UNITED NATIONS

UNEP

SC

UNEP/POPS/COP.9/INF/10

Distr.: General
5 March 2019

English only

Stockholm Convention on Persistent Organic Pollutants

Conference of the Parties to the Stockholm Convention on Persistent Organic Pollutants
Ninth meeting
Geneva, 29 April–10 May 2019
Item 5 (a) (iii) of the provisional agenda*

Matters related to the implementation of the Convention: measures to reduce or eliminate releases from intentional production and use: polychlorinated biphenyls

Report on progress towards the elimination of polychlorinated biphenyls

Note by the Secretariat

As is mentioned in the note by the Secretariat on polychlorinated biphenyls (UNEP/POPS/COP.9/6), the annex to the present note sets out a report on progress towards the elimination of polychlorinated biphenyls prepared by the small intersessional working group on polychlorinated biphenyls established in paragraph 8 of decision SC-8/3. The present note, including its annex, has not been formally edited.

* UNEP/POPS/COP.9/1.

070319

Annex

Report on progress towards the elimination of polychlorinated biphenyls

February 2019

Acknowledgement:

The European Union and the Governments of Japan and Norway are gratefully acknowledged for providing the necessary funding that made the production of this document "Report on progress towards the elimination of polychlorinated biphenyls" possible.

The Government of Colombia served as lead country of the small intersessional working group on polychlorinated biphenyls established by decision SC-8/3. The contributions of the experts participated in the working group are highly appreciated.

Special thanks to Mr. Edwin Camelo Martinez, Mr. Jonathan Alexander Romero Coca (Colombia) and Ms. Heidelore Fiedler (Germany) for analysis of quantitative information on PCB.

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Recommended citation:

UNEP (2019). Report on progress towards the elimination of polychlorinated biphenyls. Secretariat of the Basel, Rotterdam and Stockholm conventions, United Nations Environment Programme, Geneva.

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1. Introduction

1.1 Background

1. Polychlorinated biphenyls (PCB) are listed in Annex A to the Stockholm Convention on Persistent Organic Pollutants with a specific exemption for the continued use of PCB in articles in accordance with the provisions of Part II of Annex A, to be exercised by all Parties to the Convention. The production of PCB and new uses are prohibited, and equipment containing PCB shall not be exported or imported except for the purpose of environmentally sound waste management.

2. According to Part II of Annex A, each Party shall take action towards the elimination of the use of PCB in equipment (e.g. transformers, capacitors or other receptacles containing liquid stocks) by 2025, subject to review by the Conference of the Parties. Equipment containing PCB greater than 0.005% (50 mg/kg) and volumes greater than 0.05 L should be identified and removed from use.

3. Part II of Annex A also provides that each Party shall make determined efforts designed to lead to environmentally sound waste management of liquids containing PCB and equipment contaminated with PCB having a PCB content above 0.005% (50 mg/kg), in accordance with paragraph 1 of Article 6, as soon as possible but no later than 2028, subject to review by the Conference of the Parties.

4. With regard to open applications of PCB, each Party shall endeavour to identify other articles containing more than 0.005% (50 mg/kg) PCB (e.g. cable-sheaths, cured caulk and painted objects) and manage them in accordance with paragraph 1 of Article 6.

5. Furthermore, Part II of Annex A provides that each Party shall promote measures to reduce exposures and risk to control the use of PCB, except for maintenance and servicing operations, not allow recovery for the purpose of reuse in other equipment of liquids with PCB content above 0.005% (50 mg/kg).

6. In accordance with Article 15, each Party shall report to the Conference of the Parties on the measures it has taken to implement the provisions of the Convention and on the effectiveness of such measures in meeting the objectives of the Convention. Information on progress in eliminating PCB is reported in part C of national reports pursuant to Article 15. The deadlines for submitting national reports were: 31 December 2006, 31 October 2010, 31 August 2014 and 31 August 2018. Taking into account the information in those reports, the Conference of the Parties shall review progress toward elimination of PCB.

7. In its decision SC-8/3, the Conference of the Parties to the Stockholm Convention decided to undertake, at its ninth meeting, a review of progress towards the elimination of PCB in accordance with paragraph (h) of part II of Annex A to the Convention. The Conference of the Parties established a small intersessional working group (SIWG), working by electronic means and through a face-to-face meeting, to prepare the report on progress towards the elimination of PCB for consideration by the Conference of the Parties at its ninth meeting.

8. Pursuant to paragraphs 9 and 10 of the same decision, Colombia served as lead country in the preparation of the report and Parties and observers nominated 24 experts to participate in the SIWG. The list of members of the group is available on the website of the Convention.

9. In response to the request of the Conference of the Parties in paragraph 11 of decision SC-8/3, the SIWG prepared the present report on the basis of the fourth national reports submitted by Parties pursuant to Article 15 and information obtained from an online survey conducted in 2018, as well as the information contained in the reports on the consolidated assessment of efforts to eliminate PCB,[1]

1.2 Objectives

10. To prepare a report on progress towards the elimination of PCB for consideration by the Conference of the Parties at its ninth meeting, based on the fourth national reports submitted by Parties pursuant to Article 15 and information obtained from other sources, including an online survey conducted in 2018.

[1] UNEP/POPS/COP.8/INF/10.

2. Methodology

2.1 Sources of information

11. According to the mandate of the Stockholm Convention, the evaluation of progress towards eliminating PCB is based on the fourth national reports under the Stockholm Convention. The deadline for submission was 31 August 2018; however, only 59 of 182 Parties submitted before the deadline.

12. A second source of information was the national reporting under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal: on annual basis, Parties to the Basel Convention provide data on imports and exports of hazardous wastes and other wastes, including PCB wastes at 0.005 %. The relevant code is Y10.[2]

13. The Secretariat conducted a survey for the purpose of gathering additional, up to date information on the a) regulatory framework development, b) analytical capacity for identification and quantification of PCB, c) inventory development, d) local capacity for management (storage, transport, treatment and destruction) of PCB and transboundary movements of PCB, and e) open applications management. This survey was prepared by the SIWG, sent to Parties and the deadline for submission was 30 September 2018. Only 52 of 182 Parties answered the survey by December 2018.

14. For quantitative information, a questionnaire was prepared in MsExcel (thereafter in chapter 3 referred to as 'Quest2018') and distributed together with the questionnaire to all Parties. 37 Parties reported back to the secretariat.

15. It is important to mention that the questions included in the survey and in the questionnaire, were prepared, discussed and validated during the web-based sessions among the experts of the SIWG and finally in the face-to-face meeting of the SIWG in December 2018.

2.2 Terminology and classifications

16. The Stockholm Convention requests Parties to identify, label and remove from use equipment containing greater than 0.05 % PCB and volumes greater than 5 litres as well equipment containing greater than 0.005 % PCB and volumes greater than 0.05 litres (Annex A, part II, paragraph (a)). In line with this approach, existing stockpiles and the amounts eliminated reported in this document refer to equipment containing greater than 0.005 % and volumes greater than 0.05 litres, unless otherwise specified.

17. Many countries classify equipment containing greater than 0.05% PCB as equipment manufactured with PCB and equipment containing between 0.005% and 0.05% PCB as equipment contaminated with PCB. This distinction is also used in the present report. Some countries distinguish between high- and low-density PCB. Some countries refer to equipment with a PCB content between 0.0002% and 0.005% as equipment with 'residual PCB'. Equipment containing less than 0.0005% is often considered 'PCB-free'. Alternatively, many countries set the threshold at 0.0002%.

18. For purposes of measuring PCB in different parts of the equipment or waste, two cases should be considered; the result of the analysis for metal non-porous surfaces (e.g. ferrous metal of the carcass, cooper, aluminium) should be reported in terms of µg/100cm^2. Other materials or waste such as paper, wood, contaminated soils, among others, should be reported in mg/kg.

19. The term 'PCB-assumed' is mostly used to refer to classify liquids and equipment that have not been tested for PCB content. This approach for inventory purposes, used in some countries, considers the equipment, liquid or waste as containing greater than 0.005% PCB until further laboratory analysis can specify the PCB content.

20. In line with the mandate received by the COP to the Stockholm Convention, this report uses the term 'elimination'. Meanwhile, the Stockholm Convention requests the 'environmentally sound waste management' by 2028. 'Elimination' is here understood as referring to 'environmentally sound disposal' as defined in the Basel Convention's general technical guidelines for the environmentally sound management of wastes consisting of, containing or contaminated with POPs. It thus encompasses the destruction, irreversible transformation or use of other disposal methods when neither destruction nor irreversible transformation is the environmentally preferable option (such as permanent storage in underground mines) or when the POP content is low. Such operations may or may not be preceded by pre-treatment operations. In many instances, decontamination is sufficient. A number of methods are commercially available for this purpose and are listed in the technical guidelines. It follows, that other elements of environmentally sound management, such as storage, are not sufficient to fall under the category of 'elimination'.

[2] Wastes, substances and articles containing, consisting of or contaminated with polychlorinated biphenyl (PCB), poly-chlorinated terphenyl (PCT), polychlorinated naphthalene (PCN) or polybrominated biphenyl (PBB).

2.3 Data collection and analysis

2.3.1 National reporting

21. According to subparagraph (g) of part II of Annex A, each Party shall provide a report every five years on progress in eliminating PCB and submit it to the Conference of the Parties pursuant to Article 15. By decision SC-2/18, the format for reporting on PCB was adopted and incorporated into the format for national reporting pursuant to Article 15, and the reporting interval was set to four years.

22. By decision SC-7/23, the Conference of the Parties decided that each Party shall submit its fourth national report by 31 August 2018. In accordance with subparagraph (h) of part II of Annex A, the information in the national reports is the primary source of information for the preparation of the report.

23. From previous reports, the Secretariat identified Parties that have fragmented or incomplete reporting, errors in the use of units and others, as noted in the consolidated assessment of efforts made towards the elimination of PCB[3] and in the report of the effectiveness evaluation of the Stockholm Convention.[4]

24. The most relevant gap to gather the information is the lack of reports from Parties. The Secretariat provided SIWG with a list of prioritized countries, taking into account those that have not reported to date or that did so less than twice, or have not provided complete information on PCB.

25. The strategy to increase the rate of submission of national reports by Parties, pursuant to Article 15 of the Stockholm Convention[5] adopted at COP-8, gives the mandate to the Secretariat to provide feedback on national reports to all Parties and identify the areas of the reports that can be improved in the next submission.

26. In addition, a communication regarding the fourth national report was sent to Parties by the Secretariat, and members of the SIWG followed up with certain Parties to increase their submission rate.

27. The Secretariat compiled the information from the fourth national reports as well as other information submitted by Parties and observers and made it available to the members of the SIWG, by December 2018. Taking into consideration that some Parties submitted the fourth national report after deadline, therefore these national reports were not included in this report.

2.3.2 Review and update for analysis of national reports

28. Considering the recommendations and conclusions of the consolidated assessment of efforts made towards the elimination of PCB indicated that challenges and limitations are evident for the analysis of the information, it was necessary to review and adjust the methodology of information analysis. This review was conducted with support of a consultant, discussed and agreed within the SIWG members.

29. Information contained in the national reports relevant to PCB and the reports for Basel Convention were considered in the preparation of the report on progress towards the elimination of PCB.

2.3.3 Additional information collection on PCB

30. An online survey was conducted to collect additional information on PCB from Parties and observers. This was a qualitative instrument for characterization of the main achievements and challenges faced by Parties, addressing more relevant milestones on the Environmental Sound Management of PCB, including the following:

(a) Regulatory framework development;

(b) Inventories development;

(c) Analytical capacity for identification and quantification of PCB;

(d) Local capacity for treatment and decontamination of PCB;

(e) Transboundary movements of PCB;

(f) Open applications management.

31. The online survey was prepared by the lead country with support of the Secretariat, the questions were revised and validated by members of PCB SIWG and information available in national reports was considered, to avoid overlapping. The Secretariat sent the online survey to Parties, which was approved by the members of the SIWG, with deadline September 30, 2018, and compiled the results for analysis.

[3] UNEP/POPS/COP.8/INF/10.

[4] UNEP/POPS/COP.8/INF/40.

[5] UNEP/POPS/COP.8/INF/37.

32. An additional section was included in the survey, asking for the quantitative data available in the country (e.g. amounts of equipment in use, eliminated, under storage, among others), to be filled in a template, attached to the invitation letter sent to Parties.

2.3.4 Consolidated analysis of the progress towards the elimination of PCB

33. In line with the provisions of parts I and II of Annex A to the Convention, as well as considering the key elements that must be addressed in order to achieve the goals of the Stockholm Convention, the following issues were analysed by the members of the SIWG:

(a) Quantitative analysis, i.e. amounts eliminated and still to be eliminated, calculated under the reviewed analysis methodology applied on national reports;

(b) Qualitative results, i.e. identification of the main achievements and challenges at regional or national scale.

34. On the basis of the results of the analysis, the SIWG identified activities that must be prioritized in order to achieve the goals of the Convention and discussed and drafted the recommendations to be sent to COP9, during a face to face meeting that took place in Prague, from 12 to 14 December 2018.

3. Quantitative data

3.1 Baseline

35. The consolidated assessment of progress toward elimination of PCB submitted by UNEP Chemicals to COP-8 (UNEP, 2017) estimated that total production worldwide has been estimated to be around 1.5 million tons of PCB . No new or more accurate data has been found since (or was requested). The upper and the lower estimates of the global PCB production (as “pure” chemicals) are shown in **Table 1**.

Table 1: Estimate of global PCB production (tons) (source (UNEP, 2017)).

Country	Start of production		End of production		Amount (1,000 t)	
	Earliest estimate	Latest estimate	Earliest estimate	Latest estimate	Lowest estimate	Highest estimate
Korea (DPR)	1960s	1960s	2006	>2006	25	30
Soviet Union/ Russian Federation	1938	1939	1993	1993	180	180
Spain	1930	1955	1984	1986	25	29
Czechoslovakia	1959	1959	1984	1984	21	21
West Germany	1930	1950	1983	1983	59	300
Italy	1958	1958	1983	1983	24	31
France	1930	1930	1980	1984	102	135
Poland	1966	1966	1977	1977	2	2
USA	1929	1930	1975	1977	476	700
China	1960	1965	1974	1983	7	10
Japan	1952	1954	1972	1972	59	59
United Kingdom of Great Britain and Northern Ireland	1951	1954	1965	1977	66	67
Total					**1,046**	**1,512**

36. All production was declared to have occurred before 2001; however, the National Implementation Plan (NIP) from the Democratic Republic of Korea stated that production did occur at least until 2006. Since then no updated information has been found.

37. The quantity of PCB used for particular applications (e.g. construction material, flame retardants, dielectric oil) is unknown, thus there is no baseline data for individual applications.

3.2 Approach

38. For this assessment, no differentiation as to concentration or the nature of the PCB was made; all amounts that were identified as 'PCB' according to national definition is being used. Typically, countries apply the limit of 50 mg/kg as stipulated in the Basel and Stockholm conventions (UNEP, 1992, 2001). However, it shall be noted that some countries do not include equipment such as large transformers in their inventory for 'PCB destroyed' since the carcass was decontaminated or could be reused or recycled. It shall be noted that such an approach is not in line with the Article 15 national reporting where it is stated 'equipment, liquids, or other wastes containing greater than 0.005% (50 ppm) PCB'.

39. Also, some countries have reported PCB in open applications in their inventories. As a result, the data reported by Parties is not comparable.

40. This section includes the quantitative information submitted by Parties to the Stockholm Convention from the following sources:

(a) Stockholm Convention national reports under article 15:

(i) Third national report (NR3);

(ii) Fourth national report (NR4);

(b) Questionnaire form 2018, tabular form in MsExcel (hereinafter referred to as "Quest2018");

(c) Online survey, question 3.1, PCB inventory (hereinafter referred to as "3.1").

41. National reports from the Basel Convention on the export and import of PCB for destruction were available from 2001 until 2016 (UNEP, No Year-b). For this assessment, the Y10 code has been used.

42. The information from the national reports were extracted from the Stockholm Convention Website. The Questionnaire 2018 (Quest2018) and the survey were sent by the BRS Secretariat to Parties and stakeholders containing five basic questions regarding the elimination/destruction of PCB (Questions 1-3) and quantity to be eliminated (Questions 4 and 5). Question 3.1 in the survey requested quantitative results for inventory in the country.

43. It is assumed that the NR4 reporting is not yet complete, because some Parties continue to send reports after the deadline.

44. After receiving initial information, requests for clarification were sent to the Parties where necessary and values have been corrected or adjusted accordingly. It shall be noted that some Parties could not be consulted and therefore, some adjustments were made where major inconsistencies occurred. In most cases, quantities of PCB appeared to be too high, thus it was assumed, on the basis of expert judgement, that there were unit conversion errors (used kg instead of ton). These errors were amended by dividing by 1000 to achieve quantities in tons, rather than kg.

