Guidance on Calculation of Action Plan Costs for Persistent Organic Pollutants under the Stockholm Convention

2017

Secretariat of the Basel, Rotterdam and Stockholm Conventions

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1. Introduction

The Stockholm Convention on persistent organic pollutants (POPs) requires each Party to "develop and endeavour to implement a plan for the implementation of its obligations under this Convention" and "review and update, as appropriate, its implementation plan on a periodic basis and in a manner to be specified by a decision of the Conference of the Parties".[1]

In developing, reviewing, and updating a national implementation plan (NIP) for the Stockholm Convention, a number of action plans (or "strategies" or other similar plans) can be developed.[2] The implementation of each action plan will typically require a range of resources, such as human resources, facilities, equipment, services, and materials. Accurate costing of action plans will greatly facilitate national implementation as well as an understanding of the true costs of implementing the Convention globally. In order to facilitate a calculation of action plan costs, UNITAR, in collaboration with the Secretariat of the Stockholm Convention[3], has developed the following guidance, which presents a number of considerations that a Party may wish to take into account. The Conference of the Parties at its 6th meeting invited parties to provide comments based on their experience to increase the usefulness of the guidance and requested the Secretariat to update it based on the comments. However the document was not updated due to lack of resources. In response to decision SC-7/10 with the request made by the Parties to continue updating of the guidance including on the basis of the comments received from Parties and others, thanks to the generous financial support from the European Union, the current guidance document was revised and updated incorporating such inputs.

Many Parties have completed the first edition of their NIP and are in the process of NIP review and updating for the new POPs. In most cases, the Parties will have developed a number of discrete action plans where details necessary for meeting the related obligations will have been outlined and agreed. Activities that are identified under each action plan can form the basis for costing of action plans. Identifying the costs of activities also plays a role in the assessment of the funding needed by developing country Parties and Parties with economies in transition to implement the Convention.[4]

While the starting point for costing is each country's NIP, additional guidance has been provided here to serve as a "check" against the NIP's content. Firstly, as each Party's unique national situation will determine which Convention obligations are relevant, a Party could consider reviewing its obligations (and priorities) by working through the Decision Trees on Stockholm Convention obligations set out in Annex 2 to the present document.[5] Secondly, for each major area under the Convention, a (non-exhaustive) list of relevant obligations and selected activities are presented below (section 3). These can be used to assist with a review of existing action plans to ensure that all major obligations and associated activities have been included. The areas covered are as follows:

- Intentionally produced POPs:
    - Aaldrin, alpha hexachlorocyclohexane (alpha-HCH), beta hexachlorocyclohexane (beta-HCH), chlordane, chlordecone, dieldrin, endrin, heptachlor, hexabromobiphenyl (HBB), hexabromocyclododecane (HBCD), hexachlorobenzene (HCB), hexachlorobutadiene (HCBD), mirex, pentachlorobenzene (PeCB), pentachlorophenol and its salts and esters, polychlorinated naphthalenes (PCN), toxaphene;
    - Tetrabromodiphenyl ether (tetraBDE) and pentabromodiphenyl ether (pentaBDE) (commercial pentabromodiphenyl ether), hexabromodiphenyl ether (hexaBDE) and heptabromodiphenyl ether (heptaBDE) (commercial octabromodiphenyl ether);
    - Lindane; endosulfan;

[1] Guidance for assisting countries in the preparation of national implementation plans was adopted by the Conference of the Parties at its first meeting; see decision SC-1/12. Guidance for the review and updating of national implementation plans (Annex to decision SC-1/12) and an elaborated process for such review and updating (Annex to decision SC-2/7) were also adopted by the Conference of the Parties at its first and second meetings respectively.

[2] In this context, each Party must determine which action plans are critical and which are of secondary importance.

[3] In accordance with Decisions SC-1/12, SC-2/7, and SC-3/8 of the Conference of the Parties of the Stockholm Convention.

[4] In accordance with decision SC-5/22.

[5] The Decisions Trees were initially developed jointly by UNITAR and UNEP. This tool may also be applied to the new POPs added to the Convention in 2013 (Decision SC-6/13) and 2015 (Decisions SC-7/12, SC-7/13 and SC-7/14).

- DDT, perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) and PFOS related chemicals[6]
- Polychlorinated biphenyls (PCB)

- Unintentionally produced POPs:
  - Hexachlorbenzene (HCB), pentachlorobenzene (PeCB), polychlorinated naphthalenes (PCN), ,PCB, PCDDs/PCDFs
- Stockpiles
- Wastes
- Trade
- Articles containing POPs

2. Practical Steps for Costing Action Plans

This part of the document outlines a sequence of steps that can assist Parties when costing action plans. These steps—or the "costing hierarchy"—is illustrated in figure 1 below. (Further details on these steps as well as the entire action plan process, from planning to implementation, are provided in the "Guidance on Action Plan Development for Sound Chemicals Management" developed by UNITAR and presented in Annex 3 of this document).

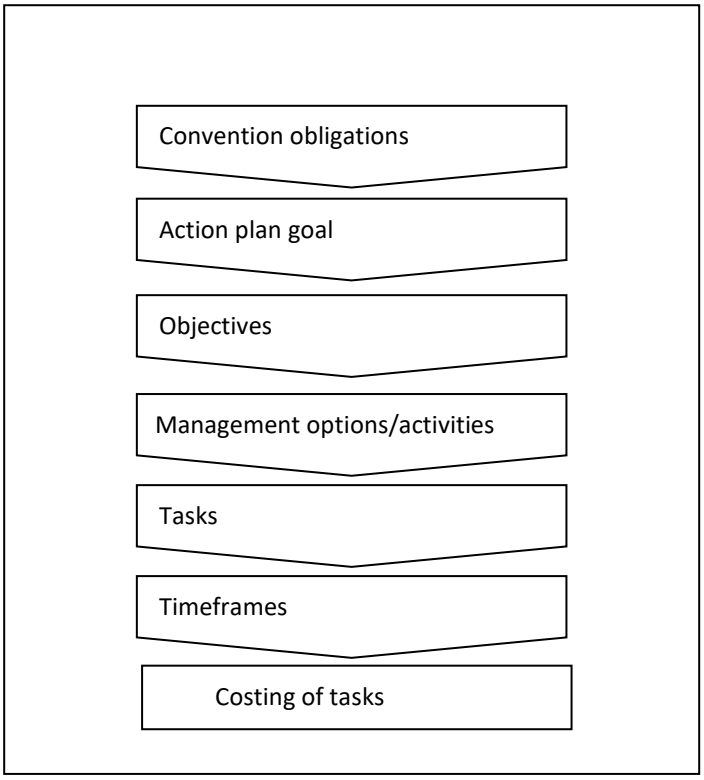

Figure 1 The Costing Hierarchy

To illustrate the steps, the theme of "Intentionally produced POPs: polychlorinated biphenyls (PCB)" will be used as an example.

[6] PFOS related chemicals are chemicals that contain the structural element PFOS in their molecular structure as they are and were produced with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) as an intermediate or starting material.

Convention Obligations:

Each Party may wish to review the major obligations under the Convention against their NIP's content. This can be achieved by reviewing the decision trees (Annex 2) and/or the
(non-exhaustive) list of relevant obligations and selected activities (Section 3).

- The major obligations for Parties under the Convention that relate to PCB management and elimination include, as appropriate, that Parties:
- Act in accordance with the Convention goal[7] of the elimination of production and use of PCB
- Cease production of new PCB immediately (upon entry into force)[8]
- Eliminate use of in-place PCB equipment by 2025
- Make best efforts to identify, label, and remove from use equipment containing > 50ppm, with a higher priority given to equipment containing higher levels of PCB
- Do not trade in PCB equipment (except for environmentally sound management of wastes)
- Do not engage in recovery of liquids with >50 ppm PCB for reuse (except for maintenance and servicing of existing equipment)
- Achieve environmentally sound management of PCB wastes as soon as possible and by no later than 2028
- Report to the Conference of the Parties every 5 years on their progress

Action Plan Goal:

- Based on the relevant obligations and country situation, the Party can establish a goal for the action plan.
- For PCB management and elimination, the action plan goal could, for example, be "Identify and eliminate the use of PCB in equipment by 2025, promote measures to reduce exposures and risk related to PCB use, and ensure environmentally sound waste management of PCB liquid and PCB-containing equipment by 2028".

Action Plan Objectives:

Objectives state, at a finer level of detail than the goal, the specific outcomes that the action plan expects to accomplish. Some objectives can be attained only towards the end of action plan implementation; others may be met along the way.

Objectives for a PCB management and elimination action plan could include:

- Establish a legal framework and technical standards, and strengthen related enforcement for managing PCB-containing equipment and articles by 2011
- Establish a regularly-updated system for identifying and labelling PCB-containing equipment by 2012 to enable prioritisation of highest risk equipment and allow tracking over time throughout the life cycle
- Strengthen national capacity for environmentally sound management of PCB-containing equipment by 2012
- Ensure environmentally sound handling and transportation of PCB wastes, and environmentally sound disposal by 2013
- Ensure that stakeholders (e.g. electricity companies, government, private operators involved in maintenance, transport, and destruction, NGOs) have sufficient levels of awareness regarding PCB management and elimination by 2013

Management Options/Activities:

An activity can be defined as an element of work performed during the course of action plan implementation. An activity has an expected duration, cost, and resource requirements. In some cases, activities will only address one objective, while in other cases they will help to deliver multiple objectives.

For the objective "Establish a legal framework and technical standards, and strengthen related enforcement for managing PCB-containing equipment and articles by 2011", management options/activities may include, inter alia:

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[7] Stockholm Convention on POPs, Article 1

[8] Stockholm Convention on POPs, Annex A, Part II

- Import:
    - Reviewing and enforcing custom control mechanisms, and training of custom officers for compliance with Stockholm, Basel, and Rotterdam Conventions
- Production:
    - Developing and implementing controls on industrial companies' manufacturing of electrical transformers using a pollutant release and transfer register approach (including analysis of input material: second hand material, mineral oil, etc.), as well as a purchasing policy for input material
- Use:
    - Developing and implementing a PCB declaration system to competent authorities including risk assessment of PCB and PCB-contaminated transformers in use and decommissioned
    - Ensuring compliance for PCB transformers in use (e.g. labelling, default protection device, fire protection devices)
    - Undertaking annual reporting
    - Carrying out inspection of PCB installations
- Disposal:
    - Regulating handling, packaging, transportation, and destruction of PCB wastes
    - Establishing a licensing system for relevant companies
    - Implementing the Basel Convention mechanisms for transboundary shipment of PCB wastes
- Recycling:
    - Reviewing regulations related to the recycling of used oil, waste control, pollutant release and transfer register approach for recycling activities, and the recycling of metal scraps

For the objective "Establish a regularly-updated system for identifying and labeling PCB-containing equipment by 2012 to enable prioritisation of highest risk equipment and allow tracking over time throughout the life cycle", management options/activities may include, inter alia:

- Developing/maintaining detailed inventories of PCB oils, equipment, and wastes, which identify the holders of PCB and PCB-containing equipment, with a segregation between PCB oil equipment and mineral oil equipment associated with a risk assessment determining the phase out process
- Determining PCB levels in equipment in-use nationally
- Developing/maintaining inventory models for equipment containing pure/high concentrations of PCB
- Developing/maintaining inventory/estimation models for equipment with low concentrations of PCB in oils (by criteria of distribution)
- Developing risk assessment models to prioritise action taken to protect human health and the environment (most exposed populations, critical steps in the sound management of equipment, etc.)
- Making use of IT-based tools for the maintenance and monitoring of PCB-containing equipment and life-cycle management

For the objective "Strengthen national capacity for environmentally sound management of PCB-containing equipment by 2012", management options/activities may include, inter alia:

- Carrying out environmental management based on BAT/BEP for transformers in use and decommissioned, developing management rules for purchasing equipment, maintenance, and replacement
- Producing and/or using substances or adopting approaches that are proven alternatives to PCB
- Reducing risk of PCB releases from equipment in use, ensuring electrical utilities are undertaking environmentally sound management of PCB oils and equipment
- Developing and implementing risk-based PCB equipment phase-out plans including progressively removing PCB equipment from high-risk locations
- Ensuring electrical utilities are equipped with tracking systems for PCB equipment

Breaking Down Activities into Tasks:

Since activities are typically large elements, to accurately estimate the costs of an action plan, it is particularly important to break down activities to the task level. Activities should only be broken down to a level which enables an accurate estimation of time and resource requirements and provides enough information for those responsible for implementing the particular activity or task.

For the activity "Determining PCB levels in equipment in-use nationally", tasks may include, inter alia:

- Reviewing results of the preliminary PCB inventory from the NIP to determine the location of in-use equipment that can contain PCB
- Procuring and training on approved PCB testing kits
- Testing of possibly PCB-containing equipment
- Compiling and analyzing data

Timeframes:

While the duration of each activity/task, at this stage, can only be an estimate, the amount of time required for each provides important input into calculating the costs. Reviewing earlier projects may provide insight into realistic timeframes, and experience shows that this is the most efficient way of learning to plan realistically. In addition, where activities or tasks are of a technical nature, it may be necessary to consult with those who have the related technical knowledge or expertise in order to make realistic estimations. Experience has shown that however careful the planning, it is wise to build in extra time to allow for unforeseen events.

An underestimation of time required for an activity or task can be caused by a range of miscalculations, such as leaving out essential activities and tasks; not accurately accounting for interdependence of activities or tasks; not accounting for time required for ordering and delivery of equipment; and failure to accurately consider competing resources (e.g. scheduling the same person or equipment for simultaneous activities or tasks).

Costing of Tasks:

With a complete set of activities and tasks defined for each action plan, a range of related resources can be accurately estimated. These may include, inter alia, human resources, facilities, equipment, services, and materials. To determine the resource inputs required to complete each activity and related tasks, the following questions can be asked, among others:

- How many people are required?
- What type of skills/expertise do they need to possess?
- Are particular facilities, equipment, services, or materials necessary?
- What duration of time is needed (for human resources, equipment, etc.)?
- Are there any other special requirements or resources not yet covered?

Finer details on each resource can be defined by considering the following:

Human resources	- knowledge and skills (including for project/activity management) - person-days required - estimated cost
Facilities	- types - space and time required - estimated cost
Equipment	- types - space and time required - estimated cost
Services	- types (e.g. travel expenses, translation) - quantity - estimated cost
Materials	- types - quantity - estimated cost
Other resources	- unique skills - resources not covered above

Other useful approaches for accurately estimating costs could include: identifying “soft costs” such as current labour costs in the country, and identifying “hard costs” such as disposal costs and equipment costs. Reviewing earlier projects may also provide insight into realistic resource requirements. A description of estimation cost methodologies is presented in Annex 1A.

Once calculated, totalling the costs for each set of tasks and activities can then provide a general estimate of the cost of the action plan.

A “Resource Requirements Matrix”, as presented in Box 1 below, can assist in identifying and recording the various costs of an action plan.

Box 1: Resource Requirements Matrix

A Resource Requirements Matrix is a tool which can assist in charting the various costs of an action plan. It can also help with preparing action plan budgets and financial mobilization efforts. An illustration of the Resource Requirements Matrix is provided below for the activity "Determining PCB levels in equipment in-use nationally".

Activities and Tasks from the Action Plan	*Human Resources*	*Facilities*	*Equipment*	*Services, Materials, etc.*	*Other Resources*	*Total Resource Costs*
***Activity:* Determining PCB levels in equipment in-use nationally**						
Task: Reviewing results of preliminary PCB inventory from the NIP to determine location of in-use equipment that can contain PCBs	Qualified reviewer (2 person-days)	Office	Computer with appropriate software			2 person-days*daily wage: $xx Office rent: $xx
Task: Procuring and training on approved PCB testing kits	Chemicals management staff (0.5 person-days) Trainer (5 person-days) Administrative staff (1 person-days)	Office			Training on testing kit use	0.5 person-days*daily wage: $xx 5 person-days*daily wage: $xx 1 person-days*daily wage: $xx Protective clothing: $xx Testing kits: $xx
Task: Testing of possibly PCB-containing equipment	Qualified driver (16 person-days to travel across country) Labourers (56 person-days) Manager (8 person-days)	Sites where PCB-containing equipment are in-situ	Vehicle; PCB testing kits; tools and safety equipment for opening of PCB-containing equipment; computer for recording of results	Cooperation of authorities with PCB-containing equipment; advance approvals, etc.	Petrol	16 person-days*daily wage: $xx 56 person-days*daily wage: $xx 8 person-days*daily wage: $xx Vehicle: $xx Petrol: $xx Tools and safety equipment: $xxx Computer: $xxx
Task: Compiling and analyzing data	Qualified data input specialist (3 person-days); Manager for data review (1 person-day)	Office	Computer and software			3 person-days*daily wage: $xxx 1 person-day*wage: $xxx

Note:
- The activities outlined here are for illustrative purposes and are not comprehensive.
- "Person-days" refer to the number of full-time days that would be required to complete an activity or task. For example, 5 person-days may equal one person working 5 days or 2 persons working simultaneously for 2.5 days. It is also important to estimate the costs of a person-day for the particular type of human resource required. For example, 1 person-day for a manager will likely be more costly than the same amount of time required for a labourer.

