PB-T	1000.008	362.930	2570.677	4	
			NFMP	ZN-T	4278.863	1497.602	8343.783	4	
			NFMP-AU	GP-L	12474.000	4365.900	24324.300	4	
			OR	CO-OR	201.334	90.600	332.201	4	
			PISP	PIP	4842.674	1833.298	9635.933	4	
			SC-DR-coal	BC-DR	112.600	70.938	161.018	4	
			SC-DR-coal	HC-DR	548.200	345.366	783.926	4	
			SC-DR-gas	NG-DR	16.939	3.811	32.607	4	
			SC-DR-oil	CO-DR	0.680	0.153	1.309	4	
			SC-DR-oil	CO-HF-DR	12.260	2.759	23.601	4	
			SC-DR-oil	CO-LF-DR	47.182	10.616	90.825	4	
			SC-IND-coal	BC-IND-CEM	1.225	0.772	1.752	4	
			SC-IND-coal	BC-IND-OTH	10.830	6.823	15.487	4	
			SC-IND-coal	HC-IND-CEM	136.675	86.105	195.445	4	
			SC-IND-coal	HC-IND-OTH	37.050	23.342	52.982	4	
			SC-IND-gas	NG-IND	8.257	1.858	15.896	4	
			SC-IND-oil	CO-HF-IND	7.940	1.787	15.285	4	
			SC-IND-oil	CO-IND	0.230	0.052	0.443	4	
			SC-IND-oil	CO-LF-IND	6.874	1.547	13.232	4	
			SC-PP-coal	BC-L-PP	3022.470	1904.156	4322.133	4	
			SC-PP-coal	HC-B-PP	2759.364	1738.399	3945.890	4	
			SC-PP-gas	NG-PP	50.605	11.386	97.415	4	
			SC-PP-oil	CO-HF-PP	154.360	34.731	297.143	4	
			SC-PP-oil	CO-LF-PP	10.380	2.336	19.982	4	
			SC-PP-oil	CO-PP	6.740	1.517	12.975	4	
			SSC	SP-S	637.536	237.287	3042.101	4	
			VCM	VCM-P	123.930	43.376	241.664	4	
			VCM	VCM-R	185.895	65.063	362.496	4	
			WASOTH	WASOTH	9896.247	2968.874	29688.741		4
			WI	WI	30.968	9.290	92.903		4
RWA	Rwanda	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	144.583	25.302	328.926	5	
			BIO	PSB – IND	3.899	0.682	8.870	5	
			BIO	PSB – PP	1.413	0.247	3.214	5	
			CEM	CEM	14.700	5.194	76.258	5	
			CREM	CREM	0.288	0.207	0.415		4
			NFMP-AU	GP-L	17.545	6.141	34.213	5	
			SC-DR-coal	HC-DR	0.770	0.324	2.170	5	
			SC-DR-oil	CO-LF-DR	0.345	0.060	0.784	5	
			SC-IND-coal	HC-IND-OTH	0.748	0.314	2.107	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.627	0.110	1.427	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-oil	CO-IND	0.086	0.015	0.196	5	
			SC-IND-oil	CO-LF-IND	0.060	0.011	0.137	5	
			SC-PP-coal	HC-B-PP	5.063	2.126	14.260	5	
			SC-PP-gas	NG-PP	0.006	0.001	0.013	5	
			SC-PP-oil	CO-HF-PP	0.816	0.143	1.856	5	
			SC-PP-oil	CO-LF-PP	0.169	0.030	0.384	5	
			WASOTH	WASOTH	63.447	27.436	97.742		4
			WI	WI	1.849	0.799	2.848		4
SHN	Saint Helena	Sub-Saharan Africa	CREM	CREM	0.000	0.000	0.000		4
			WASOTH	WASOTH	0.154	0.066	0.237		4
			WI	WI	0.000	0.000	0.000		4
KNA	Saint Kitts	Central America and the Caribbean	BIO	PSB – DR	0.068	0.012	0.154	3	
			BIO	PSB – IND	0.241	0.042	0.547	3	
			BIO	PSB – PP	0.085	0.015	0.194	3	
			CREM	CREM	0.010	0.008	0.012		4
			OR	CO-OR	0.023	0.008	0.045	3	
			SC-DR-coal	HC-DR	0.868	0.365	2.446	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.025	0.004	0.056	3	
			SC-DR-oil	CO-LF-DR	0.059	0.010	0.134	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.070	0.012	0.160	3	
			SC-IND-oil	CO-LF-IND	0.004	0.001	0.009	3	
			SC-PP-gas	NG-PP	0.004	0.001	0.010	3	
			SC-PP-oil	CO-HF-PP	0.672	0.118	1.529	3	
			SC-PP-oil	CO-LF-PP	0.049	0.009	0.113	3	
			WASOTH	WASOTH	3.666	1.100	10.997		4
			WI	WI	0.011	0.003	0.034		4
LCA	Saint Lucia	Central America and the Caribbean	BIO	PSB – DR	0.213	0.037	0.485	3	
			BIO	PSB – IND	0.361	0.063	0.822	3	
			BIO	PSB – PP	0.128	0.022	0.292	3	
			CREM	CREM	0.031	0.025	0.037		4
			OR	CO-OR	0.035	0.012	0.067	3	
			SC-DR-coal	HC-DR	1.304	0.548	3.672	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.037	0.006	0.084	3	
			SC-DR-oil	CO-LF-DR	0.088	0.015	0.201	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.106	0.019	0.241	3	
			SC-IND-oil	CO-LF-IND	0.006	0.001	0.014	3	
			SC-PP-gas	NG-PP	0.007	0.001	0.015	3	
			SC-PP-oil	CO-HF-PP	1.009	0.177	2.295	3	
			SC-PP-oil	CO-LF-PP	0.074	0.013	0.169	3	
			WASOTH	WASOTH	5.297	1.589	15.891		4
			WI	WI	0.017	0.005	0.050		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
VCT	Saint Vincent and the Grenadines	Central America and the Caribbean	BIO	PSB – DR	0.133	0.023	0.303	3	
			BIO	PSB – IND	0.213	0.037	0.484	3	
			BIO	PSB – PP	0.076	0.013	0.172	3	
			CREM	CREM	0.019	0.015	0.023		4
			OR	CO-OR	0.020	0.007	0.040	3	
			SC-DR-coal	HC-DR	0.767	0.322	2.161	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.022	0.004	0.049	3	
			SC-DR-oil	CO-LF-DR	0.052	0.009	0.118	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.062	0.011	0.142	3	
			SC-IND-oil	CO-LF-IND	0.004	0.001	0.008	3	
			SC-PP-gas	NG-PP	0.004	0.001	0.009	3	
			SC-PP-oil	CO-HF-PP	0.594	0.104	1.351	3	
			SC-PP-oil	CO-LF-PP	0.044	0.008	0.099	3	
			WASOTH	WASOTH	3.206	0.962	9.618		4
			WI	WI	0.010	0.003	0.030		4
WSM	Samoa	Australia, New Zealand & Oceania	BIO	PSB – DR	0.805	0.141	1.832	4	
			BIO	PSB – IND	0.094	0.016	0.213	4	
			CREM	CREM	0.608	0.547	0.729		4
			OR	CO-OR	0.004	0.001	0.008	4	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	4	
			SC-DR-oil	CO-HF-DR	0.010	0.002	0.022	4	
			SC-DR-oil	CO-LF-DR	0.025	0.004	0.056	4	
			SC-IND-coal	BC-IND-OTH	0.022	0.009	0.061	4	
			SC-IND-coal	HC-IND-OTH	1.376	0.578	3.875	4	
			SC-IND-oil	CO-HF-IND	0.021	0.004	0.048	4	
			SC-IND-oil	CO-LF-IND	0.002	0.000	0.005	4	
			SC-PP-coal	HC-B-PP	0.310	0.130	0.874	4	
			SC-PP-gas	NG-PP	0.000	0.000	0.000	4	
			SC-PP-oil	CO-HF-PP	0.109	0.019	0.249	4	
			SC-PP-oil	CO-LF-PP	0.014	0.003	0.033	4	
			WASOTH	WASOTH	3.805	1.141	11.415		4
			WI	WI	0.012	0.004	0.036		4
STP	Sao Tome and Principe	Sub-Saharan Africa	BIO	PSB – DR	2.215	0.388	5.040	5	
			BIO	PSB – IND	0.106	0.019	0.242	5	
			BIO	PSB – PP	0.038	0.007	0.088	5	
			CREM	CREM	0.004	0.003	0.006		4
			SC-DR-coal	HC-DR	0.021	0.009	0.059	5	
			SC-DR-oil	CO-LF-DR	0.009	0.002	0.021	5	
			SC-IND-coal	HC-IND-OTH	0.020	0.009	0.057	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.017	0.003	0.039	5	
			SC-IND-oil	CO-IND	0.002	0.000	0.005	5	
			SC-IND-oil	CO-LF-IND	0.002	0.000	0.004	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-coal	HC-B-PP	0.138	0.058	0.388	5	
			SC-PP-gas	NG-PP	0.000	0.000	0.000	5	
			SC-PP-oil	CO-HF-PP	0.022	0.004	0.051	5	
			SC-PP-oil	CO-LF-PP	0.005	0.001	0.010	5	
			WASOTH	WASOTH	3.026	1.308	4.661		4
			WI	WI	0.001	0.000	0.001		4
SAU	Saudi Arabia	Middle Eastern States	BIO	PSB – DR	0.006	0.001	0.012	1	
			CEM	CEM	4384.083	1548.008	22721.577	1	
			CREM	CREM	0.853	0.640	0.996		2
			NFMP	AL-P	52.855	18.499	103.067	1	
			NFMP-AU	GP-L	11.781	4.123	22.973	1	
			OR	CO-OR	42.084	18.938	69.439	1	
			SC-DR-oil	CO-LF-DR	40.588	9.132	78.132	1	
			SC-IND-gas	NG-IND	3.851	0.866	7.413	1	
			SC-IND-oil	CO-HF-IND	264.233	59.452	508.649	1	
			SC-IND-oil	CO-IND	50.778	11.425	97.747	1	
			SC-IND-oil	CO-LF-IND	7.904	1.778	15.215	1	
			SC-PP-gas	NG-PP	11.636	2.618	22.399	1	
			SC-PP-oil	CO-HF-PP	79.000	17.775	152.075	1	
			SC-PP-oil	CO-LF-PP	20.447	4.600	39.360	1	
			SC-PP-oil	CO-PP	116.300	26.168	223.878	1	
			SSC	SP-S	146.833	54.650	700.635	1	
			WASOTH	WASOTH	1891.801	567.540	5675.403		2
			WI	WI	55.119	16.536	165.358		2
SEN	Senegal	Sub-Saharan Africa	ASGM	GP-A	2250.000	1575.000	2925.000		
			BIO	PSB – DR	38.725	8.713	74.546	5	
			BIO	PSB – IND	2.159	0.486	4.156	5	
			BIO	PSB – PP	1.903	0.428	3.662	5	
			CEM	CEM	514.395	181.753	2668.485	5	
			CREM	CREM	0.079	0.057	0.114		4
			NFMP-AU	GP-L	311.850	109.148	608.108	5	
			OR	CO-OR	0.753	0.339	1.243	5	
			SC-DR-oil	CO-LF-DR	1.332	0.300	2.564	5	
			SC-IND-coal	HC-IND-CEM	58.350	31.509	139.068	5	
			SC-IND-oil	CO-HF-IND	1.180	0.266	2.272	5	
			SC-IND-oil	CO-LF-IND	0.044	0.010	0.085	5	
			SC-PP-gas	NG-PP	0.008	0.002	0.016	5	
			SC-PP-oil	CO-HF-PP	11.980	2.696	23.062	5	
			SC-PP-oil	CO-LF-PP	0.304	0.068	0.585	5	
			WASOTH	WASOTH	180.873	78.215	278.642		4
			WI	WI	0.035	0.015	0.053		4
SRB	Serbia	CIS & other European countries	BIO	PSB – DR	47.064	10.589	90.598	4	
			BIO	PSB – IND	6.684	1.504	12.866	4	
			BIO	PSB – PP	0.239	0.054	0.460	4	
			CEM	CEM	157.290	55.543	797.825	4	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			CEM	PC-CEM	3.640	2.048	20.521	4	
			CREM	CREM	2.584	1.895	3.445		
			NFMP	CU-P	495.876	176.988	2831.111	4	
			NFMP-AU	GP-L	31.086	10.880	60.618	4	
			OR	CO-OR	3.317	1.493	5.473	4	
			PISP	PIP	33.264	11.661	176.062	4	
			SC-DR-coal	BC-DR	83.400	45.036	198.770	4	
			SC-DR-gas	NG-DR	0.072	0.016	0.139	4	
			SC-DR-oil	CO-HF-DR	0.880	0.198	1.694	4	
			SC-DR-oil	CO-LF-DR	2.832	0.637	5.452	4	
			SC-IND-coal	BC-IND-CEM	13.519	7.300	32.220	4	
			SC-IND-coal	BC-IND-NFM	0.878	0.474	2.091	4	
			SC-IND-coal	BC-IND-OTH	29.689	16.032	70.758	4	
			SC-IND-coal	HC-IND-CEM	11.025	5.954	26.276	4	
			SC-IND-coal	HC-IND-NFM	1.444	0.780	3.441	4	
			SC-IND-coal	HC-IND-OTH	1.444	0.780	3.441	4	
			SC-IND-coal	HC-IND-PIP	1.838	0.992	4.379	4	
			SC-IND-gas	NG-IND	0.101	0.023	0.194	4	
			SC-IND-oil	CO-HF-IND	1.640	0.369	3.157	4	
			SC-IND-oil	CO-LF-IND	0.262	0.059	0.504	4	
			SC-PP-coal	BC-L-PP	3622.962	2119.433	11955.775	4	
			SC-PP-gas	NG-PP	0.177	0.040	0.342	4	
			SC-PP-oil	CO-HF-PP	4.040	0.909	7.777	4	
			SC-PP-oil	CO-LF-PP	0.058	0.013	0.112	4	
			WASOTH	WASOTH	188.054	56.416	564.161		
			WI	WI	5.479	1.644	16.437		
SCG	Serbia and Montenegro	CIS & other European countries	CSP	CSP-C	100.000	35.000	195.000	4	
SYC	Seychelles	Sub-Saharan Africa	BIO	PSB – DR	1.055	0.185	2.401	5	
			BIO	PSB – IND	0.416	0.073	0.946	5	
			BIO	PSB – PP	0.151	0.026	0.343	5	
			CREM	CREM	0.002	0.001	0.003		4
			SC-DR-coal	HC-DR	0.082	0.035	0.231	5	