3.3 Information from Stockholm Convention and Basel Convention sources

3.3.1 PCB destroyed within national boundaries

45. This section includes information extracted from question 15 of NR3 and NR4 and question 1 of Quest2018. There are considerable differences between reporting cycles, which cannot be explained by the different time periods and the survey (Table 2). Especially the amounts destroyed in Japan (Asia region) reported in the survey but not in the reporting cycles, causes big differences.

46. It can be seen from the reporting form, it is not clear if countries shall report the accumulated amounts or the amounts destroyed within the reporting period (four years). More guidance should be provided for Article 15 reporting and make clear that historically accumulated quantities shall be reported with each national report.

47. From the data available, large differences between regions, driven by a few countries in the Asia (Republic of Korea in NR4 and Japan in survey) and the GRULAC (Argentina) region can be seen. From WEOG it is assumed that not all countries reported historic local destruction.

Table 2: Total quantities of PCB destroyed within national boundaries according to national reports and Quest2018 according to region and detailed by country.

Region	NR3 Total (t)	NR4 Total (t)	Quest2018 Total (t)
Africa	1,033	1,080	
Asia	6,160	102,437	748,090
CEE	7,274	6,914	5,312
GRULAC	21,008	47,207	40,439
WEOG	93,283	22,055	132,421
Grand total	128,757	179,693	926,263

Region/country	NR3 (t)	NR4 (t)	Quest2018 (t)
Africa	1,033	1,080	
NGA	7.62		
RWA		55.2	
ZAF	1,025	1,025	
Asia	**6,160**	**102,437**	**748,090**
AZE		10.0	
CHN	4,360	5,611	
JPN			748,086
KOR		96,816	
LKA	1,000		4.25
MNG	800		
CEE	**7,274**	**6,914**	**5,312**
CZE	5,194	5,194	
EST	371	455	455
LTU	28.4	37.7	
MKD	167	682	682
POL	195		
ROU	545	545	851
SRB			522
SVK	773		2,802
GRULAC	**21,008**	**47,207**	**40,439**
ARG	54.4	25,314	37,197
BOL		100	
BRA	19,039	18,965	
COL		555	602
CRI		55.0	
ECU			382
MEX	1,897	2,172	2,172
SLV	17.7	45.7	85.0
WEOG	**93,283**	**22,055**	**132,421**
AUS		10,233	36,231
AUT	2,550		
BEL		5,145	
CAN	262	906	3,764
CHE	2,092		38,113
DEU		-	30,580
DNK	2,027		2,622
ESP	81,365	88.3	
FIN	98.6	443	
GBR	46.3	411	365
NLD	53.0		
SWE		40.0	20,747
TUR	4,789	4,789	
Grand Total	128,757	179,693	926,263

3.3.2 PCB exported for destruction

48. This section includes the information extracted from question 17 of the NR3 and NR4, question 2 'Amount of PCB exported to foreign country for destruction' of Quest2018 and the Basel Convention national reports using the Y10 code. It shall be noted that the statistics from the Basel Convention covers the years 2001-2016; thus, a longer period than usually reported in the national reports (4 years).

49. The implications of the longer period (and annual statistics) as well as the mandatory reporting of hazardous waste export under the Basel Convention can be seen in the summary information as shown in Table 3. From the detailed information by country, it can also be seen that several countries report PCB export (and management) only under the Basel Convention and not under the Stockholm Convention; for more details on the Basel reporting, see section 3.5.

50. It shall be noted that the quantities shown in Table 3 are different from those reported earlier since obvious errors in the national reports were identified where a few Parties provided amounts in kg rather than tons. For example, the draft progress report assessing the national reports in March 2018, reported an export of 4,282,900 tons from the GRULAC region; the corrected number accounts for 17,208 tons.

51. From the information provided under the Stockholm Convention (NR3, NR4, Quest2018), the quantity of PCB exported for destruction only accounts for 10% of the quantity exported for destruction reported by Africa or Asia. It is assumed that the NR4 reporting is not yet complete.

Table 3: Total quantities of PCB exported for destruction according to national reports and Survey according to region and detailed by country.

Region	NR3 Total (t)	NR4 Total (t)	Quest2018 (t)	Basel (t)
Africa	1,055	1,266	2,231	28,037
Asia	1,038	1,491	1,534	42,764
CEE	10,378	4,228	8,184	31,308
GRULAC	17,208	10,936	12,154	22,789
WEOG	25,053	17,392	13,138	367,343
Grand Total	**54,731**	**35,312**	**37,240**	**492,240**

Detailed by country

Region/country	NR3 (t)	NR4 (t)	Quest2018 (t)	Basel (t)
Africa	**1,055**	**1,266**	**2,231**	**28,037**
MAR	600	1,085		20,560
CMR	50.0	128	159	
COD				186
COG				130
DZA				1,075
EGY				180
GHA		53.0		
GIN	400			
MUS	5.00			
SEN			2,072	31
SWZ				205
TGO				60
TUN				823
ZAF				4,550
ZMB				237
Asia	**1,038**	**1,491**	**1,534**	**42,764**
ARE				54
CHN				1,500
IRN				368

Region/country	NR3 (t)	NR4 (t)	Quest2018 (t)	Basel (t)
KAZ	277	429	429	
KOR				3,807
LBN		91.0		
PHL			1,106	463
SGP				998
THA	761	971		1,900
UZB				33,675
CEE	**10,378**	**4,228**	**8,184**	**31,308**
BGR	1,892			3,045
BIH	381	494	736	369
BLR	19	857		179
CZE	820	820		184
EST	10.4	66.9	66.9	94.7
HRV	265	606	607	1,087
HUN				8,273
LTU		10.9		35.3
LVA				466
MDA				177
MKD	31.2	84.6	84.6	
MNE	65.6			210
POL	6,043			4,685
ROU	217	217	1,279	1,315
SRB		276	5,059	7,484
SVN	633	796	352	704
UKR				3,000
GRULAC	**17,208**	**10,936**	**12,154**	**22,789**
ARG	6,371		4,475	2,440
BOL	33.0	100		33.0
BRA	800	800		4,000
CHL		1,761		340
COL	548	2,294	2,101	2,077
CRI	30.0	1,226	119	
DMA				21.0
DOM				450
ECU		137	137	
GTM	93.1		176	906
HND	111			103
JAM	302			127
MEX	4,084	3,779	5,145	9,768
NIC				220
PAN				75
PER	70.4	229		1,211
SLV	12.0	12.0		
TTO		0.12		
URY				269

Region/country	NR3 (t)	NR4 (t)	Quest2018 (t)	Basel (t)
VEN	4,753	597		749
WEOG	**25,053**	**17,392**	**13,138**	**367,343**
AND				94.8
AUT				289
BEL		1,027		73,416
CHE	449		10,185	5,567
DEU		-		38,994
DNK				1,089
ESP				35,936
FRA	7,544			42,833
GBR				28,240
GRC				2,886
IRL	123	132	431	472
ISL				148
ISR				135
ITA				87,340
LIE				151
LUX				2,374
MCO				46
MLT				1,955
NLD	1,006		1,253	4,003
NOR	400			10,058
NZL		52.2		878
PRT			549	2,454
SWE			719	14,208
TUR	15,531	16,181		13,777
Grand Total	**54,731**	**35,312**	**37,240**	**492,240**

3.3.3 PCB imported for destruction

52. This section includes the information extracted from question 17 of the NR3 and NR4, question 3 ‘Amount of PCB imported from foreign country for destruction’ of Quest2018 and Basel national reporting (2001-2016).

53. Only a few countries reported import of PCB for destruction and the largest amounts were imported into certain EU countries (Table 4). Whereas the numbers are generally consistent between NR3 and NR4, the Quesrt2018 and the Basel reporting revealed very different numbers. Detailed information on the Basel reporting can be found in section 3.5.

Table 4: Total quantities of PCB imported for destruction according to national reports, Quest2018 and Basel national reports according to region and detailed by country.

Region/country	NR3 (t)	NR4 (t)	Quest2018 (t)	Basel (t)
Africa	**30.0**	**30.0**		**75.0**
ZAF	30.0	30.0		75.0
Asia				**4,547**
UZB				4,547
CEE	**2,305**	**16.7**	**2,595**	**5,768**
BLR				26.2
CZE				181
EST	5.46	16.7	16.7	7.86
LTU				4,860
POL	2,300			631

Region/country	NR3 (t)	NR4 (t)	Quest2018 (t)	Basel (t)
ROU			2,578	61.5
WEOG	**11,672**	**16,367**	**37,693**	**240,318**
AUS		2,700	2,849	140
AUT				10,019
BEL		9,019		25,306
CHE	28.0		79.0	850
DEU				73,612
DNK	393		624	7,572
ESP	419			13,677
FIN	4,449	4,565		12,170
FRA	5,262			29,288
GBR	83.4	83.4		938
ITA				875
NLD	1,038		32,737	53,587
NOR				4,740
NZL				51.7
SWE			1,403	7,492
Grand Total	**14,008**	**16,414**	**40,287**	**250,708**

3.4 Quantities to be eliminated (in storage or in use)

54. This section includes the information obtained from question 14.2 of NR3 and NR4 as well as from Quest2018 (Q4: 'Amount of PCB stored safely awaiting destruction' (domestic or export) and question 5 'Amount of PCB still available/in use or in need of safe storage/destruction') and question 3.1 of the survey. The data according to region is shown in Table 5.

55. After correction of some obvious errors, harmonized information was obtained across the information collection; note that the amounts reported in NR3 and NR4 corresponds to the Subtotal of Quest2018 (combined 'Stored' and 'in use'). The lowest total was for the online survey S 3.1 but still within a factor of 2.

56. Large differences were observed in the data of the national reports. The quantities reported by Parties were flagged with information and different approaches were used: some countries include all unknown/suspect contamination in the inventory; others only included the confirmed equipment/liquids. Further differentiation was made that some Parties only reported the liquids and not the equipment. On the other hand, several countries in the EU and WEOG included estimated quantities from open applications.

57. The quantities of PCB in storage or in use are highly uncertain due to the following:

(a) Overestimation as a precautionary approach was used to determine upper-bound estimates for not yet classified equipment including the liquids contained (i.e. where concentrations above 50 mg/kg yet been confirmed);

(b) Extrapolation of unknown contamination is based on previous percentage of positively identified equipment/liquids;

(c) Open applications are included in the inventory.

Table 5: Total quantities of PCB in inventory according to region and detailed by country.

	NR3	NR4	Quest2018			S 3.1
Region	**inventory (t)**	**inventory (t)**	**in use (t)**	**Stored (t)**	**Subtotal (t)**	**inventory (t)**
Africa	14,894	14,956	4,220	2,095	6,315	1,259
Asia	64,844	98,519	788	14,318	15,106	17,229
CEE	47,396	19,094	4,716	22,941	27,658	15,101
GRULAC	164,677	129,535	153,048	45,189	198,237	21,355
WEOG	8,683	18,182	51,579	63.4	51,642	70,002
Grand Total	**300,495**	**280,287**	**214,352**	**84,606**	**298,958**	**124,945**

Detailed by country

Region/ Country	NR3 Inventory (t)	NR4 Inventory (t)	Quest2018			S 3.1 Inventory (t)
			In use (t)	Stored (t)	Subtotal (t)	
Africa	**14,894**	**14,956**	**4,220**	**2,095**	**6,315**	**1,259**
MAR	4,195	4,195				
CIV						1,000
CMR	1,800	1,800	90.2	22.6	113	6.90
ERI			732		732	50.0
KEN						-
MDG	8,894	8,894				
MDV			0.76		0.76	0.41
MUS	4.90	4.90				
SEN			3,397	2,072	5,469	202
STP		62				
Asia	**64,844**	**98,519**	**788**	**14,318**	**15,106**	**17,229**
AZE						50.0
FSM						-
IDN		635				
IND						9,837
JPN			754	13,326	14,080	3,300
KAZ				480	480	3,500
KGZ	34.0	34.0	34.0		34.0	34.0
KOR	64,234	96,816				
LBN		195				
MNG	324	324				
NPL	252	252				
PHL		262		512	512	508
PSE						-
CEE	**47,396**	**19,094**	**4,716**	**22,941**	**27,658**	**15,101**
ALB	1.10	1.10				
BGR	7.24	7.24				
BIH		78.5	2,360	22,790	25,150	25.2
BLR	4,795	3,876				
CZE	31,799	4,742				
EST	58.0	188				-
HRV	0.72	0.72	183		183	183
LTU	19.0	43.9				
LVA	0.60	0.60				
MKD	862	308	308	16.1	324	325
POL	7,884	7,884				
ROU	1,956	1,956	1,549	88.9	1,638	1,638
RUS						-
SRB			308		308	4,500
SVK						30.0
SVN	13.3	8.41	8.50	46.4	54.9	8,400

Region/ Country	NR3 Inventory (t)	NR4 Inventory (t)	Quest2018			S 3.1 Inventory (t)
			In use (t)	Stored (t)	Subtotal (t)	
GRULAC	**164,677**	**129,535**	**153,048**	**45,189**	**198,237**	**21,355**
ARG			13,000	2,000	15,000	2,000
BRA	1,153	2.47				
CHL						353
COL*	160,978	126,074	131,203	6,370	137,573	1,573
CRI	167	16.0		10.5	10.5	
CUB		1,156				
ECU			4,183	24,450	28,633	425
GTM	318	842	728	83.2	811	801
HND	144	144				
JAM	171	171				
MEX			3,450	12,254	15,703	15,703
NIC	11.3	307				
PER	1,256	346				
SLV	478	478	485		485	478
SUR				21.5	21.5	21.5
WEOG	**8,683**	**18,182**	**51,579**	**63.4**	**51,642**	**70,002**
AUS	3,547	3,547				
CAN			0.07	22.0	22.1	0.07
CHE	5.50	5.50	217		217	220
DEU	359	11,151	50,700		50,700	47,200
DNK						52.0
ESP	4,752	3,476				
GBR			531		531	
IRL	19.8	1.98	4.17		4.17	4.33
MCO						-
NLD						-
NOR						125
PRT			112	41.4	153	22,401
SWE			15.0		15.0	
Grand Total	**300,495**	**280,287**	**214,352**	**84,606**	**298,958**	**124,945**

58. 124,000 tons of equipment/waste belonging to the category “Equipment containing an undefined concentration of PCB” were reported to the Convention by Colombia, as required in the National Reporting Format (Part C, Question 14.2).

3.5 Reporting under the Basel Convention

59. National reports from the Basel Convention regarding export and import of PCB for destruction were available from 2001 until 2016 (UNEP, No Year-b). For this assessment, the Y10 code has been used. The amounts were assessed for handling before 2004 and after 2004, i.e. entry-into-force of the Stockholm Convention.

60. It shall be noted that reported numbers in S 3.1 were corrected for a few Parties, as per consultations with Parties requesting further clarification.

61. The total quantity of PCB waste exported for destruction was 492,240 ton whereby 107,024 ton (corresponding to 22% of the total) were exported before 2004 and 385,216 tons after 2004 (corresponding to 78% of the total) (see Table 6).

Table 6: Total quantities of PCB exported for destruction according to Basel national reporting (period 2001-2016) and region.

Region	Before 2004 (t)	After 2004 (t)	Total (t)
Africa	8,825	19,212	28,037
Asia	1,536	41,228	42,764
CEE	10,076	21,232	31,308
GRULAC	9,003	13,786	22,789
WEOG	77,585	289,758	367,343
Grand Total	**107,024**	**385,216**	**492,240**

62. It can be seen from Table 6 that after entry into force of the Stockholm Convention, the amounts of PCB exported or imported for destruction increased by 4- and 5-fold, respectively. According to this survey, import is mainly into the WEOG region (96%), and therein to Germany and the Netherlands followed by France and Belgium (Table 7). No import was reported to GRULAC. Minor amounts were imported into Asia (4,547 tons into Uzbekistan) and CEE (5,768 tons into six countries), in contrast to the information from the Stockholm Convention reporting.

Table 7: Total amounts of PCB imported for destruction according to Basel national reporting (period 2001-2016) and region.

Region	Before 2004 (t)	After 2004 (t)	Total (t)
Africa	0	75	75
Asia	690	3,857	4,547
CEE	39	5,729	5,768
WEOG	42,655	197,663	240,318
Grand total	**43,384**	**207,325**	**250,708**

3.6 Summary of Quantitative Information Reporting under the Stockholm and Basel conventions

63. The quantities reported under the Basel Convention for import and export for destruction are considerably higher than from any of the three sources under the Stockholm Convention. However, after corrections the quantities reported under NR3, NR4 and obtained through Quest2018 are in the same order of magnitude. PartiesNotably, there is a lack of responses from Parties for all reports, surveys and questionnaires.

64. Through Quest2018, an initiative set forth by the PCB SIWG, new information can be obtained for quantities of PCB for domestic destruction.

Table 8: Import for destruction: Comparison of PCB destruction data provided from Stockholm and Basel information sources.