Incremental Costs

As part of costing action plans, developing country Parties and Parties with economies in transition, should give due consideration to the identification of incremental costs[9] in light of Article 13 of the Convention.

In this context, the Global Environment Facility (GEF)—in its capacity, on an interim basis, as the principal entity entrusted with the operations of the financial mechanism of the Stockholm Convention—requires that project proposals discuss the value-added of GEF involvement through incremental reasoning.[10]

As defined by GEF, "GEF finances the incremental or additional costs associated with transforming a project with national/local benefits into one with global environmental benefits as well."[11] GEF grants cover the difference or "increment" between a less costly, more polluting option and a costlier, more environmentally friendly option.

The approach by GEF[12] in determining incremental cost consists of five steps that simplify the process of negotiating incremental costs, clarifies definitions, and links incremental cost analysis to result-based management and the GEF project cycle. The emphasis is on the fit with focal area strategies and co-funding in relation with the impact/value-added of the proposed GEF intervention. The "incremental costs analysis annex" is no longer a requirement of project documentation. The steps are as follows (an example on how to calculate an incremental cost is described in annex 1C):

- Determine the environmental problem, threat, or barrier, and the "business-as-usual" scenario (or: What would happen without the GEF?)
- Identify the global environmental benefits (GEB) and fit with GEF strategic programs and priorities linked to the GEF focal area
- Develop the results framework of the intervention
- Provide the incremental reasoning and GEF's role
- Negotiate the role of co-financing

In order to provide detailed information on the business-as-usual, the Party could undertake an assessment of ongoing and planned activities and determine the quantitative (e.g. budgets and planned expenditures) and qualitative (e.g. institutional capacity) inputs that would be forthcoming regardless of whether the GEF intervention occurs or not. In simplified terms:

It should be possible to calculate which action plan costs relate to business-as-usual—i.e. the situation or context relevant to the proposed project intervention in a country or proposed project site as it would expectedly unfold without the GEF support—and which relate to the alternative "with GEF" scenario—i.e. the proposed role for the GEF based on the expected global environmental benefits of the future project.

By identifying incremental costs for the implementation of the Convention, developing country Parties and Parties with economies in transition will be able to better target financial and technical assistance. Distinguishing between baseline and incremental costs is also an essential element of the assessment of the funding needs for the implementation of the Convention as called for by the Conference of the Parties.[13]

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[9] Under Article 13 of the Stockholm Convention, developed country Parties shall provide new and additional financial resources to enable developing country Parties and Parties with economies in transition to meet the agreed full incremental costs of implementing measures which fulfil their obligations under the Convention as agreed between a recipient Party and an entity participating in the mechanism described in paragraph 6 of the same Article.

[10] GEF Trust Fund CEO Endorsement/Approval Template;

[11] Evaluation of Incremental Cost Assessment. GEF/ME/C.30/2

[12] Operational Guidelines for the Application of the Incremental Cost Principle. GEF/C.31/12

[13] Decision SC-5/22 requests Parties to report on their needs every four years distinguishing baseline and incremental needs.

3. Selected Convention Obligations and Activities

3.1 Intentionally Produced POPs

The major obligations for Parties under the Convention that relate to this theme include, as appropriate, that Parties:

- Act in accordance with the Convention goal[14] of elimination of production and use of all intentionally produced POPS (industrial chemicals and pesticides)
- Eliminate or restrict production and use and in each case, trade will be restricted[15]
- Eliminate all of the above-listed chemicals (Annex A) and restrict DDT as well as perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) and PFOS related chemicals, for which there are "Acceptable Purposes" (Annex B)

Possible activities to meet the obligations may include:[16]

- Producing and/or using substances or adopting approaches that are proven alternatives to the above chemicals
    - Seeking out internationally available information on alternatives recommended for use by experts and/or in use in other countries
    - Undertaking a feasibility study of alternatives and developing a transition study
    - Undertaking awareness raising among target groups that can be affected by the change to alternatives
    - Undertaking capacity building for workers and others that produce and/or use the alternatives
- Adopting and implementing a suitable legislative framework for achieving the obligations related to the prohibition and/or use by the Party of the above chemicals
- Enforcing legislation and regulations
    - Determining the current state of enforcement of existing legislation, and requirements, where necessary, for strengthening such enforcement of legislation prohibiting production and/or use of the above chemicals. Such requirements can include activities for:
        - Capacity building for enforcement, including training and resources to equip staff with the necessary skills and equipment to enforce existing/new regulations (e.g. With the ministry of agriculture, customs authorities, laboratories, ministry of justice or legal affairs)
        - Data collection and information exchange for reporting and assessing progress towards implementation
        - Awareness raising for key stakeholders
- Ensuring transparency, effective coordination, and assignment of responsibilities among government agencies, industry, nongovernmental organisations (NGOs), and other stakeholders more broadly
- With regard to hexachlorobenzene (HCB), continuing use as a closed-system site-limited intermediate in the manufacture of other chemicals, and notifying the Secretariat
- With regard to tetrabromodiphenyl ether and pentabromodiphenyl ether (commercial pentabromodiphenyl ether) and hexabromodiphenyl ether and heptabromodiphenyl ether (commercial octabromodiphenyl ether), continuing use for recycling of articles containing these POPs and the use and final disposal of articles manufactured from such recycled articles, if the Party has registered the specific exemption

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[14] Stockholm Convention on POPs, Article 1

[15] Stockholm Convention on POPs, Article 3

[16] For Parties that have completed, or are in the process of completing the first or subsequent edition of their NIP, the (non-exhaustive) lists of activities outlined in this guidance should only serve as an indicative "check" on existing work already undertaken by Parties.

- With regard to lindane, continuing use as a human health pharmaceutical for control of head lice and scabies as second line treatment, if the Party has registered the specific exemption
- With regard to endosulfan, continuing use as a pesticide for crop-pest combination according to Annex A Part VI, if the Party has registered the specific exemption
- With regard to DDT, continuing use as a closed-system site-limited intermediate in the manufacture of other chemicals, and notifying the Secretariat
- With regard to DDT, continuing registered acceptable purpose production and/or use for disease vector control if it is only produced or used for disease vector control in accordance with the WHO recommendations and guidance on the use of DDT, and when locally safe, effective and affordable alternatives are not available to the Party in question
- With regard to perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) and PFOS related chemicals, continuing use of the registered specific exemptions and registered acceptable purposes production and use
- Developing and implementing plans to address stockpiles and wastes of these substances (also see Sections 3.4 and 3.5)
- For chemicals, such as hexabromobiphenyl, hexabromocyclododecane, tetrabromodiphenyl ether and pentabromodiphenyl ether (commercial pentabromodiphenyl ether), hexabromodiphenyl ether and heptabromodiphenyl ether (commercial octabromodiphenyl ether), pentachlorophenol and its salts and esters, and perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) and PFOS related chemicals, occurring as constituents of articles, fulfilling the requirements for articles containing POPs (see also section 3.7)
- For chemicals such as pentachlorophenol and hexabromocyclododecane, take necessary measures to ensure that articles that contain them (as per specific exemptions), can be easily identified by labelling or other means throughout their life cycle.

3.2 Polychlorinated biphenyls (PCB)

The major obligations for Parties under the Convention that relate to this theme include, as appropriate, that Parties:

- Act in accordance with the Convention goal[17] of the elimination of production and use of PCB
- Cease production of new PCB immediately (upon entry into force)[18]
- Eliminate use of in-place PCB equipment by 2025
- Make best efforts to identify, label, and remove from use equipment containing > 50ppm, with a higher priority given to equipment containing higher levels of PCB
- Do not trade in PCB equipment (except for environmentally sound management of wastes)
- Do not engage in recovery of liquids with >50 ppm PCB for reuse (except for maintenance and servicing of existing equipment)
- Achieve environmentally sound management of PCB wastes as soon as possible and by no later than 2028
- Report to the Conference of the Parties every 5 years on their progress

Possible activities to meet the obligations may include:

- Enhancing national regulatory infrastructure and supporting mechanisms
    - Import:
        - Reviewing and enforcing custom control mechanisms, and training of custom officers for compliance with Stockholm, Basel, and Rotterdam Conventions

[17] Stockholm Convention on POPs, Article 1

[18] Stockholm Convention on POPs, Annex A, Part II

- Production:
    - Developing and implementing controls on industrial companies' manufacturing of electrical transformers using a pollutant release and transfer register approach (including analysis of input material: second hand material, mineral oil, etc.), as well as a purchasing policy for input material
- Use:
    - Developing and implementing a PCB declaration system to competent authorities including risk assessment of PCB and PCB-contaminated transformers in use and decommissioned
    - Ensuring compliance for PCB transformers in use (e.g. labelling, default protection device, fire protection devices)
    - Undertaking annual reporting
    - Carrying out inspection of PCB installations
- Disposal:
    - Regulating handling, packaging, transportation, and destruction of PCB wastes
    - Establishing a licensing system for relevant companies
    - Implementing the Basel Convention mechanisms for transboundary shipment of PCB wastes (also see Sections 3.4-3.6)
- Recycling:
    - Reviewing regulations related to the recycling of used oil, waste control, pollutant release and transfer register approach for recycling activities, and the recycling of metal scraps (also see Sections 3.4-3.6)

- Enhancing national capacity for environmentally sound management of PCB-containing equipment in use
    - Improving generation and collection of data and information on PCB to support environmentally sound management of PCB at the national level, including developing and maintaining detailed inventories of PCB oils, equipment, and wastes held by utility companies.
        - Developing/maintaining inventories which identify the holders of PCB and PCB-containing equipment, with a segregation between PCB oil equipment and mineral oil equipment associated with a risk assessment determining the phase out process
        - Developing/maintaining inventory models for equipment containing pure/high concentrations of PCB
        - Developing/maintaining inventory/estimation models for equipment with low concentrations of PCB in oils (by criteria of distribution)
        - Developing risk assessment models to prioritise action taken to protect human health and the environment (most exposed populations, critical steps in the sound management of equipment, etc.)
        - Making use of IT-based tools for the maintenance and monitoring of PCB-containing equipment and life-cycle management
    - Carrying out environmental management based on BAT/BEP for transformers in use and decommissioned, developing management rules for purchasing equipment, maintenance, and replacement
    - Producing and/or using substances or adopting approaches that are proven alternatives to PCB
    - Reducing risk of PCB releases from equipment in use, ensuring electrical utilities are undertaking environmentally sound management of PCB oils and equipment, progressively removing PCB equipment from high-risk locations, developing and implementing risk-based PCB equipment phase-out plans, and ensuring electrical utilities are equipped with tracking systems for PCB equipment

- Undertaking environmentally sound handling and transportation of PCB wastes, and environmentally sound disposal: decontamination and thermal decomposition processes
- Undertaking awareness raising for stakeholders (e.g. electricity companies; government; private operators involved in maintenance, transport, and destruction; NGOs), including developing and implementing a communications plan on the impact of PCB on health and environment addressing:
    - Risk of exposure to PCB
    - Biodegradation and bioaccumulation of PCB
    - Concentration of PCB in the food chain
    - Cost/benefit of PCB management options
    - Mechanisms for regulation
    - Mechanisms for capacity building
    - Mechanisms for disposal

3.3 Unintentionally Produced POPs in Annex C

The major obligations for Parties under the Convention that relate to this theme include, as appropriate, that Parties:

- Act in accordance with the Convention goal of continuing minimisation and, where feasible, ultimate elimination of total releases of chemicals in Annex C derived from anthropogenic sources (dioxins, furans, HCB, PCN, PeCB, PCB)
- Promote application of available, feasible, and practical measures to achieve realistic and meaningful levels of release reduction or source elimination
- Promote development and, where appropriate, require use of substitute or modified materials, products, and processes to prevent formation and release of POPS in Annex C
- Promote, and as provided for in an action plan, require use of best available techniques (BAT) for new sources within the following industrial source categories (Annex C, Part II) that have potential for comparatively high formation and release of POPs to the environment:
    - Waste incinerators (municipal, hazardous or medical waste; sewage)
    - Cement kilns firing hazardous wastes
    - Pulp production involving chlorine
    - Thermal processes used in metallurgical industry (secondary production of aluminum, copper or zinc; sinter plants in iron and steel industry)
- Phase in any BAT requirements for such new sources as soon as practicable but no later than 4 years after entry into force of the Convention
- Promote the use of best environmental practices (BEP) for these new sources
- Promote the use of BAT and BEP for:
    - New sources within 13 categories (Annex C, Part III)
        - Open burning of wastes (including landfill sites)
        - Thermal processes in metallurgical industry not specified in part ii
        - Residential combustion sources
        - Fossil-fuel fired utility and industrial boilers
        - Firing installations for wood and other biomass fuels
        - Chemical production processes releasing unintentionally produced POPs (e.g. Chlorophenols, chloranil)

        - Crematoria
        - Motor vehicles (especially those burning leaded gasoline)
        - Destruction of animal carcasses
        - Textile and leather dyeing and finishing
        - Shredder plants for the treatment of end-of-life vehicles
        - Smouldering of copper cables
        - Waste oil refineries
    - Existing sources within all categories (Part II and III, as listed in 4 and 7, above)
- Undertake inventory maintenance and action plan updating in relation to 1-7, above

Possible activities to meet the obligations may include:

- Monitoring and developing or refining an inventory, focusing on main source categories and the main release categories (air, water, land, product, residue)
    - Building capacity building for monitoring that addresses data management, sampling techniques, and validation of analytical methods
- Adopting and implementing a suitable legislative framework that facilitates coordination of actions taken by key stakeholders
- Enforcing legislation and regulations and building capacity to enforce existing/new regulations
- Developing available, feasible, and practical measures to achieve reductions and source elimination
- Developing and, where appropriate, requiring use of substitute or modified materials, products, and process to prevent the formation of unintentional POPs
- Promoting and pursuant to the action plan, requiring the use of BAT and BEP, for new existing sources, as required in Annex C, Parts II and III
    - Building capacity for use of BAT/BEP, including funding for and convening of training workshops, giving special attention to the reduction, continuing minimisation and, where feasible, the ultimate elimination of unintentionally produced POPs
- Ensuring transparency, effective coordination, and assignment of responsibilities among government agencies, industry, NGOs, and other stakeholders more broadly
    - Implementing strengthened mechanisms for public participation in the regulation of sources of chemicals listed in Annex C, as well as for the public availability of monitoring data from Annex C sources (taking into account the guidance in para. 5 of Article 9)
    - Improving and expanding reporting of releases and other relevant information involving Annex C substances, as a significant contribution to providing information exchange (Art. 9) and public information, awareness, and education (Art. 10)

3.4 Stockpiles

The major obligations for Parties under the Convention that relate to this theme[19] include, as appropriate, that Parties:

- Act in accordance with the Convention goal of environmentally sound management of stockpiles that consist of, contain, or are contaminated by POPS
- Not allow recovery, recycle, reclamation, direct use, or alternative uses of POPs
- Not transport these materials across international boundaries without taking into account international rules (e.g. Basel Convention)

[19] Stockholm Convention on POPs, Article 6

- Develop strategies for identifying contaminated sites and, if remediation is attempted, do it in an environmentally sound manner

Possible activities to meet the obligations may include:

- Carrying out inventories of stockpiles consisting of or containing chemicals listed in Annex A or B
    - Training and equipping local teams to carry out a comprehensive national inventory on obsolete pesticides, associated contaminated materials, and equipment as well as their storage locations (also see section 3.5)
- Strengthening policy and regulatory regimes related to pesticide management at the country level
    - Undertaking capacity building to implement pest and pesticide regulations, and to raise awareness and engage major stakeholders, including producers' organisations and civil society on the regulatory and policy frameworks
- Managing stockpiles, as appropriate, in a safe, efficient, and environmentally sound manner
- Undertaking clean up and site remediation measures to mitigate the impact of obsolete pesticides threatening communities and ecosystems
- Capacity building for sound pest management
    - Undertaking sustainable pest management interventions in target areas where the benefits are likely to be higher and where there are opportunities for integrated pest management adoption, involving strong collaboration with existing agricultural programmes in the county, e.g. addressing prevention of exposure to stockpiles, and accessibility to low and no-risk alternatives and substitutes
    - Undertaking public awareness campaigns and communication outreach on the appropriate use of pesticides that involve culturally-adapted messages to end-users of pesticides with the objective of enhancing decision-making processes, practices, and understanding of the potential adverse impacts of pesticides
- Developing and implementing sustainable strategies for future management of pesticide-related waste

3.5 Waste

The major obligations for Parties under the Convention that relate to this theme[20] include, as appropriate, that Parties:

- Act in accordance with the Convention goal of environmentally sound management of wastes that consist of, contain, or are contaminated by POPS
- Not allow recovery, recycle, reclamation, direct reuse or alternative uses of POPs
- Not transport these materials across international boundaries without taking into account international rules (e.g. Basel Convention)
- Develop strategies for identifying contaminated sites and, if remediation is attempted, do it in an environmentally sound manner

Possible activities to meet the obligations may include:

- Reviewing existing legislation and enforcement, regarding:
    - Control of import of pesticides (intentional or non-intentional import of non-authorized pesticides)
    - Phase-out dates for production and use of POPs
    - Health and safety legislation to protect workers from possible exposure to POPs
    - Emergency contingency planning, spill, and accident response
    - Specifications of acceptable analytical and sampling methods for POPs

[20] Ibid.