			SC-DR-oil	CO-LF-DR	0.037	0.006	0.084	5	
			SC-IND-coal	HC-IND-OTH	0.080	0.034	0.225	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.067	0.012	0.152	5	
			SC-IND-oil	CO-IND	0.009	0.002	0.021	5	
			SC-IND-oil	CO-LF-IND	0.006	0.001	0.015	5	
			SC-PP-coal	HC-B-PP	0.540	0.227	1.521	5	
			SC-PP-gas	NG-PP	0.001	0.000	0.001	5	
			SC-PP-oil	CO-HF-PP	0.087	0.015	0.198	5	
			SC-PP-oil	CO-LF-PP	0.018	0.003	0.041	5	
			WASOTH	WASOTH	7.582	3.279	11.680		4
			WI	WI	0.221	0.096	0.340		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
SLE	Sierra Leone	Sub-Saharan Africa	ASGM	GP-A	8250.000	4125.000	12375.000		
			BIO	PSB – DR	67.133	11.748	152.727	5	
			BIO	PSB – IND	1.609	0.282	3.661	5	
			BIO	PSB – PP	0.583	0.102	1.326	5	
			CEM	CEM	35.280	12.466	183.019	5	
			CREM	CREM	0.133	0.096	0.192		4
			NFMP-AU	GP-L	2.200	0.770	4.290	5	
			SC-DR-coal	HC-DR	0.318	0.134	0.896	5	
			SC-DR-oil	CO-LF-DR	0.142	0.025	0.324	5	
			SC-IND-coal	HC-IND-OTH	0.309	0.130	0.870	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.259	0.045	0.589	5	
			SC-IND-oil	CO-IND	0.036	0.006	0.081	5	
			SC-IND-oil	CO-LF-IND	0.025	0.004	0.056	5	
			SC-PP-coal	HC-B-PP	2.089	0.878	5.885	5	
			SC-PP-gas	NG-PP	0.002	0.000	0.006	5	
			SC-PP-oil	CO-HF-PP	0.337	0.059	0.766	5	
			SC-PP-oil	CO-LF-PP	0.070	0.012	0.158	5	
			WASOTH	WASOTH	50.081	21.657	77.152		4
			WI	WI	0.010	0.004	0.015		4
SGP	Singapore	East and Southeast Asia	BIO	PSB – PP	2.820	0.634	5.428	2	
			CREM	CREM	3.458	3.147	3.837		2
			OR	CO-OR	496.559	223.452	819.323	2	
			SC-DR-gas	NG-DR	0.035	0.008	0.068	2	
			SC-DR-oil	CO-LF-DR	2.510	0.565	4.832	2	
			SC-IND-coal	HC-IND-OTH	19.659	10.616	46.855	2	
			SC-IND-gas	NG-IND	0.253	0.057	0.488	2	
			SC-IND-oil	CO-HF-IND	16.834	3.788	32.405	2	
			SC-IND-oil	CO-LF-IND	0.410	0.092	0.790	2	
			SC-PP-coal	HC-B-PP	39.996	21.598	95.323	2	
			SC-PP-gas	NG-PP	1.900	0.428	3.658	2	
			SC-PP-oil	CO-HF-PP	4.810	1.082	9.259	2	
			SSC	SP-S	12.604	4.691	60.140	2	
			WASOTH	WASOTH	987.723	296.317	2963.169		2
			WI	WI	28.778	8.633	86.335		2
SVK	Slovakia	EU28	BIO	PSB – DR	1.934	0.459	3.554	1	
			BIO	PSB – IND	15.723	3.734	28.890	1	
			BIO	PSB – PP	18.598	4.417	34.173	1	
			CEM	CEM	183.640	64.858	1118.787	1	
			CEM	PC-CEM	0.986	0.585	5.305	1	
			CREM	CREM	12.652	9.941	15.137		1
			NFMP	AL-P	2.138	0.725	4.037	1	
			NFMP-AU	GP-L	1.386	0.485	2.703	1	
			OR	CO-OR	10.712	5.088	16.871	1	
			PISP	PIP	124.040	43.483	656.528	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-DR-coal	BC-DR	13.016	7.419	29.612	1	
			SC-DR-coal	HC-DR	13.519	7.706	30.755	1	
			SC-DR-gas	NG-DR	0.393	0.093	0.723	1	
			SC-DR-oil	CO-LF-DR	2.662	0.632	4.891	1	
			SC-IND-coal	BC-IND-CEM	0.830	0.473	1.888	1	
			SC-IND-coal	BC-IND-OTH	4.978	2.838	11.325	1	
			SC-IND-coal	HC-IND-CEM	4.074	2.322	9.269	1	
			SC-IND-coal	HC-IND-PIP	24.212	13.801	55.082	1	
			SC-IND-gas	NG-IND	0.183	0.044	0.337	1	
			SC-IND-oil	CO-HF-IND	0.038	0.009	0.070	1	
			SC-IND-oil	CO-LF-IND	0.023	0.005	0.042	1	
			SC-PP-coal	BC-L-PP	204.413	126.225	643.902	1	
			SC-PP-coal	HC-A-PP	2.649	1.510	10.662	1	
			SC-PP-coal	HC-B-PP	23.495	13.392	53.450	1	
			SC-PP-gas	NG-PP	0.176	0.042	0.324	1	
			SC-PP-oil	CO-HF-PP	2.030	0.482	3.730	1	
			SSC	SP-S	8.449	3.145	40.316	1	
			WASOTH	WASOTH	34.399	10.320	103.196		1
			WI	WI	13.147	3.944	39.442		1
SVN	Slovenia	EU28	BIO	PSB – DR	23.639	5.614	43.436	1	
			BIO	PSB – IND	2.882	0.684	5.295	1	
			BIO	PSB – PP	2.242	0.532	4.119	1	
			CEM	CEM	14.674	9.338	28.180	1	
			CEM	PC-CEM	3.229	1.950	4.627	1	
			CREM	CREM	7.353	5.777	8.797		1
			NFMP	AL-P	1.063	0.360	2.007	1	
			SC-DR-gas	NG-DR	0.036	0.009	0.067	1	
			SC-DR-oil	CO-LF-DR	3.020	0.717	5.549	1	
			SC-IND-coal	BC-IND-OTH	6.306	3.594	14.345	1	
			SC-IND-coal	HC-IND-CEM	0.075	0.043	0.172	1	
			SC-IND-coal	HC-IND-NFM	0.139	0.079	0.316	1	
			SC-IND-gas	NG-IND	0.094	0.022	0.172	1	
			SC-IND-oil	CO-HF-IND	0.057	0.014	0.105	1	
			SC-IND-oil	CO-LF-IND	0.086	0.020	0.157	1	
			SC-PP-coal	BC-L-PP	266.046	164.283	838.045	1	
			SC-PP-coal	BC-S-PP	37.103	21.148	84.408	1	
			SC-PP-coal	HC-B-PP	0.271	0.155	0.617	1	
			SC-PP-gas	NG-PP	0.024	0.006	0.043	1	
			SC-PP-oil	CO-LF-PP	0.012	0.003	0.022	1	
			SSC	SP-S	14.354	5.343	68.493	1	
			WASOTH	WASOTH	13.988	4.196	41.963		1
			WI	WI	5.346	1.604	16.039		1
SLB	Solomon Islands	Australia, New Zealand & Oceania	BIO	PSB – DR	2.535	0.444	5.767	4	
			BIO	PSB – IND	0.108	0.019	0.245	4	
			CREM	CREM	1.942	1.745	2.326		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			OR	CO-OR	0.005	0.002	0.009	4	
			SC-DR-gas	NG-DR	0.000	0.000	0.001	4	
			SC-DR-oil	CO-HF-DR	0.011	0.002	0.025	4	
			SC-DR-oil	CO-LF-DR	0.029	0.005	0.065	4	
			SC-IND-coal	BC-IND-OTH	0.025	0.011	0.071	4	
			SC-IND-coal	HC-IND-OTH	1.582	0.664	4.456	4	
			SC-IND-oil	CO-HF-IND	0.024	0.004	0.056	4	
			SC-IND-oil	CO-LF-IND	0.003	0.000	0.006	4	
			SC-PP-coal	HC-B-PP	0.357	0.150	1.005	4	
			SC-PP-gas	NG-PP	0.000	0.000	0.001	4	
			SC-PP-oil	CO-HF-PP	0.126	0.022	0.286	4	
			SC-PP-oil	CO-LF-PP	0.016	0.003	0.037	4	
			WASOTH	WASOTH	4.262	1.278	12.785		4
			WI	WI	0.013	0.004	0.040		4
SOM	Somalia	Sub-Saharan Africa	BIO	PSB – DR	121.227	21.215	275.792	5	
			BIO	PSB – IND	0.726	0.127	1.653	5	
			BIO	PSB – PP	0.263	0.046	0.599	5	
			CREM	CREM	0.001	0.001	0.002		4
			SC-DR-coal	HC-DR	0.144	0.060	0.404	5	
			SC-DR-oil	CO-LF-DR	0.064	0.011	0.146	5	
			SC-IND-coal	HC-IND-OTH	0.139	0.059	0.393	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	0.117	0.020	0.266	5	
			SC-IND-oil	CO-IND	0.016	0.003	0.037	5	
			SC-IND-oil	CO-LF-IND	0.011	0.002	0.025	5	
			SC-PP-coal	HC-B-PP	0.943	0.396	2.657	5	
			SC-PP-gas	NG-PP	0.001	0.000	0.003	5	
			SC-PP-oil	CO-HF-PP	0.152	0.027	0.346	5	
			SC-PP-oil	CO-LF-PP	0.031	0.006	0.072	5	
			WASOTH	WASOTH	23.305	10.078	35.902		4
			WI	WI	0.004	0.002	0.007		4
ZAF	South Africa	Sub-Saharan Africa	ASGM	GP-A	1662.500	415.625	2909.375		
			BIO	PSB – DR	444.941	100.112	856.512	3	
			BIO	PSB – IND	89.073	20.041	171.465	3	
			BIO	PSB – PP	5.134	1.155	9.882	3	
			CEM	CEM	887.145	313.458	4602.170	3	
			CREM	CREM	6.014	4.335	8.669		2
			NFMP	AL-P	45.175	27.974	74.539	3	
			NFMP	CU-P	2000.994	714.195	11424.303	3	
			NFMP-AU	GP-L	5722.794	2002.978	11159.448	3	
			OR	CO-OR	17.346	7.806	28.622	3	
			PISP	PIP	258.536	90.631	1368.395	3	
			SC-DR-coal	HC-DR	2431.520	1531.858	3477.074	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.001	3	
			SC-DR-oil	CO-HF-DR	0.680	0.153	1.309	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-DR-oil	CO-LF-DR	18.732	4.215	36.059	3	
			SC-IND-coal	HC-IND-CEM	297.724	187.566	425.745	3	
			SC-IND-coal	HC-IND-NFM	480.900	302.967	687.687	3	
			SC-IND-coal	HC-IND-OTH	1602.090	1009.317	2290.989	3	
			SC-IND-coal	HC-IND-PIP	499.800	314.874	714.714	3	
			SC-IND-gas	NG-IND	0.405	0.091	0.780	3	
			SC-IND-oil	CO-HF-IND	10.868	2.445	20.921	3	
			SC-IND-oil	CO-LF-IND	3.196	0.719	6.152	3	
			SC-PP-coal	HC-B-PP	27642.323	17414.664	39528.522	3	
			SC-PP-oil	CO-LF-PP	0.066	0.015	0.127	3	
			SSC	SP-S	71.131	26.474	339.411	3	
			WASOTH	WASOTH	2173.320	939.814	3348.088		2
			WI	WI	63.322	27.382	97.550		2
SSD	South Sudan	Sub-Saharan Africa	BIO	PSB – DR	8.353	1.879	16.079	5	
			BIO	PSB – PP	0.020	0.005	0.039	5	
			SC-DR-oil	CO-LF-DR	0.360	0.081	0.693	5	
			SC-IND-oil	CO-LF-IND	0.004	0.001	0.008	5	
			SC-PP-oil	CO-LF-PP	0.176	0.040	0.339	5	
			SC-PP-oil	CO-PP	0.230	0.052	0.443	5	
			WASOTH	WASOTH	112.971	48.852	174.037		
			WI	WI	0.022	0.009	0.033		
ESP	Spain	EU28	BIO	PSB – DR	134.623	31.973	247.370	1	
			BIO	PSB – IND	49.704	11.805	91.331	1	
			BIO	PSB – PP	51.609	12.257	94.831	1	
			CEM	CEM	807.099	285.053	4587.989	1	
			CEM	PC-CEM	28.973	17.203	155.910	1	
			CREM	CREM	56.411	44.323	67.492		1
			CSP	CSP-C	215.581	75.453	420.382	1	
			NFMP	AL-P	2.875	0.975	5.429	1	
			NFMP	CU-P	54.393	19.414	310.544	1	
			NFMP	ZN-P	159.477	78.742	373.023	1	
			NFMP-AU	GP-L	4.158	1.455	8.108	1	
			OR	CO-OR	117.296	55.716	184.741	1	
			PISP	PIP	127.919	44.843	677.055	1	
			SC-DR-coal	HC-DR	22.969	13.092	52.254	1	
			SC-DR-gas	NG-DR	1.471	0.349	2.702	1	
			SC-DR-oil	CO-HF-DR	3.220	0.765	5.917	1	
			SC-DR-oil	CO-LF-DR	50.602	12.018	92.981	1	
			SC-IND-coal	HC-IND-CEM	0.905	0.516	2.060	1	
			SC-IND-coal	HC-IND-OTH	15.471	8.818	35.196	1	
			SC-IND-coal	HC-IND-PIP	5.550	3.164	12.626	1	
			SC-IND-gas	NG-IND	1.605	0.381	2.948	1	
			SC-IND-oil	CO-HF-IND	7.087	1.683	13.022	1	
			SC-IND-oil	CO-LF-IND	2.075	0.493	3.812	1	
			SC-PP-coal	BC-S-PP	250.769	142.938	570.500	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-coal	HC-A-PP	144.106	82.140	580.025	1	
			SC-PP-coal	HC-B-PP	942.575	537.267	2144.357	1	
			SC-PP-gas	NG-PP	2.508	0.596	4.609	1	
			SC-PP-oil	CO-HF-PP	18.730	4.448	34.416	1	
			SC-PP-oil	CO-LF-PP	1.263	0.300	2.321	1	
			SSC	SP-S	234.382	87.235	1118.388	1	
			WASOTH	WASOTH	341.752	102.525	1025.255		1
			WI	WI	130.621	39.186	391.863		1
LKA	Sri Lanka	South Asia	BIO	PSB – DR	156.519	35.217	301.299	5	
			BIO	PSB – IND	89.770	20.198	172.807	5	
			BIO	PSB – PP	1.968	0.443	3.787	5	
			CEM	CEM	205.465	72.573	1083.121	5	
			CREM	CREM	12.737	10.553	14.556		4
			OR	CO-OR	3.056	1.375	5.043	5	
			SC-DR-oil	CO-HF-DR	0.800	0.180	1.540	5	
			SC-DR-oil	CO-LF-DR	3.624	0.815	6.976	5	
			SC-IND-coal	HC-IND-CEM	13.050	7.047	31.103	5	