	NR3 (t)	NR4 (t)	Quest2018 (t)	Survey (t)	Basel (t)
Locally destroyed	128,757	179,693	926,263		
Exported	54,731	35,312	37,240		492,240
Imported	14,008	16,414	40,287		250,708
Inventory (Stored+in use)	300,495	280,287	298,958	124,945	

3.7 Conclusions

65. The conclusions of the quantitative analysis are the following:

(a) Quantitative information does not match within national reports, questionnaires or surveys. It required post-response QA/QC as data provided was inconsistent among Parties;

(b) PCB inventory in NR does not differentiate between PCB waste safely stored and PCB in use/not classified;

(c) PCB in open applications are not to be quantified in the national reports (and not an obligation under the Stockholm Convention); however, some Parties include open applications in their inventory;

(d) National reports are obligatory under the Stockholm Convention but are not completed on time and are rarely fully completed;

(e) The surveys gave important information but were limited and voluntary;

(f) Reported data under the Basel and Stockholm conventions were inconsistent. However, data reported under the Basel Convention covers a longer period of time;

(g) Inaccuracies resulted from different interpretations of the meaning of 'PCB in use', in some cases it contained confirmed PCB waste and 'to be tested' PCB using the definition of 50 mg/kg as stipulated in the Stockholm Convention.

4. Qualitative analysis

4.1 Progress in developing legal framework for PCB

66. The Stockholm Convention obliges the phase out of PCB in equipment by 2025 as well as environmentally sound waste management of PCB and PCB-contaminated equipment with PCB content above 0.005% by 2028. Without legal framework, these goals would be exceptionally challenging and perhaps even unmanageable.

67. Question 1 of the survey on the progress of elimination of PCB investigates the number of respondents having PCB-related legislative or regulatory measures in place. 100% of respondents of the CEE, GRULAC and WEOG groups have indicated there is legislation or are regulatory measures in place in their respective countries (Figure 1). Of the respondents in the Asia-Pacific group, approximately 73% of respondents have indicated there is legislation or are regulatory measures in place in their respective countries. Finally, in the African group, only 25% of respondents have indicated there is legislation or are regulatory measures in place in their respective countries. Ultimately, the majority of respondents (~83%) have some sort of legislative or regulatory measures in place related to PCB.

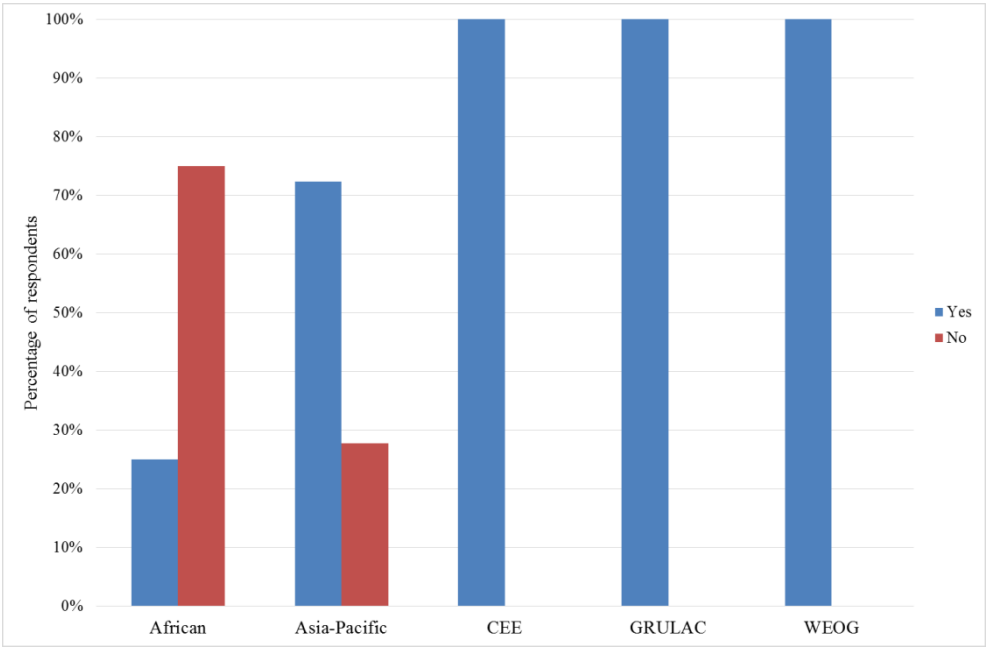

Figure 1: Percentage of respondents by region having or not having legislation or regulatory requirements related to PCB. Results from survey; question 1.

68. Disparities in the data as a result of having only ~29% of Parties respond to the survey become apparent when comparing with the results from the third and fourth National Report pursuant to Article 15 of the Stockholm Convention (Figure 2). Though the data from the National Reports is the result of a slightly different question, there is at least an approximate 50% response rate, which is likely more representative of the situation.

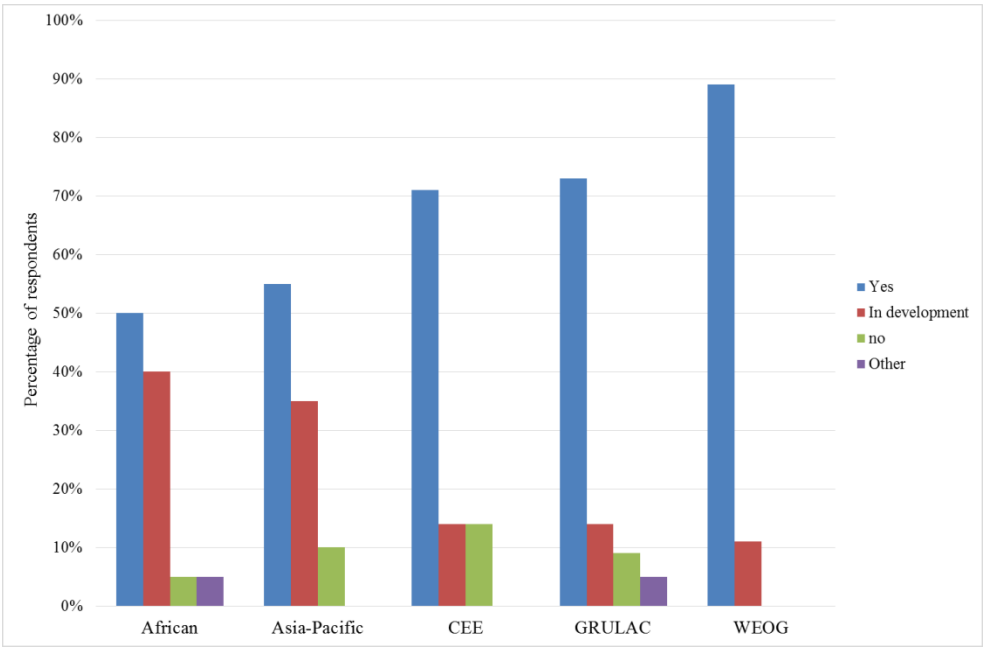

Figure 2: State of measures in place for the management, phase-out and disposal of PCB by United Nations regional groups. Results from 3rd and 4th National Reports pursuant to Article 15 of the Stockholm Convention.

69. Question 5 of Part B, Section II of the National Report requests if legal and administrative measures are in place to prohibit the production, use, import and export of PCB. WEOG respondents have the highest percentage of measures in place to prohibit the production, use, import and export followed by CEE and Asia-Pacific. In comparison to the survey results, data from National reports indicates that GRULAC and Africa regional groups have the fewest regulatory measures in place. Finally, it is concerning that almost 30% of Africa respondents have no measures in place.

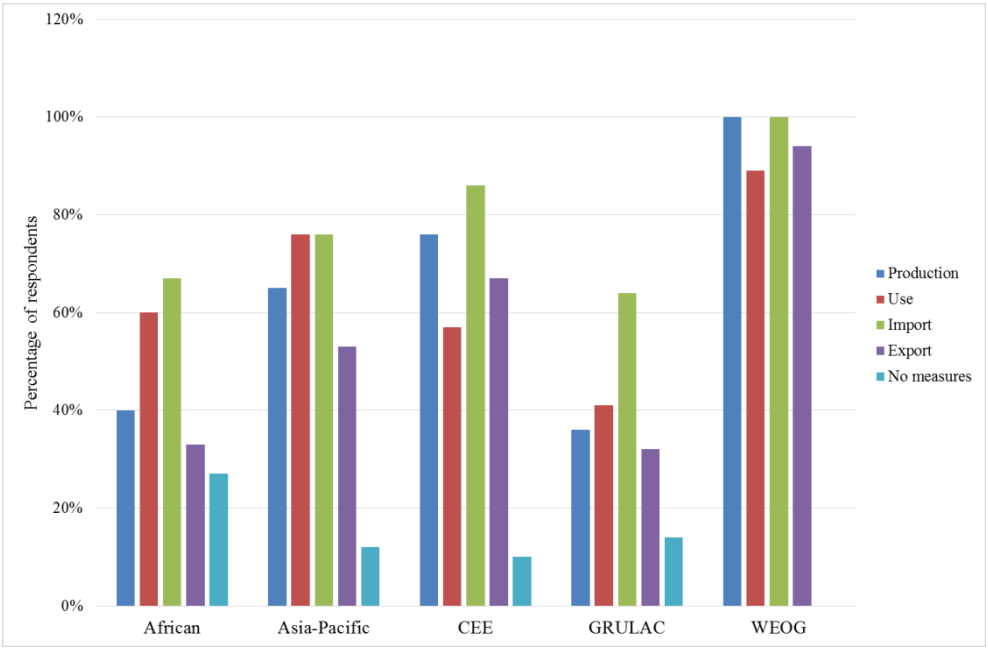

Figure 3: State of measures in place to prohibit the production, use, import and export of PCB by United Nations regional group. Results from Third National Reports pursuant to Article 15 of the Stockholm Convention.

70. Question 1.1 from the survey looks deeper into the requirements of the legislation or regulatory measures in place relating to PCB. Of the respondents to the survey, about three quarter believe that their respective countries will achieve the 2025/2028 goals of the Stockholm Convention (i.e. each Party eliminates the use of PCB in equipment by 2025 and ensures the environmentally sound management (ESM) of wastes containing or contaminated with PCB by 2028). At the regional level ≥70% of the countries believe they will meet the 2025/2028 goals in all regions except for in Africa (~38%), with the CEE region having the highest (90%) likelihood of meeting the 2025/2028 goals (Figure 4).

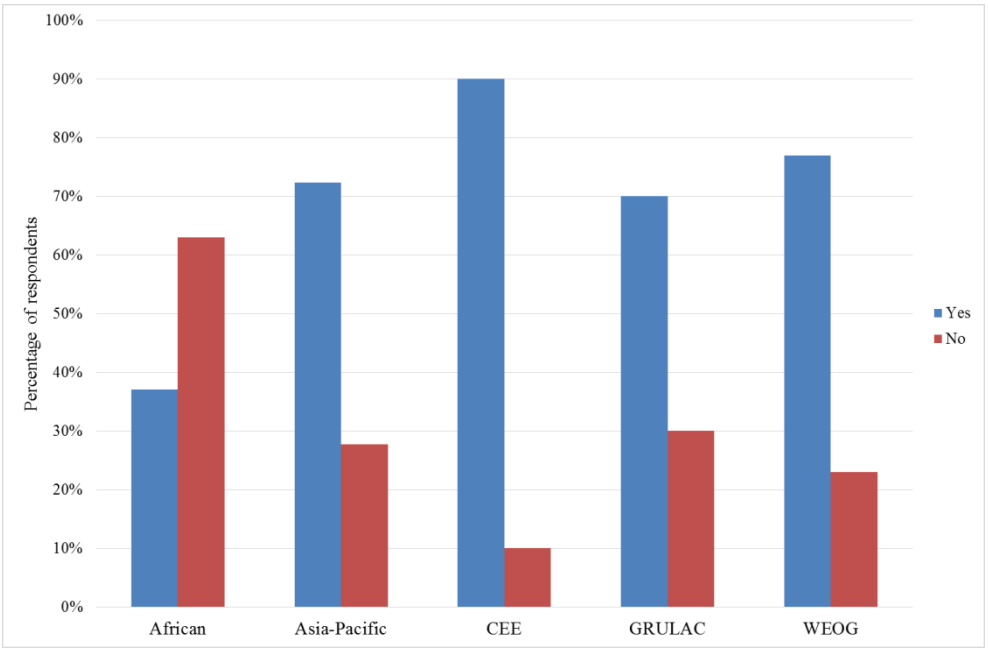

Figure 4: Percentage of respondents by region in relation to meeting the PCB 2025/2028 goals of the Stockholm Convention. Results from survey; question 1.1(a).

71. The following results will look only at those who have PCB-related legislative or regulatory measures in place, since the requirements to be discussed would be stipulations of the measures in place (Figure 5).

72. For those with PCB-related legislation or regulations in place, considerable work has been put in place to ensure that PCB-containing or -contaminated equipment is labelled (~88% of respondents) and that it is decontaminated or disposed (~91%). The majority of respondents to the survey (with measures in place) indicated that their respective country: designated competent authorities to coordinate and implement their PCB-related legislation or regulations (81%), enforces the measures (84%), takes action to ensure stakeholder awareness (86%) and upholds an inventory of equipment containing PCB (84%); all of which are crucial steps toward the elimination of PCB.

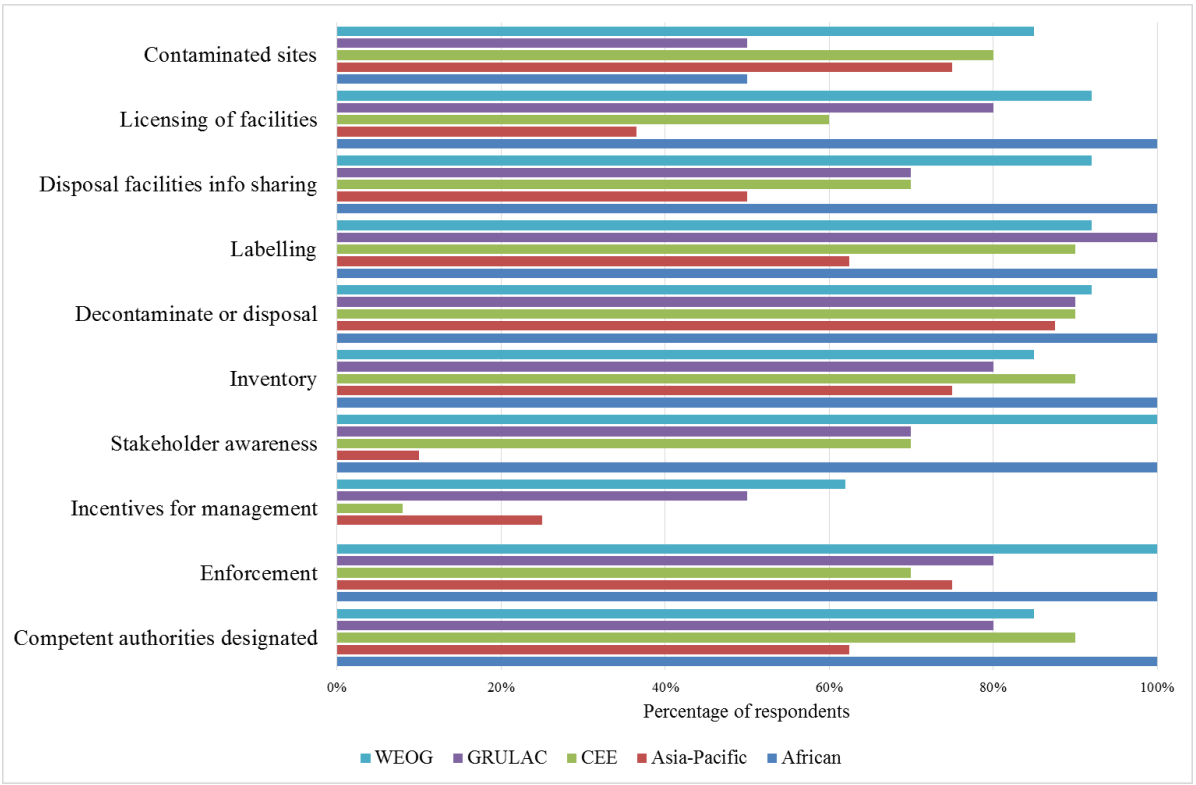

Figure 5: Percentage of respondents in each of the five United Nations Regional Groups who have the designated type of requirement in legislation or regulations related to PCB. Results from survey; question 1.1(b-k) only considering those who indicated in question 1 that their respective countries have PCB-related legislative or regulatory measures in place.

73. It is concerning that approximately 30% of respondents have indicated that the quality of the facilities or companies for interim storage, decontamination or elimination of PCB is not ensured through licensing or accreditation. Inherent risks of exposure to workers and accidental releases to the environment emerge without quality control for storage, decontamination or elimination of PCB. Furthermore, the same respondents indicated that the PCB disposal facilities do not keep registers or communicate to authorities the origin, quantities, nature, and content of equipment containing PCB, meaning there is no record or assurance that PCB are being disposed of correctly.