    - Identification of contaminated sites and remediation technologies and provisions enabling the development of related inventories
    - Provisions and requirements relative to the storage, handling, collection, and transport of wastes and specifications for containers, equipment, bulk containers, and storage sites containing POPs
    - Requirements for hazardous waste treatment and disposal facilities
    - Transboundary movement requirements in accordance with the Basel Convention
- Capacity building for:
    - Enforcing legislation (inspection, risk assessment, control, licensing private companies for laboratory work, handling, transportation, and storage)
    - Developing and maintaining an inventory of POPs waste: analysis, characterization based on disposal requirements
    - Handling, transportation, temporary storage of POPs waste and undertaking bat/bep for the management of POPs waste
    - Transboundary shipment (mechanisms of the basel convention)
    - Financial mechanisms for incremental management costs
- Determining scope/amount of wastes
    - Identifying POPs wastes and stockpiles consisting of or containing POPs chemicals in the formal and informal sector
    - Developing appropriate strategies for the identification of products and articles in use and wastes consisting of, containing, or contaminated with POPs
    - Developing and maintaining inventories to establish a baseline quantity of products, articles, and wastes consisting of, containing, or contaminated with POPs
    - Establishing an information registry to assist with safety and regulatory inspections
- Undertaking analysis of wastes
    - Sampling of POPs wastes
    - Analysis to select appropriate disposal technologies and relevant disposal facilities
    - Monitoring of waste disposal processing
- Developing a strategy, allowing waste separation and temporary storage including:
    - Classification of POPs waste based on risks during storage and disposal technologies (e.g. Organic, inorganic, flammable, non-flammable, reactivity with humidity , acids)
    - Temporary storage of POPs waste according the characterization and the disposal technology (e.g. handling, collecting, transporting, and storing in an environmentally sound manner)
- Developing and implementing a disposal management plan in accordance with the Basel Convention based on destruction and irreversible transformation methods
    - Identifying disposal facilities (e.g. domestic treatment if disposal facilities available, pre-treatment if appropriate; regional facilities; export facilities)
    - Obtaining bids
    - Obtaining export licences form transit and export countries
    - Packaging for shipment
    - Addressing handling
    - Ensuring transporting across international boundaries takes into account international rules, standards, and guidelines (e.g. Basel Convention, concerning packing, labelling, and safety information)
    - Ensuring appropriate disposal whereby POPs content is destroyed or irreversibly transformed in an environmentally sound manner, taking into account international rules, standards, etc.

    - Reporting to Secretariat of the Basel Convention
    - Preventing recovery, recycle, reclamation, direct reuse, or alternative uses of POPs, including:
        - Reuse of POPs waste as medicine or for food conservation
        - Control of illegal import and export of POPs wastes and uncontrolled landfills POPs wastes
- Undertaking awareness raising of stakeholders, including public sector, private sector, civil society (NGOs, informal sector)

3.6 Trade

The major obligations for Parties under the Convention that relate to this theme[21] include, as appropriate, that Parties:

- Restrict trade for all POPs in Annex A and B
- Limit imports and exports to shipments:
    - Intended for environmentally sound disposal, or
    - To parties with "specific exemptions" under Annex A or B, or "acceptable purposes" under Annex B
- Adhere to certain requirements when exporting to non-Parties, i.e.
    - Conditions on both Non-Party and Party, and
    - Accountability requirements (use and disposal of POPs)

Possible activities to meet the obligations may include:

- Establishing national registers and databases related to exports and imports of chemicals, including safety information
- Building capacity to provide the infrastructure and skills necessary to manage transboundary movement of chemicals, including ensuring chemicals are handled safely throughout their life-cycle, in an environmentally sound manner
    - Providing training courses for customs agents and border patrols regarding chemicals-related categories, trade names, names of preparations, code numbers, information on hazard classification, physicochemical, toxicological, and ecotoxicological properties, among other considerations
    - Training scientists, with requisite laboratory equipment and facilities, to enable them to assess and identify chemical components and characteristics in the context of international trade of those substances
    - Training regulatory officials and customs agents as appropriate, on the workings of the Rotterdam, Stockholm , and Basel Conventions, and SAICM as those and other relevant international instruments relate to their trade-related responsibilities
    - Building capacity with regard to the rules, procedures, and infrastructure, including laboratories, necessary to ensure compliance with and responsible use of the Rotterdam Convention rights and obligations
- Ensuring that good management practices for chemicals are in place, and that any hazardous chemicals being exported or imported are adequately protective of human health and the environment (also see section 3.4)
- Taking effective steps and special precautions to minimise and prevent illegal international traffic in harmful, hazardous, or toxic chemicals and pesticides

[21] Stockholm Convention on POPs, Article 3(2)

3.7 Articles Containing POPs

The major obligations for Parties under the Convention that relate to this theme[22] include, as appropriate, that Parties:

- Act in accordance with the Convention goal of environmentally sound management of articles upon becoming wastes that consist of, contain, or are contaminated by POPs
- Develop and implement strategies to identify articles in use that consist of, contain, or are contaminated by POPs
- Not allow recovery, recycle, reclamation, direct use, or alternative uses of articles containing POPs
- Not transport articles in use, or upon becoming waste, that consist of, contain or are contaminated by POPs across international boundaries without taking into account international rules (e.g. Basel Convention)
- Where quantities of a chemical occurring as constituents of articles manufactured or already in use before or on the date of entry into force of the relevant obligation with respect to that chemical, notify the Secretariat that a particular type of article remains in use within the Party. The article shall not be considered as listed in Annex A or B. The Secretariat shall make such notifications publicly available[23]

Possible activities to meet the obligations may include:

- Investigating the technical aspects of the risks associated with chemicals in articles, and developing appropriate systems to enhance information exchange in the supply chains
- Developing criteria for those chemicals that need to be included in a watch/monitor list regarding chemicals in articles
- Establishing/strengthening a management regime that seeks to ensure that all appropriate types of information, including where appropriate on chemicals in articles, is available, accessible, adequate, and appropriate to the needs of all stakeholders
    - Notifying the Secretariat that a particular type of article remains in use within the Party
    - Transmitting relevant information and data on chemicals in articles to the Stockholm Convention and SAICM secretariats, and other relevant actors
    - Improving communication concerning chemicals in articles throughout their product supply chain and life-cycle
    - Using various communications-related tools (advertisements, workshops, public service announcements, posters, etc.) to increase the level of awareness and knowledge about risks to human health or the environment
    - Convening workshops among companies selling or using products which contain POPs or other potentially suspect chemicals to consider options for investigating the matter further, and for their willingness to collectively address the matter in coordination with the national authorities and other interested stakeholders
    - Take necessary measures to ensure that articles containing POPs can be easily identified by labelling or other means throughout their life cycle.

4. Cost estimation

4.1 Cost estimating methods

Cost estimation involves developing an approximation of the costs of the resources needed to complete project activities. In approximating cost, the estimator considers the causes of variation of the final estimate, which requires identifying and considering various costing alternatives, as well as using the costing method that better fits each particular context. The cost estimating process can be resumed in three main steps:

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[22] Stockholm Convention on POPs, Article 6(d)

[23] Stockholm Convention on POPs, note ii of Part I of Annex A and Annex B

- Define, at successive levels of detail, the work elements of the project and their interrelationships, taking into account the total capital costs and the variable costs for the project.
- Delineation of the cost and benefit categories and elements is made for the estimates
- Select a cost estimating model used to estimate the future costs and revenues during the analysis period.

There cost estimating models used, vary according to the specific context of the project and the information available for costs[24]. Some of the mostly used methods are[25]:

Bottom up cost estimating method

This technique involves estimating the cost of individual activities or work packages, then summarizing or rolling up the individual estimates to get a project total. The cost and accuracy of bottom-up estimating is driven by the size and complexity of the project. The bottom-up approach relies on detailed engineering analysis and calculation to determine an estimate. To apply this approach, a detailed design and configuration information for various components and accounting information is needed for all material, equipment, services, and labor required of a project.

Parametric cost estimating method

Parametric estimating is a technique that uses validated relationships between a projects technical, programmatic, and cost characteristics and the historical resources used during the development formulation of a program. Parametric modeling involves using project characteristics in a mathematical model to predict project costs.

Analogy cost estimating method

This technique uses the actual cost of a precious, similar project as the basis for estimating the cost of the current project. It is frequently used to estimate total project costs when there is a limited amount of detailed information about the project. It is generally less costly than other techniques, but it is also less accurate. However, a good starting baseline must exist to apply the method successfully. For radical changes or new technologies, the bottom-up approach is clearly the better choice.

Expert judgment cost estimating method

In the expert judgment technique a judgment is made based upon a specific set of criteria and expertise that has been acquired in a specific knowledge area, a particular discipline, etc. Typically expert judgment requires an expertise that is not present within the project team and, as such, it is common for an external group or person with a specific relevant skill set or knowledge base to be brought in for a consultation.

It should be noted that the previous cost estimating methods are included in many cost estimating software in the market, so the implementation of each method is fairly easy and should be chosen according to the context regarding the project, as well as the available information and resources.

4.2 How to calculate incremental costs

Incremental cost and benefits are a central concept in the global environmental conventions. These concepts arise from cost-benefit analysis (CBA), and represent the difference between "business-as-usual" scenarios outcomes without project and the increments which are to be defined for projects for the sound management of Persistent Organic Pollutants (POPs) seeking to get financed by the GEF, for example.

[24] Project Management Institute (2000), A Guide to the Project Management Body of Knowledge (PMBOK Guide), Four Campus Boulevard, Newton Square, PA.

[25] Ruth, James, Overview of cost definitions and costing methods, http://siteresources.worldbank.org/INTPRS1/Resources/383606-1201883571938/Cost_Definitions_and_Methods.pdf

According to the Operational Guidelines for the Application of the Incremental Cost Principle[26], the Incremental Costs of Global Environmental Benefits[27] and the Evaluation of Incremental cost Assessment[28], there are five main steps to follow:

Step 1. Determine the environmental problem, threat, or barrier, and the "business-as-usual" scenario (or: What would happen without the GEF?)

- The identification of the environmental problem, threat, or barrier that the use of Persistent Organic Pollutants (POPs) might pose for a specific sector, taking into account the country specific context and the system boundaries that it are impacted.
- One of the basic concepts to clarify at this step is System Boundaries that have to be set to estimate the base line. Often the system analysed is a single project it is more appropriate to analyse the entire sectoral program or an industry that could be impacted. There may even be analyse an even the broader system, such as the national economy.
- Based on the identification, a "business-as-usual" scenario must be constructed and assessed. This scenario describes the situation or context relevant to the proposed project or policy intervention in a country as it would expectedly unfold without the GEF support.
- There are different ways of constructing the baselines, it is important to clarify on which criteria is defined, for example, a possible baseline is for example, "current trends," which incorporates any existing price and policy distortions assumes that industrial the strategy and economic policy are not changed.) Using this interpretation, the analyst runs the risk of defining incremental cost too widely; donors may not want to indefinitely subsidize projects that would be financially attractive even after an economic reform.
- This step provides an assessment of ongoing and planned activities towards the restriction or elimination of POPs in the absence of the GEF and the expected/projected loss of global environmental benefits (GEB) if left unattended. In the case that there are none ongoing or planned activities aimed at POPs, then this should be taken as the "business-as-usual" scenario (Figure 2).

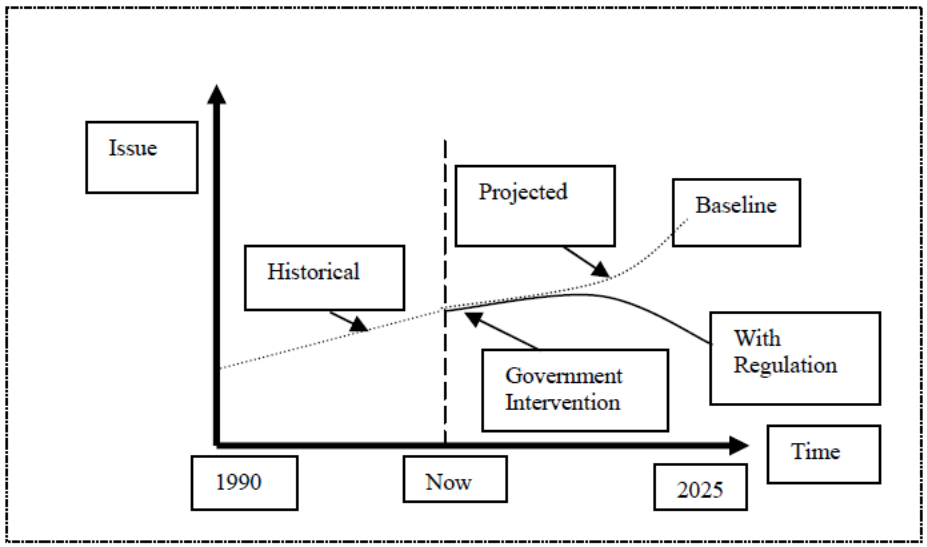


Figure 2 Comparison between the Baseline and "With Regulation" Scenarios

[26]GEF.2007.Operational Guidelines for the Application of the Incremental Cost Principle.https://www.thegef.org/sites/default/files/documents/OPERATIONAL.GUIDELINES.FOR_.THE_.APPLICATION.OF_.THE_.INCREMENTAL.COST_.PRINCIPLE_0.pdf

[27] King, Ken. 1993, The Incremental Costs of Global Environmental Benefits, Working paper, Number 5, GEF Washington. http://documents.worldbank.org/curated/en/920591467990298589/The-incremental-costs-of-global-environmental-benefits

[28] GEF.2007. the Evaluation of Incremental cost Assessment, Evaluation report 34, Washington, May, https://books.google.com.mx/books?id=U4SX4j9dkqgC&pg=PA10&lpg=PA10&dq=The+Incremental+Costs+of+Global+Environmental+Benefits,&source=bl&ots=WFakEifA5R&sig=sKaVUdosV8b4VVDnjrQ7876BCn0&hl=es&sa=X&ved=0ahUKEwi_ifeMofnSAhUL6lMKHSypCkMQ6AEIXDAI#v=onepage&q=The%20Incremental%20Costs%20of%20Global%20Environmental%20Benefits%2C&f=false

Source: Treasury Board of Canada Secretariat (2007), Cost-Benefit Analysis Guide. Regulatory Proposals[29]

- In the assessment, the health, socio-economic and the environmental sustainability tradeoffs between the short and long run must be identified and taken into account. This can be done by estimating the potential economic loss due to the tradeoffs previously stated, taking into account the supply and demand effects that the "business-as-usual" could have.
- The "business-as-usual" scenario will be analyzed in terms of the objectives and outcomes that might be achieved, and the quantitative (e.g. budgets and planned expenditures) and qualitative (e.g. institutional capacity) inputs that would be forthcoming regardless of whether the GEF intervention occurs or not.
- It is important to consider that the "business-as-usual" scenario is a counterfactual, which means, the scenario will not be undertaken if the incremental cost project is taken. It is important to take into account that any mutually exclusive options can be taken as "business-as-usual" which could in turn lead to an ambiguity due to the many alternative scenarios that we can compare (different chemical substitutes for POPs), therefore, the "business-as-usual" must be correctly specified in order to carry the incremental cost analysis in an effective way.

Example to define business as usual

The following example of defining a "business-as-usual" scenario for new regulation of Chlorobiphenyl and Storage of Polychlorinated biphenyls (PCB)[30]. The regulation requires:

- Phase-out of most high-level (>500 ppm) PCB in-service by the end of 2007.
- Phase-out most low-level (50-500 ppm) PCB in-service by the end of 2014.
- Phase-out of all PCB in storage by the end of 2009 and allow in-service PCB to be transferred to storage for only one year or less.

Environmental problem: PCB have been linked to cancer, reproductive failure, birth deformities and other health problems in many animals, the most obvious signs of environmental harm caused by PCB in aquatic ecosystems and in species such as eagles and herring gulls that eat primarily aquatic organisms.

Once the problem is identified, the "business-as-usual" scenario must be assessed. In this case, the scenario was made using the estimated inventory of PCB in Canada by the end of 2001, along with the projections of inventory reductions without the regulated phase-out program. The results for the estimated inventory are shown in Table 1 and the projections of inventory reductions without the regulated phase-out program are shown in Figure 3.