			SC-IND-oil	CO-HF-IND	13.680	3.078	26.334	5	
			SC-IND-oil	CO-LF-IND	0.218	0.049	0.420	5	
			SC-PP-coal	HC-B-PP	211.500	114.210	504.075	5	
			SC-PP-oil	CO-HF-PP	5.800	1.305	11.165	5	
			SC-PP-oil	CO-LF-PP	0.172	0.039	0.331	5	
			SSC	SP-S	0.899	0.335	4.289	5	
			WASOTH	WASOTH	885.287	265.586	2655.862		4
			WI	WI	2.770	0.831	8.311		4
SPM	St. Pierre-Miquelon	Central America and the Caribbean	BIO	PSB – DR	0.007	0.001	0.017	3	
			BIO	PSB – IND	0.037	0.007	0.085	3	
			BIO	PSB – PP	0.013	0.002	0.030	3	
			CREM	CREM	0.001	0.001	0.001		4
			OR	CO-OR	0.004	0.001	0.007	3	
			SC-DR-coal	HC-DR	0.134	0.056	0.378	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.004	0.001	0.009	3	
			SC-DR-oil	CO-LF-DR	0.009	0.002	0.021	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.011	0.002	0.025	3	
			SC-IND-oil	CO-LF-IND	0.001	0.000	0.001	3	
			SC-PP-gas	NG-PP	0.001	0.000	0.002	3	
			SC-PP-oil	CO-HF-PP	0.104	0.018	0.236	3	
			SC-PP-oil	CO-LF-PP	0.008	0.001	0.017	3	
			WASOTH	WASOTH	0.566	0.170	1.698		4
			WI	WI	0.002	0.001	0.005		4
SDN	Sudan	Sub-Saharan Africa	ASGM	GP-A	62250.000	15562.500	108937.500		
			BIO	PSB – DR	200.813	45.183	386.564	5	
			BIO	PSB – IND	42.237	9.503	81.305	5	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			CEM	CEM	365.190	129.034	1894.467	5	
			CREM	CREM	1.091	0.786	1.573		4
			NFMP-AU	GP-L	453.200	158.620	883.740	5	
			OR	CO-OR	36.321	16.344	59.929	5	
			SC-DR-oil	CO-LF-DR	3.426	0.771	6.595	5	
			SC-IND-oil	CO-HF-IND	1.400	0.315	2.695	5	
			SC-IND-oil	CO-LF-IND	0.226	0.051	0.435	5	
			SC-PP-oil	CO-HF-PP	8.540	1.922	16.440	5	
			SC-PP-oil	CO-LF-PP	0.786	0.177	1.513	5	
			SC-PP-oil	CO-PP	4.720	1.062	9.086	5	
			WASOTH	WASOTH	871.879	377.029	1343.165		4
			WI	WI	0.167	0.072	0.257		4
SUR	Suriname	South America	ASGM	GP-A	14332.500	10032.750	18632.250		
			BIO	PSB – DR	1.285	0.289	2.474	3	
			BIO	PSB – IND	0.204	0.046	0.393	3	
			CEM	CEM	9.568	3.385	50.768	3	
			CREM	CREM	0.226	0.158	0.317		4
			NFMP	AL-P	115.940	40.579	226.083	3	
			NFMP-AU	GP-L	1188.000	415.800	2316.600	3	
			OR	CO-OR	0.416	0.187	0.687	3	
			SC-DR-oil	CO-HF-DR	0.340	0.077	0.655	3	
			SC-DR-oil	CO-LF-DR	0.324	0.073	0.624	3	
			SC-IND-oil	CO-LF-IND	0.032	0.007	0.062	3	
			SC-PP-oil	CO-HF-PP	4.110	0.925	7.912	3	
			SC-PP-oil	CO-LF-PP	0.026	0.006	0.049	3	
			SC-PP-oil	CO-PP	0.023	0.005	0.043	3	
			WASOTH	WASOTH	19.635	5.891	58.906		4
			WI	WI	0.066	0.020	0.198		4
SWZ	Swaziland	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	16.393	2.869	37.294	4	
			BIO	PSB – IND	2.061	0.361	4.689	4	
			BIO	PSB – PP	0.756	0.132	1.721	4	
			CREM	CREM	0.032	0.023	0.046		4
			SC-DR-coal	HC-DR	0.412	0.173	1.162	4	
			SC-DR-oil	CO-LF-DR	0.185	0.032	0.420	4	
			SC-IND-coal	HC-IND-OTH	0.374	0.157	1.053	4	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	4	
			SC-IND-oil	CO-HF-IND	0.336	0.059	0.764	4	
			SC-IND-oil	CO-IND	0.046	0.008	0.105	4	
			SC-IND-oil	CO-LF-IND	0.032	0.006	0.073	4	
			SC-PP-coal	HC-B-PP	2.711	1.138	7.635	4	
			SC-PP-gas	NG-PP	0.003	0.001	0.007	4	
			SC-PP-oil	CO-HF-PP	0.437	0.076	0.994	4	
			SC-PP-oil	CO-LF-PP	0.090	0.016	0.206	4	
			WASOTH	WASOTH	55.858	24.155	86.051		4
			WI	WI	0.011	0.005	0.016		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
SWE	Sweden	EU28	BIO	PSB – DR	55.604	13.206	102.173	1	
			BIO	PSB – IND	165.231	39.242	303.613	1	
			BIO	PSB – PP	161.271	38.302	296.336	1	
			CEM	CEM	39.780	14.459	73.593	1	
			CREM	CREM	36.727	28.857	43.941		1
			CSP	CSP-C	15.600	5.460	30.420	1	
			NFMP	AL-P	1.438	0.487	2.715	1	
			NFMP	CU-P	52.560	19.105	165.496	1	
			NFMP	PB-P	0.952	0.519	1.501	1	
			OR	CO-OR	36.094	17.145	56.848	1	
			PISP	PIP	75.793	27.080	199.114	1	
			SC-DR-gas	NG-DR	0.038	0.009	0.071	1	
			SC-DR-oil	CO-HF-DR	0.860	0.204	1.580	1	
			SC-DR-oil	CO-LF-DR	8.202	1.948	15.071	1	
			SC-IND-coal	HC-IND-CEM	11.475	6.541	26.106	1	
			SC-IND-coal	HC-IND-NFM	3.469	1.977	7.891	1	
			SC-IND-coal	HC-IND-OTH	11.100	6.327	25.253	1	
			SC-IND-coal	HC-IND-PIP	4.232	2.412	9.628	1	
			SC-IND-gas	NG-IND	0.094	0.022	0.172	1	
			SC-IND-oil	CO-HF-IND	4.180	0.993	7.681	1	
			SC-IND-oil	CO-LF-IND	0.473	0.112	0.869	1	
			SC-PP-coal	HC-B-PP	7.722	4.402	17.568	1	
			SC-PP-gas	NG-PP	0.043	0.010	0.080	1	
			SC-PP-oil	CO-HF-PP	0.710	0.169	1.305	1	
			SC-PP-oil	CO-LF-PP	0.074	0.017	0.135	1	
			SSC	SP-S	33.680	12.535	160.708	1	
			WASOTH	WASOTH	99.378	29.814	298.135		1
			WI	WI	37.983	11.395	113.950		1
CHE	Switzerland	CIS & other European countries	BIO	PSB – DR	31.471	7.474	57.827	1	
			BIO	PSB – IND	8.559	2.033	15.727	1	
			BIO	PSB – PP	5.068	1.204	9.312	1	
			CEM	CEM	88.473	48.336	697.100	1	
			CEM	PC-CEM	0.503	0.299	2.707	1	
			CREM	CREM	12.607	9.245	16.809		1
			CSP	CSP-C	29.680	10.388	57.876	1	
			OR	CO-OR	3.171	1.506	4.994	1	
			SC-DR-coal	HC-DR	2.100	1.197	4.778	1	
			SC-DR-gas	NG-DR	0.405	0.096	0.744	1	
			SC-DR-oil	CO-HF-DR	0.020	0.005	0.037	1	
			SC-DR-oil	CO-LF-DR	10.716	2.545	19.691	1	
			SC-IND-coal	BC-IND-CEM	9.809	5.591	22.314	1	
			SC-IND-coal	HC-IND-CEM	3.471	1.978	7.896	1	
			SC-IND-coal	HC-IND-OTH	0.069	0.040	0.158	1	
			SC-IND-coal	HC-IND-PIP	0.971	0.554	2.210	1	
			SC-IND-gas	NG-IND	0.217	0.051	0.398	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-oil	CO-HF-IND	0.114	0.027	0.209	1	
			SC-IND-oil	CO-LF-IND	0.568	0.135	1.044	1	
			SC-PP-gas	NG-PP	0.045	0.011	0.082	1	
			SC-PP-oil	CO-HF-PP	0.130	0.031	0.239	1	
			SC-PP-oil	CO-LF-PP	0.017	0.004	0.030	1	
			SSC	SP-S	34.427	12.813	164.272	1	
			WASOTH	WASOTH	247.541	74.262	742.622		1
			WI	WI	94.613	28.384	283.838		1
SYR	Syrian Arab Rep.	Middle Eastern States	BIO	PSB – DR	0.238	0.053	0.457	3	
			CEM	CEM	343.520	121.296	1780.376	3	
			CREM	CREM	0.521	0.391	0.608		4
			CSP	CSP-C	70.000	24.500	136.500	3	
			OR	CO-OR	2.009	0.904	3.315	3	
			SC-DR-oil	CO-HF-DR	5.640	1.269	10.857	3	
			SC-DR-oil	CO-LF-DR	3.546	0.798	6.826	3	
			SC-IND-gas	NG-IND	0.048	0.011	0.092	3	
			SC-IND-oil	CO-HF-IND	12.198	2.745	23.481	3	
			SC-IND-oil	CO-LF-IND	0.642	0.144	1.236	3	
			SC-PP-gas	NG-PP	0.675	0.152	1.300	3	
			SC-PP-oil	CO-HF-PP	19.470	4.381	37.480	3	
			SC-PP-oil	CO-LF-PP	0.314	0.071	0.603	3	
			SSC	SP-S	0.126	0.047	0.602	3	
			WASOTH	WASOTH	84.745	25.424	254.235		4
			WI	WI	0.265	0.080	0.796		4
TWN	Taiwan (China)	East and Southeast Asia	BIO	PSB – IND	4.238	0.954	8.158	1	
			BIO	PSB – PP	12.329	2.774	23.733	1	
			CEM	CEM	1078.378	380.895	5684.734	1	
			CREM	CREM	17.216	15.665	19.104		1
			OR	CO-OR	567.628	255.433	936.586	1	
			PISP	PIP	466.686	163.599	2470.104	1	
			SC-DR-gas	NG-DR	0.287	0.065	0.553	1	
			SC-DR-oil	CO-HF-DR	8.360	1.881	16.093	1	
			SC-DR-oil	CO-LF-DR	9.224	2.075	17.756	1	
			SC-IND-coal	HC-IND-CEM	215.706	116.481	514.099	1	
			SC-IND-coal	HC-IND-OTH	500.888	270.479	1193.782	1	
			SC-IND-coal	HC-IND-PIP	17.552	9.478	41.832	1	
			SC-IND-gas	NG-IND	0.371	0.083	0.714	1	
			SC-IND-oil	CO-HF-IND	28.804	6.481	55.448	1	
			SC-IND-oil	CO-LF-IND	0.184	0.041	0.355	1	
			SC-PP-coal	BC-S-PP	1245.989	672.834	2969.608	1	
			SC-PP-coal	HC-B-PP	1696.212	915.955	4042.639	1	
			SC-PP-gas	NG-PP	2.964	0.667	5.705	1	
			SC-PP-oil	CO-HF-PP	26.440	5.949	50.897	1	
			SC-PP-oil	CO-LF-PP	0.215	0.048	0.413	1	
			SSC	SP-S	225.862	84.065	1077.738	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			WASOTH	WASOTH	597.190	179.157	1791.570		1
			WI	WI	228.252	68.476	684.757		1
TJK	Tajikistan	CIS & other European countries	ASGM	GP-A	3000.000	750.000	5250.000		
			CEM	CEM	112.700	39.797	571.651	4	
			CREM	CREM	0.357	0.262	0.476		4
			NFMP	AL-P	5.000	1.695	9.442	4	
			NFMP-AU	GP-L	173.250	60.638	337.838	4	
			NFMP-HG	HG-P	202.500	70.875	394.875	4	
			OR	CO-OR	0.028	0.013	0.047	4	
			SC-DR-coal	BC-DR	8.550	4.617	20.378	4	
			SC-DR-coal	HC-DR	125.100	67.554	298.155	4	
			SC-DR-gas	NG-DR	0.001	0.000	0.002	4	
			SC-DR-oil	CO-HF-DR	0.240	0.054	0.462	4	
			SC-DR-oil	CO-LF-DR	0.458	0.103	0.882	4	
			SC-PP-coal	HC-B-PP	18.450	9.963	43.973	4	
			SC-PP-oil	CO-HF-PP	0.140	0.032	0.270	4	
			WASOTH	WASOTH	68.541	20.562	205.622		4
			WI	WI	0.214	0.064	0.643		4
THA	Thailand	East and Southeast Asia	ASGM	GP-A	1125.000	281.250	1968.750		
			BIO	PSB – DR	162.536	36.571	312.882	2	
			BIO	PSB – IND	255.426	57.471	491.695	2	
			BIO	PSB – PP	163.134	36.705	314.033	2	
			CEM	CEM	2775.663	979.930	14511.890	2	
			CREM	CREM	43.511	39.592	48.283		2
			NFMP	ZN-P	112.462	39.843	308.945	2	
			NFMP-AU	GP-L	89.070	31.174	173.686	2	
			OR	CO-OR	798.374	359.268	1317.317	2	
			SC-DR-gas	NG-DR	0.572	0.129	1.101	2	
			SC-DR-oil	CO-LF-DR	28.680	6.453	55.209	2	
			SC-IND-coal	BC-IND-CEM	84.249	45.494	200.793	2	
			SC-IND-coal	BC-IND-OTH	10.832	5.849	25.816	2	
			SC-IND-coal	HC-IND-CEM	1066.464	575.891	2541.739	2	
			SC-IND-coal	HC-IND-NFM	4.556	2.460	10.859	2	
			SC-IND-coal	HC-IND-OTH	157.275	84.929	374.839	2	
			SC-IND-gas	NG-IND	0.708	0.159	1.362	2	
			SC-IND-oil	CO-HF-IND	11.457	2.578	22.055	2	
			SC-IND-oil	CO-LF-IND	6.494	1.461	12.501	2	
			SC-PP-coal	BC-L-PP	1393.361	815.116	4598.091	2	
			SC-PP-coal	HC-B-PP	791.142	427.217	1885.556	2	
			SC-PP-gas	NG-PP	7.114	1.601	13.694	2	
			SC-PP-oil	CO-HF-PP	1.840	0.414	3.542	2	
			SC-PP-oil	CO-LF-PP	0.071	0.016	0.136	2	
			SSC	SP-S	95.578	35.573	456.065	2	
			WASOTH	WASOTH	2307.763	692.329	6923.289		2
			WI	WI	67.239	20.172	201.716		2