74. Finally, a further area of improvement is represented by the nearly 30% of respondents indicating that their respective countries do not identify (and remediate) contaminated sites as per Article 6(1)(e) of the Convention.

75. When looking at the results to question 1.1 (b-k) of the survey and considering of all responses, i.e., irrespective of whether a country does or does not have PCB-related legislation or regulations in place, significant differences can be seen (Figure 6). For example, the consistent pattern of higher percentages of actions coming from CEE, GRULAC and WEOG regional groups is apparent. While two countries from the African region have a significant number of measures in place, those countries without PCB-related legislative or regulatory measures in place are severely lagging behind. Perhaps the implementation of the measures in development will result in an improvement in this region.

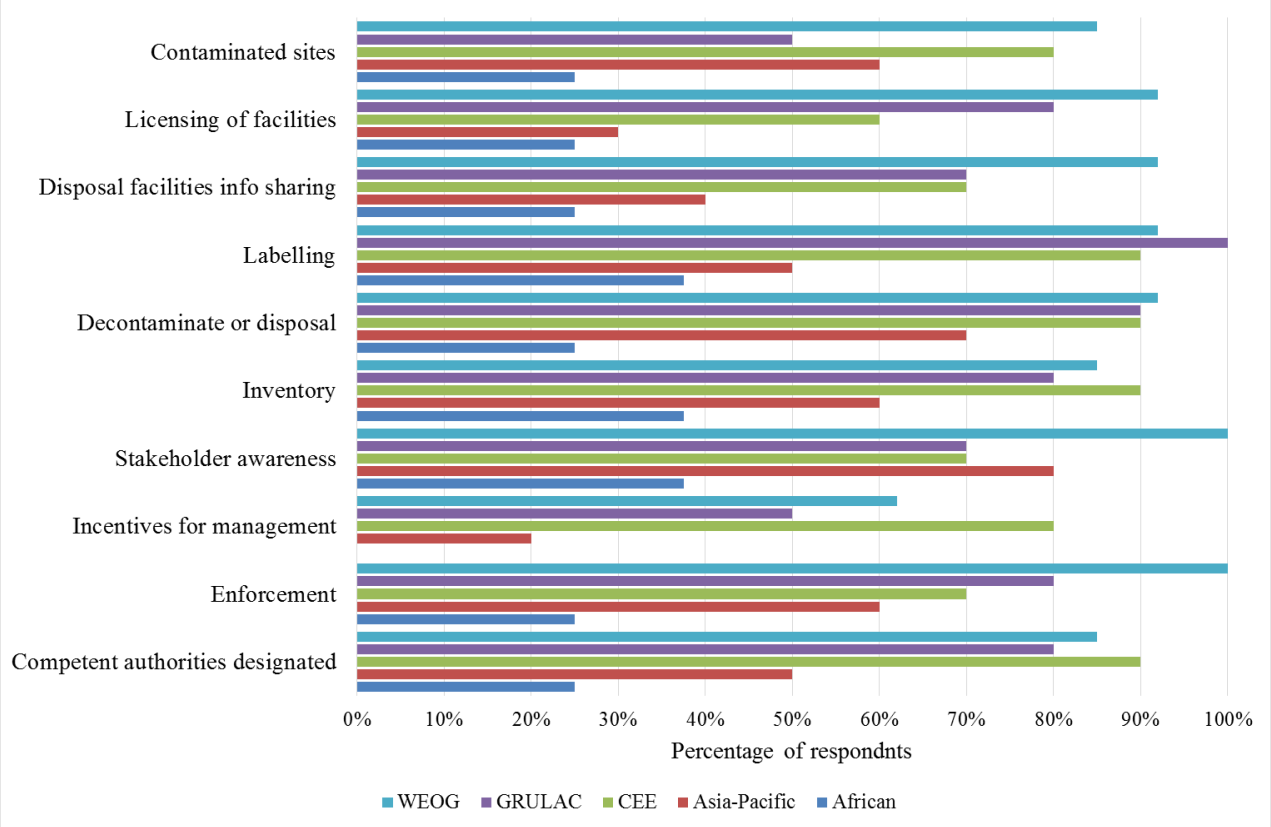

Figure 6: Percentage of respondents in each of the five United Nations Regional Groups who have the designated type of requirement in legislation or regulations related to PCB. Results from voluntary survey 2018; question 1.1(b-k) regardless of indication of having PCB-related legislative or regulatory measures in place or not.

4.2 Progress in developing analytical capacity for identification and quantification of PCB

76. Laboratory analyses of PCB are undertaken to determine compliance with Annex A part II and subpoints contained therein (cf Annex A part II a i)-iii) and f) in particular). Not in all cases are laboratory analyses necessary to identify PCB. In some cases, a descriptive label may be sufficient; however, the question 2.3.1 indicates the type of PCB application or sampling undertaken by trained personnel and thus a need for an interpretation of the result observed.

77. A guidance document has been developed under the Stockholm Convention Global Monitoring Plan to generate validated and harmonized information on POP levels for the purposes of the implementation of Article 16.

78. The Global Monitoring Plan under the Stockholm Convention have developed and repeated four rounds of proficiency testing for laboratories that are analyzing POP levels in the environment and biota, although this interlaboratory comparison was not aimed at or required for laboratories focusing on analyzing PCB in articles and in equipment in use or as waste.

79. The identification and quantification of PCB is pivotal to the evaluation of progress towards the elimination of PCB. This section of the on-line questionnaire was intended to evaluate the availability of scientifically supportable data. The availability of accredited laboratories in countries which comply with the ISO/IEC 17025 standard ensures that analyses are undertaken competently. In the absence of an independent verification of compliance with the standard by an accreditation body, laboratory data become little more than a self-declaration. The credibility of laboratory data that results from accreditation allows the data from a laboratory in one country to be compared with, and accepted by, those evaluating the results in another country and is therefore central to the global analysis for the elimination of PCB.

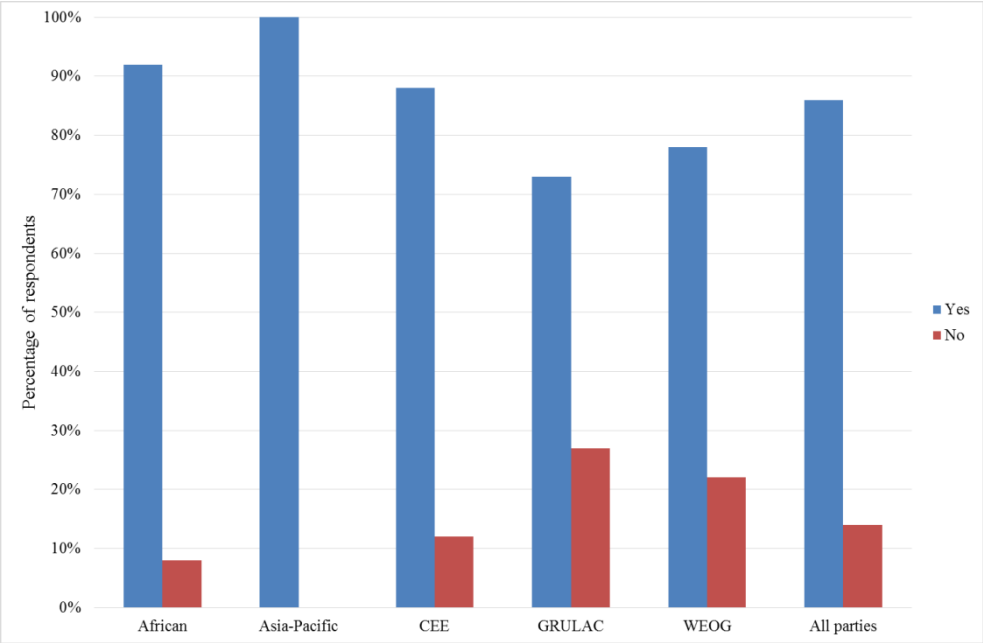

Figure 7: Percentage of respondents, by region, who have answered the question 2.

80. From the online survey, 87% (45) of the respondents indicated that they had analysed for PCB using standard methods defined by the Global Monitoring Plan under the Stockholm Convention, and 13% (7) answered "No" to the chemical analysis of PCB. But of those who had analysed PCB, 22% (11) did not have an accreditation body. However, it may also be true that many laboratories are able to correctly undertake PCB analyses without being accredited. This level of confidence in the analytical data may also be partly attributed to activities supporting capacity building under the Global Monitoring Plan and establishment or enhancement of the analytical capacities of the Parties in POPs analyses.

81. From the third round of national reports, 27% of Parties who said they did not establish any measures to identify waste with a PCB concentration higher than 50 mg/kg. 67% of Parties with measures in place to identify PCB containing waste have used laboratory analyses.

82. Question 2.1 sought to determine the types of analyses which had been undertaken. The equipment tested that is in use or not in use was about the same at 69% and 62% respectively, and equal to the number conducting oil analyses. Those respondents who had tested for solid waste and metals were 40% and 24% respectively, indicating that the amounts of PCB identified as being disposed of, or in storage, may have been identified through oil analysis rather than the accumulated quantity of oil and residual contaminated equipment.

83. The analysis of water and soil was reported by about 60% of respondents. Both types of matrices have well established analytical protocols and the high percentage of responses points to general concerns regarding the dispersion of PCB into the environment. The same is true for the analysis of biological samples performed by 44% (22) of respondents. However, the analysis of open source samples such as caulks/sealants, paints, anti-corrosion coatings, cable sheaths, and flame retardants have received much less attention with only about 13% undertaking analyses, which are beyond identifiable point sources, whereas 30% responded positively to question 2.3.1 which asked whether PCB in open applications had been sampled and analyzed by trained personnel. In addition, 48% of Parties indicated from the 4th national reports that the analysis of open systems had been undertaken. The discrepancy may have been caused by the specificity of the on-line questionnaire compared with the generality of the national reports.

84. Only 14% of respondents indicated that reference materials were available for open sources and 12% indicated that they are involved with performance evaluation tests. Consequently, it seems likely that not more than 12% of Parties have laboratories which are accredited for the analysis of open sources within their scope of accreditation even though 68% of respondents do have national accreditation bodies. However, about 48% of the Parties reporting data

for open source analyses in the 4th national reports probably have accredited laboratories. Overall, the interpretation and identification of open sources, and the reliability of data reported for open sources, is likely to be low. This is because the analysis of open applications may not be within the scope of accreditation of many laboratories, whereas the PCB analysis of oils is typically within the accredited scope.

85. Environmental samples were analysed by 64% of respondents and 44% have analysed biological samples. The high percentages indicated in these categories likely reflect the availability of complex laboratory analyses. The analysis of PCB in open systems requires considerable analytical sophistication and may therefore explain why only 12% of respondents have made this type of analysis. However, the credibility of the available open system data is supported by the fact that 68% of the respondents have accreditation bodies. This assumes that the laboratories are accredited for this type of PCB analysis.

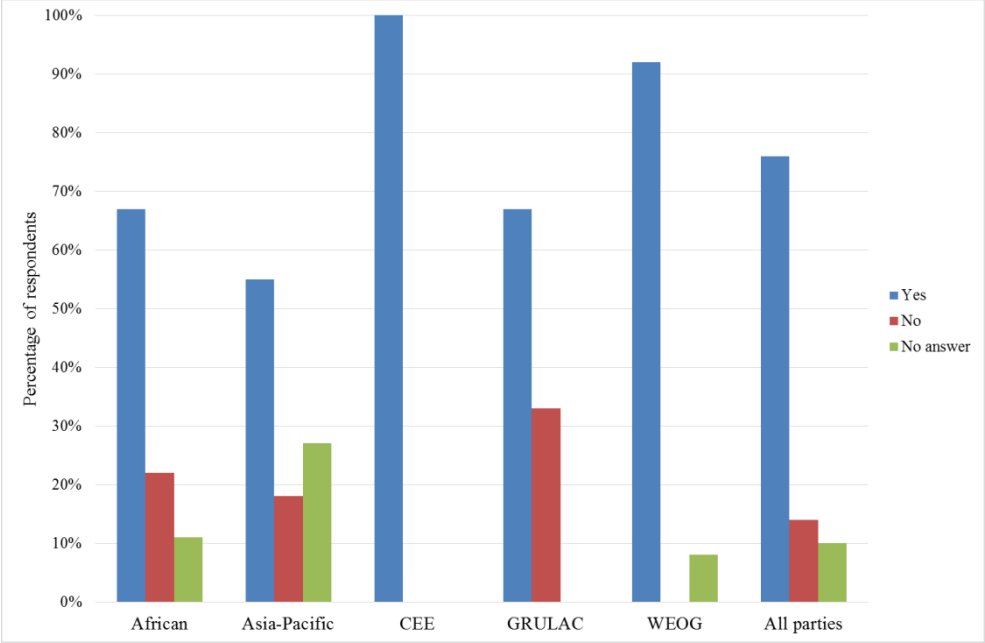

Figure 8: Percentage of respondents to question 2.2, regarding to the use of standard methods for sampling and analysis of PCB in the country.

86. As indicated above, 87% (45) of respondents reported that they analysed for PCB and 68% (34) have accreditation bodies. In addition, 73% (38) indicated that they used standard methods for sampling and analysis. This is interpreted to mean that the large majority of respondents have laboratories which are accredited for PCB analysis. The majority of these accreditations are probably reflected in the types of analyses undertaken. Parties

87. While the global statistics provide a general impression of the status of PCB analysis there are also substantial differences in regional statistics. For example, in the GRULAC region, all respondents have tested for PCB and all have tested oils compared with 67% for Africa and 62% for WEOG. In addition, about 60% of respondents who answered yes to Question 2 have used reference materials and participated in performance tests for oils, but a relatively small percentage have done so for other types of analysis. The CEE and WEOG respondents have 60-90% participation in performance tests and reference material use for water, soil and biological materials and each of those regions are almost 100% covered by accreditation bodies. On the other hand, all of the other regions do not report the use of reference materials or performance tests for these types of samples.

88. Section 7.2 of the ISO/IEC 17025 standard deals with the selection and verification of methods to ensure supportable results. In particular, clause 7.2.1.2 indicates that the methods used shall be made readily available to personnel. In the absence of the use of the latest, valid version of a method, as required by clause 7.2.1.3 of the standard, it is difficult to understand why 14% of respondents do not claim to have standard methods even when 50% of this group have accreditation bodies. Consequently, the 90% response in question 2.3 that PCB sampling and analysis has been undertaken by trained personnel leaves significant doubt. At best, only about 70% of respondents have the credibility afforded by accreditation for their PCB analyses.

89. 48% of countries which undertake PCB analyses have access to PCB in oil reference material. However, some respondents did not answer the question even though it is highly probable that such reference material was available. The percentage is important because it is an indicator of the extent to which one can attribute the reliability of the reported amounts for a major component of the elimination of PCB.

90. 24% of respondents indicated that solid waste reference material was available. 10% indicated that reference material was available for metal surfaces. The low values for these categories imply that results for the quantities of discarded and disposed equipment may contain substantial uncertainty.

91. 34% of respondents indicated that performance evaluation samples were available for soil and 30% for biological samples. These very similar numbers support the argument presented above that although 86% of laboratories may be accredited for PCB analysis in oils, only about 35% may have accreditations which include the analysis of soil and biological samples.

92. Section 7.7 of the ISO/IEC 17025 standard is aimed at ensuring the validity of results and includes performance tests. 44% of respondents indicated that performance tests were available for PCB in oil, although, of those which undertook performance tests, 85% did so for PCB in oil analysis. This is the same as the number of countries which indicated that PCB in oil reference material was available. Consequently, this probably means that about 52% of countries have laboratories which do not have scientific support for their analysis of PCB in oil and 15% of the countries that do have PCB in oil reference material available do not use it. 10% indicated that performance evaluation rounds were available for metal surfaces. This low percentage points to the likelihood that few Parties are accredited for the PCB analysis of metal surfaces and, indeed, only 24% indicated that they analysed metals. Performance evaluation rounds for water, soil and biological samples were about the same at 32% and this, again, supports the conclusion that only 60% of laboratories are accredited for this type of PCB analysis.

93. The number of positive responses to the analysis of open systems from Parties which had indicated a lack of technical capacity as a limitation was 13% and the number citing a lack of analytical laboratories was very similar at 9%. If a country had no accreditation body, then the percentage that did not analyse open systems for PCB was twice as great at 22%.

94. On the other hand, if a country had an accreditation body, then those which did not undertake analyses for open systems of PCB was 28%. The number of positive responses reported in the fourth national report to the analysis of open systems was very similar 9%, however many countries may not have correctly interpreted how an open source is defined or did not have such sources.

95. The lack of reported data for open applications of PCB in the survey may therefore be attributed to two important factors: one is a lack of technical capacity and availability of laboratories and the second is the availability of accreditation bodies. It is therefore important that future funding for development should focus on these two areas in particular.