Table 1 Estimated Inventory of PCB in Canada, End of 2001 (all values in tonnes)

	In-Service PCB Equipment, Not Including Sensitive Locations		In-Service PCB Equipment in Sensitive Locations		PCB In Storage	
	Net Wt Fluid	Gross Wt Equipment	Net Wt Fluid	Gross Wt Equipment	Net Wt Fluid (incl. bulk fluid)	Gross Wt Equipment , Fluid and Solids
Askarel In Transformers & Bulk	6 546	19 637	345	1 034	3 408	8 478
Capacitors and Other	1 316	5 263	69	277	563	2 252
Light Ballasts	63	3 802	2	127	30	1 824
CMO >500 ppm*	998	998	48	48	300	300
CMO 50-500 ppm*	5 652	5 652	298	298	1 703	1 703

[29] Treasury Board of Canada Secretariat (2007), Cost-Benefit Analysis Guide. Regulatory Proposals, https://www.tbs-sct.gc.ca/rtrap-parfa/analys/analys-eng.pdf

[30] This example was taken from Government of Canada (2002), Highlights of the Proposed Amendments to the CEPA Chlorobiphenyl and Storage of PCB Material Regulations, Draft for Discussion Summary Report, Version 2, https://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=BA8F49B0-1&printfullpage=true

Table 1 Estimated Inventory of PCB in Canada, End of 2001 (all values in tonnes)

	In-Service PCB Equipment, Not Including Sensitive Locations		In-Service PCB Equipment in Sensitive Locations		PCB In Storage	
	Net Wt Fluid	Gross Wt Equipment	Net Wt Fluid	Gross Wt Equipment	Net Wt Fluid (incl. bulk fluid)	Gross Wt Equipment , Fluid and Solids
Solid Waste	NA	NA	NA	NA	NA	3 742
Soil	NA	NA	NA	NA	NA	87 771
Totals	11 250	32 027	589	1 611	5 992	101 940

*CMO = contaminated mineral oil

	# Companies	# Cables/End Points	Km of Cable
PCB Cables	120	1 200	28

	# Companies	# Valves	Km of PCB Coated Pipeline
PCB Pipelines	10	30 000	10 000

The previous tables takes into account all of the factors that are incumbent to the problem identified, even if they are measured in different units. This is an issue that must be taken into account in order to achieve a robust analysis.

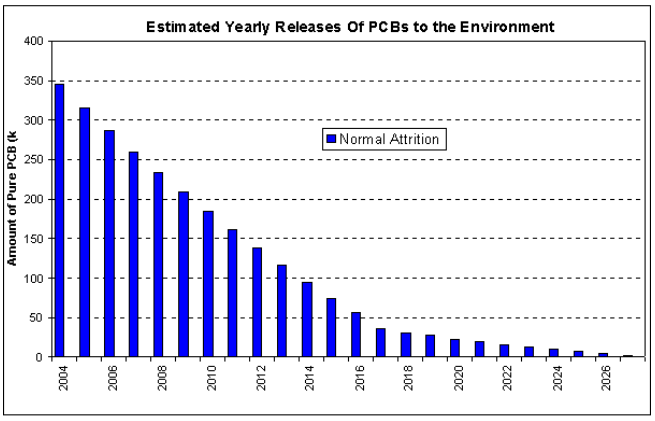


Figure 3 Projections of inventory reductions without the regulated phase-out program

Source : Government of Canada (2002), Highlights of the Proposed Amendments to the CEPA Chlorobiphenyl and Storage of PCB Material Regulations

Figure 3 shows the evolution of PCB releases to the environment, taking into account the technological, economic and environmental trends that might affect the quantity of chemicals in the environment. This trend shows that the amount of pure PCB will decrease to zero only after 2027.

Step 2. Identify the global environmental benefits (GEB) and fit with GEF strategic programs and priorities linked to the GEF focal area.

Once the environmental issue has been defined, the extent to which global environmental benefits (GEB) are being lost has to be identified. In order to identify GEB, total benefits must be distinguished from incremental benefits.

- The total benefits can be estimated generically and do not need a baseline to be calculated. However, the incremental benefits are situation-specific, and will depend on the country context, a baseline reference and on the magnitude of the potential impact that the elimination or restriction of POPs might have on the local and global scale.

- Incremental benefits can be measured using relevant economic indicators (such as prices and production), health indicators (number of diseases related to POPs) and tracking tools (satellite dust images) to measure the GEB derived from projects or programs aimed at POPs, and will articulate how the project will contribute to the focal area for POPs of the GEF.
- There are some analytical issues in calculating global environmental benefits are such as how to value biodiversity; how to separate domestic from global benefits; how to value a reduction in uncertainty, how to value risk-spreading, and how to value demonstration effects.
- For example, one tool that can be used in how to value the benefits of biodiversity, is the Economics of Ecosystem and Biodiversity (TEEB)[31] initiative launch by UNEP. This initiative could provide the countries with economic valuation methodologies and literature review of different values for biodiversity ecosystem services and other natural resources.
- Another tool that could be useful to value environmental and socio economic benefits of phasing out chemicals could be the Environmental Valuation Reference Inventory[32].
- The determination of the GEBs then in turn defines the specific strategic program of the focal area that the potential project can fall under. It should be noted that the attainment of a GEB shall not undermine or result in the loss of another GEB.

Example to define global environmental benefits

The following is an example of the global environmental benefits of an implementation of the Proposed Amendments to the CEPA Chlorobiphenyl and Storage of Polychlorinated biphenyls (PCB) Material Regulations proposed by Canada (2002):

The global environmental benefits arise from the restoration of the aquatic ecosystems and indirectly of the species that eat primarily aquatic organisms. These benefits can be quantified using diverse economic valuation methods, which are dependent on the specific context of the environmental benefit. In the present example, the benefits are quantified using the avoided cost method for the reduction in ecosystem impairment in use of resources.

Table 2 Summary of Incremental Benefits

Industrial Sector and Type of Expense	**Category of PCB**	**Incremental Benefit of Enacting Revised Regulations ($millions Present Value)**		
		Best Estimate	Low Estimate	High Estimate
PCB Owners - benefit due to reduction in costs of cleaning up spills and fires	In-Service, Excluding Sensitive Locations	$19.7	$14.8	$24.6
	In-Service in Sensitive Locations	$1.5	$1.1	$1.9
	In Storage	$10.7	$8.0	$13.4
	Sub-total	$31.9	$23.9	$39.9
Canadian Environment - reduction in ecosystem impairment/improvement in use of resources	In-Service, Excluding Sensitive Locations	$40.1	$30.1	$50.1
	In-Service in Sensitive Locations	$2.1	$1.6	$2.6
	In Storage	$25.8	$19.4	$32.2
	Sub-total	$68.0	$51.1	$84.9

Source: Government of Canada (2002), Highlights of the Proposed Amendments to the CEPA Chlorobiphenyl and Storage of PCB Material Regulations

[31] http://www.teebweb.org/.

[32] https://www.evri.ca/Global/Splash.aspx

The shaded area in the previous table are the estimated benefits for the Canadian environment, it is still left to determine the impact on the global environmental benefits that this will have, but it will depend on the specific context of the analysis. In this example, the importance of the water ecosystems that are benefited from the intervention to the overall global environment must be assessed in order to get the GEB.

Step 3. Develop the results framework of the intervention

In this step it is important to identify and negotiate the vision, objective and expected outcomes of a project. These decisions are enshrined in the results framework. The results framework describes both the achievement of GEB and the underlying interventions related to the "business-as-usual" scenario.

Impact (e.g. health due to POPs) and outcome (e.g. the indicators of the focal area for POPs management) would show the expected global environmental and national benefits, while the information from the "business-as-usual" analysis may also provide important information for the proposed project.

The results framework should present appropriate baseline data for the proposed indicators, if major baseline indicators cannot be identified, the GEF Monitoring and Evaluation Policy allows the project to submit a plan for collecting this information within one year of implementation.

Example to define global environmental benefits

The following example of the indicator is the amount of pure PCB, in this case, the indicator measures the impact of the program using the estimated yearly releases of PCB to the environment with regulated phase-out, as shown in Figure 4.

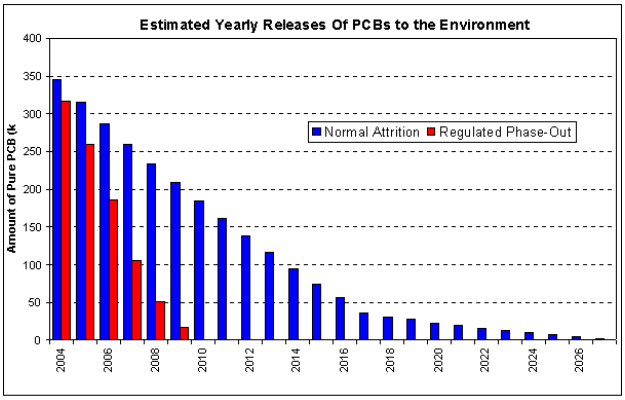


Figure 4 Estimated yearly releases of PCB to the environment

Source: Government of Canada (2002), Highlights of the Proposed Amendments to the CEPA Chlorobiphenyl and Storage of PCB Material Regulations

Figure 4 shows that the amount of pure PCB decreases more rapidly with the regulated phase-out problem than with the "business-as-usual" scenario, until zero releases of PCB to the environment are achieved in 2010, this indicates that the intervention had a positive effect on the environmental problem that was previously identified.

Step 4. Provide the incremental reasoning and GEF's role

Incremental reasoning defines the role for the GEF in the context of the expected agreed global environmental benefits from a proposed project. It is based on an assessment of the value added by involving the GEF. The value added is typically measured in economic terms, using monetary measures. Using the results of the framework intervention and the "business-as-usual" scenario, incremental costs and benefits, can be estimated using the costing methods described in Annex 1.A. Once the incremental costs and benefits are estimated, an economic analysis is performed as follows:

If net incremental cost (NIC) is defined as incremental cost (IC) less incremental domestic benefit (IDB), then the selection rule for the project or program is equivalent to requiring that the incremental global environmental benefit (IGB) exceed the net incremental cost.

IGB>NIC

NIC=IC-IDB

IDB= Incremental domestic benefit

GB=Incremental global benefit

The identification of GEF's role is of great importance for the design and implementation of a project, and therefore requires a recorded process of transparent dialogue and negotiation between key stakeholder groups such as the project proponent, the involved GEF Agency, the GEF Secretariat and the GEF Council.

The following example of the economic analysis that provides the incremental reasoning for an adaptation of the Proposed Amendments to the CEPA Chlorobiphenyl and Storage of Polychlorinated biphenyls (PCB) Material Regulations proposed by Canada:

Year-by-year costs and benefits for a number of industry sectors, the federal government, and human use of the environment have been calculated.

Table 3 Summary of Incremental Costs

Industrial Sector and Type of Expense	**Category of PCB**	**Incremental Cost of Enacting Revised Regulations ($millions Present Value)**		
		Best Estimate	Low Estimate	High Estimate
PCB Owners - costs of decommissioning and destroying high-level (>500 ppm) PCB and replacing equipment by 2007	In-Service, Excluding Sensitive Locations	-$84.5	-$63.4	-$105.6
	In-Service in Sensitive Locations	-$6.5	-$4.9	-$8.1
	In Storage	-$10.8	-$8.1	-$13.5
	Sub-total	-$ 101.8	-$ 76.4	-$ 127.2
PCB Owners - costs of decommissioning and destroying low-level (50-500 ppm) PCB and replacing equipment by 2014	In-Service, Excluding Sensitive Locations	-$3.0	-$2.25	-$3.75
	In-Service in Sensitive Locations	-$0.6	-$0.45	-$0.75
	In Storage	$0.2	$0.15	$0.25
	Sub-total	-$3.4	-$2.55	-$4.25
PCB Owners - costs of destroying PCB 2-50 ppmto below 2 ppm	All equipment	-$4.1	-$3.1	-$5.1
Federal Government - cost of enforcing revised regulations and tracking inventories	In-Service, Excluding Sensitive Locations	-$0.49	-$0.37	-$0.61
	In-Service in Sensitive Locations	-$0.05	-$0.04	-$0.06
	In Storage	$0.06	$0.05	$0.07
	Sub-total	-$0.48	-$0.36	-$0.60
PCB Owners - additional costs of labeling	In-Service, Excluding Sensitive Locations	-$0.29	-$0.22	-$0.36
	In-Service in Sensitive Locations	-$0.01	-$0.01	-$0.01
	Sub-Total	-$0.3	-$0.23	-$0.37
PCB Owners - additional costs reporting and mgmt. plans	In-Service, Excluding Sensitive Locations	-$16.3	-$12.2	-$20.4
	Sensitive Loc.	-$0.35	-$0.26	-$0.44
	Sub-Total	-$16.65	-$12.46	-$20.84
Total Cost Related to In-Service PCB, Excl. Sensitive Locations		-$108.68	-$81.54	-$135.82

Total Cost Related to In-Service PCB in Sensitive Locations		-$7.51	-$5.66	-$9.36
Total Cost Related to In-Storage PCB		-$10.54	-$7.90	-$13.18
Grand Total Costs		-$ 126.7	-$ 95.1	-$ 158.4

Source: Government of Canada (2002), Highlights of the Proposed Amendments to the CEPA Chlorobiphenyl and Storage of PCB Material Regulations

Table 4 Summary of Incremental Benefits

Industrial Sector and Type of Expense	**Category of PCB**	**Incremental Cost of Enacting Revised Regulations ($millions Present Value)**		
		Best Estimate	Low Estimate	High Estimate
PCB Owners - benefit due to reduction in costs of cleaning up spills and fires	In-Service, Excluding Sensitive Locations	$19.7	$14.8	$24.6
	In-Service in Sensitive Locations	$1.5	$1.1	$1.9
	In Storage	$10.7	$8.0	$13.4
	Sub-total	$31.9	$23.9	$39.9
Canadian Environment - reduction in ecosystem impairment/improvement in use of resources	In-Service, Excluding Sensitive Locations	$40.1	$30.1	$50.1
	In-Service in Sensitive Locations	$2.1	$1.6	$2.6
	In Storage	$25.8	$19.4	$32.2
	Sub-total	$68.0	$51.1	$84.9
Total Benefit Related to In-Service PCB, Excl. Sensitive Locations		$59.8	$44.9	$74.7
Total Benefit Related to In-Service PCB in Sensitive Locations		$3.6	$2.7	$4.5
Total Benefit Related to In-Storage PCB		$36.5	$27.4	$45.6
Grand Total		$ 99.9	$75.0	$124.8

Source: Government of Canada (2002),Highlights of the Proposed Amendments to the CEPA Chlorobiphenyl and Storage of PCB Material Regulations

Based on the previous tables, the following are conclusions of the economic analysis of this measure.

- PCB owners will bear the bulk of the cost of the regulated phase-out. The earlier phase-out dates will result in additional costs of $109.3 million for decommissioning, destroying and replacing in-service equipment and destroying in-storage PCB and $16.95 million for labeling additional equipment, preparing management plans and reporting annually. However PCB owners will benefit by $31.9 million from the earlier phase-out as a result of having to clean up fewer spills and fires involving PCB. The net result is an incremental cost to PCB owners of $94.4 million.
- The federal government will experience some additional costs to administer and enforce the amended regulations. This cost is estimated at $0.49 million.
- Human use of the Canadian environment will benefit from the regulated phase-out because less PCB will be released to the environment from spills and fires. The benefit arises from an earlier return to safe consumption levels of PCB in sport and commercial species such as fish and wildfowl. The financial benefit is estimated at $68.0 million.
- Overall for Canada the quantifiable incremental (additional) cost of implementing the regulated phase-out is $126.7 million (best estimate, present value). The overall quantifiable incremental benefit of implementing the regulated phase is $99.9 million (best estimate, present value). The net incremental cost/benefit to Canada is a cost of $26.8 million.

Step 5. Negotiate the role of co-financing

Cofinancing is defined as the non-GEF project resources that are essential for meeting the GEF project objectives, and directly contribute to the outcomes of the future project. Finance for activities that are not essential for achieving the GEF objectives but are processed for transactional convenience in the same loan or technical assistance package are not considered as cofinance but as parallel finance.