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
TLS	Timor-Leste	East and Southeast Asia	BIO	PSB – DR	5.013	0.877	11.405	4	
			BIO	PSB – IND	0.627	0.110	1.427	4	
			CREM	CREM	0.805	0.732	0.893		4
			OR	CO-OR	0.678	0.237	1.321	4	
			SC-DR-gas	NG-DR	0.001	0.000	0.003	4	
			SC-DR-oil	CO-HF-DR	0.065	0.011	0.148	4	
			SC-DR-oil	CO-LF-DR	0.166	0.029	0.378	4	
			SC-IND-coal	BC-IND-OTH	0.146	0.061	0.412	4	
			SC-IND-coal	HC-IND-OTH	9.222	3.873	25.976	4	
			SC-IND-oil	CO-HF-IND	0.142	0.025	0.324	4	
			SC-IND-oil	CO-LF-IND	0.016	0.003	0.035	4	
			SC-PP-coal	HC-B-PP	2.080	0.874	5.860	4	
			SC-PP-gas	NG-PP	0.001	0.000	0.003	4	
			SC-PP-oil	CO-HF-PP	0.734	0.128	1.670	4	
			SC-PP-oil	CO-LF-PP	0.096	0.017	0.218	4	
			WASOTH	WASOTH	8.942	2.683	26.826		4
			WI	WI	0.028	0.008	0.084		4
TGO	Togo	Sub-Saharan Africa	ASGM	GP-A	3000.000	750.000	5250.000		
			BIO	PSB – DR	51.631	11.617	99.390	5	
			BIO	PSB – IND	0.164	0.037	0.316	5	
			BIO	PSB – PP	0.104	0.023	0.200	5	
			CEM	CEM	176.085	62.217	913.462	5	
			CREM	CREM	0.172	0.124	0.248		4
			SC-DR-oil	CO-LF-DR	0.586	0.132	1.128	5	
			SC-IND-oil	CO-HF-IND	1.060	0.239	2.041	5	
			SC-IND-oil	CO-LF-IND	0.004	0.001	0.008	5	
			SC-PP-oil	CO-LF-PP	0.008	0.002	0.015	5	
			WASOTH	WASOTH	52.680	22.781	81.156		4
			WI	WI	0.010	0.004	0.016		4
TKL	Tokelau	Australia, New Zealand & Oceania	CREM	CREM	0.004	0.004	0.005		4
			WASOTH	WASOTH	0.005	0.001	0.015		4
			WI	WI	0.000	0.000	0.000		4
TON	Tonga	Australia, New Zealand & Oceania	BIO	PSB – DR	0.434	0.076	0.987	4	
			BIO	PSB – IND	0.049	0.009	0.112	4	
			CREM	CREM	0.326	0.293	0.390		4
			OR	CO-OR	0.002	0.001	0.004	4	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	4	
			SC-DR-oil	CO-HF-DR	0.005	0.001	0.012	4	
			SC-DR-oil	CO-LF-DR	0.013	0.002	0.030	4	
			SC-IND-coal	BC-IND-OTH	0.012	0.005	0.032	4	
			SC-IND-coal	HC-IND-OTH	0.727	0.305	2.046	4	
			SC-IND-oil	CO-HF-IND	0.011	0.002	0.026	4	
			SC-IND-oil	CO-LF-IND	0.001	0.000	0.003	4	
			SC-PP-coal	HC-B-PP	0.164	0.069	0.462	4	
			SC-PP-gas	NG-PP	0.000	0.000	0.000	4	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-oil	CO-HF-PP	0.058	0.010	0.132	4	
			SC-PP-oil	CO-LF-PP	0.008	0.001	0.017	4	
			WASOTH	WASOTH	1.950	0.585	5.849		4
			WI	WI	0.006	0.002	0.018		4
TTO	Trinidad and Tobago	Central America and the Caribbean	BIO	PSB – DR	0.534	0.120	1.027	3	
			CEM	CEM	70.978	25.077	389.540	3	
			CREM	CREM	0.115	0.092	0.138		4
			OR	CO-OR	5.399	2.429	8.908	3	
			SC-DR-gas	NG-DR	0.018	0.004	0.035	3	
			SC-DR-oil	CO-LF-DR	0.844	0.190	1.625	3	
			SC-IND-gas	NG-IND	0.419	0.094	0.807	3	
			SC-IND-oil	CO-LF-IND	0.232	0.052	0.446	3	
			SC-PP-gas	NG-PP	1.350	0.304	2.599	3	
			SC-PP-oil	CO-LF-PP	0.042	0.009	0.081	3	
			SSC	SP-S	12.288	4.574	58.635	3	
			WASOTH	WASOTH	119.115	35.734	357.344		4
			WI	WI	0.373	0.112	1.118		4
TUN	Tunisia	North Africa	BIO	PSB – DR	37.379	8.410	71.954	5	
			CEM	CEM	903.573	319.445	4668.917	5	
			CEM	PC-CEM	32.600	18.338	183.783	5	
			CREM	CREM	0.096	0.072	0.120		4
			OR	CO-OR	2.535	1.141	4.183	5	
			SC-DR-gas	NG-DR	0.114	0.026	0.220	5	
			SC-DR-oil	CO-HF-DR	0.480	0.108	0.924	5	
			SC-DR-oil	CO-LF-DR	3.714	0.836	7.149	5	
			SC-IND-gas	NG-IND	0.185	0.042	0.357	5	
			SC-IND-oil	CO-HF-IND	4.320	0.972	8.316	5	
			SC-IND-oil	CO-LF-IND	0.114	0.026	0.219	5	
			SC-PP-gas	NG-PP	0.871	0.196	1.676	5	
			SC-PP-oil	CO-HF-PP	5.320	1.197	10.241	5	
			SC-PP-oil	CO-LF-PP	0.042	0.009	0.081	5	
			SSC	SP-S	4.495	1.673	21.446	5	
			WASOTH	WASOTH	329.775	98.933	989.326		4
			WI	WI	1.109	0.333	3.328		4
TUR	Turkey	Middle Eastern States	BIO	PSB – DR	147.050	34.924	270.204	3	
			BIO	PSB – PP	1.777	0.422	3.265	3	
			CEM	CEM	6790.521	2396.654	35162.344	3	
			CREM	CREM	0.304	0.228	0.355		2
			NFMP	AL-P	7.750	2.713	15.113	3	
			NFMP	CU-T	285.898	102.043	1632.278	3	
			NFMP-AU	GP-L	990.000	346.500	1930.500	3	
			OR	CO-OR	9.634	4.576	15.174	3	
			PISP	PIP	516.191	180.953	2732.123	3	
			SC-DR-coal	BC-DR	470.400	268.128	1070.160	3	
			SC-DR-coal	HC-DR	1010.850	576.185	2299.684	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-DR-gas	NG-DR	2.818	0.669	5.179	3	
			SC-DR-oil	CO-HF-DR	4.960	1.178	9.114	3	
			SC-DR-oil	CO-LF-DR	38.556	9.157	70.847	3	
			SC-IND-coal	BC-IND-CEM	168.720	96.170	383.838	3	
			SC-IND-coal	BC-IND-OTH	333.668	190.190	759.094	3	
			SC-IND-coal	HC-IND-CEM	396.840	226.199	902.811	3	
			SC-IND-coal	HC-IND-NFM	1.013	0.577	2.303	3	
			SC-IND-coal	HC-IND-OTH	119.250	67.973	271.294	3	
			SC-IND-coal	HC-IND-PIP	45.675	26.035	103.911	3	
			SC-IND-gas	NG-IND	1.964	0.466	3.609	3	
			SC-IND-oil	CO-HF-IND	4.921	1.169	9.042	3	
			SC-IND-oil	CO-LF-IND	1.161	0.276	2.133	3	
			SC-PP-coal	BC-L-PP	4853.738	2997.183	15289.274	3	
			SC-PP-coal	BC-S-PP	57.564	32.811	130.958	3	
			SC-PP-coal	HC-B-PP	1597.118	910.357	3633.442	3	
			SC-PP-gas	NG-PP	4.275	1.015	7.855	3	
			SC-PP-oil	CO-HF-PP	9.015	2.141	16.565	3	
			SC-PP-oil	CO-LF-PP	0.338	0.080	0.620	3	
			SSC	SP-S	323.027	113.060	629.903	3	
			WASOTH	WASOTH	2089.880	626.964	6269.641		2
			WI	WI	60.891	18.267	182.672		2
TKM	Turkmenistan	CIS & other European countries	CEM	CEM	284.200	100.358	1441.554	4	
			CREM	CREM	0.498	0.365	0.665		4
			OR	CO-OR	9.725	4.376	16.047	4	
			SC-DR-gas	NG-DR	2.197	0.494	4.230	4	
			SC-DR-oil	CO-HF-DR	18.620	4.190	35.844	4	
			SC-DR-oil	CO-LF-DR	4.160	0.936	8.008	4	
			SC-IND-gas	NG-IND	0.233	0.052	0.448	4	
			SC-PP-gas	NG-PP	2.536	0.571	4.882	4	
			WASOTH	WASOTH	253.342	76.003	760.025		4
			WI	WI	0.793	0.238	2.378		4
TCA	Turks and Caicos Islands	Central America and the Caribbean	BIO	PSB – DR	0.065	0.011	0.149	3	
			BIO	PSB – IND	0.276	0.048	0.627	3	
			BIO	PSB – PP	0.098	0.017	0.223	3	
			CREM	CREM	0.010	0.008	0.012		4
			OR	CO-OR	0.026	0.009	0.051	3	
			SC-DR-coal	HC-DR	0.995	0.418	2.801	3	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	3	
			SC-DR-oil	CO-HF-DR	0.028	0.005	0.064	3	
			SC-DR-oil	CO-LF-DR	0.067	0.012	0.153	3	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	3	
			SC-IND-oil	CO-HF-IND	0.081	0.014	0.184	3	
			SC-IND-oil	CO-LF-IND	0.005	0.001	0.010	3	
			SC-PP-gas	NG-PP	0.005	0.001	0.011	3	
			SC-PP-oil	CO-HF-PP	0.770	0.135	1.751	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-oil	CO-LF-PP	0.057	0.010	0.129	3	
			WASOTH	WASOTH	1.662	0.499	4.985		4
			WI	WI	0.005	0.002	0.016		4
TUV	Tuvalu	Australia, New Zealand & Oceania	CREM	CREM	0.034	0.030	0.040		4
			WASOTH	WASOTH	0.129	0.039	0.388		4
			WI	WI	0.000	0.000	0.001		4
UGA	Uganda	Sub-Saharan Africa	ASGM	GP-A	3000.000	750.000	5250.000		
			BIO	PSB – DR	423.660	74.141	963.827	5	
			BIO	PSB – IND	12.694	2.222	28.880	5	
			BIO	PSB – PP	4.599	0.805	10.463	5	
			CEM	CEM	224.805	79.431	1166.203	5	
			CREM	CREM	0.849	0.612	1.224		4
			SC-DR-coal	HC-DR	2.508	1.053	7.065	5	
			SC-DR-oil	CO-LF-DR	1.122	0.196	2.552	5	
			SC-IND-coal	HC-IND-OTH	2.435	1.023	6.860	5	
			SC-IND-gas	NG-IND	0.000	0.000	0.000	5	
			SC-IND-oil	CO-HF-IND	2.042	0.357	4.647	5	
			SC-IND-oil	CO-IND	0.281	0.049	0.639	5	
			SC-IND-oil	CO-LF-IND	0.195	0.034	0.445	5	
			SC-PP-coal	HC-B-PP	16.483	6.923	46.427	5	
			SC-PP-gas	NG-PP	0.019	0.003	0.044	5	
			SC-PP-oil	CO-HF-PP	2.656	0.465	6.041	5	
			SC-PP-oil	CO-LF-PP	0.549	0.096	1.250	5	
			SSC	SP-S	0.899	0.335	4.289	5	
			WASOTH	WASOTH	357.275	154.497	550.397		4
			WI	WI	0.068	0.030	0.105		4
UKR	Ukraine	CIS & other European countries	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	59.198	13.319	113.955	4	
			BIO	PSB – IND	4.413	0.993	8.495	4	
			BIO	PSB – PP	29.384	6.611	56.564	4	
			CEM	CEM	944.328	333.466	4789.935	4	
			CREM	CREM	22.713	16.656	30.284		2
			OR	CO-OR	2.379	1.071	3.926	4	
			PISP	PIP	1499.118	525.524	7934.616	4	
			SC-DR-coal	HC-DR	89.400	48.276	213.070	4	
			SC-DR-gas	NG-DR	2.554	0.575	4.917	4	
			SC-DR-oil	CO-HF-DR	0.300	0.068	0.578	4	
			SC-DR-oil	CO-LF-DR	8.852	1.992	17.040	4	
			SC-IND-coal	HC-IND-CEM	122.194	65.985	291.228	4	
			SC-IND-coal	HC-IND-NFM	25.200	13.608	60.060	4	
			SC-IND-coal	HC-IND-OTH	7.088	3.827	16.892	4	
			SC-IND-coal	HC-IND-PIP	252.263	136.222	601.226	4	
			SC-IND-gas	NG-IND	0.643	0.145	1.237	4	
			SC-IND-oil	CO-HF-IND	0.200	0.045	0.385	4	
			SC-IND-oil	CO-LF-IND	1.536	0.346	2.957	4	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-coal	HC-A-PP	218.138	117.794	919.813	4	
			SC-PP-coal	HC-B-PP	3097.688	1672.751	7382.822	4	
			SC-PP-gas	NG-PP	2.216	0.499	4.267	4	
			SC-PP-oil	CO-HF-PP	7.160	1.611	13.783	4	
			SC-PP-oil	CO-LF-PP	0.154	0.035	0.296	4	
			SC-PP-oil	CO-PP	0.030	0.007	0.058	4	
			SSC	SP-S	48.956	18.221	233.601	4	
			WASOTH	WASOTH	639.563	191.869	1918.690		2
			WI	WI	18.634	5.590	55.903		2
ARE	United Arab Emirates	Middle Eastern States	CEM	CEM	1225.824	432.835	6353.131	1	
			CREM	CREM	0.180	0.135	0.210		2
			CSP	CSP-C	22.500	7.875	43.875	1	
			NFMP	AL-P	30.000	10.169	56.655	1	
			OR	CO-OR	12.351	5.558	20.380	1	
			SC-DR-oil	CO-LF-DR	5.566	1.252	10.715	1	
			SC-IND-coal	HC-IND-CEM	41.189	22.242	98.166	1	
			SC-IND-gas	NG-IND	6.177	1.390	11.892	1	
			SC-IND-oil	CO-HF-IND	25.441	5.724	48.974	1	
			SC-PP-gas	NG-PP	7.119	1.602	13.705	1	
			SC-PP-oil	CO-HF-PP	0.500	0.113	0.963	1	
			SC-PP-oil	CO-LF-PP	0.821	0.185	1.579	1	
			SSC	SP-S	55.783	20.762	266.177	1	
			WASOTH	WASOTH	713.795	214.139	2141.386		2
			WI	WI	20.797	6.239	62.391		2
GBR	United Kingdom	EU28	BIO	PSB – DR	90.999	21.612	167.211	1	
			BIO	PSB – IND	31.165	7.402	57.266	1	
			BIO	PSB – PP	150.465	35.735	276.479	1	
			CEM	CEM	443.300	156.633	2697.586	1	
			CREM	CREM	224.833	176.654	268.996		1
			CSP	CSP-C	249.300	87.255	486.135	1	
			NFMP	AL-P	0.588	0.199	1.109	1	
			NFMP	PB-P	3.660	1.995	5.772	1	
			OR	CO-OR	100.032	47.515	157.551	1	
			PISP	PIP	313.656	109.954	1660.136	1	
			SC-DR-coal	HC-DR	76.650	43.691	174.379	1	
			SC-DR-gas	NG-DR	7.030	1.670	12.918	1	
			SC-DR-oil	CO-HF-DR	2.120	0.504	3.896	1	
			SC-DR-oil	CO-LF-DR	52.166	12.389	95.855	1	
			SC-IND-coal	HC-IND-CEM	71.402	40.699	162.439	1	
			SC-IND-coal	HC-IND-NFM	1.457	0.830	3.314	1	
			SC-IND-coal	HC-IND-OTH	65.004	37.052	147.885	1	
			SC-IND-coal	HC-IND-PIP	3.053	1.740	6.944	1	
			SC-IND-gas	NG-IND	1.701	0.404	3.125	1	
			SC-IND-oil	CO-HF-IND	3.040	0.722	5.586	1	
			SC-IND-oil	CO-LF-IND	3.129	0.743	5.750	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-PP-coal	HC-B-PP	1521.968	867.521	3462.476	1	
			SC-PP-gas	NG-PP	5.330	1.266	9.794	1	
			SC-PP-oil	CO-HF-PP	5.530	1.313	10.161	1	
			SC-PP-oil	CO-LF-PP	1.110	0.264	2.040	1	
			SSC	SP-S	45.630	16.983	217.730	1	
			WASOTH	WASOTH	576.863	173.059	1730.588		1
			WI	WI	220.483	66.145	661.449		1
TZA	United Republic of Tanzania	Sub-Saharan Africa	ASGM	GP-A	26250.000	6562.500	45937.500		
			BIO	PSB – DR	774.571	174.279	1491.050	4	
			BIO	PSB – IND	142.583	32.081	274.472	4	
			BIO	PSB – PP	0.473	0.106	0.910	4	
			CEM	CEM	258.077	91.187	1338.805	4	
			CREM	CREM	1.163	0.838	1.676		4
			NFMP-AU	GP-L	2265.962	793.087	4418.625	4	
			SC-DR-oil	CO-LF-DR	2.830	0.637	5.448	4	
			SC-IND-coal	HC-IND-OTH	33.731	18.215	80.393	4	
			SC-IND-gas	NG-IND	0.032	0.007	0.062	4	
			SC-IND-oil	CO-HF-IND	3.160	0.711	6.083	4	
			SC-PP-gas	NG-PP	0.138	0.031	0.266	4	
			SC-PP-oil	CO-HF-PP	4.720	1.062	9.086	4	
			SC-PP-oil	CO-LF-PP	0.400	0.090	0.770	4	
			WASOTH	WASOTH	685.131	296.273	1055.472		4
			WI	WI	0.131	0.057	0.202		4
USA	United States	North America	BIO	PSB – DR	662.954	157.452	1218.177	1	
			BIO	PSB – IND	1094.668	259.984	2011.452	1	
			BIO	PSB – PP	473.399	112.432	869.871	1	
			CEM	CEM	3102.081	1105.469	22693.129	1	
			CEM	PC-CEM	17.425	9.932	54.887	1	
			CREM	CREM	523.081	438.104	600.365		1
			CSP	CSP-C	182.500	63.875	355.875	1	
			NFMP	AL-P	122.955	43.034	239.762	1	
			NFMP	CU-P	101.289	36.152	578.293	1	
			NFMP	ZN-P	8.407	3.081	15.185	1	
			NFMP-AU	GP-L	494.340	173.019	963.963	1	
			OR	CO-OR	1033.537	490.930	1627.820	1	
			PISP	PIP	512.795	180.006	2852.798	1	
			SC-DR-coal	BC-DR	78.975	45.016	179.668	1	
			SC-DR-coal	HC-DR	88.725	50.573	201.849	1	
			SC-DR-gas	NG-DR	46.513	11.047	85.468	1	
			SC-DR-oil	CO-HF-DR	27.720	6.584	50.936	1	
			SC-DR-oil	CO-LF-DR	339.380	80.603	623.611	1	
			SC-IND-coal	BC-IND-CEM	45.257	25.796	102.959	1	
			SC-IND-coal	BC-IND-OTH	634.324	361.565	1443.087	1	
			SC-IND-coal	HC-IND-CEM	847.771	483.230	1928.679	1	
			SC-IND-coal	HC-IND-OTH	718.794	409.713	1635.257	1	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-coal	HC-IND-PIP	11.308	6.446	25.726	1	
			SC-IND-gas	NG-IND	27.425	6.514	50.394	1	
			SC-IND-oil	CO-HF-IND	19.893	4.725	36.553	1	
			SC-IND-oil	CO-LF-IND	25.677	6.098	47.181	1	
			SC-PP-coal	BC-L-PP	2616.806	1615.878	8242.938	1	
			SC-PP-coal	BC-S-PP	9931.688	6604.572	13556.754	1	
			SC-PP-coal	HC-A-PP	68.543	39.069	275.885	1	
			SC-PP-coal	HC-B-PP	6528.007	4341.125	8910.730	1	
			SC-PP-gas	NG-PP	69.689	16.551	128.053	1	
			SC-PP-oil	CO-HF-PP	25.500	6.056	46.856	1	
			SC-PP-oil	CO-LF-PP	11.976	2.844	22.006	1	
			SSC	SP-S	1287.768	479.299	6144.788	1	
			WASOTH	WASOTH	3297.817	989.345	9893.451		1
			WI	WI	1252.992	375.898	3758.976		1
URY	Uruguay	South America	BIO	PSB – DR	18.223	4.100	35.078	3	
			BIO	PSB – IND	59.026	13.281	113.625	3	
			BIO	PSB – PP	13.895	3.126	26.749	3	
			CEM	CEM	60.352	21.353	320.226	3	
			CREM	CREM	1.295	0.906	1.813		4
			CSP	CSP-C	75.000	26.250	146.250	3	
			NFMP-AU	GP-L	65.894	23.063	128.494	3	
			OR	CO-OR	1.828	0.823	3.016	3	
			SC-DR-gas	NG-DR	0.007	0.002	0.014	3	
			SC-DR-oil	CO-HF-DR	0.420	0.095	0.809	3	
			SC-DR-oil	CO-LF-DR	1.448	0.326	2.787	3	
			SC-IND-gas	NG-IND	0.003	0.001	0.005	3	
			SC-IND-oil	CO-HF-IND	2.964	0.667	5.706	3	
			SC-IND-oil	CO-LF-IND	0.025	0.006	0.048	3	
			SC-PP-gas	NG-PP	0.000	0.000	0.001	3	
			SC-PP-oil	CO-HF-PP	1.320	0.297	2.541	3	
			SC-PP-oil	CO-LF-PP	0.272	0.061	0.523	3	
			SSC	SP-S	2.372	0.883	11.318	3	
			WASOTH	WASOTH	163.572	49.072	490.716		4
			WI	WI	0.550	0.165	1.651		4
VIR	US Virgin Islands	Central America and the Caribbean	CREM	CREM	0.019	0.016	0.023		4
			WASOTH	WASOTH	9.970	2.991	29.911		4
			WI	WI	0.031	0.009	0.094		4
UZB	Uzbekistan	CIS & other European countries	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	0.211	0.048	0.407	4	
			CEM	CEM	720.300	254.356	3653.593	4	
			CREM	CREM	4.038	2.961	5.384		4
			NFMP	CU-P	1153.200	411.600	6583.980	4	
			NFMP	ZN-P	1145.808	405.938	3147.643	4	
			NFMP-AU	GP-L	5049.000	1767.150	9845.550	4	
			OR	CO-OR	3.002	1.351	4.954	4	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-DR-coal	BC-DR	64.350	34.749	153.368	4	
			SC-DR-gas	NG-DR	3.290	0.740	6.333	4	
			SC-DR-oil	CO-HF-DR	2.800	0.630	5.390	4	
			SC-DR-oil	CO-LF-DR	1.546	0.348	2.976	4	
			SC-IND-coal	BC-IND-OTH	25.301	13.663	60.301	4	
			SC-IND-coal	HC-IND-OTH	48.169	26.011	114.802	4	
			SC-IND-gas	NG-IND	1.111	0.250	2.139	4	
			SC-IND-oil	CO-HF-IND	0.020	0.005	0.039	4	
			SC-IND-oil	CO-LF-IND	0.164	0.037	0.316	4	
			SC-PP-coal	BC-L-PP	285.768	167.174	943.034	4	
			SC-PP-gas	NG-PP	3.775	0.849	7.267	4	
			SC-PP-oil	CO-HF-PP	1.020	0.230	1.964	4	
			SC-PP-oil	CO-PP	0.050	0.011	0.096	4	
			SSC	SP-S	21.094	7.851	100.652	4	
			WASOTH	WASOTH	541.717	162.515	1625.151		4
			WI	WI	1.695	0.509	5.085		4
VUT	Vanuatu	Australia, New Zealand & Oceania	BIO	PSB – DR	1.109	0.194	2.522	4	
			BIO	PSB – IND	0.062	0.011	0.141	4	
			CREM	CREM	0.849	0.763	1.017		4
			OR	CO-OR	0.003	0.001	0.005	4	
			SC-DR-gas	NG-DR	0.000	0.000	0.000	4	
			SC-DR-oil	CO-HF-DR	0.006	0.001	0.015	4	
			SC-DR-oil	CO-LF-DR	0.016	0.003	0.037	4	
			SC-IND-coal	BC-IND-OTH	0.014	0.006	0.041	4	
			SC-IND-coal	HC-IND-OTH	0.910	0.382	2.565	4	
			SC-IND-oil	CO-HF-IND	0.014	0.002	0.032	4	
			SC-IND-oil	CO-LF-IND	0.002	0.000	0.003	4	
			SC-PP-coal	HC-B-PP	0.205	0.086	0.579	4	
			SC-PP-gas	NG-PP	0.000	0.000	0.000	4	
			SC-PP-oil	CO-HF-PP	0.072	0.013	0.165	4	
			SC-PP-oil	CO-LF-PP	0.009	0.002	0.022	4	
			WASOTH	WASOTH	2.624	0.787	7.871		4
			WI	WI	0.008	0.002	0.025		4
VEN	Venezuela	South America	ASGM	GP-A	34425.000	17212.500	51637.500		
			BIO	PSB – DR	14.083	3.169	27.109	3	
			BIO	PSB – IND	20.624	4.640	39.702	3	
			CEM	CEM	588.800	208.320	3124.160	3	
			CREM	CREM	11.944	8.361	16.722		4
			NFMP	AL-P	17.050	5.968	33.248	3	
			NFMP-AU	GP-L	59.400	20.790	115.830	3	
			OR	CO-OR	43.106	19.398	71.124	3	
			SC-DR-gas	NG-DR	0.274	0.062	0.527	3	
			SC-DR-oil	CO-LF-DR	5.500	1.238	10.588	3	
			SC-IND-coal	HC-IND-CEM	22.440	12.118	53.482	3	