96. Moreover, a guidance document was developed under the Stockholm Convention Global Monitoring Plan to generate validated and harmonized information on POPs levels in environment and biota and it can be used to build analytical capacities of laboratories without necessarily involving accreditation if validated methods are followed with a necessary statistical control (QA/QC procedures).

97. The percentages found to have been analysed of equipment in use and not in use, as well as oil, are very similar and high for each region except for GRULAC. This may mean that in the case of GRULAC, the oil has been taken out of equipment and tested and that there is a large amount of equipment yet to be tested.

98. The testing of solid waste is in the range of 30%-60% but in Africa it is only 11%. This may reflect the amount of disposal that has taken place or that, in Africa, disposal has been focused on the elimination of clearly identified pieces of equipment, which have not produced residual solid waste.

99. Water and soil have been analysed more extensively in all regions when compared to Africa which, again, may reflect different approaches to the disposal of equipment. Consideration of open sources is strikingly low in all regions except for WEOG.

100. Question 2.3.1 asks Parties to indicate the type of PCB application, or sampling, undertaken by trained personnel. Each region indicates a similarly high percentage for PCB in closed applications. The most striking differences lie in open applications between GRULAC with 0% and WEOG with 62%.

101. The analysis of PCB in biological samples reported for all Parties respondents is 44%. This value seems to be biased because of the 77% reported by the WEOG region in comparison with the 10%-20% reported from other regions respondents. However, this may be attributed to the arrangements providing chemical analyses for the purposes of the Global Monitoring Plan in biological samples done in one laboratory at the global level.

102. Reference materials are available in all regions for the types of analysis listed but are much less used in Africa and the Asia-Pacific regions.

103. The analysis of metal surfaces using reference samples seems to be low within the respondents, even though from WEOG region utilizes twice as much as any other. This type of analysis is conducted in the respondents from Asia-Pacific and CEE regions but without using reference materials. There is an inconsistency in the Asia-Pacific region data since the use of performance tests is claimed for metal analysis. The countries from CEE region did not

undertake this type of analysis using reference materials or performance tests but 25% claimed that such analyses were done.

104. The use of reference materials for water analysis was high for the respondents from CEE and WEOG regions and about three times greater than the other regions. This correlates with the statistic that the respondents from CEE and WEOG regions also reported about 85% participation in water analysis and the largest participation in performance tests for water amongst the regions at 54%-75%. The same general observations can be made for soil and biological analysis.

4.3 Progress in developing national inventories of PCB

105. As mentioned before, the biggest limitation at the time of writing this report is that only 59 of the 182 Parties responded to the 4th National Report and just 52 Parties answered the online questionnaire sent by the Secretariat of the Stockholm Convention. Some of the most important countries in relation to their size, population and therefore, could be inferred, in the quantity of electrical equipment containing PCB, did not answer the questionnaire.

106. In addition, not all the Parties who responded completed the questionnaire. The question that was most left unanswered was question 3.2, which consisted of quantitative data in Excel format sent together with the questionnaire. The data which can be obtained from question 3.2 are the most relevant in order to collect information about the inventories of each country and the amount, in tons, of existing and destroyed PCB by each Party.

107. From the answers reported in this section of the online survey, except question 3.2, the following can be observed:

108. Question 3: 87% of the Parties carry out an inventory of PCB.

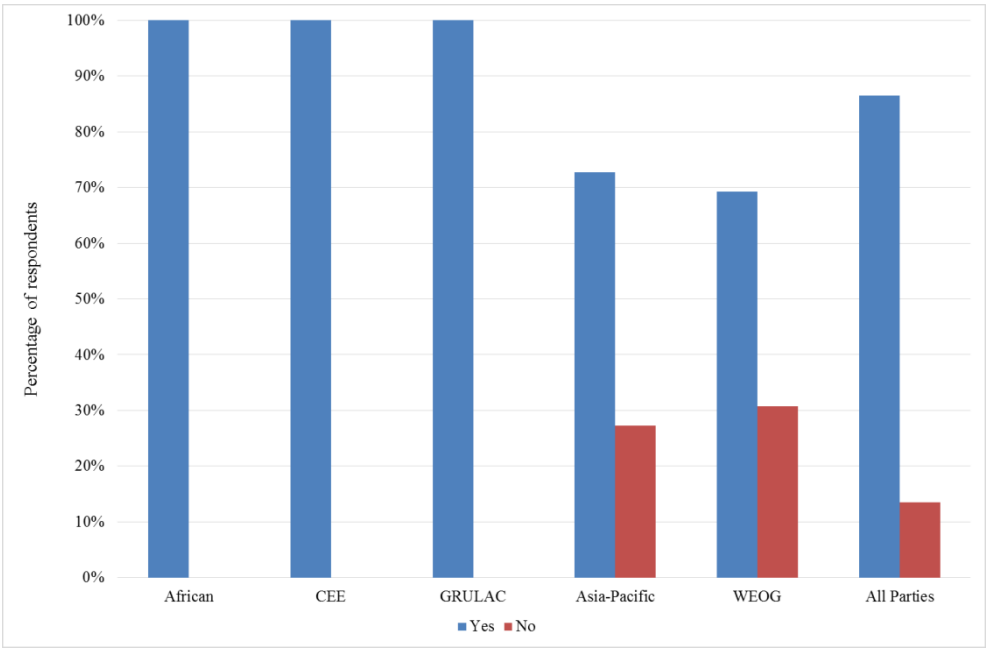

Figure 9: Percentage of Parties that perform PCB inventory by region.

109. Approximately 156,963 tons of PCB are still in the reporting countries. The regions which report the highest quantity of PCB are: WEOG with 70,002; GRULAC with 21,355; CEE with 40,275; Asia-Pacific with 17,179 tons and Africa 8,151 tons.

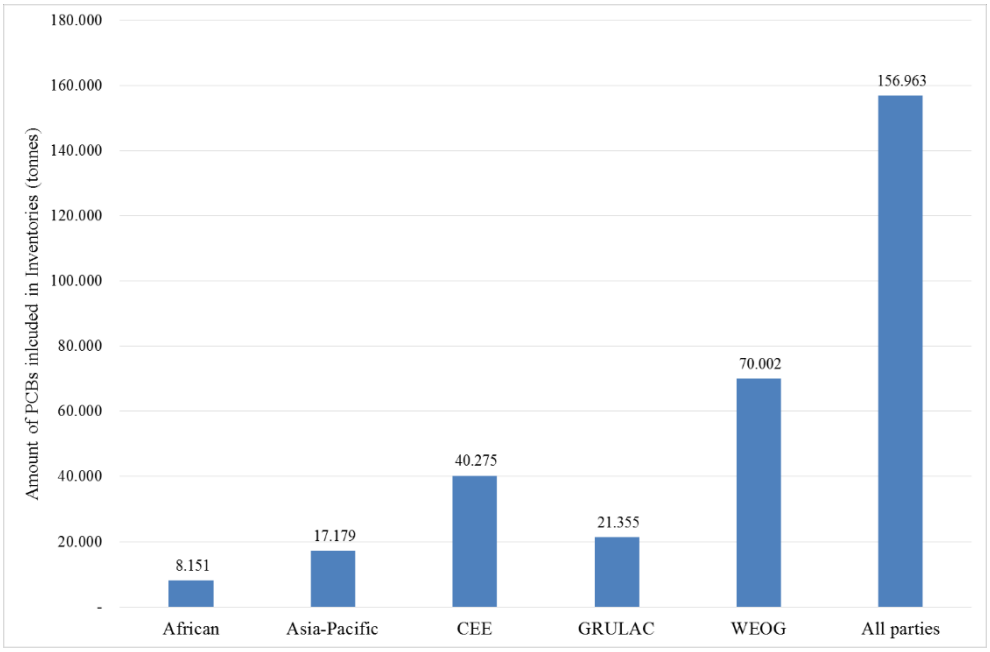

Figure 18: Estimated total quantity (tons) of PCB currently remaining.

110. Of the stocks reported in question 3.1, all the Parties report that their stocks are in either equipment in operation or equipment that has been decommissioned and stored waiting for proper final management. From the Parties that reported, it can be observed that they include in their inventories the following:

(a) 12% did not answer the question.

(b) 12% of the Parties only included in their inventory equipment in operation and equipment out of use.

(c) 27% reported that oil and other contaminated liquids were also taken into account,

(d) 37% also took into account other contaminated materials, and

(e) Only 12% included open applications in their inventory.

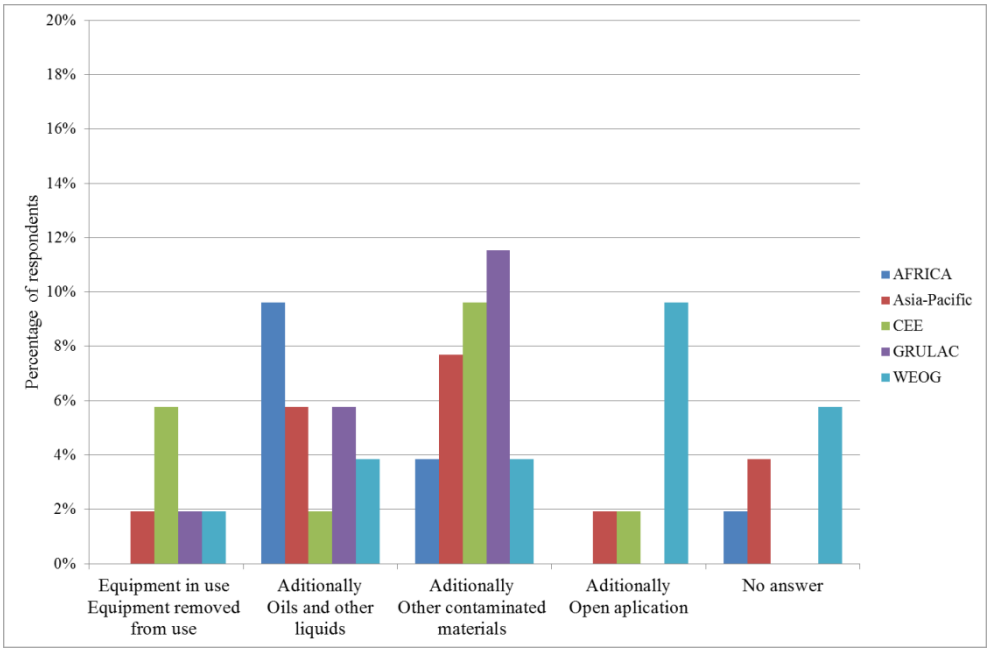

Figure 10: Elements included in the PCB inventories by region.

111. Only 17% of the Parties that answered the questionnaire reported that their inventory is complete. Most countries (56%) reported that their inventory is greater than or equal to 50% complete.

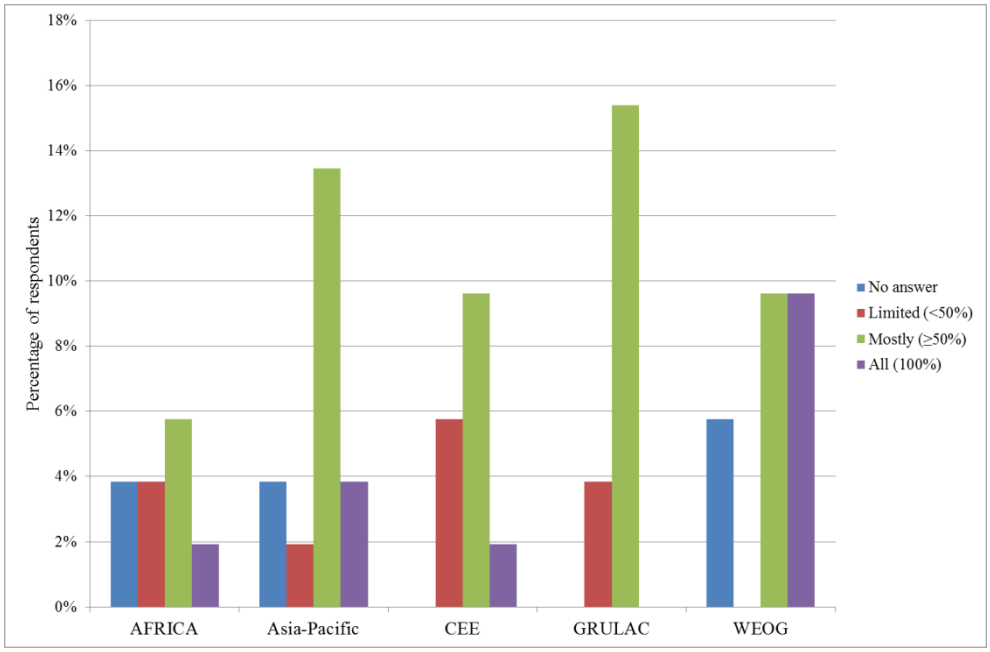

Figure 11: Advance in the PCB inventory by region.

112. 69% of the Parties indicated that they carry out some type of analysis to determine the PCB content of their equipment or other types of waste. The remaining 31% did not answer or does not perform PCB determination analysis.

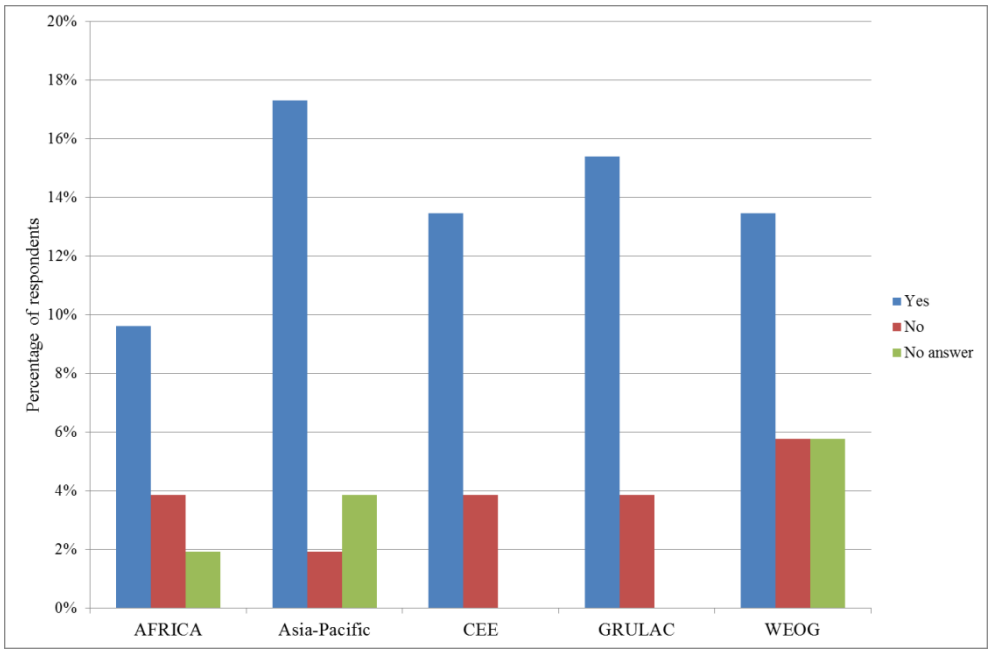

Figure 12: Percentage of Paries that carry out PCB analysis.

113. Additionally, about 58% of responding Parties determined the PCB content using quantitative methods. While 11% only use qualitative methods of PCB determination and 31% of the Parties did not respond to this question.

114. Half of the countries that answered the questionnaire indicated that there is an authority that validates the national inventory data, 37% indicated that there is not an authority validating data and 13% did not answer the question.

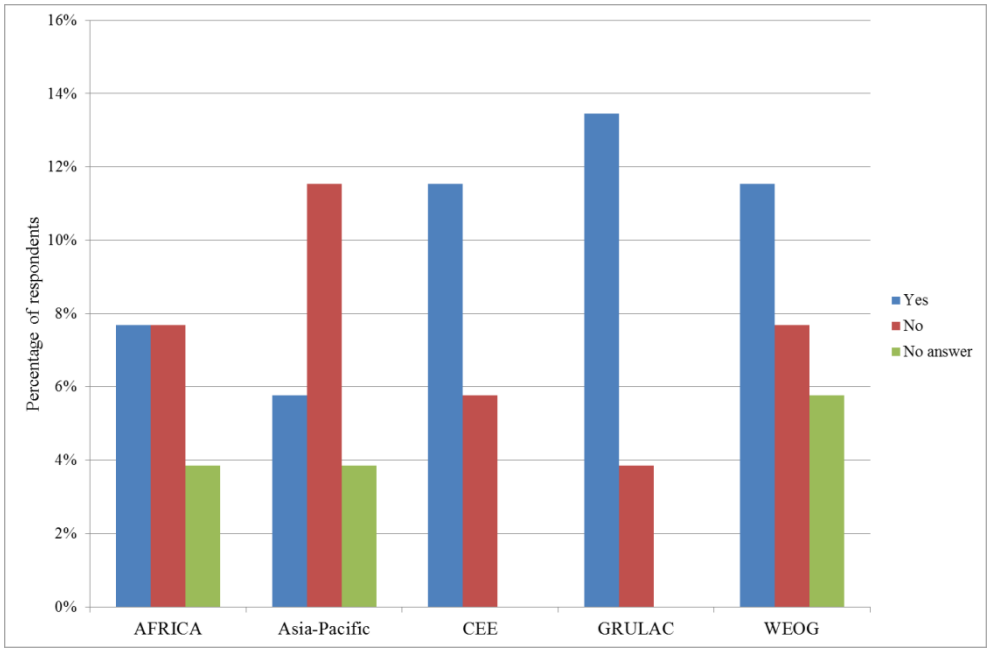

Figure 13: Parties that have an authority validating inventory data by region.