Cofinancing can be either part of the underlying project as on-going interventions or new and additional funding secured for the project. Cofunding can be considered as incremental if it achieves GEBs, thus allowing the GEF to share or (co-fund) the incremental costs of the future proposal with other partners

Annex 1: Resource Requirements Matrix Template and Checklist

Activities and Tasks from the Action Plan	***Human Resources***	***Facilities***	***Equipment***	***Services, Materials, etc.***	***Other Resources***	***Total Resource Costs***
Activity:						
Task:	- knowledge and skills - person-days required - estimated cost	- types - space and time required - estimated cost	- types - space and time required - estimated cost	- types - quantity - estimated cost	- unique skills - resources not covered elsewhere	
Task:						
Task:						
Task:						
Total:						

Annex 2: Stockholm Convention Obligations Decision Trees

Available at :

https://cwm.unitar.org/publications/publications/cw/pops/Printable_SC_decision_trees_en_(mar_09).pdf

Decision Trees to assist with the Implementation of the Stockholm Convention

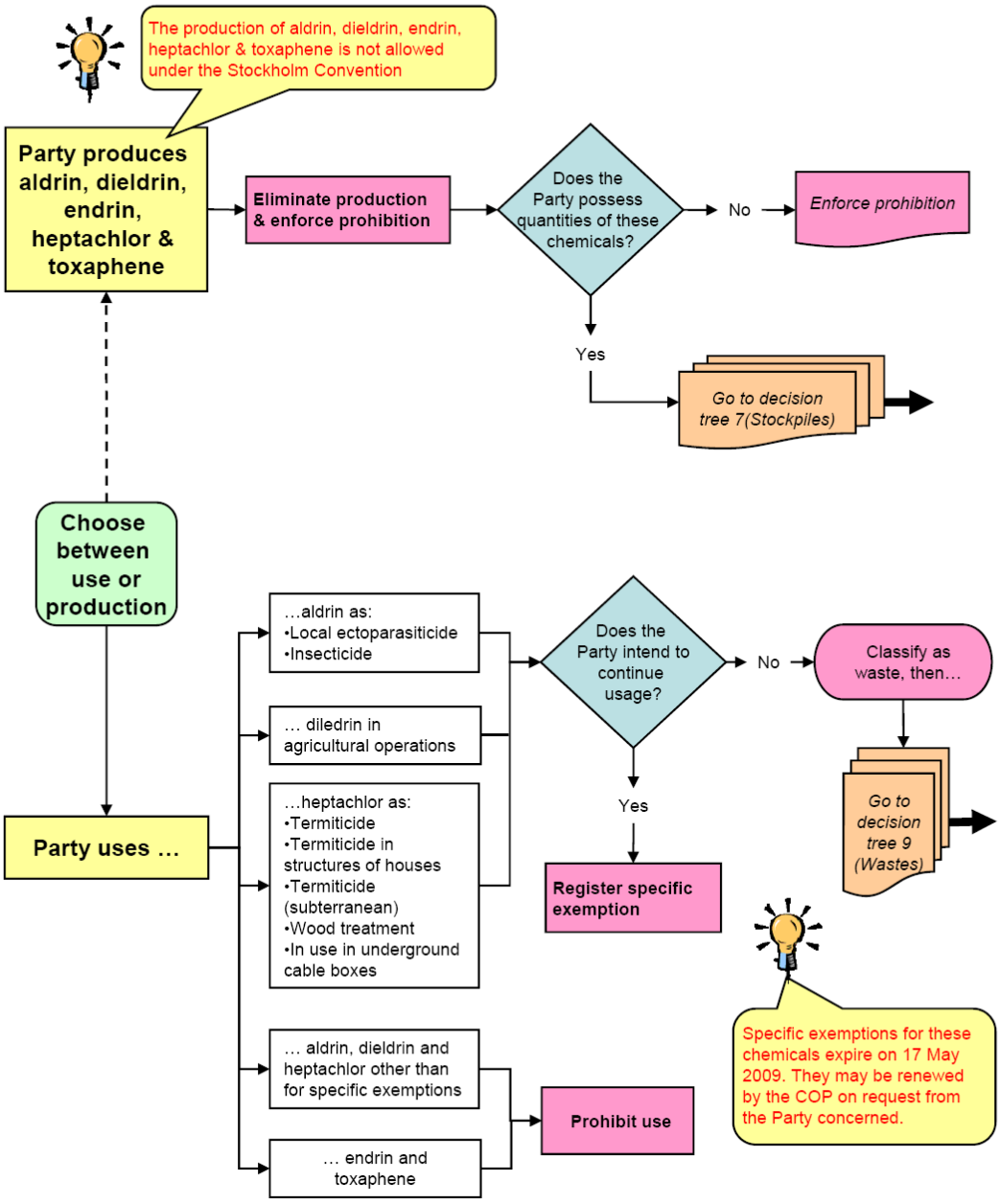
March 2009 Edition

UNEP

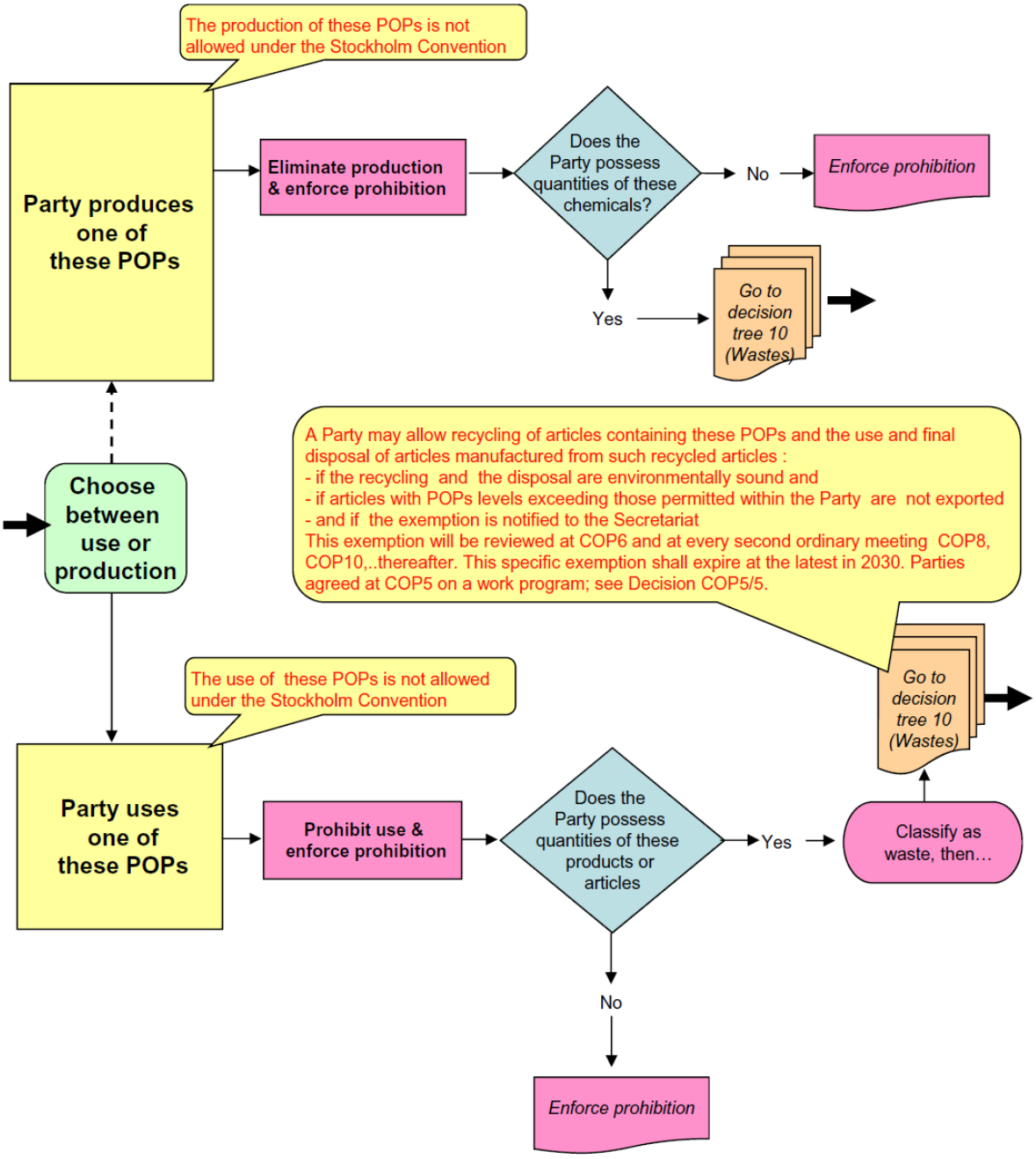
unitar

United Nations Institute for Training and Research

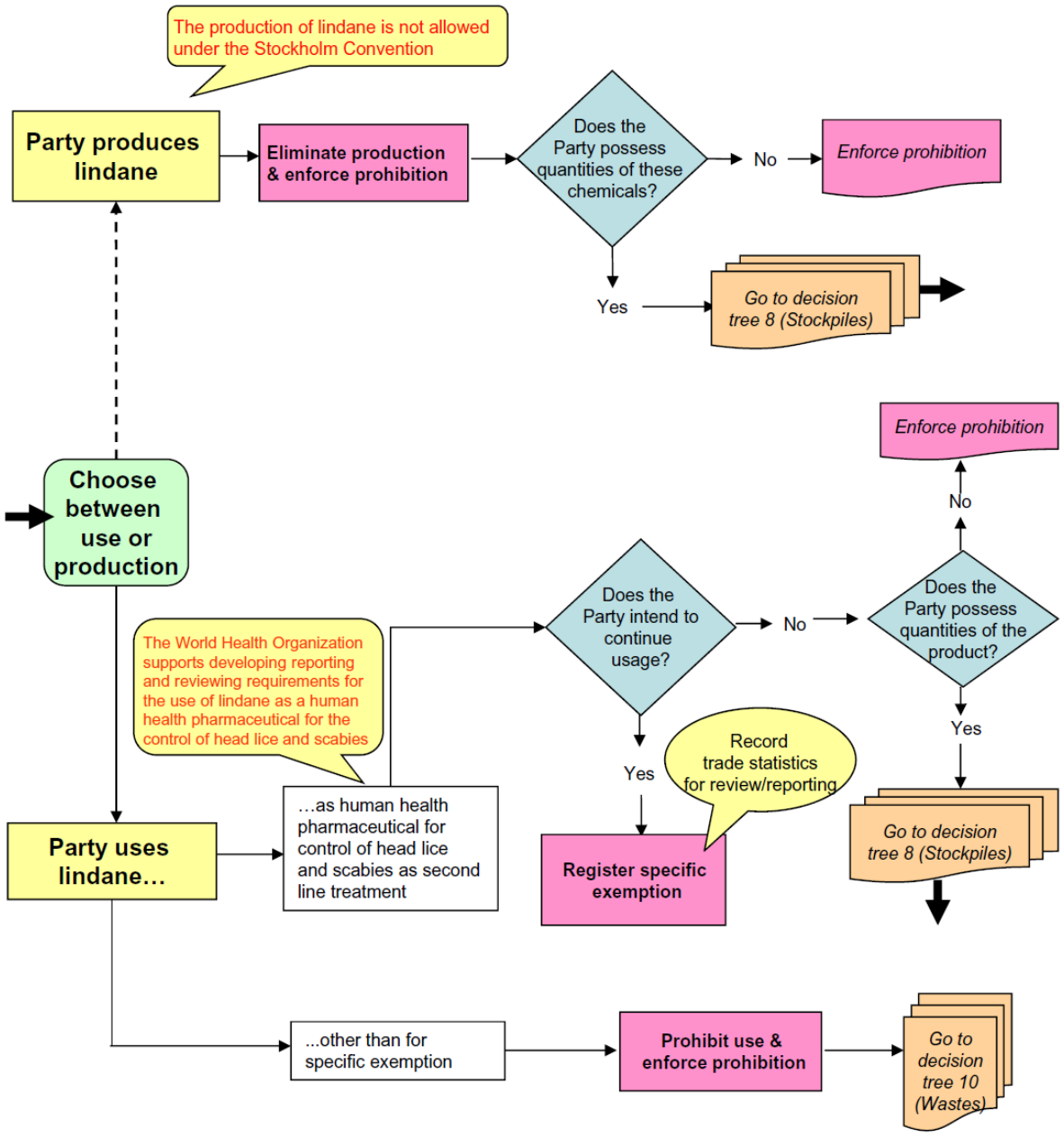
1. Intentionally produced POPs:
aldrin, dieldrin, endrin, heptachlor, toxaphene



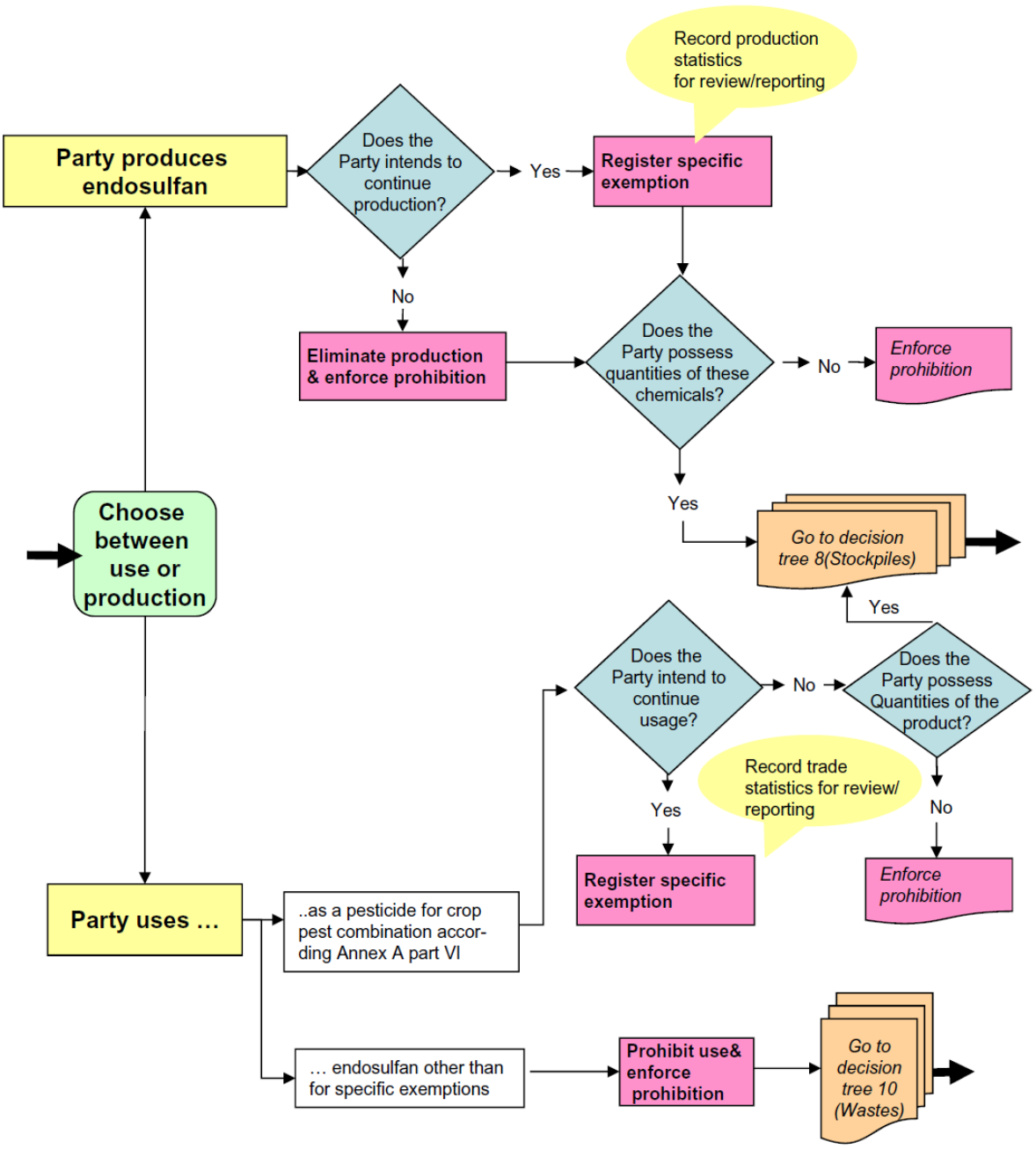
2. Intentionally produced POPs:
tetraBDE and pentaBDE (commercial PentaBDE), hexaBDE and heptaBDE (commercial OctaBDE)