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
			SC-IND-gas	NG-IND	1.559	0.351	3.002	3	
			SC-IND-oil	CO-HF-IND	18.563	4.177	35.734	3	
			SC-IND-oil	CO-LF-IND	2.981	0.671	5.739	3	
			SC-PP-gas	NG-PP	2.743	0.617	5.281	3	
			SC-PP-oil	CO-HF-PP	9.975	2.244	19.202	3	
			SC-PP-oil	CO-LF-PP	8.699	1.957	16.745	3	
			SSC	SP-S	37.470	13.946	178.796	3	
			WASOTH	WASOTH	963.946	289.184	2891.837		4
			WI	WI	3.243	0.973	9.729		4
VNM	Vietnam	East and Southeast Asia	ASGM	GP-A	3562.500	890.625	6234.375		
			BIO	PSB – DR	596.854	134.292	1148.943	4	
			BIO	PSB – IND	139.090	31.295	267.748	4	
			BIO	PSB – PP	0.840	0.189	1.617	4	
			CEM	CEM	5770.855	2038.330	30421.407	4	
			CREM	CREM	60.775	55.301	67.440		4
			NFMP	AL-P	150.040	52.514	292.578	4	
			NFMP	CU-P	92.256	32.928	526.718	4	
			NFMP	ZN-P	156.960	55.608	431.184	4	
			OR	CO-OR	120.515	54.232	198.849	4	
			SC-DR-coal	HC-DR	401.550	216.837	957.028	4	
			SC-DR-oil	CO-HF-DR	0.820	0.185	1.579	4	
			SC-DR-oil	CO-LF-DR	11.712	2.635	22.546	4	
			SC-IND-coal	BC-IND-OTH	169.650	91.611	404.333	4	
			SC-IND-coal	HC-IND-CEM	1266.694	684.015	3018.953	4	
			SC-IND-coal	HC-IND-OTH	910.088	491.447	2169.042	4	
			SC-IND-coal	HC-IND-PIP	101.063	54.574	240.866	4	
			SC-IND-gas	NG-IND	0.347	0.078	0.668	4	
			SC-IND-oil	CO-HF-IND	5.960	1.341	11.473	4	
			SC-IND-oil	CO-LF-IND	2.256	0.508	4.343	4	
			SC-PP-coal	HC-A-PP	2513.813	1357.459	10599.909	4	
			SC-PP-coal	HC-B-PP	137.925	74.480	328.721	4	
			SC-PP-gas	NG-PP	1.834	0.413	3.531	4	
			SC-PP-oil	CO-HF-PP	4.320	0.972	8.316	4	
			SC-PP-oil	CO-LF-PP	0.080	0.018	0.154	4	
			SSC	SP-S	127.933	47.616	610.453	4	
			WASOTH	WASOTH	1741.088	522.326	5223.265		4
			WI	WI	5.448	1.634	16.345		4
WLF	Wallis and Futuna Islands	Australia, New Zealand & Oceania	CREM	CREM	0.048	0.043	0.057		4
			WASOTH	WASOTH	0.199	0.060	0.597		4
			WI	WI	0.001	0.000	0.002		4
ESH	Western Sahara	Sub-Saharan Africa	CREM	CREM	0.000	0.000	0.000		4
			WASOTH	WASOTH	4.477	1.936	6.897		4
			WI	WI	0.001	0.000	0.001		4