115. 66% of the respondents reported that their inventories are consistent with question 14.1, part C of the National Report format of the Stockholm Convention. The remaining 34% responded that their inventories are not consistent or did not answer the question. 61% of the answers indicate that their inventories are updated periodically. 29% indicated that their inventories are not up to date and 10% did not answer the question.

116. Finally, 62% of the respondents indicated that their inventory allows traceability of the environmental management of equipment and waste containing PCB.

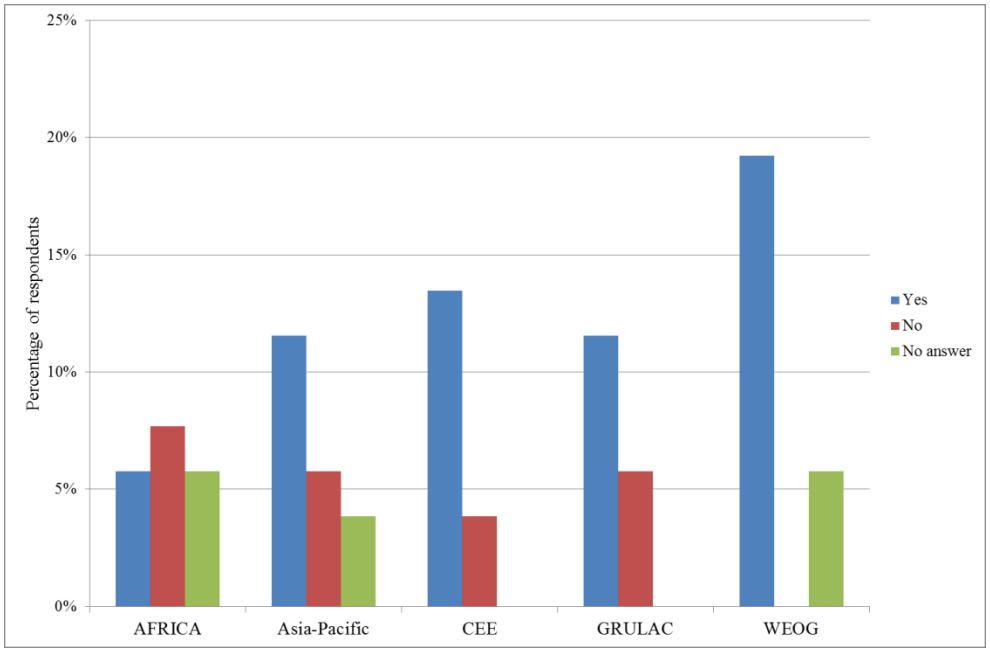

Figure 14: Traceability of environmental management information related to equipment and waste containing PCB by region.

4.4 Progress in developing national capacity for the treatment of PCB

117. Almost half of the countries that answered the survey have reported the availability of facilities for PCB treatment in their countries (30), most of them are from WEOG (11), Eastern Europe (8), GRULAC (6) and Asia (4), only 1 of is from Africa.

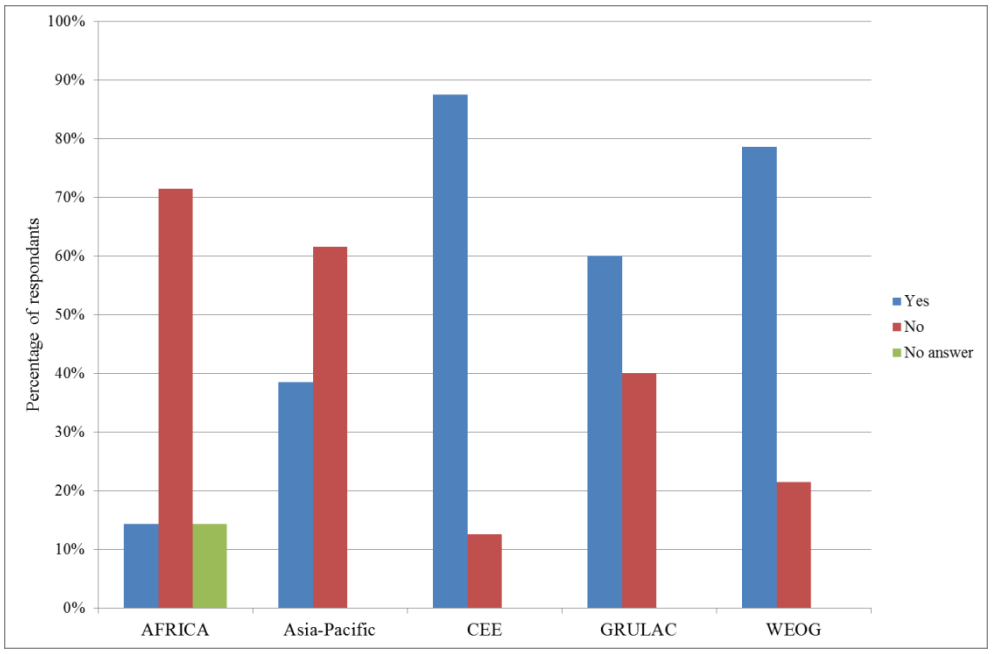

Figure 15: Availability of facilities capable of PCB treatment by region, from answers. Results from survey; question 4.

118. Of the 30 countries that reported having facilities for PCB elimination or decontamination, only 37% (19) countries reported the quantity of PCB eliminated or treated.

119. Most PCB (85%) were eliminated by facilities located in three countries: Germany (27,800 ton), Finland (26,533 tons) and Japan (22,600 tons). Almost all the facilities (up to 25) are able to treat oils (including PCB oil and PCB-contaminated oil), but the treatment for the elimination of PCB in open applications is limited to facilities in 9 countries in WEOG (7) and Eastern Europe (2).

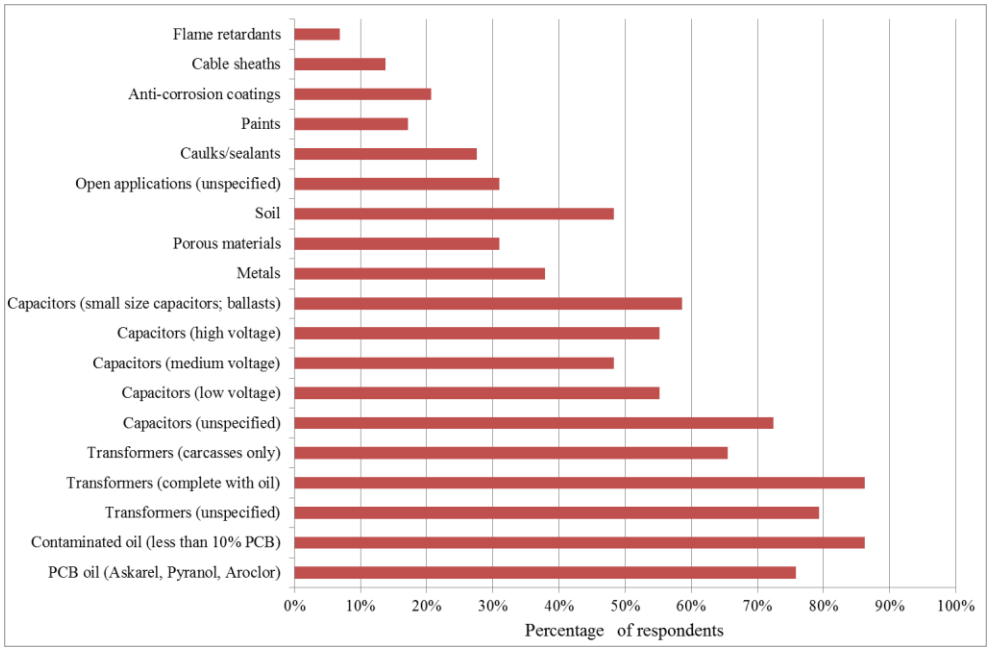

Figure 16: Types of PCB eliminated or decontaminated. Results from survey; question 4.2

120. The most common type of facility used for treatment of PCB is hazardous incineration plant (21) followed by chemical-based treatment (13), and cement kilns (6).

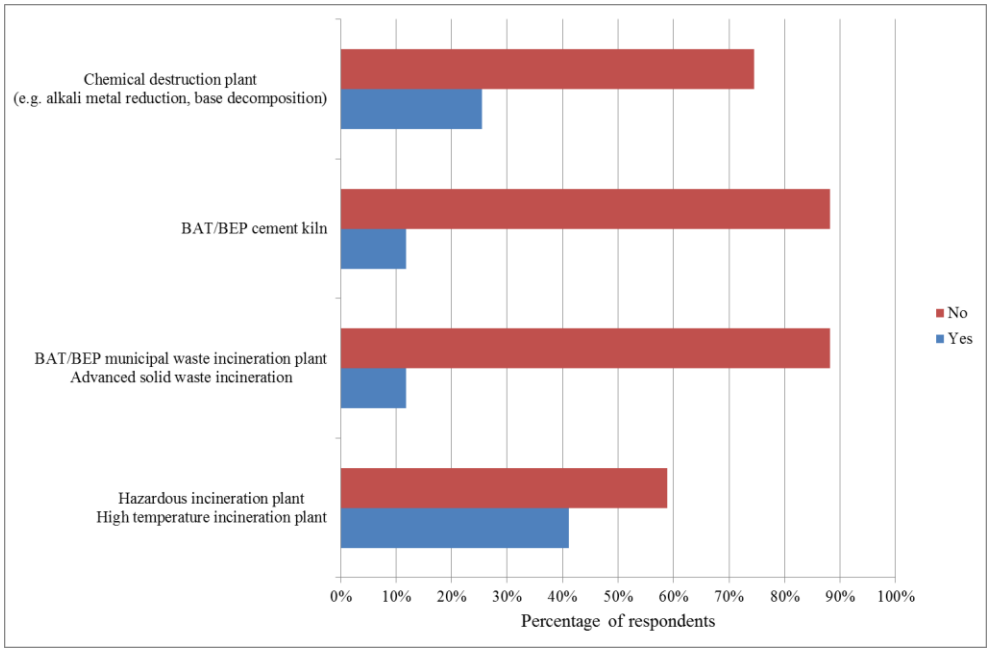

Figure 17: Type of facility used for the elimination or decontamination of PCB. Results from survey; question 4.3

121. From the countries that answered the questionnaire, up to 46% (14) have facilities that provide services to other countries, and they are located mainly in WEOG (7) and Eastern Europe (4).

122. 31 countries reported interim storage facilities (59%). Nevertheless, only 10 countries reported their estimated capacity, distributed mainly in Eastern Europe (92%), Africa and WEOG. One country of Eastern Europe reported storage capacity up to 155,192 tons. It is relevant to highlight that less than half of Parties reported to have storage capacity, know the quantity of PCB they have capacity to store.

123. Regarding retrofilling and decontamination activities, from all Parties that responded survey, less than a half (23) have information or controls over conditions for retrofilling and decontamination of transformers, and from them, only 13 countries verify PCB content in oil 90 days after retrofilling. From these countries only 10 include the results of retrofilling activities in the inventory (Figure 18).

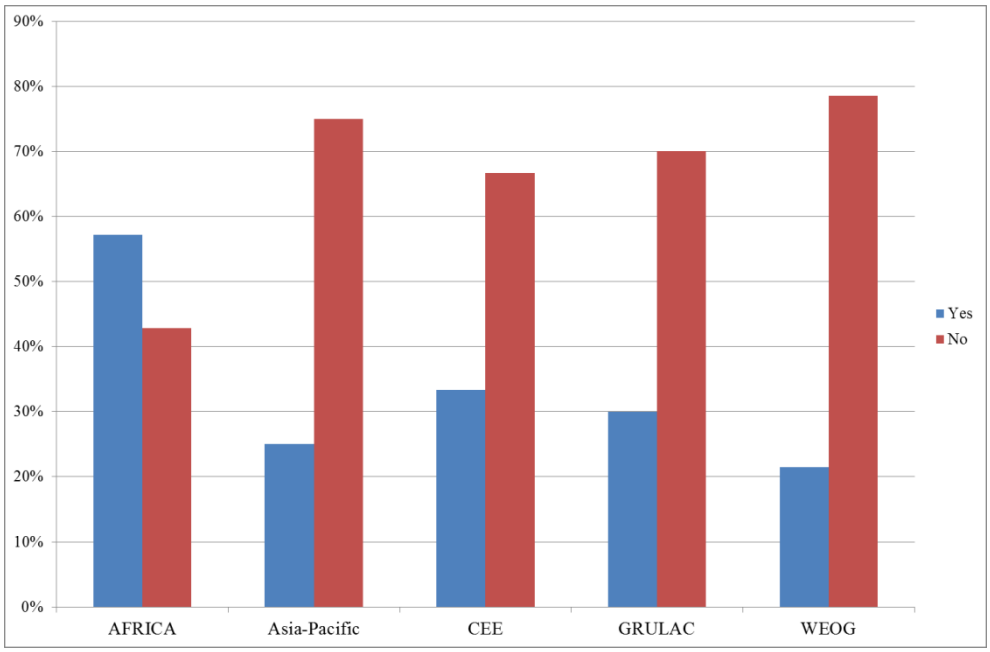

Figure 18: Inclusion of information on retrofilled or decontaminated trasformers in PCB inventory by region. Results from survey, question 6.3.

124. From all countries that answered the survey, some countries (34) have reported to be aware of import/export of PCB; by regions WEOG 93% (13), GRULAC 80% (8), and Eastern Europe 88% (7), in contrast only 43% of countries in Africa were aware of transboundary movements of PCB.

125. For analysis of the development of transboundary movements of PCB, the following elements were included in the questionnaire:

(a) Question 7.1: Are the customs authorities trained to apply control of transboundary movements of equipment that may contain PCB?

(b) Question 7.2: Is the authorization of export of PCB in accordance with the Basel Convention processed within a period of six months?

(c) Question 7.3: Does your country have any customs control procedure towards electrical equipment that use dielectric oil, to prevent illegal imports of contaminated equipment?

126. From the Parties that answered the survey, 15% (8) of respondents indicated that their respective countries are not capable of managing PCB present in their countries as they do not have storage facilities, the ability to eliminate or decontaminate PCB and have not exported PCB. 43% of these countries are located in the African region (3), 36% are in Asia-Pacific (4), and 10% from GRULAC (1).

127. From Parties that reported import /export PCB (34), approximately 70% of respondents (24) indicated that authorization of export of PCB in accordance with the Basel Convention has been processed within a period of six months, with only 9% of them (3) indicating the authorization was not processed within six months. Generally, in all regions the majority of authorizations were processed within six months, though within the Eastern Europe region and GRULAC almost 90% of authorizations were process within six months.

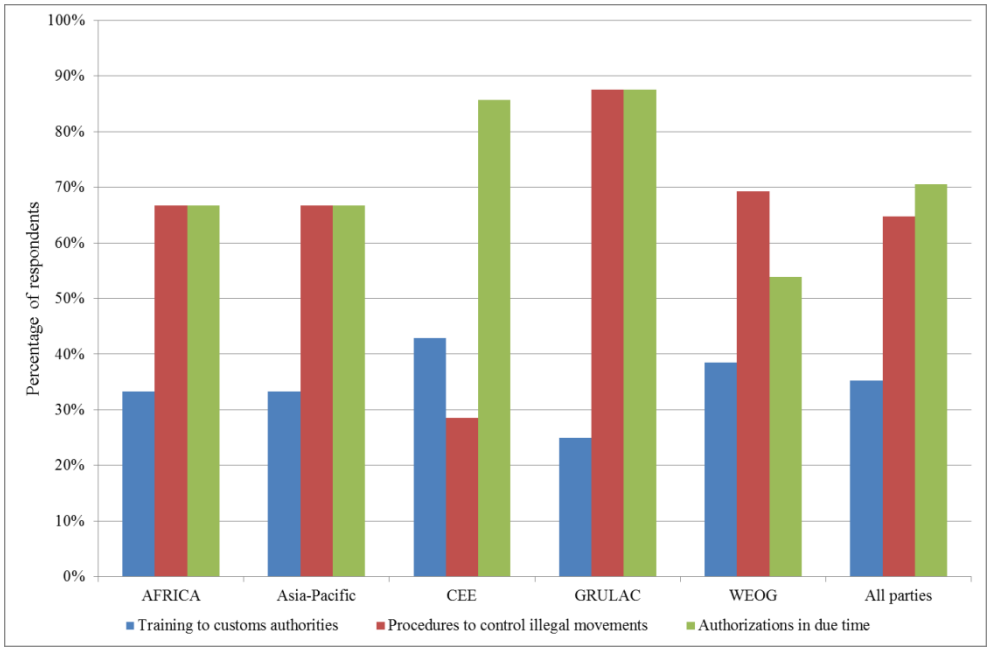

Figure 19: Percent distribution of responses[6] by regions of question 7.1-7.3 as per legend.