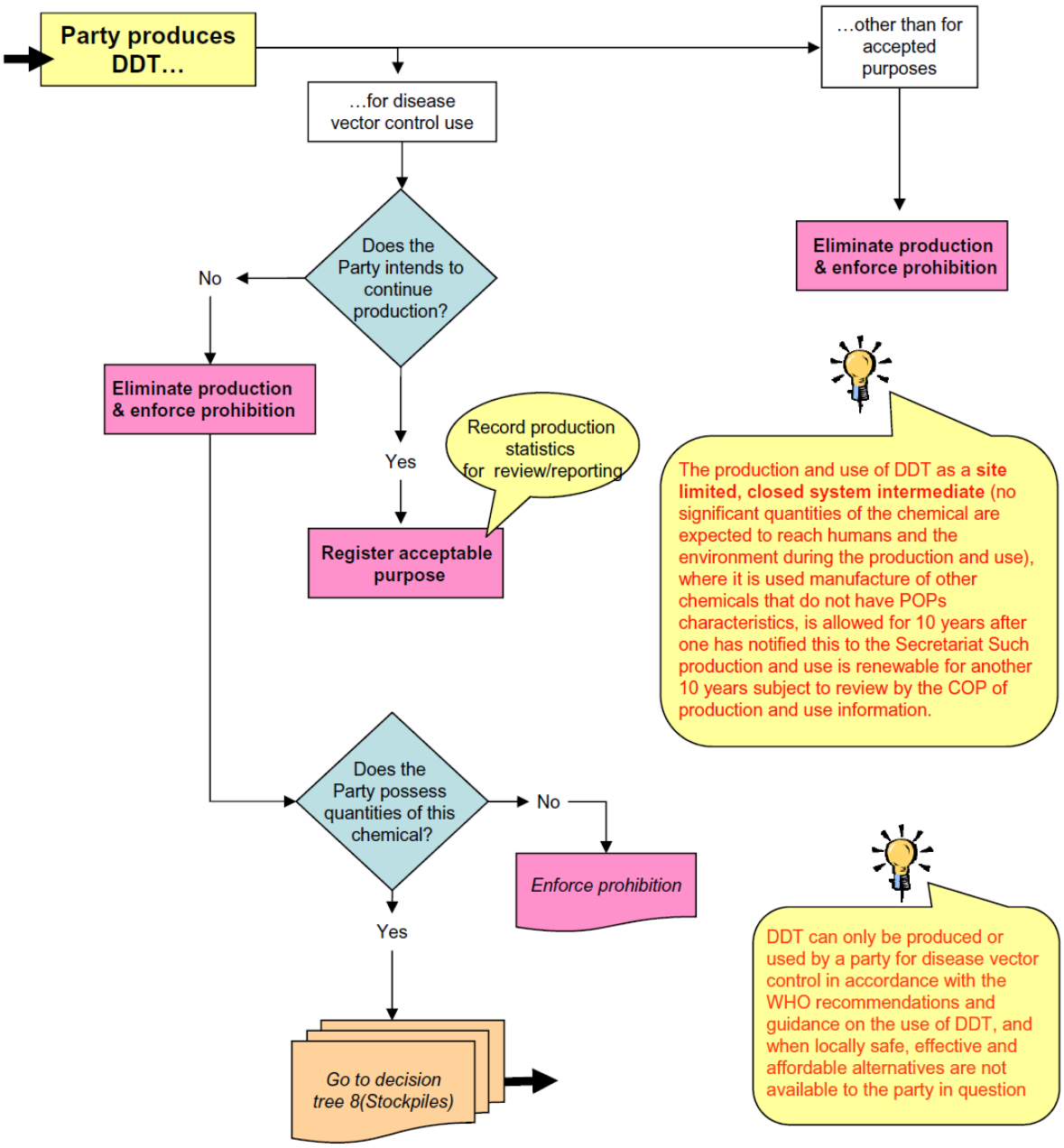
3.1 Intentionally produced POPs with specific exemption: *lindane*



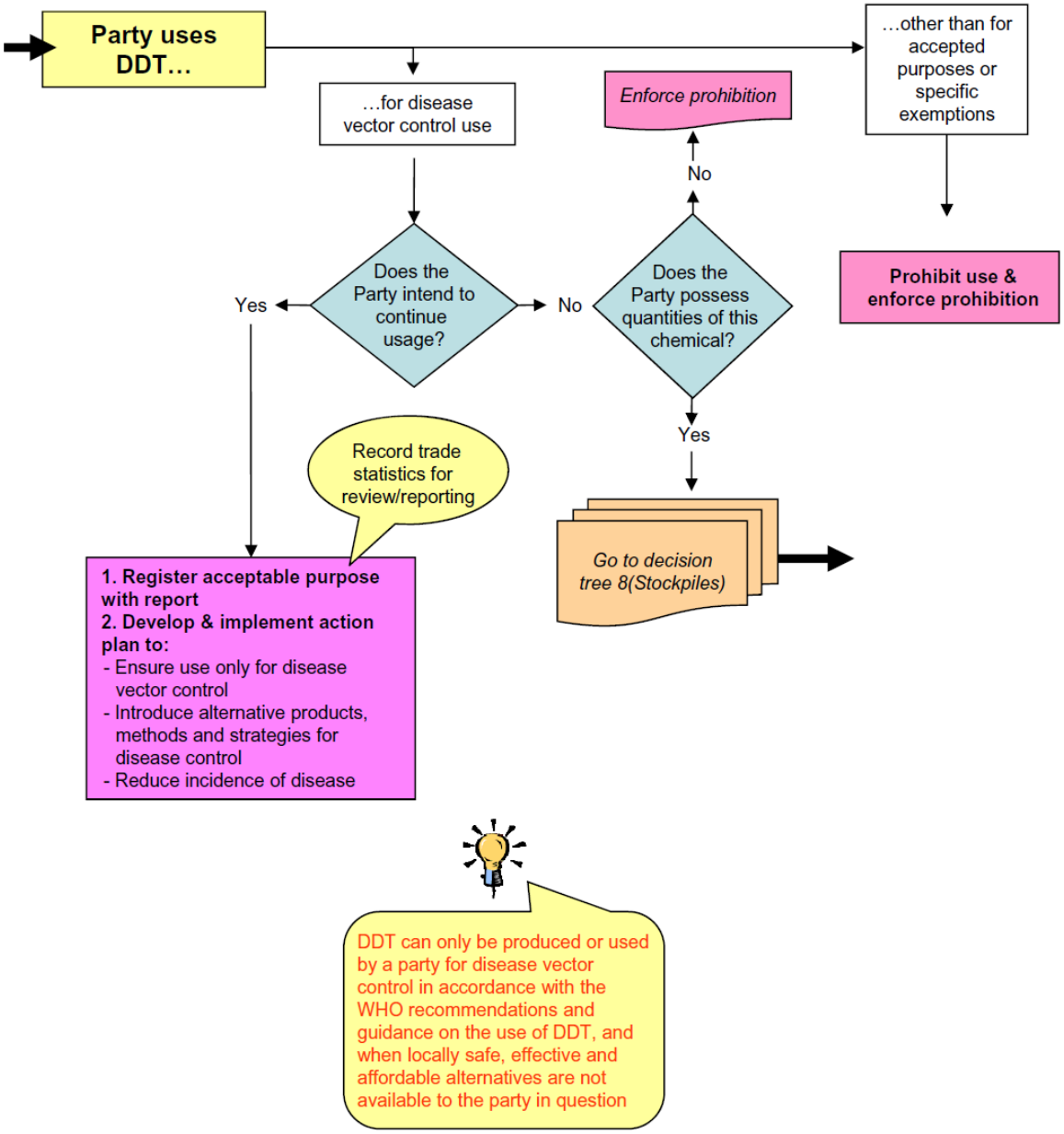
3.2 Intentionally produced POPs with specific exemption: *endosulfan*



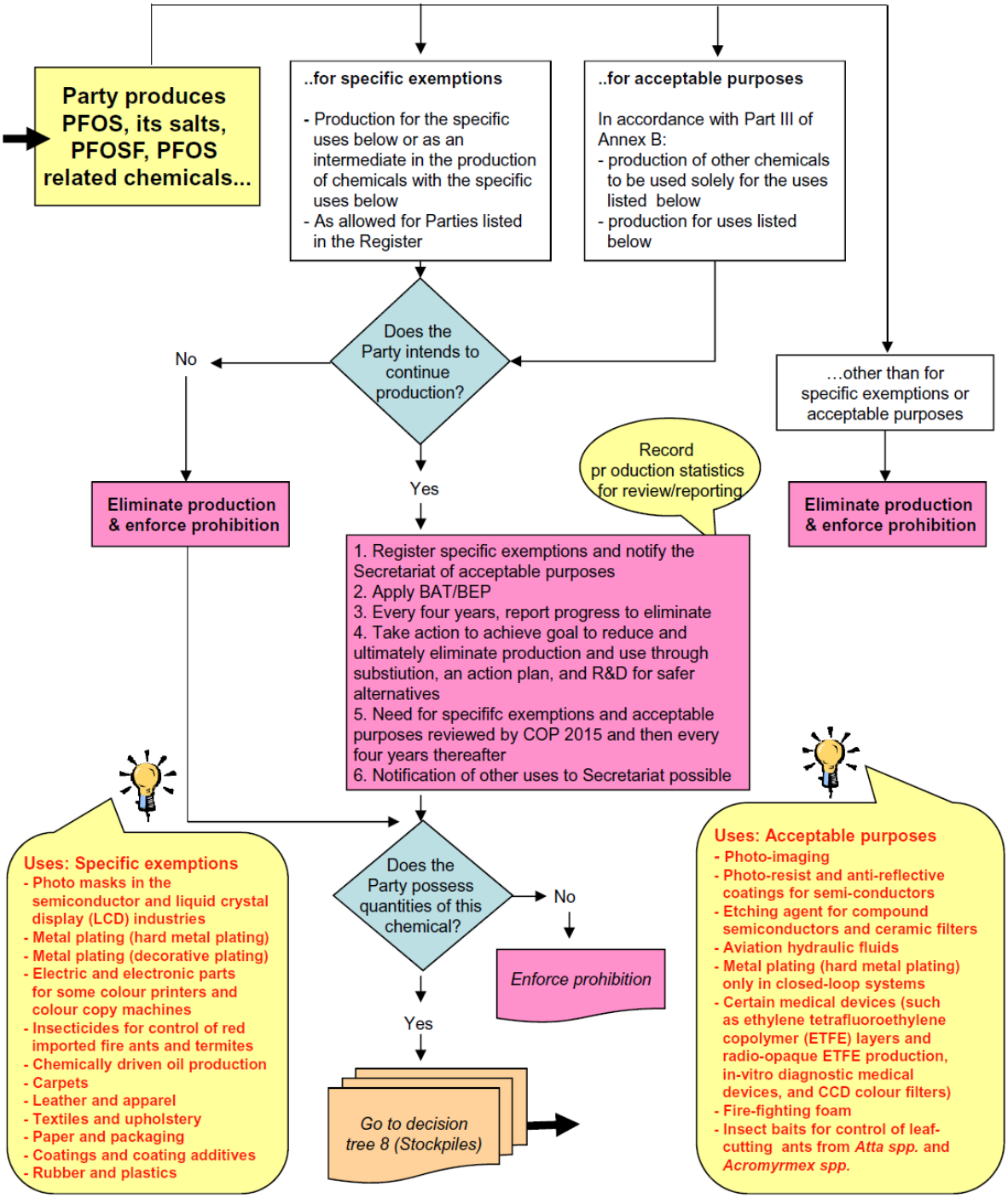
4.1 Intentionally produced POPs:
DDT production



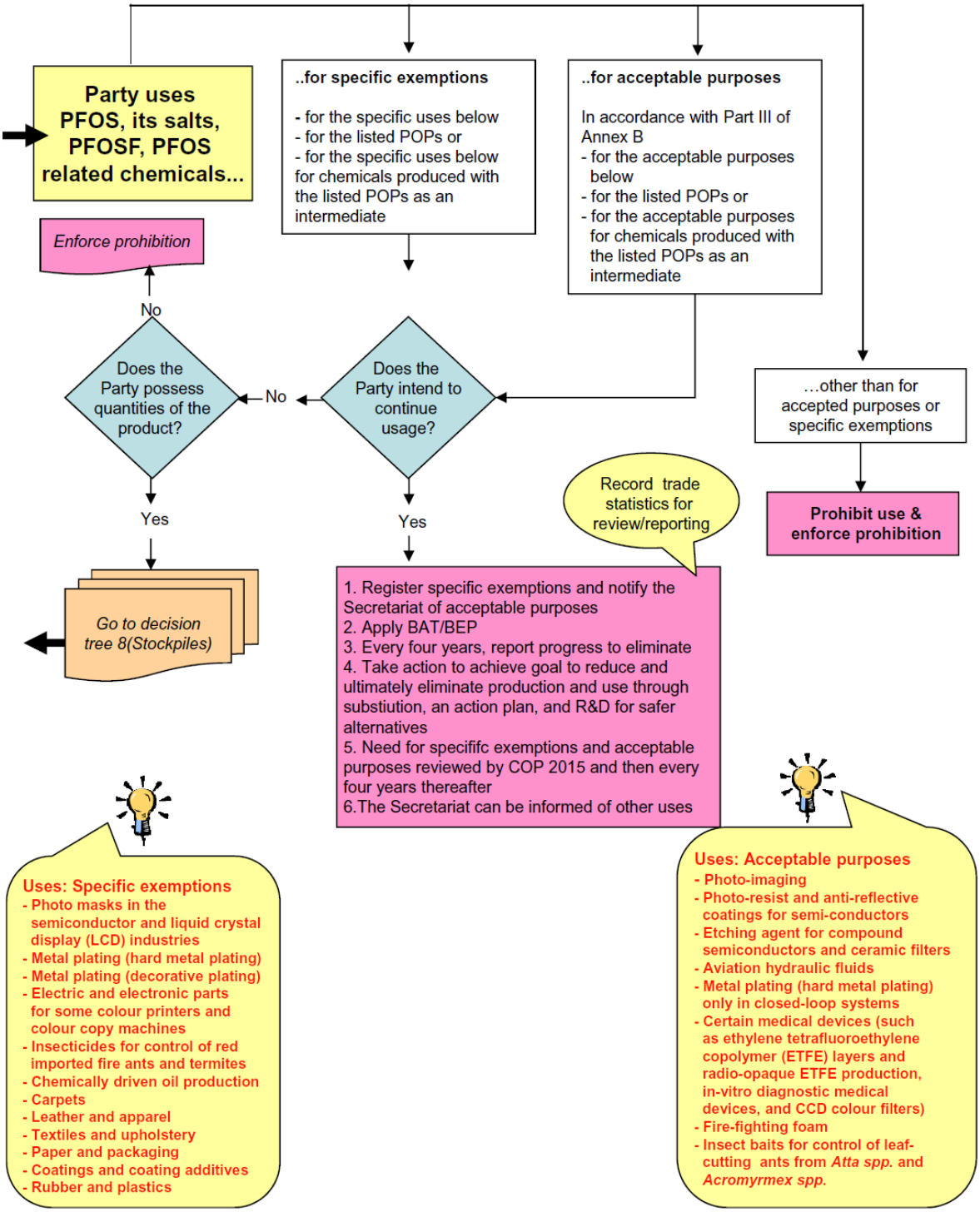
4.2 Intentionally produced POPs:
DDT use



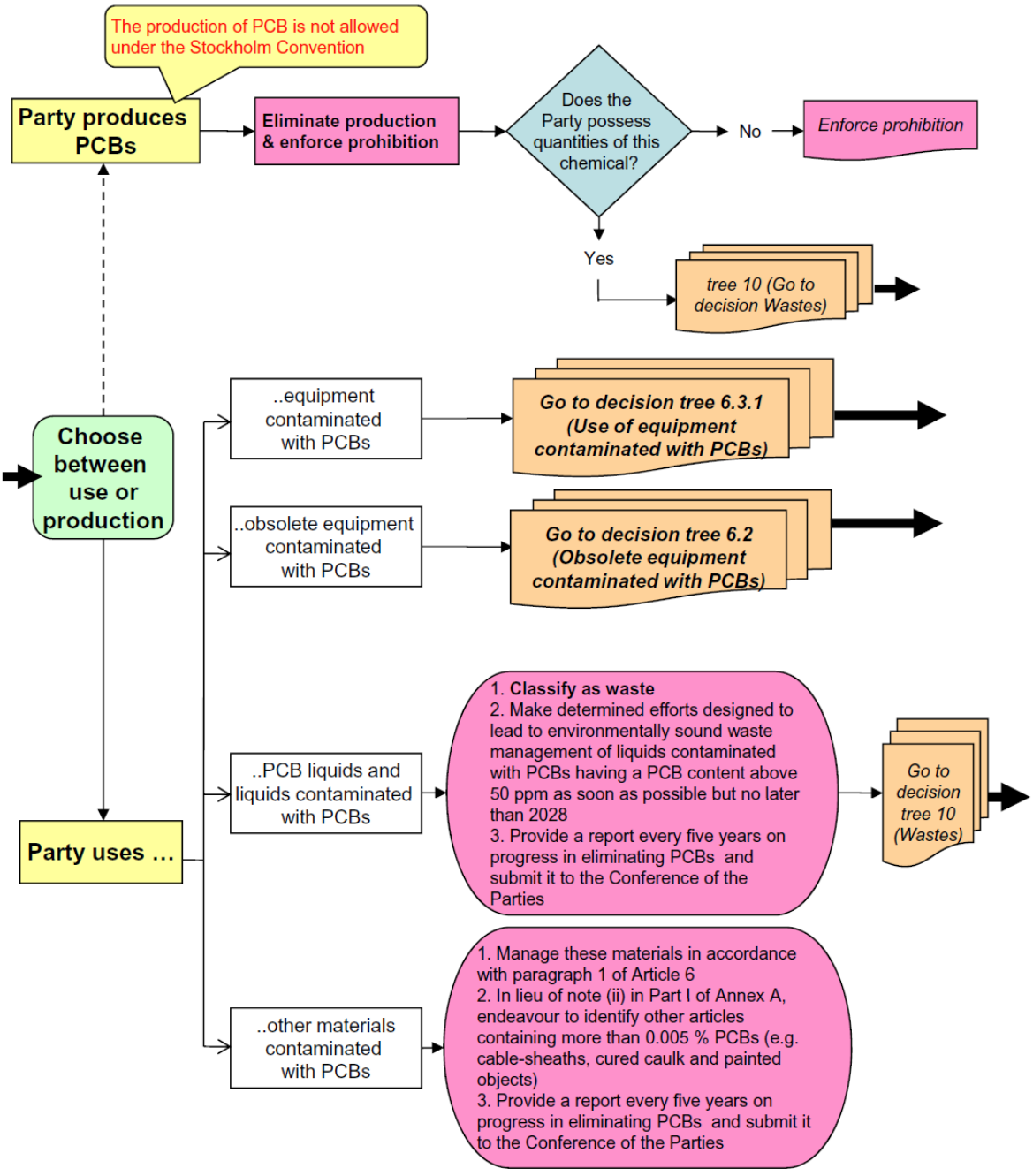
5.1 Intentionally produced POPs:
PFOS, its salts, PFOSF, PFOS related chemicals - production