Country code	Country name	Region	Sector Code	Activity Code	Emission estimate, kg	Low range estimate, kg	High range estimate, kg	Technology group	Waste group
YEM	Yemen	Middle Eastern States	CEM	CEM	276.850	97.755	1434.843	4	
			CREM	CREM	0.208	0.156	0.242		4
			OR	CO-OR	0.347	0.156	0.572	4	
			SC-DR-oil	CO-LF-DR	0.580	0.131	1.117	4	
			SC-IND-coal	HC-IND-CEM	17.456	9.426	41.604	4	
			SC-IND-oil	CO-HF-IND	2.760	0.621	5.313	4	
			SC-IND-oil	CO-LF-IND	0.248	0.056	0.477	4	
			SC-PP-gas	NG-PP	0.190	0.043	0.367	4	
			SC-PP-oil	CO-HF-PP	8.520	1.917	16.401	4	
			SC-PP-oil	CO-LF-PP	0.800	0.180	1.540	4	
			SC-PP-oil	CO-PP	0.410	0.092	0.789	4	
			WASOTH	WASOTH	127.570	38.271	382.710		4
			WI	WI	0.399	0.120	1.198		4
ZMB	Zambia	Sub-Saharan Africa	ASGM	GP-A	225.000	56.250	393.750		
			BIO	PSB – DR	201.401	45.315	387.697	4	
			BIO	PSB – IND	78.609	17.687	151.323	4	
			CEM	CEM	202.125	71.418	1048.548	4	
			CREM	CREM	0.344	0.248	0.495		4
			NFMP	CU-P	978.692	638.973	1394.636	4	
			NFMP-AU	GP-L	222.750	77.963	434.363	4	
			OR	CO-OR	0.542	0.244	0.894	4	
			SC-DR-oil	CO-LF-DR	0.286	0.064	0.551	4	
			SC-IND-coal	HC-IND-OTH	20.869	11.269	49.737	4	
			SC-IND-oil	CO-HF-IND	0.960	0.216	1.848	4	
			SC-IND-oil	CO-LF-IND	0.638	0.144	1.228	4	
			SC-PP-oil	CO-HF-PP	1.620	0.365	3.119	4	
			SC-PP-oil	CO-LF-PP	0.020	0.005	0.039	4	
			WASOTH	WASOTH	307.079	132.791	473.068		4
			WI	WI	0.059	0.025	0.091		4
ZWE	Zimbabwe	Sub-Saharan Africa	ASGM	GP-A	7750.000	3875.000	11625.000		
			BIO	PSB – DR	380.296	85.567	732.070	4	
			BIO	PSB – IND	7.022	1.580	13.518	4	
			BIO	PSB – PP	2.301	0.518	4.430	4	
			CEM	CEM	119.438	42.201	619.596	4	
			CREM	CREM	0.322	0.232	0.464		4
			NFMP-AU	GP-L	990.000	346.500	1930.500	4	
			SC-DR-coal	HC-DR	7.050	3.807	16.803	4	
			SC-DR-oil	CO-LF-DR	1.318	0.297	2.537	4	
			SC-IND-coal	HC-IND-CEM	10.763	5.812	25.651	4	
			SC-IND-coal	HC-IND-OTH	20.738	11.198	49.424	4	
			SC-IND-coal	HC-IND-PIP	0.131	0.071	0.313	4	
			SC-IND-oil	CO-LF-IND	0.062	0.014	0.119	4	
			SC-PP-coal	HC-B-PP	309.488	167.123	737.612	4	
			SC-PP-oil	CO-LF-PP	0.064	0.014	0.123	4	
			WASOTH	WASOTH	156.861	67.832	241.650		4
			WI	WI	0.030	0.013	0.046		4