128. Approximately 65% of all Parties who indicated that they do import or export PCB have customs authorities trained to apply control of transboundary movements of equipment that may contain PCB and have customs control procedure regarding electrical equipment that use dielectric oil, to prevent illegal imports of contaminated equipment. The distribution between regions is quite variable, as shown in Figure 19.

[6] This data is based solely on the percentage of respondents who indicated that their country does import or export PCB and excludes those who indicated they do not export or did not provide a response.

4.5 Progress in addressing PCB in open applications

4.5.1 Definition of PCB in open applications

129. In order to assist Parties in better understanding PCB open applications, is important to highlight that Due to their chemical characteristics and physical stability PCB mixtures were widely used in open and partially open applications. It is generally believed that PCB were used in open applications between the 1950s and the early 1980s. However, the time of usage of PCB in the different applications can vary from country to country.

130. The percentage of PCB in the materials highly depends on the type of application, the product itself, and the manufacturer. Concentrations can vary considerably and may reach up to 80 % of PCB. Open applications are not usually defined as hazardous waste at the time of disposal, so PCB often find their way into the environment, e.g. as construction debris. PCB from open applications can also be released into the environment by weathering and inappropriate removal of PCB containing materials.

131. Examples of relevant open applications in which PCB can be found include the following[7]:

(a) Caulks/sealants;

(b) Paints/plaster;

(c) Anti-corrosion coatings;

(d) Cable sheaths;

(e) Flame retardants;

(f) Adhesives;

(g) Small capacitors;

(h) Lubricating fluids;

(i) Impregnating agents;

(j) End of life vehicles (cars, dashboards etc.);

(k) Recycled paper.

4.5.2 Health and environmental impacts from PCB in open applications

132. PCB in open applications may diffuse into other substances. PCB-containing caulks, for example, contaminate the surrounding concrete, brick, wood, etc., as well as the caulk backing materials. Similarly, paints containing PCB do greatly diffuse into upper/lower coatings and substances, of course depending on material type and porosity[8].

133. PCB do not only diffuse into substances, but also emit into the air. Concentrations in indoor air greatly depend on the type of PCB application, the PCB concentration, and conditions, such as temperatures. Buildings frequented by many people (schools, public buildings, etc.) or with long duration of stay (flats, hospitals) pose the greatest risks for the users.[8]

134. The concentration of PCB in indoor air is influenced both by primary as well as secondary sources of PCB. Unlike closed applications of PCB, in the case of open applications, dioxin-like compounds also have to be considered. The content of dioxin-like compounds is strongly influenced by the type of technical PCB mixture (i.e. lower chlorinated or higher chlorinated PCB). If the PCB sources are not identified, it is possible that users of buildings are constantly exposed to PCB emissions. It is not possible to determine the total dose of such exposure. Apart from the before-mentioned secondarily contaminated surrounding materials, completely independent items and substances can be affected by PCB. Elevated concentrations of PCB can be for example detected in furniture, dirt and dust.[9]

135. The managing of PCB in open applications should also be considered from the health impact side, specifically when looking at buildings. By inhalation of contaminated indoor air, the tolerable daily intake (TDI) for PCB, set by

[7] UNEP (2009), Guidance documents on PCB. PCBs in open applications. Available in http://chm.pops.int/Implementation/IndustrialPOPs/PCBs/Guidance/tabid/665/Default.aspx

[8] Wagner, U., Schneider, E., Watson, A., Weber, R. (2013) Management of PCB from Open and Closed Applications – Case Study Switzerland.

[9] Hopf, N. (2018) PCB ist toxisch – räumen wir auf – Beobachter.

the WHO in 2003,[10] may be exceeded at air concentrations as low as 60 ng PCB/m^3. With regard to dioxin-like PCB, special attention is warranted. Many useful studies about this issue are available.

136. Recent studies PCB emissions show that open applications of PCB have a relevant impact on indoor and outdoor air. For example, in Switzerland in 2015 total PCB emissions to outdoor air was nearly 0.6 t/year, and it is estimated that the use of PCB in open applications will cause Swiss emissions to remain above 100 kg PCB per year, even after the year 2030.[11] For Germany the current PCB emissions from open applications are estimated to 7 to 12 tons.[12,13,14] Theses emissions lead to an impact on animal feed and related contamination of food producing animals[9,10,11]. Also the presence of PCB in open applications in stables and farms and in establishments for animal feed production still results in exposure of food producing animals with related exposure of humans.[9,10,11,15] The consequences of such exposure and of no or late actions with regard to PCB in open applications shall be further investigated.

4.5.3 Analysis of progress in addressing PCB in open applications

137. A relevant limitation of the progress evaluation is that only 59 of the 182 Parties responded to the 4th National Report (93 Parties responded to the 3rd National Report) and just 52 Parties answered the online questionnaire sent by the Secretariat of the Stockholm Convention.

138. Of the 52 respondents to the survey, 48 responded to questions regarding PCB in open applications. Approximately 70% of respondents indicated that their respective countries do not have any national regulations or guidelines that specifically mention PCB in open applications. Of the approximately 30% of respondents who do have national regulations or guidelines, the component(s) of environmentally sound management of PCB in open application varies considerably (Figure 20). Though there is one Party in GRULAC who responded yes to having regulations or guidelines, no components of ESM were selected. Additionally, no regulations or guidelines exist in the Parties11 Parties who responded from the Asia-Pacific region. Finally, only 36% of Parties have endeavoured to identify (and manage in accordance with paragraph 1 of Article 6) PCB in open applications, with WEOG comprising the largest contributors to the 36%.

[10] WHO (2003), Concise International Chemical Assessment Document 55, POLYCHLORINATED BIPHENYLS: HUMAN HEALTH ASPECTS, http://www.who.int/ipcs/publications/cicad/en/cicad55.pdf

[11] Glüge J, Steinlin C, Schalles S, Wegmann L, Tremp J, Breivik K, Hungerbüher K, Bodgal C, Import, use, and emissions of PCB in Switzerland from 1930 to 2100; 2017.

[12] Weber R, Herold C, Hollert H, Kamphues J, Ungemach L, Blepp M, Ballschmiter K (2018) Life cycle of PCB and contamination of the environment and of food products from animal origin. Environ Sci Pollut Res Int. 25(17), 16325-16343

[13] Weber R, Herold C, Hollert H, Kamphues J, Blepp M, Ballschmiter K (2018) Reviewing the relevance of dioxin and PCB sources for food from animal origin and the need for their inventory, control and management. Environ Sci Eur. 30:42. https://doi.org/10.1186/s12302-018-0166-9. https://rdcu.be/bax79

[14] Weber R, Hollert H, Kamphues J, Ballschmiter K, Blepp M, Herold C (2015) Analyse und Trendabschätzung der Belastung der Umwelt und von Lebensmitteln mit ausgewählten POPs und Erweiterung des Datenbestandes der POP-Dioxin-Datenbank des Bundes und der Länder mit dem Ziel pfadbezogener Ursachenaufklärung., FKZ 371265407/01. ISSN 2199-6571. Published by German Environment Agency (UBA). Pp 528. https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/doku_114_2015_analyse_und_trendabschaetzung_der_belastung_6.pdf

[15]https://www.lanuv.nrw.de/landesamt/veroeffentlichungen/pressemitteilungen/details/?tx_ttnews%5Btt_news%5D=1919&cHash=ee08699aa6daa84c6db6b8264d900007

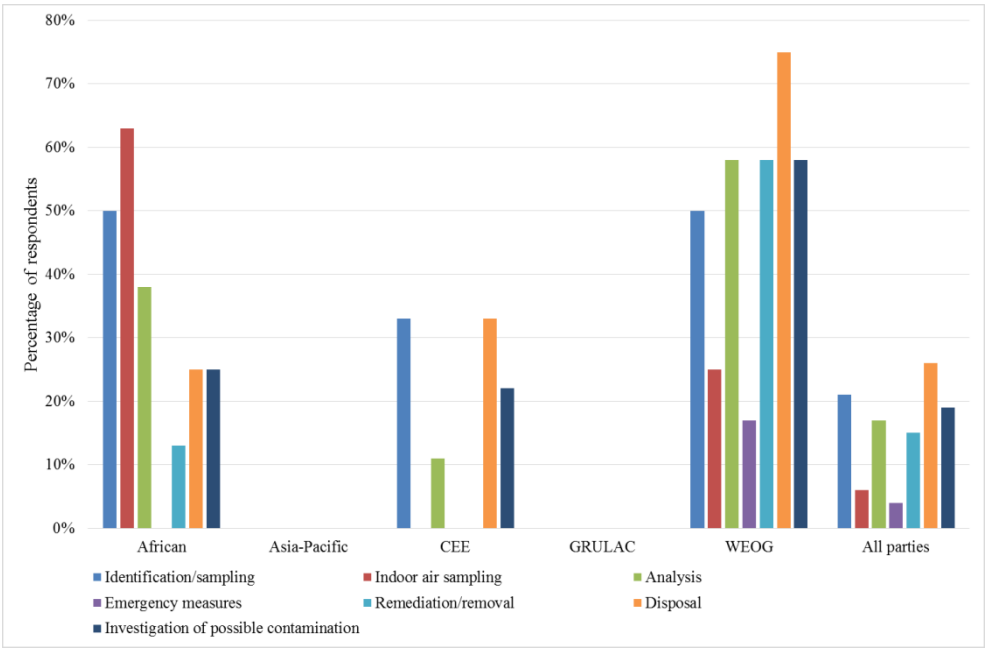

Figure 20: Percent component of environmentally sound management of PCB in open application stipulated by regulation or guidelines by region. Results from survey, question 8.1.

139. Only 50% of those that have guidelines or regulations have a threshold for PCB in open application, with the thresholds primarily being for caulks/sealants (86%), paints (71%) and anti-corrosion coatings (86%). Thresholds for cable sheaths (43%) and flame retardants (57%) are less prevalent, and thresholds for indoor air (29%) were even less frequent.

140. Absence of regulations or guidelines does not necessarily indicate stakeholders are unaware as there is some awareness of at least 4 of the 5 open applications listed in the questionnaires. 40% of all respondents indicated stakeholders are aware of PCB in caulks/sealant as well as paints, while only 26-28% of respondents indicated stakeholders are aware of PCB in anti-corrosion coatings (28%), cable sheaths (28%) and flame retardants (26%). Stakeholder awareness of PCB in open application varies considerably by region and by application (Figure 21).

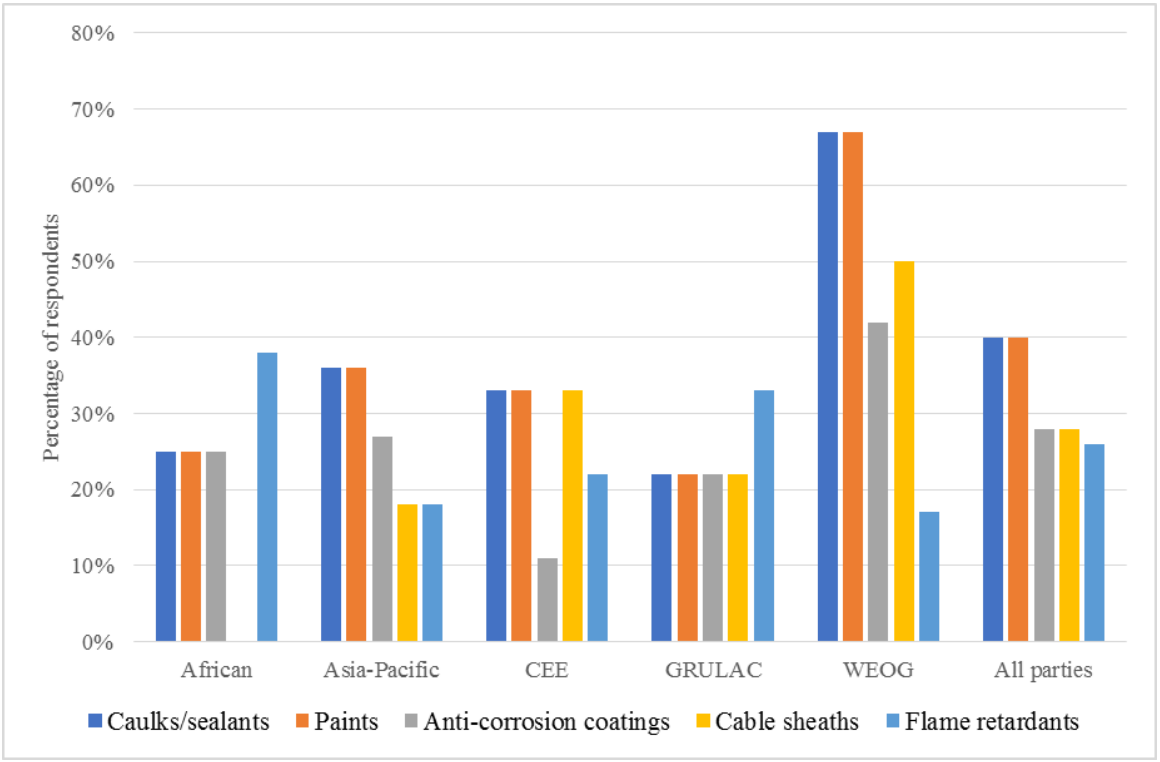

Figure 21: Percent Stakeholder awareness of PCB in open applications by region and by application. Results from survey, question 9.

141. One country stated that during the National PCB inventory no PCB in open applications were identified. It seems that many Parties are not aware of the Stockholm Convention Annex A, *Part II*, PCB (*f*): "*In lieu of note (ii) in Part I of this Annex, endeavour to identify other articles containing more than 0.005 % PCB manage them in accordance with paragraph 1 of Article 6*". Only a detailed investigation of both closed and open applications can provide firm background information about the existence of relevant PCB sources and therefore the basis for inventories.

142. Other than in WEOG regions (58%), there is from little to no awareness (0-38%) amongst stakeholders regarding POPs with similar open applications as PCB such as polychlorinated naphthalenes and short-chain chlorinated paraffins. On average, ~36% of stakeholders are aware of POPs with similar open applications as PCB. Even fewer stakeholders (18%) are trained in the identification and sample of PCB in open applications and they are only found in the WEOG region, where 67% of stakeholders are trained. In WEOG, 75% of trained groups are regulators and competent authorities, while 50% are other stakeholders of concern (note, there are two regions that have selected both options).

143. It is unsurprising that with few regulations or guidelines combined with little awareness that remediation or removal of PCB in open applications is occurring in only ~23% of the countries who responded to the survey. Of the 23%, most (64%) indicated that the problem has been addressed but that work still remains. Some (36%) have or also have (multiple selections possible on the survey) addressed the problem to a small extent, fewer (27%) say there is a basic survey on identification of potential sources and the same amount (27%) say there is an on-going programme on identification, remediation and disposal. Finally, a small portion (9%) of the countries that have projects for remediation or removal of PCB in open applications indicate that such PCB no longer constitute a problem (i.e., 1/11 countries).

144. Interestingly, where there are more published studies of PCB in open applications (WEOG and CEE), there are more regulations or guidelines, which specifically mention PCB in open applications and following that trend, there are more thresholds and more remediation or removal projects. Due to sample size, the significance of this trend cannot be established.

145. There are no countries where complete inventories of open PCB applications are mandatory. The obligation to record the data of buildings, facilities, objects and materials with PCB in open applications after their identification would however minimise the risks of inexpert treatment and non-ESM disposal and therefore minimize the impact on the environment and human health.

146. A biological monitoring could for example identify people with an increased exposure to PCB. In residents of PCB-contaminated dwellings higher levels of PCB in plasma were found for most of the lower chlorinated and many of the higher chlorinated congeners[16]. OH-PCB levels in urine of workers were increased several folds after PCB waste transportation work, and also a slight increase of OH-PCB was observed in the researchers doing the air sampling at a PCB storage area[17]. After recommended PCB exposure reduction measures had been enacted, the worker's OH-PCB levels did not increase during handling of PCB equipment. Such results would help identify sources of PCB and improve safety measures.