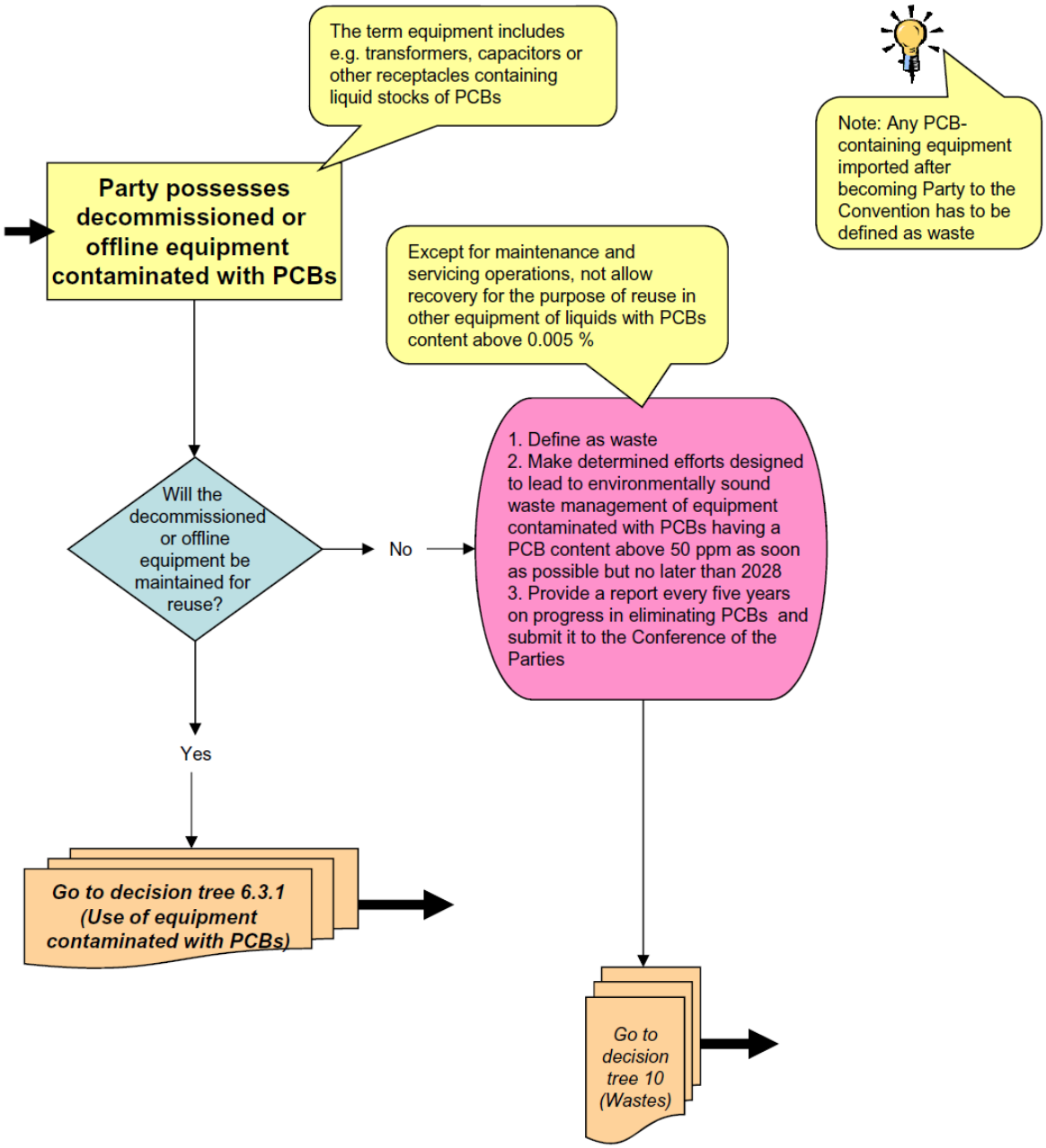
5.2 Intentionally produced POPs:
PFOS, its salts, PFOSF, PFOS related chemicals - use



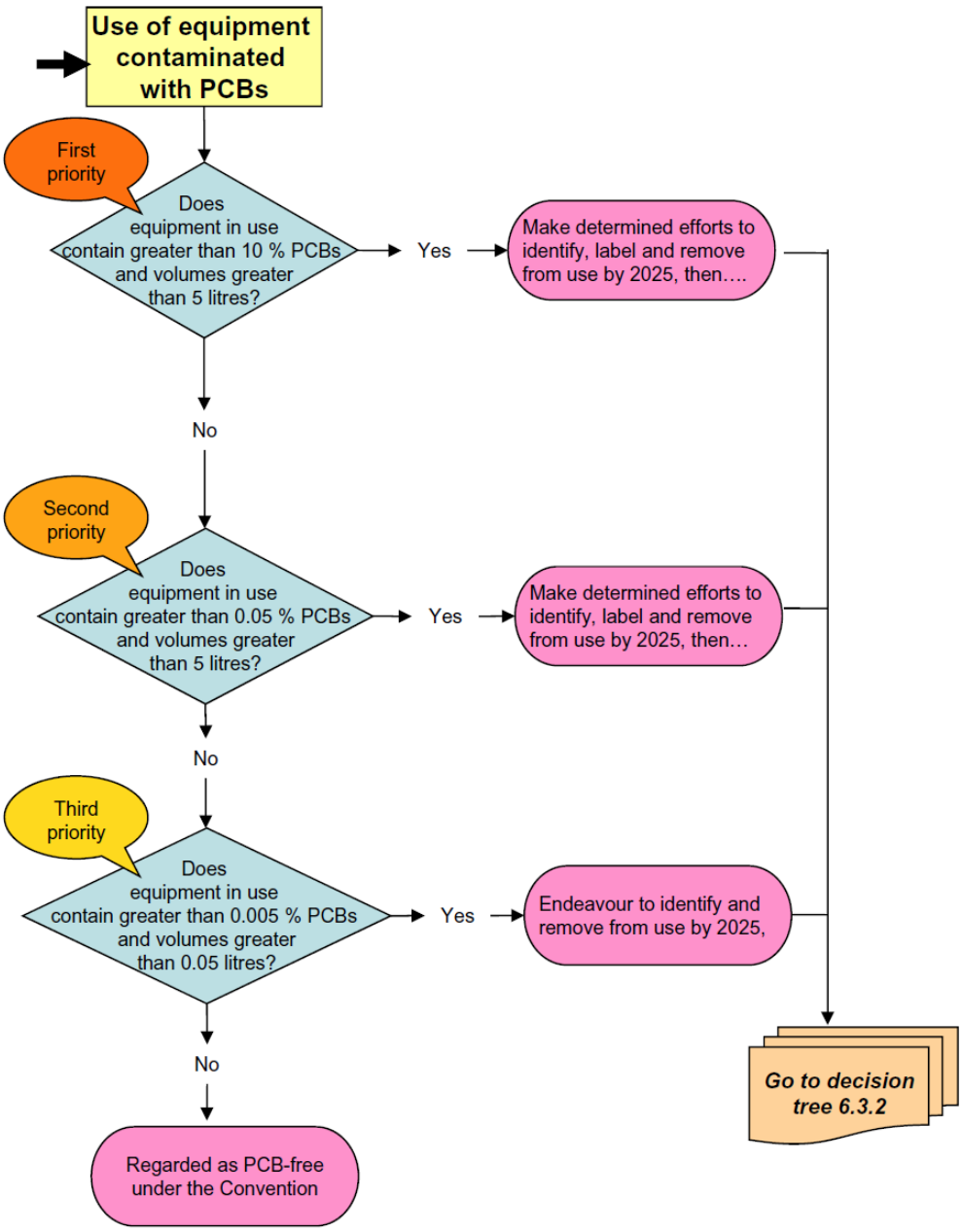
6.1 Intentionally produced POPs:
PCBs



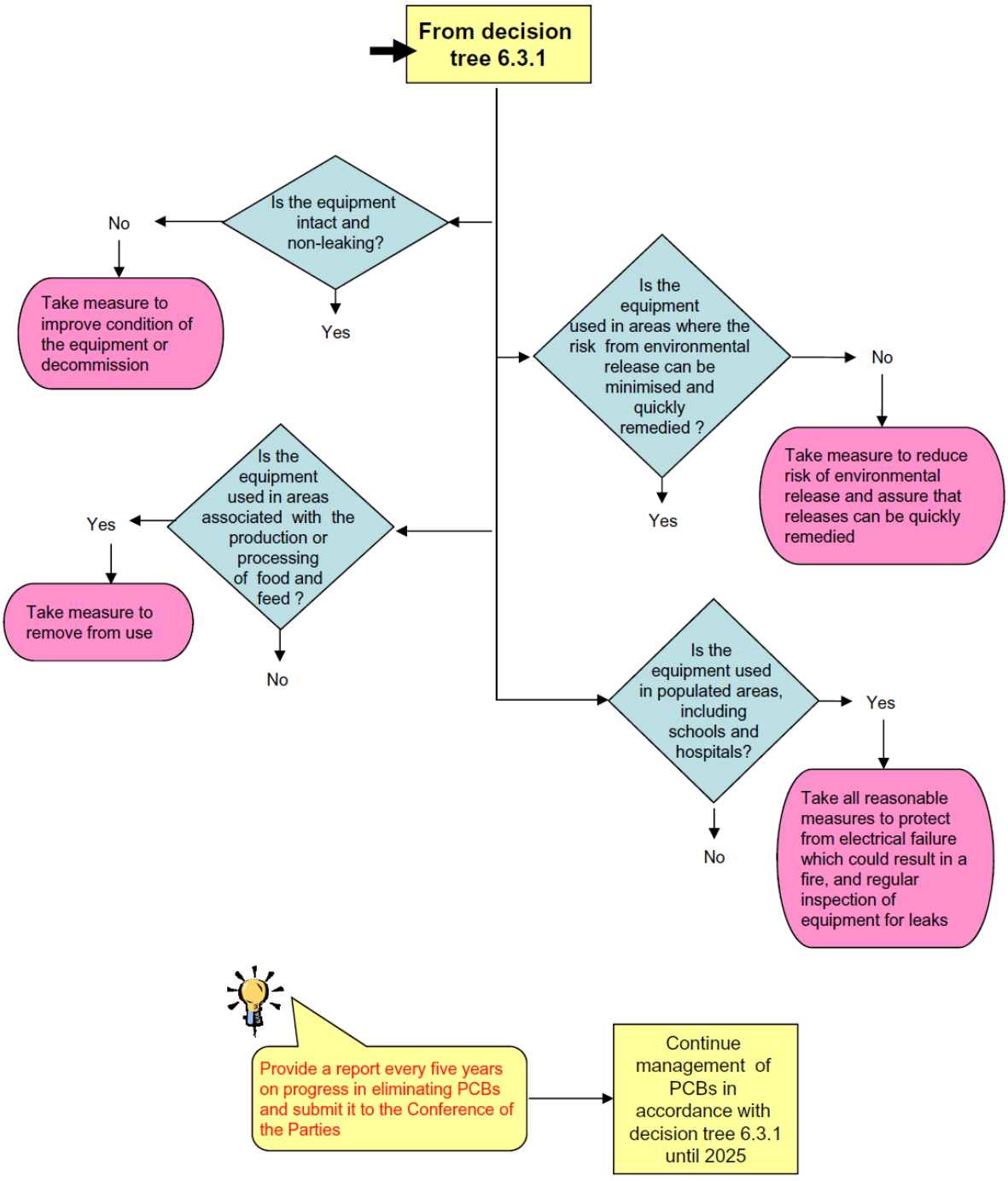
6.2 Intentionally produced POPs:
PCBs (Decommissioned or offline equipment contaminated with PCBs)