Chapter 6 E-Annex: Methodology for estimating 2015 mercury releases to water

Given the global nature of the inventory and general lack of data/information on aquatic Hg releases and associated information, assumptions had to be made to derive the estimates presented in this work. These assumptions are often difficult to validate. For reasons of transparency, details on data/information and assumptions made within individual release category are given here.

A6.1 Methodology for estimating Hg releases to water, land and waste streams for Group 1 sectors

The following sectors for which the UNEP Toolkit provides 'distribution factors' (DFs) for water are included in Group 1: chlor-alkali industry, oil refining, large scale Au and non-ferrous metals production. Water releases for these sectors are estimated using water/air DF ratios as scaling factors together with the GMA atmospheric Hg emission inventory for which details regarding data compilation and the derivation of emissions are given in Chapter 3 and E-Annex 3, Sections A3.1 to A3.6.

For the sectors where abatement is considered for calculation of atmospheric emissions, country/group specific abatement profiles are considered and the DFs revised accordingly, while for others DFs are directly adopted from the UNEP Toolkit. The former sectors comprise production of various non-ferrous metals (primary production of Cu, Pb, Zn and Al), large-scale Au production and the chlor-alkali industry. The methodology applied to calculate water releases involves the following consecutive steps:

1. Using information on the country-/group-specific technology profiles (reduction efficiency and percentage and application rates), total air emissions are distributed between various types of abatement technologies.
2. Using information on air emissions by abatement technology combined with the information on reduction efficiency of individual technology profiles, unabated/uncontrolled emissions to air are calculated.
3. Depending on the sector, input of Hg that is being directly (i.e., not via abatement) released to pathways other than air (non-air inputs) is calculated (see sector-specific comments below).
4. Total Hg input is calculated as the sum of unabated air emissions and non-air inputs.
5. The actual DF for air is calculated from air emissions and total Hg input.
6. Distribution factors for other pathways are revised depending on whether they are assumed to originate from the abatement technologies or considered as direct releases (see sector-specific comments below).
7. Releases to water are calculated based on reported emissions to air and revised water/air ratios. In the same way by using appropriate DF ratios, outputs to other pathways considered in the UNEP Toolkit are estimated.

The water releases derived using the general methodological approach outlined above are based on sector-specific knowledge regarding the fate and pathways of Hg as described in more detail in the UNEP Toolkit (UN Environment, 2017b,c). In general, two types of release to water are considered – direct releases and those resulting from the abatement technologies used. Direct releases are those where Hg passes directly to water without first entering the air pathway, while abatement releases are associated with wet cleaning technologies (such as scrubbers etc.). For the latter it is further assumed that Hg is initially re-allocated from the air pathway and then subjected to other pathways including water, with the same proportions as defined in the UNEP Toolkit. Whether dry-only abatement methods or wet-based abatement dominates in each particular country and sector was decided based on technology profiles presented in Chapter 3, E-Annex 3, Section A3.6. For the purpose of these estimates, sector-specific assumptions are made, as follows.

Primary production of copper, lead and zinc: Water releases for these sectors are assumed to originate from the wet gas cleaning technologies used. No direct releases to pathways other than air are considered. The exception is Hg bound in slag which, according to data provided by Hui et al. (2017) varies from 3% to 14%, depending on the metal. The share of slag is considered a part of the sector-specific treatment which does not depend on air abatement and is kept constant in the calculations. It is also assumed that Hg once re-allocated from the air pathway is subject to water, products (including sulfuric acid produced at acid plants considered as part of the abatement) and sector-specific treatment. In cases where only dry abatement technologies are used, no water releases are considered.

Primary production of aluminum: Water releases for this sector are assumed to be the sum of direct releases and the abatement technologies used. Where wet cleaning abatement technologies prevail, Hg re-allocated from the air pathway is subject to three pathways: water, general waste and sector-specific treatment. In cases where dry or no abatement is used, the water pathway is excluded.

Production of gold from large-scale gold mining: Water releases for this sector are assumed to be the sum of direct releases and the abatement technologies used. Where wet cleaning dominates the abatement profile, Hg re-allocated from air is distributed between water and land. In cases where dry or no abatement is used, the water pathway is excluded. The share of product-bound Hg is assumed to be constant.

Chlor-alkali industry: Water releases for this sector are assumed to be direct releases, while releases to land and sector-specific treatment are assumed to be the sum of direct releases and abatement technologies used. Hg re-allocated from the air pathway is distributed between these two pathways. The share of product-bound Hg is assumed to be constant.

Primary mercury production and oil refining: For these two sectors no wet abatement technologies are considered when calculating emissions to air. Therefore, DFs are directly adopted from the UNEP Toolkit. For the primary Hg production, in addition to air emissions, releases to water and land are considered. For the oil-refining sector, releases to water and sector-specific treatment are considered.

Gaps/needs to improve methodological approach

- For the releases associated with abatement technologies used, this approach does not consider that a proportion of the Hg that is being abated by dry methods is not associated with water pathways, which in some cases may result in methodological overestimation of water releases. However, since 'dry-only' abatement technologies are in most countries less common than wet-based abatement, this issue can be neglected.
- For Cu, Pb and Zn production the DFs from the UNEP Toolkit reflect the distribution after abatement and no direct releases (except for slag) are assumed – which makes it relatively easy to calculate unabated DFs. For Al production, large-scale Au mining and the chlor-alkali industry the approach assumes that DFs from the UNEP Toolkit imply unabated emissions. Due to the lack of more detailed information regarding abatement used in DFs given in the Toolkit – those are a combination of direct releases and releases via abatement so it is virtually impossible to derive actual unabated DFs. It is therefore assumed for simplicity that DFs in the UNEP Toolkit imply no abatement.
- The approach does not consider potential further abatement of water releases. Efficient water cleaning would also affect actual DFs resulting in lower water releases and more Hg going to sector-specific treatment; however lack of data does not make such corrections possible.

A6.2 Methodology for estimating Hg releases to water associated with municipal wastewater

The 2015 inventory for Hg releases associated with municipal wastewater is based on information regarding volumes of municipal wastewater produced, wastewater treatment practices used and reported Hg ranges for concentrations measured in wastewater before (influent) and after (effluent) treatment. Municipal wastewater is defined here as water that has been used for municipal use and is afterwards released back to the environment. Treatment of this released water mostly depends on prosperity of the country concerned and thus its capacities and number of wastewater treatment plants. Most of the information for individual countries was obtained from the AQUASTAT database of the UN Food and Agriculture Organization. AQUASTAT reports amounts of municipal wastewater generated within urban areas. Since not all countries are reporting their amounts of municipal wastewater on a regular annual basis, the latest available data for each country was used. For countries with no data available, wastewater was calculated based on assumed water use per person per day. Water use averages for individual continents were assigned to the countries with missing data: 230 for Asia (Kamal et al., 2008), 50 for Africa, 200 for Europe, 100 for Oceania and 100 l/person/day for Caribbean countries. The percentage of treated wastewater was then assigned to each country. The most recent information on treatment practices in individual countries was adopted from the global database compiled by Malik et al. (2015). For countries missing from that database, wastewater treatment data were based on regional averages as discussed by Malik et al. (2015) and a recent UN world water development report (WWAP, 2017), assuming similarities within regions and between neighboring countries. Based on these two sources, the following wastewater treatment rates were selected: 80% for the EU28 and developed countries, 50% for North Africa and the Middle East, 15% for countries in Sub-Saharan Africa, 5% for South Asia and 25% for other regions.

Table A6.1 Ranges in Hg concentration in untreated and treated sewage as used to derive the estimates.