147. In 2017, a draft medium-sized project (MSP) on "POPs in Open Applications" was developed (GEF/UNE/UNITAR), with the aim "To assess the global situation of POPs – polychlorinated biphenyls (PCB), polychlorinated naphthalenes (PCNs), and short-chain chlorinated paraffins (SCCPs) – in open applications and to draft guidance and methodologies to assist countries to identify their sources and generate reliable data that will enable the development of sound planning and policies to manage POPs in open applications; and to develop a global strategy to address the issue". This project shall be pursued and implemented as soon as possible.

148. To conclude, it is difficult to predict the worldwide situation with responses from less than half of Parties to the Stockholm Convention. From those who responded it is clear that there is a significant amount of work that must be done to address the issue of PCB in open applications.

[16] Meyer HW, Frederiksen M, Göen T, Ebbehoj NE, Gunnarsen L, Brauer C, Kolarik B, Müller J,Jacobsen P (2013), Plasma polychlorinated biphenyls in residents of 91 PCB-contaminated and 108 non-contaminated dwellings—An exposure study, International Journal of Hygiene and Environmental Health 216, 755– 762

[17] Haga, Y., Suzuki, M. et al. (2018). Monitoring OH-PCB in PCB transport worker's urine as a non-invasive exposure assessment tool. Environmental Science and Pollution Research, 1-9.

5. Recommendations and prioritized actions

149. Based on the analysis of the available information, the SIWG recommends the following:

(a) **General approach to the evaluation of PCB and information collection:**

(i) All Parties should report every 4 years, completely and accurately the quantities of PCB (a) in use, (b) in storage awaiting destruction, (c) exported for destruction, (d) imported for destruction, and (e) destroyed locally;

(ii) In addition to national reports, online questionnaire should be used to collect information necessary for carrying out periodic reviews of progress in the elimination of PCB;

(iii) The category "PCB in use" should be defined in such a way that it contains confirmed PCB waste and "to be tested" PCB using the definition of 50 mg/kg as provided in the Stockholm Convention;

(iv) The mass unit should be defined (total consisting of oil and equipment or only oil since the equipment is decontaminated and can be recycled or reused); quantities should be reported in "tons" throughout all forms/templates;

(v) As the information contained in the national reports under the Stockholm Convention and the Basel Convention is useful for evaluating the progress towards PCB elimination, the discrepancies and inconsistencies between those reports should be identified and corrected where possible;

(vi) For the reporting under the Basel Convention, code "Y10" should be assigned to all waste defined as "consisting of, contaminated with or containing PCB", which will allow annual updates for export and import of PCB waste;

(vii) An expert group should be tasked by the Conference of the Parties to provide continuity and quality control of the national reporting and assist Parties in their reporting under the Stockholm Convention, as appropriate;

(viii) Assist with the review of data reported pertaining to PCB under the Basel Convention, as appropriate;

(b) **Actions in developing legal framework:**

(i) All Parties should put in place legal and administrative measures to implement the obligations of the Stockholm Convention in particular with respect to Annex A, Part II (a) on PCB in equipment and (e) environmentally sound management of PCB.

(ii) Legal framework should include the identification and remediation of PCB contaminated sites and identification of PCB in open-applications;

(c) **Actions in building analytical capacity:**

(i) National capacities should be developed for PCB analyses, including for open applications, by providing the necessary equipment and quality system training, in particular in Africa;

(ii) Laboratories should be accredited for PCB analysis, taking into account the ISO/IEC 17025 standard, and provided with training to include specific types of PCB analyses within the scope of reporting;

(d) **Actions in developing national inventories:**

(i) All Parties, including developed countries that are considered to have completed PCB management, should periodically report and update their PCB inventory;

(ii) Parties from developing countries should be better supported (knowledge transfer and more strictly controlled financing) to carry out adequate PCB management and strengthen their reporting capacities;

(e) **Actions in developing national capacity for the treatment of PCB:**

(i) The capacity for the treatment of PCB, including for open applications, should be strengthened in particular in Africa and Asia;

(ii) Parties should collect and report national information on the capacity, operation conditions and location of interim storage, treatment or final disposal facilities;

(iii) Measures should be taken to promote BAT/BEP during maintenance and retrofilling of equipment to avoid cross contamination of PCB;

(f) **Actions in addressing PCB in open applications:**

(i) All Parties should be reminded of their obligations under the Stockholm Convention, in particular Annex A, Part II (f): "In lieu of note (ii) in Part I of this Annex, endeavour to identify other articles containing more than 0.005 % PCB manage them in accordance with paragraph 1 of Article 6";

(ii) BAT/BEP guidance on PCB in open applications as well as guidance on the identification and management of PCB in open applications should be developed;

(iii) Awareness should be raised on PCB in open applications as well as other POPs that have similar open applications e.g. polychlorinated naphthalenes and short-chain chlorinated paraffins, through regional preparatory meetings, technical assistance and webinars;

(iv) Health impact should be considered in the managing of PCB in open applications, in particular those in buildings and PCB should be analysed for indoor contamination and contamination of relevant materials before renovation, remediation, or demolition works.

Reference

UNEP (1992). Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (United Nations Environment Programme).

UNEP (2001). Stockholm Convention on Persistent Organic Pollutants (United Nations Environment Programme).

UNEP (2017). Consolidated assessment of efforts made toward the elimination of polychlorinated biphenyls (Geneva, Switzerland: United Nations Environment Programme).

UNEP (No year-a). National reporting under article 15 of the Stockhlm Convention on Persistent Organic Pollutants (Secretariat of the Stockholm Convention, United Nations Environment Programme).

UNEP (No Year-b). National reporting under the Basel Convention (United Nations Environment Programme (UNEP), Secretariat of the Stockholm Convention,).

Appendix

Questionnaire for the review of progress towards the elimination of PCB in accordance with paragraph (h) of part II of Annex A

Country:

Name of the submitter:

Organization:

E-mail:

I. Regulatory framework development

1. Do you have any legislations or regulatory requirements related to PCB in your country to comply with the provisions of the Stockholm Convention?

☐ Yes

☐ No

If the response to question 1 is YES:

1.1 Please select the requirements included: (Multiple selection)

☐ (a) Achieve 2025/2028 goals of the Stockholm Convention (i.e. each Party eliminates the use of PCB in equipment by 2025 and ensures the environmentally sound management of wastes containing or contaminated with PCB by 2028)

☐ (b) Designate competent authorities to coordinate the implementation of the legislation on PCB management

☐ (c) Enforce the implementation of the legislation on PCB management (e.g. by penalties)

☐ (d) Incentivize the replacement or elimination of equipment containing PCB

☐ (e) Ensure appropriate awareness raising of stakeholders involved in the PCB management

☐ (f) Competent authorities to compile and maintain/update a database (inventory) of equipment containing PCB

☐ (g) Owners of equipment containing PCB to decontaminate or dispose of such equipment

☐ (h) Owners of equipment containing PCB to label such equipment or decontaminated equipment

☐ (i) PCB disposal facilities to keep registers of origin, quantities, nature and content of equipment containing PCB and to communicate this information to the competent authorities

☐ (j) Ensure the quality of facilities or companies for interim storage, decontamination or elimination of PCB by licensing or accreditation

☐ (k) Identify (and remediate) sites contaminated by PCB

☐ (l) Identify (and manage in accordance with paragraph 1 of Article 6) PCB in open applications (e.g. caulks/sealants, paints, anti-corrosion coatings, cable sheaths, flame retardants)

II. Analytical capacity for identification and quantification of PCB

2. Has your country analyzed PCB?

☐ Yes

☐ No

If the response to question 2 is YES:

2.1 Which matrices or samples have been analyzed in your country? (Multiple selection)

☐ Equipment in use

☐ Equipment not in use

☐ Oil

☐ Solid waste

☐ Metals

☐ Water

☐ Soil

☐ Biological samples (e.g. blood, breast milk, food)

☐ Caulks/sealants

☐ Paints

☐ Anti-corrosion coatings

☐ Cable sheaths

☐ Flame retardants

☐ Other (Please specify): _____

2.2 Do you have standard methods for sampling and analysis of PCB in your country?

☐ Yes

☐ No

2.3 Have the sampling and analysis of PCB been undertaken by trained personnel? (Multiple selection)

☐ Yes

☐ No

If the response to question 2.3 is YES:

2.3.1. Please indicate the type of PCB application or sampling undertaken by trained personnel

Please select all that apply.

☐ PCB in closed applications

☐ PCB in open applications

☐ PCB in environmental samples

☐ PCB in biological samples

2.4 Do you have a system for accreditation of laboratories for PCB analysis in your country?

☐ Yes

☐ No

2.5 Please select matrices for which reference materials and performance evaluation tests are available in your country:

	Oil	**Solid waste**	**Metal surface**	**Water**	**Soil**	**Biological samples**	**Open applications**
Reference material							
Performance evaluation test							

III. Inventory development

3. Do you have any inventory of PCB in your country?

☐ Yes

☐ No

If the response to question 3 is YES:

3.1 What is the estimated total quantity of PCB currently remaining in your country?

☐ Estimated total quantity of PCB currently remaining: _____ tonnes

☐ Information not available

3.2 Please provide the quantitative data available in your country using the Excel file template attached to the invitation letter.

3.3 What elements are included in the PCB inventory in your country? Please select all that apply. (Multiple selection)

☐ Equipment in use

☐ Equipment removed from use

☐ Oils and other liquids

☐ Other contaminated materials (e.g. soil, wipes, drums)

☐ Open applications (e.g. caulks/sealants, paints, anti-corrosion coatings, cable sheaths, flame retardants)

3.4 What is the estimated coverage of PCB inventory in your country?

☐ All (100%)

☐ Mostly (≥50%)

☐ Limited (<50%)

3.5 Do you determine PCB content?

☐ Yes

☐ No

If the response to question 3.5 is YES:

3.5.1. How do you determine PCB content?

☐ Qualitative methods (e.g. colorimetric test kits, PCB screening kits, ion specific analyzer)

☐ Quantitative methods (e.g. gas chromatography)

☐ Other (Please specify) _____

3.6 Do you have any authority that validates the data in your country?

☐ Yes

☐ No

3.7 Is the information contained in your PCB inventory consistent with the information requested in question 14.1 of Part C of the format for national reporting under the Stockholm Convention?

☐ Yes

☐ No

3.8 Does your country periodically update the PCB inventory?

☐ Yes

☐ No

3.9 Based on the PCB inventory, do you consider that your country has traceability of environmental management information related to equipment and waste containing PCB?

☐ Yes

☐ No

IV. Local capacity for management (storage, transport, treatment and destruction) of PCB and transboundary movements of PCB

4. Do you have facilities or companies that are able to eliminate or decontaminate PCB in your country?

☐ Yes

☐ No

If the response to question 4 is YES:

4.1 Please provide total estimated quantities of PCB eliminated or decontaminated to date in your country.

☐ Estimated total quantities of PCB eliminated or decontaminated to date: _____ tonnes

☐ Information not available

4.2 Which of the following types of PCB have been eliminated or decontaminated in your country? (Multiple selection)

☐ PCB oil (Askarel, Pyranol, Aroclor)

☐ Contaminated oil (less than 10% or 10000 mg/kg PCB)

☐ Transformers (unspecified)

☐ Transformers (complete with oil)

☐ Transformers (carcasses only)

☐ Capacitors (unspecified)

☐ Capacitors (low voltage)

☐ Capacitors (medium voltage)

☐ Capacitors (high voltage)

☐ Capacitors (small size capacitors with <1 liter cooling fluid or oil; ballasts)

☐ Metals

☐ Porous materials

☐ Soil

☐ Open applications (unspecified)

☐ Caulks/sealants

☐ Paints

☐ Anti-corrosion coatings

☐ Cable sheaths

☐ Flame retardants

4.3 What types of facilities have been used for elimination or decontamination of PCB? (Multiple selection)

- ☐ Hazardous incineration plant / High temperature incineration plant
- ☐ BAT/BEP municipal waste incineration plant / Advanced solid waste incineration
- ☐ BAT/BEP cement kiln
- ☐ Chemical destruction plant (e.g. alkali metal reduction, base decomposition)
- ☐ Other (Please specify): _____

4.4 Have those facilities or companies provided services for other countries?

- ☐ Yes
- ☐ No

5. Do you have facilities or companies for the interim storage of PCB in your country?

- ☐ Yes
- ☐ No

If the response to question 5 is YES:

5.1 Do you have a reliable estimate of the national capacity for the interim storage of PCB in your country?

- ☐ Estimated total capacity for the interim storage of PCB: _____ tonnes
- ☐ Information not available

6. Does your country have information or controls over the conditions for retrofilling or decontamination of transformers contaminated with PCB?

- ☐ Yes
- ☐ No

If the response to question 6 is YES:

6.1 Do you verify by analytical data whether the retrofill bulk oil is less than 0.005% PCB after a period of at least 90 days in your country?

- ☐ Yes
- ☐ No

6.2 When the transformer is treated, do you determine the quantity of residual PCB in the transformer carcass and the porous solids?

- ☐ Yes
- ☐ No

6.3 Is the information on retrofilled or decontaminated transformers included in the PCB inventory?

☐ Yes

☐ No

7. Has your country imported or exported PCB?

☐ Yes

☐ No

If the response to question 7 is YES:

7.1 Are the customs authorities trained to apply control of transboundary movements of equipment that may contain PCB?

☐ Yes

☐ No

7.2 Is the authorization of export of PCB in accordance with the Basel Convention processed within a period of six months?

☐ Yes

☐ No

☐ Not applicable

7.3 Does your country have any customs control procedure towards electrical equipment that use dielectric oil, to prevent illegal imports of contaminated equipment?

☐ Yes

☐ No

V. Open applications management

8. Do you have any national regulations or guidelines that specifically mention PCB in open applications (e.g. caulks/sealants, paints, anti-corrosion coatings, cable sheaths, flame retardants)?

- ☐ Yes
- ☐ No

If the response to question 8 is YES:

8.1 Which of the following components of the environmentally sound management of PCB in open applications are stipulated in the regulations or guidelines? (Multiple selection)

- ☐ Identification/sampling
- ☐ Indoor air sampling
- ☐ Analysis
- ☐ Emergency measures
- ☐ Remediation/removal
- ☐ Disposal
- ☐ Investigation of possible contamination by PCB for example before renovation of buildings

9. Which of the following open applications of PCB are known to the stakeholders in your country? (Multiple selection)

- ☐ Caulks/sealants
- ☐ Paints
- ☐ Anti-corrosion coatings
- ☐ Cable sheaths
- ☐ Flame retardants
- ☐ Other (Please specify) _____

10. Are the stakeholders aware of other POPs with similar open applications as PCB such as polychlorinated naphthalenes and short-chain chlorinated paraffins?

- ☐ Yes
- ☐ No

11. Are the stakeholders trained in the identification and sampling of PCB in open applications?

- ☐ Yes
- ☐ No

If the response to question 11 is YES:

11.1. Please indicate the groups trained:

☐ Regulators and competent authorities

☐ All other stakeholders of concern (Please indicate) _____

12. Do you have any thresholds for PCB in open applications in your country?

☐ Yes

☐ No

If the response to question 12 is YES:

12.1 Which of the following do the thresholds refer to? (Multiple selection)

☐ Caulks/sealants

☐ Paints

☐ Anti-corrosion coatings

☐ Cable sheaths

☐ Flame retardants

☐ Indoor air

13. Do you have any projects for remediation or removal of PCB in open applications in your country?

☐ Yes

☐ No

If the response to question 13 is YES:

13.1 What is the current status of phasing out or remediation of PCB in open applications in your country? (Multiple selection)

☐ (a) The problem has been addressed to a small extent

☐ (b) The problem has been addressed, but work still remains

☐ (c) There is a basic survey on identification of potential sources

☐ (d) There is an on-going programme on identification, remediation and disposal

☐ (e) PCB in open applications no longer constitute a problem

13.2 Please select all that you have: (Multiple selection)

- ☐ (a) Experts, facilities or companies that are trained in the remediation or removal of PCB in open applications
- ☐ (b) Standardized training courses for the remediation or removal of PCB in open applications
- ☐ (c) Special equipment for the remediation or removal of PCB in open applications (e.g. cutting tools, grinding machines, industrial vacuum cleaners, filters, negative pressure units)
- ☐ (d) Special personal protective equipment (PPE) for the remediation or removal of PCB in open applications (e.g. breath protection, clothing)?
- ☐ (e) Environmental protective equipment for the remediation or removal of PCB in open applications (e.g. lock systems)
- ☐ (f) None of the above

14. Do you have any scientific studies on the health effects of PCB exposure conducted and published in your country?

- ☐ Yes
- ☐ No

If the response to question 14 is YES:

14.1 Which of the following open applications of PCB were considered in the study? (Multiple selection)

- ☐ Occupational (including electric equipment exposure)
- ☐ Food, water
- ☐ Blood, human milk
- ☐ PCB in open applications
- ☐ Other: (Please specify) _____

Additional information and comments

Please use the space provided below to include any additional information or comments.

End of the questionnaire

Thank you very much for your responding to the questionnaire.