6.3.1 Intentionally produced POPs:
PCBs (Use of equipment contaminated with PCBs)

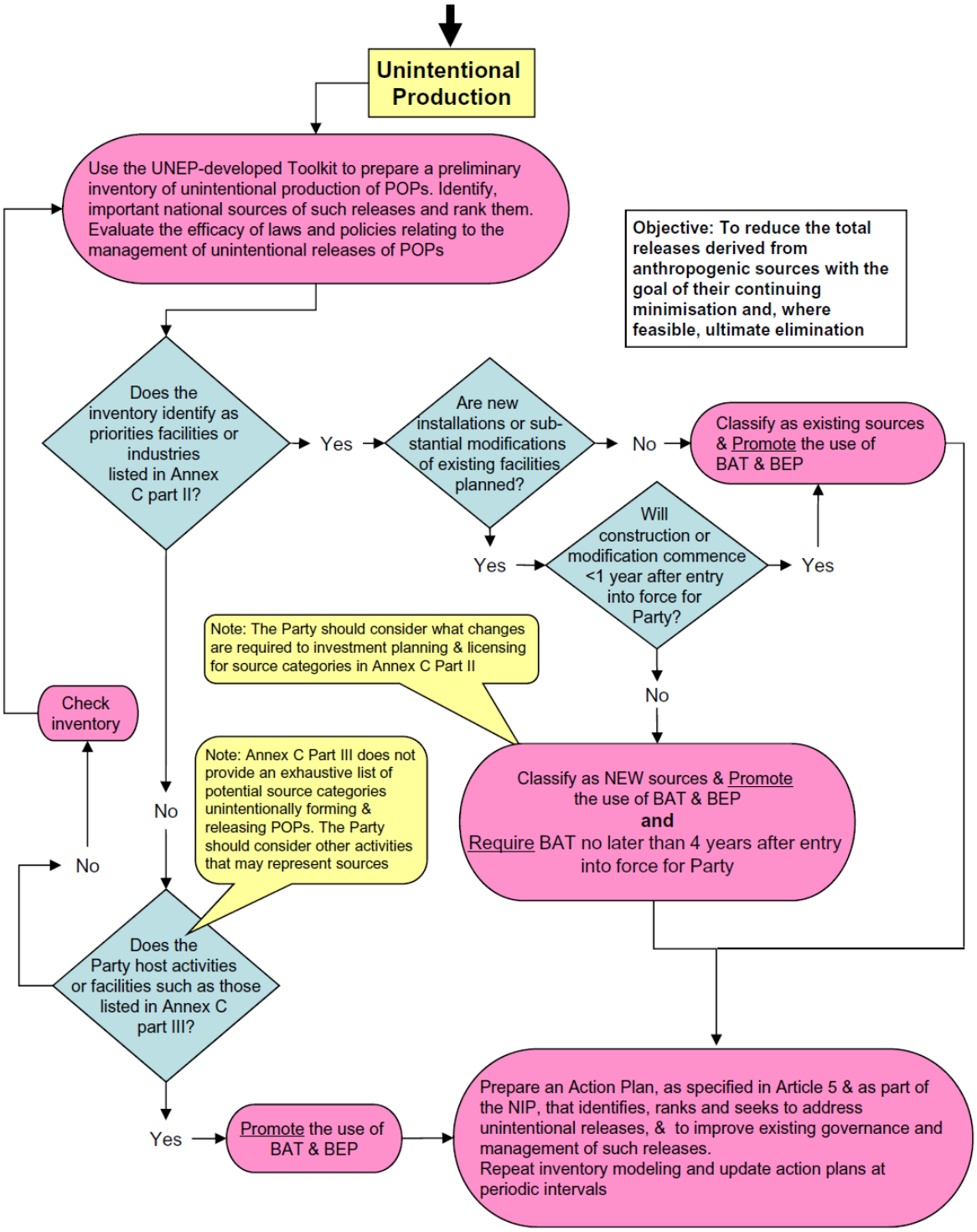


6.3.2 Intentionally produced POPs:
PCBs (Use of equipment contaminated with PCBs)

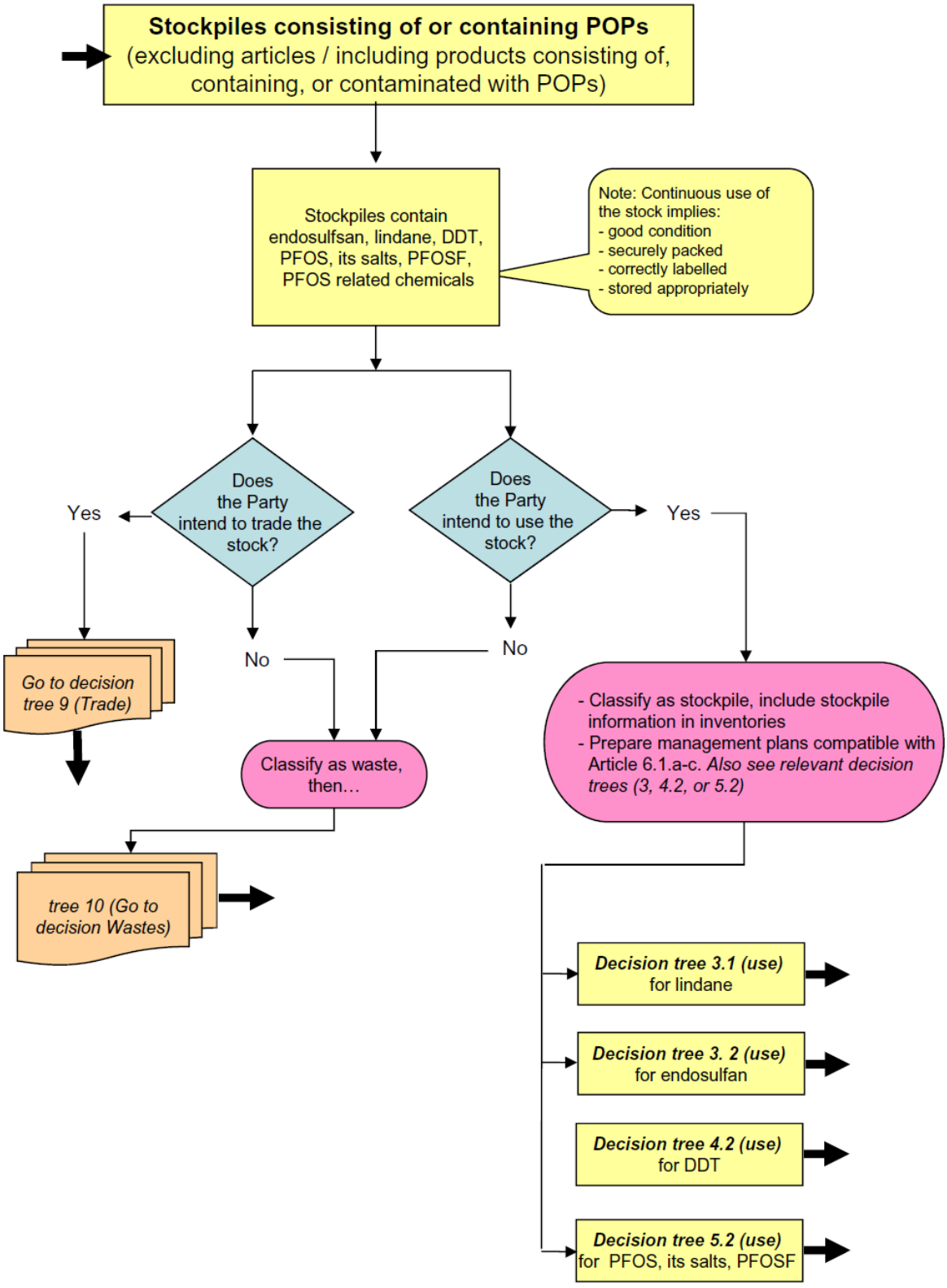


7. Unintentionally produced POPs

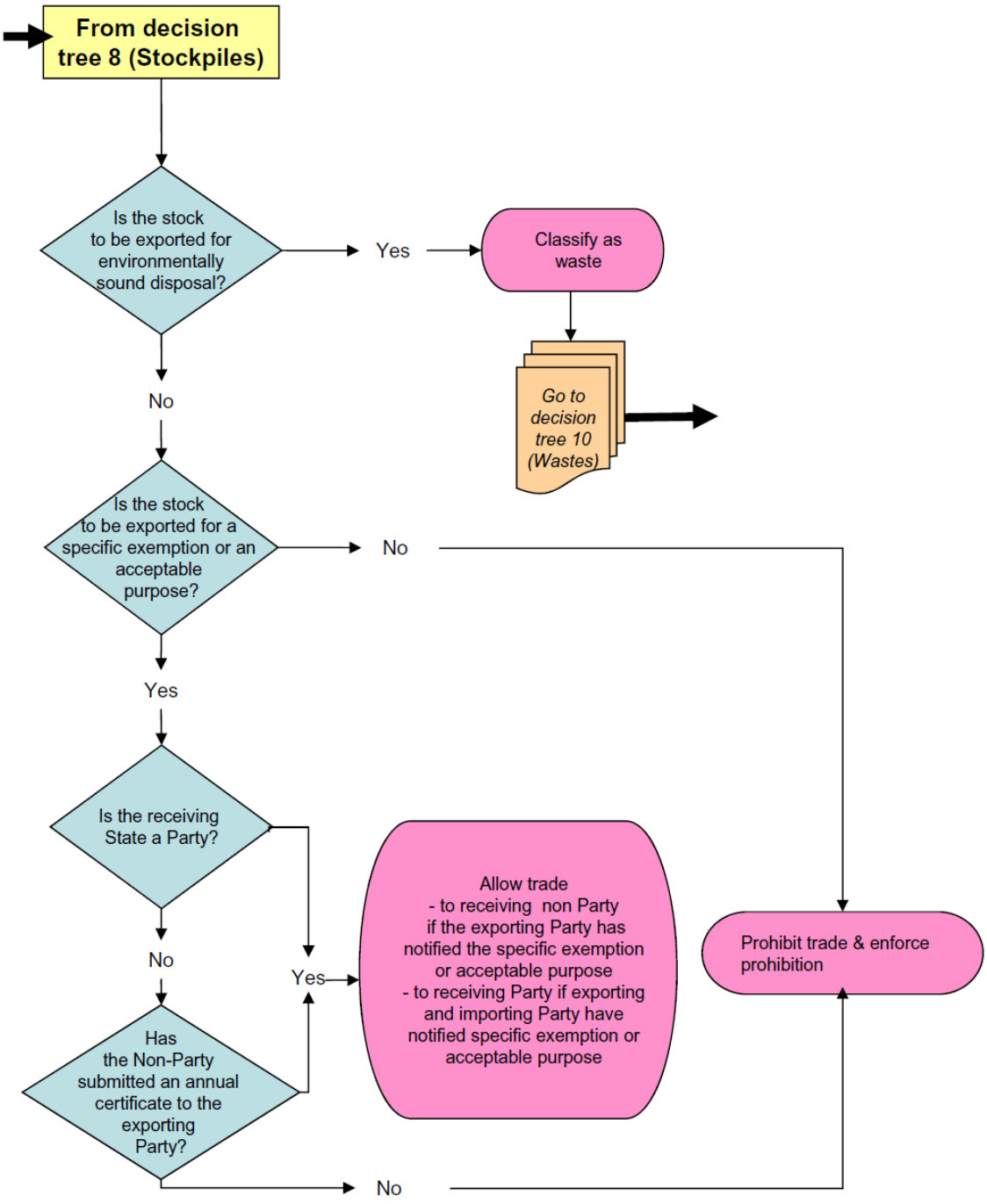
HCB, pentachlorobenzene, PCBs, PCDDs/PCDFs



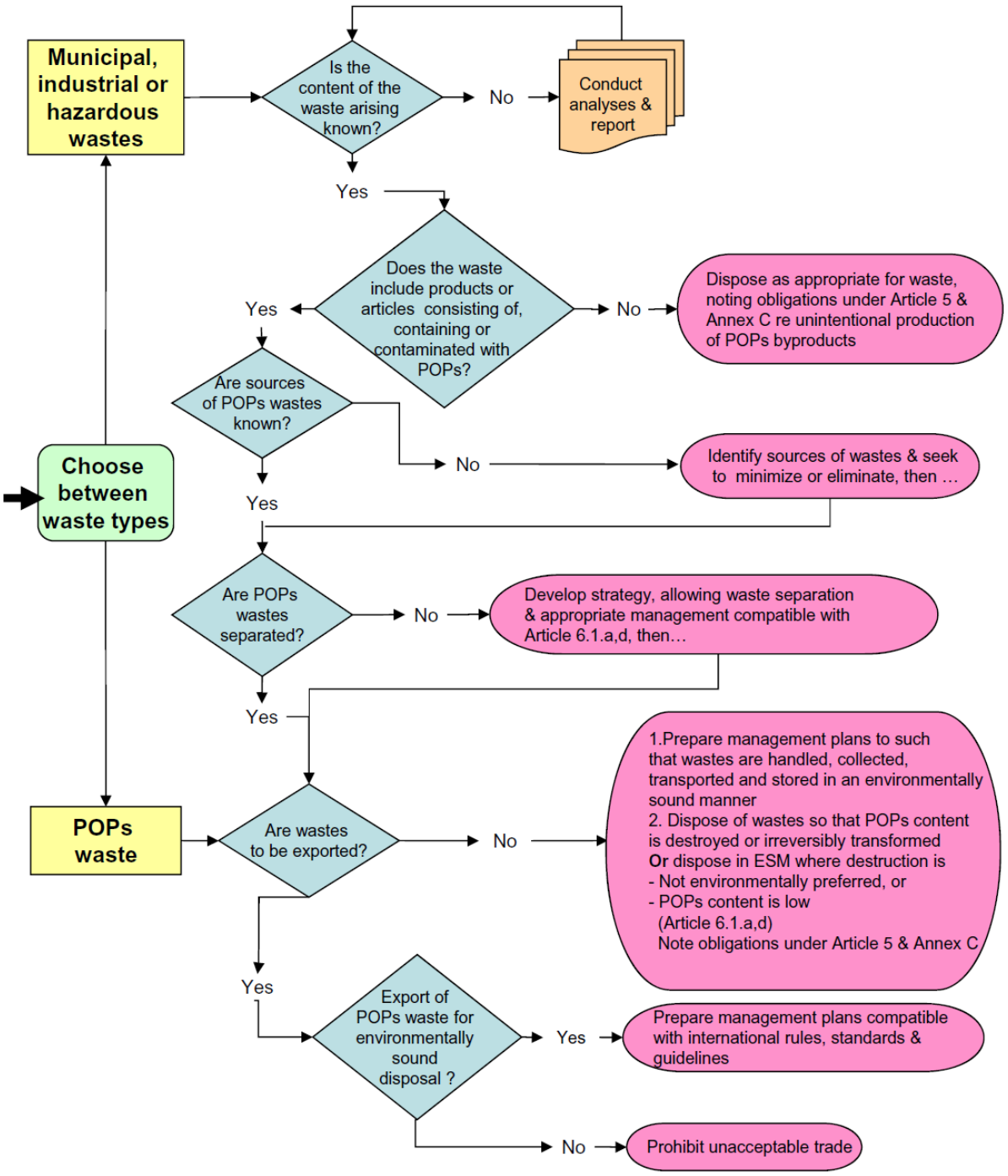
8. Stockpiles



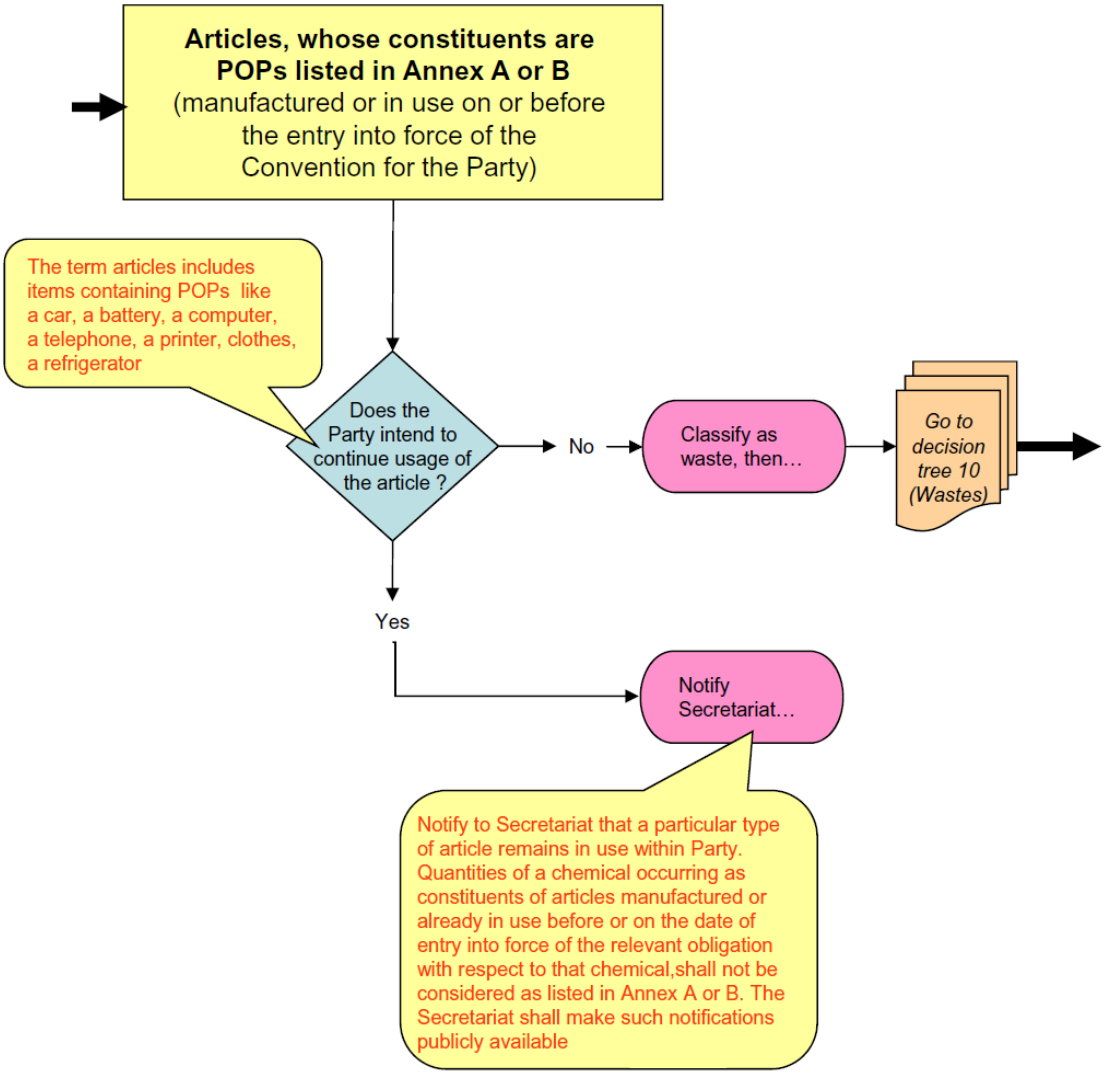
9. Trade


From decision tree 8 (Stockpiles)
Is the stock to be exported for environmentally sound disposal?
Yes
Classify as waste
Go to decision tree 10 (Wastes)
No
Is the stock to be exported for a specific exemption or an acceptable purpose?
No
Yes
Is the receiving State a Party?
No
Yes
Has the Non-Party submitted an annual certificate to the exporting Party?
Allow trade
- to receiving non Party if the exporting Party has notified the specific exemption or acceptable purpose
- to receiving Party if exporting and importing Party have notified specific exemption or acceptable purpose
No
Prohibit trade & enforce prohibition

10. Wastes


Municipal, industrial or hazardous wastes
Is the content of the waste arising known?
No
Conduct analyses & report
Yes
Does the waste include products or articles consisting of, containing or contaminated with POPs?
Yes
No
Dispose as appropriate for waste, noting obligations under Article 5 & Annex C re unintentional production of POPs byproducts
Are sources of POPs wastes known?
No
Identify sources of wastes & seek to minimize or eliminate, then …
Choose between waste types
Yes
Are POPs wastes separated?
No
Develop strategy, allowing waste separation & appropriate management compatible with Article 6.1.a,d, then…
Yes
POPs waste
Are wastes to be exported?
No
1.Prepare management plans to such that wastes are handled, collected, transported and stored in an environmentally sound manner
2. Dispose of wastes so that POPs content is destroyed or irreversibly transformed
Or dispose in ESM where destruction is
- Not environmentally preferred, or
- POPs content is low
(Article 6.1.a,d)
Note obligations under Article 5 & Annex C
Yes
Export of POPs waste for environmentally sound disposal ?
Yes
Prepare management plans compatible with international rules, standards & guidelines
No
Prohibit unacceptable trade

11. Articles containing POPs



Annex 3: Guidance on Action Plan Development for Sound Chemicals Management

Available at :

https://cwm.unitar.org/national-profiles/publications/cw/pops/AP_Guidance_01_Apr_09_en.pdf

Guidance on Action Plan Development for Sound Chemicals Management

Guidance Document

March 2009 Edition

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