Profile	Hg in untreated wastewater, ng/L	Hg removal efficiency, %	Hg in treated wastewater, ng/L
1	100–500	95	5–25
2	300–1500	80	60–300
3	300–1500	70	90–450
4	300–1500	60	120–600
5	300–1500	50	150–750

The magnitude of Hg releases from this sector will largely depend on the amount of Hg products used, general waste handling practices and especially the level of wastewater treatment – information lacking for most of the countries. In the absence of such information, a generic waste management profile was used and different ranges of Hg concentration were applied for untreated wastewater and wastewater treated in treatment plants, to estimate releases for an individual country. These estimates are based on the assumption that Hg concentrations in untreated wastewater are lower in more developed countries than in developing nations, as seen from values reported in the scientific literature. Furthermore, the assumption is that Hg removal is more efficient in developed countries due to higher levels of wastewater treatment (Table A6.1).

A6.3 Methodology for estimating Hg releases to water from coal-fired power plants

The 2015 inventory for Hg releases with wastewater from coal-fired power plants uses a very coarse approach for a first preliminary estimate of the global magnitude associated with this sector. In the absence of more detailed country-specific information, the approach largely relies on information available for China and work undertaken by Liu et al. (2016), by upscaling global relationships between the electricity generation capacity of coal-fired power plants, the amounts of wastewater produced and the range in Hg concentration reported in their work.

The method applied is based on an assumption that on average global water use patterns in coal-fired power plants are similar to those in China, the single largest user of coal-derived electricity in the world. Although this is a rough generalization, it is necessary to achieve a harmonized global calculation approach.

Based on wastewater volumes reported by Liu et al. (2016) and the total electricity generation capacity of coal-fired power plants in China, wastewater generation was estimated at 0.25–0.5 m^3 per MWh of energy produced. For the purposes of this wastewater generation estimate, the realized energy output from coal-fired power plants was calculated using a capacity factor of 0.55 (Biesheuvel et al., 2016). To estimate wastewater generation from coal-fired power plants in each country of the world, the wastewater generation rate from China was used together with country-specific information on the total capacity of coal-fired power plants based on information from the Global Coal Plant Tracker database (GCPT, 2017). Capacity factors used for calculating the amount of energy produced in individual countries were adopted from Biesheuvel et al. (2016). The final amounts of Hg release per country were estimated using Hg concentrations in the range 5–25 mg/m^3 for wastewater generated by coal-fired power plants (Liu et al., 2016 and references therein).

A6.4 Methodology for estimating Hg releases to water associated with coal washing

The 2015 inventory for Hg releases associated with coal washing is based on global coal production, coal Hg content, Hg removal efficiency and coal washing rates, similar to the approach of Liu et al. (2016).

Total coal production in 2015 for individual countries was obtained from the Global Energy Statistical Yearbook 2016 (Enerdata, 2016). In the absence of detailed country-specific information on the amounts of different coal types, regional information on coal type produced (anthracite, metallurgical, bituminous, subbituminous, lignite) was obtained from International Energy Statistics for 2014 (EIA, 2017). Regional ratios were then applied to individual countries. For countries where information on the Hg content in coals was available (as summarized in Chapter 3, E-Annex 3, Section A3.6), a country-specific average Hg content was used, whereas generic values were applied for countries for which such information was not available. Information on coal washing rates in individual countries is available for some of the world's major coal producers only and varies from <5% to 90% (ENM, 2016; DTI, 2001). For the rest of the world, it is assumed that high percentages of coal produced are being washed in developed countries and the following washing rates were assigned using technology profiles (TP) for the country concerned: 80% (TP1), 60% (TP2), 40% (TP3), 20% (TP4) and 10% (TP5). The Hg removal efficiency of coal washing is selected in the 20–30% range (Liu et al., 2016; UN Environment, 2017b). It is further assumed that only part of the Hg released during washing will reach local aquatic systems, the rest being deposited in slurry ponds. Using waste management profiles (WP) of individual countries, the following percentages for Hg reaching water courses were selected: 20% (WP1), 30% (WP2), 40% (WP3), 50% (WP4) and 60% (WP5).

A6.5 Methodology for estimating Hg releases to water from the use of and wastes associated with Hg-added products

The 2015 inventory of Hg releases to water from Hg-added products is generated using methodology comparable to that applied to estimate emissions to air (see Chapter 3, E-Annex 3, Section A3.3 for details). The approach uses regional patterns of consumption of Hg and Hg-added products. Mercury releases at various points in the life-cycle of the products are estimated using assumptions regarding rates of breakage, waste handling, and factors for releases to water. The input data comprise estimated Hg consumption in one year (2015) for the following product groups: batteries, measuring devices, lamps, electrical and electronic devices, dental applications, and other uses. The amounts are then distributed to four initial pathways (safe storage, breakage and release of Hg during use, waste stream, products still in use) using DFs. Waste pathways are further differentiated among waste recycling, waste incineration and waste landfill. The final pathway is further differentiated between two levels of waste management: controlled and uncontrolled waste landfill. All the initial and waste DFs used to determine the amount of Hg distributed to the above-mentioned pathways are the same as those used in the case of atmospheric emissions estimates (see Chapter 3, E-Annex 3, Section A3.3 for details). Within these pathways, releases to water are assumed for breakage/release during use, recycling and from waste landfills (Figure A6.1).

Releases to water are then estimated by applying release factors according to Table A6.2 to the distributed individual amounts of Hg. As in the case of atmospheric emissions for this sector, varying waste management practices were taken into account by using five different profiles of release factors. Each country has been assigned one of these five generic profiles based on assumptions and information available as discussed in E-Annex 3, Section A3.3. For releases resulting from breakage during use, waste recycling and controlled landfills, release factors are the same as for the assigned generic profiles of waste management. A differentiation is introduced for releases from uncontrolled landfills by using different release factors for individual profiles.

Table A6.2 Release factors (fraction released) applied to distributed amounts of Hg in Hg-added products.

Profile	Break/release during use	Waste recycling	Landfill	
			controlled	uncontrolled
1	0.1	0.05	0.0001	0.05
2	0.1	0.05	0.0001	0.10
3	0.1	0.05	0.0001	0.15
4	0.1	0.05	0.0001	0.20
5	0.1	0.05	0.0001	0.25

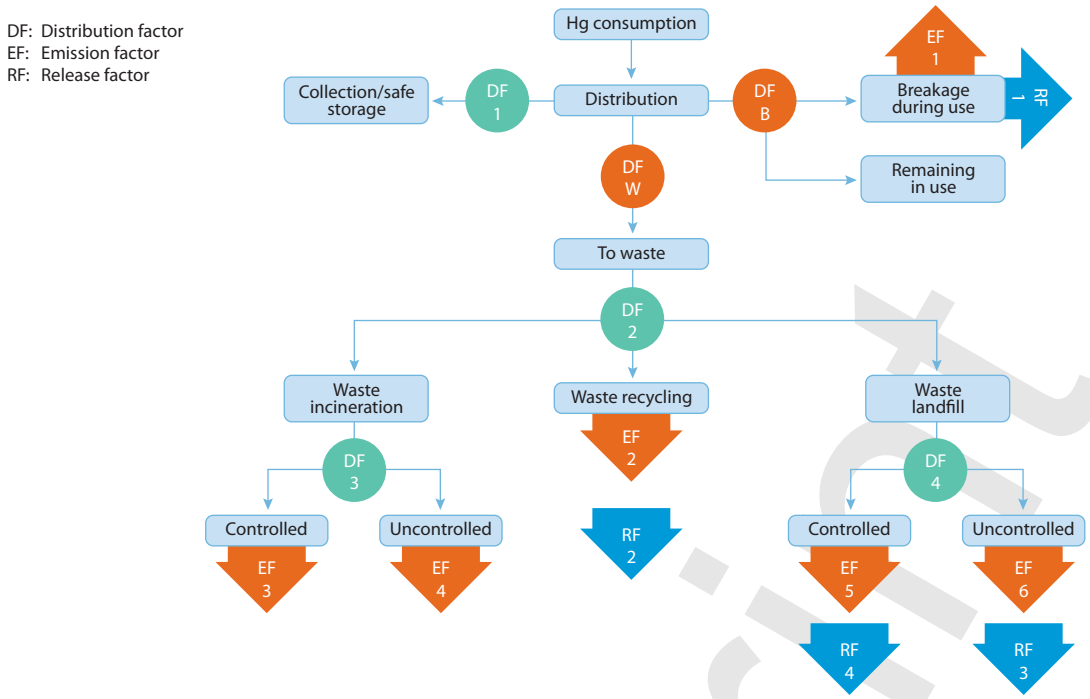

Figure A6.1 Schematic representation of the model used to estimate Hg releases from waste streams associated with Hg-added products and comparison with Hg emission streams.

Example calculation

The following example shows the calculation scheme applied to estimate releases associated with the use and disposal of Hg-added products for Mexico. The distribution of Hg between different distribution pathways, starting with the distribution of regional total amounts of Hg consumed in intentional Hg use products is the same as that for atmospheric emissions and described in detail in Chapter 3, E-Annex 3, Section A3.3.

The flowchart in Figure A6.2 illustrates how, on the basis of this distribution, releases to water totaling about 2.5 t are calculated. Of this, following breakage during use, 0.088 t are released, while other releases are attributed to secondary waste pathways: 0.024 t are estimated to be released during waste recycling and 2.337 t from controlled and uncontrolled waste landfills.

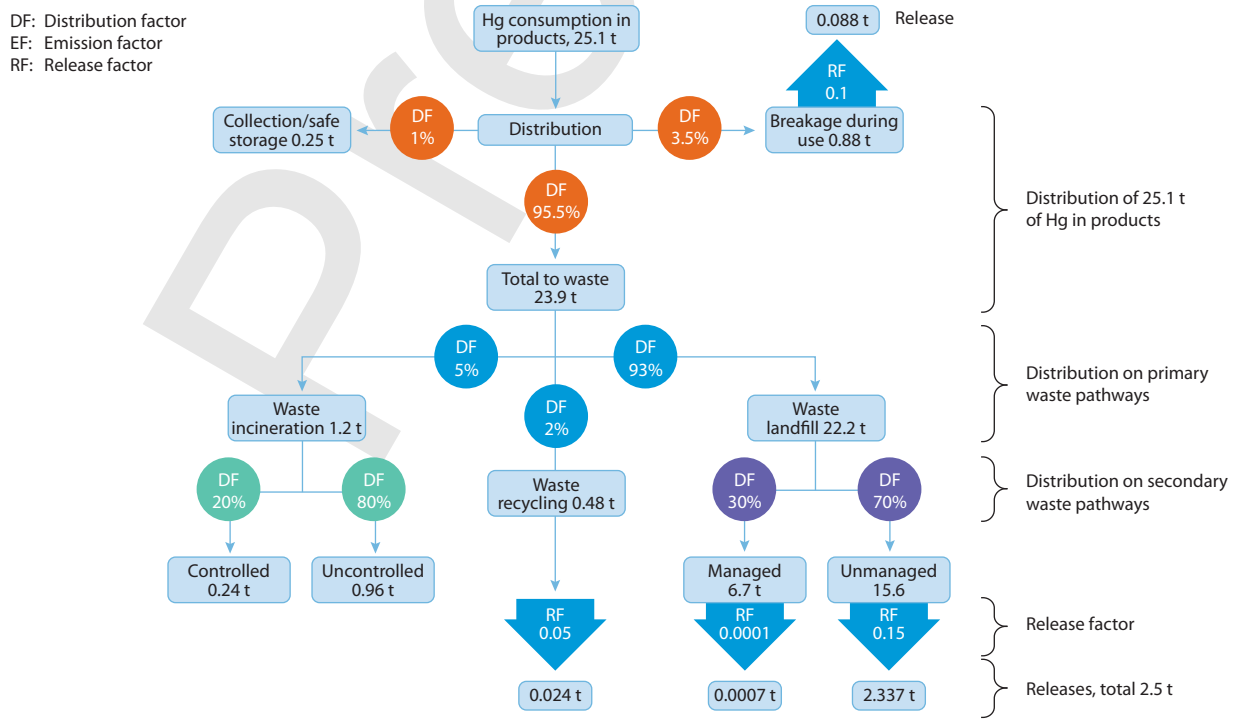

Figure A6.2 Example calculation of Hg releases from waste streams associated with Hg-added products. The example is for Mexico.